Appendix A Notice of Preparation

Appendices

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City of Brea
Notice of Preparation
of a Draft Environmental Impact Report
for the Brea 265 Specific Plan
and Notice of Scoping Meeting

Date: December 14, 2018

Subject: Notice of Preparation (NOP) and Scoping Meeting for the Brea 265 Specific Plan Draft Environmental Impact Report (EIR)

To: State Clearinghouse, Responsible and Trustee Agencies, Interested Individuals and Organizations

Lead Agency: City of Brea, Planning Division

Project Title: Brea 265 Specific Plan

NOTICE IS HEREBY GIVEN that the City of Brea will prepare an environmental impact report (EIR) for the Brea 265 Specific Plan. The City is the lead agency for the project. The purpose of this notice is to (1) serve as a Notice of Preparation of an EIR pursuant to the California Environmental Quality Act (CEQA) Guidelines § 15082, (2) advise and solicit comments and suggestions regarding the scope and content of the EIR to be prepared for the project, and (3) notice the public scoping meeting.

NOTICE OF PREPARATION: The City of Brea, as Lead Agency, requests that responsible and trustee agencies respond in a manner consistent with § 15082(b) of the CEQA Guidelines. Pursuant to CEQA §21080.4, responsible agencies must submit any comments in response to this notice no later than 30 days after receipt. The extended public review period will commence on Friday, December 14, 2018, and will close on Wednesday, January 23, 2019. A copy of the NOP is available for review at the City of Brea offices and at the Brea Branch of the Orange County Public Library.

City of Brea – Planning Division, Level 3
1 Civic Center Circle
Brea, CA 92821

Brea Library
1 Civic Center Circle, Level 1
Brea, CA 92821

The document can also be viewed electronically on the City's webpage at:
https://www.cityofbrea.net/projectsinprocess

WRITTEN COMMENTS: We ask that any person wishing to comment on the NOP provide written comments by the end of the public review period at 5:00 p.m., January 23, 2019, addressed to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at maribethT@cityofbrea.net, or by mail to the City of Brea at the address above.

PUBLIC SCOPING MEETING: The City will hold a scoping meeting in conjunction with this NOP in order to present the project and the EIR process, and to provide an opportunity for agency representatives and the public to assist the lead agency in determining the scope and content of the environmental analysis for the EIR. The public scoping meeting will be an open house format and held during the time and location listed below:

Date: January 16, 2019
Time: 5:00 p.m. – 7:00 p.m.
Location: City of Brea City Hall, Community Room B
1 Civic Center Circle
Brea, CA 92821

PROJECT LOCATION: The Project Site consists of a 260-acre site located in the City of Brea and City's Sphere of Influence, north of State Route 90 (SR-90) and east of State Route 57 (SR-57). The 43-acre portion of the Project Site is in the incorporated City of Brea, and 217-acre portion of the Project Site is in the City's Sphere of Influence area.

The project site is located to the south of Lambert Road/Carbon Canyon Road, north of Rose Drive, east of Valencia Avenue and west of Carbon Canyon Regional Park, as shown on Figure 1. The Specific Plan area is bisected by Valencia Avenue which runs in a north-south direction, and by Lambert Road which runs in an east-west direction.

EXISTING CONDITIONS: The Project Site is generally bordered by residential uses to the west and north. A small area devoted to oil operations and open space is also to the north. The Olinda Elementary School, the Brea Sports Park, and the mixed-use community of La Floresta are adjacent to the site's southern border. Carbon Canyon Regional Park and the Carbon Canyon Dam are adjacent to the site's eastern border.

The 260-acre Project Site is an active oil operations site operated by Aera Energy, with the exception of the southern agricultural area. The Project Site has been used for oil production continuously since the early 1900s. Of the approximately 190 wells drilled on the site 110 remain in operation and produce approximately 500 barrels per day. The majority of the site is relatively flat with elevations gradually increasing in the north-eastern portions of the project, falling into the 0-10% slope range.

GENERAL PLAN AND ZONING: The Project Site is designed as Hillside Residential and Low Density Residential by the General Plan, and zoned HR Hillside Residential and R-1 Single-Family Residential.

PROJECT DESCRIPTION: The Brea 265 Specific Plan proposes a master planned residential community of low-, medium-, and high-density residential neighborhoods, parks, recreational amenities and open space, linked together by an extensive trail network that connects to the Tracks at Brea and other regional systems. At buildout, the Proposed Project would provide 301 low density units, 273 medium-density units, and 526 high-density units, totaling 1,100 units with an overall average density of approximately 4 dwelling units per acre, provide 18.1 acres of parks/recreations uses and 55.7 acres of open space. The proposed land use summary is shown in Table 1. The Conceptual Land Use Plan is shown on Figure 2. One of the fundamental design principles of the Proposed Project would be to create a walkable environment integrated with parks, open space, and trails, while providing a diverse, multi-generational housing choices, a pedestrian focused public realm, sustainable site planning, landscaping and building design elements, and natural open space preservation.

Table 1 Proposed Land Use Summary

Land Use	Acreage (Acres)	Density Range	Units
Low Density Residential	77.7	1 – 6 du/ac	301
Medium Density Residential	28.0	6.1 – 12.0 du/ac	273
High Density Residential	54.3	12.1 – 24.99 du/ac	526
Parks/Paseo/Parkways	18.1	--	--
Open Space/Slopes	55.7	--	--
Master Plan Roadways	26.2	--	--
Total	260.0	n/a	1,100 Units

Once the project entitlements are complete, all on-site oil operations would be discontinued and abandoned, and wells and production facilities would be remediated in accordance with Federal, State and local regulations. No residual oil operations will remain in the proposed residential community. The Proposed Project would change the current land use designations to ”Brea 265 Specific Plan.”

POTENTIAL ENVIRONMENTAL EFFECTS: As authorized by the State CEQA Guidelines, based on preliminary review, the City determined that it would prepare an EIR for the Proposed Project, and therefore it is beginning work directly on the EIR process and will focus on potentially significant effects of the Proposed Project in that EIR, while briefly indicating the reasons that other effects will not be potentially significant. An Initial Study is not required to determine that an EIR will be prepared and is therefore not attached. The City EIR will discuss potential environmental impacts of the Proposed Project including potential pre-construction, construction, and operations impacts. The EIR will analyze the following topics in detail: Aesthetics, Agricultural and Forestry Resources, Air Quality, Biological Resources, Cultural Resources, Geology/Soils, Greenhouse Gas Emissions, Hazards & Hazardous Materials, Hydrology/Water Quality, Land Use/Planning, Mineral Resources, Noise, Population and Housing, Public Services, Recreation Transportation/Traffic, Tribal Cultural Resources, Utilities/Service Systems, and Energy.

The Draft EIR will address the short- and long-term effects of the Proposed Project on the environment. Mitigation measures will be proposed for impacts that are determined to be potentially significant. A mitigation monitoring program will also be developed for any mitigation measures incorporated in the analysis. In addition, the Draft EIR will describe a range of reasonable alternatives to the Proposed Project, or to its location, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.

SCOPING REVIEW PERIOD: This NOP will be available for an extended review from December 14, 2018, to January 23, 2019 on the City’s website at www.cityofbrea.net/projectsinprocess. Hardcopies will be available at the Community Development Counter, 3rd Floor and the Brea Library, 1 Civic Center Circle, Brea, CA 92821

Date: December 14, 2018

Signature:

_____

Maribeth Tinio, Senior Planner

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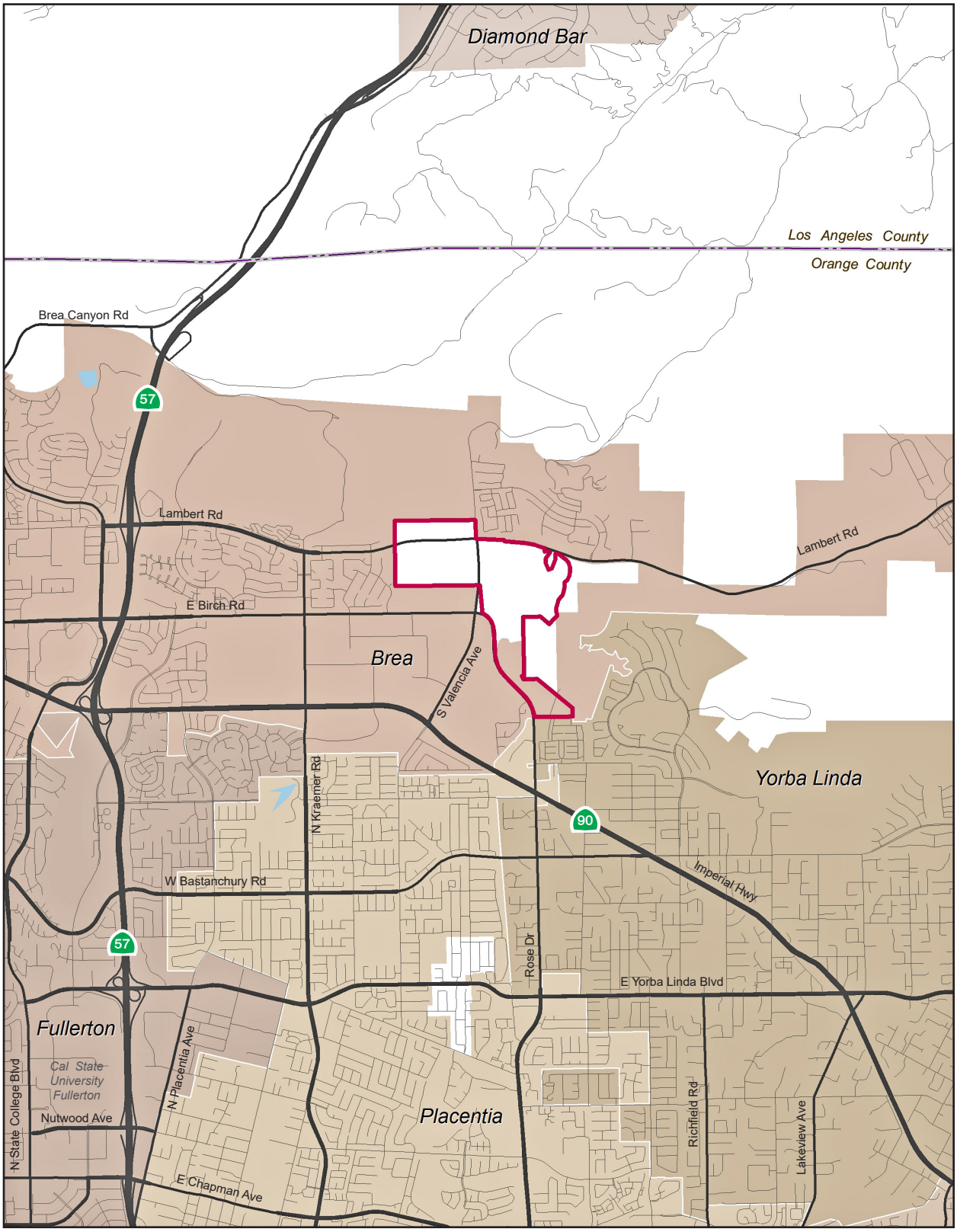
Figure 1 - Local Vicinity



Specific Plan Boundary

Note: Unincorporated county areas are shown in white.

Source: ESRI, 2018

0 4,000
Scale (Feet)

PlaceWorks

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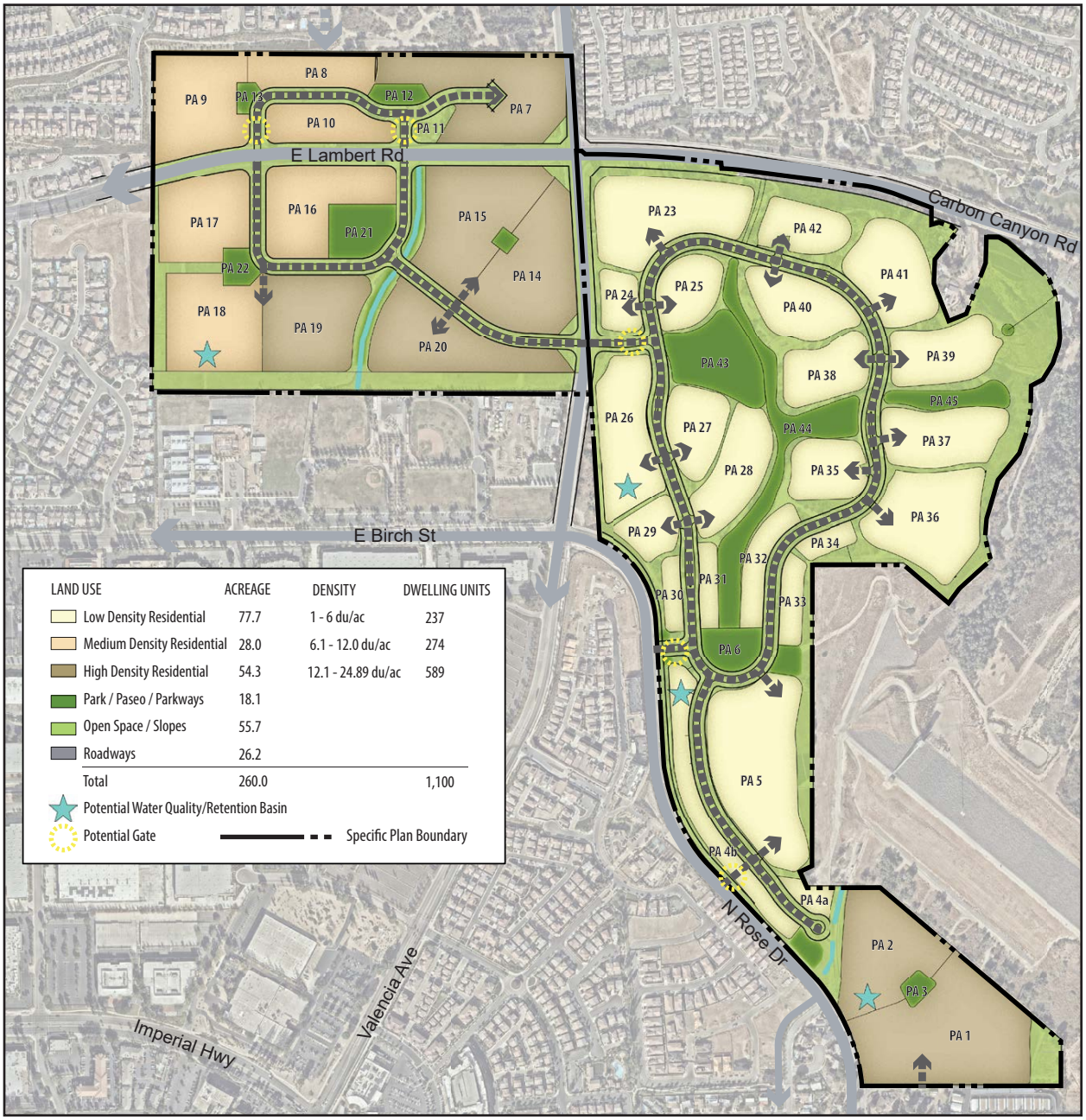
Figure 2 - Conceptual Land Use Plan



0 1,000
Scale (Feet)

Source: Forma, 2018

PlaceWorks

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Appendix B NOP Comments

Appendices

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OC PublicWorks
Integrity, Accountability, Service, Trust
Shane L. Silsby, Director

January 24, 2019 NCL-18-062

Maribeth Tinio, Senior Planner
City of Brea – Planning Division
1 Civic Center Circle
Brea, CA 92821

Subject: Notice of Preparation and Notice of Scoping Meeting for the Brea 265 Specific Plan Draft Environmental Impact Report

Dear Ms. Maribeth Tinio:

Thank you for the opportunity to comment on the Notice of Preparation and Notice of Scoping Meeting for the Brea 265 Specific Plan Draft Environmental Impact Report (EIR). The County of Orange offers the following comments for your consideration.

OC Infrastructure Programs /Flood Programs/Hydrology

1. The Draft EIR for the proposed project must clearly identify the possible impacts to Orange County Flood Control District (OCFCD) facilities. Carbon Canyon Channel (Facility No. E03), and Loftus Diversion Channel (Facility No. A06) are in the subject project's vicinity. Please be advised that the mentioned channels contain deficient segments that are not capable of conveying runoff from the 100-year storm event. The potential development sites should not worsen existing conditions or shift flooding problems upstream or downstream of proposed developments. Appropriate mitigation measures should be provided to address adverse impacts, and minimize increased runoff resulting from the project.

2. The hydrology and hydraulic impacts resulting from the project must be assessed. These analyses of possible impacts to OCFCD's existing facilities and appropriate mitigation measures should be conducted in consultation with OC Public Works/OC Infrastructure Programs. The analyses must be consistent with the prevailing criteria of the Orange County Hydrology Manual (OCHM), Addendum No. 1 to the OCHM, the Orange County Flood Control Design Manual, the Orange County Local Drainage Manual, and other related design criteria.

3. The City of Brea and County of Orange, as floodplain administrators, should ensure that floodplains are properly identified and that structures are located outside the FEMA 100-year floodplain, or designed in conformance with local

floodplain ordinances, and Federal Emergency Management Agency (FEMA) regulations.

4. All work within or adjacent to any OCFCD right-of-way for flood control facilities shall be conducted so as not to adversely impact the channel's structural integrity, hydraulic flow conditions, access and maintainability. Furthermore, all proposed projects within OCFCD's right-of-way should be reviewed and approved by OC Public Works, and the work should be conducted only after an encroachment permit has been obtained. For information regarding the permit application process and other details, please refer to the Encroachment Permits Section link on OC Public Works' website located at http://www.ocpublicworks.com/ds/permits/encroachment_permits. Technical reviews and approvals for the proposed work will be accomplished within the permit process.

OC Environmental Resources - North Orange County Watershed Management Area

1. Potential long-term water quality impacts of such project elements should be evaluated in accordance with provisions outlined in Section 7 of the County of Orange Drainage Area Management Plan (DAMP) (http://ocwatersheds.com/documents/wqmp). At a minimum, the following information are to be provided:

   i. Description of project characteristics with respect to water quality issues, such as project site location in a given watershed, site acreage, known soil contamination, known groundwater contamination, and anticipated change in percent impervious surface area.

   ii. Identification of receiving waters. The EIR should identify all downstream receiving waters that may receive contributory runoff from the project site.

   iii. Description of the sensitivity of the receiving waters. In particular, the EIR should identify Areas of Special Biological Significance, water bodies with Total Maximum Daily Loads (TMDLs), and Clean Water Act Section 303(d) list of impaired water bodies.

   iv. Characterization of the potential water quality impacts from the proposed project and identification of the anticipated pollutants to be generated by the project.

   v. Identification of downstream hydrologic conditions of concern that may be affected by project-related changes in runoff volume and velocity; sediment load, makeup or characteristics; reduced infiltration; and/or increased flow, frequency, duration, and peak(s) of storm runoff.

   vi. Evaluation of thresholds of significance.

vii. Assessment of project impact significance to water quality.

viii. If the proposed project has the potential to create a new significant stormwater discharge to a water body with an established TMDL, the EIR should consider quantitative analysis of the anticipated pollutant loads in the stormwater discharges to the receiving waters.

ix. A reasonable analysis of the cumulative impacts of the proposed project together with past, present and reasonably anticipated future projects (related projects) that could produce cumulative impacts together with the proposed project.

x. Mitigation for long-term impacts in accordance with the 2017 Model Water Quality Management Plan (WQMP) and 2017 Technical Guidance Document (TGD) (http://www.ocpublicworks.com/ds/water). Please note that hydromodification exemptions for projects discharging to or through large rivers or engineered channels are not currently allowed. These exemptions are referenced in the TGD and Hydromodification Management Plan; however, they should be disregarded at this time.

2. Projects that, as part of a common plan of development, disturb one or more acres are required to obtain coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order 2009-0009-DWQ (As amended by 2010-0014-DWQ and 2012-0006-DWQ), adopted on September 2, 2009.

3. On June 2, 2017, the Santa Ana Regional Board issued an Order pursuant to California Water Code section 13383, which required Municipal Separate Storm Sewer Systems (MS4) Permittees to take initial steps in planning for the implementation of the Trash Amendments. The first of these steps was to submit a written notice stating the MS4 Permittee's selection of the Track 1 or Track 2 compliance pathway. The City of Brea selected Track 1; therefore, the City should consider this as it designs BMPs for the project.

OC Parks

1. Drainage – How will the drainage for the Brea 265 development project, specifically the west side of park above the maintenance road, be sufficiently addressed to ensure that the park is not impacted?

2. Defensible Space Clearance – For the area between the Home Owners Association (HOA) and Carbon Canyon Regional Park, defensible space clearance should be at minimum 100 feet per OCFA standards. Maintenance of fuel modification area to be completed by HOA.

3. Construction of the development – Where is the planned construction staging area? What, if any, impact will there be on the public accessing the regional park from Carbon Canyon Road?

4. Fencing/Access – Fencing along HOA and Carbon Canyon Regional Park must be constructed in a way that would not allow for homeowners to create independent gates and access into the park. Fencing to be approved by OC Parks, as well as language added to HOA by-laws prohibiting private access/gates into the park from private residents. Additionally, HOA by-laws should indicate authorized access points and trailheads.

5. Regional Trails – There are several planned regional bikeway and trail opportunities per the County's General Plan Transportation and Recreation Elements. The easterly planned regional bikeway actually terminates at the project site, providing opportunities for the City and developer to work with the County to ensure regional bikeway and trail requirements are met per the General Plan.

OC Infrastructure Programs, Traffic Engineering

1. Please provide a copy of the subject EIR Traffic Study to OC Traffic Engineering when it becomes available.

If you have any questions regarding these comments, please contact Penny Lew at (714) 647-3990 or Sahar Parsi at (714) 647-3988 in OC Flood Programs/Hydrology & Floodplain Management, Matt Tucker at (714) 955-0669 in OC Environmental Resources - North Orange County Watershed Management Area, Eric Hull at (949) 585-6446 in OC Parks, Jamie Reyes at (714) 647-3903 in OC Infrastructure Programs, Traffic Engineering or Cindy Salazar at (714) 667-8870 in OC Development Services.

Sincerely,

Richard Vuong, Manager, Planning Division
OC Public Works Service Area/OC Development Services
300 North Flower Street
Santa Ana, California 92702-4048
Richard.Vuong@ocpw.ocgov.com

cc: Penny Lew, OC Flood Programs/Hydrology & Floodplain Management
Sahar Parsi, OC Flood Programs/Hydrology & Floodplain Management
Matt Tucker, OC Environmental Resources - North Orange County Watershed Management Area
Eric Hull, OC Parks
Jamie Reyes, OC Infrastructure Programs, Traffic Engineering

DEPARTMENT OF TRANSPORTATION
DISTRICT 12
1750 EAST FOURTH STREET, SUITE 100
SANTA ANA, CA 92705
PHONE (657) 328-6368
FAX (657) 328-6510
TTY 711
www.dot.ca.gov

Making Conservation a California Way of Life.

January 23, 2019

Maribeth Tinio
City of Brea
Planning Division, Level 3
1 Civic Center Circle
Brea, CA. 92821

File: IGR/CEQA
SCH# 2018121035
12-ORA-2018-01045
Brea 265 Specific Plan

Dear Ms. Tinio,

Thank you for including the California Department of Transportation (Caltrans) in the review of the Notice of Preparation (NOP) for an Environmental Impact Report (EIR), for the Brea 265 Specific Plan, for the City of Brea. The mission of Caltrans is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

The Brea 265 Specific Plan proposes a master planned residential community of low-, medium-, and high-density residential neighborhoods, parks, recreational amenities and open space, linked together by an extensive trail network that connects to the Tracks at Brea and other regional systems. At build-out, the proposed project would provide 301 low density units, 273 medium-density units, and 526 high-density units, totaling 1,100 units with an overall average density of approximately 4 dwelling units per acre, provide 18.1 acres of parks/recreations uses and 55.7 acres of open space.

The project site consists of a 260-acre site located in the City of Brea, north of State Route (SR) 90, south and adjacent of SR 142, and east of SR 57. The 43-acre portion of the project site is in the incorporated City of Brea, and 217-acre portion of the project site is in the City's Sphere of Influence area. The project site is located to the south of Lambert Road/Carbon Canyon Road/SR 142, north of Rose Drive, east of Valencia Avenue and west of Carbon Canyon Regional Park. The specific plan area is bisected by Valencia Avenue which runs in a north-south direction, and by Lambert Road which runs in an east-west direction.
The project lies directly adjacent to SR 142, which is overseen by Caltrans. With Caltrans being a responsible agency, we have the following comments:

Traffic Operations Comments:

1. Please provide the Traffic Analysis and Queue Analysis for all ramps to SR-142 & SR-57.

2. Please provide the Traffic Management Plan (TMP) for Caltrans to review and comments.
3. Submit all works within Caltrans Right of Way to the Permit Branch for review & comment.
4. Please use HCM 2010 for Caltrans signals analysis.

System Planning

1. Please ensure there are adequate connections to the bicycle network near the Project site. This will increase regional connectivity since there are several existing and planned bicycle facilities nearby, including a proposed section of the OC Loop.

LD-IGR

2. For all projects resulting in 0.4 hectares (1 acre) or more of soil disturbance or otherwise subject to the NPDES program, the Contractor will develop, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) conforming to the requirements of the Caltrans Specification Section, "Water Pollution Control", the Department's Statewide NPDES Permit, the General NPDES Permit for Construction Activities, and the Storm Water Quality Handbooks "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual", and "Construction Site Best Management Practices (BMPs) Manual", and subsequent revisions. In addition, the SWPPP must conform to the requirements of the SWRCB Resolution No. 2001-046, the Sampling and Analytical Procedures (SAP) Plan.

3. Any work performed within Caltrans right-of-way (R/W) will require discretionary review and approval by Caltrans, and an encroachment permit will be required for any work within the Caltrans R/W prior to construction.

Please continue to coordinate with Caltrans for any future developments that could potentially impact State transportation facilities. If you have any questions, do not hesitate to contact Julie Lugaro at 657-328-6368 or Julie.lugaro@dot.ca.gov.

Sincerely,

SCOTT SHELLEY
Branch Chief, Regional-IGR-Transit Planning
District 12

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

CITY OF YORBA LINDA

4845 CASA LOMA AVENUE • YORBA LINDA • CALIFORNIA 92886

January 23, 2019

Ms. Maribeth Tinio, Senior Planner
Brea Planning Division, Level 3
1 Civic Center Circle
Brea, CA 92821

Subject: City of Yorba Linda Comments Regarding the Notice of Preparation for the Brea 265 Specific Plan Project

Dear Ms. Tinio:

The City of Yorba Linda has reviewed the Notice of Preparation (NOP) for the Brea 265 Specific Plan Project issued by the City of Brea on December 14, 2018. The NOP is the first step in the CEQA/land use approval process for the proposed development project. The purpose of the NOP is to solicit early input from the community on the scope and content of environmental review for the project The City of Yorba Linda understands the proposed Specific Plan consists of a master planned residential community of low-, medium-, and high-density residential neighborhoods, parks, recreational amenities and open space, linked together by an extensive trail network that connects to the Tracks at Brea and other regional systems. At build-out, the project would include 301 low-density units, 273 medium-density and 526 high-density units, totaling 1,100 units, with an overall average density of approximately 4 dwelling units per acre, provide 18.1 acres of parks/recreation uses and 55.7 acres of open space. The project site, owned by Aera Energy, is located on 260 acres of vacant land currently under oil production, with the exception of the southerly portion which presently is under agricultural production (i.e., Manassero Farms). The site is generally west and northwest of N. Rose Drive/ E. Birch Street, north of Blake Road, and north and south of E. Lambert Road/Carbon Canyon Road as reflected below. The project abuts the City of Yorba at its northwesterly corner, just west of the Vista Del Verde master planned residential community. As such, the City has identified several environmental concerns that potentially could affect Yorba Linda residents, infrastructure, and/or resources that should be addressed within the Draft Environmental Impact Report (EIR). These concerns are described in detail below.

- Traffic and Circulation: Impacts related to access and circulation along Rose Drive must be addressed in detail within the Draft EIR. Based on information provided within the NOP, access to the project site would be provided at two points along Rose Drive, east of Valencia Avenue. Traffic impacts related to the proposed 1,100 dwelling units on Rose Drive and other proximal local roadways and intersections within the City of Yorba Linda must be quantitatively addressed based on the City of Yorba Linda's thresholds of significance. Excessive speed has been well documented along Rose Drive due to the vertical curve at the common boundary of Brea/Yorba Linda. The Draft EIR should consider the effect of the proposed project's access points along this segment of Rose on vehicles speeds and consider signalization and/or other traffic calming measures to mitigate excessive travel speeds. The Draft EIR must also determine roadway and/or intersections impacts along Rose Drive, Imperial Highway, and Yorba Linda Boulevard, among other potentially affected roadways. In particular, the analysis should consider what additional east and westbound 91 Freeway commuter "cut-through" traffic (that presently

diverts via Carbon Canyon Road as an alternate route to the 91 Freeway) may be encouraged to alternately divert through the City of Yorba Linda upon project build out via Rose Drive, Imperial Highway, La Palma Avenue and Gypsum Canyon Road due to increased project-related congestion at the intersection of Valencia Avenue and Lambert Road/Carbon Canyon Road.

- Aesthetics and Landform Impacts: The Brea 265 project would construct higher density residential development (PAs-1 and 2 @ 12-25 du/ac) within a visually prominent area at the base of the Carbon Canyon Dam, Carbon Canyon Park and the Redwood Grove. The Draft EIR should provide a detailed discussion of the visual impacts of the project as viewed from existing the Park and Redwood Grove, as well as residential uses within Vista Del Verde to the immediate east. Changes in the aesthetic environment pertaining to scenic vistas and visual character should be addressed as required under the CEQA Guidelines. The provision of visual simulations from key public viewpoints within the City of Yorba Linda (e.g., Vista Del Verde) may also be helpful in disclosing aesthetic impacts related to the project.

- Recreational Resources Impacts: A network of recreational trails is proposed as part of the Brea 265 project. The Draft EIR should identify opportunities to link proposed trails within the project to existing trails within the City of Yorba Linda to provide an expanded network of regional trails for the benefit of residents within both communities. Coordination of trails wherever there are opportunities to do so is encouraged.

The City of Yorba Linda appreciates the opportunity to provide input regarding the scope of the Draft EIR for the Brea 265 Project. We request that the City of Brea provide the City of Yorba Linda with the Draft EIR upon commencement of the public review period. The City of Yorba Linda also requests to be informed of any public meetings and/or public hearings for the project. Should you have any questions regarding the City's comments on the NOP, please contact David Brantley, AICP, Community Development Director at 714/961-7130 or dbrantley@yorba-linda.org.

Sincerely,

David Brantley

David Brantley, AICP
Community Development Director
City of Yorba Linda

c: Yorba Linda City Council Members
Mark Pulone, City Manager
Todd Litfin, City Attorney

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

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LOS ANGELES, CALIFORNIA 90063-3294
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RECEIVED
JAN 23 2019
PLANNING DIVISION

January 16, 2019

Maribeth Tinio, Senior Planner
City of Brea
Planning Division, Level 3
1 Civic Center Circle
Brea, CA 92821

Dear Ms. Tinio:

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT, "BREA 265 SPECIFIC PLAN," PROPOSES A MASTER PLANNED RESIDENTIAL COMMUNITY OF LOW, MEDIUM, AND HIGH-DENSITY RESIDENTIAL NEIGHBORHOODS, PARKS, RECREATIONAL AMENITIES AND OPEN SPACE, LINKED TOGETHER BY AN EXTENSIVE TRAIL NETWORK THAT CONNECTS TO THE TRACKS AT BREA AND OTHER REGIONAL SYSTEMS, BREA, FFER 201800145

The Notice of Preparation of a Draft Environmental Impact Report has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department.

The following are their comments:

PLANNING DIVISION:

The subject property is entirely within the City of Brea which is not a part of the emergency response area of the Los Angeles County Fire Department (also known as the Consolidated Fire Protection District of Los Angeles County). Therefore, this project does not appear to have any impact on the emergency responsibilities of this Department.

LAND DEVELOPMENT UNIT:

This project is located entirely in the City of Brea. Therefore, the City of Brea Fire Department has jurisdiction concerning this project and will be setting conditions.

This project is located in close proximity to the jurisdictional area of the Los Angeles County Fire Department. However, this project is unlikely to have an impact that necessitates a comment concerning general requirements from the Land Development Unit of the Los Angeles County Fire Department.

Should any questions arise regarding this report, please contact the County of Los Angeles Fire Department Land Development Unit's, SFPEA Claudia Soiza at (323) 890-4243 or Claudia.Soiza@fire.lacounty.gov.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

This project is located entirely in the City of Brea. The County of Los Angeles Fire Department's Forestry Division has no further comments regarding this project.

HEALTH HAZARDOUS MATERIALS DIVISION:

The Health Hazardous Materials Division of the Los Angeles County Fire Department has no comments or requirements for the project at this time.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

MICHAEL Y. TAKESHITA, ACTING CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

MYT:ac

ORANGE COUNTY LAFCO
EST. 1963

January 16, 2019

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DEREK J. MCGREGOR
Representative of
General Public

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CHERYL BROTHERS
Councilmember
City of Fountain Valley

IMMEDIATE PAST CHAIR
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LISA BARTLETT
Supervisor
5th District

DR. ALLAN BERNSTEIN
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City of Tustin

DOUGLASS DAVERT
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ALTERNATE
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JAMES FISLER
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Mesa Water District

ALTERNATE
LOU PENROSE
Representative of
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MICHELLE STEEL
Supervisor
2nd District

CAROLYN EMERY
Executive Officer

Maribeth Tinio
Senior Planner
City of Brea, Planning Division
1 Civic Center Circle
Brea, CA 92821

RECEIVED
JAN 23 2019
PLANNING DIVISION

Subject: Notice of Preparation (NOP) of a Draft Environmental Impact Report for Brea 265 Specific Plan and Notice of Scoping Meeting

Dear Ms.Tinio:

On behalf of the Orange County Local Agency Formation Commission ("OC LAFCO"), we would like to thank you for this opportunity to provide written comments on the Notice of Preparation of a Draft Environmental Impact Report and Notice of Scoping Meeting prepared for the Brea 265 Specific Plan Project.

As you know, OC LAFCO seeks to serve the citizens of Orange County by facilitating constructive changes in governmental structure and boundaries through actions that resolve intergovernmental issues, by fostering orderly development and governance, and by promoting the efficient delivery of services. OC LAFCO also seeks to serve as a resource for local governments and citizens by providing a structure for sharing information among stakeholders in Orange County. To that end, we recognize the City of Brea's efforts to notify the public and public agencies of the Project under the California Environmental Quality Act ("CEQA"), and submit the following comments:

The City of Brea's Draft Environmental Impact Report should include municipal service responsibilities such as, police protection, fire protection, solid waste, library, animal control, code enforcement, education, maintenance of public facilities (e.g. roads, landscaping, street sweeping) and general government services.

In addition to the above, and as permitted under CEQA and the Ralph M. Brown Act, OC LAFCO requests that it be added to the mailing list for any and all notices related to the Project. This request specifically includes copies of any and all CEQA notices as well as any and all public meetings and/or hearing notices for the Project. The satisfaction of this written request is required both by CEQA (Public Resources Code, § 21092.2) and the Ralph M. Brown Act (Government Code, § 54954.1). Please send copies of any and all such notices to the following:

Orange County Local Agency Formation Commission
2677 N. Main Street, Suite 1050
Santa Ana, CA 92705
Attn: Gavin Centeno, Policy Analyst
Email: gcenteno@oclafco.org

Thank you again for your attention on this matter. Should you have any questions or concerns regarding this request, please contact Gavin Centeno at gcenteno@oclafco.org or 714-640-5100.

Sincerely,

Carolyn Emery
Executive Officer

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January 21, 2019

Ms. Maribeth Tinio
Senior Planner
City of Brea – Planning Division, Level 3
1 Civic Center Circle
Brea, CA 92821

Subject: **Brea 265 Specific Plan - Notice of Preparation of a Draft Environmental Impact Report**

Dear Ms. Tinio:

Thank you for providing the Orange County Transportation Authority (OCTA) with the Notice of Preparation of a Draft Environmental Impact Report for the Brea 265 Specific Plan (Specific Plan). The following comments are provided for your consideration:

Active Transportation

- OCTA has worked with Caltrans to improve the bikeway infrastructure along Carbon Canyon Road (SR-142). Staff recommends that the Specific Plan include improvements along both Lambert Road-Carbon Canyon Road and Valencia Avenue. This will provide bikeways consistent with City of Brea and County of Orange master plan documents.

- Please include plans to provide a paved off-road bikeway as identified on the County of Orange "Major Riding & Hiking Trails and Off-Road Paved Bikeways" map. This map includes both paved and unpaved trails along the project's easterly edge adjacent Carbon Canyon Regional Park. (http://www.ocparks.com/civicax/filebank/blobdload.aspx?BlobID=8223)

- New residential land use construction can provide an opportunity to encourage a variety of travel choices. OCTA encourages the Specific Plan include short- and long-term bicycle parking and bicycle facilities for residents and guests. Please consider a short-term parking ratio of one bicycle parking space for each four units, and inclusion of a secure ground floor indoor bicycle storage area for long-term bicycle parking.

Orange County Transportation Authority
550 South Main Street / P.O. Box 14184 / Orange / California 92863-1584 / (714) 560-OCTA (6282)

Master Plan of Arterial Highways (MPAH)

- Please note that Rose Drive, currently built as two lanes, is classified as a primary arterial highway that is planned for 4 lanes per its MPAH classification. The proposed Brea 265 Specific Plan should consider the planned buildout of Rose Drive, as it relates to potential future right-of-way needs. If there is a desire to amend the MPAH, please contact OCTA staff.

Throughout the development of this project, we encourage communication with OCTA on any matters discussed herein. If you have any questions or comments, please contact me at (714) 560-5683 or at clarwood@octa.net.

Sincerely,

Charles Larwood
Department Manager, Transportation Planning

SCAG
INNOVATING FOR A BETTER TOMORROW

SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS
900 Wilshire Blvd., Ste. 1700
Los Angeles, CA 90017
T: (213) 236-1800
www.scag.ca.gov

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January 22, 2019

Ms. Maribeth Tinio, Senior Planner
City of Brea, Planning Division
1 Civic Center Circle
Brea, California 92821
E-mail: maribethT@cityofbrea.net

RE: SCAG Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Brea 265 Specific Plan [SCAG NO. IGR9797]

Dear Ms. Tinio,

Thank you for submitting the Notice of Preparation of a Draft Environmental Impact Report for the Brea 265 Specific Plan ("proposed project") to the Southern California Association of Governments (SCAG) for review and comment. SCAG is the authorized regional agency for Inter-Governmental Review (IGR) of programs proposed for Federal financial assistance and direct Federal development activities, pursuant to Presidential Executive Order 12372. Additionally, SCAG reviews the Environmental Impact Reports of projects of regional significance for consistency with regional plans pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.

SCAG is also the designated Regional Transportation Planning Agency under state law, and is responsible for preparation of the Regional Transportation Plan (RTP) including the Sustainable Communities Strategy (SCS) pursuant to Senate Bill (SB) 375. As the clearinghouse for regionally significant projects per Executive Order 12372, SCAG reviews the consistency of local plans, projects, and programs with regional plans.[1] SCAG's feedback is intended to assist local jurisdictions and project proponents to implement projects that have the potential to contribute to attainment of Regional Transportation Plan/Sustainable Community Strategies (RTP/SCS) goals and align with RTP/SCS policies.

SCAG staff has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Brea 265 Specific Plan in Orange County. The proposed project includes 1,100 low-, medium- and high-density units, 18.1 acres of parks/recreational uses, and 55.7 acres of open space on a 260 acre project site.

When available, please send environmental documentation to *SCAG's Los Angeles office in Los Angeles (900 Wilshire Boulevard, Ste. 1700, Los Angeles, California 90017) or by email to au@scag.ca.gov* providing, at a minimum, the full public comment period for review.

If you have any questions regarding the attached comments, please contact the Inter-Governmental Review (IGR) Program, attn.: Anita Au, Associate Regional Planner, at (213) 236-1874 or au@scag.ca.gov. Thank you.

Sincerely,

Ping Chang

Ping Chang
Manager, Compliance and Performance Monitoring

[1] Lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the 2016 RTP/SCS for the purpose of determining consistency for CEQA. Any "consistency" finding by SCAG pursuant to the IGR process should not be construed as a determination of consistency with the 2016 RTP/SCS for CEQA.

COMMENTS ON THE NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE BREA 265 SPECIFIC PLAN [SCAG NO. IGR9797]

CONSISTENCY WITH RTP/SCS

SCAG reviews environmental documents for regionally significant projects for their consistency with the adopted RTP/SCS. For the purpose of determining consistency with CEQA, lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the RTP/SCS.

2016 RTP/SCS GOALS

The SCAG Regional Council adopted the 2016 RTP/SCS in April 2016. The 2016 RTP/SCS seeks to improve mobility, promote sustainability, facilitate economic development and preserve the quality of life for the residents in the region. The long-range visioning plan balances future mobility and housing needs with goals for the environment, the regional economy, social equity and environmental justice, and public health (see http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx). The goals included in the 2016 RTP/SCS may be pertinent to the proposed project. These goals are meant to provide guidance for considering the proposed project within the context of regional goals and policies. Among the relevant goals of the 2016 RTP/SCS are the following:

SCAG 2016 RTP/SCS GOALS	
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region*
RTP/SCS G4:	*Preserve and ensure a sustainable regional transportation system*
RTP/SCS G5:	*Maximize the productivity of our transportation system*
RTP/SCS G6:	*Protect the environment and health for our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking)*
RTP/SCS G7:	*Actively encourage and create incentives for energy efficiency, where possible*
RTP/SCS G8:	*Encourage land use and growth patterns that facilitate transit and active transportation*
RTP/SCS G9:	*Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies**
	**SCAG does not yet have an agreed-upon security performance measure.*

For ease of review, we encourage the use of a side-by-side comparison of SCAG goals with discussions of the consistency, non-consistency or non-applicability of the goals and supportive analysis in a table format. Suggested format is as follows:

SCAG 2016 RTP/SCS GOALS		
	Goal	Analysis
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*	*Consistent: Statement as to why;* *Not-Consistent: Statement as to why;* *Or* *Not Applicable: Statement as to why;* *DEIR page number reference*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*	*Consistent: Statement as to why;* *Not-Consistent: Statement as to why;* *Or* *Not Applicable: Statement as to why;* *DEIR page number reference*
etc.		etc.

2016 RTP/SCS STRATEGIES

To achieve the goals of the 2016 RTP/SCS, a wide range of land use and transportation strategies are included in the 2016 RTP/SCS. Technical appendances of the 2016 RTP/SCS provide additional supporting information in detail. To view the 2016 RTP/SCS, please visit: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx. The 2016 RTP/SCS builds upon the progress from the 2012 RTP/SCS and continues to focus on integrated, coordinated, and balanced planning for land use and transportation that the SCAG region strives toward a more sustainable region, while the region meets and exceeds in meeting all of applicable statutory requirements pertinent to the 2016 RTP/SCS. These strategies within the regional context are provided as guidance for lead agencies such as local jurisdictions when the proposed project is under consideration.

DEMOGRAPHICS AND GROWTH FORECASTS

Local input plays an important role in developing a reasonable growth forecast for the 2016 RTP/SCS. SCAG used a bottom-up local review and input process and engaged local jurisdictions in establishing the base geographic and socioeconomic projections including population, household and employment. At the time of this letter, the most recently adopted SCAG jurisdictional-level growth forecasts that were developed in accordance with the bottom-up local review and input process consist of the 2020, 2035, and 2040 population, households and employment forecasts. To view them, please visit http://www.scag.ca.gov/Documents/2016GrowthForecastByJurisdiction.pdf. The growth forecasts for the region and applicable jurisdictions are below.

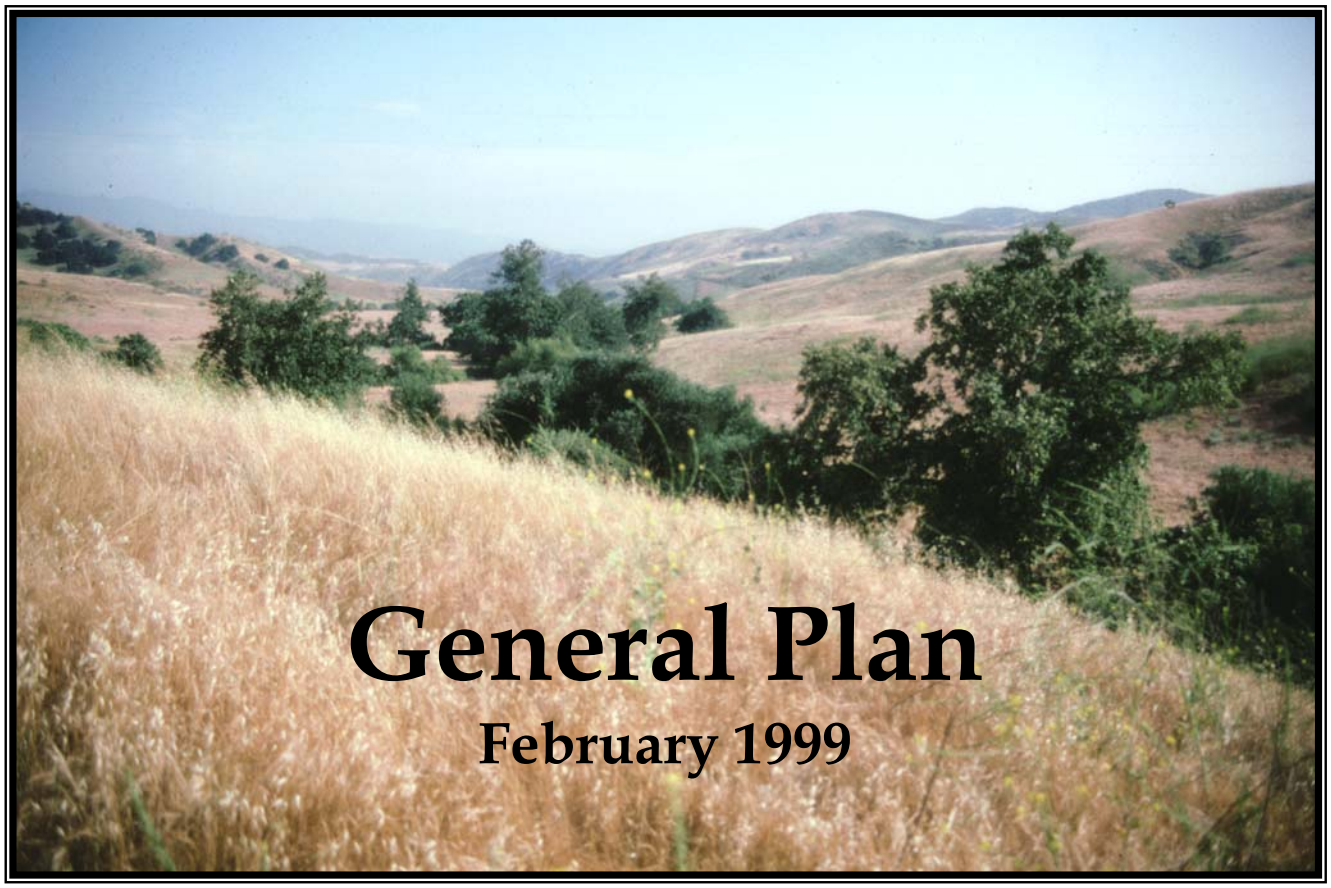
	Adopted SCAG Region Wide Forecasts			Adopted City of Brea Forecasts		
	Year 2020	**Year 2035**	**Year 2040**	**Year 2020**	**Year 2035**	**Year 2040**
Population	19,663,000	22,091,000	22,138,800	48,700	50,600	50,600
Households	6,458,000	7,325,000	7,412,300	17,300	18,100	18,100
Employment	8,414,000	9,441,000	9,871,500	51,800	53,400	53,700

MITIGATION MEASURES

SCAG staff recommends that you review the Final Program Environmental Impact Report (Final PEIR) for the 2016 RTP/SCS for guidance, as appropriate. SCAG's Regional Council certified the Final PEIR and adopted the associated Findings of Fact and a Statement of Overriding Considerations (FOF/SOC) and Mitigation Monitoring and Reporting Program (MMRP) on April 7, 2016 (please see: http://scagrtpscs.net/Pages/FINAL2016PEIR.aspx). The Final PEIR includes a list of project-level performance standards-based mitigation measures that may be considered for adoption and implementation by lead, responsible, or trustee agencies in the region, as applicable and feasible. Project-level mitigation measures are within responsibility, authority, and/or jurisdiction of project-implementing agency or other public agency serving as lead agency under CEQA in subsequent project- and site- specific design, CEQA review, and decision-making processes, to meet the performance standards for each of the CEQA resource categories.

Attachment 1: Chino Hills State Park General Plan

Chino Hills State Park



General Plan

February 1999

CALIFORNIA
STATE PARKS®



GRAY DAVIS
Governor

MARY D. NICHOLS
Secretary for Resources

RUSTY AREIAS
Director of Parks and Recreation
P.O. Box 94286
Sacramento, CA 94296-0001

General Plan Inquiries

The Chino Hills State Park General Plan was prepared by the California Department of Parks and Recreation Southern Service Center. For general information regarding the document contact the service center at (619) 220-5300, or direct correspondence to:

California Department of Parks and Recreation
Southern Service Center
8885 Rio San Diego Drive, Suite 270
San Diego, California 92108

Publication Price and Order Information

Additional Copies of the approved Chino Hills State Park General Plan can be obtained for $6.00 each, plus $5.00 per copy for postage and handling. California residents must add 7.75% sales tax. Make checks payable to California Department of Parks and Recreation, and send your order to:

California State Parks Store
P.O. Box 942896
Sacramento, California 94296-0001

STATE OF CALIFORNIA - RESOURCES AGENCY
GRAY DAVIS, Governor
DEPARTMENT OF PARKS AND RECREATION
STATE PARK AND RECREATION COMMISSION
P.O. BOX 942896, SACRAMENTO, CA 94296-0001
(916) 653-0524

Resolution 13-99
adopted by the
CALIFORNIA STATE PARK RECREATION COMMISSION
at its regular meeting in Brea on
February 23, 1999

WHEREAS, the Director of the Department of Parks and Recreation has presented to this Commission for approval the proposed General Plan for Chino Hills State Park; and

WHEREAS, this document reflects long-range development plans to provide for optimum use and enjoyment of the unit as well as the protection of its quality, resources, and diversity;

NOW, THEREFORE, BE IT RESOLVED that the California State Park and Recreation Commission hereby approves the Department of Park and Recreation's Chino Hills State Park Preliminary General Plan, dated October 1998, subject to such environmental changes as the Director of Parks and Recreation shall determine advisable and necessary to implement the provisions of said plan.

STATE OF CALIFORNIA - RESOURCES AGENCY GRAY DAVIS, Governor

DEPARTMENT OF PARKS AND RECREATION

STATE PARK AND RECREATION COMMISSION

P.O. BOX 942896, SACRAMENTO, CA 94296-0001
(916) 653-0524

Resolution 14-99
adopted by the
CALIFORNIA STATE PARK RECREATION COMMISSION
at its regular meeting in Brea on
February 23, 1999

WHEREAS, the Director of the Department of Parks and Recreation has proposed a 1425-acre Natural Preserve be established within Chino Hills State Park to provide for the recognition and protection of the important natural resources of the unit; and

WHEREAS, the proposed Natural Preserve is located in the hills and wooded canyons that encompass the Water Canyon and Brush Canyon watersheds; and

WHEREAS, the proposed Natural Preserve consists of rare plant communities, including coastal sage scrub, southern California black walnut woodland, and coast live oak woodland that support a wide variety of sensitive wildlife; and

WHEREAS, the proposed Natural Preserve is the northern extension of the Coal Canyon Biocorridor—a vital linkage between the wildlife habitats of the Puente-Chino Hills and the Santa Ana Mountains; and

WHEREAS, the proposed Natural Preserve offers an opportunity for the scientific study of wildlife movement in a rare regional biocorridor;

NOW, THEREFORE, BE IT RESOLVED pursuant to Section 5019.50 of the Public Resources Code, and after proceedings in accordance with the Administrative Procedures Act, that the California State Park and Recreation Commission hereby classifies 1425 acres in Chino Hills State Park as a Natural Preserve and names the unit Water Canyon Natural Preserve.

CHINO HILLS STATE PARK

GENERAL PLAN

FEBRUARY 1999

CALIFORNIA STATE PARKS®

State of California……...….Gray Davis, Governor
The Resources Agency……..……...…...Mary D. Nichols, Secretary
California Department of Parks and Recreation…….….Rusty Areias, Director

Mission Statement

The Mission of the California Department of Parks and Recreation is to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high quality outdoor recreation.

Chino Hills State Park General Plan

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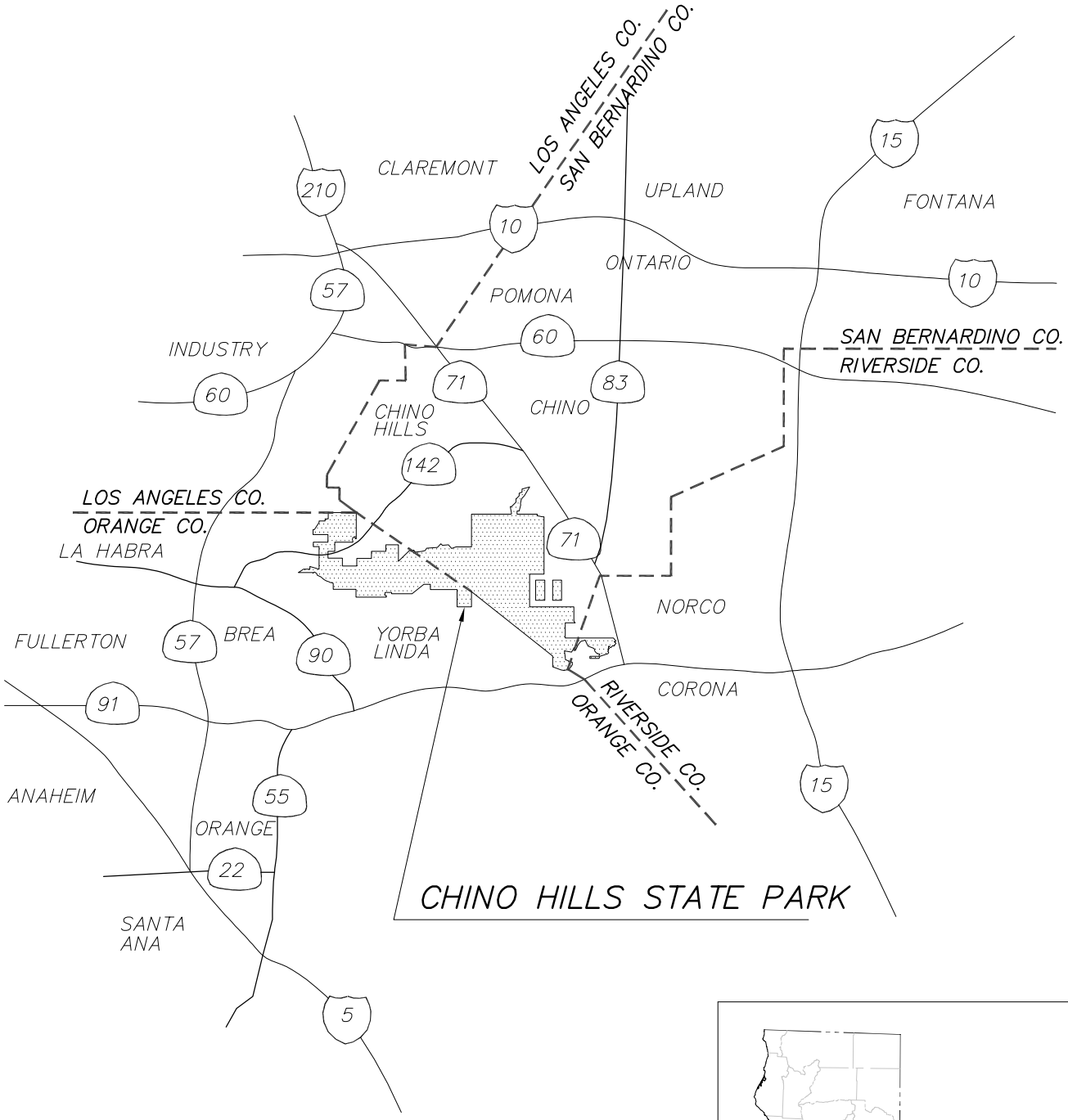


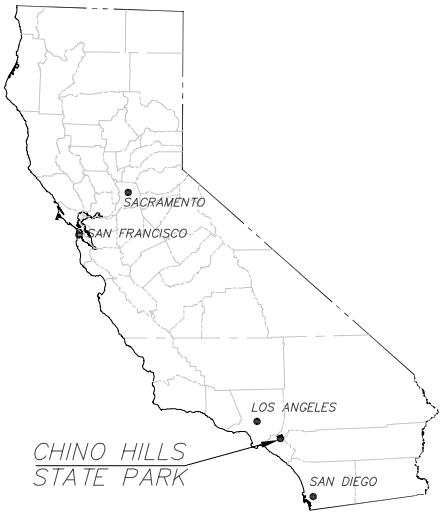
CHINO HILLS STATE PARK

VICINITY MAP

NO SCALE

NORTH

FIGURE 1



REGIONAL MAP

NO SCALE

NORTH

VI

Chino Hills State Park General Plan

INTRODUCTION



Sycamore trees in Lower Aliso Canyon

INTRODUCTION TO THE PARK

LOCATION

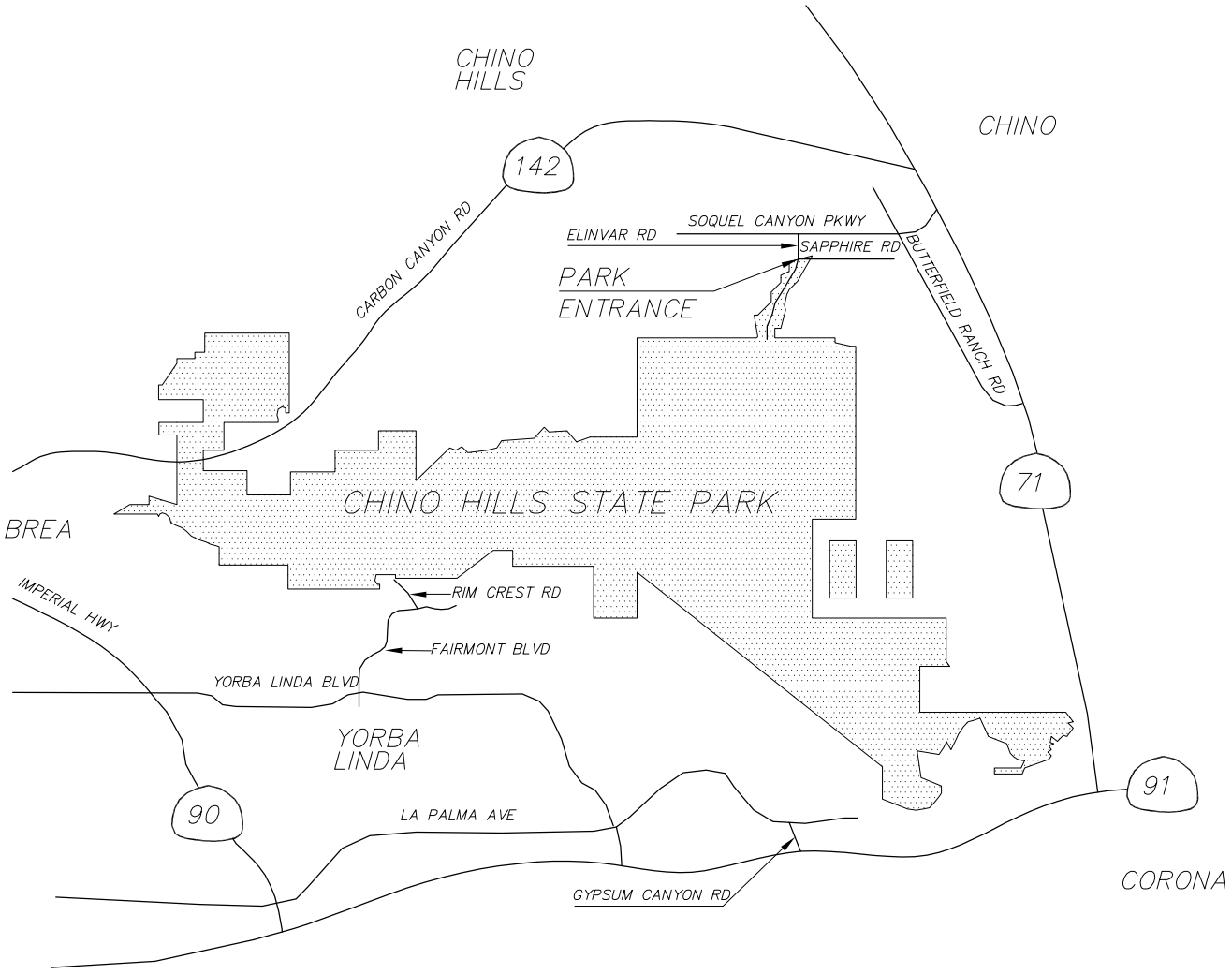
Chino Hills State Park is situated in the counties of Orange, Riverside, and San Bernardino (see Figures 1 and 2). Nearby transportation corridors include the Riverside Freeway (State Highway 91) to the south, State Highway 71 to the east, and Carbon Canyon Road (State Highway 142) to the north and west. The Sonome Canyon Area is just north of Carbon Canyon Road and is adjacent to Los Angeles County. The park is bordered on the north by the City of Chino Hills, on the south by the City of Yorba Linda, on the west by the City of Brea, and is close to the communities of Chino, Olinda Village, Sleepy Hollow, and Corona. Riverside is approximately 16 miles to the east of the park along Highway 91.

Chino Hills State Park lies within the densely populated urban communities of the southern California metropolitan complex. Approximately 15 million people live within a one-hour drive of the park. This number will escalate, as rural communities in the vicinity of the park are rapidly transformed into subdivisions.

Chino Hills State Park is within the Puente-Chino Hills, which are at the northern end of the Peninsular Ranges Geomorphic Province. The Cleveland National Forest in the Santa Ana Mountains is just 2 miles south of the park boundary on the opposite side of Highway 91. It is biologically connected to Chino Hills State Park via the Coal Canyon biocorridor, which is the only remaining viable link between them. Other parks in the vicinity include Carbon Canyon Regional Park to the west, Prado Regional Park to the east, Featherly Regional Park to the south, and Yorba Regional Park to the southwest.

The nearest State Park System units are California Citrus State Historic Park, 13 miles to the east; Pio Pico State Historic Park, 18 miles to the northwest; Bolsa Chica and Huntington State Beaches and Crystal Cove State Park, all 24 miles to the southwest; and Lake Perris State Recreation Area, 29 miles to the east.

As of November 1998 the park encompassed approximately 11,770 acres, most of which is made up of rolling hills. The dominant vegetation type in the park is non-native annual grassland. However, walnut woodlands, coastal sage scrub, coast live oak woodland, sycamore woodland, chaparral, and riparian scrub are also important components. In addition, a one-mile-long section of the Santa Ana River and its associated Fremont cottonwood riparian woodland are within park boundaries. This is the only remaining natural stretch of the Santa Ana River in Orange County.



CHINO HILLS STATE PARK

LOCATION MAP

NO SCALE

NORTH

FIGURE 2

PURPOSE ACQUIRED

Chino Hills State Park was acquired primarily for the purpose of preserving its natural landscape features, its biological diversity, and the opportunities for solitude and recreation that open space provides for people in densely populated areas. In June 1977, the California Legislature passed Concurrent Resolution No. 17 directing the California Department of Parks and Recreation (the Department) to undertake a study of the feasibility of acquiring land in the Chino Hills for State Park System purposes:

> *WHEREAS, The Chino Hills is an almost undeveloped island of unspoiled land surrounded by the urban sprawl and freeways of the Counties of Los Angeles, San Bernardino, Riverside, and Orange and is presently threatened with major development that is incompatible with its wildlife, aesthetic and recreational values; and WHEREAS, Securing the Chino Hills for park purposes would assure the preservation of those values to the benefit of residents of the state; now, therefore, be it resolved by the Assembly of the State of California, the Senate thereof concurring, That the Department of Parks and Recreation is requested to undertake, in cooperation with the Counties of Los Angeles, San Bernardino, Riverside, and Orange on a shared cost basis, a study of the feasibility of acquiring lands in the Chino Hills for park purposes and to report thereon to the Legislature on or before March 1, 1978…*

In April 1979, the Department issued the Chino Hills Feasibility Study that identified 30,000 acres of the Chino Hills as suitable for inclusion into the State Park System. The acquisition of 2,237 acres in November 1981 initiated the project.

A local conservation organization called Hills For Everyone initiated the Chino Hills Project and worked closely with the Legislature and the Department to make Chino Hills State Park a reality. In 1982, Hills For Everyone entered into a lease agreement with the Department of General Services to manage the land involved in the early acquisitions until the Department of Parks and Recreation was ready to assume management responsibility. Hills For Everyone opened the area to the public on a limited basis in the spring of 1983 and managed the property until 1984, at which time the Department of Parks and Recreation took over its management.

SPIRIT OF PLACE

Chino Hills State Park gives those who visit it a sense of being transported back in time to an earlier and more undeveloped California. Upon entering the park, the transition from the human-made environment to the natural environment is abrupt; housing tracts quickly give way to open hills, and once inside, the sights and sounds of modern intrusions are minimal and one feels many miles away from cities and freeways. The park interior is enveloped by its ridgelines, and one perceives the land as being secluded, protected, and still. Without city noises and visual obtrusions, visitors become aware of the park's subtle movements, natural smells, and variations in microclimate, vegetation, and topography. Many endearing values of the park are intangible. The qualities of open space, natural sounds, and fresh air cannot be quantified like physical resources can, but they allow visitors to be aware of and reconnected with the natural world.



Coast live oak forest in Telegraph Canyon

The forces of nature that have shaped the land are evident by the steeply cut valleys, landslides, and rolling hills of the park. These places mark the passage of time through their variation of seasonal colors. The park's landscape changes over the course of a year from one that is dry and dusty to one that is moist and lush. These variations can also be discovered while moving from the exposed ridgetops to the dense shade under riparian tree canopies.

The park is one of few in the Los Angeles Basin that offers opportunities for tranquility, solitude, and relief from the hectic urban life that surrounds it. It gives visitors a place to explore and recreate at their leisure. As the pace of life in this area quickens and the size of the population adjacent to the park grows, these values will become increasingly precious to many park visitors.

One comes away from Chino Hills State Park feeling refreshed. But the effect of one's experience at the park is most apparent when one returns to the urban environment. The park leaves visitors with a feeling of compassion for the disappearing values of California's past landscapes and a sincere appreciation for the remaining open space that is available for today's enjoyment.

PURPOSE OF THIS GENERAL PLAN

This general plan provides guidelines for long-term management, development, and operation of Chino Hills State Park. It replaces the original Chino Hills State Park General Plan approved in August 1986. After a review by the Department, it was determined that an amendment to the 1986 general plan should be developed. However, due to the extensive nature of the amendment, the planning team decided to completely revise and replace the original document.

This document is prepared by the California Department of Parks and Recreation to satisfy the requirements of Public Resources Code (PRC) Section 5002.2. The PRC specifies that a general plan be prepared prior to development of any new facilities and will consist of elements that will evaluate and define the proposed management of resources, land uses, facilities, concessions, and operation of the park. In addition, the plan serves as a first-tier environmental impact report (as defined in Section 15166 of the California Environmental Quality Act [CEQA] Guidelines). The Chino Hills State Park General Plan must be submitted to, and approved by, the State Park and Recreation Commission.

The proposals in this general plan are conceptual in nature. They are intended to provide vision for the park rather than make detailed recommendations. Separate management and project plans will be developed that will provide the necessary details for specific actions. These plans are required to assess the potential environmental impacts of specific proposals made.

This general plan also discusses the potential for future acquisitions. Areas of interest extend beyond present Department of Parks and Recreation ownership for the purposes of long range planning. This does not constitute a commitment for acquisition nor portray an ultimate park boundary.



Telegraph Canyon Trail

EXISTING CONDITIONS AND ISSUES



Eastern view from Telegraph Canyon Trail

PARK SUMMARY

The Park Summary highlights and summarizes the existing land use, facilities, and significant resource values at Chino Hills State Park necessary to understand the goals and guidelines noted in the Plan Section of this document.

EXISTING LAND USE

Chino Hills State Park is a large area of relatively undeveloped land. One of the principal appeals for visitors is the natural character of the landscape. Most of the land is natural open space, cut occasionally by roads, trails, pipelines, and power lines. In a few locations, this land use changes to accommodate recreational and operational needs.

ROLLING M RANCH

For visitors, park staff, and volunteers, the Rolling M Ranch is the most actively used area of the park (Figure 3). It is at the end of the entrance road and offers a place for visitors to park their vehicles and access the trail network. Here, visitors can picnic, use the restroom, get water, and find park information. Park volunteers often use this area to meet and conduct business. The Rolling M Ranch is also a hub for park operations. It is a residential area for park staff as well as the operations center. The area is used for equipment and supply storage as well as a workspace for maintenance and ranger staff.



Cattle chute and barn – Rolling M Ranch

OTHER VISITOR-USE AREAS

There are additional visitor-use areas near the Rolling M Ranch that offer structured-type recreation. The equestrian staging area is used for large groups and special events. The campground area allows for night use of the park. Picnic areas and scenic overlooks are nearby. Panorama Point near the Rolling M Ranch offers a scenic viewpoint, parking, and interpretive information. There are no formal group-use areas in the park; however, the campgrounds can accommodate small groups as needed. Other visitor-use areas include pedestrian access points along the park boundary. Some visitors access the trail network via these access points after parking offsite on residential streets.

LEMON GROVE AREA

The Lemon Grove Area is located in Carbon Canyon on the far-western end of the park (see Figure 3). This trailhead area can be reached from Carbon Canyon Road by entering through Carbon Canyon Regional Park (County of Orange) and provides the only access from the western side of the park. Visitors can reach the park's interior by traveling through Telegraph Canyon from this area. The Lemon Grove Area contains significant riparian habitat as well as approximately 40 acres of trees that represent the only extant remnant of the historically significant citrus industry that once surrounded the park.

SONOME CANYON AREA

In November 1996, The Department of Parks and Recreation purchased the Sonome Canyon Area from Shell Western E&P Inc. This 965-acre property is north of Carbon Canyon Road (State Route 142) (see Figure 3). A Habitat Conservation Plan (HCP) was developed and funded by Shell Western E&P Inc. as part of mitigation for nearby Shell Western E&P Inc. developments. Also in 1997 an additional 19 acres was added to the Park as part of an HCP mitigation obligation for Metropolitan Water District of Southern California (MWD). The intent of the HCP is to protect and enhance habitat on a 2,600-acre Study Management Area that includes the Sonome Canyon Area as well as other areas in the western portion of the park. As of 1998, the property had no developed facilities and was accessed by trail from the south.

SUB-CLASSIFICATIONS

There are currently no sub-classifications or formal land-use designations within Chino Hills State Park. Three land-use zones, however, were identified in the original (1986) general plan. These are Primitive, Park Land, and Developed Park Zones. All uses in these zones fall within the State Park classification of the Public Resources Code (Section 5019.53). The land use for the Primitive Zones is limited to trails and trail camping. The Park Land Zones include trails and trail camping as well as walk-in camping, family picnicking, and vehicle access limited to park personnel. The Developed Park Zones, in addition to the above, offer parking, day use, overnight use, administrative and operational use, and public vehicle access. The management zones described in this Chino Hills State Park General Plan supersede the land-use zones identified in the original general plan.

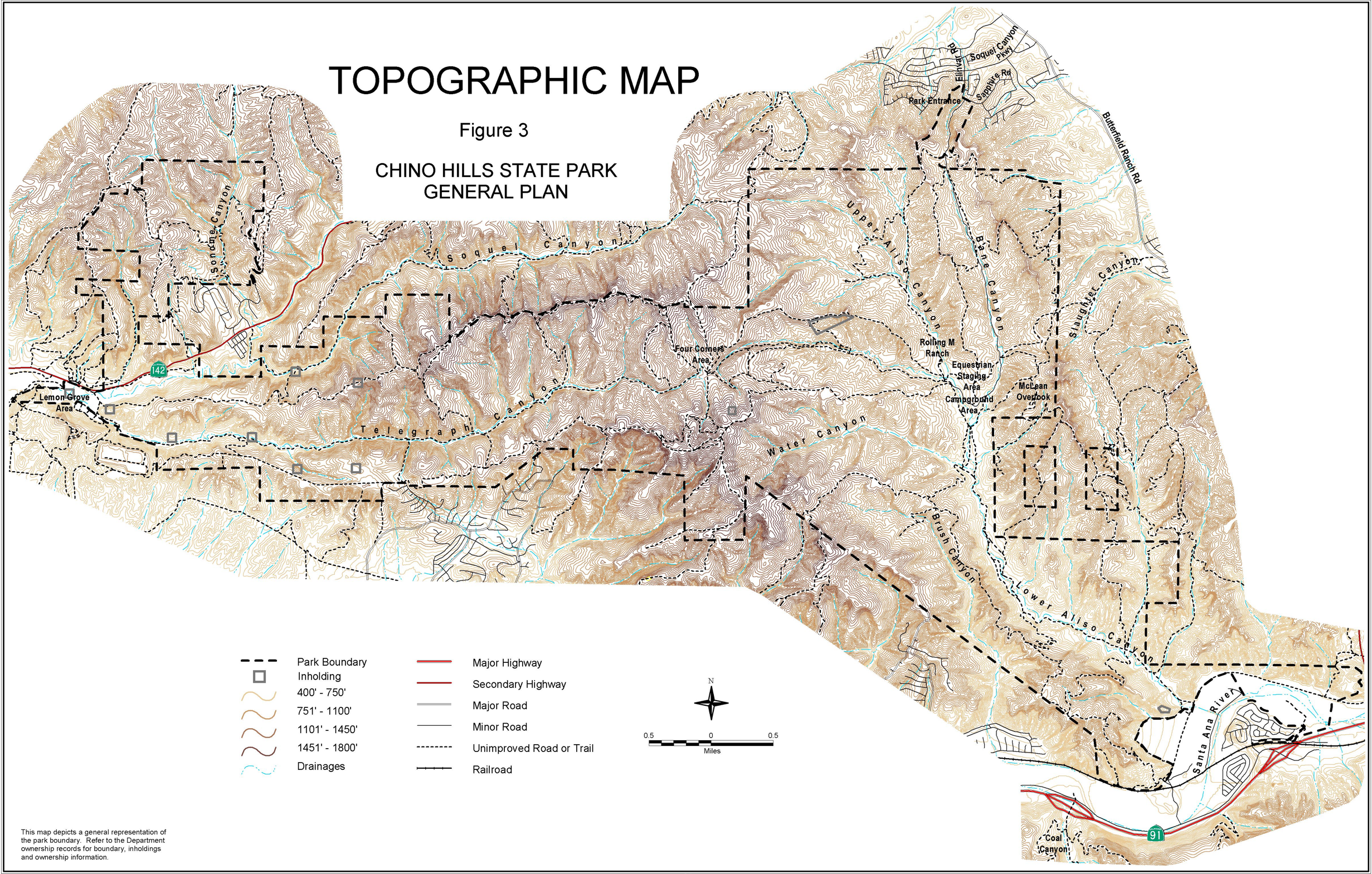
INHOLDINGS

Several property inholdings occur at Chino Hills State Park (see Figure 3). These inholdings are, in general, owned in fee by public agencies and privately held companies such as Metropolitan Water District of Southern California, Shell Western E&P Inc, and Southern California Edison. The Department of Parks and Recreation cannot make substantial improvements in these areas. Refer to the Department Land Ownership Record for complete information about these inholdings.

TOPOGRAPHIC MAP

Figure 3

CHINO HILLS STATE PARK
GENERAL PLAN



This map depicts a general representation of the park boundary. Refer to the Department ownership records for boundary, inholdings and ownership information.

EXISTING FACILITIES

Chino Hills State Park has few facilities (see Figure 4). In general, existing facilities in the park were constructed during three different periods: the historic ranching period, the Hills For Everyone management of the park, and the initial development by the California Department of Parks and Recreation.

Most of the existing structures at the Rolling M Ranch were constructed prior to ownership by the California Department of Parks and Recreation. These include two residences, a barn, and a shed. As of 1998, the smaller of the two residences was condemned due to structural damage. Some of these structures are over 50 years old, and are considered historic resources. Also, many of the existing park roads were built during this ranching period.

Hills For Everyone established some of the existing facilities during its management of the parkland from 1983 to 1984. These include a trailhead and trail, a viewpoint, an equestrian camping area, family camping and picnicking sites, parking areas, and signs. These facilities were established with volunteered labor and materials.

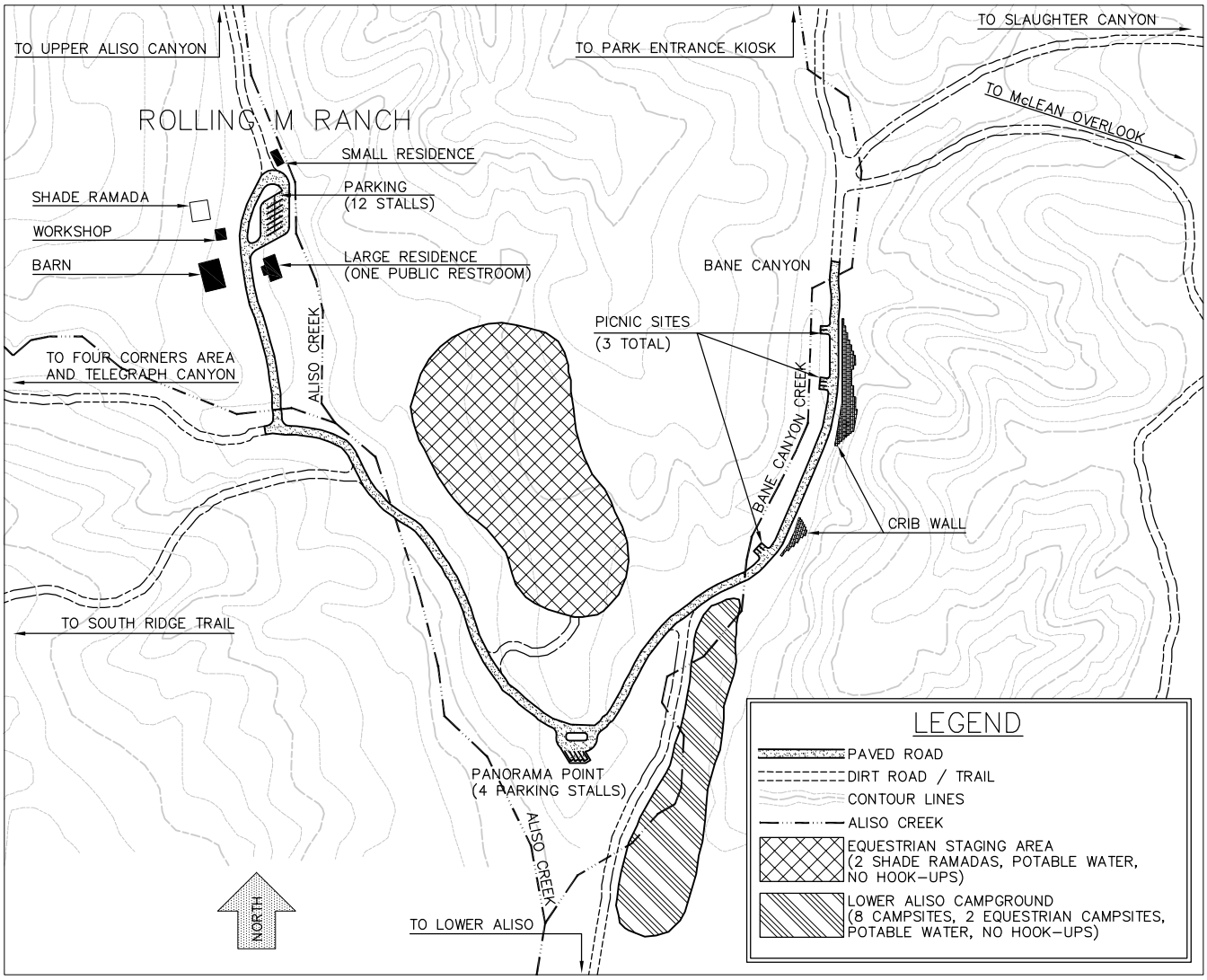
Initial development of the park by the Department consisted of building an entry station; paving portions of the entrance road; constructing retaining walls, family picnic sites with parking, a scenic overlook, and paved parking at the Rolling M Ranch; and installing water and underground electric utilities. The residences at the Rolling M Ranch use propane gas from tanks. Water is supplied by the City of Chino Hills and power is supplied to the Rolling M Ranch by Southern California Gas and Electric. No telephone service is available at the park.

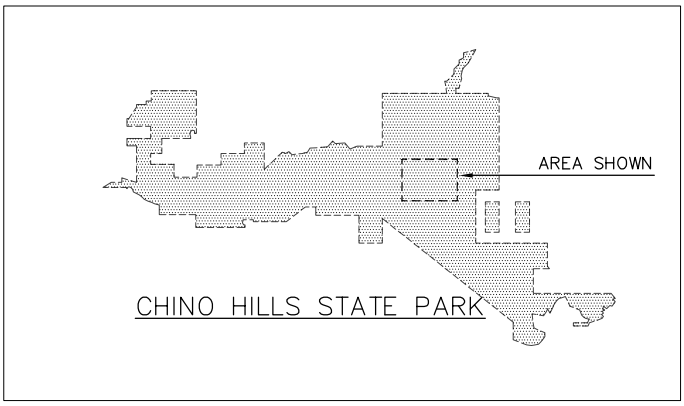


Panorama Point looking south down Aliso Canyon

The park contains approximately 50 miles of roads and trails (see Figure 3), including single and double track trails, and dirt roads. The three-mile long entrance road is mostly unpaved, except for a three-quarter-mile paved section between the Rolling M Ranch and the road to McLean Overlook.

As of 1998, no concessions existed within the park.





CHINO HILLS STATE PARK

EXISTING FACILITIES MAP

NORTH

NO SCALE

FIGURE 4

PARK SUPPORT

VOLUNTEERS

Three groups of organized park volunteers are involved in recreation, land use, resource management, and interpretation issues and play an important role in the operation of the park. The volunteer groups include a Natural History Unit, Mounted Assistance Unit, and a Bicycle Assistance Unit. In 1997, these volunteer groups logged 3,980 hours of service. Typical volunteer activities include trail patrols and maintenance, interpretive programs, facility maintenance and construction, and habitat restoration projects.

COOPERATING ASSOCIATION

The Chino Hills State Park Interpretive Association, a non-profit, cooperating association operating under a contract with California State Parks, provides funds to the park to assist with interpretive and educational activities. This association raises funds through membership fees, donations, and fundraising efforts.

HILLS FOR EVERYONE

Hills For Everyone is a citizen advocacy group dedicated to the preservation of the local hills for people and wildlife. Hills For Everyone was instrumental in preserving land in the Chino Hills for park purposes and they work closely with Department staff on planning and conservation issues.



Interpretive panel – Hills For Everyone Trail

SIGNIFICANT RESOURCE VALUES

PHYSICAL RESOURCES

Topography

The Chino Hills are part of a group of hills that also includes the Puente Hills to the northwest. The Chino Hills and the Puente Hills form a roughly triangular area of approximately 35 square miles of valleys, canyons, hills, and steep slopes. The hills are bounded on the northwest by the San Gabriel Valley, on the northeast by the San Bernardino Valley, and on the south by the Santa Ana River Canyon and the Los Angeles Basin.

Telegraph Canyon running east to west and Aliso Canyon running north to south are the principal stream drainage areas in the park. Slopes are generally steeper in the Telegraph drainage than the Aliso drainage. The most level areas in the park are near Aliso Creek, adjacent to the Santa Ana River, and at the mouth of Telegraph Canyon. The highest elevations in the park are San Juan Hill (1,781 feet) and Gilman Peak (1,865 feet). The lowest elevations occur along the Santa Ana River (430 feet).

Meteorology

The climate at Chino Hills State Park is typically Mediterranean with cool, moist winters and warm, dry summers. Local weather conditions are greatly influenced by wind patterns. Westerly breezes bring in moist marine air, which moderates temperatures and frequently brings in low clouds or fog. Easterly breezes bring in dry desert air, which accentuates temperature extremes (raising maximums and lowering minimums). Occasionally, strong (35 to 50 miles per hour) easterly winds may blow for several days, sometimes raising temperatures over 100 degrees Fahrenheit. These Santa Ana winds produce low humidity and reduce fuel moisture, which, with the high wind speeds, create extreme fire hazard conditions.

Average annual precipitation in the Chino Hills area ranges from 15 to 18 inches. Typically, the summer months are dry. Late winter and early spring rains (December through March) usually produce 75 percent of the annual precipitation. These rains produce high runoff, which initiates the period of stream flow. The dry summer period typically leads to depletion of soil moisture, cessation of vegetative growth, and termination of stream flow in the creeks.

Air pollution is a significant environmental problem that restricts visibility and poses health hazards in the Chino Hills area.

Hydrology

The Chino Hills are part of the divide between the Los Angeles and Santa Ana Hydrologic Basins. Most of Chino Hills State Park is in the Carbon Canyon and Aliso Canyon watersheds. Bane Canyon and Water Canyon are part of the Aliso Canyon watershed and are completely within the park, as is 87 percent of Aliso Canyon. The Carbon Canyon Watershed includes Carbon Canyon, Soquel Canyon, Sonome Canyon, and Telegraph Canyon. The first three canyons are in private ownership outside the park, however, 96 percent of Telegraph Canyon is located within park boundaries. A majority of the headwaters is currently used for grazing, but significant upstream portions of the Carbon Canyon, Soquel Canyon, and Sonome Canyon watersheds are residential.

Several roads that cross streams exist in Bane, Aliso, Telegraph, and Soquel Canyons. In some areas, increased soil erosion, turbidity, and damage to aquatic habitat has occurred because of road use through stream channels.

Geology

The Chino Hills are made up of a thick sequence of middle to upper Miocene marine sedimentary rocks of the Puente Formation, deposited from five to fifteen million years ago. The Puente Formation has been divided into four members from oldest to most recent: the La Vida, Soquel, Yorba, and Sycamore Canyon members.

Petroleum and associated gas have been extracted from oil fields in the region since the late 1800s. In 1885 the first commercial production of oil in the Los Angeles Basin was at the old Puente oil field west of the park. Although numerous oil wells have been drilled in the Chino Hills, there is no record of commercial production in the park.

The hills are a result of uplift and folding along the Whittier fault zone and the Chino fault. Both the Whittier fault zone and the Chino fault may be branches of the Elsinore fault, which is a major structural feature of the Peninsular Ranges Geomorphic Province to the south. The state geologist classifies the Whittier fault zone as active. A branch of the Whittier fault cuts through the park in the vicinity of Telegraph and Carbon Canyons. Damage to structures or facilities could result from seismic shaking. Landslides could also be generated, especially if the slopes are saturated.

Chino Hills State Park has major geologic hazards and sensitivities. The Chino Hills are prone to frequent landslides. In fact, the area around and including the park has been identified as the most landslide-prone area in southwestern San Bernardino County. Even though many of the landslides occurred long ago by human standards, they must still be considered as areas of instability, because the landslide deposits are generally perched precariously on hillslopes, awaiting only the proper climatic, hydrologic, and perhaps seismic conditions to become activated.

Soils

Chino Hills State Park is located in Soil Region VII – Southern California. In this region, upland soils have clay or clay-loam surfaces, neutral to basic reacting, and often-calcareous subsoil. Alluvial soils are mostly sandy loam, light brown in color, and have neutral reactions. The Chino Hills area soils are primarily upland soils, formed in place with only minor occurrences of alluvial soils.

In Chino Hills State Park, the Soil Conservation Service has mapped 39 soil units representing 20 soil series. These soils vary widely in depth, fertility, permeability, and other important characteristics. Two important characteristics of the soils in the park, which may affect potential land uses, are erosion hazard and shrink-swell potential.

The steepness of watershed lands, past land-use practices, and the rapid surface runoff create a high potential for erosion throughout Chino Hills State Park. The park is riddled with a network of roads, fences, transmission easements, power lines, and gas lines. In some places livestock have created linear paths along steep fence lines, leading to development of gullies, loss of soil and vegetative resources, and potentially contributing to development of new landslides. The roads promote gullying, mass wasting, and loss of vegetative resources. Increased water runoff results from water concentration through culverts, removal of vegetation, and diversion from natural watercourses. Ditches, berms, and improperly constructed water bars also lead to erosion of the roads and adjacent lands in the park.

NATURAL RESOURCES

Connectivity

The Southwest Ecoregion, of which Chino Hills State Park is a part, is recognized worldwide as a significant area of biodiversity. Biodiversity refers to the variety of species occurring within a given area. The Southwest Ecoregion extends roughly from San Diego to Santa Barbara, as far east as the crest of the Transverse Ranges and west to the coast. This area contains a greater number of biological resources than any other area of comparable size in the United States (E.O. Wilson, *Biodiversity*, National Academy Press, Washington D.C., 1988). As land in southern California becomes more developed and open space dwindles, the importance of Chino Hills State Park to the preservation of biodiversity in the Southwest Ecoregion will greatly increase.

Even with continued protection, the biodiversity of the park is at risk. The Puente-Chino Hills, including the park, have become increasingly isolated by the conversion of the surrounding landscape to urban uses. Scientific studies have shown that the isolation of habitat can lead to ecosystem collapse. Small, isolated areas of habitat simply cannot support as many species as larger areas. In order for the biodiversity of

the park to be maintained at or near current levels it must remain connected to other protected open space in the region.

Without the ability to protect the entire landscape, biocorridors are the best known way to counteract the effects of the isolation of parks and their habitat areas. Biocorridors, like hallways between rooms, are extensions of habitat that connect one core habitat area to another. A core habitat is an area of high resource sensitivity because it supports habitat that is crucial for a majority of wildlife species in the park. Biocorridors provide for plant and animal movement between core habitat areas. The exchange of plants and animals between habitat areas is critical to the maintenance of healthy ecosystems for several reasons. These include the maintenance of genetic variation, the ability of species to shift their ranges over time in response to environmental change, and as a source of repopulating after a natural catastrophe. Without plant and animal exchange with other protected areas, many species populations within Chino Hills State Park will not be able to perpetuate and will eventually die off.

The habitat linkages important to the biological survival of Chino Hills State Park are: 1) Coal Canyon which links the park to the Cleveland National Forest and the Santa Ana Mountains; 2) the Sonome Canyon Area which links Chino Hills State Park to Tonner Canyon and other open space to the northwest; and 3) the Prado Basin area that links the park to the Prado Basin, and thereby to the Dairy Preserve, the Santa Ana River watershed, and open space east of State Route 71. Roads with heavy traffic bisect these linkages and are barriers to wildlife attempting to cross them. When future improvements to these roads are undertaken, including capacity increases planned for the regional transportation system, the construction or enhancement of suitable bridges, culverts or other acceptable structures are necessary to maintain corridor function and biological viability.



Mountain lion tracks (photo by Connie Spenger)

Biocorridor Areas

Coal Canyon

The most important biological linkage between Chino Hills State Park and adjacent, protected open space is the Coal Canyon biocorridor which connects the park and surrounding Puente-Chino Hills on the north to the Cleveland National Forest and the Santa Ana Mountains on the south. The biocorridor provides for the dispersal of plants and the movement of animals between the two areas. The much larger Santa Ana Mountains support the diversity of the Puente-Chino Hills by allowing animals to disperse into the area thereby bolstering populations, providing new genetic material, and helping to prevent local extinctions.

The Coal Canyon biocorridor extends within park boundaries through Brush and Water Canyons to the interior of the park. These two canyons constitute an important natural resource area that supports high quality examples of California walnut woodland, oak woodland, and riparian habitat. The area provides for the movement of special status species such as the mountain lion, as well as habitat that is crucial to the California gnatcatcher and the nesting success of a pair of resident golden eagles. All of Water Canyon and a large portion of upper Brush Canyon are within the park's boundary.

The Riverside Freeway (State Route 91) bisects the Coal Canyon biocorridor outside of park boundaries. Terrestrial animals attempting to cross the freeway are forced to either cross under it via a relatively small double box culvert or over it across multiple lanes and a freeway divider. Because the culvert crossing is small relative to its length, many animals do not use it. Deer, for example, typically will not use the 91 Freeway culvert crossing because they require a view of the opposite end of the crossing and the culvert does not provide this need. A freeway underpass at this location, which is currently fenced off from the wildland area, holds the potential to allow for the movement of many animals that cannot currently overcome the impediment of the freeway.

As of 1998, portions of the Coal Canyon biocorridor remained in private ownership and may be developed. If development occurs, the Puente-Chino Hills, including Chino Hills State Park will be biologically isolated. Eventually, this will result in local species extinction on a large scale and may result in the biological decline of the park and the Puente-Chino Hills because this area is too small to support many of the existing plant and animal populations.

Sonome and Tonner Canyons

The Sonome Canyon biocorridor lies within the Sonome Canyon Area. It links Chino Hills State Park with two adjacent open space areas in the Puente and Whittier Hills via the Tonner Canyon biocorridor on the north and west. This important connection

ties three significant core habitat areas together and allows for the passage of species between them.

The Sonome and Tonner Canyon biocorridor is bisected by Carbon Canyon Road (State Route 142). There are several culverts that pass under the road but they are very small and are, therefore, of limited value for wildlife passage. Larger mammals such as deer and mountain lions are unable to pass through and must cross the road in order to enter and leave Chino Hills State Park through this corridor. If Carbon Canyon Road is widened to accommodate greater vehicle usage, wildlife losses will increase unless adequate mitigation measures are enacted.

Prado Basin

The Prado Basin biocorridor links Chino Hills State Park with the high quality habitat within the basin and with the upper reaches of the Santa Ana River to the east. The State Endangered western yellow-billed cuckoo and the State and Federally Endangered least Bell's vireo have been documented within the Prado Basin. This corridor offers an important opportunity for exchange of these species between the park's Fremont Cottonwood habitat along the Santa Ana River and that of the Prado Basin. As with the other corridors connecting Chino Hills State Park to adjacent open space areas, this one is bisected by a major highway. As mitigation for the widening of State Highway 71, the California Department of Transportation installed fences in an attempt to direct wildlife into culverts and away from at-road crossings of the freeway.

Plant Life

Vegetation Types

At first look, Chino Hills State Park may appear to be simply composed of rolling hills covered with non-native grassland. Although these grasslands are truly the dominant vegetation type in the park, a closer look reveals a significant diversity of plant community types. In fact, Chino Hills State Park supports 14 different vegetation series as defined in the California Native Plant Society's (CNPS) classification, *A Manual of California Vegetation* by John O. Sawyer and Todd Keeler-Wolf (1995). A Draft Vegetation Map has been delineated for the park following this classification scheme (see Figure 5). The vegetation type series mapped for Chino Hills State Park are listed in the following table:

Series	
California Grassland Series	California Walnut Series
Purple Sage Series	California Sagebrush Series
Sumac Series	California Buckwheat Series
Coast Prickly Pear Series	Coast Live Oak Series
California Sycamore Series	Arroyo Willow Series
Fremont Cottonwood Series	Mulefat Series
Purple Needlegrass Series	Cattail Series

Of these 14 vegetation types, 9 are considered unique or significant in southern California because their acreage is rapidly dwindling and because of their importance as habitat to both sensitive and common wildlife species. These 9 are the California Walnut Series, California Buckwheat Series, California Sagebrush Series, Purple Sage Series, Coast Prickly Pear Series, Sumac Series, Arroyo Willow Series, Fremont Cottonwood Series, and California Sycamore Series.

California Walnut Series

The southern California black walnut (*Juglans californica* var. *californica*) has a range limited to the Los Angeles Basin and surrounding foothills. Some of the largest remaining woodlands in southern California can be found in Chino Hills State Park, particularly throughout Water Canyon, on the south side of Telegraph Canyon, and in the Sonome Canyon Area. Walnut trees are found typically on north-facing slopes and in canyon bottoms and are often in association with coast live oak (*Quercus agrifolia*).



Southern California black walnut woodland – Water Canyon

Coastal Sage Scrub Habitats: California Buckwheat Series, California Sagebrush Series, Purple Sage Series, and Coast Prickly Pear Series

The coastal sage scrub habitats have declined rapidly in southern California due to increased open space development. Remaining patches of habitat in the state have become crucial to the survival of many animal species, including the California gnatcatcher (*Polioptila californica*), a Federally Threatened bird species. Even the coastal sage scrub habitat types that are not ideal for California gnatcatcher nesting sites are important for the species dispersal into nearby habitats that are more suitable.

California Buckwheat Series is a type of coastal sage scrub habitat that is dominated by California buckwheat (*Eriogonum fasciculatum*) in association with California sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), purple sage (*Salvia leucophylla*), and black sage (*Salvia mellifera*). This habitat type is important to California gnatcatcher survival. The California Buckwheat Series is well represented in various parts of Chino Hills State Park, with excellent examples in Telegraph Canyon.

California Sagebrush Series is another type of coastal sage scrub habitat. This vegetation series differs from the California Buckwheat Series in that it is dominated, sometimes entirely, by California sagebrush (*Artemisia californica*) and may also include California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), bush monkeyflower (*Mimulus aurantiacus*), purple sage (*Salvia leucophylla*), white sage (*Salvia apiana*), or lemonade berry (*Rhus integrifolia*). This habitat type is as important to California gnatcatcher survival as the California Buckwheat Series. As of 1998, the California gnatcatcher had been documented as nesting within park boundaries only in the California Sagebrush Series habitat along the park's southern boundary.

Purple Sage Series, another type of coastal sage scrub habitat, is different from the others in that it is dominated by purple sage (*Salvia leucophylla*). Purple sage may be the sole component in this series, but typically California sagebrush (*Artemisia californica*) occurs in the canopy as well. Examples of this series can be found in the Sonome Canyon Area.

Coast Prickly Pear Series is dominated by the coast prickly pear (*Opuntia littoralis*). This habitat is found as small patches in various locations within the park. Some good examples can be found on the south-facing slope in Telegraph Canyon and in Upper Aliso Canyon. The cactus wren (*Campylorhynchus brunneicapillus*), a California Species of Concern, is dependent upon this habitat and is found in many of the park's cactus patches.



Coast Prickly Pear – Upper Aliso Canyon

Sumac Series

Sumac Series is dominated by relatively tall shrubs such as laurel sumac (*Malosma laurina*), toyon (*Heteromeles arbutifolia*), and lemonade berry (*Rhus integrifolia*). This series is well represented in Chino Hills State Park particularly along the north ridge of Telegraph Canyon. Because the understory is composed of several coastal sage scrub species such as California buckwheat and California sagebrush, this series could provide habitat for the California gnatcatcher.

Riparian Habitats: Arroyo Willow Series, Fremont Cottonwood Series, and California Sycamore Series

Riparian habitat in general is uncommon in southern California. It is important habitat for many wildlife species that use it for nesting, foraging, perching, and cover from the hot sun. It has decreased dramatically over the years and continues to decline due to development and habitat degradation.

Arroyo Willow Series is a type of riparian habitat that is represented in several of the canyons in the park by thickets dominated by the arroyo willow (*Salix lasiolepis*). Some examples of this habitat are found in Upper and Lower Aliso Canyon and Telegraph Canyon. It is excellent habitat for wildlife such as herpetofauna (reptiles and amphibians), birds, and mammals. Within the park, this habitat supports the existence of the State Endangered willow flycatcher (*Empidonax trailii*) and least Bell's vireo (*Vireo bellii pusillus*).

Fremont Cottonwood Series is another type of riparian habitat that is found in the park only within a small area along the Santa Ana River. This type of habitat is extremely limited in southern California and is of crucial importance for two bird species. These species are the State Endangered western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), which has been documented in adjacent habitat within the Prado Basin, and the State and Federal Endangered least Bell's vireo (*Vireo bellii pusillus*), which has been documented within this habitat at Chino Hills State Park.

California Sycamore Series is a type of riparian woodland dominated by the California sycamore (*Platanus racemosa*). This habitat within Chino Hills State Park is well represented in Aliso Canyon. Dominated by mature sycamore trees, the woodland is valuable for various bird- perching and nesting sites and is habitat for various arboreal wildlife species. Sycamore tree seedlings are uncommon in the park, as well as elsewhere. This is due, in part, to competition with non-native annual grasses and forbs.



California sycamore – Bane Canyon

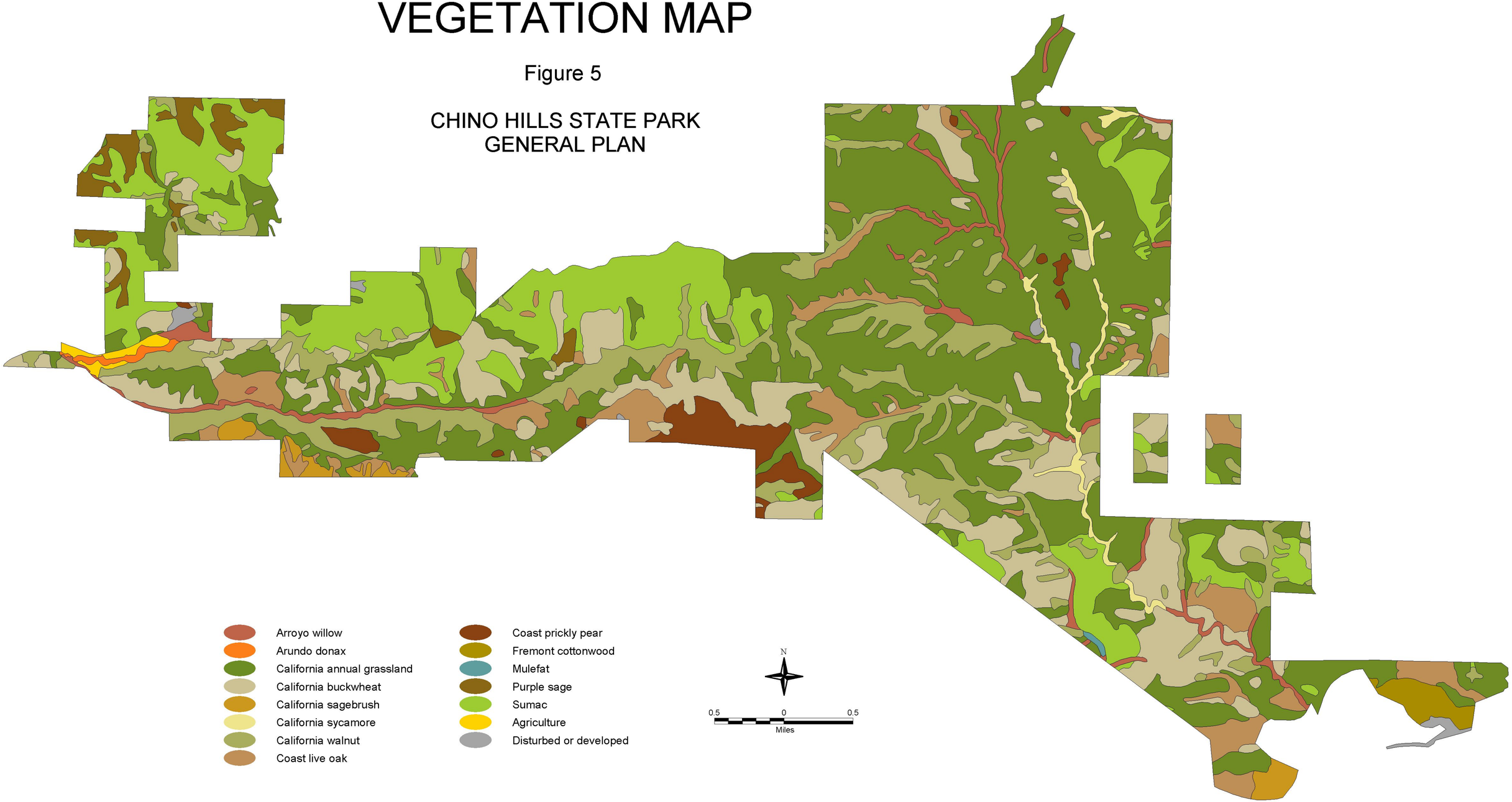
Cattail Series

Three livestock ponds, McDermott Spring, Windmill, and Panorama Ponds were constructed by previous land owners and offer year-round water for wildlife as well as suitable conditions for the establishment of aquatic plants and emergent wetland vegetation.

VEGETATION MAP

Figure 5

CHINO HILLS STATE PARK
GENERAL PLAN



Vegetation series defined in the California Native Plant Society's classification, "A Manual of California Vegetation" by John O. Sawyer and Todd Keeeler--Wolf (1995).

Purple Needlegrass Series
Small stands of the native bunchgrass called purple needlegrass (*Nasella pulchra*) are recovering in some areas within Chino Hills State Park. Prior to heavy grazing and other disturbances in the Chino Hills, purple needlegrass and other native perennial bunchgrasses dominated the grasslands. Currently, the extent of native bunchgrass patches in the park is minimal compared to the coverage of non-native annual grassland.

Sensitive Plant Populations
There are three sensitive plant taxa known to occur within the boundaries of Chino Hills State Park (see below). One is a Federal Species of Concern, but all three are listed in the California Native Plant Society - Inventory of Rare and Endangered Vascular Plants of California.

There are several other sensitive taxa that have a potential to occur within the park (see below). One of these, Braunton's milk-vetch (*Astragalus brauntonii*) is documented as occurring on property adjacent to the park and is likely to occur within park boundaries, as well. This species is currently listed as Federal Endangered. Seven other listed sensitive plant taxa have the potential to occur within park boundaries.



Catalina Mariposa Lily

1998 Sensitive Plant Taxa Known To Occur Within Chino Hills State Park

Taxon	Common name	CNPS List*	State/Federal List*
Dudleya multicaulis	many-stemmed dudleya	1B	FSC
Calochortus catalinae	Catalina mariposa lily	4	
Romneya coulteri	Coulter's matilija poppy	4	

1998 Sensitive Plant Taxa For Which Potential Habitat Exists Within Chino Hills State Park

Taxon	Common name	CNPS List*	State/Federal List*
Astragalus brauntonii	Braunton's milk-vetch	1B	FE
Calochortus weedii var. *intermedius*	intermediate mariposa lily	1B	
Atriplex coulteri	Coulter's saltbush	1B	
Brodiaea filifolia	thread-leaved brodiaea	1B	CE/FSC

Hemizonia pungens ssp. *laevis*	smooth tarplant	1B	
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	1A	
Dodecahema leptocera	slender-horned spineflower	1B	CE/FE
Eriastrum densifolium ssp. *sanctorum*	Santa Ana River woollystar	1B	CE/FE

*Listing status codes: CNPS 1A = Presumed extinct in California; CNPS 1B = Rare and Endangered in California and elsewhere; CNPS 4 = Plants of limited distribution; FSC = Federal Species of Concern (formerly candidate species); CE = State of California Endangered; FE = Federally Endangered

Exotic Plant Populations

For over 100 years, livestock grazing occurred within the boundaries of what is now Chino Hills State Park. This grazing, along with fire suppression, disrupted natural ecological processes and allowed the introduction and rapid expansion of many non-native plant pest species to occur. The most noticeable disturbance has occurred in the many acres of open grassland which are now heavily dominated by non-native annual grasses and mustards. However, riparian areas have been adversely affected as well. Heavy grazing in riparian areas has disturbed habitat and degraded water quality thus paving the way for the proliferation of such exotic plant pests as the tree-of-heaven (*Ailanthus altissima*).

The giant cane (*Arundo donax*) is an invasive, exotic plant that is found in the Santa Ana River and Carbon Canyon Creek. Giant cane is currently manageable in the portion of the Santa Ana River within park boundaries, but has overrun Carbon Canyon Creek. Efforts will be necessary to further control and eradicate this species from park property.

Animal Life

The great diversity of vegetation types and habitat supports the existence of a wide variety of animal species. Some of the taxa occurring in the park are considered threatened, endangered, or species of special concern by the U.S. Fish and Wildlife Service and/or the California Department of Fish and Game.

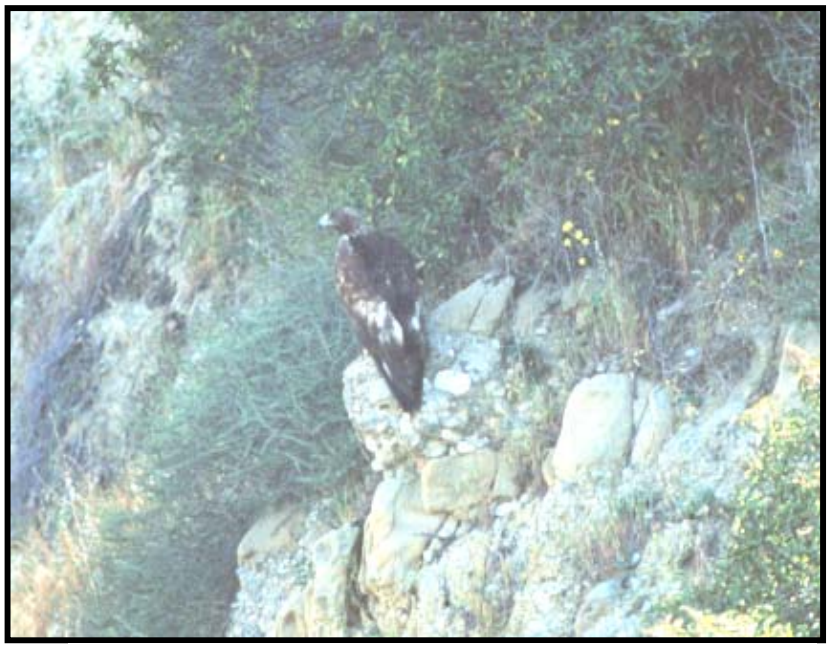
Sensitive Animal Populations

Mammals

Two California Mammal Species of Special Concern are known to occur within Chino Hills State Park. These are the western mastiff bat and the mountain lion (also a California Fully Protected Species). In addition to these, 22 special status mammal species have been recorded with the California Natural Diversity Database (CNDDB) of the California Department of Fish and Game as occurring in the vicinity of the park. Although they have not been documented within the park as of 1998, suitable habitat exists within the park to support their existence (see Appendix A).

Birds

Chino Hills State Park provides suitable habitat for numerous bird species. Of the 15 sensitive bird species documented using the park, one is on the Federal Threatened list, two are listed as Federal Endangered, two as California Fully Protected, two as California Endangered, eight are California Species of Special Concern, and three are of local or regional concern even though they don't appear on current sensitivity lists (see Appendix A). Several of these taxa occur on more than one sensitivity list. Suitable habitat exists within the park for an additional 28 bird species that have special status although they had not been documented there as of 1998 (see Appendix A).



Golden Eagle – Brush Canyon (photo by Rick Jackson)

Reptiles

Six sensitive reptile species occur within the boundaries of Chino Hills State Park: the southwestern pond turtle, San Bernardino ringneck snake, San Diego (coast) horned lizard, northern red-diamond rattlesnake, coast patch-nosed snake, and coastal western whiptail. All of these are considered California Species of Special Concern, but the pond turtle and the horned lizard are also listed as California Fully Protected. Suitable habitat for eleven other sensitive reptile species occurs within the park boundaries (see Appendix A).

Amphibians

There are nine special status amphibian taxa that could occur in the park (see Appendix A). Three of these, the arboreal salamander (a species of local concern), the western spadefoot (California Fully Protected, California Species of Special Concern), and the Monterey salamander have been documented as occurring within park boundaries.

In all, 23 wildlife taxa with some level of sensitivity have been documented utilizing the habitats and resources of Chino Hills State Park. Also, suitable habitat exists to support 65 additional sensitive animal taxa. These numbers are very large for a park the size of Chino Hills State Park.

Aquatic Life

Fish habitat in the Santa Ana River and in most of its tributaries has been significantly reduced from its original extent. Stream channelization, dams, and other projects related to urbanization of the Los Angeles plain have contributed to this habitat loss. As a result, steelhead and Pacific lamprey, two anadromous fish species that once inhabited the river, are no longer present. Of the native freshwater fish species, only the arroyo chub still can be found in the Santa Ana River. The Santa Ana sucker, Santa Ana speckled dace, and unarmored three-spine stickleback no longer exist in this river system. Currently, the unarmored three-spine stickleback is listed as both State and Federal Endangered and a recovery team is inspecting the possibility of appropriate sites for reintroduction within the park (see Appendix A).



Lower Aliso Creek

Chino Hills State Park includes a one-mile-long unchanneled section of the Santa Ana River. Also within park boundaries, Aliso Creek, which provides suitable habitat for the four freshwater fish native to the area, is the only unchanneled tributary with access to the river downstream of the Prado Dam. It also contains a perennial reach that supports populations of the arroyo chub. Aquatic habitat in Aliso Creek has become increasingly important to the regional conservation of the arroyo chub. The introduction of pollutants and exotic animal species has reduced habitat quality in the Santa Ana River. Introduced crayfish, two species of non-native fish, and African clawed frogs are present in Aliso Creek. They are both a competitive and predatory threat to the arroyo chub.

Paleontology

Chino Hills State Park has not been systematically surveyed for paleontological resources. However, many fossils have been found in the Chino Hills area. The Puente Formation, present throughout the park, is well documented to contain abundant fossil deposits. Fossil specimens known to be present in that geologic formation include whales, porpoises, fish, shark teeth, leaves, marine invertebrates, and others. The Puente Formation is particularly well recognized for its fossil fish remains, especially near-shore species. Unique Pliocene-age fossil deposits may also be present in the southeastern portion of the park. Microscopic foraminifera are also contained in the marine sandstone members. A thorough paleontological survey may reveal that important fossil deposits exist within the park.

CULTURAL RESOURCES

Native American Ethnographic Overview

Chino Hills State Park is located in the inland southern portion of the traditional Gabrielino territory in close proximity to the Juaneño, Luiseño, Serrano, and Cahuilla Indian groups. The Gabrielino were occupying lands in and around the park at the time the Spaniards arrived in southern California.

The Gabrielino are reported to have been the wealthiest, most populous, and most powerful ethnic nationality in aboriginal southern California, other than the Chumash. The Gabrielino possessed a material culture reflecting sophisticated knowledge of the working qualities of natural materials and elaborate artisanship. They were particularly known for their tool, utensils, and ritual objects. The Gabrielino traded their creations, food products, and animal skins over a broad region in present-day southern California.

San Gabriel Mission baptism records list village names and an occasional note concerning village locations. These location notes and the number of individuals baptized suggest that four large villages were situated in the Santa Ana River Basin near Chino Hills State Park. The Indians of these villages are hypothesized to have regularly exploited the natural resources of the Chino Hills.

Historic Overview

The historic period of the Park dates from the first recorded Euroamerican explorations along the Santa Ana River in the late-eighteenth century and continues through ranching endeavors of the mid-twentieth century.

This area was originally part of the extensive grazing lands granted to the San Gabriel Mission, which was established in 1771. During the Mexican Republic era, the area served as spillover grazing land for Rancho Santa Ana del Chino to the north, Rancho La Brea to the west, and Ranchos Cañon de Santa Ana and La Sierra Yorba to the south. In 1848, when Mexico ceded California to the United States, it became part of the United States public domain lands. Documented legal acquisition of public land in the park began during the last three decades of the nineteenth century.

Throughout its recorded history, the area served primarily as grazing land, although some late-nineteenth and early-twentieth century agriculture, horticulture, oil exploration, and mining activities occurred in parts of the park. Historic activity left only one complex of historic buildings (Rolling M Ranch) and scattered historic features. However, stock grazing had a significant effect on the park. Cattle and sheep grazing eliminated native grasses and grains once used by Native Americans as food sources, and ranchers introduced non-native grasses to feed stock herds.

Hispanic Period (1771-1848)
Although exploration occurred both north and south of the park, there is no documented evidence indicating the park was formally surveyed by Euroamericans during the eighteenth or early-nineteenth century, nor legally acquired prior to the 1830s. Mission San Gabriel was established just 20 miles northwest of the park, so stock grazing may have occurred on park land as early as the 1770s.

Early American Period (1848-1920)
In contrast to the surrounding region, there is no evidence of permanent activity other than grazing in the present-day park prior to the U.S. Surveyor General's public domain surveys. These surveys began in 1853 and were not completed until 1894. The deputy surveyor's field notes do not note any structures, fences, or wagon roads in the park, although much of the land was obtained and used for grazing during this period.

Legal acquisition of public domain land within Chino Hills State Park by private individuals did not begin until the early 1870s. Many of those filing were associated with the small ranching community of Rincon just east of the park boundary along the Prado Basin. Local ranchers such as Fenton Slaughter, who had purchased Raymundo Yorba's home and property in 1868, established successful sheep and cattle ranching operations that extended into the eastern limits of Chino Hills State Park. Activity and ownership increased during the Great Land Boom of the mid-1880s. Those who purchased Chino Hills land for ranching use included the founder of the town of Chino, Richard Gird. By 1895 much of the future park property was under absentee ownership, such as that of the San Francisco based Chino Land and Water Company.

Although most of the Chino Hills land was in ownership by 1900, the first published USGS quadrangle map of 1902 indicates only three miscellaneous structures and a wagon road running within current park boundaries. These structures were likely associated with various ranching and mineral extraction activities. Although no large deposits were located or exploited within the park, several oil wells and mines have been documented from this period.

Twentieth Century Development Period (1920s-1980)
During the inter-war years of the 1920s to the 1940s, the ranching industry reached its most active period at Chino Hills. In 1921, local dairy rancher Frank Pellissier purchased most of the Chino Land and Water Company holdings for his dairy herds, including the area of the future Rolling M Ranch. The first aerial photographs of the region in the late 1930s indicate numerous cleared areas that had obviously received regular grazing activity along almost all the watershed canyons of the park, including near the Santa Ana River and Carbon Canyon.

The 1940s would also see the increased development of the Rolling M Ranch complex. Aerial photographs show several structures and cleared areas on the site by 1940. In

1948, the Mollin Investment Company acquired 1,720 acres, subsequently giving the area the name of the Rolling M Ranch. The company enlarged and improved the corral system and rehabilitated and enlarged the main house. Mollin owned the property until the establishment of the State Park in the 1980s.

Cultural Resources Within The Park

Archaeological Resources

Archaeological resources within Chino Hills State Park include those from both the prehistoric and historic periods. Some areas of the park have not been surveyed for archaeological resources, so, the full extent of archaeological resources occurring in the park is not known. Descriptions and locations of recorded sites are found in the park Resource Inventory, as well as in other Department files.

Prehistorical Archaeology

The Native American sites located in Chino Hills State Park indicate that the Indians of the Santa Ana River Basin used the area for hunting and gathering. To date, two Native American camp sites and many isolated artifacts have been identified and recorded in the park. The range of site types recorded within the park includes one site with occupational debris and appreciable depth, one with sparse occupational remains, an outcrop with one cupule petroglyph, numerous isolated metates and manos, and two isolated projectile points. Archaeological surveys of limited scope within the Sonome Canyon Area have yielded no archaeological sites to date.

The most recent dates for sites in the Prado Basin and Chino Hills are not well defined, but fall around 1,000 years before present (BP). Mission baptismal records indicate the former presence of aboriginal villages near Chino Hills State Park, however, archeological data on these villages is lacking. One site within Chino Hills State Park yielded dates between 1,070 and 2,380 years BP.

Historical Resources

The park's historic period resources include various structures, features, and cultural landscapes. Most are associated with ranching, the dominant historical land use. Other historic resources are associated with mineral and oil extraction, transportation and other public utilities, and varied agricultural and horticultural uses.

Only some of these resources are inventoried and identified. Most of these were evaluated as individual features. Those sites identified as locally or regionally significant include the Rolling M Ranch complex (seven structures) and four windmills, circa 1900-1930. Twenty other historic-period sites have been recorded. Most of these lack individual significance, but when evaluated collectively as features of the larger landscape, their historical significance is apparent. Such features include corrals, stock ponds, water troughs, water tanks, cross fencing, structure and equipment remains, and small, miscellaneous structures.

Cultural Landscapes

The most significant historic resource at Chino Hills State Park is the historic ranch landscape, a vernacular landscape that reflects the lives and activities of those occupying the land in the late-nineteenth and early-twentieth centuries. This remnant, rural landscape provides a rich contrast to the dense urban development fast enveloping the park. The historic character is defined by patterned relationships of cultural features to the land—its inherent topography, soils, vegetation, and water sources—and also to climate patterns. Landscape components (old trails, ranch roads, fields, orchards); water system features (windmills, stock ponds, water troughs, tanks, pipes); and individual elements, such as the barn, sheds, stock fences, chute, scale, and other ranching equipment, remind us of this historic "working landscape".



Cattle chute at Rolling M Ranch

The park contains several sites associated with the history of the local oil industry and small-scale mining efforts. Research available at this time does not indicate that any of these sites is individually significant. However, they do represent locally recognized historic land uses within Chino Hills State Park.

Of six livestock ponds that were constructed in the park during the ranching era, four are still present. Three of these, McDermott Spring, and Windmill and Panorama ponds, have stable earthen dams, are not interfering with fish migration routes, and are deep enough to provide positive wildlife habitat values. These ponds represent a significant example of the historic ranching landscape.

Approximately 40 acres of lemon trees in the Lemon Grove Area represent the only extant remnant of the historically significant citrus industry that once surrounded the park. This area is located off Carbon Canyon Road at the far-western end of the park. It offers trailhead parking and access to Telegraph Canyon.

Collections

The most notable collection currently housed at the park is a collection of historic ranching artifacts once used at the Rolling M Ranch and surrounding ranchlands. These artifacts represent a prime resource for interpreting the events of the historic ranching era.

AESTHETIC RESOURCES

Aesthetic value is attributed by park visitors to experiences, features, and qualities in harmony with natural, unmanipulated conditions and is perceived through the senses; by seeing, hearing, touching, smelling, and tasting. In addition to the tangible natural and cultural features such as plants, animals, waters, geologic features, buildings, and archaeological sites, Chino Hills State Park also offers many intangible qualities. These include natural quiet, solitude, space, scenery, a sense of history, sounds of nature, and clear night skies that are important components of people's enjoyment of the park.

The appearance of the landscape in Chino Hills State Park is relatively unaltered by the works of humans, especially when compared to the surrounding urban landscape. Long distance views of natural terrain and vegetation are available from selected locations. The acquisition plans for this park have emphasized the value of acquiring ridgetops to protect the viewsheds within the park. As a result, the relative pristine views of the hills from Telegraph and Aliso Canyons and from selected panorama points have been mostly protected from urban encroachments. Viewpoints of particular interest are San Juan Hill, Gilman Peak, and McLean Overlook.

A wide variety of more intimate natural scenes are available throughout the park. Densely wooded canyon bottoms offer dark shade, lush vegetation, and running water. Many species of wildflowers provide scenes of great beauty during the spring. The grassy hills are brilliant green during the spring and golden brown in the summer.



Electrical transmission lines – Telegraph Canyon

Due to the proximity to urban environments, the hills are interlaced with utility easements, roads, and other human-made works that are significant negative visual features in the park. By far the most prominent negative visual features are the many high-voltage electrical transmission lines that traverse the park. Other negative visual features include partially buried natural gas pipelines and the many unsurfaced roads. Also, some modern facilities such as a large cribbed retaining wall along the entrance road and modern site amenities at the overlook area near the Rolling M Ranch are not compatible with the rural scenery and detract from the visitor's experience of the natural landscape.

RECREATIONAL RESOURCES

The proximity of its natural open space to urban populations and extensive trail network make Chino Hills State Park a popular and valuable recreational resource. Visitors enjoy both active and passive forms of recreation that focus primarily on trail use. People frequently visit the park from adjacent communities to walk, jog, bike, or ride horses. The park is also a popular spot for family and equestrian campers, as well as picnickers.

Trail Use

Trails are used by a majority of visitors for their recreational pursuits (see Figure 3). The trail network gives access to many of the park's special places, including wooded riparian areas, open grasslands, and scenic viewpoints. The variety of trails available at the park offers a wide range of difficulty and recreational experience. Many visitors use the trails for active-types of recreation such as jogging, hiking, mountain biking, and horseback riding. Other visitors use the trails for passive-type activities such as bird watching, photography, and nature study. Some hiking-only trails occur in the park to accommodate these activities.



Hiking trail in Water Canyon

Conflicts between trail users have occurred on multi-use trails in the park. These conflicts have resulted when trail users perceive their trail experience to be negatively affected by the behavior or activity of another. Trail users with different activity styles, modes of travel, or expectations sometimes perceive other trail uses to be incompatible with their use.

Camping and Picnicking

The shaded campground area near Aliso Creek offers a comfortable and appealing camping location. The site is suitable for families, small groups, and equestrians. The equestrian staging area is a large, flat area with scenic vistas of the park. This area is suitable for large equestrian groups as well as individuals and families with horses. Both sites are along the interior of the park, offering a quiet location and dark nighttime skies suitable for stargazing (see Figure 4).

Several family picnic sites occur along the interior of the park (see Figure 4). The most popular of these is at a shade ramada located at the Rolling M Ranch.

PLANNING INFLUENCES

The goals and guidelines established in the *Plan Section* of this document are the result of many factors. The existing conditions of the park; the natural, cultural, and aesthetic resources; and the public use of the park all shape general planning. In addition, there are other factors that influence long-range planning. The influences of system-wide planning, regional planning, and public concerns are summarized in this section.

SYSTEM-WIDE PLANNING

Some regulations, policies, and plans address issues that cross park and regional boundaries. Appendix B (Page 96) shows system-wide planning influences that may affect planning decisions at Chino Hills State Park. Any system-wide plans developed in the future that contain specific recommendations pertaining to the use, operation, or management of the State Park may also effect future planning decisions at Chino Hills State Park.

REGIONAL PLANNING

Certain plans and programs address regional issues and events. The following regional influences may affect planning decisions at Chino Hills State Park.

NATURAL COMMUNITIES CONSERVATION PROGRAM (NCCP)

The Department of Parks and Recreation has signed a Memorandum of Agreement (MOA) with the California Department of Fish and Game (DFG) outlining each agency's responsibilities in the implementation of the Coastal Sage Scrub Natural Communities Conservation Program (NCCP).

In cooperation with the U.S. Fish and Wildlife Service (USFWS), the NCCP is designed to provide for regional protection and conservation of sensitive species habitat at the natural community level and at the same time to allow for compatible development and urban growth. The program is attempting to do this by acquiring and protecting large parcels of adjoining quality habitat and by restoring adjacent habitat of lower quality within an interconnected core habitat system. California State Parks, as a leader in the conservation and management of the natural habitats, is playing an important role in the formulation of regional preserves for the NCCP.

Southern California, with its fast urban growth rate and urgent need to preserve rapidly declining natural habitats, is the first area of the state to implement the NCCP. The focus is on coastal sage scrub habitat, crucial to the survival of the Federal Threatened California gnatcatcher and an important habitat for species of concern such as the coastal cactus wren and the orange-throated whiptail.

Chino Hills State Park has a considerable amount of high quality coastal sage scrub habitat within its boundaries. Its lands have been enrolled as a reserve in the NCCP program, and its contribution to a regional NCCP Habitat Conservation Plan (HCP) is imminent. The park's inclusion in the NCCP program necessitates that management of the park should be consistent with NCCP long-term plans and management goals.

BIOCORRIDORS

Biocorridors, or habitat linkages, are imperative to the biological survival of Chino Hills State Park and the Puente-Chino and Whittier Hills. These biocorridors cross several jurisdictional and private property boundaries. To effectively manage them for the facilitation of wildlife movement requires cooperation and a regional perspective.

The Wildlife Corridor Conservation Authority (WCCA) is a local joint powers authority (JPA) represented by city and state agencies, as well as members of the public. California State Parks is currently represented as a Governing Board member of the JPA. The mission of WCCA is to provide for the proper planning, conservation, environmental protection, and maintenance of the habitat and wildlife corridor between the Puente Hills in the west and the Chino Hills in the east, which connects to the Cleveland National Forest to the south. WCCA encourages the Department to pay special attention to the areas that are ecologically sensitive such as the north-south connection between the park and the Cleveland National Forest, and the east-west connection between the park and the Prado Basin. It is the responsibility of Chino Hills State Park to manage identified wildlife movement corridors within the park's boundaries in a manner consistent with the conservation and perpetuation of the species that use them and to facilitate their movement.

The results of resource studies undertaken by WCCA are available to Department managers for use at Chino Hills State Park.

SANTA ANA RIVER

A small area of Chino Hills State Park is in the Santa Ana Canyon and Santa Ana River Flood Plain. This area between the Green River Golf Course and State Route 71 is subject to the *Lower Santa Ana River Canyon Resource, Floodplain, and Habitat Management Plan*. The Department was a part of the Study Group that developed the plan. Flowage easement rights are also required in this portion of the park for the Santa Ana River Mainstem Project, per an agreement between the Riverside County Flood Control and Water Conservation District (RCFC&WCD) and the Department.

TRAILS

Many regional riding and hiking trails and bikeways exist in the vicinity of Chino Hills State Park. Because the park borders four counties and three cities, there are numerous opportunities to link regional trails with those at the park. The cities of

Anaheim, Brea, Chino Hills, and Yorba Linda, as well as the County of Orange, for example, currently show trail linkages to the State Park in their general plans. The following agencies have regional trail plans: City of Chino Hills, City of Anaheim, Orange County Transportation Agency, County of Orange, and City of Yorba Linda.

PARK ACCESS

The cities adjacent to the park, Yorba Linda, Brea, and Chino Hills, have expressed concerns about providing adequate park access and trailhead parking. This is a result of problems associated with visitors parking on residential streets to access the trail network.

WILDFIRE MANAGEMENT

The City of Brea is concerned about park activities that may affect adjoining wildlands in the jurisdiction of the City of Brea. In addition, the Metropolitan Water District of Southern California (MWD), because of their operation of a water filtration plant adjacent to the park, as well as water feeder lines and easements within the park, is concerned about any wildfire management planning occurring at the park. Parties to the Habitat Conservation Plan (HCP) also are concerned about wildfire management planning at the park.

HABITAT CONSERVATION

The Metropolitan Water District of Southern California (MWD) and Shell Western E&P Inc., adjacent property owners to the park with planned future activities that will have impacts on habitat, have developed a Habitat Conservation Plan (HCP) with the Department and other agencies (U.S. Fish and Wildlife Service, California Department of Fish and Game, the County of Orange, the Cities of Yorba Linda and Brea, and Hills for Everyone) in accordance with Section 10(a)(1)(B) of the Federal Endangered Species Act**.** The HCP is a plan to protect and restore coastal sage scrub habitat and the species that utilize it. The HCP was required as mitigation for the development by Metropolitan and Shell Western E&P Inc. of coastal sage scrub habitat used by the Federally listed California gnatcatcher. The HCP covers a 2,600-acre Study/Management Area in the western portion of Chino Hills State Park and results in the preservation of more than 1,200 acres, including the Sonome Canyon Area.

The HCP is a major component of the Natural Communities Conservation Program (NCCP) because it provides crucial habitat protection and enhancement for some of the last remaining coastal sage scrub habitat in the region. The HCP includes resource management objectives for the area that are consistent with Department goals and also provides for a resource ecologist to implement and monitor results of the program for a period of fifteen years.

UTILITY EASEMENTS AND ROADS

Metropolitan Water District of Southern California (MWD)

The Metropolitan Water District of Southern California (MWD) operates the Robert B. Diemer Water Filtration Plant at its 200-acre facility adjacent to the southern boundary of the park in Orange County. MWD's Yorba Linda Feeder tunnel and pipeline system traverses the park in a north-south direction to connect with the Diemer plant. In addition, MWD's Lower Feeder pipeline traverses the park in San Bernardino County in an east-west direction.

MWD's *Guidelines for Development in the Area of Facilities, Fee Properties, and/or Easements of the Metropolitan Water District of Southern California* was developed to assist other agencies, including the Department of Parks and Recreation, in preparing plans that are compatible with MWD's facilities and easements.

In addition, MWD Operations personnel use several dirt roads, including those along the Lower Feeder and Yorba Linda Feeder rights-of-way and to miscellaneous substructure facilities associated with pipelines. Any of the Department's maintenance activities, land uses, or planning efforts that affect MWD's access is a concern of MWD.

MWD has an Emergency Response Plan. This plan addresses public safety issues associated with nearby storage areas of hazardous chemicals. These chemicals are currently used in the water treatment process and stored in bulk at the Diemer plant. Any public uses planned for park areas adjacent to the plant are a concern of MWD.

Heavy trucks must routinely travel through the park to access the solids drying ponds near Telegraph Creek. Any activities or planning that affect this access is a concern of MWD.

Southern California Edison

Southern California Edison (SCE) Operations personnel use several dirt roads in the park to access gas pipelines and electric transmission lines. Any of the Department's maintenance activities, land uses, or planning efforts that affect safe access to SCE facilities is a concern of SCE.

REGIONAL TRANSPORTATION

The Southern California Association of Governments (SCAG) is the authority for the Regional Transportation Plan (RTP) that incorporates Chino Hills State Park and communities in the region. The 1998 RTP is known as *CommunityLink 21*, which covers the period from 1998 to 2020. This plan addresses mobility, economic, social, and environmental goals and objectives for transportation planning for the region.

The Orange County Transportation Agency and the Southern California Association of Governments are lead agencies of the Four Corners Policy Committee. This committee is made up of representatives from county, city, and local government agencies, as well as regional transportation agencies and private organizations in the affected area. The area that surrounds Chino Hills State Park is named for the four corners of the Counties of Los Angeles, San Bernardino, Orange, and Riverside, which come together at this location and includes State Routes 57, 90, 142, 71, 91, 60, 83, and Interstate 15. Knowledge of proposals made in the RTP and by the Four Corners Policy Committee, as well as other potential regional transportation authorities, is crucial to understanding potential impacts to resources and operation of the park.

POPULATION TRENDS

The proximity of Chino Hills State Park to the intensely developed metropolitan areas of Los Angeles, Orange, Riverside and San Bernardino Counties potentially offers an open-space retreat to 15 million people. By the year 2020, the California Department of Finance projects that the resident population of these counties will grow by 32 percent and exceed 22 million people. This means that approximately 45 percent of the state's population will live within 40 miles (a short driving distance) of the park. The estimated resident population of the three bordering communities of Brea, Yorba Linda, and Chino Hills is expected to exceed 225,000 people by the year 2025. These local populations will create the highest demand for park use.

The regional population is unparalleled in its cultural and ethnic diversity and includes a growing number of single-parent households. It is important to note that in the next twenty years there will be a population explosion of senior-aged citizens. To accommodate these citizens, Chino Hills State Park will need to provide for a wider range of recreational interests and abilities than it does now.

Visitor attendance at Chino Hills State Park steadily increased between the opening of the park in 1984 and 1995. There were an estimated 9,845 visitors to the park in 1990. This amount increased to an estimated 193,891 visitors in 1995. Attendance from 1995 through 1997 decreased slightly to an average 171,835 visitors per year.

PUBLIC CONCERN

Public input was solicited at several steps in the general plan process. Several meetings were held to familiarize the public with the planning process and park issues. The first public meeting, held in the City of Brea, was informative and provided an opportunity to describe the significant resources and unique features that make Chino Hills State Park a special place. The meeting was opened to public comments, and all comments were noted. In addition, a questionnaire was distributed to those attending to gauge what issues and concerns were considered most important. Responses from the questionnaires indicated that the primary interest in

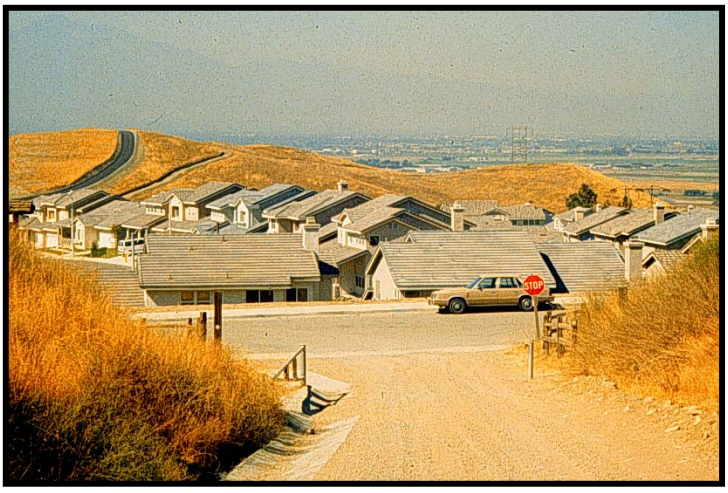
Chino Hills State Park was for natural resource preservation, interpretation, and recreational activities. The majority of respondents thought that the park should be left natural and undeveloped. Trails and public access were important concerns as well.

The second public meeting, held in the City of Chino Hills, was a workshop where participants noted specific concerns and commented on proposed general plan guidelines. A similar workshop was held in the City of Yorba Linda to expand opportunities for public involvement to surrounding communities. After each workshop proposed guidelines were reevaluated and, where appropriate, rewritten to incorporate these comments and suggestions. The overriding concerns were public use of the proposed Core Habitat Zone, the need for improved public access points into the park, and the desire to restrict future developments and concessions within park boundaries.

A final public meeting, describing plan alternatives and the preferred plan, was held in the City of Corona. At the end of the meeting, the public was invited to ask questions. These were again noted and reviewed after the meeting.

Throughout the course of public involvement in the general plan process for Chino Hills State Park, it was clear that the primary issues of concern for park users are those related to park access, trail use, and maintaining the wildness of the park by restricting further developments and concessions.

In addition to the meetings held for the general public, the Chino Hills State Park General Plan team held a meeting with public agency representatives. Concerns were voiced about public access points and parking, continued access to utility company structures and maintenance of utility roads, and the need for more interpretive programs, including campfire programs, designed to increase public awareness of the park's resources.



Residential subdivision adjacent to park entrance at Bane Canyon

ISSUES

The *Issues Section* highlights the important issues derived from the *Park Summary* (beginning on Page 9) and from the *Planning Influences* (beginning on Page 37). The goals and guidelines of the *Plan Section* address these issues.

RESOURCE MANAGEMENT AND PROTECTION

BIOCORRIDORS AND CORE HABITAT AREAS

Urbanization within and surrounding the Puente-Chino Hills has resulted in the near biological separation of Chino Hills State Park from adjacent open-space areas. The remaining biological connections to these adjacent areas are tenuous. They are bisected by roads and reduced in size by the conversion of surrounding open space urban uses. In some cases, portions of remaining, viable habitat linkages are privately owned and unprotected. Development of these private parcels will jeopardize the diversity and integrity of the park's biological resources by eliminating or reducing wildlife movement through these corridors. The identification and management of areas containing representative, sensitive, or otherwise important habitats within the park and the biocorridors that link these habitats to those outside of the park, are essential to the maintenance of the park and regional ecosystems.

NATURAL RESOURCES

Increased awareness of the diversity and fragility of sensitive plant and animal species, as well as their supporting habitats has created greater need to protect and interpret these resources. Further guidance to direct resource management and conservation efforts at the park is needed to ensure the perpetuation of these values for future generations.

HISTORIC RESOURCES

Information acquired since the original general plan places new emphasis on the park's historic resources, particularly the historic ranching landscape and features associated with the Rolling M Ranch. Greater protection and interpretation of these historic resources is needed in order to preserve California's heritage and for the education and enjoyment of park visitors.

AESTHETIC RESOURCES

Aesthetic qualities of the park can be adversely impacted by man-made intrusions such as developments, activities, or land uses that are incompatible with the park's natural character. Increasing development and more intensive land uses surrounding the park place increased emphasis on protecting scenic features and preserving the visitor's experience of the park's aesthetic qualities.

INTERPRETATION

Current knowledge of natural and cultural resources at Chino Hills State Park places new emphasis on habitat connections, native plant and animal diversity and fragility, Native American involvement in the area, and historic ranching. Interpretive topics need to reflect this current knowledge and emphasis.

VISITOR USE AND DEVELOPMENT

VISITOR-USE FACILITIES

The original (1986) general plan proposed the development of a large number of campgrounds, picnic areas, and trailhead parking areas in the park, specifically within Lower Aliso Canyon and the Santa Ana River floodplain. Continuing resource inventory work within the park has increased the Department's understanding of the sensitivity of the resources located at these proposed campground sites. Also, the current demand for camping at the park places question on the need for many large, developed campgrounds. The placement of facilities at these sites is no longer considered appropriate, yet additional facilities to enhance the visitor's park experience may still be needed. Guidance for the development of both visitor-use and operations facilities is needed to accommodate new recreational opportunities and at the same time protect park resources.

PARK ACCESS

Public vehicle access into the park is limited to the Bane Canyon entrance. This entrance is accessed through a residential area. The location makes it difficult to access the park and causes off-site parking conflicts. Furthermore, the access into the park from this point is on a one-lane, steep, dirt road. This road cannot be upgraded to an acceptable condition because of the steepness of the grade and adjacent slopes.

The emergency vehicle access at Rim Crest Road (see Figure 2) is being used as a pedestrian access point and certain problems have developed because of it. There are no developed parking, restroom, or trash facilities at this location, and visitors are parking on residential streets. This situation points to the need for coordination with local jurisdictions in addressing access. Also, information on sensitive park resources indicates that some of the park's access points proposed in the original general plan may be inappropriate.

ACQUISITIONS

Acquisition plans for the park have, among other things, emphasized the value of acquiring ridgelines to protect the viewsheds within the park. However, additional guidelines are needed to help Department staff evaluate the desirability of proposed land acquisitions at Chino Hills State Park.

PLAN SECTION



Riparian vegetation – Lower Aliso Canyon

INTRODUCTION TO THE PLAN SECTION

The long-range vision for Chino Hills State Park is depicted in the *Plan Section*. The purpose here is to portray both the desired resource condition and visitor experience of the park and to provide goals and guidelines that will direct future management efforts toward achieving those desires. The *Plan Section* does not designate detailed facility improvements with specific sizes and capacities. Over the next 5, 15, or 30 years there will be different technologies, different recreational needs, and new opportunities that can not be foreseen with the writing of this document. In short, there will be many ways to achieve the desired conditions within the parameters provided by the *Plan Section's* goals and guidelines.

The following planning hierarchy provides direction for the future of Chino Hills State Park. Items in bold boxes were created as part of this general plan effort.

Classification: Along with all units that have been designated as "state parks", Chino Hills State Park is managed under the direction of Public Resources Code Section 5019.53.

Declaration of Purpose: A broad statement of direction, unique to Chino Hills State Park (Page 48).

Management Zones: A land-use zoning plan for the park that links four general levels of desired resource conditions and visitor experience to geographic areas depicted on a map (Page 49).

Park-wide Management Goals and Guidelines: Topical guidance whose scope is relevant for the entire park (Page 57).

Specific Area Goals and Guidelines: Management goals and guidelines that clarify goals for a specific area (Page 75).

DECLARATION OF PURPOSE

The Declaration of Purpose defines the purpose of the park and is the broadest statement of management goals. A declaration of purpose is required by the Public Resources Code, Section 5002.2 (b), "setting forth specific long-range management objectives for the park consistent with the park's classification..." The Declaration of Purpose for Chino Hills State Park will be as follows:

Purpose

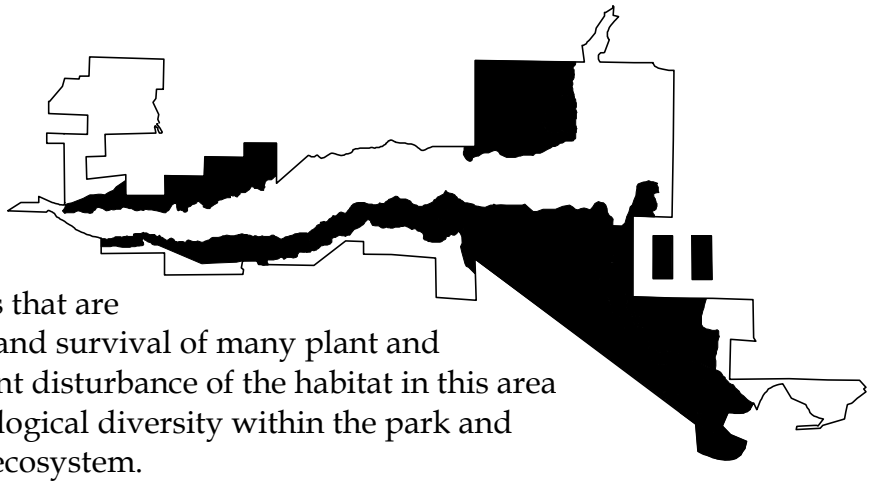
The purpose of Chino Hills State Park is to preserve the natural, cultural, and scenic resources of the rolling hills, wooded canyons, and riparian forests that are representative of the early California landscape, and make them available for public enjoyment and education.

California State Parks will endeavor to preserve and restore native habitats in the park for their intrinsic natural values, to promote biological diversity, and to support the integrity of regional ecosystems. California State Parks will endeavor to protect the cultural and scenic resources, promote an understanding of the park's unique features, and provide recreation opportunities in a manner consistent with the protection of natural and cultural values.

MANAGEMENT ZONES

Management zones spatially define the management scheme for the unit (see Management Zones Map – Figure 6). The management zones for Chino Hills State Park are based primarily on the degree of natural, cultural, and aesthetic resource value and sensitivity. Secondarily, they are based on recreational, visitor service, and management needs, and ecological and geographical parameters. Four management zones for Chino Hills State Park are presented below, along with goals and guidelines for visitor activities, resource management, and facility development within the management zones. The management zones are the Core Habitat Zone, Natural Open Space Zone, Historic Zone, and Recreation and Operations Zone. The Management Zone Matrix on Page 55 further defines the vision for these four management zones.

CORE HABITAT ZONE



The Core Habitat Zone is the area of highest biological resource sensitivity in the park. The area includes very sensitive wildlife habitats that are crucial to the movement and survival of many plant and animal species. Significant disturbance of the habitat in this area could seriously affect biological diversity within the park and throughout the regional ecosystem.

WATER CANYON NATURAL PRESERVE

Statutes for classification of units of the State Park System are contained in Article 1.7 of the Public Resources Code. Based on these statutes and an evaluation of the park's resources it is proposed that a portion of the Core Habitat Zone be sub-classified as the **Water Canyon Natural Preserve**, as described in Public Resources Code Section 5019.71. The natural preserve will incorporate the entire Water Canyon watershed as well as the entire upper Brush Canyon watershed. The boundary of the natural preserve is generally delineated by the watershed boundaries of Water and Brush Canyons up to the southern park boundary and existing park trails in Lower Aliso Canyon (see Figure 6).

The Water Canyon Natural Preserve contains the northern extension of the Coal Canyon biocorridor, thereby preserving habitat crucial to the movement of sensitive wildlife and providing an important connection to the park's interior. The natural preserve also contains large stands of coastal sage scrub habitat which is necessary for the success of the California gnatcatcher, as well as fine examples of California Walnut Woodland and Coast Live Oak Woodland.

The creation of the Water Canyon Natural Preserve within Chino Hills State Park will provide the highest level of protection for the sensitive resources found in the preserve and will protect wildlife movement within the park and throughout the region. This sub-classification is necessary to ensure that development, inappropriate land use, or improper management decisions do not adversely affect the resources contained within the natural preserve boundary.

The sub-classification of the area to a natural preserve will require some adaptation from current land uses and management for this area. Currently, this area is governed by the state park classification as stated in Public Resources Code, Section 5019.53. The change to a natural preserve status will amend the primary goal for the area from balancing resource protection with recreational opportunities, to resource protection taking precedence over recreational opportunities. The Public Resources Code, Section 5019.71 governs the intent, management, and use of natural preserves:

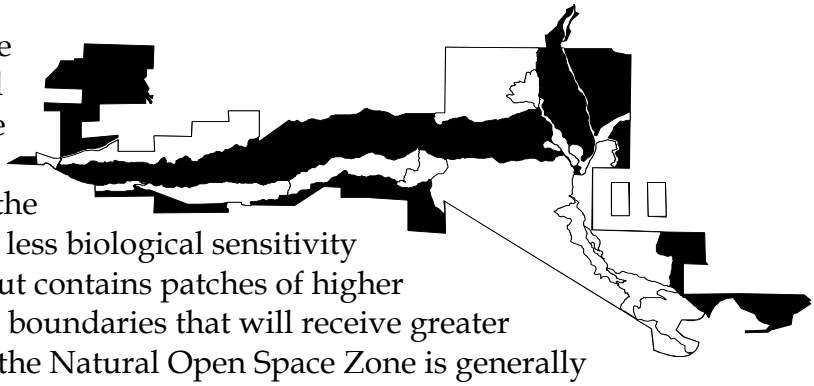
> PRC Section 5019.71: *Natural Preserves consist of distinct areas of outstanding natural or scientific significance established within the boundaries of other state park system units. The purpose of natural preserves shall be to preserve such features as rare or endangered plant and animal species and their supporting ecosystems, representative examples of plant or animal communities existing in California prior to the impact of civilization, geological features illustrative of geological processes, significant fossil occurrences or geological features of cultural or economic interest, or topographic features illustrative of representative or unique biogeographical patterns. Areas set aside as natural preserves shall be of sufficient size to allow, where possible, the natural dynamics of ecological interaction to continue without interference, and to provide, in all cases, a practicable management unit. Habitat manipulation shall be permitted only in those areas found by scientific analysis to require manipulation to preserve the species or associations which constitute the basis for the establishment of the natural preserve.*

The Water Canyon Natural Preserve will be managed according to PRC, Section 5019.71, the *Management Zones Section* of this general plan, and applicable Departmental policies as outlined in *System-wide Planning* of this general plan. Furthermore, the natural preserve will be managed according to the *Resource Management Directives for the California Department of Parks and Recreation,* Section 1812.2, which states that:

> *Boundaries of wildernesses and natural preserves will be established to give full protection to environmental and ecological integrity, from the standpoints of watershed influences, scenic and visual unity, cultural values, and other appropriate environmental factors.*

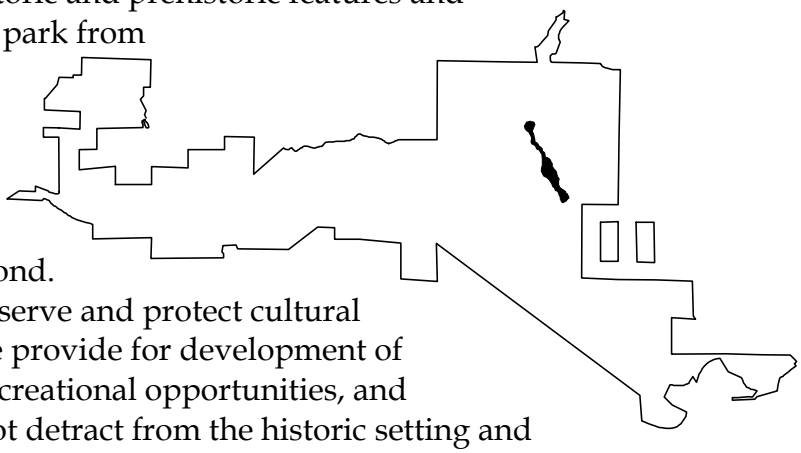
Developments in natural preserves are limited to trails and interpretive facilities required to make possible the visual and sensory enjoyment of the resources by visitors. Vehicle access and parking are not appropriate; visitor centers, restrooms, structures, and facilities other than signs shall be placed outside natural preserves.

NATURAL OPEN SPACE ZONE



The Natural Open Space Zone protects natural, cultural, and aesthetic resources, and at the same time allows for recreational opportunities at the park. The zone generally has less biological sensitivity than the Core Habitat Zone but contains patches of higher resource sensitivity within its boundaries that will receive greater protection. The boundary of the Natural Open Space Zone is generally delineated by roads and trails, the park boundary, and other management zone boundaries.

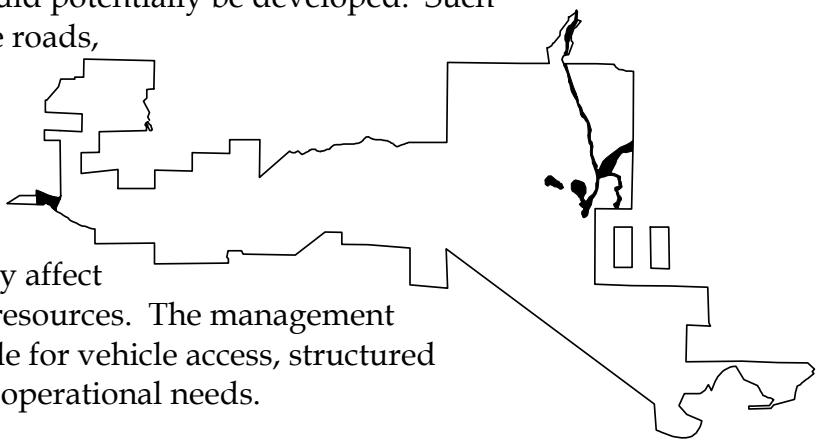
HISTORIC ZONE



The Historic Zone protects historic and prehistoric features and cultural landscapes within the park from impacts that may compromise their integrity. The zone incorporates the Rolling M Ranch complex, the windmill area west of the campground, and Windmill Pond. The intent of the zone is to preserve and protect cultural resources and at the same time provide for development of appropriate visitor services, recreational opportunities, and operational facilities that do not detract from the historic setting and experience. The Historic Zone allows visitors to experience a landscape from a past era. Management efforts and land use decisions will be based on the preservation of this value. The Historic Zone boundary includes significant historic landscape features, important views from the Rolling M Ranch, and other cultural resources.

RECREATION AND OPERATIONS ZONE

The Recreation and Operations Zone is designated where visitor services and operations facilities exist or could potentially be developed. Such facilities include public vehicle roads, maintenance structures, a visitor center, campgrounds, a campfire area, and employee housing. This zone is already developed or future development will not adversely affect significant natural or cultural resources. The management intent for this zone is to provide for vehicle access, structured recreation, visitor service, and operational needs.



The boundary of the Recreation and Operations Zone is generally delineated by existing roads, and campground and staging areas. The zone incorporates the current entrance road up to the Historic Zone, a proposed entrance road through Slaughter Canyon, the road leading to and including the McLean Overlook, the area currently used for equestrian staging, an area west of the Rolling M Ranch, and the Lemon Grove Area. In the event of a developed park entrance road through Slaughter Canyon, the Bane Canyon entrance road will be included in the Natural Open Space Zone.

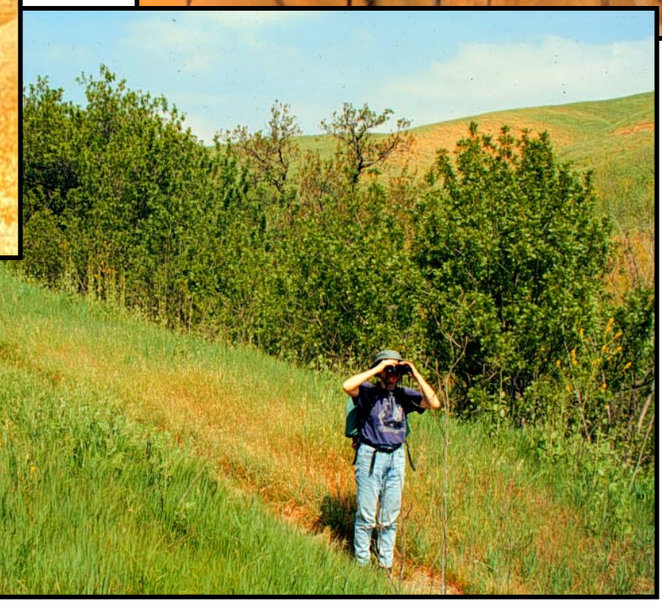
Cattails – lower Aliso Creek





California gnatcatcher (photo by D. Rossack)





Birdwatching – upper Telegraph Canyon



Coastal sage scrub vegetation – Telegraph

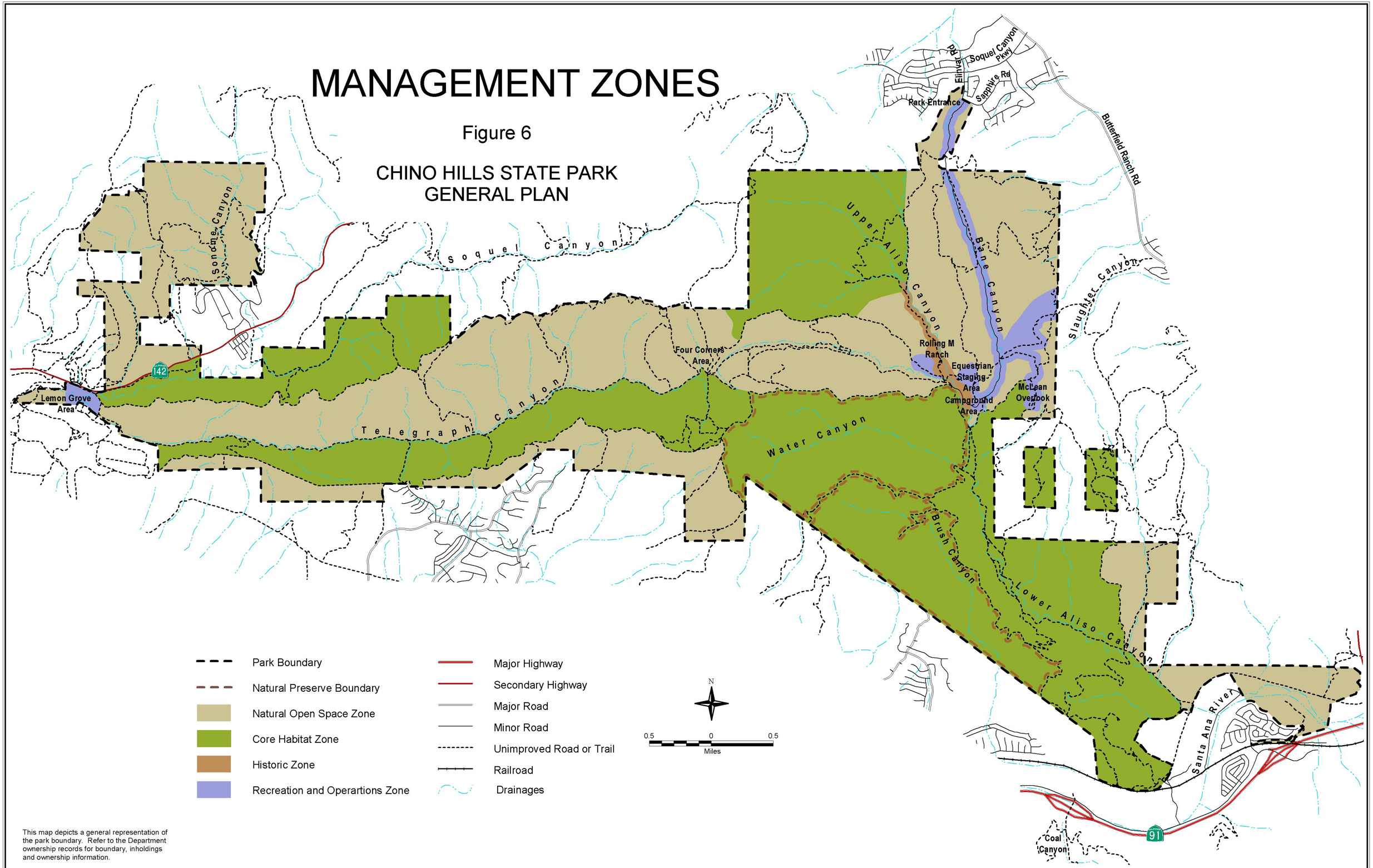


Fence lizard

MANAGEMENT ZONES

Figure 6

CHINO HILLS STATE PARK
GENERAL PLAN



This map depicts a general representation of the park boundary. Refer to the Department ownership records for boundary, inholdings and ownership information.

Figure 7

Management Zone Matrix

Figure 7

	Core Habitat Zone	*Natural Open Space Zone*	*Historic Zone*	*Recreation and Operations Zone*
PRIMARY GOAL	The primary goal of the Core Habitat Zone is to preserve and protect sensitive plant and animal species and their supporting habitats, as well as to protect the movement of plants and animals within the park and throughout the region. Resource protection will be the foremost consideration for all land use and management decisions.	The primary goal for the Natural Open Space Zone is to preserve and protect the resources and at the same time to provide for quality recreational opportunities.	The primary goal of the Historic Zone is to protect the cultural resources and at the same time to provide for quality recreational and educational experiences.	The primary goal of the Recreation and Operations Zone is to provide for vehicle access, structured recreation, visitor service, and operational needs.
RESOURCE MANAGE-MENT	Visitor and management activities within the zone will have no significant adverse impact on resources. Patrol and utility company vehicles and motorized equipment use is permitted on designated park roads and trails.	Visitor use and management activities will not have more than minimal impacts on resources. Patrol and utility company vehicles and motorized equipment use is permitted on designated park roads and trails.	Visitor use and management activities will not have more than minimal impacts to natural and aesthetic resources, and will include only those that do not detract from the historical setting and experiences. Vehicles and motorized equipment will be allowed on designated park roads and trails and will be managed to minimize impacts. Protection of cultural sites will include preservation of the surrounding cultural and natural landscapes by the elimination and exclusion of modern intrusions that adversely affect the cultural landscapes.	Visitor use and management activities will be mitigated to reduce significant impacts to resources. Activities may include the movement of vehicles, and intense visitor use. Vehicles and motorized equipment will be allowed on designated park roads and trails.
CARRYING CAPACITY	Visitors will experience a sense of remoteness and calm. The sights and sounds of nature will be more prevalent than those of human use. The chance of encountering other people will be low, and there will be extensive opportunities to experience natural quiet and solitude. Encounters with others should be less than 2/hour during peak use periods. Human uses will not disrupt or compromise sensitive resources.	The social environment will be leisurely and uncrowded with occasional sights and sounds of people. During some seasons, days, and times of day, there will be a good chance of encountering other people or groups of people. Opportunities for natural quiet and solitude will be variable depending upon the park location and season, day, and time of day. Encounters with others should be less than 6/hour during peak-use periods.	The social environment will be active and communal. At times, the sights and sounds of human use and activities will be more prevalent than those of nature. There will be frequent encounters with vehicles, other people, and groups of people. The chance of interacting with others will be high.	The social environment is active and communal. At times, the sights and sounds of human use and activities are more prevalent than those of nature. There are frequent encounters with vehicles, other people, and groups of people. The chance of interacting with others will be high.
TYPICAL VISITOR ACTIVITIES	Acceptable uses of the Core Habitat Zone include approved scientific research that increases our knowledge of the resources and improves management strategies. Conducted and self-guided interpretive programs are acceptable in the Core Habitat Zone. Visitor activities will be confined to daylight hours only.	Conducted and self-guided interpretive programs are acceptable in the Natural Open Space Zone. Visitor activities will be confined to daylight hours only.	Acceptable activities include interpretational and educational programs, exhibits, and historic structure museums. Opportunities for other interpretive programs and appropriate visitor services also exist. Overnight use is limited to educational and environmental living programs.	Acceptable activities include vehicle circulation, interpretation, camping, picnicking, and other forms of recreation suitable in the park. Overnight uses will be permitted only in specific areas designated for such use.
PUBLIC ACCESS	Public access through the zone includes hiking, biking, and horseback riding. Bikers and horseback riders are restricted to designated trails only.	Public access through the zone includes hiking, biking, and horseback riding. Bikers and horseback riders are restricted to designated trails only.	Public access through the zone includes hiking, biking, horseback riding, and driving (highway legal vehicles). Bikers and horseback riders are restricted to roads and designated trails only.	Public access through the zone includes hiking, biking, and horseback riding on designated trails and driving (highway legal vehicles). Bikers and horseback riders are restricted to roads and designated trails only.
RANGE OF APPROPRIATE FACILITIES	Multiple-use trails, trailhead features, and trailside rest stops are appropriate.	Multiple-use trails, trailhead features, trailside rest stops, and day-use parking along boundary (see *Park Access Points,* Page 70) are appropriate.	Only those facilities that support the visitor's use, understanding, and appreciation of the historical landscape and that are visually compatible with the historical scenery are appropriate.	Any visitor service and support facilities that are consistent with Parkwide and Specific Area Goals and Guidelines are appropriate. These could include but are not limited to: - Overnight Accommodations (camping, lodging) - Concession Facilities - Restrooms - Park Operations Buildings - Roads and Trails

PARKWIDE MANAGEMENT GOALS AND GUIDELINES

This section presents the broad goals and guidelines developed for managing park-wide resources, interpretation, visitor uses, and development. It addresses related planning issues that are not tied to a specific geographic area of the park.

RESOURCE MANAGEMENT AND PROTECTION

NATURAL RESOURCES

Biocorridors

Protecting biocorridors and facilitating the movement of animals and dispersal of plant seed within Chino Hills State Park, and between the park and other wildland areas, is imperative to maintain ecosystem health and support regional conservation.



Mountain Lion
(Photo by Mountain Lion Foundation)

Goal: Maintain and enhance the movement of native animals through the park and regional ecosystem. Visitors will gain an understanding of the importance of biocorridors and management efforts at the park aimed at supporting wildlife movement in the region.

Guidelines:

- Biocorridors within Chino Hills State Park that interconnect the park and its core habitat areas to other protected lands are of the highest priority for protection.

- The collection of baseline information and the monitoring of the health and function of core areas and biocorridors are high management priorities for the park. An emphasis should be placed on measuring the effects of human uses on the integrity of the system.

- Biocorridors will be recognized when there is enough information to indicate the necessity or importance of these connections to the movement of wildlife between Chino Hills State Park and other wildland areas. The adequacy and effectiveness of these habitat linkages will be monitored by tracking and documenting the presence, distribution, movement, and habitat associations of the representative species using them.

- The Department will actively work with local jurisdictions, transportation agencies, and regulatory agencies in the planning of future transportation projects. The Department will discourage the fragmentation and isolation of habitat by such projects and ensure that adequate mitigation measures are incorporated into all road improvement and construction projects. The Department will advocate measures that consider known information on wildlife use of biocorridors, principles of conservation biology, and other professionally accepted design criteria. An emphasis should be placed on the maintenance of habitat linkages and construction of under-crossings and bridges that allow full wildlife movement between the affected areas.

- The Department will support and work towards the preservation, protection, and enhancement of the lands that make up the Coal Canyon, Sonome and Tonner Canyons, and Prado Basin biocorridors. Efforts will be directed towards enhancing wildlife habitat linkages so as to accommodate as many different native species as possible. Enhancement tools may include:
  - restoring or expanding native habitat to facilitate wildlife movement.
  - installing fencing to direct wildlife into underpasses or culverts and away from roads and freeways;
  - limiting vehicular use of underpasses to daytime use by land management agencies and emergency vehicles only;
  - widening of underpasses;
  - removing lighting in underpasses to make crossing more conducive to wildlife;
  - removing all or some of the pavement in underpasses;
  - reducing noise impacts by erecting structures to block freeway noise

Buffers

Land uses outside park boundaries can cause significant impacts on parklands. Possible impacts include exotic plant infestations, chemical pollution, predation and competition from domestic pets, wildfire, artificial light and noise, and loss of foraging or nesting habitat. Buffers, such as dedicated open space and agricultural lands, are low-intensive-use areas between the park's boundary and adjacent developments that help to separate conflicting land uses and protect natural habitats from destructive impacts.

Goal: Establish, maintain, and protect buffers adjacent to Chino Hills State Park.

Guidelines:

- The Department will work with adjacent landowners, neighbors, and local jurisdictions to provide for necessary buffers adjacent to park boundaries.

- The Department will assist local jurisdictions in the development of plant palettes for proposed projects in the vicinity of the park.

Vegetation Management

Past management practices, including livestock grazing and fire suppression, changed the ecological conditions under which native plant communities flourished at Chino Hills State Park. Current conditions favor the existence and continued domination of non-native annual grasses and forbs over much of the park, effectively eliminating native perennial bunch grasses. Changes such as these alter the ecological dynamics of the system and reduce wildlife values.

Goal: Restore and protect the native vegetation within Chino Hills State Park through active resource management programs. Planning and conservation efforts will address unique or important plant and wildlife resources at the community level and provide for their continued health and protection.

Guidelines:

- Vegetation management will be directed toward reestablishing the natural ecological processes that are essential for the development of native plant communities, expansion of these native communities, and the removal or reduction of exotic plant taxa. These objectives will be met through various studies, updates to the park's Unit Data File, and the preparation of comprehensive management plans.

- Management actions will minimize and, where possible, prohibit activities that further the spread of non-native plants.

Native Plant Communities

Chino Hills State Park supports a number of important native plant communities such as the California Walnut Series, California Buckwheat Series, Coast Prickly Pear Series, Arroyo Willow Series, Fremont Cottonwood Series, California Sycamore Series, and the Purple Needlegrass Series. These plant communities are essential habitat for both rare and locally important wildlife species and communities.

Guidelines:

- The Department will actively work to restore native plant communities and the natural processes that ensure their perpetuation.
- All seedlings and saplings used in habitat restoration projects will originate from seed collected from native plant taxa within park boundaries or from a

nearby area, with the exception of plants used for historic restoration within the Historic Zone. Only non-native plant taxa that are considered to be non-invasive are allowed within the Historic Zone.

Sensitive Plant Populations
The park offers open space that is vitally important to the continuation of several sensitive plant taxa occurring within or adjacent to Chino Hills State Park.

Guideline:

- All current, professionally recognized lists will be used to determine sensitivity. Current lists include state taxa of special concern; the California Native Plant Society's (CNPS) Lists 1A, 1B, 3, and 4; taxa of local concern (including endemic species); and taxa that are State or Federally listed or are candidates for listing. The Department will protect all sensitive plant taxa to the degree necessary to maintain or increase populations.

Wildlife Management

The protection and perpetuation of native wildlife populations will be accomplished, in part, through restoration and enhancement of native plant communities, removal of exotic plant taxa, and perpetuation of aquatic habitats.

Goal: Protect, perpetuate, and restore native wildlife populations and native aquatic species at Chino Hills State Park.

Guidelines:

- All sensitive wildlife species and their habitats will be protected. Include all taxa that are locally important (including endemic species), whether or not they appear on any endangerment list, as well as those protected by Federal and/or State law. Management and protection of sensitive species is dependent upon adequate maps and other data regarding species presence within, movement through, and uses of the park.

- Avoid ecological imbalances resulting from human-caused activities. If it is necessary to regulate animal populations, use methods based on sound principles of ecosystem management and consistent with Department Resource Management Directives. Avoid disturbance to other natural values of the park.

- The Department will work with surrounding property owners and jurisdictions to reduce numbers of non-native animals such as feral cats, starlings, and cowbirds that enter the park. This can be most effectively accomplished by developing a program to monitor and control non-native pests.

- Regular monitoring of medium and large mammals is necessary to gauge the effectiveness of biocorridors and to identify declines or increases in wildlife populations.

- Re-introduction of extirpated species will be appropriate only if historical documentation exists to confirm the presence of the species of interest within the Chino Hills at some time in the past and if suitable habitat exists to support its survival. Re-introduction of a species will be conducted using sound ecological methods and will not negatively affect populations of other native species. Animals to be re-introduced will come from a nearby area.

- Specific management programs using sound ecological principles and professionally accepted methods are necessary to protect and restore sensitive animal populations and their habitats.

Wildfire Management

Wildfire is a threat to structures and human safety in the dry hills of southern California. The prescribed use of fire can simulate a more natural fire regime for the Chino Hills and reduce the risk of catastrophic fires. In addition, controlled fires provide the added benefit of enhancing conditions for the expansion of native plant communities. However, extremely dry and windy conditions along with a high incidence of human-caused ignition dictates that wildfires will continue to occur in these hills. It is, therefore, prudent to plan for such an emergency.

Planning for wildland fires can considerably reduce damage to natural and cultural resources, particularly that caused by the activities of fire suppression. For example, adverse impacts can be caused by the hasty bulldozer construction of fire-control lines. These lines have the potential to remove roots and upper organic soil horizons, thereby increasing erosion and slowing the re-establishment of vegetation. Damage to resources can also occur from improper applications of chemical fire retardant that affect aquatic systems.

Goal: Plan for the occurrence of wildfires in order to preserve sensitive park resources and protect human lives and structures.

Guideline:

- The Department will work with appropriate agencies such as the California Department of Forestry and Fire Protection, county and city fire Departments, and Metropolitan Water District of Southern California to develop and implement a wildfire management plan for Chino Hills State Park. This plan will address all aspects of wildfire planning, including prevention, pre-suppression, and suppression. The plan will identify modified fire suppression methods and ways to protect sensitive park resources.

Prescribed Fires

Since the early 1900s, fire suppression practices have effectively reduced the occurrence of wildfires in southern California. Over time, fire plays an important role in the development of native plant communities. The near-elimination of wildfires has stressed the ecological balance, thereby allowing non-native plant pest species to establish and, in some cases, dominate the landscape. Fire suppression also results in the increased build-up of dry fuels, which can then lead to large-scale, catastrophic fires.

Goal: Restore the role of fire in the natural ecological processes of Chino Hills State Park.

PALEONTOLOGICAL RESOURCES

The presence of a Miocene-age marine geologic formation within Chino Hills State Park, which is known to yield abundant fossils in adjacent land, suggests that important fossil resources may exist within park boundaries.

Goal: Document and protect paleontological resources that are found within the park.

Guideline:

- As fossil remains are discovered during the course of a survey or if new resources are uncovered, professional measures will be taken to protect the resources found at the site.

CULTURAL RESOURCES

Archaeological Sites (Prehistoric and Historic)

Chino Hills State Park includes significant archaeological resources. Prehistoric sites located in Chino Hills State Park indicate that the area was used for hunting and gathering by Indians of the Santa Ana River Basin. Several historic archaeological sites are also found within the park and reflect examples of historic land use of the area.

Goal: Protect the archaeological resources at Chino Hills State Park.

Guidelines:
Management guidelines for protecting archaeological resources can be found in the *Visitor Use and Development Section* (see Page 68).

Historic Resources (Structures, Sites, and Landscapes)

Chino Hills State Park includes a number of locally significant historic resources, including buildings and structures, features, and cultural landscapes. Windmills, water troughs, tanks, and water piping are scattered throughout the park. These features are visible reminders of the ranching landscape and reflect historic land uses over the past two hundred years. The semi-rural landscape, a remnant of nineteenth and early twentieth century southern California, is rapidly being eliminated by urbanization. The non-renewable historic resources of Chino Hills State Park, in juxtaposition with its significant natural resources, offers a revealing view of past cultural patterns to future generations.

Goal: Protect the significant historic sites at Chino Hills State Park.

Guidelines:

- All historic resources identified within the Historic Zone (i.e. structures, sites, and landscapes) will be preserved and protected through implementation of applicable Department policies and the application of professional standards.

- Recognized historic resources or sites outside of the Historic Zone should be removed based on the determination that they create physical or visual impacts to natural resources. Of those chosen for removal, the ones with historic integrity and interpretive value should be considered for relocation to the Historic Zone or another interpretive facility.



Windmill near Rolling M Ranch

Historic Ranching Landscape

The most historically significant land use associated with the lands of Chino Hills State Park is that of cattle ranching. From the early days of the Spanish missionaries and their Native American neophyte workforce, through Mexican Californio vaqueros and American ranchers and settlers, the grazing of stock represents one of the most profound human impacts upon the land.

Goal: Preserve and interpret the historic ranching landscape within the Historic Zone for the education and enjoyment of park visitors.

Guidelines:

- Preservation treatments will be based on primary research to identify historic fabric of features.

- Ranch buildings and structures can be utilized for appropriate operational and interpretive functions.

Oil Industry and Mining Sites
The park contains several sites associated with the history of the local oil industry and small-scale mining efforts.

Goal: Allow oil and mining sites to remain in place.

Guideline:
- Oil and mining sites will be passively managed with onsite interpretation, restoration, or reconstruction discouraged.

Historic Roads and Trails
Portions of several historic roads and trails, some dating to the nineteenth century, are located within the boundaries of the park. Many are currently in use as transportation and circulation routes for park visitors, utility companies, and staff.

Goal: Preserve historic roads and trails and at the same time provide for visitor, Department, and utility company use.

Historic Electrical Towers and Utility Lines
The first electrical towers to be erected on the parkland were completed in the late 1930s. A few of these historic towers still exist within the park. Additionally, many more modern towers and utility lines also exist within the park. Efforts are being made to remove the modern towers because they adversely affect both the natural and cultural landscapes of the park. Historic towers are not considered to be individually eligible historic resources, however, they may be compatible with the historic ranching landscape of the park.

Goal: Preserve the historic electrical towers within the Historic Zone that are considered to be contributing elements of the historic landscape.

Guideline:
- Placing electrical lines underground is preferred. However, historic towers may be considered for use within the Historic Zone when evaluating options for powering park facilities.

AESTHETIC RESOURCES

Visitors to Chino Hills State Park enjoy many aesthetic qualities inherent to the park's natural conditions. Some of these include open space, sounds of nature, and scenic views. Impacts to aesthetic qualities are, at times, created by developments, activities, or land uses, within or outside the park, that are incompatible with these qualities.

Goal: Protect scenic features from man-made intrusions and preserve the visitor's experience of the natural landscape by minimizing adverse impacts to aesthetic resources.

Guidelines:

- Unnecessary structures such as interior fences and signs will be removed. The Department will work with utility companies to remove electric lines that are no longer used and are not considered historic resources.

- The Department will work to reduce the negative impacts of utility easements in the park. All utility companies will be encouraged to reduce the impacts by consolidating easements into fewer or smaller corridors, or by placing the equipment underground. The Department will work with utility companies to remove unnecessary utility roads and reduce road widths, and will discourage any new easements within the park unless mitigated to benefit park resources.

- Ridgeline and knoll developments outside the park that adversely affect significant views will be discouraged. The Department will work with park neighbors and local government to review and plan adjacent developments in a manner that protects views.

- Tranquility and the sounds associated with the park's natural resources will be preserved. Unnatural sounds that adversely affect park resources, values, or visitors' enjoyment will be prevented or minimized.

- The Department will cooperate with park neighbors and local government agencies to minimize the intrusion of artificial light into the night scene, recognizing that darkness and the night sky play significant roles in the overall visitor experience. Artificial outdoor lighting within the park will be limited to basic safety requirements and shielded when and where possible.

INTERPRETATION

Interpretation is based on the premise that knowledge deepens the park experience and provides lasting benefits not only to individuals but also to society in general. Interpretive themes define the point of view given to the park's natural, cultural, aesthetic, and recreational resources.

Goal: Expand the visitor's awareness, understanding, and appreciation of the park's resources. The unifying theme explores how Chino Hills State Park is part of southern California's natural and cultural heritage.

The following primary and secondary themes will support the unifying theme:

Primary Theme: Chino Hills State Park is a remnant of California's past natural and cultural landscapes.

Secondary Theme: Native plants and animals find refuge in the fragile natural environment of Chino Hills State Park.

Secondary Theme: The connection of Chino Hills State Park to other wildland areas is crucial to the survival of plants and animals throughout the region.

Secondary Theme: Chino Hills State Park is a landscape reflective of its prehistoric and historic inhabitants and their cultures.

Secondary Theme: Fossil remains and petroleum deposits in Chino Hills State Park tell the secret of how natural forces shaped the land.

Secondary Theme: Showing respect for the environment and other visitors while recreating at Chino Hills State Park will ensure safety for the park and people.

COLLECTIONS

The Department acquires and maintains collections for several reasons. First, to preserve elements of the natural and cultural environment original to the park; second, to document the people, events, and cultural or natural features that are central to the park's purpose; and third, to support the interpretation of themes that are important to the park.

Goal: Provide for the collection of natural and cultural artifacts original to Chino Hills State Park which support the Declaration of Purpose and Department mission.

The following Scope of Collections Statement for Chino Hills State Park states the management objectives and provides guidance for the type of park collections.

Scope of Collections Statement

> Natural and cultural material and object collections at Chino Hills State Park will have a specific connection to the natural and cultural history of the park, or provide support for interpretive themes and programs. Archaeological and paleontological materials, natural history specimens of park flora and fauna, and objects like historic furnishings, equipment, or personal items associated with the park are all potential collection items at Chino Hills State Park. Historic object collections will include those of the ranching period up to the year 1950.

- Acquisitions of ranching era artifacts and props will have a local historical association to the Rolling M Ranch, or other ranching activities within or near Chino Hills State Park.

- Natural history specimens of rare species will not be collected. Only lawfully salvaged specimens will be maintained in collections.

- The Department will establish safe and secure spaces for storage and display of park collections, and systems for inventory and management. Policies as outlined in the Department Operations Manual (DOM) Chapter 20 will be followed.



Hills For Everyone Nature Trail interpretive sign

VISITOR USE AND DEVELOPMENT

RECREATIONAL USES

Chino Hills State Park is a place where visitors can appreciate undeveloped scenic open spaces; enjoy diverse, abundant wildlife and vegetation; and recreate on a regionally significant trail system.

Goal: Provide for appropriate visitor uses of the park and at the same time protect resources.

Guideline:

- Recreational uses will satisfy both user needs and resource protection requirements, and for the most part be compatible with other visitor experiences. Recreational uses will generally occur where manageable with existing park staff or volunteers and where there is adequate, safe access to the recreation activity areas.



Mountain biker in Telegraph Canyon

DEVELOPMENT

Chino Hills State Park offers public facilities for visitor use and education, as well as maintenance and operational facilities for park management.

Goal: Provide essential visitor services and operations facilities to enhance the visitor's experience and at the same time maintain the park's natural, cultural, and aesthetic values.

The following guidelines for development pertain to all built and maintained facilities for public and park use, including such facilities as roads, trails, campgrounds, picnic areas, utilities, and buildings.

Natural Resources

- Resource protection and management will take priority in decisions regarding development and use. Development will not adversely affect park resources, including natural, cultural, and scenic resources. Development will be located a sufficient distance away from sensitive habitat areas, such as riparian zones,

wildlife corridors, or where sensitive species are known to occur. Design of public-use facilities will protect resources by preventing inadvertent damage by users. The location and type of facilities and visitor uses will be consistent with the protection of biological exchange (biocorridors) and the maintenance of core habitat areas.

- Programs, projects, and developments within the park will be designed so that sensitive animal populations, aquatic systems, and native plant communities are protected. When disturbance is unavoidable, efforts will be made to minimize and mitigate disturbance.

Cultural Resources

- Cultural resource surveys will be completed at proposed development sites prior to any facility development. Additional archaeological investigations, such as archival research, detailed site mapping, and subsurface testing will occur at any project or undertaking that would disturb a known or potential cultural site. Project design modifications and/or monitoring can further serve to minimize or prevent disturbance of significant archaeological resources.

Aesthetics

- The design and placement of facilities will be aesthetically pleasing and blend with the natural environment. Development will not compete with nor dominate park features. Visitor services will be provided, however, the number of buildings will be minimized and their visual impacts reduced.

- Structures will be placed away from prominent locations, such as ridgelines, and screened and blended into the natural terrain with native vegetation, strategic siting, appropriate grading, and natural-appearing materials. The general appearance and design details of new structures will be compatible with a ranch style.

- Manufactured slopes will be graded and planted so as to blend into natural, adjoining slopes. Utilities will be placed underground where feasible, and erosion control will be used for all projects that involve grading.

Roads and Trails

- The Department will study the feasibility of realigning existing roads to avoid sensitive habitat when and where possible, with an emphasis on riparian areas. The benefits of reducing the current adverse effects on sensitive habitat by realigning roads will be balanced against the possible adverse effects of new road construction on alternative alignments.

- Road maintenance standards will be developed and implemented in cooperation with utility companies. These standards will be designed to maintain natural drainage patterns, reduce erosion and stream siltation, and minimize road widths and impacts to aquatic habitats.

- When road or trail conditions are such that further use is either unsafe or would result in significant impacts to natural or cultural resources, the affected routes will be closed until appropriate repairs are made or conditions change.

- The Department will seek the input and cooperation of local jurisdictions, park neighbors, and significant user groups to develop and implement a trails management plan. This plan will address pedestrian access points, trailhead parking facilities, the trail system and connections to regional trails, trail maintenance, and appropriate recreational uses of trails.

PARK ACCESS POINTS

Access points that are properly placed enable visitors to reach all primary-use areas of the park and access facilities such as trails, campgrounds, and visitor centers with minimal impacts on park resources.

Vehicle Access

A vehicle access point currently exists at the Bane Canyon entrance. Using this road, park visitors can reach the Rolling M Ranch, a focal point of the park that provides structured recreation and houses park operations. A better and more reliable vehicle access point in Slaughter Canyon may be considered in the future. A second access point identified at Carbon Canyon could be improved for trailhead parking.

Goal: Provide safe, reliable vehicle access points for park visitors to enter the park and travel to the primary park destinations.

Guidelines:

- The main park access road will clearly orient and safely guide the visitor from the park entry to the primary park destinations. The road design will reduce vehicle speed and minimize impacts on park resources. The road alignment should allow, if possible, a scenic and panoramic view of the park, complement the land's natural contours, and minimize any visual impacts. Park access roads will fall within the Recreation and Operations Zone (see Figure 6).

- If additional accessibility is needed, trailhead parking will be developed adjacent to the park boundary within the zone designated as Natural Open Space as long as such development is consistent with the protection of park resources.

Pedestrian Access

Trailhead parking should be developed in appropriate locations to provide access to park facilities. On the other hand, when development occurs adjacent to the park, coordination and advance planning should avoid the creation of de facto trailheads that cause damage to park resources.

Goal: Create appropriate pedestrian access points to meet the needs of both the park and the local jurisdictions that are contiguous to the park boundary.

Guidelines:

- The Department will seek the input and cooperation of local jurisdictions to develop appropriate pedestrian access points and trailhead parking facilities, and in developing solutions to localized parking concerns.

The following criteria will be used to determine appropriate pedestrian access point locations. Designated access points should generally:

- Provide access to trails that offer scenic and panoramic views of the park
- Accommodate multiple trail uses (hikers, bikers, equestrians)
- Avoid adverse impacts to sensitive resources and important resource values (gnatcatchers, coastal sage scrub, raptor nests, archaeological sites, etc.)
- Be manageable with available park staff and reasonably accessible to park patrol and emergency vehicles
- Require minimum grading
- Have minimal affect on significant viewsheds and aesthetic resources
- Be in close proximity to trail loops and connectors
- Include parking that is limited in size to ensure that visitor use is within the park's carrying capacities (see Management Zone Matrix, Figure 7)
- Be spaced so that resources and visitor experiences are not adversely affected by overuse of an area
- Provide a connection to local or regional trail systems outside the park boundary to the extent feasible and appropriate. Efforts will be made to integrate the park's trail system with regional and local trail systems where feasible. These pedestrian access point criteria, where applicable, will be used in determining linkages to other trail systems.

ACQUISITIONS

Past land acquisitions have emphasized the inclusion of ridgelines, watersheds, and buffer areas. This practice helped to maintain views and protect resources as the park was formed and as new parcels were added.

Goal: Protect and enhance park resources and improve visitor's enjoyment and education in the park through appropriate land acquisitions.

When evaluating the desirability of proposed land acquisitions at the park, the Department will consider the following guidelines:

- The Department will evaluate each proposal of land dedication and accept only those dedications that are in keeping with the purposes of Chino Hills State Park. Land acquisitions will support the park's resource management goals by enhancing watershed protection and adding significant or unique resources, habitats, or features to the park. They will create buffer areas (areas between developments and park resources) and include ridgelines whenever possible, increase the size and improve the effectiveness of biocorridors, and establish park facilities outside of sensitive resource areas. Land acquisitions may also add to the park's recreational opportunities and establish links to regional trail systems.

- The Department must exercise caution when considering land adjacent to developed areas. Difficulties arise from illegal-refuse dumping, illegal off-highway vehicle activity, the spread of exotic plant species onto parkland, and wildlife predation and harassment by domestic animals.

- The Department will actively work towards acquisition of properties that contribute to biocorridors ensuring that key linkages will be preserved.

- In order to accomplish mutual goals such as resource protection, biocorridor enhancement, and providing recreational opportunities, partnerships with local and regional jurisdictions as well as state and federal agencies will be encouraged.

CONCESSIONS

Concession operations in Chino Hills State Park are governed in part by Public Resources Code, Section 5080.02, by State Park and Recreation Commission policies, and the Department Operations Manual (DOM).

Goal: Concession operations will provide visitor services that enhance recreational and educational experiences at the park and at the same time will protect natural, cultural, and aesthetic resources.

Guideline:

- Concession operations will be consistent with the park's purpose and classification, and in conformance with the park's general plan. No concessions will be permitted in the Core Habitat Zone. Concessions will be compatible

with the historic settings and the visitors' experiences of the Historic Zone. Concessions will not typically compete against similar private concessions that are within a reasonable distance to the park. Examples of possible concessions may include, but are not limited to, an equestrian center, bicycle rentals, and camp store.



Corrals in campground area

SPECIFIC-AREA GOALS AND GUIDELINES

This section defines the management goals and guidelines that are more specific to individual areas in Chino Hills State Park and will clarify the application of broader park-wide goals and guidelines.

LEMON GROVE AREA

The Lemon Grove Area is a part of the Recreation and Operations Zone, and is located in Carbon Canyon on the far-western end of the park (see Figure 6). This trailhead area can be reached from Carbon Canyon Road by entering through Carbon Canyon Regional Park (County of Orange) and provides the only access from the western side of the park. Visitors can reach the park's interior by traveling through Telegraph Canyon. The area contains significant riparian habitat as well as approximately 40 acres of trees that represent the only extant remnant of the historically significant citrus industry that once surrounded the park.

Goal: Management efforts will support the use of the Lemon Grove Area for park access, habitat restoration, and interpretation of the historic citrus industry that once surrounded the park.

LIVESTOCK PONDS

Of the six livestock ponds that were constructed in the park during the ranching era, four are still present. Three of these ponds offer year-round water for wildlife and suitable conditions for the establishment of aquatic plants including emergent wetland vegetation. The increase in wildlife habitat and diversity that the McDermott Spring, Windmill, and Panorama ponds provide justifies maintaining them. In addition to its wildlife value, Windmill Pond is located within the Historic Zone and is a contributing element to the historic ranching landscape.

Goal: Preserve the Windmill Pond for both its natural and cultural value. Preserve McDermott Spring and Panorama Ponds for their natural habitat values. Visitors will learn about historic uses of the ponds as well as present-day management activities associated with the preservation of sensitive plants and animals.

Guideline:

- Appropriate efforts will be made to maintain the earthen dams and to conserve and enhance native vegetation around the ponds. Other ponds in the park will be evaluated for their contribution to habitat enhancement and historic significance. If it is determined that they will be removed, the streambed will be restored to natural contours and native vegetation will be re-established.

SANTA ANA RIVER

The Santa Ana River passes through the park in the southeast corner. It drains a large watershed area of southern California and passes through the cities of San Bernardino, Riverside, Corona, and other communities before entering Chino Hills State Park. Treated sewage effluent as well as non-point source pollution is discharged into the river by many of these communities, resulting in river pollution. Poor water quality seriously threatens aquatic resources, including the native fishes and the wildlife species that feed upon them.

As of 1998, the invasive, non-native plant giant cane (*Arundo donax*) in the Santa Ana River portion of the park was manageable. However, efforts will be necessary to limit and eradicate this invasive species from park property.

Goal: Protect and enhance natural resources in the Santa Ana River and adjacent habitat.

Guidelines:

- The Department will work with state and regional water quality control entities and other appropriate agencies to seek solutions to the water quality problems in the section of Santa Ana River that passes through Chino Hills State Park.

- The Department will work with local jurisdictions regarding land use and resource management decisions that may affect the Santa Ana River. (See *Planning Influences*, Page 37)

- The Department will work to eradicate invasive species such as the giant cane (*Arundo donax*) from its property along the Santa Ana River.

ISSUE RESOLUTION

There are a number of issues and planning efforts that require attention beyond the scope of this general plan. Funding and staffing limitations restrict what issues and studies the Department is able to immediately address and require that the Department set priorities. Many goals and guidelines of the *Plan Section* (Page 47) provide direction for each issue. Some of these goals and guidelines recommend future planning efforts such as management plans and studies. The following lists are not intended to be a restriction to working on other issues or lower priority issues or planning efforts.

The general plan recommends that the following issues be resolved:

- **Biocorridors and Core Habitat Areas –** Protect and enhance the park's wildlife habitat linkages with nearby wildlife habitat areas through coordination with local, state, and federal agencies, and acquisition and restoration projects.

- **Park Access Points –** Resolve main park road and boundary access problems through detailed site planning, coordination with local agencies, and facility implementation. Solutions to access problems may require additional property acquisitions.

- **Appropriate Recreational Uses –** Provide quality recreational activities and public-use facilities without compromising resource integrity.

Note: Interpretation plays a significant role in the resolution of these general plan issues. The general plan recommends that educational programs, interpretive planning, design, and facility implementation be accomplished with the resolution of the above issues.

The general plan recommends that the following planning efforts and studies be undertaken. See the referenced page number for a complete description of the guideline:

- Collection of information and monitoring of the health and function of core areas and biocorridors (Page 57)

- Management plans, studies, and updates to the park's Unit Data File as necessary to meet vegetation management guidelines (Page 59)

- Collection of information regarding sensitive species presence within, movement through, and uses of the park (Page 60)

- Management programs to monitor and control non-native pests (Page 60)

- Regular monitoring of medium and large mammals necessary to gauge the effectiveness of biocorridors and to identify declines or increases in wildlife populations (Page 61)
- Management programs to protect and restore sensitive animal populations and their habitats (Page 61)
- Wildfire management plan (Page 61)
- Trail management plan (Page 70)



Looking southwest toward lower Aliso Canyon

Chino Hills State Park General Plan

ENVIRONMENTAL ANALYSIS SECTION



Coast Horned Lizard (photo by Gordon Ruser)

INTRODUCTION

The California Department of Parks and Recreation is the lead agency responsible for the preparation of environmental review documentation for the proposed Chino Hills State Park General Plan, in compliance with the California Environmental Quality Act (CEQA) (PRC §§21000 et. seq.) and the CEQA Guidelines (CCR §§15000 et. seq.). This Environmental Analysis Section and other sections of this document, incorporated by reference, constitute the Environmental Impact Report (EIR) in fulfillment of CEQA requirements (CCR §§15166, 15120[b]), and reflect the independent judgement of the Department. It should be recognized that the level of detail addressed by this EIR is commensurate with the level of detail provided in the land-use proposals of the general plan. As subsequent management plans and site-specific projects are proposed they will be subject to further environmental review, and appropriate environmental documents will be prepared with specific mitigation measures, as necessary.

The proposed Chino Hills State Park General Plan intends to reduce the potential for significant environmental impacts allowed in the original general plan (approved in 1986). It also includes modifications to the declaration of purpose for the park, changes in land-use designations and management goals to reflect the new statement of purpose, and the incorporation of new guidelines for the protection of resources, future acquisitions, and the development of recreational, interpretive, and operational facilities.

PROJECT DESCRIPTION

See the *Introduction* (Page 1) and *Plan Section* (Page 47).

ENVIRONMENTAL SETTING

See the *Existing Conditions and Issues* (Page 7), *Significant Resource Values* (Page 16), and *Planning Influences* (Page 37).

ANALYSIS OF ENVIRONMENTAL EFFECTS

The Initial Study for the Chino Hills State Park General Plan EIR identified potential impacts related to soil erosion, drainage, water quality, flooding, air quality, plants, animals, noise, light and glare, transportation/circulation, fire protection, utilities, recreation, and cultural resources. A Notice of Preparation was circulated through the State Clearinghouse, to local city and county planning offices, as well as to affected utility companies and special interest groups. A total of twelve comment letters were received representing the following agencies and groups:

California Department of Transportation, Districts 8 and 12
County of Orange, Planning and Development Services

City of Anaheim
City of Brea
City of Chino Hills
City of Yorba Linda
Metropolitan Water District of Southern California
Hills for Everyone
Friends of Tecate Cypress
Wildlife Corridor Conservation Authority

In general, the environmental issues raised for consideration in the draft plan were in regards to potential impacts to transportation/circulation (roads and trails), plants and animals (acquisition of biocorridors), public services/hazards (existing water utility right-of-ways, proximity of a landfill and fire suppression), noise, and aesthetics/viewshed.

A high number of significant resource values are recognized within Chino Hills State Park. These include sensitive plants and animals, plant communities, natural open space connectivity, solitude, scenic vistas, and cultural landscapes (See *Significant Resource Values,* Page 16). Due to the location of the park within a highly urbanized area and its tenuous connection to other open space areas in the region, the significance of these values is amplified. Therefore, any proposals that affect these values have the potential to result in significant environmental impacts. In addition, any proposals for the development and management of the park have the potential to cause impacts to the surrounding communities and associated public services, due to their proximity to the park.

UNAVOIDABLE SIGNIFICANT ENVIRONMENTAL EFFECTS

The land-use designations and the management goals and guidelines presented in the general plan are intended to avoid or mitigate all significant environmental effects of facility development, maintenance, operations, and visitor use. If a specific project is proposed that does not conform to all of the guidelines contained in the plan, it will not be implemented. Therefore, there are no unavoidable significant environmental effects.

MITIGABLE SIGNIFICANT ENVIRONMENTAL EFFECTS

Impact: Even though the majority of development will occur within a limited portion of the park (Recreation and Operations Zone), development and maintenance of facilities such as roads, trails, parking lots, camp sites, picnic areas, utilities, septic systems, and buildings have the potential for significant short- and long-term impacts to the environment. These impacts could include soil disturbance, dust, increased erosion, altered drainage patterns, lowered water quality, degradation of cultural resources, and degradation of sensitive plant or animal populations or their habitat.

Mitigation: Site-specific searches for sensitive species of plants and animals will be conducted in areas proposed for development or for other activities. The proposed project will be modified to avoid significant adverse impacts to any detected sensitive populations. Impacts to rare plant communities will be avoided to the maximum extent possible. Where unavoidable, the loss of a rare vegetation type will be compensated for through restoration of the same vegetation type at an appropriate location within the park at a replacement ratio of at least one to one.

Mitigation: Site-specific cultural resource surveys will be conducted in areas proposed for development or for other ground disturbing activities. The proposed project will be modified to avoid significant adverse impacts to any archaeological or historical resources, in accordance with the Department's resource management directives and professional standards for the treatment of historic properties.

Mitigation: Facilities will be designed and constructed to minimize the footprint of impact and will generally be located in relatively flat areas to minimize the potential for soil disruption. Any bare disturbed surfaces resulting from construction, which is not part of a trail or parking area, will be revegetated with appropriate native plant species for the site. See *Vegetation Management Guidelines*, Page 59.

Mitigation: Design, construction, and maintenance of facilities will follow the best management practices for the elimination or reduction of adverse effects to air quality, water quality, and drainage patterns. No activities or developments that significantly affect the park's aquatic systems will be allowed.

Impact: The soils of the Chino Hills are such that they become very slippery when wet and are prone to landslides and other forms of erosion. Use of roads and trails within the park may, under certain conditions, be unsafe for the public or increase the potential for soil movement and erosion.

Mitigation: When trail or road conditions are such that further use is either unsafe or would result in significant impacts to natural or cultural resources, the affected routes will be closed until appropriate repairs are made or conditions change.

Impact: The locations of trailhead parking sites on the boundaries of the park have the potential to create impacts to adjacent residential areas, in terms of an increase in traffic, noise, and litter. They also have the potential to concentrate public use in sensitive resource areas.

Mitigation: The Department will coordinate trail access points with appropriate local planning agencies and avoid significant environmental impacts by following a set of criteria contained in the general plan (See *Park Access Points*, Page 70). Appropriate mitigation is also discussed in the plan and made a part of specific site plans, where necessary.

NONSIGNIFICANT ENVIRONMENTAL EFFECTS

The following potential impacts have been determined to be less than significant:

Impact: Construction of facilities and their recreational use may increase noise, dust, and traffic levels either temporarily or periodically.

Discussion: Most of the development activities and higher intensity recreational uses are located within the Recreation and Operations Zone, which is primarily located within the interior portion of the park, or adjacent to State Route 142 and Carbon Canyon Regional Park. As such, the potential for significant noise, dust, and traffic impacts to residential or commercial areas is limited to temporary construction impacts of the main park entrance (east end of Slaughter Canyon) and boundary trailhead parking. Development within these areas is not anticipated to be substantial and will utilize standard construction noise and dust reduction measures.

Impact: Potential development may produce associated increases in light or glare.

Discussion: The general plan states that materials for facilities will be chosen to preserve the rural qualities of the park and lighting of use areas will be limited to the minimum necessary to provide for public safety and shielded where feasible. Therefore there should be no significant impacts from light or glare.

Impact: Use of camping facilities within wildland areas has the potential to place the public at risk due to wildfires caused by inadvertent ignition from within, as well as from outside the park.

Discussion: No campfires or nighttime activity will be allowed outside designated areas within the Recreation and Operations Zone or Historic Zones. Following Department standards, these designated areas will be designed to reduce the chance of accidental escape of fire to surrounding vegetation. A wildfire management plan will be developed, as appropriate, to ensure protection of human lives and property, and will emphasize control of fires along predetermined suppression lines, which divide the park into control compartments, and will include evacuation procedures.

Impact: The use of prescribed fire as a vegetation management tool has the potential for significant impacts to regional air quality and may, in the event of an escape, place the public in danger.

> **Discussion**: The restoration of the role of fire in natural ecological processes will include a prescribed fire management plan. This plan will include provisions for coordinating with regional air quality control boards to avoid significant emissions of smoke during sensitive time periods. It will also provide for public notification and exclusion areas prior to and during prescribed burning operations. In the event of an escape, the wildfire management plan is invoked, which provides for public evacuation and appropriate suppression activities.

Impact: The proposed Chino Hills State Park General Plan calls for an overall reduction in the number of vehicles trips to and from the park relative to the original general plan. Even so, an increase and change to the current traffic pattern as a result of potential future development allowed in the proposed general plan is anticipated (See Appendix C - *Comparison of Public Use Under Plan Alternatives*, Page 97).

> **Discussion**: The majority of the maximum vehicle trips estimated to be generated would result from recreational development in the main use area located in Upper Aliso Canyon (See Appendix D - *A Public-Use Scenario*, Page 98). This area is currently accessed through the Bane Canyon park entrance located on Sapphire Road (15,000 Average Daily Traffic [ADT] capacity) and accessed via Soquel Canyon Parkway (56,300 ADT capacity) and Elinvar Road (15,000 ADT capacity) in the City of Chino Hills. The general plan calls for relocating this park entrance to Slaughter Canyon off Butterfield Ranch Road (56,300 ADT capacity) also within the City of Chino Hills, when and if associated acquisitions or rights-of-way can be obtained. Recent (November 1997, January 1998) traffic estimates indicate that current use of these roads is well below their capacity (5-9% of rated capacity). The projected increase in traffic potentially generated as a result of the proposed Chino Hills State Park General Plan (estimated 945 maximum trips per day) is not anticipated to add significantly to the volume of traffic on these routes. Furthermore, if at the time park developments are proposed, it is determined that the development would produce an increase in vehicle trips in excess of the capacity of the access roads, the proposed facilities will be downscaled to avoid significant impacts.

Impact: According to the Metropolitan Water District, the Robert B. Diemer Water Filtration Plant, located adjacent to the southwest boundary of the park, uses and stores various hazardous chemicals. Accidental release of these chemicals may affect park users in the immediate vicinity. In addition, abandoned oil wells in the park may present a potential hazard.

Discussion: Park facilities adjacent to or within the drainage from the Robert B. Diemer Plant are limited to existing roads and trails. No new facilities are planned for that area. Any abandoned oil wells in the vicinity of planned development will be re-abandoned in accordance with PRC 3208.1 to assure public safety. There are no significant public health risks anticipated as a result of the general plan.

Impact: Development of visitor use and operational facilities within a rural park has the potential to adversely affect aesthetics and viewsheds.

Discussion: The proposed general plan calls for facilities to be located off of ridgelines and to be sited, designed, and constructed to blend into the natural (or historic, where appropriate) terrain and setting, thereby avoiding significant impacts to aesthetics.

BENEFICIAL ENVIRONMENTAL EFFECTS

Many of the proposed management practices will protect or enhance park resources, such as plants, wildlife, viewsheds, and cultural resources, above and beyond that required for mitigation of impacts resulting from development and use of the park. The following sets of management guidelines provide for beneficial environmental effects:

Biocorridors
Water Canyon Natural Preserve
Historic Zone
Resource Management and Protection
Core Habitat Zone

GROWTH-INDUCING IMPACTS

Implementation of the general plan will result in an increase in the number of day-use and overnight visitors in Chino Hills State Park. Based on *Appendix D - A Public-Use Scenario* (Page 98), an estimated peak total of 1,310 people and 395 vehicles may be present within the unit at a moment in time, if full development of the park is achieved. These levels of visitor use are not expected to contribute to an increase in need for local services. The developing cities adjacent to the unit provide services adequate to meet the needs of the local residents and visitors to the local parks, including Chino Hills State Park. The projected peak number of vehicle trips per day has been estimated to be 945, but at no time will parking facilities be developed that cause an increase in vehicle trips in excess of the capacity of the affected roads. Therefore, there will be no significant growth-inducing impacts.

CUMULATIVE IMPACTS

None of the proposals contained in the plan will contribute significantly to the cumulative impacts of past, ongoing, or future projects, which include primarily residential, highway, and public service developments within the region. In fact, this plan recognizes and attempts to provide for the increasing rarity of natural open space

and rural landscapes within the region, by setting guidelines for the preservation of natural and cultural resources within the park and of biological corridors that link the park to similar wildland areas. These guidelines reduce some types of recreation proposed in the original general plan (such as camping and picnicking). However, several regional parks in the vicinity of Chino Hills State Park, including Carbon Canyon Regional Park in Carbon Canyon, Featherly Regional Park on the Santa Ana River, Prado Regional Park, and Yorba Regional Park provide for structured daytime recreation (picnic facilities). Camping facilities in the Chino and Puente Hills area are not now, nor are they anticipated to be, in high demand.

PLAN ALTERNATIVES

Based on the accumulation of information from biological studies, local planners, park managers, and the general public (at four public meetings), three plan alternatives were considered during formulation of the proposed general plan.

Alternative 1: the Existing General Plan Alternative (representing the "no project" alternative required by CEQA) which allows for more intensive recreational use and development of the park unit relative to the other two alternatives;

Alternative 2: the Core Habitat Zone Without Trail Corridors Alternative, which provides for an increase in protection of natural resource values at the expense of some recreational opportunities; and

Alternative 3: the Core Habitat Zone With Trail Corridors Alternative or the "preferred" alternative, which (like Alternative 2) provides for an increase in natural resource protection, but allows for the maintenance of existing recreational opportunities (see Figure 7 – Management Zone Matrix, Page 55).

ALTERNATIVE 1: EXISTING GENERAL PLAN - "NO PROJECT"

Under this alternative, the park unit would continue to be managed in accordance with the existing general plan (approved in 1986). The land-use section of the original general plan provides equivalents to three of the four management zones found in the proposed general plan, but in differing relative proportions. The "primitive zone" of the original 1986 plan, described as a precursor to natural preserve designation, encompasses portions of Upper Aliso Canyon, Water Canyon, and Brush Canyon for a total of approximately 2,825 acres. The "developed park zone" provides for public vehicle access, parking, day use, camping, administrative facilities, and operational facilities development, and includes portions of Upper (Rolling M Ranch) and Lower Aliso Canyon, Slaughter Canyon, Santa Ana River floodplain, and the mouth of Telegraph Canyon adjacent to State Route 142 (640 acres). The remainder of the park is designated as "park land zone" with land use limited to trails, picnicking, and

primitive trailside camping. Access to the main use area of the park would eventually be limited to the entrance through Slaughter Canyon.

Given the current knowledge and understanding of sensitive resources within the park, this alternative would likely cause significant impacts to riparian habitat, rare birds, rare aquatic animals, animal movement, and water quality due to the extent of park development proposed in the original general plan for Lower Aliso Canyon and the Santa Ana River floodplain. In addition, campground and picnic facilities proposed for the Santa Ana River floodplain would cause an increase in noise, light and glare, impacts to local air quality (smoke from campfires and barbecues) and traffic, immediately adjacent to private residences and a major freeway (State Route 91). Also under the original general plan the significance of historical resources within the park is not recognized nor defined, possibly leading to significant impacts to recently recognized important cultural resources, such as ranching-era features and landscapes.

ALTERNATIVE 2: CORE HABITAT ZONE WITHOUT TRAILS

This alternative, like the preferred alternative, would designate four types of management zones: Core Habitat, Historic, Natural Open Space, and Recreation and Operations. The Core Habitat Zone would encompass about half of the unit (approximately 6,000 acres) and provide increased protection for large portions of the Aliso Creek drainage, Water Canyon, Brush Canyon, and the north-facing side of Telegraph Canyon. No mechanized vehicles or bicycles would be allowed within this zone. The Historic Zone (approximately 70 acres) is a new designation that would recognize and provide guidance for the protection of ranching-era features and landscapes associated with the Rolling M Ranch. The Recreation and Operations Zone (approximately 370 acres) would no longer include the Santa Ana River floodplain or sensitive reaches of Lower Aliso Canyon as in Alternative 1, but would include a portion of Bane Canyon to allow for the existing entrance road and picnic areas.

This alternative would reduce short- and long-term impacts associated with park facility development, such as loss of vegetation, increased erosion, reduced water quality, and impacts to sensitive fish, animals, and riparian habitat. It would also eliminate impacts to adjacent residents in the Santa Ana River floodplain area, including noise, light and glare, local air quality, and traffic. The Core Habitat Zone designation would, however, reduce recreational opportunities by causing closure of some trails to bicycles, and reduce accessibility of utility and emergency response vehicles to portions of the park, thereby potentially affecting public services. Facilities proposed for Lower Aliso and the Santa Ana River floodplain in the original (1986) general plan have not yet been developed; nevertheless, elimination of these areas for consideration of such development represent a reduction in future recreational opportunities within the park. This reduction in recreational opportunities would not be expected to be significant in a regional context.

ALTERNATIVE 3: CORE HABITAT ZONE WITH TRAILS - "PREFERRED"

This preferred alternative is essentially the same as Alternative 2, with two exceptions. First, the Core Habitat Zone boundaries would include currently recognized established roads and trails that traverse this zone, thereby eliminating the impacts to recreation and public services associated with the Core Habitat Zone in Alternative 2. Second, a portion of the Core Habitat Zone (Water Canyon and Brush Canyon) would be designated as a natural preserve. Within the preserve area, resources would receive the highest level of protection. Impacts associated with the Alternative 3 are discussed under *Analysis of Environmental Effects* above.

Chino Hills State Park General Plan

APPENDICES



Purple sage

APPENDIX A

List of Sensitive Wildlife Species (January 1998) That Occur, or For Which Potential Habitat Exists Within Chino Hills State Park

TYPE	SPECIES	COMMON NAME	STATUS*	PROBABILITY IN CHINO HILLS S.P.
AMPHIBIANS	*Taricha torosa torosa*	Coast Range newt	CSC	not likely
	Ensatina eschscholtzi eschscholtzi	Monterey salamander	CSC	**present**
	Batrachoseps nigriventris	black-bellied salamander	local concern	**present**
	Batrachoseps pacificus	pacific slender salamander	CSC	probable
	Aneides lugubris	arboreal salamander	local concern	**present**
	Scaphiopus hammondi	western spadefoot	CFP, CSC	**present**
	Bufo microscaphus californicus	arroyo southwestern toad	FE, CFP, CSC	not likely
	Rana aurora	red-legged frog	FT, CFP, CSC	not likely
	Rana muscosa	mountain yellow-legged frog	CFP, CSC	not likely
BIRDS	*Phalacrocorax auritus*	double-crested cormorant	CSC	not likely
	Ixobrychus exilis hesperis	western least bittern	CSC	not likely
	Plegadis chihi	white-faced ibis	CSC	not likely
	Pandion haliaetus	osprey	CSC	not likely
	Elanus leucurus	white-tailed kite	CFP	**present**
	Haliaeetus leucocephalus leucocephalus	bald eagle	FT, CE, CFP	not likely
	Circus cyaneus	northern harrier	CSC	**present**
	Accipiter striatus	sharp-shinned hawk	CSC	**present**
	Accipiter cooperii	Cooper's hawk	CSC	**present**
	Buteo swainsoni	Swainson's hawk	CT	**present**
	Buteo regalis	ferruginous hawk	CSC	**present**
	Aquila chrysaetos	golden eagle	CFP, CSC	**present**
	Falco columbarius	merlin	CSC	**present**
	Falco peregrinus anatum	peregrine falcon	FE, CE, CFP	possible
	Falco mexicanus	prairie falcon	CSC	**present**
	Charadrius montanus	mountain plover	CSC	possible
	Numenius americanus	long-billed curlew	CSC	possible
	Larus californicus	California gull	CSC	not likely
	Coccyzus americanus	western yellow-billed cuckoo	CE	possible
	Athene cunicularia	burrowing owl	CSC	possible
	Strix occidentalis	spotted owl	FT, CSC	not likely
	Asio otus	long-eared owl	CSC	not likely
	Asio flammeus	short-eared owl	CSC	not likely
	Cypseloides niger	black swift	CSC	not likely
	Chaetura vauxi	Vaux's swift	CSC	**present**
	Empidonax trailii	willow flycatcher	FE, CE	**present**
	Eremophila alpestris actia	horned lark	CSC	**present**

APPENDIX A (continued)

TYPE	SPECIES	COMMON NAME	STATUS*	PROBABILITY IN CHINO HILLS S.P.
	Progne subis	purple martin	CSC	possible
	Riparia riparia	bank swallow	CT	**present**
	Polioptila californica	California gnatcatcher	FT	**present**
	Lanius ludovicianus	loggerhead shrike	CSC	**present**
	Vireo bellii pusillus	least Bell's vireo	FE, CE	**present**
	Vireo vicinior	gray vireo	CSC	not likely
	Vireo huttoni	Hutton's vireo	local concern	**present**
	Campyforhynchus brunneicapillus	cactus wren	CSC	**present**
	Dendroica petechia	yellow warbler	CSC	probable
	Icteria virens	yellow-breasted chat	CSC	**Present**
	Piranga rubra	summer tanager	CSC	**present**
	Parus inornatus	oak titmouse	local concern	**present**
	Aimophila ruficeps canescens	rufous-crowned sparrow	CSC	**present**
	Ammodramus savannarum	grasshopper sparrow	local concern	**present**
	Amphispiza belli belli	sage sparrow	CSC	possible
	Agelaius tricolor	tricolored blackbird	CSC	possible
MAMMALS	*Sorex ornatus*	ornate shrew	CSC, FC/P	possible
	Scapanus latimanus parvus	broad-footed mole	CSC	**present**
	Macrotus californicus	California leaf-nosed bat	CSC	not likely
	Euderma maculatum	spotted bat	CSC	not likely
	Plecotus townsendii	Townsend's big-eared bat	CSC	not likely
	Antrozous pallidus	pallid bat	CSC	probable
	Eumops perotis californicus	western mastiff bat	CSC	**present**
	Lepus californicus benneti	San Diego black-tailed jackrabbit	CSC	not likely
	Perognathus longimembris brevinasus	Los Angeles pocket mouse	CSC	not likely
	Chaetodipus fallax	San Diego pocket mouse	CSC	not likely
	Chaetodipus californicus femoralis	California pocket mouse	CSC	probable
	Dipodomys stephensi	Stephen's kangaroo rat	FE, CT	not likely
	Dipodomys merriami parvus	San Bernardino kangaroo rat	CSC, FC/P	possible
	Onychomys torridus	southern grasshopper mouse	CSC	not likely
	Neotoma lepida intermedia	San Diego desert woodrat	CSC	probable
	Microtus californicus stephensi	Stephen's vole	CSC	??
	Bassariscus astutus	ringtail	CFP	possible
	Taxidea taxus	American badger	local concern	probable
	Felis concolor	mountain lion	CFP, CSC	**Present**

TYPE	SPECIES	COMMON NAME	STATUS*	PROBABILITY IN CHINO HILLS S.P.
REPTILES	*Clemmys marmorata pallida*	southwestern pond turtle	CFP, CSC	**present**
	Coleonyx variegatus abbotti	San Diego banded gecko	local concern	possible
	Phyllodactylus xanti	leaf-toed gecko	CFP	not likely
	Phrynosoma coronatum	coast horned lizard	CFP, CSC	**present**
	Xantusia henshawi	granite night lizard	CFP, CSC	not likely
	Eumeces skiltonianus interparietalis	Coronado skink	CSC	not likely
	Cnemidophorus hyperythrus	orange-throated whiptail	CFP, CSC	Probable
	Cnemidophorus tigris multiscutatus	coastal western whiptail	local concern	**present**
	Charina bottae umbricata	southern rubber boa	CT, CFP	not likely
	Lichanura trivirgata	rosy boa	local concern	possible
	Salvadora hexalepis virgultea	coast patch-nosed snake	CSC	**present**
	Coluber constrictor mormon	western yellow-bellied racer	local concern	**present**
	Lampropeltis zonata parvirubra	San Bernardino mountain kingsnake	CSC	not likely
	Lampropeltis zonata pulchra	San Diego mountain kingsnake	CFP, CSC	not likely
	Thamnophis sirtalis parietalis	red-sided garter snake	local concern	possible
	Thamnophis hammondii	two-striped garter snake	FT, CT, CFP	possible
	Diadophis punctatus modestus	San Bernardino ringneck snake	local concern	**present**
	Crotalus ruber ruber	northern red diamond rattlesnake	CSC	**present**
FISHES	*Gila orcutti*	arroyo chub	CSC	**present**
	Gasterosteus aculeatus williamsoni	unarmored three-spine stickleback	CE, FE	possible
	Rhinichthys osculus	Santa Ana speckled dace	CSC	possible
	Catostomus santaanae	Santa Ana sucker	CSC	possible

*Status Codes: FE = Federal Endangered; FT = Federally Threatened; FC/P = Federal Candidate/Proposal; CE = California Endangered; CT = California Threatened; CFP = California Fully Protected; CSC = California Species of Concern

APPENDIX B

System-Wide Planning Influences

Public Resources Code (PRC)
California Code of Regulations (CCR)
Policies, Rules, Regulations, and Orders of the California State Park and Recreation Commission and California Department of Parks and Recreation
California Department of Parks and Recreation Operation Manual (DOM)
California Department of Parks and Recreation Administration Manual (DAM)
California State Park System Plan
California State Parks *Mission Statement*
California State Parks Access to Parks Guidelines
Resource Management Directives for the California Department of Parks and Recreation.
These directives amplify the legal codes contained in the PRC, the CCR, and the California State Park and Recreation Commission's Statements of Policy and Rules of Order. Specific Resource Management Directives that are particularly pertinent to the management of resources at Chino Hills State Park are:

#3 - Inventory of Features Updates
#5 - The Purposes of Developments in State Parks
#7 - Acquisition Boundaries
#9 - Boundaries and Developments in Natural Preserves
#27 - Establishment of Natural Preserves
#28 - Visitor-Use Impacts
#31 - Implementing Resource Elements
#33 - Exotic Plant Introduction
#34 - Exotic Plant Removal
#35 - Wildlife Management
#37 - Controlling Erosion
#43 - Water Diversion
#46 - Protection of Esthetic Quality
#58 - Cultural Resources
#59 - Underground Work
#70 - Archaeological Values
#72 - Archaeological Research
#74 - Recreational Resources

APPENDIX C

Comparison of Public Use Under Plan Alternatives

		Alternative 1 Existing Plan	**Alternatives 2 and 3 Revised Plan**
	Current Estimate	Projected Plan Scenario for Peak Use	Projected Plan Scenario for Peak Use
Peak Day-Use Vehicles	20-40	366	235
Peak Night-Use Vehicles	10-30	550	160
Walk- or Ride-In	155	205(3)	205
Peak number of People In Park (1)	365	2,925	1,310
Peak number of Trips per day (2)	165	1,923	945

(1) See calculations used in Appendix D – A Public-Use Scenario.
(2) Does not include use of easements by utility vehicles, which is presumed to remain the same.
(3) Not projected in original (1986) general plan.

APPENDIX D

A Public-Use Scenario

The following scenario represents a reasonable estimate of the type and size of public-use facilities that might be fully implemented within the parameters set by the *Plan Section* (Page 47) of this document. It is just one of a range of possibilities of types/sizes of facilities and is provided merely for the purpose of assessing the potential environmental impacts on the park and nearby properties and highways.

	Number of Parking Spaces	Turnover Rate	Peak Trips per Day*	Visitors/ Vehicle	Peak Number of Visitors in Park
Upper Aliso/Bane Canyon					
• Overnight Use (2 vehicles/campsite)	160	28%	240	3	480
• Day-Use Parking (inc. Visitor & Admin. Center)	120	50%	360	3	360
Boundary Trailheads					
• Day-Use Parking (5 locations)	75	50%	225	2.3	173
Lemon Grove					
• Day-Use Parking	40	50%	120	2.3	92
Walk-in					205
TOTALS	*395*		*945*		*1310*

*Trips per day is based on the following:
Day Use: 50% turnover rate = 3 trips x number of spaces
Overnight: 28% leave and return each day = 1.5 trips x number of spaces
A trip is defined as one-way travel over the entry road either entering or leaving

APPENDIX E

CEQA Review - Public Comments and DPR Responses

As a part of the public review process required by the California Environmental Quality Act, the preliminary (draft) of a General Plan document is made available for public review and comment for a minimum of 45 days. For the review process, each plan is assigned a unique number by the State Clearinghouse, located in the Governor's Office of Planning and Research.

The State Clearinghouse number assigned to the preliminary general plan for Chino Hills State Park is No. 98101049.

At the close of the review period, all public comments which are received in writing, comments from individuals, organizations, and other public agencies, are evaluated by the Department's planning staff, which prepares written responses. The California Park and Recreation Commission reviews these materials as part of the process of evaluating and approving a general plan.

These comments and the resultant departmental responses are retained by the Department as part of the public record. Those wishing to examine these materials should contact the Department at its Sacramento headquarters or at the office of the District in which the park unit is located.

The mailing address of the Department's Sacramento Headquarters is:

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
P.O. Box 942896
Sacramento, CA 94296-0001

The address of the Inland Empire District is:

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DEPARTMENT OF PARKS AND RECREATION
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Attachment 2: California Gnatcatcher, California Partners in Flight Coastal Scrub and Chaparral Bird Conservation Plan

California Partners in Flight Coastal Scrub and Chaparral Bird Conservation Plan

California Gnatcatcher (*Polioptila californica*)



Photo by Peter Knapp

Prepared by: **Patrick J. Mock** (Patrick_Mock@URSCorp.com)

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RECOMMENDED CITATION:

Mock, P. 2004. California Gnatcatcher (*Polioptila californica*). *In* The Coastal Scrub and Chaparral Bird Conservation Plan: a strategy for protecting and managing coastal scrub and chaparral habitats and associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/scrub.html

SHORTCUTS:

range map

action plan summary

references

SUBSPECIES STATUS:

Three subspecies recognized based on subtle morphological differences (*californica, pontilis, margaritae*; Atwood and Bontrager 2001). Mellnick and Rea (1994) restricted the *californica* subspecies to north of Ensenada and described *P. c. atwoodi* for the region between Ensenada and 30°N. Analysis of mtDNA shows little geographic structure or differentiation, suggesting no support for recognition of evolutionary-based subspecies (Zink et al. 2000). This species account will focus on the *californica* subspecies.

MANAGEMENT STATUS:

The *californica* subspecies (coastal California Gnatcatcher) has been listed as a Species of Special Concern in California and was listed as Threatened by the U.S. Fish and Wildlife Service in 1993 (USFWS 1993). Critical Habitat designated in 2000; but the economic effects of this designation are under court-ordered review; California Gnatcatcher is a focal species under California's Natural Communities Conservation Planning (NCCP) program. Several subregional coastal sage scrub focused conservation plans are approved or in the late planning stages throughout southern California.

DISTRIBUTION:

HISTORICAL DISTRIBUTION:

Species restricted to Baja California, Mexico and coastal areas of southern California, USA. California populations described as "rather scarce and irregularly distributed (Grinnell 1898, Dawson 1923, Woods 1949). Habitat reduction noted by Grinnell and Miller (1944). Current loss of potential habitat in U.S. estimated at 70 to 90 percent (Westman 1981, MBA 1991).

CURRENT BREEDING DISTRIBUTION:

P. c. californica subspecies occurs north of 30°N in nw Baja California, Mexico to Ventura County. Limited to lower elevations (<500m) south and west of Transverse and Peninsular Ranges (Bolsinger and Atwood 1992). Highest densities occur in coastal areas of Orange and San Diego counties (Atwood 1993, Mock 1993, Preston et al. 1998a, Weaver 1998 USFWS 2002). Lower densities occur in western Riverside and southwestern San Bernardino counties and inland San Diego County (Davis et al. 1998, PSBS 1995, Mock 1998). Small, now disjunct populations documented for Ventura and Los Angeles counties (Atwood et al. 1998a, Atwood and Bontrager 2001).

"Core" population areas supporting 30 or more pairs of California Gnatcatcher include Palos Verdes Peninsula, Montebello, Coyote Hills near Fullerton, Puente/Chino Hills, El Toro Air Station, coastal (Upper Newport Bay to Dana Point Headlands east to Interstate-5), north-central and southern Orange County (Interstate-5 to base of Santa Ana Mountains, from El Toro to southern county Border), Camp Pendleton/Fallbrook, Oceanside, North Carlsbad, southeast Carlsbad, Southwest San Marcos, Rainbow/Pala, Olivenhain/Lake Hodges/San Pasqual, Poway, Upper San Diego River/El Capitan Reservoir, Mission Trails/Miramar, Lakeside/Dehesa, Sweetwater River Reservoir, Jamul Mountains, Otay Lakes/Mesa, Tijuana River mouth, Lake Elsinore Lake Skinner, and Temecula (Atwood et al. 1998a, Bontrager 1997, Mock 1993, PSBS 1995?, Dudek 2002).

Extensive areas of potentially suitable habitat lack California Gnatcatcher (Mock 1998). The distribution and abundance of gnatcatchers appears to be constrained by local winter weather patterns and sage scrub plant species composition (Mock et al. 1990, Bontrager 1991, Bontrager et al. 1995, Atwood et al. 1998a, Mock 1998, Weaver 1998, USFWS 2002).

ECOLOGY:

AVERAGE TERRITORY SIZE:

Highly variable correlated with distance from the coast, ranging from less than 1 ha to over 9 ha (Braden 1997, Preston et al. 1998a, Atwood et al. 1998b). Non-breeding season home range size about 80% larger than

breeding season home range (Preston et al. 1998a, Bontrager 1991).

TIME OF OCCURRENCE AND SEASONAL MOVEMENTS:

California Gnatcatcher is non-migratory. Post-breeding dispersal by fledglings occurs during late summer and fall. Natal dispersal distance typically documented at less than 3 km. Longest documented dispersal distance by juvenile is 16 km (Braden 1992). Dispersal across highly man-modified landscapes, including major highways and residential development, occurs often (Bailey and Mock 1998, Gavin 1998, Lovio 1996, Haas and Campbell 2003, Atwood unpublished data). Many examples of occupied habitat patches isolated by extensive development (e.g., Dana Point Headlands, Oceanside; Bailey and Mock 1998). Extensive movements by breeding adults are relatively rare (Bailey and Mock 1998). Longest documented dispersal distance by an adult is 9 km (Atwood and Bontrager 2001). Types of habitat used during dispersal are highly variable (Campbell et al. 1998).

FOOD HABITS:

FORAGING STRATEGY:

Ground- and shrub-foraging insectivore.

DIET:

Orthoptera, Araneae, Coleoptera, Homoptera (Burger et al. 1999); Hymenoptera, Lepidoptera larva (Grishaver et al. 1998), Arachnids (Atwood and Bontrager 2001).

DRINKING:

Obtains most of water through diet

BREEDING HABITAT:

Generally "prefers open sage scrub with California sagebrush (*Artemisia californica*) as a dominant or co-dominant species (summarized in Atwood and Bontrager 2001). More abundant near sage scrub-grassland interface than where sage scrub grades into chaparral. Dense sage scrub occupied less frequently than more open sites. Mostly absent from coastal areas dominated by black sage (*Salvia mellifera*), white sage (*S. leucophylla*), or lemonadeberry (*Rhus integrifolia*). Nest placement typically in areas with less than 40 percent slope gradient. Gullies and drainages, when available within territory, used as nest sites. See also Braden et al. 1997.

NEST SUBSTRATE:

Use proportional to shrub species availability: typically California sagebrush, California buckwheat (*Eriogonum fasciculatum*), California sunflower (*Encilia californica*), broom baccharis (*Baccharis sarothroides*), and laural sumac (*Malosma laurina*). Many other less common sage scrub species used less frequently.

HEIGHT OF NEST:

Mean: 82 ± 2.9 SE cm (range 30-292, n = 101).

HEIGHT OF PLANT:

135 cm ± 3.6 SE (range 62-155, n=103).

NEST CONCEALMENT:

Nests placed lower than 70 cm above the ground less successful than higher placed nests. Nest success varied significantly between host shrub species (Grishaver et al. 1998. See also Braden et al. 1999.). Site selection affects risk of nest predation (Sockman 1997).

VEGETATION SURROUNDING THE NEST:

AVERAGE SHRUB COVER:

Typically between 20 and 60 percent. Inter-shrub gap 153 to 176 cm (Bontrager 1991, Mock and Bolger 1992, Grishaver et al. 1998).

DOMINANT SHRUB SPECIES:

California sagebrush dominant or co-dominant.

SLOPE:

Prefers nesting in areas with less than 40 percent slope gradient (Mock and Bolger 1992, J.L. Atwood, unpublished data).

NEST TYPE:

Open cup.

BREEDING BIOLOGY:

DISPLAYS:

Preferentially sings from taller shrubs (e.g., *Malosma larina*) (Mock and Bolger 1992; Preston et al. 1998b).

MATING SYSTEM:

Monogamous.

CLUTCH SIZE:

Mean varies between site and year, influenced by rainfall prior to egg laying (Grishaver et al. 1998, Patten and Rotenberry 1999). Clutch size typically 3 or 4 eggs (summarized in Atwood and Bontrager 2001).

INCUBATING SEX:

Both sexes incubate; female incubates 61 percent of time during day, Female on nest at night. Female controls duration of incubation shifts (Grishaver et al. 1998).

INCUBATION PERIOD:

14 ± 0.13 SE days from completion of clutch (Grishaver et al. 1998).

DEVELOPMENT AT HATCHING:

Altricial, naked, blind, uncoordinated.

NESTLING PERIOD:

13.3 ± 0.29 SE days after hatching, range: 10 to 15 days (Grishaver et al. 1998).

PARENTAL CARE:

Both parents feed young. Male brings food more frequently (Grishaver et al. 1998)

POST FLEDGING BIOLOGY OF OFFSPRING:

Offspring disperse from natal territory 3-4 weeks after fledging to unoccupied habitat. Young-of-Year typically paired and with established territories by October (Mock and Bolger 1992, Preston et al. 1998a, Grishaver et al. 1998).

POST BREEDING SOCIAL BEHAVIOR:

Remain on territory throughout the year, expand home range during non-breeding season. Forage with neighboring individuals in habitats not defended (Preston et al. 1998a, Grishaver et al. 1998).

DELAYED BREEDING:

Young of year breed during spring following birth.

NUMBER OF BROODS:

Highly variable between sites and year. Very persistent breeder. Typically 3 or 4 clutches laid per pair per year; maximum number: 10 nests per season. Number of successful broods per successful pair ranges from 1 to 3 (summarized in Atwood and Bontrager 2001).

BROOD PARASITISM:

Nest have been parasitized by Brown-headed Cowbirds (*Molothrus ater*). Both abandonment and the raising of cowbird young have been observed. Demographic effects of nest parasitism may be small due substitution for typically high natural rates of predation on gnatcatcher nests (Braden et al. 1997). Reduced number of nesting attempts in a season likely an adverse effect of nest parasitism.

LANDSCAPE FACTORS:

ELEVATION:

Sea Level to 500 m (Atwood and Bolsinger 1992). Most core populations in coastal counties below 300 m (Mock 1993).

FRAGMENTATION:

Occurrence or nest success of California Gnatcatcher is not reduced near edges with human development (Mock 1993, San Diego County Bird Atlas 2002, Mock and Preston 1995, Lovio 1996, Atwood 1998, Atwood et al. 1998b).

PATCH SIZE:

Presence of California Gnatcatcher not related to patch size in coastal areas of range, although smaller patches less consistently occupied over time (Atwood et al. 1998). Successful breeding reported from patch as small as 0.2 ha. Larger patch size requirements in inland portions of range (Mock and Bolger 1992, Famarlaro and Newman 1998, Preston et al. 1998a).

DISTURBANCE: (natural or managed):

Disturbances that reduce shrub cover, such as frequent fire, mechanical disruption, livestock grazing, off-highway vehicle use, and military training activities appear to reduce habitat suitability for California Gnatcatcher (Bontrager et al. 1995b, Mayer and Wirtz 1995, Beyers and Wirtz 1997, Wirtz et al. 1997, Atwood et al. 1998c). Construction monitoring studies suggest California Gnatcatchers are tolerant of adjacent construction activities (Atwood and Bontrager 2001) and high noise levels (Famarlaro and Newman 1998, Awbrey 1993, Awbrey et al. 1995, Awbrey and Hunsaker 1997, URS Corporation 2004).

ADJACENT LAND USE:

Abundance not reduced near urban edges (see "fragmentation" above).

PREDATORS:

Like most other open cup nesters, California Gnatcatchers are extremely vulnerable to nest predation. Snakes, birds, rodents, medium-sized mammals, and ants are reported nest predators. Nest predation rates vary from 26 to 68 percent of nests monitored (summarized in Atwood and Bontrager 2001).

EXOTIC SPECIES INVASION/ENCROACHMENT:

In coastal scrub habitats, increased fire frequency can cause extensive habitat conversion to grassland (Zedler et al. 1983), and reductions in gnatcatcher populations (Bontrager et al. 1995a, Atwood et al. 1998c).

DEMOGRAPHY AND POPULATION TRENDS:

AGE AND SEX RATIOS:

Equal sex ratios at birth.

PRODUCTIVITY:

Varies between sites and year: Palos Verdes: 3.0 ± 0.62 SD fledglings per female per year (n = 5 years); Orange Co.: 2.5 ± 0.48 SD (n = 5); San Diego Co.: 2.4 ± 1.48 SD (n = 4); Riverside Co.: range 1.4 to 3.8 at 3 sites during 3 years Summarized in Atwood and Bontrager 2001).

SURVIVORSHIP:

Palos Verdes, First-year survivorship 29 ± 5.4 SE percent (n = 4 years); Adults: 52 ± 10.2; Orange Co., Adults 57 ± 7.2 SE (n = 4 years). Mortality greatest during winter and immediately after fledging (Atwood and Bontrager 2001, Atwood et al. 1998a, Grishaver et al. 1998, Mock 1998, Erickson and Miner 1998).

DISPERSAL:

Majority of relocated banded juveniles found within 3 km of banding location; maximum juvenile dispersal distance reported: 16 km (Braden 1992). Longest documented dispersal distance by an adult is 9 km (Atwood and Bontrager 2001). Gnatcatcher distribution in isolated habitat patches suggest that maximum long-range dispersal could extend to nearly 22 km (Braden 1992, Mock and Bolger 1992, Gavin 1998, Bailey and Mock 1998, Atwood and Bontrager 2001).

POPULATION TREND:

In California, BBS analysis of 52 routes shows no significant trend between 1966 and 2000. However, for individual regions in California, there is too little BBS data available (4-12 routes per region) to reliably estimate trends (http://www.mbr-pwrc.usgs.gov/bbs/). Based on estimates of suitable habitat and survey data, U.S. population likely exceeds 3,000 pairs and maybe as high as 5000 pairs during years with favorable weather conditions (USFWS 1996, Mock 1993).

MANAGEMENT ISSUES:

FIRE AND EXOTIC VEGETATION:

Fire frequency and the invasion of exotic vegetation, especially grasses and annual forbs, interact to pose potentially serious threats to suitable gnatcatcher habitat. In much of coastal southern California, where these exotic plants are well-established and where the irreversible conversion of shrublands to grasslands is likely, fire frequency and burn size should be kept low. Where possible, flammable exotics should be removed or reduced in shrubland habitats. The recent series of wildfires in 2003 in southern California affected 4% of known

gnatcatcher occurrences, 16% of designated critical habitat acreage, and 28% of USFWS modeled habitat for the California Gnatcatcher (Bond and Bradley 2004).

HABITAT FRAGMENTATION:

California Gnatcatchers do not appear to be especially sensitive to fragmentation and development at the landscape scale. Primary concern is the chronic reduction in habitat carrying capacity due to development and need to develop a network of habitat reserves linked by habitat linkages. A sufficient number of "core" populations for California Gnatcatcher are extant to allow for a viable network of habitat reserves to be conserved though NCCP/HCP subregional planning processes that are ongoing throughout southern California.

PREDATION:

Predation is the most common cause of gnatcatcher nest failure. Information is lacking as to whether this predation rate is influenced by anthropogenic factors, although typical edge effects on gnatcatcher breeding is not evident (Atwood 1998).

ASSOCIATED SPECIES:

Greater Roadrunner, Bewick's Wren, Rufous-crowned Sparrow, Wrentit, Cactus Wren, California Towhee, San Diego pocket mouse (Chase et al. 2000).

MONITORING METHODS AND RESEARCH NEEDS:

Trend monitoring: The BBS method does not monitor California Gnatcatchers well in the areas of California where they are most likely to be declining due to habitat loss and degradation. Off-road monitoring methods should be applied in coastal scrub habitats in coastal California. Monitoring plans for NCCP efforts in southern California includes the monitoring plots of conserved California Gnatcatcher populations.

Demographic monitoring and research: Nest success and the factors that influence it should be monitored directly (through nest monitoring) in replicate sites to evaluate management options. Additional data on survivorship, productivity, and dispersal capability could be obtained from color-band re-sightings. Confirmation of assumed metapopulation and source-sink dynamics, and sensitivity to local weather conditions would be valuable (Mock 1993, Akçakaya and Atwood 1997, Mock 1998).

ACTION PLAN SUMMARY

SPECIES: California Gnatcatcher (*Polioptila californica*)

STATUS:

One subspecies occurs in the California shrublands covered by this plan. The coastal California Gnatcatcher (*P. c. californica*) is a characteristic coastal sage scrub bird found mainly in the coastal plain of southern California. Given the amount of loss of habitat in coastal California (Atwood 1993), its distribution in coastal scrub habitat has been reduced. The coastal California Gnatcatcher has been listed as a Species of Special Concern in California and a federal Threatened Species.

HABITAT NEEDS and CONCERNS:

California Gnatcatcher requires variable amounts of semi-open sage scrub co-dominated by California sagebrush on shallow slope gradients. Too frequent fires in sage scrub habitats can convert shrubland habitat to grassland and has probably contributed to the decline in California Gnatcatcher throughout southern California. Other disturbances that eliminate shrubby vegetation should also be avoided or minimized. Large areas of suitable habitat should be conserved to benefit California Gnatcatcher populations. Reduced localized productivity due to nest predation and nest parasitism is a cause for concern.

OBJECTIVES:

· Maintain current distribution.
· Conserve healthy, interconnected local breeding populations that exceed 50-100 pairs (Mock 1993).
· Guide conservation planning efforts to benefit California Gnatcatcher.
· Improve trend and demographic monitoring efforts (Atwood 2000).
· Gather information on the effects of management practices, habitat restoration, and dispersal capacity (Rotenberry and Scott 1998).

ACTION:

Habitat protection recommendations:

Habitat preservation for the Bells' Sage Sparrow should focus on coastal sage scrub associations that have California sagebrush as a co-dominant species. The habitat and area requirements of California Gnatcatcher should be addressed in multi-species conservation planning efforts (NCCPs and HCPs) throughout the range in southern California.

Management and restoration recommendations:

Manage fire frequency and other disturbances to maintain a semi-open shrub structure in coastal scrub.

MONITORING AND RESEARCH NEEDS:

As is true of many coastal shrubland bird species, California Gnatcatchers are not well monitored by Breeding Bird Survey counts. Given their sensitivity to habitat degradation, monitoring to determine population trends and demographics should be a high priority. Further studies of gnatcatcher dispersal capability through man-modified landscapes will help in the design of adequate habitat linkages between core populations.

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Attachment 3: Coastal California Gnatcatcher, Center for Biological Diversity

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SAVING THE COASTAL CALIFORNIA GNATCATCHER

Sometimes called the canary in Southern California's proverbial coal mine, the coastal California gnatcatcher with its kitten-like mew of a call is a prime indicator of ecosystem health. In the coastal sage scrub that once stretched unbroken from Ventura County to northern Baja California, this tiny gray songbird's habitat now lies amid a patchwork of freeways, shopping malls, and farmlands. Ninety percent of Southern California's coastal sage scrub has already been lost to development, and remnant patches have been hit hard by unnaturally frequent wildfire.

The Center is protecting the coastal California gnatcatcher from threats posed by transmission lines like the proposed Sunrise Powerlink (http://www.biologicaldiversity.org/programs/public_lands/energy/sunrise_powerlink/index.html) that would extend through gnatcatcher habitat and increase the risk of fire, as well as development — like the Coyote Hills development, approved for the site of one of the largest coastal California gnatcatcher populations. In late 2007, we announced our intent to sue (http://www.biologicaldiversity.org/campaigns/esa/pdfs/60-day-notice-sw-corridor.pdf) over the designation of the Southwest National Interest Electric Transmission Corridor, which would allow for the fast-track approval of utility and power lines through the habitat of several endangered species, including the gnatcatcher.

Since the gnatcatcher was listed as threatened under the Endangered Species Act — soon after Center staffer David Hogan filed a listing petition — the Center has been challenging sprawling projects that would bulldoze coastal sage scrub, whittle away at gnatcatcher habitat, and keep the bird's death toll on the rise. We successfully pressed for improved conservation measures for the bird under the San Diego Multiple Species Conservation

Plan, won a landmark settlement to protect the gnatcatcher and other species on Southern California's four national forests, and compiled a database documenting the federal authorization of “taking” coastal California gnatcatchers, which has so far resulted in the killing of at least 1,280 gnatcatcher pairs.

Enter email address JOIN EMAIL LIST Get the latest on our work for biodiversity and learn how to help in our free weekly e-newsletter.

KEY DOCUMENTS

2007 Critical habitat designation (http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2007_register&docid=fr19de07-26)
2007 Notice of intent to sue over Southwest Energy Corridor (../../../campaigns/esa/pdfs/60-day-notice-sw-corridor.pdf)
1993 Endangered Species Act listing (http://ecos.fws.gov/docs/federal_register/fr2253.pdf)

ENDANGERED SPECIES ACT PROFILE (endangered_species_act_profile.html)

ACTION TIMELINE (action_timeline.html)

NATURAL HISTORY (natural_history.html)

MEDIA

Press releases (../../../news/press_releases/search.html?cx=006464995654994533830%3Akwj3rw_lnja&cof=FORID%3A11&q=%22California%20gnatcatcher%22)Media highlights (media_highlights.html)
Search our newsroom for the coastal California gnatcatcher (../../../news/media-archive/search_results.html?cx=006464995654994533830%3Au4kkgjchupg&cof=FORID%3A11&q=%22California%20gnatcatcher%22)

RELATED ISSUES

Golden State Biodiversity Initiative (../../../campaigns/golden_state_biodiversity_initiative/index.html)
California Environmental Quality Act (../../../campaigns/ceqa/index.html)
Southwest National Interest Electric Transmission Corridor (../../../programs/public_lands/energy/southwest_national_interest_electric_transmission_corridor/index.html)
Sunrise Powerlink (../../../programs/public_lands/energy/sunrise_powerlink/index.html)
Transmission Lines (../../../programs/public_lands/energy/transmission_lines/index.html)
Endangered Species Act (../../../campaigns/esa/index.html)

Contact: Lisa Belenky (mailto:lbelenky@biologicaldiversity.org)

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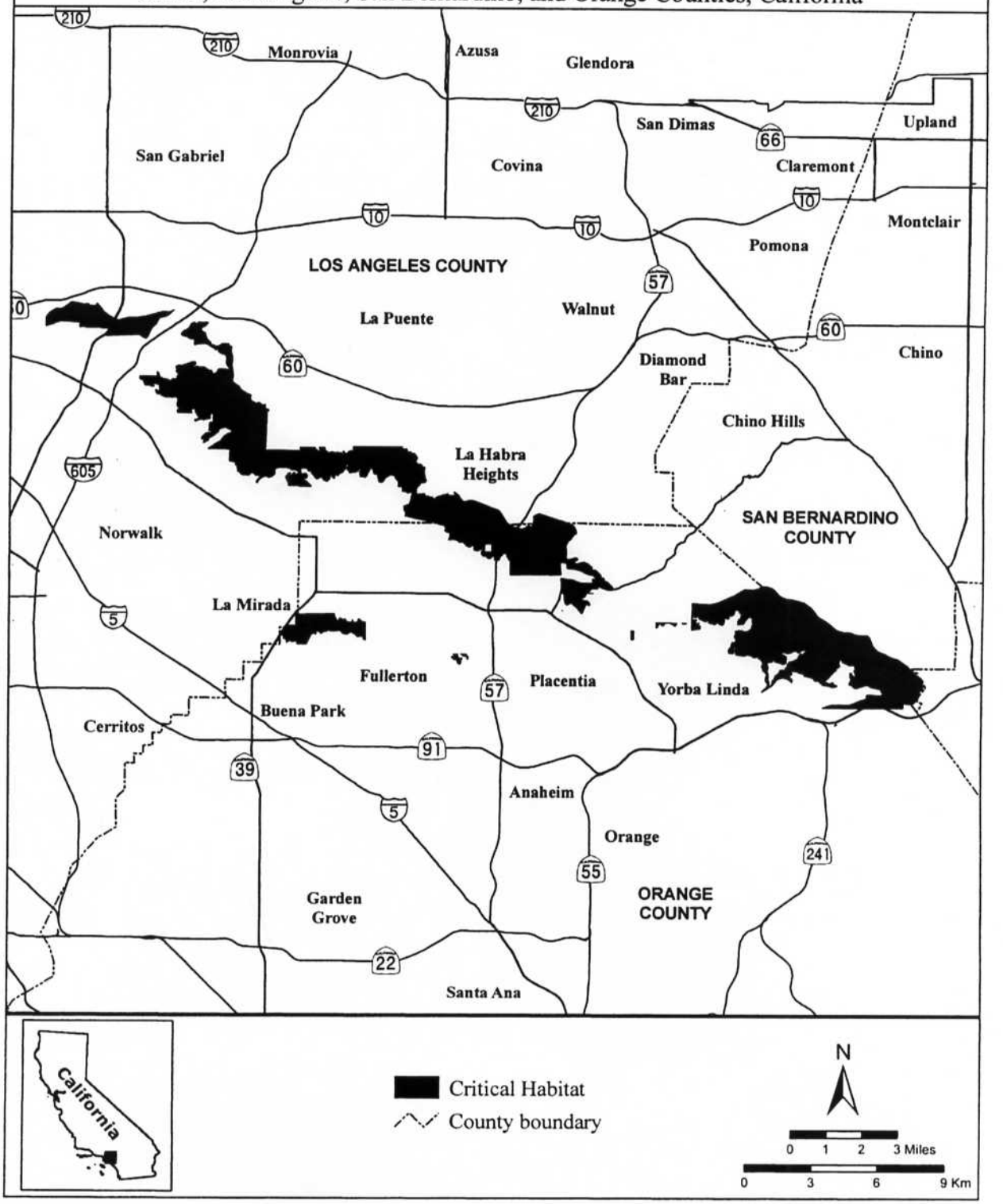
Attachment 4: Critical Habitat Map excerpted from 72 Fed. Reg. 72182

Map 9
Critical Habitat for Coastal California Gnatcatcher (*Polioptila californica californica*), Unit 9, Los Angeles, San Bernardino, and Orange Counties, California



BILLING CODE 4310–55–C

Attachment 5: Orange County Fire Hazard Severity Zone

ORANGE COUNTY

CAL FIRE SINCE 1885 — FRAP
Fire and Resource Assessment Program
California Department of Forestry and Fire Protection

VERY HIGH FIRE HAZARD SEVERITY ZONES IN LRA

As Recommended By CAL FIRE

118°6'0"W 118°0'0"W 117°54'0"W 117°48'0"W 117°42'0"W 117°36'0"W 117°30'0"W 117°24'0"W

34°0'0"N 33°54'0"N 33°48'0"N 33°42'0"N 33°36'0"N 33°30'0"N

LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
PACIFIC OCEAN

La Habra, Brea, Fullerton, Placentia, Yorba Linda, Buena Park, La Palma, Anaheim, Cypress, Villa Park, Orange, Stanton, Los Alamitos, Garden Grove, Westminster, Seal Beach, Santa Ana, Tustin, Fountain Valley, Irvine, Huntington Beach, Costa Mesa, Lake Forest, Rancho Santa Margarita, Trabuco Canyon, Silverado, Mission Viejo, Laguna Woods, Laguna Hills, Aliso Viejo, Laguna Beach, Laguna Niguel, San Juan Capistrano, Dana Point, San Clemente, Newport Beach

Santiago Creek, Santiago Lake, Santa Ana River

LRA — VHFHSZ — Non-VHFHSZ

Fire Hazard Severity Zones

Local Responsibility Area	State or Federal Responsibility Areas
VHFHSZ	VHFHSZ
Non-VHFHSZ	Non-VHFHSZ

Incorporated Cities
County Boundary

Government Code 51175-89 directs the California Department of Forestry and Fire Protection (CAL FIRE) to identify areas of very high fire hazard severity zones within Local Responsibility Areas (LRA). Mapping of the areas, referred to as Very High Fire Hazard Severity Zones (VHFHSZ), is based on data and models of, **potential** fuels over a 30-50 year time horizon and their associated expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure (including firebrands) to buildings. Details on the project and specific modeling methodology can be found at http://frap.cdf.ca.gov/projects/hazard/methods.htm. Local Responsibility Area VHFHSZ maps were initially developed in the mid-1990s and are now being updated based on improved science, mapping techniques, and data.

In late 2005 to be effective in 2008, the California Building Commission adopted California Building Code Chapter 7A requiring new buildings in VH FHSZs to use ignition resistant construction methods and materials. These new codes include provisions to improve the ignition resistance of buildings, especially from firebrands. The updated very high fire hazard severity zones will be used by building officials for new building permits in LRA. The updated zones will also be used to identify property whose owners must comply with natural hazards disclosure requirements at time of property sale and 100 foot defensible space clearance. It is likely that the fire hazard severity zones will be used for updates to the safety element of general plans.

This specific map is based on a geographic information system dataset that depicts final CAL FIRE recommendations for Very High FHSZs within the local jurisdiction. The process of finalizing these boundaries involved an extensive local review process, the details of which are available at http://frap.cdf.ca.gov/projects/hazard/btnet/ (click on "Continue as guest without logging in"). Local government has 120 days to designate, by ordinance, very high fire hazard severity zones within its jurisdiction after receiving the recommendation. Local government can add additional VHFHSZs. There is no requirement for local government to report their final action to CAL FIRE when the recommended zones are adopted. Consequently, users are directed to the appropriate local entity (county, city, fire department, or Fire Protection District) to determine the status of the local fire hazard severity zone ordinance.

N W E S

0 5 Miles
0 10 Kilometers

California Teale Albers, NAD 1983
Scale 1: 100,000
at 30" x 34"
October 2011



The State of California and the Department of Forestry and Fire Protection make no representations or warranties regarding the accuracy of data or maps. Neither the State nor the Department shall be liable under any circumstances for any direct, special, incidental, or consequential damages with respect to any claim by any user or third party on account of, or arising from, the use of data or maps.

Obtain FRAP maps, data, metadata and publications on the Internet at http://frap.cdf.ca.gov
For more information, contact CDF-FRAP, PO Box 944246, Sacramento, CA 94244-2460, (916) 327-3939.

Jerry Brown, Governor, State of California
John Laird, Secretary for Resources, The Natural Resources Agency
Ken Pimlott, Director, Department of Forestry and Fire Protection

MAP ID: OrangeCo

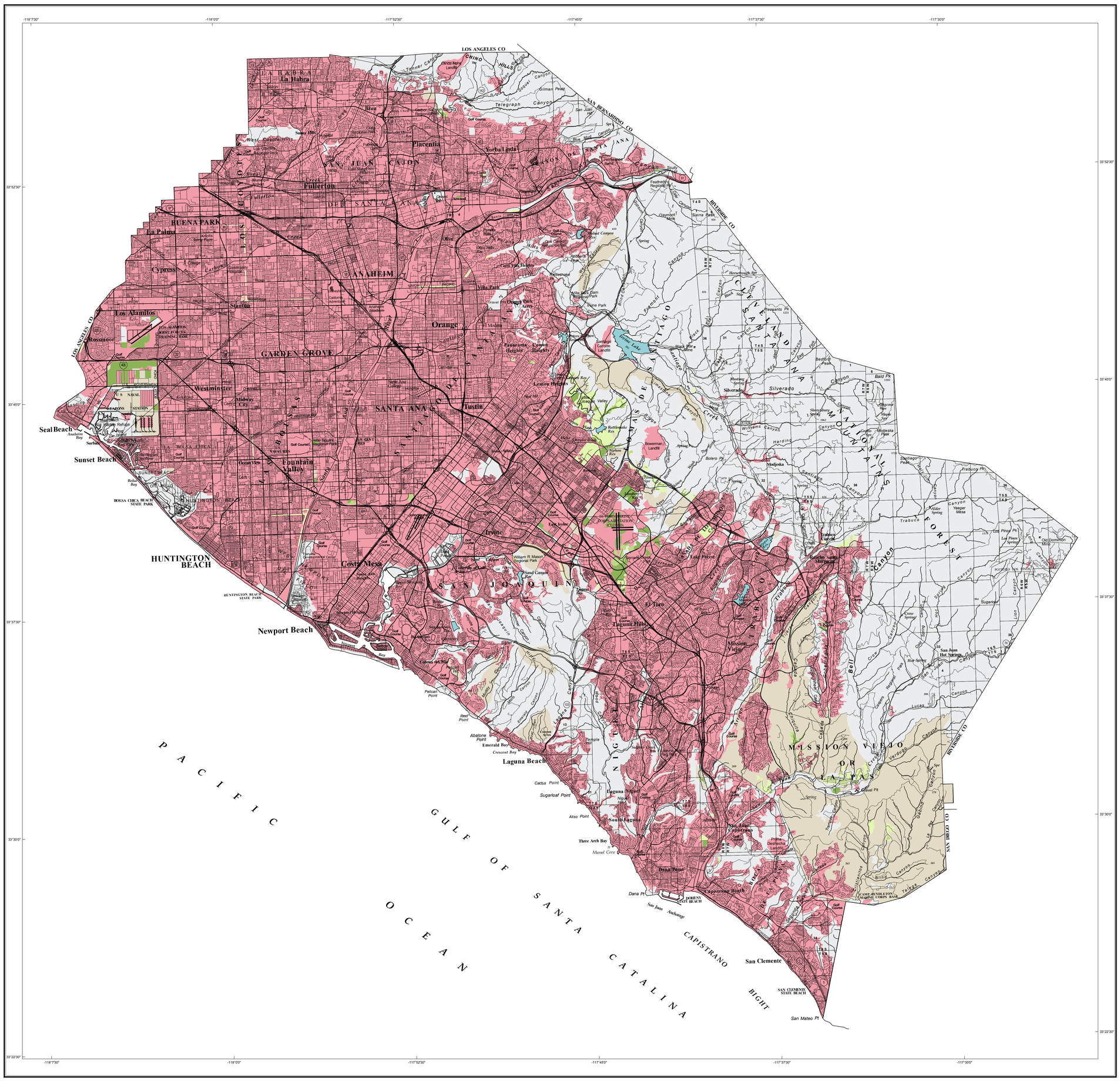
DATA SOURCES
CAL FIRE Fire Hazard Severity Zones (FHSZL06_1)
CAL FIRE Very High Fire Hazard Severity Zones in LRA - Orange (c30fhszl06_3)

Attachment 6: Orange County Important Farmland 2016

STATE OF CALIFORNIA
Edmund G. Brown Jr., *Governor*
THE NATURAL RESOURCES AGENCY
John Laird, *Secretary*
DEPARTMENT OF CONSERVATION
David Bunn, *Director*

ORANGE COUNTY IMPORTANT FARMLAND 2016

CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF LAND RESOURCE PROTECTION
FARMLAND MAPPING AND MONITORING PROGRAM



PRIME FARMLAND

PRIME FARMLAND HAS THE BEST COMBINATION OF PHYSICAL AND CHEMICAL FEATURES ABLE TO SUSTAIN LONG-TERM AGRICULTURAL PRODUCTION. THIS LAND HAS THE SOIL QUALITY, GROWING SEASON, AND MOISTURE SUPPLY NEEDED TO PRODUCE SUSTAINED HIGH YIELDS. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

FARMLAND OF STATEWIDE IMPORTANCE

FARMLAND OF STATEWIDE IMPORTANCE IS SIMILAR TO PRIME FARMLAND BUT WITH MINOR SHORTCOMINGS, SUCH AS GREATER SLOPES OR LESS ABILITY TO STORE SOIL MOISTURE. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

UNIQUE FARMLAND

UNIQUE FARMLAND CONSISTS OF LESSER QUALITY SOILS USED FOR THE PRODUCTION OF THE STATE'S LEADING AGRICULTURAL CROPS. THIS LAND IS USUALLY IRRIGATED, BUT MAY INCLUDE NONIRRIGATED ORCHARDS OR VINEYARDS AS FOUND IN SOME CLIMATIC ZONES IN CALIFORNIA. LAND MUST HAVE BEEN CROPPED AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

GRAZING LAND

GRAZING LAND IS LAND ON WHICH THE EXISTING VEGETATION IS SUITED TO THE GRAZING OF LIVESTOCK.

URBAN AND BUILT-UP LAND

URBAN AND BUILT-UP LAND IS OCCUPIED BY STRUCTURES WITH A BUILDING DENSITY OF AT LEAST 1 UNIT TO 1.5 ACRES, OR APPROXIMATELY 6 STRUCTURES TO A 10-ACRE PARCEL. COMMON EXAMPLES INCLUDE RESIDENTIAL, INDUSTRIAL, COMMERCIAL, INSTITUTIONAL FACILITIES, CEMETERIES, AIRPORTS, GOLF COURSES, SANITARY LANDFILLS, SEWAGE TREATMENT, AND WATER CONTROL STRUCTURES.

OTHER LAND

OTHER LAND IS LAND NOT INCLUDED IN ANY OTHER MAPPING CATEGORY. COMMON EXAMPLES INCLUDE LOW DENSITY RURAL DEVELOPMENTS, BRUSH, TIMBER, WETLAND, AND RIPARIAN AREAS NOT SUITABLE FOR LIVESTOCK GRAZING, CONFINED LIVESTOCK, POULTRY, OR AQUACULTURE FACILITIES, STRIP MINES, BORROW PITS, AND WATER BODIES SMALLER THAN 40 ACRES. VACANT AND NONAGRICULTURAL LAND SURROUNDED ON ALL SIDES BY URBAN DEVELOPMENT AND GREATER THAN 40 ACRES IS MAPPED AS OTHER LAND.

WATER

PERENNIAL WATER BODIES WITH AN EXTENT OF AT LEAST 40 ACRES.

SCALE: 1:100,000
1 inch represents approximately 1.6 miles

1 0 1 2 3 4 5 6 7 8 9 10 Kilometers

1 0 1 2 3 4 5 Miles

10 40 160
1 mile

The minimum land use mapping unit is 10 acres, except Water, which is mapped to a minimum of 40 acres.

1 square mile = 640 acres.



Total County Area - 509,717 acres
Mapped Area - 509,717 acres

Important Farmland Maps are compiled by the Farmland Mapping and Monitoring Program (FMMP) pursuant to Section 65570 of the California Government Code. To create the maps, FMMP combines current land use information with U.S. Department of Agriculture-Natural Resources Conservation Service (NRCS) soil survey data. Soil units qualifying for Prime Farmland and Farmland of Statewide Importance are determined by the NRCS. Changes to soil profiles subsequent to publication of NRCS Gridded Soil Survey Geographic (gSSURGO) Database for California, November 29, 2016 are not reflected on this map. This map was developed using NRCS gridded digital soil data (gSSURGO) and may contain individual soil units less than one acre.

Land use status is determined using current and historic aerial imagery, supplemental GIS data, and field verification. Imagery sources may include public domain datasets, web-based information, and commercially purchased data, depending on data availability. Supplemental data on land management status is obtained from federal, state, and local governments. Map reviewers at the local level contribute valuable information with their comments and suggestions. Please refer to FMMP field analyst reports for each county to obtain specific citations.

County boundaries for the 2016 Important Farmland Series are from the California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (FRAP) 2009 version of California Counties GIS data.

Cultural base information for the Important Farmland Maps was derived from public domain data sets, based upon design of the U.S. Geological Survey, with updates generated by digitizing over current imagery.

This map should be used within the limits of its purpose - as a current inventory of agricultural land resources. This map does not necessarily reflect general plan or zoning designations, city limit lines, changing economic or market conditions, or other factors which may be taken into consideration when land use policies are determined. This map is not designed for parcel-specific planning purposes due to its scale and the ten-acre minimum land use mapping unit. Classification of important farmland and urban areas on this map is based on best available data. The information has been delineated as accurately as possible at 1:24,000-scale, but no claim to meet 1:24,000 National Map Accuracy Standards is made due to variations in the quality of source data.

The Department of Conservation makes no warranties as to the suitability of this product for any particular purpose.

Additional data is available at www.conservation.ca.gov/dlrp/fmmp, including detail on the program, full size PDF maps, map categories, statistics, field summaries, and GIS data for download. Contact the:

Farmland Mapping and Monitoring Program
801 K Street, MS 14-15
Sacramento, CA 95814
Phone: (916) 324-0850
e-mail: fmmp@conservation.ca.gov

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Map published September 2018.

City of La Habra

"A Caring Community"

COMMUNITY DEVELOPMENT

110 E. La Habra Boulevard
Post Office Box 337
La Habra, CA 90633-0785
Office: (562) 383-4100
Fax: (562) 383-4476

RECEIVED
JAN 23 2019
PL

January 18, 2019

Ms. Maribeth Tinio
Senior Planner
City of Brea
Planning Division-Level 3
1 Civic Center Circle
Brea, California 92821

Re: Brea 265 Specific Plan

Dear Ms. Tinio,

Thank you for the opportunity to review the Notice of Preparation of a Draft Environmental Impact Report for the Brea 265 Specific Plan. As you are aware, the California Environmental Quality Act allows potentially affected agencies to comment on proposed projects that may cause significant environmental impacts to their community. We would offer the following comments on the environmental document:

1. In 2015, La Habra and Brea coordinated efforts to synchronize Lambert Road to allow for improved flow of traffic, a decrease in the number of stops, and a reduction of greenhouse gases throughout the communities. The construction of 1,100 residential units could affect the signal synchronization related to vehicular trips to and from La Habra. The Transportation and Traffic Section of the Draft Environmental Impact Report (DEIR) should analyze the potential impacts to La Habra.

2. The City of La Habra requires developers to pay "fair share" traffic impact fees towards intersections that require improvements, in order to maintain acceptable Levels of Service ("LOS") for existing and future conditions. The DEIR should at a minimum study the intersections of Lambert Road/Palm Street, Lambert Road/Harbor Boulevard, La Habra Boulevard/Harbor Boulevard, and Harbor Boulevard/Imperial Highway based on the trip distribution pattern identified in the Traffic Study as appropriate. A condition should be placed on the project that requires the developer to contribute their "fair share" traffic impact fees for any incremental project impacts at these intersections in La Habra as required by the La Habra Municipal Code.

3. Imperial Highway in the City of La Habra is on the Orange County Congestion Management Program (CMP) Highway System. Furthermore, the intersection of Imperial Highway/Harbor Boulevard is a monitored intersection on the Orange County CMP system. The DEIR should address CMP impacts at this intersection.

We are prepared to assist you in addressing the above concerns. We would request that when the DEIR is completed, a copy be provided to the City of La Habra for review and comment. Additional comments may be generated based on that review.

If you should have any questions, please feel free to contact me at (562) 383-4100.

Sincerely,

Carlos Jaramillo
Deputy Director of Community Development

cc: Jim Sadro, City Manager
Chris Johansen, City Engineer
Michael Plotnik, Traffic Manager
Andrew Ho, Director of Community and Economic Development

From:	Jennifer Ward
To:	Tinio, Maribeth
Cc:	M Kenji Coleman; Craig Wojciak; Ryann Higashi; Kelley Lee
Subject:	City of Brea - Brea 265 Specific Plan Draft EIR
Date:	Wednesday, January 02, 2019 2:13:42 PM
Attachments:	image001.png

Good afternoon Maribeth,

I received a copy of a NOP of a draft EIR for the subject project. I would like to know if the development will cause any of SCE's facilities (mainly 50kV and above) to be relocated? If so, we should chat as our scope of work should be covered in the EIR. We have certain CPUC exemptions we can use for our work under General Order 131D, however if SCE's work is not in the project EIR, SCE may have to prepare their own CEQA and that could delay the project (if SCE relocation work is required).

Please give me a call at your convenience.

Jennifer Ward
Project Manager
Transmission Project Management / T&D
T. 714-973-5418 | M. 714-269-7172

1444 E. McFadden Ave. Santa Ana, CA 92705

SOUTHERN CALIFORNIA EDISON® | Energy for What's Ahead™

From:	Michael Ennabe
To:	Tinio, Maribeth
Subject:	Brea 265
Date:	Monday, December 17, 2018 10:53:18 AM

Hi Maribeth,

I was recently made aware of this project and I would like to voice my support for the project. I live at 4362 Bob White Rd. which would be directly impacted by the development.

However, I did have some questions/concerns. To what extent is the developer improving Carbon Canyon park? It would be great if they could expand access as well as more open space. I believe they will also be building out a few other small parks which is very important. Also, I would request that some infrastructure improvements be included in the project. Specifically, Lambert Rd. east of Valencia. As I'm sure you know there is a huge bottleneck as you enter Carbon Canyon particularly in the afternoons. Although I rarely drive through the Canyon it takes me sometimes as long as 15 minutes to go from Valencia to Brea Hills Ave. This problem will only be exacerbated with the new development.

With that said, the fact this project is relatively low density when taking into account the scope of the project - around 260 acres - this would be a great project for the area. I believe what is currently on the site is an eye sore with chain link fencing and oil rigs. I think the development would be great for the community and generate badly needed tax revenue.

Again, my only recommendations would be to add as much outdoor space for parks and other recreational activities and to help ease traffic both on Lambert east of Valencia and the general traffic around the subject property. Let me know if you have any questions. Thank you!

--
Michael Ennabe, Esq. LL.M.
SVP & General Counsel
Ennabe Properties, Inc.
BRE: 01962256 SBN: 282809
11310 Valley Blvd.
El Monte, CA 91731
Office: (213) 388-2125
Fax: (213) 388-2194
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Please consider the environment before printing this e-mail

From: Mike Cocos
To: Tinio, Maribeth
Subject: Brea 265
Date: Tuesday, December 18, 2018 3:36:04 PM

Dear Maribeth,

Some of my thoughts and suggestions for the new proposed development. Brea 265.

As with any project like this, safety, traffic and traffic mitigations has to be considered.

I could see the residents of the East of Valencia Ave. parcel having issues accessing their homes during the afternoon time traffic or when the 91, 57 or 60 freeway have a traffic issue. This traffic is terrible now and will not change. See how the Brea Hills neighborhood is coping with this now.

Some General suggestions or would like to have.

1. Dedicated road from North bound Rose to East bound Carbon Canyon.

2. Dedicated lane from North bound Valencia Ave. to East bound Carbon Canyon East

3. Green traffic arrow for North Rose to North Valencia turn.

4. Two right turn lanes from North Rose to North Valencia.

5. Dedicated turn lanes in to all neighborhoods in Brea 265.

6. Regularly followed scheduled of sweeping Valencia Ave. (not like the random cleaning that occurs now)

7. Strongly enforce Commercial vehicle traffic and codes on Valencia, Lambert and Santa Fe.

8. Minimize cut through traffic.

9. Trail, bike, kids access across East Lambert Road.

10. Trail, bike, kids access across Valencia Ave.
(For kids to be able to travel safely to the school or parks.)

11. Connect the Tracks at Brea to this project.

12. No gates. There are minimal gated communities throughout North Orange County. Gates at this project would not portray the inclusive look or statement that we would want for this area of Brea.

13. Build as fire safe as possible.

14. Find a way to prevent vehicles lining up at the signal to go straight on North Valencia Ave. from cutting and turning right into East bound Carbon Canyon Road

traffic. (not using the existing right turn merging lane to east Carbon Canyon road.)

Sincerely,

Mike Cocos

From:	Dennis Pritchett
To:	Tinio, Maribeth
Subject:	Comments on Aera Energy Project
Date:	Sunday, December 23, 2018 5:14:13 PM

Maibeth Tino:

I live in the North Hills neighborhood of Brea and I am writing to express my concerns about the proposed Aera Energy Project.

1) The addition of 1,100 homes in Brea will greatly stress traffic in an area that already has insufficient infrastructure to support what will certainly be over 2,000 additional vehicles. Valencia, Rose, Lambert, and Imperial Highway are already very conjested during the peak traffic hours. Long waits occur on all of these streets now.

2) The additional traffic will also add to the noise and air pollution in Brea. We need to focus on reducing carbon emissions not add to them with additional homes in the city of Brea.

3) Brea only has one high school and one middle school. These schools cannot handle the new students from developments already underway at Valencia Avenue and Imperial Highway, Central and Site Drive, and the Aera project.

4) Additional homes will have a negative impact on animal life in one of the few open spaces currently in Brea. Small animals and birds abound in the area proposed for development.

5) This newly planned development will also have a negative impact on the redwood grove which is within several hundred yards of the beautiful trees. They are still in a fragile development stage and their growth and survival will be hampered by this development.

6) This development will also tax the Brea landfill and water requirements for the city of Brea

Please investigate all of these issues when developing the Enviromental Impact Survey.

Dennis Pritchett
761 Oak Knoll St.
Brea, CA 92821

From:	Se Choi
To:	Tinio, Maribeth
Subject:	Brea 265 Plan
Date:	Wednesday, December 26, 2018 1:13:40 PM

Hi,

My name is Se Choi, and I am a resident of the Walden Estates in Brea, off of Lambert Rd. The proposed Brea 265 Plan would be directly adjacent to my neighborhood, and I have concerns on the impact to the already congested traffic on Lambert by the addition of 1,100 dwelling units.

Also, I would like clarification into what exactly a "medium density" and "high density" residential housing means, in terms of language I can relate to, such as:
- 3BDR, 1500-2000 sq ft homes (<- is this medium density?)
- 2/3BDR 1000-1300 sq ft condo / townhomes (<- is this high density?)

Or, are the "high density residential" still Single Family detached homes?

Thank you, and Happy Holidays/Happy New Year.

-Se Choi

Dec 26th 2018

Marjorie Eason
370 Vesuvius Drive
Brea, CA 92823-6343

City of Brea Planning Committee,

I am a 54 year resident of Vesuvius Dr in Brea. I received the notification of the plan to build residences along Rose Dr. This is a very impacted road way right now. The Sa Idoreto developers considered the impact to the residences in our area and did not have an exit onto Rose Drive. Valencia and Lambert and Carbon Canyon are also impacted due to the traffic coming over the Brea Hills from Chino on a daily basis. I hope this traffic is considered before adding to the problem.

My other concern are the fires that occur from time to time. The last one ten years ago forcing an evacuation for all residences off of Rose Drive. I have lived through 8-10 fires and evacuated for 2. The wind through Carbon Canyon caused the fires to burn through Carbon Canyon Park and down to Vesuvius Dr. The trees are just now growing back. The Orange

2) County Fire Service is in control of Rose Drive closing it completely without notice. People have been stranded in their homes.

The Edison company intends to shut off the electricity to all homes with "above ground wiring." This includes the 65 homes in our tract. I see people getting gridlocked trying to evacuate their homes on Rose Drive. We do not want another "Paradise" to happen ~~here~~ here.

What are your plans to alleviate the traffic problem on Rose Dr.? What are your evacuation plans for people living off of Rose Drive in the Brea area?

I think our neighborhood should be considered in your study. I do plan on attending your meeting on Jan 16th

Thank you,

Margie Eason

MARGIEEASON@MAC.COM 714-524-0480

From:	Forrest Hatfield
To:	Tinio, Maribeth
Subject:	Brea 265 Specific Plan
Date:	Friday, January 11, 2019 1:08:03 PM

To whom it may concern,

After reading the subject plan proposal I want to express my surprise that anyone would suggest putting homes in this area. Thousands of cars travel these three roads { Lambert Road/ Carbon Canyon Road, Rose Drive, Valencia Ave } everyday day of the week and to suggest that more residents be put in the middle of these streets is asking for more traffic that backs up for hours a day already. People traveling these three roads would be subjected to additional delays, not to mention the new residents trying to get in and out their new homes.

I am adamantly against this proposed plan to bulld any new homes in this area because of the great negative impact it will have on the existing traffic problem that we already have on these three streets!

Sincerely,

Forrest Hatfield
3618 Rose Drive
Yorba Linda, CA 92886

Sent from Mail for Windows 10

From:	Duane Thompson
To:	Tinio, Maribeth
Cc:	Crabtree, David
Subject:	Brea 265 Specific Plan
Date:	Tuesday, January 22, 2019 4:15:07 PM

I have some comments I would like to submit regarding Brea 265.

The maps on display did a great job of showing lots of green space and trail connectivity.

What was missing was what impact these trails would have on traffic, as most each connection crosses either Lambert or Valencia or Rose and would include an intersection.

I would like to have the planners consider avoiding direct impacts to these streets as much as possible.

Would it be possible to access Rose from the existing traffic signal at Vesuvius Drive or at least synchronize with that existing signal?

Would it be possible to access Lambert via Sunflower St., which already has a signal.

Would it be possible to access Naranjal Dr. then Santa Fe?

That would connect traffic from Kraemer to Santa Fe to Naranjal and keep traffic off of Lambert.

Peak hour traffic is miserable on SH142 and will only get worse.

Any trails that cross these roads should have under passes or over passes.

I think all of these routes are within the scope of the development area.

You may have other suggestions that would achieve the same benefits.

Thanks for the opportunity to comment.

Duane Thompson
275 Verbena Ln.
Brea, 92823

Ms. Tinio
Senior Planner
City of Brea, Planning Division

In reference to the 265 Specific Plan Residential Project NOP, the EIR should analyze the following:

Land use. In that the proposed project is vast, it will be easier to discuss this topic in two areas; The portion currently on unincorporated land (OC Part) and the part in Brea city (Brea Part). The Brea Part will be addressed first.

The Brea Part is currently zoned HR for single family dwelling use and not medium or high density residential use. Applicant proposes to develop in the Brea Part medium and high density residential units with high density residential as dense as up to 24.99 dwelling units per acre. To the west of the Brea Part is the mixed use La Floresta complex that includes a mix of uses and densities including high density residential units near the intersection of the Imperial Highway and Valencia. The Applicant proposes to develop high density residential units at the southern end of the Brea Part which is in an area surrounded by single family residences.

While the adjacent La Floresta development establishes a precedent for mixed residential densities including high density residential units in the wider general location of Applicant's development, the Applicant's proposal for its high density residential units is not similarly situated as the Applicant's proposed site of the Brea Part for high density residential units would be next to mostly all existing single family dwellings and parklands rather than medium density residential and retail units. The question of whether the zoning of the Brea Part should be changed or varied to include high density residential use should be analyzed in the context that it would be contrary to the existing General Plan and not in conformance with the well-established neighborhood consisting of single family dwellings and parklands.

As to the OC Part, the question is whether Brea should incorporate the OC Part which would be logical from the viewpoint of the Applicant and maybe Brea, so the entire proposed project would be fully integrated under one jurisdiction with respect to its development. However, before that decision should be made, the threshold question is whether that part should even be developed before determining whether it should be annexed. There are also various other critical considerations besides land use that require analysis before that question can be answered, but for this NOP the focus will be on land use, and in particular the OC Part that is west of Valencia to be referred to as OC Part West, where Applicant proposes to develop medium and high density residential units. The zoning in Brea nearest this OC Part West currently has no high density residential units and is not zoned for such use, and the nearest zoned areas are the ORSP or Olinda Ranch Specific Plan with all single family dwellings directly to the east, THSP or Tonner Hills Specific Plan to the northwest which includes medium and low density residential units and R-1 (Eagle Hills) single family units to the west. The question is why should this OC Part West be zoned for high density residential use when all other adjacent areas are established as either low or medium density residential use, and so will Applicant's proposed development to the east of Valencia which is proposed to also be low density residential. There is no indication of how high the high density residential unit buildings will be, but based on the

proposed number of units and area described, it is estimated that the buildings will be at least three stories which would be higher than any of the residential units in the adjacent areas.

It is not known whether the Applicant applied for a density bonus under the various California new affordable housing laws enacted since 2017, but it is unconceivable that Applicant would qualify for a density bonus that would essentially convert current zoning from single family residential use to high density residential use. As such, it is even more important that the Applicant be able to justify its proposed project.

Air quality. In particular, the high density residential structures will result in additional burden to air quality compared its current zoning where applicably zoned with its carbon and nitrogen footprint from car trips generated by residents and workers at the proposed project and the use of carbon fuels for heating water and likely living spaces. Though state mandated solar energy usage for the proposed project will reduce this impact, the net impact still must be determined using reasonable assumptions. While the NOP does not specify the number of parking spaces for the proposed project with respect to the high density residential units, there should be a reasonable estimate of the average of number of cars per unit which may be parked on or offsite.

Population and housing. The proposed project will add a proposed 1,100 new housing units and a related number of residents to the site. Assuming the average household in Orange County has 3.0 people per household, this proposed project would add an additional 3,300 people to the population in Brea. Why should the General Plan be amended or varied to allow such high density residential development when it would be inconsistent with established medium and low density residential use? While Brea is in need of more housing, the question is what is the impact to the environment due to this increase in residential units and people living therein, especially when the current General Plan specifies a lower density residential use for the land in the Brea Part.

Noise. The proposed project will likely generate 5,000 or more motorized vehicle trips per day generating significant additional noise that would affect the fauna in nearby parks and uninhabited areas. In addition, there will be residents who have non-standard mufflers on cars, trucks and motorcycles that will create additional noise above what factory made vehicles would emit. The additional noise in decibels throughout the day should be determined along with its effect on humans and nearby resident fauna.

Public Services. To what extent will the proposed project have on the need for additional public services, the cost of such services, and how those services will be paid for not only in terms of upfront development fees but also long term estimated costs needed to provide future services to the extent not covered by upfront development fees or direct payment through specific funds for such services such as from a CFD for the proposed project?

The proposed project will generate significant runoff of rainwater into storm drains as open land is being replaced by hard surfaces and less permeable surfaces, so the extent of additional storm drains needed and upgrade of arterial storm drains must be determined. While the Applicant indicates that there will be catchment basins related to the project, the sufficiency of such basins needs to be determined in light of the increasing extreme weather events such as the “Pineapple

Express" which is becoming less rare due to climate change. There is a concern that existing FEMA flood maps are outdated for lack of consideration of climate change. The same needs to be determined for waste water as well as infrastructure for utilities supplied by the city, road and related lighting maintenance.

The additional police, fire, paramedic, traffic and maintenance services required will need to be determined based on the estimated number of additional residents and units. In particular, it is expected that traffic along Lambert and Valencia will be much heavier and may require more dedicated police services to ensure smooth traffic flow despite the recent widening of that intersection to accommodate increased traffic volume and flow.

The geography of Brea is such that a long range of hills (Puente and Chino) along its northern border. There are only a few north to south highways that go through these hills, namely Brea Canyon Road, the 57, and Carbon Canyon Road. Due to the differential in (1) wages and (2) market value per square foot of residential housing between the Inland Empire and Orange County, many worker-commuters travel southbound in the morning to work and northbound to go home in the evening during rush hour, with many using Carbon Canyon Road which goes directly through the proposed project, in particular the intersection at Carbon Canyon Road (Valencia) and Lambert. While some may argue that many of those worker-commuters may move to the proposed project to shorten their drive, this will be unlikely unless they can afford Brea housing costs and want to pay that price, thus it is more likely there will not be very many of those that will move to the proposed project.

The additional students including special needs students that will result from the proposed project also needs to be determined along with its effect on the existing enrollment and number of campuses. In particular, Brea has only one middle and high school and while the number of additional students may possibly be accommodated in the existing schools, there needs to be a focus on the impact of additional traffic that will be generated on Lambert Road during the school start times. There is already near gridlock conditions at the Lambert and State College intersection at school start times, and with Hines and Central developments operational in the near future, the further impact of the proposed project will need to be determined as to whether it will be the proverbial straw that breaks the camel's back causing total gridlock to exist at key intersections in Brea along Lambert Road, State College and Birch. As to elementary school capacity, it is likely that current declining enrollment will result in students from the proposed project being assigned to existing schools besides Olinda Elementary, in which case would cause more traffic at school start and end times.

It should be mentioned that as part of the Hines project, smart signals will be installed to alleviate and mitigate traffic congestion, but it is my opinion that smart signals will have little effect in Brea during heavy traffic times. This is because (i) the aforementioned key intersections will have so much traffic in all directions that little if any efficiency will be gained by timing differentials in the order and duration of the different signal lights and arrows, especially when (ii) those same intersections are so close to the 57, Imperial Highway and other state controlled intersections where Brea has no jurisdiction to control because traffic flow on state routes is takes precedent over traffic flow on city roads. Gridlock will have a serious and

possibly lethal consequence for residents of Brea that will need emergency medical services and are unable to receive those services in a timely manner.

Special mention needs to be made of the additional risk created by high density residential units with respect to fire. In 2008, during a Santa Ana wind event, a couple of hours after the start of the Freeway Complex, a fire started allegedly by malfunctioning electrical equipment in the area very close to the proposed project merged with the Freeway Complex Fire that destroyed over 200 homes including homes nearby in Carbon Canyon and Yorba Linda. Fierce winds drove the fire west, all the way to the 57 and across it before airdrops by the OFCA and ground efforts by BFD were able to stop its westward spread to dense housing. The proposed project located at the base of the Carbon Canyon is susceptible to windy conditions and heightened fire danger. With high density residential units proposed for the area, even assuming the zoning would allow for such, unless special safeguards are to built into these structures such as wide greenbelts, plaster boxed eaves, tiled roofs, etc., then these housing units will be like matchboxes that would be a threat to the entire Brea community.

Transportation and circulation. There is no efficient mass transit in Brea or Orange County, meaning transportation by car is still the primary means of traveling to work and school, unless work or school is within walking distance of the proposed project. Traffic in Brea is heavy during the rush hours, and the proposed project may add a significant amount of traffic, especially on Valencia and Lambert. These concerns have been also addressed at length in the earlier topics. So the impact of the proposed project on circulation should also be evaluated as to whether the additional volume of traffic will surpass the maximum volumes of existing roads for efficient traffic flow at or near the existing speed limits, and it should also be evaluated the estimated average time during rush hour it will take to reach the 57 from the proposed project. It should also be estimated, the time cars will have to wait to enter the 57 southbound in the morning due to the signals at the on-ramps. It would be very sad, if that on ramp will become like on ramps in other areas like Corona where the wait during morning rush hour averages 10-15 minutes or more. Finally, the impact on other Brea residents due to the added traffic burden to Lambert, Kramer and Birch should be determined by estimating future traffic counts at different key intersections in Brea.

Conclusion. As a longtime resident of Brea, it has been difficult to acknowledge the adverse changes that resulted from growth in Brea, but growth and change are inevitable. Brea has adopted a General Plan providing for controlled growth in Brea that is and has been in the best interests of all stakeholders, and there is no reason to change that now.

Tom Kwan
Brea

From:	dale knudtson
To:	Tinio, Maribeth
Subject:	Brea 265 - "comment card"
Date:	Friday, January 18, 2019 11:13:48 AM

I wanted to give you my concerns, which I am confident are shared by residents in my neighborhood, as you accumulate information for the EIR report for the Brea 265 project. I live in the Eagle Hills neighborhood. This neighborhood is already negatively impacted by the adjoining elementary school by families utilizing our neighborhood as a “parking lot” and “drop off point” for their kids. Rather than navigating the traffic at the school itself or affording themselves the many parking spaces available at Brea Sports Park, many take the “closer / less congested option” and impact our neighborhood. Every morning and afternoon, Flower Hill street is overrun with cars and with people crossing the street mid block at their convenience – in addition, often parents choose to gather on the sidewalk in front of houses to “chit chat”, so not only is our neighborhood a “parking lot” and a “drop off point”, but you can add “meeting place” to the unintended consequences to the homeowners when the school was approved.

The Eagle Hills neighborhood is also used a “short cut” from the congestion of surrounding streets (Valencia, Santa Fe, Lambert, Birch) – off of Lambert, cars turn onto Starflower and speed through the neighborhood on Flower Hill to the intersection at Birch. From Birch (or after dropping off kids at "the eagle”), cars speed through the neighborhood on Flower Hill to Lambert in order to get to the arterial street to the 57 Fwy (rather than continuing on Birch to Kraemer and then to Lambert, thereby keeping traffic out of the residential area). Even the school bus utilizes this route as a short cut to the school each day. I doubt that when this neighborhood was developed there was the intention that Flower Hill was to be a traffic bearing street to this extent, but with surrounding development and no mitigating requirements that is what it has become.

Brea 265 now proposes to add 1100 more units (with accompanying thousands of people and cars) to the immediately surrounding area without any new streets to handle the increased travel to the already overly congested roads (Valencia, Santa Fe, Lambert, Birch). I submit that any approval of this magnitude has to also include a condition for mitigating traffic to the surrounding area. Some possible suggestions include: prohibiting left turns at Starflower from Westbound Lambert during particular times of the day (prohibiting extra traffic in the neighborhood); right turn only at Lambert from Northbound Starflower (residents can still access Lambert by exiting the neighborhood on Birch, travelling to Kraemer, turning North to Lambert) - eliminates using the neighborhood as "short cut" to get to a main street to the freeway after "school drop offs"); require “school drop offs” at the school or utilize the Brea Sports Park for parking (this could be reinforced by instituting resident permit parking only on Flower Hill and/or “no stopping signs” for the first several hundred feet on Flower Hill) – all of the preceding options would require police enforcement at the two critical times of day to “get the message out”; speed bumps on Flower Hill to reduce vehicle speed; a stop light at Flower Hill (twice a day it is very difficult to get out of the neighborhood due to the increased school traffic) – if Brea 265 is approved, the

amount of traffic will increase where the difficulty to exit might exist all day rather than only twice a day). It may obviously take more than one of these solutions/suggestions to resolve some of the problems given here. And some of these mitigation measures are needed *whether the Brea 265 project goes forward or not*. These concerns are specifically for the Eagle Hills neighborhood – I am certain there are similar types of concerns in other surrounding neighborhoods that are impacted by current traffic issues on the surrounding streets that will only be exacerbated by the Brea 265 project without appropriate mitigation traffic measures.

Currently Eagle Hills is one of Brea's biggest "bragging rights" with the annual Christmas light displays in this neighborhood. The neighborhood participates even though individual households have to endure the expense of landscape damage, broken sprinklers, trash, added utility cost, restricted access to the neighborhood and our homes. With the school & the annual light display viewings, this neighborhood already shoulders a disproportionate share of traffic issues, probably more than any other neighborhood in the city. Please give traffic mitigation a priority in any discussion pertaining to this project. I also request that these issues outlined above be reviewed for remediation regardless of what transpires with the Brea 265 project.

Dale Knudtson

From:	Nancy Stevens
To:	Tinio, Maribeth
Subject:	: Brea 265 response
Date:	Sunday, January 20, 2019 12:14:23 PM

Re: Response to proposed EIR for Brea 265
From: Nancy Stevens, 3620 Rose Dr. Yorba Linda, CA 92886, ylns5281@aol.com
land line 714-528-9272

My personal introduction: I have lived in the same house since May 1972 on Rose Dr., S of Blake on E side of street.
I am not so naïve as to not expect some changes in all these years, however I do believe I am capable of offering some valuable information about this area. I offer my observations to this proposed project in Brea.

FIRE---The proposed information lies in a very high fire area. Over the many years I have lived here we have been threatened many times by fires . I have had mandatory evacuation situations as well as voluntary. There have been MANY fires in this immediate area as proposed. On that alone---------building in the proposed area should be limited dramatically.in interest of existing residents as well as future residents..

FALSEHOODS---over these many years, and by a huge variety of sources, longtime residents have been told information that seems to be untrue. I do not like to point fingers, nor do I like to use the word LIES, however, over time I have a multitude of reason to believe this as I have observed.

FLOOD---Repeatedly over these years we all have been told by the Army Engineers responsible for Carbon Canyon Dam that nothing could be built, for reference purposes, where the strawberry field currently exists, yet It appears that the proposed plan calls for HIGH DENSITY development. Would seem that 'someone has been led down the primrose path.'

STREET DESIGNATION---For many years residents have been told that Rose Drive was a SECONDARY ARTERIAL HIGHWAY and then, out of the blue, we were told it was designated as a PRIMARY ARTERIAL HIGHWAY. When you are dealing with increasingly UNSAFE situations on Rose Drive negatively affecting the residential areas-------this becomes a really BIG DEAL as with the primary designation there are many restrictions to deal with, further complicated by being influenced by several jurisdictions---------Brea, Placentia, Yorba Linda and county. I honestly do not know when the designation changed. Who lied?
.

OIL FIELDS---part of this proposed project involves a still producing oil field. What I know from following other proposed developments in Yorba Linda these functioning oil wells require a huge amount of consideration to reduce negative impacts on

environment as well as humans. Therefore, I believe that a goodly portion of proposed project would need to be reduced to accommodate safety for all.

EXISTING NEIGHBORS---much of this proposal is not compatible with residences that are zoned for horses, both in Yorba Linda and some in Placentia.

ACCESS TO CARBON CANYON----there has been access to Carbon Canyon Park from Rose Drive for many------cyclists, joggers, walkers, equestrians. This proposed project should include continued access.

RESPONSIBILTY FOR TRAFFIC IMPACTS---for a very long time and because several jurisdictions are involved it is very important that a great deal of consideration is given to the dangers created by any increase in traffic on Rose Drive. Brea needs to step up to the plate and make some effort to divert Brea traffic onto Valencia which is capable of handling the traffic. This is called cooperation with ALL jurisdictions.

NATURE-- this proposed development location would have a negative impact on a huge amount of wildlife that exists in Carbon Canyon Park and Chino Hills State Park. Much of this wildlife filters into the existing nearby neighborhoods. Limits need to be made to accommodate both wildlife and the humans who are invading their space. As we invade the space of the wildlife with more housing we are generating bigger problems for existing residents. There are rules/;laws that we have to follow. From my experience vector and animal control offer residents very little help. It becomes our responsibility to deal with the creatures coming into our area--------I must tell you, it is expensive to rid one's property of invading creatures. Every year I spend a lot of my budget managing this problem. I will not go into further detail--------I support the philosophy of HILLS FOR EVERYONE. I urge you to consider this.

I am willing to accept change----------IF it is well thought out and that ALL nearby residents are considered and that our quality life is preserved. I love this area-------PLEASE CONSIDER MY QUALITY OF LIFE AND THAT OF MY NEIGHBORS.

Thanking you in advance for allowing me to contribute my thoughts. I would appreciate verification that this information was received by the right person.

Nancy Stevens

From:	Deanna Kuper
To:	Tinio, Maribeth
Subject:	Written Comments for Brea 265 Specific Plan
Date:	Monday, January 21, 2019 4:12:55 PM
Attachments:	Brea 265 Comment.docx

Dear Maribeth,

Thank you very much for answering my earlier questions regarding the Brea 265 Project. I would also like to thank you for the informed individuals who assisted at the scoping meeting. I have attached my written comments that I would like included in the preparation of the EIR. Please respond to this email to let me know that you have received my comments for inclusion in the report.

Thank you,

Deanna Kuper
3516 Rose Dr.
Yorba Linda CA 92886

(714) 983-7196

Written Comments on Brea 265 Specific Plan

Submitted to Maribeth Trinio, Senior Planner, City of Brea

Submitted by: Deanna M. Kuper
3516 Rose Dr.
Yorba Linda, CA 92886

Date: January 21, 2019

Please submit my comments as written in their entirety for review and analysis for the EIR for the Brea 265 Specific Plan.

Introduction:

I am a resident of Yorba Linda. My address of 3516 Rose Dr. Yorba Linda is property that runs along Blake Rd, which will be directly impacted by the Brea 265 Specific Plan. Areas PA1 and PA2 will have a direct and significant impact on my and my neighbors properties and quality of life.

A. General Comments

1. Although the project is in only the NOP phase, I am deeply concerned that guidelines are not being followed regarding notification of the project. Our residence lays within the 300 ft contiguous to the project site, yet no notification was mailed. Additionally, there has been no posting on or off site for the proposed area near our residence. Both of these are requirements of CEQA, and although the official EIR has not been filed, I find it troubling that we were only made aware of the project when the OC Register was flying a drone over the area—this was weeks after the NOP was opened.

2. I am unclear about how the City of Brea has gained a “Sphere of Influence”, and has decision-making powers for “Unincorporated Orange County” areas laying within the proposed Brea 265 Plan, as well as how zoning changes were made from Agricultural to Hillside Residential and Low and High Density Residential by Brea’s General Plan—without notification to residents or neighboring cities. Our home, as well as our neighbors’ homes are zoned for horses and livestock. We have horses, goats, chickens, and other animals that would seem to be at odds with High Density Residences in our vicinity. Also, the area nearest to the Carbon Canyon Dam currently serves as a water retention basin. Although the Brea 265 Plan shows PA2 as having a water retention basin, I am unclear how the area can serve as both a water retention basin and a “High Density Residence” area. Additionally, Carbon Canyon Creek currently runs through PA2. This creek seems to have disappeared from the map as it is no longer indicated on the Brea 265 Project map.

3. As Brea (and neighboring Placentia and Yorba Linda) have continued to develop and grow economically, they have not made any effort to improve the deteriorating conditions to our neighborhood due to this continued development. The conditions of most concern are: increased and continuous traffic, loss of accessible passage in and out of our residences by vehicles; **loss of safe passage** of pedestrians, equestrians, and bicyclists from our residences to urban and open spaces; and the loss of critical habitat for native California species.

B. Traffic Concerns on Rose Dr., specifically between Imperial Hwy and Valencia.

1. Traffic along Rose Dr. has increased dramatically over the last several years. The Imperial to Rose to Birch (and Birch to Rose to Imperial) route has become the commuters choice—it not only allows bypassing of the main section of Imperial, it is the primary route for commuters going to Carbon Canyon Rd, Lambert, and to access freeways. This same route has become the "short cut" for weekday and weekend drivers to reach the Brea Mall and Downtown Brea. The volume of traffic has increased to the point that there is rarely a break in the flow of traffic. The speed of cars continues to exceed posted limits. Many cars pass over the center divider line as they take the curve near Blake Rd., and many cars drift into the narrow bike lane as they pass the curve. As a resident I find it is extremely difficult to exit or enter our property. Cars do not stop to allow us to exit. Returning from work I have waited 15 minutes for traffic to slow (usually only because the Vesuvius light has changed) allowing me to access my property. There is extremely limited parking in our area. Residents currently must park along Rose Dr. and along Blake Rd. Entering and exiting our cars is difficult and dangerous. The attempt to divert La Floresta Project traffic from Rose Dr. was not successful. The addition of the Brea 265 Plan will put even more pressure on an already overused road. The placement of high density housing at the Rose Dr./Blake Rd. intersection places an extreme demand on the area that is already most impacted by traffic. Additionally, our proximity to Carbon Canyon and Chino Hills State Park places us near a high fire risk area. More housing with no additional roads out of the area is irresponsible.

C. Loss of Safe Passage for Pedestrians, Equestrians, and Bicyclists

1. Despite the significant and dangerous traffic, Rose Dr. is still used by pedestrian, equestrian, and bicycle traffic. It is a primary point of entrance for Carbon Canyon, and therefore walkers, runners, and hikers continue to use the road. **For local residents, it is the only available walking option out of the neighborhood.** Dogs and children are kept close as cars speed past exceeding 50 mph. Our neighborhood continues to be zoned for horses. Again, the only option for equestrians out of the neighborhood is along Rose Dr. Although equestrians and hikers had access to Carbon Canyon and open space for decades via the trails in fields along Rose Dr., Aera Energy recently blocked all access to these trails, without notice or community input. At this time, equestrians from the local neighborhood, as well as those riding in from other equestrian neighborhoods in Yorba Linda and Brea must take horses onto the street alongside the fast-moving traffic. No past development of Brea, or neighboring communities has taken the equestrian issue into consideration in their planned development. **The Brea 265 Specific Plans must address this specific, important, and necessary component**. Equestrians must continue to have access to trails that lead into Carbon Canyon, into Chino Hills State Park, and into the connecting trails of Yorba Linda.

D. Loss of Critical Habitat, Agricultural Land, and Cultural Resources

1. The most significant threat to species globally is the loss of habitat. The continued encroachment of development on open spaces is causing species to become endangered, and extinct, at an alarming rate. The areas proposed for development in the Brea 265 Specific Plan currently provide habitat, breeding areas, and wildlife corridors critical for many species. Along with coyotes, raccoons, possums, skunks, and rattlesnakes, a small sample of the additional species that I have personally observed in the proposed project area includes: Barn Owls, Great Horned Owls, Cooper's Hawks, Red-tailed Hawks, California Quail, Roadrunners, Juncos, Gnatcatchers, Cactus Wren, California Kingsnake, California Ringneck snake, Garter Snakes, Gopher Snakes, California toads, Western Fence Lizards, Monarch Butterflies, Swallowtail Butterflies, bats, and bees, as well as migrating birds and butterflies. The habitat in the proposed area is also critical to local bee operations. Decreasing bee populations are significant not to just honey, beeswax, and pollen industries, but sustaining bee populations is critical to the pollination of a significant percentage of our food crop, and critical to the pollination of indigenous plants needed to sustain plant and wildlife populations. **Significant is the fact that migrating birds (I believe in the Sandpiper family, possibly Long-billed Curlews) use PA1 as a stopover site during their migration. These birds are present for a few weeks every year. Any development in this area would permanently destroy the habitat used by these birds.**

2. Another impact to the environment caused by the Brea 265 Project is the loss of agricultural land. A significant part of the proposed project impacts land currently zoned and used as agriculture. Both Peltzer Pines Christmas Tree Farm and Manassero Farms have agricultural investments in the proposed project area. The loss of this land for this use will continue to push the production of food and products further from population hubs. The loss of access to some of the locally grown food and trees will force people to drive further for these resources, or cause the producers to transport these resources further distances, thus increasing the use of fossil fuel, and further contributing to issues such as global warming.

3. The Peltzer Pines Christmas Tree Farm has operated in Brea for decades. It is a cultural resource that serves not only the local community, but provides trees for people around Southern California. **The loss of this resource would be a tremendous cultural loss for the community**.

4. The residents of our local area chose our homes because they met specific requirements. In addition to the access to hiking and equestrian trails, and proximity to open space, Carbon Canyon Regional Park, and Chino Hills State Park, **our homes were selected for the aesthetics the area offered**. Brea 265 as proposed will permanently end our proximity to agriculture and open space, and will transform our view of agriculture and open space to one of houses, and most probably to a wall. This will not only negatively impact our property values, it will negatively affect our emotional, mental, and physical well-being.

From:	Emily Chen
To:	Tinio, Maribeth
Subject:	Brea 265 Specific Plan - NOP of DEIR - Comment Letter
Date:	Monday, January 21, 2019 3:01:14 PM
Attachments:	1.21.19 Brea 265 Specific Plan NOP of DEIR.pdf

Hi Ms. Maribeth Tinio,

Thank you for providing the Orange County Transportation Authority (OCTA) with the Notice of Preparation of a Draft Environmental Impact Report for the Brea 265 Specific Plan.

Attached is OCTA's comment letter. A hard copy is also being sent by post.

Thank you!

Emily Chen
Planning Intern
Orange County Transportation Authority
(714) 560-5912

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January 23, 2019

Via E-Mail and U.S. Mail

Maribeth Tinio
Senior Planner, City of Brea
Planning Division, Level 3
1 Civic Center Circle
Brea, CA 92821
E-Mail: maribethT@cityofbrea.net

Re: Notice of Preparation (NOP) and Scoping Meeting for the Brea 265 Specific Plan Draft Environmental Impact Report (EIR)

Dear Ms. Tinio:

On behalf of Hills For Everyone, thank you for the opportunity to review the Notice of Preparation and Scoping Meeting for the Brea 265 Specific Plan Draft Environmental Impact Report. Hills For Everyone is a non-profit organization that works to protect, preserve, and restore the environmental resources and natural environs of the Puente-Chino Hills and surrounding areas for the enjoyment of current and succeeding generations. The organization has been working in the region since 1978, and was instrumental in the creation and expansion of Chino Hills State Park.

As proposed, the Brea 265 Specific Plan ("Project") would provide 1,100 residential units on a 260-acre site currently used for oil production and agriculture. Thirty percent of the acreage would be covered by low-density residential development, 11 percent by medium-density, and 21 percent by high-density. Twenty-eight percent of the acreage would be earmarked for parks and open space and 10 percent for roadways. The Project also includes the remediation of all oil wells and facilities.

While much of the site is currently occupied by oil operations, it is also home to the Peltzer Pines Christmas Tree Farm and the Manaserro Farms and Farm Stand—two locally-beloved businesses. Additionally, Carbon Canyon Regional Park borders the site to the east and connects via trail to Chino Hills State Park. The proposed Project will create a new trail network connected to this regional system. To ensure that

the Project is sized properly and becomes the development that Brea needs, the City must thoroughly assess and mitigate the Project's significant impacts.

The recently released NOP is required to provide adequate and reliable information regarding the nature of the proposed Project and its probable environmental impacts, in order to "solicit guidance from public agencies as to the scope and content of the environmental information to be included in the EIR." California Environmental Quality Act (CEQA) Guidelines § 15375; *see also* CEQA Guidelines § 15082(a)(1).

The CEQA Guidelines specify that an NOP shall include a description of the probable environmental effects of the Project so that reviewers can provide a meaningful response. CEQA Guidelines § 15082. By providing only a list of the issue areas that will be analyzed in the EIR, this NOP fails to meet CEQA's mandate. No assessment of probable environmental effects is provided. Moreover, we understand that the City was unable to provide relevant information during the scoping meeting on January 16, 2019. The public has thus been unable to consider the required scope of environmental review for the Specific Plan or to provide complete comments.

These failures are problematic given the broad scope of likely environmental effects associated with the proposed Brea 265 Specific Plan. Hills For Everyone details its specific concerns below and expects to be actively involved in the planning and environmental review of the Brea 265 Specific Plan.

I. Probable Environmental Impacts

As noted above, rather than providing a description of probable environmental effects of the Project, the NOP simply lists each of CEQA's issue areas contained in Appendices F and G of the CEQA Guidelines. Based on the limited project description, Hills For Everyone believes the impacts to the areas below will likely be significant.

A. Recreation

A potentially significant recreation impact occurs when a project would "increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated." CEQA Guidelines, Appendix G § XV. Hills For Everyone is concerned that such an impact will occur here.

The Project proposes to link its neighborhoods together through "an extensive trail network" connected to the regional trail system. Volunteer trails from

Carbon Canyon Regional Park already extend into the Project site. On the other side of the regional park, these trails directly connect to the trail system within Chino Hills State Park. The Project will introduce thousands of new residents to the area and offer convenient access to both parks. New residents will take advantage of the trail connections and explore both the regional park and the state park. This increase in use will overburden the already burdened parks and accelerate their deterioration. Therefore, the EIR must examine this impact and propose and adopt mitigation.

Hills For Everyone encourages the use of these beautiful public spaces for all users, but stresses that they must be kept in good condition, which includes preserving the natural resources the State Park is tasked with protecting. The Project's new residents will make such protective maintenance significantly more difficult and expensive.

As it develops mitigation for the recreation impacts, the City must consider the funding and staffing situation at Chino Hills State Park. Only two rangers are currently staffed to protect over 14,000 acres and they are also responsible for managing Citrus State Historic Park thirty-one miles to the east. This is barely sufficient to care for the park now; with the increased use from the Project, it will be plainly insufficient.

Given the staffing and funding issues, Hills For Everyone therefore proposes that the Project should include mitigation fees earmarked specifically for Chino Hills State Park. These fees would prevent deterioration of the park from increased use by providing funding for maintenance and improvements. They could also be used to increase park staffing and provide education about and enforcement of park regulations. The state park land immediately adjacent to the county park is also part of a Habitat Conservation Plan ("HCP") developed by the Metropolitan Water District of Southern California and Shell Western E&P Inc., which requires an even higher level of care.[1] The HCP was created to protect and restore coastal sage scrub habitat used by the California gnatcatcher.[2]

B. Biological Resources: Coastal California Gnatcatcher

The coastal California gnatcatcher is a federally-listed threatened species and a California-listed species of special concern.[3] Its coastal sage scrub habitat once

[1] Chino Hills State Park General Plan at 39, included as Attachment 1.
[2] *Id.*
[3] Patrick Mock, California Gnatcatcher (*Polioptila californica*) (2004), *in* The Coastal Scrub and Chaparral Bird Conservation Plan: a strategy for protecting and managing

stretched from Ventura County to Northern Baja California but now lies fragmented around suburbs, cities, and freeways.[4] The Puente-Chino Hills remains a core population area.[5] And part of the site itself is potentially critical habitat for the gnatcatcher.[6] Gnatcatchers have been sighted near the Project site by community members. The Project site may be used during the breeding season for nesting pairs, or it may be used during the off-season because habitats during the post-breeding-season dispersal are highly variable.[7] Therefore, the EIR must include both a breeding-season survey and an off-season survey. Surveys are required to check both for the birds and for their potential habitat, and mitigation will be required if the site contains either.

Given that biologists recognize the Puente-Chino Hills as a core population area, critical habitat, and prime habitat for the gnatcatcher, mitigation should be tailored toward permanent protection of habitat in the Project vicinity. The development proponent owns several inholdings within and adjacent to Chino Hills State Park. These parcels are likely suitable habitat for the gnatcatcher, and mitigation for impacts at the Project site to the gnatcatcher or its habitat could include the transfer of these inholdings to the state park.

C. Wildfire

The majority of wildfires in California are started by human activity. Consequently, the EIR must thoroughly assess the increased wildfire risk associated with bringing more visitors, equipment, motor vehicles, utility facilities, and machinery into this area. The property is located in a Very High Fire Hazard Severity zone, according to CalFire.[8] The Project will increase the size of the area's wildland-urban interface, and the EIR must evaluate the impacts of increased risk of fire to the surrounding environment, including the adjacent parks, to local and state fire and emergency service providers, and to the current and future residents of the region.

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coastal scrub and chaparral habitats and associated birds in California, California Partners in Flight, http://www.prbo.org/calpif/htmldocs/species/scrub/california_gnatcatcher.html, included as Attachment 2.

[4] Coastal California Gnatcatcher, Center for Biological Diversity, https://www.biologicaldiversity.org/species/birds/coastal_California_gnatcatcher/index.html, included as Attachment 3.

[5] Patrick Mock, California Gnatcatcher (*Polioptila californica*).

[6] *See* Critical Habitat Map excerpted from 72 Fed. Reg. 72182, included as Attachment 4.

[7] Patrick Mock, California Gnatcatcher (*Polioptila californica*).

[8] *See* Orange County Fire Hazard Severity Zone map, included as Attachment 5.

D. Hazards and Hazardous Materials

Under CEQA, an impact is potentially significant if the project would create a significant hazard to the public or environment through the transport or disposal of hazardous materials. CEQA Guidelines, Appendix G § VIII. The Project will include the remediation of 190 wells and associated production facilities, and will necessarily involve the transport and disposal of the hazardous byproducts and/or contaminated soil. The EIR must evaluate and mitigate the impacts of this hazard to the environment and to the current and future residents of the region.

E. Agriculture

Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use creates a significant impact. CEQA Guidelines, Appendix G § II. According to the Orange County Important Farmland 2016 map, prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, the Project site contains Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Grazing Land.[9] The conversion of this resource to a residential development will be a significant impact that must be disclosed, analyzed, and mitigated in the EIR. Importantly, the converted farmland would include Peltzer Pines Christmas Tree Farm and the Manaserro Farms and Farm Stand. These local business are important to the community and are a surviving piece of Orange County's once-widespread agricultural economy. The developer should be encouraged to maintain them onsite, perhaps by increasing density elsewhere thus making room for legacy agricultural operations.

F. Cumulative Impacts

The NOP fails to indicate that it will consider the cumulative impacts of the Project. CEQA Guidelines section 15130 requires that an EIR "discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." The City must examine the impacts of this project in combination with other projects causing related impacts.

[9] *See* Orange County Important Farmland 2016 map, included as Attachment 6 (this is the most recent year for which this data is available).

II. Project Alternatives

The City's evaluation of alternatives to the Project will be a critically important exercise. An EIR must describe a range of alternatives to a proposed project, and to its location, that would feasibly attain a project's basic objectives while avoiding or substantially lessening a project's significant impacts. Pub. Res. Code § 21100(b)(4); CEQA Guidelines § 15126.6(a). A proper analysis of alternatives is essential for the City to comply with CEQA's mandate that significant environmental damage be avoided or substantially lessened where feasible. Pub. Res. Code § 21002; CEQA Guidelines §§ 15002(a)(3), 15021(a)(2), 15126.6(a); *Citizens for Quality Growth v. City of Mount Shasta*, 198 Cal. App. 3d 433, 443–45 (1988). As the California Supreme Court explained in *Laurel Heights Improvement Association v. Regents of University of California*, "[w]ithout meaningful analysis of alternatives in the EIR, neither the courts nor the public can fulfill their proper roles in the CEQA process. . . . [Courts will not] countenance a result that would require blind trust by the public, especially in light of CEQA's fundamental goal that the public be fully informed as to the consequences of action by their public officials." (1988) 47 Cal.3d 376, 404.

Unfortunately, the NOP fails to define the specific objectives for the proposed Project. Without a thorough understanding of the proposed Project's purpose, it is all but impossible for the City to identify and evaluate reasonable and feasible Project alternatives. Nor is it possible, in the absence of clearly defined Project objectives, for members of the public or public agencies to identify or provide meaningful input on alternatives or the scope of the EIR. The City must clearly articulate the Project objectives, in order to systematically identify and analyze the significant effects of the proposed Project and the feasible mitigation measures or alternatives that will avoid or substantially lessen such significant effects. These objectives should include the preservation of open space onsite and maintaining legacy agriculture.

The City's NOP does not identify a single alternative to the proposed Project. It simply explains that CEQA requires a description of reasonable alternatives to the Project, which would feasibly attain most of the basic objectives but would lessen the Project's significant impacts. The City must ensure that the EIR includes a robust discussion of additional alternatives that would lessen the significant impacts of the Project.

In developing project alternatives, the City should consider an alternative with fewer acres devoted to low-density residential housing. The area taken out of housing could be used for larger tracts of open space, especially in the hillier, north-eastern portion of the site adjacent to Carbon Canyon Regional Park, for agriculture, or

for a combination of the two. This analysis could evaluate various other options for meeting housing demands, looking toward higher-density housing. Such solutions must be considered as alternatives and would likely lessen the Project's impacts on recreation, biological resources, and greenhouse gas emissions.

III. Conclusion

Thank you for the opportunity to comment on the Brea 265 Specific Plan NOP. We have submitted this letter and the attachments via email. For convenience, a hard copy of the letter and a thumb drive with the attachments is following via U.S. Mail. We request that this firm and Hills For Everyone receive a copy of the DEIR when it is released. We also request that the City keep us informed of all contracts, notices, hearings, staff reports, briefings, meetings, and any other events related to the Project.

Sincerely,

SHUTE, MIHALY & WEINBERGER LLP



Gabriel M.B. Ross
Caitlin F. Brown

cc: Claire Schlotterbeck, Hills For Everyone

Attachments
Attachment 1: Chino Hills State Park General Plan
Attachment 2: California Gnatcatcher, California Partners in Flight Coastal Scrub and Chaparral Bird Conservation Plan
Attachment 3: Coastal California Gnatcatcher, Center for Biological Diversity
Attachment 4: Critical Habitat Map excerpted from 72 Fed. Reg. 72182
Attachment 5: Orange County Fire Hazard Severity Zone
Attachment 6: Orange County Important Farmland 2016

1079282.11

From:	Toneman1@gmail.com
To:	Tinio, Maribeth
Subject:	Question on Brea 265 Specific Plan
Date:	Tuesday, January 22, 2019 7:58:38 PM

Dear Maribeth,

Two questions:

1) I'm curious as to how this fairly substantial development will affect traffic on Lambert.
It's already quite annoying trying to make it through the Lambert/57 interchange. For several hours each morning and from 3-6pm each day, that area is best avoided.

2) High density, low density etc are a bit ambiguous terms. Can anyone give an estimated price range of the structures that are planned? Are these residential homes, apartments, townhouses, condos, what?

Thank you.

Sincerely,
Anthony A. Kerhin
1135 Orangewood Drive
Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

I would like to see an amphitheater, a community garden (or several) and a farmer's market. Firepits, barbeques and parks with swings and shade over the play areas. Also a roof top deck area, a bocce ball court, and other community recreational spaces. Especially more flexibility with the Community clubhouses, supported by HOA's and

Name: Ann Smith

Address: 44 Mallorca Ln, Brea, CA. 92823

Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

RECEIVED
JAN 2 3 2019
BY: CH

Place Stamp Here

City of Brea – Planning Division, Level 3
Attn: Maribeth Tinio, Senior Planner
1 Civic Center Circle
Brea, CA 92821

Thank you!

often limited in their use due to high fees. Maybe a theater room where residents could show movies for a group of friends no alcohol, and little fee or something where there is a space residents can use for gatherings without the high costs, let's have it user friendly and user affordable! A gathering place for residents. Landscape with primarily CA/natives, minimal sod. Walkability!! Elevators as an option! What is school availability, what will be the impact? Is fire planning happening considering the canyon in particular? Are there homeless people camped out in the area, will they likely come down what might be done? Make it a showpiece!! Design is #1!!

Also a problem we've had at La Floresta is package theft. Maybe by the time Brea 265 is built everyone will be happy to let delivery people inside their homes, though if not, maybe there is a solution you can offer your residents.

The other thing: more guest parking! We are quite limited and it's a hassle!

Fans or balconies? More fans generally!

LED in kitchens and bathrooms - we have some horrible florescent bulbs, very difficult to change.

Storage!

Little Libraries!

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

traffic is the biggest issue - Lambert, Valencia, CC Road, Rose intersections are all overloaded - not sure how that can be mitigated.

Name: THERESA ULLRICH

Address: 1160 Buck Thorn Dr. Brea

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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City of Brea – Planning Division, Level 3
Attn: Maribeth Tinio, Senior Planner
1 Civic Center Circle
Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print): Suggestion:

Let the citizens of Brea vote on the approval of this project, it affects their daily lives

Name: Keith Fullington

Address: P. O. Box 8787
Brea 92822

Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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City of Brea – Planning Division, Level 3
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Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

Driveways need to be long enough to fit a car.

preserve tree farm & strawberry farm

Name:

Address:

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COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

1) Horse Trail To China Hills State Park.

2) Full Size ST, Sidewalk on Rev. Side, walk, keep ST. Single Side loaded.

3) City Sewer + Storm Drain.

Name: Ross McCune

Address: 16822 Blake Rd.
Yorba Linda, CA 92886

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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4) Access to Rev. from Rose Pl. La Floresta Rd not provide access from Rose Pl.

5) Widening of Rose Pl.

6) Consider 2ac and Horse Estates 1/3 to 1/2 Acre Property sites.

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

Too much traffic. Would like to see traffic deflected to Valencia instead of Rose Dr. Need trails to include horses. Need horse trail from Blake Rd to Carbon Canyon Park. Don't like high density in the strawberry field. Prefer horse property estates

Name: Kristy Foster

Address: 3542 Rose Dr C/C

Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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1 Civic Center Circle
Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

Affordable housing is a serious problem in Brea. I waited 3 years to get into affordable housing while I went to grad school w/ my child. I had to live in, I'm 3 years

Name: Keri Knopke

Address: 315 N. Associated Rd #1315 Brea, CA 92821

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

My name never moved on the list. We must do better in our city.

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City of Brea – Planning Division, Level 3
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Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

Save the Strawberry Patch. Its hard to get around the traffic will continue to be an issue. Where will these kids going to school this will effect elementary, junior high & high school. Lambert is a problem now

Name: Liz Hall

Address: 147 S Star flower Brea Ca 92821

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Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

CARBON CANYON DAM
OBJECT TO ANY BUILDING BASE
OF DAM – FLOOD PLANE AREA

Name: GARY E. KAIN

Address: 195 BUCKTHORN DR BREA, CA 92823-7004

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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City of Brea – Planning Division, Level 3
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Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

I have very large concerns about the traffic impact on Rose drive and also the crime impact from the high density housing. I can already barely get out of my driveway as it is.

Name: Nic Estanislau

Address: 2501 N Rose drive Placentia CA 92870

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

1. Please consider traffic impact on Lambert, Imperial, Rose, Santa Fe and Birch. Take into account potential MOU landfill extension and 2035 Co. San Canyon traffic growth.

2. Please consider the City of Brea purchasing some land while available to expand the following services: New Junior High, New Community center CDI recital For Youth, Pool, Rec hall, etc; New Library

Name: James Ribbe

Address: 3648 Mocking bird Lane Brea CA.

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

A. Please consider for the landfill MOU changing the time to 9am - 2pm for ~~#~~ trash delivery to reduce/mitigate traffic.

Place Stamp Here

City of Brea – Planning Division, Level 3
Attn: Maribeth Tinio, Senior Planner
1 Civic Center Circle
Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

1. Notice mailed to Residents within 300 ft / Posted notices per CEQA – Not adhered to
2. Rezoning (Agric. to Residential) – how? No public input
3. Increased traffic congestion on Rose, high volume, excessive speeds
4. No access for equestrians to Carbon Canyon and open spaces
5. Loss of local & cultural resources – Peltzer Farms, Manassero
6. EIR accounting for migratory bird species – if EIR is not open long enough to identify such species

Name: Deanna Kuper

Address: 3516 Rose Dr.
Yorba Linda CA 92886

Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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Brea, CA 92821

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

I live in Olinda Village, in the canyon. I have lived there for 25 years and have watched the traffic become more and more congested. I cannot imagine how much worse it will get with this development right at the entrance to the canyon. (entrance to the bottleneck)

Name: Giulii Kraemer

Address: 190 Lilac Lane Brea

- Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

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City of Brea – Planning Division, Level 3
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Brea, CA 92821

What plans do you have to alleviate this added traffic as a result of all these new dwellings? Currently, the traffic backs up from Kraemer on Lambert, and from Birch on Valencia. It can take 1/2 hour to get home from Lambert + 57 fwy. Are there any plans for any new roads?

COMMENT CARDS

January 16, 2019 5:00-7:00 PM – Brea 265 Specific Plan Scoping Meeting

Please let us know your comments/concerns regarding the Brea 265 Specific Plan Project EIR (please print):

- Traffic on Lambert & Valencia & Rose – So many multiple uses on these arteries such as commuters using 142, ~~xxxxx~~ dump vehicles on Valencia, homeowners getting kids to schools on Birch & Lambert and those using the Sport Park on Birch. It is a lot of people added to an already busy area.

Name: Kelly Reed

Address: 200 Verbena Lane

Please return this card to Maribeth Tinio, Senior Planner, City of Brea – Planning Division, at the end of the Scoping Meeting or mail to:

- Safety – Oil lands safely mitigated as it relates to emissions, ground water, etc.

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City of Brea – Planning Division, Level 3
Attn: Maribeth Tinio, Senior Planner
1 Civic Center Circle
Brea, CA 92821

Appendix C Air Quality /GHG Emissions Data

Appendices

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1. Criteria Air Pollutant and GHG Emissions Worksheets

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Regional Construction Emissions Worksheet - Unmitigated

*CalEEMod, Version 2020.4.0

	Distance (mi)	Percent of Haul Route (%)
Total Haul Route Length:[1]	75	100%
Haul Route in the MDAB:[2]	21.9	29%
Haul Route in the SoCAB:	53.1	71%

[1] *Based on distance between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.*

[2] *Based on the distance at the MDAB and SoCAB border along to the haul route to Soil Safe of California.*

Western Remediation Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6595	27.5242	18.2443	0.0381	1.266	1.1647
	Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**9.6694**	**5.4835**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0162	0.5607	0.2325	2.88E-03	0.0986	3.06E-02
	Worker	0.0507	0.0325	0.5512	1.70E-03	0.1865	0.0504
	Total	**0.0669**	**0.5932**	**0.7837**	**4.58E-03**	**0.2851**	**0.081**
TOTAL		***2.73***	***28.12***	***19.03***	***0.04***	***9.95***	***5.56***
Onsite	**2023 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6595	27.5242	18.2443	0.0381	1.266	1.1647
	Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**9.6694**	**5.4835**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0156	0.5857	0.2399	2.88E-03	0.0986	3.06E-02
	Worker	0.0554	0.0356	0.5135	1.62E-03	0.1865	0.0504
	Total	**0.071**	**0.6214**	**0.7534**	**4.50E-03**	**0.2851**	**0.081**
TOTAL		***2.73***	***28.15***	***19.00***	***0.04***	***9.95***	***5.53***
Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.66	27.52	18.24	0.04	1.27	1.16
	Total	**2.66**	**27.52**	**18.24**	**0.04**	**9.67**	**5.48**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.59	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.55	0.00	0.19	0.05
	Total	**0.07**	**0.62**	**0.78**	**0.00**	**0.29**	**0.08**
TOTAL		***2.73***	***28.15***	***19.03***	***0.04***	***9.95***	***5.56***

Western Remediation Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					3.9862	1.5698
	Off-Road	3.3217	34.5156	28.0512	0.0621	1.4245	1.3105
	Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**5.4107**	**2.8803**

Offsite							
	Hauling[1]	0.491352	37.7811456	11.0091168	0.19293	6.0249384	1.845402
	Vendor	0.0323	1.1215	0.465	5.75E-03	0.1972	6.12E-02
	Worker	0.0564	0.0361	0.6124	1.89E-03	0.2072	0.0561
	Total	**0.580052**	**38.9387456**	**12.0865168**	**2.01E-01**	**6.4293384**	**1.962702**
TOTAL		***3.90***	***73.45***	***40.14***	***0.26***	***11.84***	***4.84***
Onsite	**2023 Winter**						
	Fugitive Dust					3.9862	1.5698
	Off-Road	3.3217	34.5156	28.0512	0.0621	1.4245	1.3105
	Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**5.4107**	**2.8803**
Offsite							
	Hauling[1]	0.4797408	39.2694324	11.0441628	0.19293	6.0251508	1.8456144
	Vendor	0.0312	1.1715	0.4798	5.76E-03	0.1973	6.12E-02
	Worker	0.0616	0.0396	0.5705	1.80E-03	0.2072	0.0561
	Total	**0.5725408**	**40.4805324**	**12.0944628**	**2.00E-01**	**6.4296508**	**1.9629144**
TOTAL		***3.89***	***75.00***	***40.15***	***0.26***	***11.84***	***2.94***
Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.99	1.57
	Off-Road	3.32	34.52	28.05	0.06	1.42	1.31
	Total	**3.32**	**34.52**	**28.05**	**0.06**	**5.41**	**2.88**
Offsite							
	Hauling	0.49	39.27	11.04	0.19	6.03	1.85
	Vendor	0.03	1.17	0.48	0.01	0.20	0.06
	Worker	0.06	0.04	0.61	0.00	0.21	0.06
	Total	**0.58**	**40.48**	**12.09**	**0.20**	**6.43**	**1.96**
TOTAL		***3.90***	***75.00***	***40.15***	***0.26***	***11.84***	***4.84***

[1] *Proportioned based on the segment of the haul route within the South Coast Air Basin compared to the total haul route between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.*

Phase 1 Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6595	27.5242	18.2443	0.0381	1.266	1.1647
	Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**9.6694**	**5.4835**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	8.08E-03	0.2804	0.1162	1.44E-03	0.0493	1.53E-02
	Worker	0.0507	0.0325	0.5512	1.70E-03	0.1865	0.0504
	Total	**0.0588**	**0.3128**	**0.6674**	**3.14E-03**	**0.2358**	**0.0657**
TOTAL		***2.72***	***27.84***	***18.91***	***0.04***	***9.91***	***5.55***
Onsite	**2023 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6595	27.5242	18.2443	0.0381	1.266	1.1647
	Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**9.6694**	**5.4835**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.80E-03	0.2929	0.12	1.44E-03	0.0493	1.53E-02
	Worker	0.0554	0.0356	0.5135	1.62E-03	0.1865	0.0504
	Total	**0.0632**	**0.3285**	**0.6334**	**3.06E-03**	**0.2358**	**0.0657**
TOTAL		***2.72***	***27.85***	***18.88***	***0.04***	***9.91***	***5.53***
Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.66	27.52	18.24	0.04	1.27	1.16
	Total	**2.66**	**27.52**	**18.24**	**0.04**	**9.67**	**5.48**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.06	0.04	0.55	0.00	0.19	0.05
	Total	**0.06**	**0.33**	**0.67**	**0.00**	**0.24**	**0.07**
TOTAL		***2.72***	***27.85***	***18.91***	***0.04***	***9.91***	***5.55***
2023 West Remediation Site Preparation & P1 Site Preparation		**5.45**	**56.00**	**37.94**	**0.08**	**19.86**	**11.11**
2023 West Remediation Grading & P1 Site Preparation		**6.62**	**102.85**	**59.06**	**0.30**	**21.75**	**10.39**
Phase 1 Rough Grading							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	3.3217	34.5156	28.0512	0.0621	1.4245	1.3105
	Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**5.359**	**2.8725**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0162	0.5607	0.2325	2.88E-03	0.0986	3.06E-02
	Worker	0.0564	0.0361	0.6124	1.89E-03	0.2072	0.0561
	Total	**0.0725**	**0.5968**	**0.8449**	**4.77E-03**	**0.3058**	**0.0866**
TOTAL		***3.39***	***35.11***	***28.90***	***0.07***	***5.66***	***2.96***
Onsite	**2023 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	3.3217	34.5156	28.0512	0.0621	1.4245	1.3105
	Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**5.359**	**2.8725**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0156	0.5857	0.2399	2.88E-03	0.0986	3.06E-02
	Worker	0.0616	0.0396	0.5705	1.80E-03	0.2072	0.0561
	Total	**0.0772**	**0.6253**	**0.8104**	**4.68E-03**	**0.3058**	**0.0867**
TOTAL		***3.40***	***35.14***	***28.86***	***0.07***	***5.66***	***2.93***
Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	3.32	34.52	28.05	0.06	1.42	1.31
	Total	**3.32**	**34.52**	**28.05**	**0.06**	**5.36**	**2.87**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.59	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.61	0.00	0.21	0.06
	Total	**0.08**	**0.63**	**0.84**	**0.00**	**0.31**	**0.09**
TOTAL		***3.40***	***35.14***	***28.90***	***0.07***	***5.66***	***2.96***
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	3.2181	32.377	27.7228	0.0621	1.3354	1.2286
	Total	**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.2699**	**2.7906**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0159	0.5591	0.2308	2.83E-03	0.0988	3.07E-02
	Worker	0.053	0.0324	0.5708	1.83E-03	0.2072	0.056
	Total	**0.0689**	**0.5915**	**0.8016**	**4.66E-03**	**0.3059**	**0.0867**
TOTAL		***3.29***	***32.97***	***28.52***	***0.07***	***5.58***	***2.88***

Onsite		**2024 Winter**					
	Fugitive Dust					3.9345	1.562
	Off-Road	3.2181	32.377	27.7228	0.0621	1.3354	1.2286
	Total	**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.2699**	**2.7906**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0154	0.5841	0.238	2.83E-03	0.0988	3.07E-02
	Worker	0.0581	0.0356	0.5323	1.74E-03	0.2072	0.056
	Total	**0.0734**	**0.6196**	**0.7704**	**4.57E-03**	**0.3059**	**0.0867**
TOTAL		***3.29***	***33.00***	***28.49***	***0.07***	***5.58***	***2.85***

Onsite		**2024**					
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	3.22	32.38	27.72	0.06	1.34	1.23
	Total	**3.22**	**32.38**	**27.72**	**0.06**	**5.27**	**2.79**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.57	0.00	0.21	0.06
	Total	**0.07**	**0.62**	**0.80**	**0.00**	**0.31**	**0.09**
TOTAL		***3.29***	***33.00***	***28.52***	***0.07***	***5.58***	***2.88***

Phase 1 Utility Trenching

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2023 Summer**					
	Off-Road	0.5854	5.1948	6.6976	9.88E-03	0.3207	0.295
	Total	**0.5854**	**5.1948**	**6.6976**	**9.88E-03**	**0.3207**	**0.295**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0225	0.0144	0.245	7.50E-04	0.0829	0.0224
	Total	**0.0225**	**0.0144**	**0.245**	**7.50E-04**	**0.0829**	**0.0224**
TOTAL		***0.61***	***5.21***	***6.94***	***0.01***	***0.40***	***0.32***

Onsite		**2023 Winter**					
	Off-Road	0.5854	5.1948	6.6976	9.88E-03	0.3207	0.295
	Total	**0.5854**	**5.1948**	**6.6976**	**9.88E-03**	**0.3207**	**0.295**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0246	0.0158	0.2282	7.20E-04	0.0829	0.0224
	Total	**0.0246**	**0.0158**	**0.2282**	**7.20E-04**	**0.0829**	**0.0224**
TOTAL		***0.61***	***5.21***	***6.93***	***0.01***	***0.40***	***0.32***

Onsite		**2023**					
	Off-Road	0.59	5.19	6.70	0.01	0.32	0.30
	Total	**0.59**	**5.19**	**6.70**	**0.01**	**0.32**	**0.30**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.02	0.25	0.00	0.08	0.02
	Total	**0.02**	**0.02**	**0.25**	**0.00**	**0.08**	**0.02**
TOTAL		***0.61***	***5.21***	***6.94***	***0.01***	***0.40***	***0.32***

2023 P1 Rough Grading & P1 Utility Trenching		**4.01**	**40.35**	**35.84**	**0.08**	**6.07**	**3.28**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
Off-Road		0.5681	4.9375	6.7068	9.89E-03	0.3065	0.282
Total		**0.5681**	**4.9375**	**6.7068**	**9.89E-03**	**0.3065**	**0.282**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0212	0.013	0.2283	7.30E-04	0.0829	0.0224
Total		**0.0212**	**0.013**	**0.2283**	**7.30E-04**	**0.0829**	**0.0224**
TOTAL		***0.59***	***4.95***	***6.94***	***0.01***	***0.39***	***0.30***
Onsite	**2024 Winter**						
Off-Road		0.5681	4.9375	6.7068	9.89E-03	0.3065	0.282
Total		**0.5681**	**4.9375**	**6.7068**	**9.89E-03**	**0.3065**	**0.282**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0232	0.0142	0.2129	7.00E-04	0.0829	0.0224
Total		**0.0232**	**0.0142**	**0.2129**	**7.00E-04**	**0.0829**	**0.0224**
TOTAL		***0.59***	***4.95***	***6.92***	***0.01***	***0.39***	***0.30***
Onsite	**2024**						
Off-Road		0.57	4.94	6.71	0.01	0.31	0.28
Total		**0.57**	**4.94**	**6.71**	**0.01**	**0.31**	**0.28**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.02	0.01	0.23	0.00	0.08	0.02
Total		**0.02**	**0.01**	**0.23**	**0.00**	**0.08**	**0.02**
TOTAL		***0.59***	***4.95***	***6.94***	***0.01***	***0.39***	***0.30***

2024 P1 Rough Grading & P1 Utility Trenching		**3.88**	**37.95**	**35.46**	**0.08**	**5.97**	**3.18**

Phase 1 Fine Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
Fugitive Dust						3.9345	1.562
Off-Road		3.2181	32.377	27.7228	0.0621	1.3354	1.2286
Total		**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.2699**	**2.7906**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0159	0.5591	0.2308	2.83E-03	0.0988	3.07E-02
Worker		0.053	0.0324	0.5708	1.83E-03	0.2072	0.056
Total		**0.0689**	**0.5915**	**0.8016**	**4.66E-03**	**0.3059**	**0.0867**
TOTAL		***3.29***	***32.97***	***28.52***	***0.07***	***5.58***	***2.88***
Onsite	**2024 Winter**						
Fugitive Dust						3.9345	1.562
Off-Road		3.2181	32.377	27.7228	0.0621	1.3354	1.2286
Total		**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.2699**	**2.7906**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0154	0.5841	0.238	2.83E-03	0.0988	3.07E-02
Worker		0.0581	0.0356	0.5323	1.74E-03	0.2072	0.056
Total		**0.0734**	**0.6196**	**0.7704**	**4.57E-03**	**0.3059**	**0.0867**
TOTAL		***3.29***	***33.00***	***28.49***	***0.07***	***5.58***	***2.85***

Onsite		**2024**						
	Fugitive Dust		0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road		3.22	32.38	27.72	0.06	1.34	1.23
	Total		**3.22**	**32.38**	**27.72**	**0.06**	**5.27**	**2.79**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.02	0.58	0.24	0.00	0.10	0.03
	Worker		0.06	0.04	0.57	0.00	0.21	0.06
	Total		**0.07**	**0.62**	**0.80**	**0.00**	**0.31**	**0.09**
TOTAL			***3.29***	***33.00***	***28.52***	***0.07***	***5.58***	***2.88***
2024 P1 Rough Grading, P1 Utility Trenching, & P1 Fine Grading			**7.17**	**70.94**	**63.98**	**0.14**	**11.54**	**6.06**
2024 P1 Utility Trenching & P1 Fine Grading			**3.88**	**37.95**	**35.46**	**0.08**	**5.97**	**3.18**

Phase 1 Asphalt Paving

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Off-Road		0.9882	9.5246	14.6258	0.0228	0.4685	0.431
	Paving		3.02E-02				0	0
	Total		**1.0184**	**9.5246**	**14.6258**	**0.0228**	**0.4685**	**0.431**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0397	0.0243	0.4281	1.37E-03	0.1554	0.042
	Total		**0.0397**	**0.0243**	**0.4281**	**1.37E-03**	**0.1554**	**0.042**
TOTAL			***1.06***	***9.55***	***15.05***	***0.02***	***0.62***	***0.47***
Onsite		**2024 Winter**						
	Off-Road		0.9882	9.5246	14.6258	0.0228	0.4685	0.431
	Paving		3.02E-02				0	0
	Total		**1.0184**	**9.5246**	**14.6258**	**0.0228**	**0.4685**	**0.431**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0436	0.0267	0.3993	1.30E-03	0.1554	0.042
	Total		**0.0436**	**0.0267**	**0.3993**	**1.30E-03**	**0.1554**	**0.042**
TOTAL			***1.06***	***9.55***	***15.03***	***0.02***	***0.62***	***0.47***
Onsite		**2024**						
	Off-Road		0.99	9.52	14.63	0.02	0.47	0.43
	Paving		0.03	0.00	0.00	0.00	0.00	0.00
	Total		**1.02**	**9.52**	**14.63**	**0.02**	**0.47**	**0.43**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.04	0.03	0.43	0.00	0.16	0.04
	Total		**0.04**	**0.03**	**0.43**	**0.00**	**0.16**	**0.04**
TOTAL			***1.06***	***9.55***	***15.05***	***0.02***	***0.62***	***0.47***
2024 P1 Fine Grading & P1 Asphalt Paving			**4.35**	**42.55**	**43.58**	**0.09**	**6.20**	**3.35**

Phase 1 Finishing/Landscaping

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Off-Road		0.1433	1.4424	2.2265	3.10E-03	0.0662	0.0609
	Total		**0.1433**	**1.4424**	**2.2265**	**3.10E-03**	**0.0662**	**0.0609**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	7.95E-03	4.86E-03	0.0856	2.70E-04	0.0311	8.40E-03
	Total	**7.95E-03**	**4.86E-03**	**0.0856**	**2.70E-04**	**0.0311**	**8.40E-03**
TOTAL		***0.15***	***1.45***	***2.31***	***0.00***	***0.10***	***0.07***
Onsite		**2024 Winter**					
	Off-Road	0.1433	1.4424	2.2265	3.10E-03	0.0662	0.0609
	Total	**0.1433**	**1.4424**	**2.2265**	**3.10E-03**	**0.0662**	**0.0609**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	8.71E-03	5.33E-03	0.0799	2.60E-04	0.0311	8.40E-03
	Total	**8.71E-03**	**5.33E-03**	**0.0799**	**2.60E-04**	**0.0311**	**8.40E-03**
TOTAL		***0.15***	***1.45***	***2.31***	***0.00***	***0.10***	***0.07***
Onsite		**2024**					
	Off-Road	0.14	1.44	2.23	0.00	0.07	0.06
	Total	**0.14**	**1.44**	**2.23**	**0.00**	**0.07**	**0.06**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.01	0.01	0.09	0.00	0.03	0.01
	Total	**0.01**	**0.01**	**0.09**	**0.00**	**0.03**	**0.01**
TOTAL		***0.15***	***1.45***	***2.31***	***0.00***	***0.10***	***0.07***
2024 P1 Fine Grading, P1 Asphalt Paving, & P1 Finish/Landscape		**4.51**	**44.00**	**45.89**	**0.09**	**6.30**	**3.42**
Phase 1 Building Construction							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**					
	Off-Road	1.4716	13.4438	16.1668	0.027	0.6133	0.5769
	Total	**1.4716**	**13.4438**	**16.1668**	**0.027**	**0.6133**	**0.5769**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0597	2.0966	0.8654	1.06E-02	0.3703	0.1152
	Worker	0.6251	0.3822	6.7356	0.0216	2.4444	0.6607
	Total	**0.6848**	**2.4788**	**7.601**	**0.0322**	**2.8147**	**0.7759**
TOTAL		***2.16***	***15.92***	***23.77***	***0.06***	***3.43***	***1.35***
Onsite		**2024 Winter**					
	Off-Road	1.4716	13.4438	16.1668	0.027	0.6133	0.5769
	Total	**1.4716**	**13.4438**	**16.1668**	**0.027**	**0.6133**	**0.5769**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0576	2.1903	0.8926	1.06E-02	0.3704	0.1152
	Worker	0.6855	0.4196	6.2816	0.0205	2.4444	0.6607
	Total	**0.7431**	**2.6099**	**7.1742**	**0.0311**	**2.8147**	**0.776**
TOTAL		***2.21***	***16.05***	***23.34***	***0.06***	***3.43***	***1.35***
Onsite		**2024**					
	Off-Road	1.47	13.44	16.17	0.03	0.61	0.58
	Total	**1.47**	**13.44**	**16.17**	**0.03**	**0.61**	**0.58**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.06	2.19	0.89	0.01	0.37	0.12
	Worker	0.69	0.42	6.74	0.02	2.44	0.66
	Total	**0.74**	**2.61**	**7.60**	**0.03**	**2.81**	**0.78**
TOTAL		***2.21***	***16.05***	***23.77***	***0.06***	***3.43***	***1.35***
2024 P1 Asphalt Paving, P1 Finish/Landscape, & P1 Building		**3.43**	**27.05**	**41.13**	**0.09**	**4.15**	**1.90**
2024 P1 Finish/Landscape & P1 Building		**2.37**	**17.50**	**26.08**	**0.06**	**3.53**	**1.42**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
Off-Road		1.3674	12.4697	16.0847	0.027	0.5276	0.4963
Total		**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0588	2.0863	0.8619	1.04E-02	0.3704	0.1152
Worker		0.5904	0.3464	6.336	0.0208	2.4438	0.6602
Total		**0.6492**	**2.4327**	**7.1978**	**0.0312**	**2.8142**	**0.7755**
TOTAL		***2.02***	***14.90***	***23.28***	***0.06***	***3.34***	***1.27***
Onsite	**2025 Winter**						
Off-Road		1.3674	12.4697	16.0847	0.027	0.5276	0.4963
Total		**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0567	2.1797	0.8885	1.04E-02	0.3704	0.1153
Worker		0.6493	0.3802	5.9128	0.0198	2.4438	0.6602
Total		**0.706**	**2.5599**	**6.8013**	**0.0302**	**2.8142**	**0.7755**
TOTAL		***2.07***	***15.03***	***22.89***	***0.06***	***3.34***	***1.27***
Onsite	**2025**						
Off-Road		1.37	12.47	16.08	0.03	0.53	0.50
Total		**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.06	2.18	0.89	0.01	0.37	0.12
Worker		0.65	0.38	6.34	0.02	2.44	0.66
Total		**0.71**	**2.56**	**7.20**	**0.03**	**2.81**	**0.78**
TOTAL		***2.07***	***15.03***	***23.28***	***0.06***	***3.34***	***1.27***

Phase 1 Architectural Coating

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
Archit. Coating		36.3648				0	0
Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
Total		**36.5357**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.1176	0.069	1.2618	4.15E-03	0.4867	0.1315
Total		**0.1176**	**0.069**	**1.2618**	**4.15E-03**	**0.4867**	**0.1315**
TOTAL		***36.65***	***1.21***	***3.07***	***0.01***	***0.54***	***0.18***

Onsite		**2025 Winter**					
	Archit. Coating	36.3648				0	0
	Off-Road	0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total	**36.5357**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.1293	0.0757	1.1776	3.95E-03	0.4867	0.1315
	Total	**0.1293**	**0.0757**	**1.1776**	**3.95E-03**	**0.4867**	**0.1315**
TOTAL		***36.67***	***1.22***	***2.99***	***0.01***	***0.54***	***0.18***

Onsite		**2025**					
	Archit. Coating	36.36	0.00	0.00	0.00	0.00	0.00
	Off-Road	0.17	1.15	1.81	0.00	0.05	0.05
	Total	**36.54**	**1.15**	**1.81**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.13	0.08	1.26	0.00	0.49	0.13
	Total	**0.13**	**0.08**	**1.26**	**0.00**	**0.49**	**0.13**
TOTAL		***36.67***	***1.22***	***3.07***	***0.01***	***0.54***	***0.18***

Eastern Remediation Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**					
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6609	27.176	18.3356	0.0381	1.2294	1.131
	Total	**2.6609**	**27.176**	**18.3356**	**0.0381**	**9.6327**	**5.4498**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0318	1.1182	0.4615	5.65E-03	0.1975	6.14E-02
	Worker	0.0477	0.0292	0.5137	1.64E-03	0.1864	0.0504
	Total	**0.0795**	**1.1473**	**0.9753**	**7.29E-03**	**0.3839**	**0.1118**
TOTAL		***2.74***	***28.32***	***19.31***	***0.05***	***10.02***	***5.56***

Onsite		**2024 Winter**					
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6609	27.176	18.3356	0.0381	1.2294	1.131
	Total	**2.6609**	**27.176**	**18.3356**	**0.0381**	**9.6327**	**5.4498**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0307	1.1681	0.4761	5.66E-03	0.1975	6.15E-02
	Worker	0.0523	0.032	0.4791	1.57E-03	0.1864	0.0504
	Total	**0.083**	**1.2002**	**0.9552**	**7.23E-03**	**0.384**	**0.1119**
TOTAL		***2.74***	***28.38***	***19.29***	***0.05***	***10.02***	***5.50***

Onsite		**2024**					
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.66	27.18	18.34	0.04	1.23	1.13
	Total	**2.66**	**27.18**	**18.34**	**0.04**	**9.63**	**5.45**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.03	1.17	0.48	0.01	0.20	0.06
	Worker	0.05	0.03	0.51	0.00	0.19	0.05
	Total	**0.08**	**1.20**	**0.98**	**0.01**	**0.38**	**0.11**
TOTAL		***2.74***	***28.38***	***19.31***	***0.05***	***10.02***	***5.56***

Eastern Remediation Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
	Fugitive Dust					3.9843	1.5695
	Off-Road	3.2181	32.377	27.7228	0.0621	1.3354	1.2286
	Total	**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.3197**	**2.7981**
Offsite							
	Hauling[1]	0.4660764	36.1350456	10.915236	0.1828764	5.8157244	1.7886912
	Vendor	0.0159	0.5591	0.2308	2.83E-03	0.0988	3.07E-02
	Worker	0.053	0.0324	0.5708	1.83E-03	0.2072	0.056
	Total	**0.5349764**	**36.7265456**	**11.716836**	**1.88E-01**	**6.1217244**	**1.8753912**
TOTAL		***3.75***	***69.10***	***39.44***	***0.25***	***11.44***	***4.67***
Onsite	**2024 Winter**						
	Fugitive Dust					3.9843	1.5695
	Off-Road	3.2181	32.377	27.7228	0.0621	1.3354	1.2286
	Total	**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.3197**	**2.7981**
Offsite							
	Hauling[1]	0.45489	37.5581256	10.9479456	0.1828764	5.815866	1.7888328
	Vendor	0.0154	0.5841	0.238	2.83E-03	0.0988	3.07E-02
	Worker	0.0581	0.0356	0.5323	1.74E-03	0.2072	0.056
	Total	**0.52839**	**38.1778256**	**11.7182456**	**1.87E-01**	**6.121866**	**1.8755328**
TOTAL		***3.75***	***70.55***	***39.44***	***0.25***	***11.44***	***2.85***
Onsite	**2024**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.98	1.57
	Off-Road	3.22	32.38	27.72	0.06	1.34	1.23
	Total	**3.22**	**32.38**	**27.72**	**0.06**	**5.32**	**2.80**
Offsite							
	Hauling	0.47	37.56	10.95	0.18	5.82	1.79
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.57	0.00	0.21	0.06
	Total	**0.53**	**38.18**	**11.72**	**0.19**	**6.12**	**1.88**
TOTAL		***3.75***	***70.55***	***39.44***	***0.25***	***11.44***	***4.67***

[1] Proportioned based on the segment of the haul route within the South Coast Air Basin compared to the total haul route between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.

Phase 2 Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6609	27.176	18.3356	0.0381	1.2294	1.131
	Total	**2.6609**	**27.176**	**18.3356**	**0.0381**	**9.6327**	**5.4498**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.96E-03	0.2795	0.1154	1.41E-03	0.0494	1.54E-02
	Worker	0.0477	0.0292	0.5137	1.64E-03	0.1864	0.0504
	Total	**0.0556**	**0.3087**	**0.6291**	**3.05E-03**	**0.2358**	**0.0658**
TOTAL		***2.72***	***27.48***	***18.96***	***0.04***	***9.87***	***5.52***
Onsite	**2024 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.6609	27.176	18.3356	0.0381	1.2294	1.131
	Total	**2.6609**	**27.176**	**18.3356**	**0.0381**	**9.6327**	**5.4498**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.68E-03	0.292	0.119	1.42E-03	0.0494	1.54E-02
	Worker	0.0523	0.032	0.4791	1.57E-03	0.1864	0.0504
	Total	**0.06**	**0.324**	**0.5981**	**2.99E-03**	**0.2358**	**0.0658**
TOTAL		***2.72***	***27.50***	***18.93***	***0.04***	***9.87***	***5.50***
Onsite	**2024**						
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.66	27.18	18.34	0.04	1.23	1.13
	Total	**2.66**	**27.18**	**18.34**	**0.04**	**9.63**	**5.45**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.05	0.03	0.51	0.00	0.19	0.05
	Total	**0.06**	**0.32**	**0.63**	**0.00**	**0.24**	**0.07**
TOTAL		***2.72***	***27.50***	***18.96***	***0.04***	***9.87***	***5.52***
2024 P1 Building Construction, P2 Site Preparation, & East Remediation Site Preparation		**7.68**	**71.93**	**62.04**	**0.15**	**23.31**	**12.43**
2024 P1 Building Construction, P2 Site Preparation, & East Remediation Grading		**8.69**	**114.11**	**82.17**	**0.35**	**24.74**	**11.54**
2024 P1 Building Construction & P2 Site Preparation		**4.94**	**43.55**	**42.73**	**0.10**	**13.30**	**6.87**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.4727	25.2339	17.9118	0.0381	1.0868	0.9999
	Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**9.4902**	**5.3187**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.84E-03	0.2782	0.1149	1.38E-03	0.0494	1.54E-02
	Worker	0.045	0.0264	0.4833	1.59E-03	0.1864	0.0504
	Total	**0.0529**	**0.3046**	**0.5982**	**2.97E-03**	**0.2358**	**0.0657**
TOTAL		***2.53***	***25.54***	***18.51***	***0.04***	***9.73***	***5.38***
Onsite	**2025 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.4727	25.2339	17.9118	0.0381	1.0868	0.9999
	Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**9.4902**	**5.3187**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.56E-03	0.2906	0.1185	1.39E-03	0.0494	1.54E-02
	Worker	0.0495	0.029	0.451	1.51E-03	0.1864	0.0504
	Total	**0.0571**	**0.3196**	**0.5695**	**2.90E-03**	**0.2358**	**0.0657**
TOTAL		***2.53***	***25.55***	***18.48***	***0.04***	***9.73***	***5.37***
Onsite	**2025**						
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.47	25.23	17.91	0.04	1.09	1.00
	Total	**2.47**	**25.23**	**17.91**	**0.04**	**9.49**	**5.32**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.05	0.03	0.48	0.00	0.19	0.05
	Total	**0.06**	**0.32**	**0.60**	**0.00**	**0.24**	**0.07**
TOTAL		***2.53***	***25.55***	***18.51***	***0.04***	***9.73***	***5.38***

2025 P1 Building Construction & P2 Site Preparation		**4.60**	**40.58**	**41.79**	**0.10**	**13.07**	**6.66**

Phase 2 Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0157	0.5563	0.2298	2.77E-03	0.0988	3.07E-02
	Worker	0.05	0.0294	0.5369	1.76E-03	0.2071	0.056
	Total	**0.0657**	**0.5857**	**0.7668**	**4.53E-03**	**0.3059**	**0.0867**
TOTAL		***2.97***	***28.53***	***27.10***	***0.07***	***5.37***	***2.69***
Onsite	**2025 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0151	0.5813	0.2369	2.77E-03	0.0988	3.07E-02
	Worker	0.055	0.0322	0.5011	1.68E-03	0.2071	0.056
	Total	**0.0702**	**0.6135**	**0.738**	**4.45E-03**	**0.3059**	**0.0867**
TOTAL		***2.97***	***28.56***	***27.07***	***0.07***	***5.37***	***2.66***
Onsite	**2025**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.03	0.54	0.00	0.21	0.06
	Total	**0.07**	**0.61**	**0.77**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.56***	***27.10***	***0.07***	***5.37***	***2.69***

2025 P1 Building Construction & P2 Rough Grading		**5.19**	**44.61**	**50.87**	**0.13**	**8.80**	**4.04**
2025 P1 Building Construction, P1 Architectural Coating, & P2 Rough Grading		**41.85**	**45.83**	**53.94**	**0.13**	**9.34**	**4.23**

Phase 2 Utility Trenching

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
	Off-Road	0.6515	5.4135	9.1328	0.0138	0.3174	0.292
	Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.02	0.0117	0.2148	7.10E-04	0.0828	0.0224
	Total	**0.02**	**0.0117**	**0.2148**	**7.10E-04**	**0.0828**	**0.0224**
TOTAL		***0.67***	***5.43***	***9.35***	***0.01***	***0.40***	***0.31***
Onsite	**2025 Winter**						
	Off-Road	0.6515	5.4135	9.1328	0.0138	0.3174	0.292
	Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.022	0.0129	0.2004	6.70E-04	0.0828	0.0224
	Total	**0.022**	**0.0129**	**0.2004**	**6.70E-04**	**0.0828**	**0.0224**
TOTAL		***0.67***	***5.43***	***9.33***	***0.01***	***0.40***	***0.31***
Onsite	**2025**						
	Off-Road	0.65	5.41	9.13	0.01	0.32	0.29
	Total	**0.65**	**5.41**	**9.13**	**0.01**	**0.32**	**0.29**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.21	0.00	0.08	0.02
	Total	**0.02**	**0.01**	**0.21**	**0.00**	**0.08**	**0.02**
TOTAL		***0.67***	***5.43***	***9.35***	***0.01***	***0.40***	***0.31***
2025 P1 Building Construction, P2 Rough Grading, P1 Architectural Coating, & P2 Utility Trenching		**42.52**	**51.26**	**63.28**	**0.15**	**9.74**	**4.54**
2025 P2 Rough Grading & P2 Utility Trenching		**3.64**	**33.98**	**36.45**	**0.08**	**5.77**	**3.00**
Phase 2 Fine Grading							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0157	0.5563	0.2298	2.77E-03	0.0988	3.07E-02
	Worker	0.05	0.0294	0.5369	1.76E-03	0.2071	0.056
	Total	**0.0657**	**0.5857**	**0.7668**	**4.53E-03**	**0.3059**	**0.0867**
TOTAL		***2.97***	***28.53***	***27.10***	***0.07***	***5.37***	***2.69***
Onsite	**2025 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0151	0.5813	0.2369	2.77E-03	0.0988	3.07E-02
	Worker	0.055	0.0322	0.5011	1.68E-03	0.2071	0.056
	Total	**0.0702**	**0.6135**	**0.738**	**4.45E-03**	**0.3059**	**0.0867**
TOTAL		***2.97***	***28.56***	***27.07***	***0.07***	***5.37***	***2.66***
Onsite	**2025**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.03	0.54	0.00	0.21	0.06
	Total	**0.07**	**0.61**	**0.77**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.56***	***27.10***	***0.07***	***5.37***	***2.69***
2025 P2 Rough Grading, P2 Trenching & P2 Fine Grading		**6.62**	**62.54**	**63.54**	**0.15**	**11.14**	**5.69**

2025 P2 Trenching & P2 Fine Grading		**3.64**	**33.98**	**36.45**	**0.08**	**5.77**	**3.00**

Phase 2 Asphalt Paving

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
Paving		0.0445				0	0
Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0375	0.022	0.4027	1.32E-03	0.1553	0.042
Total		**0.0375**	**0.022**	**0.4027**	**1.32E-03**	**0.1553**	**0.042**
TOTAL		***1.00***	***8.60***	***14.98***	***0.02***	***0.57***	***0.43***
Onsite	**2025 Winter**						
Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
Paving		0.0445				0	0
Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0413	0.0242	0.3758	1.26E-03	0.1553	0.042
Total		**0.0413**	**0.0242**	**0.3758**	**1.26E-03**	**0.1553**	**0.042**
TOTAL		***1.00***	***8.61***	***14.95***	***0.02***	***0.57***	***0.43***
Onsite	**2025**						
Off-Road		0.92	8.58	14.58	0.02	0.42	0.39
Paving		0.04	0.00	0.00	0.00	0.00	0.00
Total		**0.96**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.04	0.02	0.40	0.00	0.16	0.04
Total		**0.04**	**0.02**	**0.40**	**0.00**	**0.16**	**0.04**
TOTAL		***1.00***	***8.61***	***14.98***	***0.02***	***0.57***	***0.43***

2025 P2 Fine Grading & P2 Asphalt Paving		**3.97**	**37.16**	**42.08**	**0.09**	**5.95**	**3.12**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2026 Summer**						
Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
Paving		0.0445				0	0
Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0356	0.0202	0.3814	1.28E-03	0.1553	0.0419
Total		**0.0356**	**0.0202**	**0.3814**	**1.28E-03**	**0.1553**	**0.0419**
TOTAL		***1.00***	***8.60***	***14.96***	***0.02***	***0.57***	***0.43***
Onsite	**2026 Winter**						
Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
Paving		0.0445				0	0
Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0393	0.0221	0.3561	1.22E-03	0.1553	0.0419
	Total	**0.0393**	**0.0221**	**0.3561**	**1.22E-03**	**0.1553**	**0.0419**
TOTAL		***1.00***	***8.60***	***14.93***	***0.02***	***0.57***	***0.43***
Onsite		**2026**					
	Off-Road	0.92	8.58	14.58	0.02	0.42	0.39
	Paving	0.04	0.00	0.00	0.00	0.00	0.00
	Total	**0.96**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.04	0.02	0.38	0.00	0.16	0.04
	Total	**0.04**	**0.02**	**0.38**	**0.00**	**0.16**	**0.04**
TOTAL		***1.00***	***8.60***	***14.96***	***0.02***	***0.57***	***0.43***

Phase 2 Finishing/Landscaping

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		7.50E-03	4.40E-03	0.0805	2.60E-04	0.0311	8.39E-03
	Total		**7.50E-03**	**4.40E-03**	**0.0805**	**2.60E-04**	**0.0311**	**8.39E-03**
TOTAL			***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***
Onsite		**2025 Winter**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		8.25E-03	4.83E-03	0.0752	2.50E-04	0.0311	8.39E-03
	Total		**8.25E-03**	**4.83E-03**	**0.0752**	**2.50E-04**	**0.0311**	**8.39E-03**
TOTAL			***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***
Onsite		**2025**						
	Off-Road		0.13	1.33	2.22	0.00	0.05	0.05
	Total		**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.01	0.00	0.08	0.00	0.03	0.01
	Total		**0.01**	**0.00**	**0.08**	**0.00**	**0.03**	**0.01**
TOTAL			***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***

2025 P2 Fine Grading, P2 Asphalt Paving, & P2 Finish/Landscape		**4.11**	**38.50**	**44.38**	**0.09**	**6.03**	**3.17**
2025 P2 Asphalt Paving, & P2 Finish/Landscape		**1.14**	**9.94**	**17.28**	**0.03**	**0.66**	**0.48**

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2026 Summer**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	7.12E-03	4.03E-03	0.0763	2.60E-04	0.0311	8.39E-03
	Total	**7.12E-03**	**4.03E-03**	**0.0763**	**2.60E-04**	**0.0311**	**8.39E-03**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***
Onsite		**2026 Winter**					
	Off-Road	0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total	**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	7.85E-03	4.42E-03	0.0712	2.40E-04	0.0311	8.39E-03
	Total	**7.85E-03**	**4.42E-03**	**0.0712**	**2.40E-04**	**0.0311**	**8.39E-03**
TOTAL		***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***
Onsite		**2026**					
	Off-Road	0.13	1.33	2.22	0.00	0.05	0.05
	Total	**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.01	0.00	0.08	0.00	0.03	0.01
	Total	**0.01**	**0.00**	**0.08**	**0.00**	**0.03**	**0.01**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***

Phase 2 Building Construction

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1725	6.1197	2.5282	0.0305	1.0864	0.338
	Worker	1.7136	1.0055	18.3904	0.0604	7.0933	1.9164
	Total	**1.8861**	**7.1252**	**20.9186**	**0.0909**	**8.1797**	**2.2544**
TOTAL		***3.25***	***19.59***	***37.00***	***0.12***	***8.71***	***2.75***
Onsite		**2025 Winter**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1663	6.3938	2.6063	0.0305	1.0866	0.3382
	Worker	1.8847	1.1037	17.1622	0.0576	7.0933	1.9164
	Total	**2.051**	**7.4974**	**19.7685**	**0.0881**	**8.1799**	**2.2545**
TOTAL		***3.42***	***19.97***	***35.85***	***0.12***	***8.71***	***2.75***
Onsite		**2025**					
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.17	6.39	2.61	0.03	1.09	0.34
	Worker	1.88	1.10	18.39	0.06	7.09	1.92
	Total	**2.05**	**7.50**	**20.92**	**0.09**	**8.18**	**2.25**
TOTAL		***3.42***	***19.97***	***37.00***	***0.12***	***8.71***	***2.75***

2025 P2 Asphalt Paving, P2 Finishing/Landscaping, & P2 Building Construction		**4.56**	**29.91**	**54.29**	**0.15**	**9.37**	**3.24**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2026 Summer**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.17	6.0757	2.5201	0.0298	1.0864	0.338
	Worker	1.6255	0.9205	17.4164	0.0586	7.0916	1.9148
	Total	**1.7954**	**6.9962**	**19.9365**	**0.0884**	**8.178**	**2.2528**
TOTAL		***3.16***	***19.47***	***36.02***	***0.12***	***8.71***	***2.75***
Onsite	**2026 Winter**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1637	6.3486	2.5966	0.0299	1.0865	0.3381
	Worker	1.7932	1.0101	16.2603	0.0558	7.0916	1.9148
	Total	**1.9569**	**7.3587**	**18.8569**	**0.0857**	**8.1781**	**2.253**
TOTAL		***3.32***	***19.83***	***34.94***	***0.11***	***8.71***	***2.75***
Onsite	**2026**						
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.17	6.35	2.60	0.03	1.09	0.34
	Worker	1.79	1.01	17.42	0.06	7.09	1.91
	Total	**1.96**	**7.36**	**19.94**	**0.09**	**8.18**	**2.25**
TOTAL		***3.32***	***19.83***	***36.02***	***0.12***	***8.71***	***2.75***
2026 P2 Asphalt Paving, P2 Finishing/Landscaping, & P2 Building Construction		**4.46**	**29.77**	**53.28**	**0.14**	**9.36**	**3.23**
2026 P2 Finish/Landscape & P2 Building		**3.46**	**21.16**	**38.32**	**0.12**	**8.79**	**2.81**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1677	6.0304	2.5125	0.0292	1.0863	0.3379
	Worker	1.5441	0.849	16.5928	0.0569	7.0896	1.913
	Total	**1.7117**	**6.8794**	**19.1054**	**0.0861**	**8.1759**	**2.2509**
TOTAL		***3.08***	***19.35***	***35.19***	***0.11***	***8.70***	***2.75***
Onsite	**2027 Winter**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1614	6.302	2.5874	0.0292	1.0864	0.338
	Worker	1.7079	0.9315	15.4967	0.0542	7.0896	1.913
	Total	**1.8692**	**7.2335**	**18.0841**	**0.0834**	**8.1761**	**2.2511**
TOTAL		***3.24***	***19.70***	***34.17***	***0.11***	***8.70***	***2.75***

Onsite		**2027**						
	Off-Road		1.37	12.47	16.08	0.03	0.53	0.50
	Total		**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.17	6.30	2.59	0.03	1.09	0.34
	Worker		1.71	0.93	16.59	0.06	7.09	1.91
	Total		**1.87**	**7.23**	**19.11**	**0.09**	**8.18**	**2.25**
TOTAL			***3.24***	***19.70***	***35.19***	***0.11***	***8.70***	***2.75***

Phase 2 Architectural Coating

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2027 Summer**						
	Archit. Coating		30.8767				0	0
	Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total		**31.0475**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.3088	0.1698	3.3186	1.14E-02	1.4179	0.3826
	Total		**0.3088**	**0.1698**	**3.3186**	**1.14E-02**	**1.4179**	**0.3826**
TOTAL			***31.36***	***1.32***	***5.13***	***0.01***	***1.47***	***0.43***
Onsite		**2027 Winter**						
	Archit. Coating		30.8767				0	0
	Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total		**31.0475**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.3416	0.1863	3.0993	1.08E-02	1.4179	0.3826
	Total		**0.3416**	**0.1863**	**3.0993**	**1.08E-02**	**1.4179**	**0.3826**
TOTAL			***31.39***	***1.33***	***4.91***	***0.01***	***1.47***	***0.43***

Onsite		**2027**						
	Archit. Coating		30.88	0.00	0.00	0.00	0.00	0.00
	Off-Road		0.17	1.15	1.81	0.00	0.05	0.05
	Total		**31.05**	**1.15**	**1.81**	**0.00**	**0.05**	**0.05**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.34	0.19	3.32	0.01	1.42	0.38
	Total		**0.34**	**0.19**	**3.32**	**0.01**	**1.42**	**0.38**
TOTAL			***31.39***	***1.33***	***5.13***	***0.01***	***1.47***	***0.43***

Phase 3 Site Preparation

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2026 Summer**						
	Fugitive Dust						8.4034	4.3188
	Off-Road		2.4727	25.2339	17.9118	0.0381	1.0868	0.9999
	Total		**2.4727**	**25.2339**	**17.9118**	**0.0381**	**9.4902**	**5.3187**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		7.73E-03	0.2762	0.1146	1.36E-03	0.0494	1.54E-02
	Worker		0.0427	0.0242	0.4577	1.54E-03	0.1864	0.0503
	Total		**0.0504**	**0.3004**	**0.5722**	**2.90E-03**	**0.2357**	**0.0657**
TOTAL			***2.52***	***25.53***	***18.48***	***0.04***	***9.73***	***5.38***

Onsite		**2026 Winter**					
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.4727	25.2339	17.9118	0.0381	1.0868	0.9999
	Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**9.4902**	**5.3187**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.44E-03	0.2886	0.118	1.36E-03	0.0494	1.54E-02
	Worker	0.0471	0.0265	0.4273	1.47E-03	0.1864	0.0503
	Total	**0.0546**	**0.3151**	**0.5453**	**2.83E-03**	**0.2357**	**0.0657**
TOTAL		***2.53***	***25.55***	***18.46***	***0.04***	***9.73***	***5.37***

Onsite		**2026**					
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.47	25.23	17.91	0.04	1.09	1.00
	Total	**2.47**	**25.23**	**17.91**	**0.04**	**9.49**	**5.32**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.05	0.03	0.46	0.00	0.19	0.05
	Total	**0.05**	**0.32**	**0.57**	**0.00**	**0.24**	**0.07**
TOTAL		***2.53***	***25.55***	***18.48***	***0.04***	***9.73***	***5.38***

2026 P2 Building & P3 Site Preparation		**5.85**	**45.38**	**54.51**	**0.16**	**18.43**	**8.13**

Phase 3 Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2026 Summer**					
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0155	0.5523	0.2291	2.71E-03	0.0988	3.07E-02
	Worker	0.0475	0.0269	0.5085	1.71E-03	0.2071	0.0559
	Total	**0.0629**	**0.5792**	**0.7376**	**4.42E-03**	**0.3058**	**0.0866**
TOTAL		***2.96***	***28.52***	***27.07***	***0.07***	***5.37***	***2.69***

Onsite		**2026 Winter**					
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0149	0.5772	0.2361	2.72E-03	0.0988	3.07E-02
	Worker	0.0524	0.0295	0.4748	1.63E-03	0.2071	0.0559
	Total	**0.0673**	**0.6066**	**0.7108**	**4.35E-03**	**0.3058**	**0.0867**
TOTAL		***2.97***	***28.55***	***27.04***	***0.07***	***5.37***	***2.66***

Onsite		**2026**					
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.51	0.00	0.21	0.06
	Total	**0.07**	**0.61**	**0.74**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.55***	***27.07***	***0.07***	***5.37***	***2.69***

2026 P2 Building & P3 Rough Grading		**6.29**	**48.38**	**63.09**	**0.18**	**14.08**	**5.44**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0152	0.5482	0.2284	2.65E-03	0.0988	3.07E-02
	Worker	0.0451	0.0248	0.4845	1.66E-03	0.207	0.0559
	Total	**0.0603**	**0.573**	**0.7129**	**4.31E-03**	**0.3058**	**0.0866**
TOTAL		***2.96***	***28.52***	***27.04***	***0.07***	***5.37***	***2.69***
Onsite	**2027 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0147	0.5729	0.2352	2.66E-03	0.0988	3.07E-02
	Worker	0.0499	0.0272	0.4525	1.58E-03	0.207	0.0559
	Total	**0.0645**	**0.6001**	**0.6877**	**4.24E-03**	**0.3058**	**0.0866**
TOTAL		***2.97***	***28.54***	***27.02***	***0.07***	***5.37***	***2.66***
Onsite	**2027**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.57	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.48	0.00	0.21	0.06
	Total	**0.06**	**0.60**	**0.71**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.54***	***27.04***	***0.07***	***5.37***	***2.69***

2027 P2 Building & P3 Rough Grading		**6.20**	**48.25**	**62.23**	**0.18**	**14.07**	**5.44**
2027 P2 Building Construction, P3 Rough Grading, & P2 Architectural Coating		**37.59**	**49.58**	**67.36**	**0.19**	**15.54**	**5.87**

Phase 3 Utility Trenching

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
	Off-Road	0.6515	5.4135	9.1328	0.0138	0.3174	0.292
	Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.018	9.92E-03	0.1938	6.60E-04	0.0828	0.0223
	Total	**0.018**	**9.92E-03**	**0.1938**	**6.60E-04**	**0.0828**	**0.0223**
TOTAL		***0.67***	***5.42***	***9.33***	***0.01***	***0.40***	***0.31***
Onsite	**2027 Winter**						
	Off-Road	0.6515	5.4135	9.1328	0.0138	0.3174	0.292
	Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**

Offsite							
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.02	0.0109	0.181	6.30E-04	0.0828	0.0223
	Total		**0.02**	**0.0109**	**0.181**	**6.30E-04**	**0.0828**	**0.0223**
TOTAL			***0.67***	***5.42***	***9.31***	***0.01***	***0.40***	***0.31***
Onsite		**2027**						
	Off-Road		0.65	5.41	9.13	0.01	0.32	0.29
	Total		**0.65**	**5.41**	**9.13**	**0.01**	**0.32**	**0.29**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.02	0.01	0.19	0.00	0.08	0.02
	Total		**0.02**	**0.01**	**0.19**	**0.00**	**0.08**	**0.02**
TOTAL			***0.67***	***5.42***	***9.33***	***0.01***	***0.40***	***0.31***
2027 P2 Building Construction, P3 Rough Grading, P2 Architectural Coating, & P3 Utility Trenching			**38.26**	**55.00**	**76.69**	**0.21**	**15.94**	**6.18**
Phase 3 Fine Grading								
			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2027 Summer**						
	Fugitive Dust						3.9345	1.562
	Off-Road		2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total		**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		1.52E-02	0.5482	0.2284	2.65E-03	0.0988	3.07E-02
	Worker		0.0451	0.0248	0.4845	1.66E-03	0.207	0.0559
	Total		**0.0603**	**0.573**	**0.7129**	**4.31E-03**	**0.3058**	**0.0866**
TOTAL			***2.96***	***28.52***	***27.04***	***0.07***	***5.37***	***2.69***
Onsite		**2027 Winter**						
	Fugitive Dust						3.9345	1.562
	Off-Road		2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total		**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		1.47E-02	0.5729	0.2352	2.66E-03	0.0988	3.07E-02
	Worker		0.0499	0.0272	0.4525	1.58E-03	0.207	0.0559
	Total		**0.0645**	**0.6001**	**0.6877**	**4.24E-03**	**0.3058**	**0.0866**
TOTAL			***2.97***	***28.54***	***27.02***	***0.07***	***5.37***	***2.66***
Onsite		**2027**						
	Fugitive Dust		0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road		2.90	27.94	26.33	0.06	1.13	1.04
	Total		**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.02	0.57	0.24	0.00	0.10	0.03
	Worker		0.05	0.03	0.48	0.00	0.21	0.06
	Total		**0.06**	**0.60**	**0.71**	**0.00**	**0.31**	**0.09**
TOTAL			***2.97***	***28.54***	***27.04***	***0.07***	***5.37***	***2.69***
2027 P2 Building Construction, P3 Rough Grading, P2 Architectural Coating, P3 Utility Trenching, & P3 Fine Grading			**41.23**	**83.55**	**103.73**	**0.27**	**21.32**	**8.87**

2027 P3 Rough Grading, P3 Utility Trenching, & P3 Fine Grading		**6.60**	**62.51**	**63.41**	**0.15**	**11.14**	**5.69**
2027 P3 Utility Trenching & P3 Fine Grading		**3.64**	**33.97**	**36.37**	**0.08**	**5.77**	**3.00**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2028 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	1.51E-02	0.5445	0.2283	2.59E-03	0.0987	3.07E-02
	Worker	0.0429	0.023	0.4643	1.62E-03	0.2069	0.0558
	Total	**0.0579**	**0.5675**	**0.6926**	**4.21E-03**	**0.3057**	**0.0865**
TOTAL		***2.96***	***28.51***	***27.02***	***0.07***	***5.37***	***2.69***
Onsite	**2028 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	1.45E-02	0.5691	0.235	2.60E-03	0.0988	3.07E-02
	Worker	0.0475	0.0253	0.4338	1.54E-03	0.2069	0.0558
	Total	**0.062**	**0.5944**	**0.6687**	**4.14E-03**	**0.3057**	**0.0865**
TOTAL		***2.96***	***28.54***	***27.00***	***0.07***	***5.37***	***2.66***
Onsite	**2028**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.57	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.46	0.00	0.21	0.06
	Total	**0.06**	**0.59**	**0.69**	**0.00**	**0.31**	**0.09**
TOTAL		***2.96***	***28.54***	***27.02***	***0.07***	***5.37***	***2.69***

Phase 3 Asphalt Paving

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
	Off-Road	0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving	0				0	0
	Total	**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0338	0.0186	0.3634	1.25E-03	0.1553	0.0419
	Total	**0.0338**	**0.0186**	**0.3634**	**1.25E-03**	**0.1553**	**0.0419**
TOTAL		***0.95***	***8.60***	***14.94***	***0.02***	***0.57***	***0.43***
Onsite	**2027 Winter**						
	Off-Road	0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving	0				0	0
	Total	**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0374	0.0204	0.3393	1.19E-03	0.1553	0.0419
	Total	**0.0374**	**0.0204**	**0.3393**	**1.19E-03**	**0.1553**	**0.0419**
TOTAL		***0.95***	***8.60***	***14.92***	***0.02***	***0.57***	***0.43***
Onsite	**2027**						
	Off-Road	0.92	8.58	14.58	0.02	0.42	0.39
	Paving	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.92**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.04	0.02	0.36	0.00	0.16	0.04
	Total	**0.04**	**0.02**	**0.36**	**0.00**	**0.16**	**0.04**
TOTAL		***0.95***	***8.60***	***14.94***	***0.02***	***0.57***	***0.43***
2027 P3 Uility Trenching, P3 Fine Grading, & P3 Asphalt Paving		**4.59**	**42.57**	**51.31**	**0.10**	**6.35**	**3.43**
2027 P3 Fine Grading & P3 Asphalt Paving		**3.92**	**37.15**	**41.99**	**0.09**	**5.95**	**3.12**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2028 Summer**						
	Off-Road	0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving	0				0	0
	Total	**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0322	0.0173	0.3482	1.21E-03	0.1552	0.0419
	Total	**0.0322**	**0.0173**	**0.3482**	**1.21E-03**	**0.1552**	**0.0419**
TOTAL		***0.95***	***8.60***	***14.93***	***0.02***	***0.57***	***0.43***
Onsite	**2028 Winter**						
	Off-Road	0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving	0				0	0
	Total	**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0357	0.019	0.3253	1.16E-03	0.1552	0.0419
	Total	**0.0357**	**0.019**	**0.3253**	**1.16E-03**	**0.1552**	**0.0419**
TOTAL		***0.95***	***8.60***	***14.90***	***0.02***	***0.57***	***0.43***
Onsite	**2028**						
	Off-Road	0.92	8.58	14.58	0.02	0.42	0.39
	Paving	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.92**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.04	0.02	0.35	0.00	0.16	0.04
	Total	**0.04**	**0.02**	**0.35**	**0.00**	**0.16**	**0.04**
TOTAL		***0.95***	***8.60***	***14.93***	***0.02***	***0.57***	***0.43***

Phase 3 Finishing/Landscaping

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2027 Summer**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		6.76E-03	3.72E-03	0.0727	2.50E-04	0.0311	8.38E-03
	Total		**6.76E-03**	**3.72E-03**	**0.0727**	**2.50E-04**	**0.0311**	**8.38E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***
Onsite		**2027 Winter**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		7.48E-03	4.08E-03	0.0679	2.40E-04	0.0311	8.38E-03
	Total		**7.48E-03**	**4.08E-03**	**0.0679**	**2.40E-04**	**0.0311**	**8.38E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***
Onsite		**2027**						
	Off-Road		0.13	1.33	2.22	0.00	0.05	0.05
	Total		**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.01	0.00	0.07	0.00	0.03	0.01
	Total		**0.01**	**0.00**	**0.07**	**0.00**	**0.03**	**0.01**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***

2027 P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping			**4.06**	**38.48**	**44.28**	**0.09**	**6.03**	**3.17**

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2028 Summer**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		6.43E-03	3.46E-03	0.0697	2.40E-04	0.031	8.37E-03
	Total		**6.43E-03**	**3.46E-03**	**0.0697**	**2.40E-04**	**0.031**	**8.37E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.08***	***0.06***
Onsite		**2028 Winter**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		7.13E-03	3.79E-03	0.0651	2.30E-04	0.031	8.37E-03
	Total		**7.13E-03**	**3.79E-03**	**0.0651**	**2.30E-04**	**0.031**	**8.37E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.08***	***0.06***
Onsite		**2028**						
	Off-Road		0.13	1.33	2.22	0.00	0.05	0.05
	Total		**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.01	0.00	0.07	0.00	0.03	0.01
	Total	**0.01**	**0.00**	**0.07**	**0.00**	**0.03**	**0.01**
TOTAL		***0.14***	***1.33***	***2.29***	***0.00***	***0.08***	***0.06***
2028 P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping		**4.05**	**38.47**	**44.24**	**0.09**	**6.03**	**3.17**
Phase 3 Building Construction							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2028 Summer**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0132	0.4764	0.1997	2.27E-03	0.0864	0.0269
	Worker	0.105	0.0565	1.1376	3.97E-03	0.507	0.1367
	Total	**0.1182**	**0.5329**	**1.3373**	**6.24E-03**	**0.5934**	**0.1636**
TOTAL		***1.49***	***13.00***	***17.42***	***0.03***	***1.12***	***0.66***
Onsite	**2028 Winter**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0127	0.498	0.2056	2.27E-03	0.0864	0.0269
	Worker	0.1164	0.0619	1.0627	3.78E-03	0.507	0.1367
	Total	**0.1291**	**0.5599**	**1.2683**	**6.05E-03**	**0.5934**	**0.1636**
TOTAL		***1.50***	***13.03***	***17.35***	***0.03***	***1.12***	***0.66***
Onsite	**2028**						
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.50	0.21	0.00	0.09	0.03
	Worker	0.12	0.06	1.14	0.00	0.51	0.14
	Total	**0.13**	**0.56**	**1.34**	**0.01**	**0.59**	**0.16**
TOTAL		***1.50***	***13.03***	***17.42***	***0.03***	***1.12***	***0.66***
2028 P3 Finish/Landscape & P3 Building Construction		**1.64**	**14.36**	**19.71**	**0.04**	**1.21**	**0.72**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2029 Summer**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.013	0.4733	0.1997	2.22E-03	0.0864	0.0269
	Worker	0.0997	0.0528	1.0944	3.87E-03	0.5069	0.1366
	Total	**0.1127**	**0.5261**	**1.2941**	**6.09E-03**	**0.5932**	**0.1634**
TOTAL		***1.48***	***13.00***	***17.38***	***0.03***	***1.12***	***0.66***
Onsite	**2029 Winter**						
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0125	0.4947	0.2054	2.23E-03	0.0864	0.0269
	Worker	0.1108	0.0579	1.0226	3.69E-03	0.5069	0.1366
	Total	**0.1233**	**0.5526**	**1.228**	**5.92E-03**	**0.5933**	**0.1634**
TOTAL		***1.49***	***13.02***	***17.31***	***0.03***	***1.12***	***0.66***
Onsite	**2029**						
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.49	0.21	0.00	0.09	0.03
	Worker	0.11	0.06	1.09	0.00	0.51	0.14
	Total	**0.12**	**0.55**	**1.29**	**0.01**	**0.59**	**0.16**
TOTAL		***1.49***	***13.02***	***17.38***	***0.03***	***1.12***	***0.66***

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2030 Summer**						
	Off-Road	1.3091	7.9346	16.157	0.031	0.1481	0.1481
	Total	**1.3091**	**7.9346**	**16.157**	**0.031**	**0.1481**	**0.1481**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0129	0.4703	0.1996	2.18E-03	0.0864	0.0269
	Worker	0.0946	0.0496	1.0573	3.79E-03	0.5067	0.1365
	Total	**0.1075**	**0.5199**	**1.2569**	**5.97E-03**	**0.5931**	**0.1633**
TOTAL		***1.42***	***8.45***	***17.41***	***0.04***	***0.74***	***0.31***
Onsite	**2030 Winter**						
	Off-Road	1.3091	7.9346	16.157	0.031	0.1481	0.1481
	Total	**1.3091**	**7.9346**	**16.157**	**0.031**	**0.1481**	**0.1481**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0124	0.4917	0.2052	2.18E-03	0.0864	0.0269
	Worker	0.1053	0.0543	0.988	3.61E-03	0.5067	0.1365
	Total	**0.1177**	**0.546**	**1.1932**	**5.79E-03**	**0.5931**	**0.1633**
TOTAL		***1.43***	***8.48***	***17.35***	***0.04***	***0.74***	***0.31***
Onsite	**2030**						
	Off-Road	1.31	7.93	16.16	0.03	0.15	0.15
	Total	**1.31**	**7.93**	**16.16**	**0.03**	**0.15**	**0.15**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.49	0.21	0.00	0.09	0.03
	Worker	0.11	0.05	1.06	0.00	0.51	0.14
	Total	**0.12**	**0.55**	**1.26**	**0.01**	**0.59**	**0.16**
TOTAL		***1.43***	***8.48***	***17.41***	***0.04***	***0.74***	***0.31***

Phase 3 Architectural Coating

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2029 Summer**						
	Archit. Coating	10.7078				0	0
	Off-Road	0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total	**10.8787**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0204	0.0108	0.2234	7.90E-04	0.1034	0.0279
	Total	**0.0204**	**0.0108**	**0.2234**	**7.90E-04**	**0.1034**	**0.0279**
TOTAL		***10.90***	***1.16***	***2.03***	***0.00***	***0.15***	***0.08***
Onsite	**2029 Winter**						
	Archit. Coating	10.7078				0	0
	Off-Road	0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total	**10.8787**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0226	0.0118	0.2087	7.50E-04	0.1034	0.0279
	Total	**0.0226**	**0.0118**	**0.2087**	**7.50E-04**	**0.1034**	**0.0279**
TOTAL		***10.90***	***1.16***	***2.02***	***0.00***	***0.15***	***0.08***
Onsite	**2029**						
	Archit. Coating	10.71	0.00	0.00	0.00	0.00	0.00
	Off-Road	0.17	1.15	1.81	0.00	0.05	0.05
	Total	**10.88**	**1.15**	**1.81**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.22	0.00	0.10	0.03
	Total	**0.02**	**0.01**	**0.22**	**0.00**	**0.10**	**0.03**
TOTAL		***10.90***	***1.16***	***2.03***	***0.00***	***0.15***	***0.08***
2029 P3 Building Construction & P3 Architectural Coating		**12.39**	**14.18**	**19.41**	**0.04**	**1.28**	**0.74**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2030 Summer**						
	Archit. Coating	10.7078				0	0
	Off-Road	0.1308	0.8563	1.7977	2.97E-03	0.0203	0.0203
	Total	**10.8386**	**0.8563**	**1.7977**	**2.97E-03**	**0.0203**	**0.0203**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0193	0.0101	0.2158	7.70E-04	0.1034	0.0279
	Total	**0.0193**	**0.0101**	**0.2158**	**7.70E-04**	**0.1034**	**0.0279**
TOTAL		***10.86***	***0.87***	***2.01***	***0.00***	***0.12***	***0.05***
Onsite	**2030 Winter**						
	Archit. Coating	10.7078				0	0
	Off-Road	0.1308	0.8563	1.7977	2.97E-03	0.0203	0.0203
	Total	**10.8386**	**0.8563**	**1.7977**	**2.97E-03**	**0.0203**	**0.0203**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0215	0.0111	0.2016	7.40E-04	0.1034	0.0279
	Total	**0.0215**	**0.0111**	**0.2016**	**7.40E-04**	**0.1034**	**0.0279**
TOTAL		***10.86***	***0.87***	***2.00***	***0.00***	***0.12***	***0.05***
Onsite	**2030**						
	Archit. Coating	10.71	0.00	0.00	0.00	0.00	0.00
	Off-Road	0.13	0.86	1.80	0.00	0.02	0.02
	Total	**10.84**	**0.86**	**1.80**	**0.00**	**0.02**	**0.02**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.22	0.00	0.10	0.03
	Total	**0.02**	**0.01**	**0.22**	**0.00**	**0.10**	**0.03**
TOTAL		***10.86***	***0.87***	***2.01***	***0.00***	***0.12***	***0.05***
2030 P3 Building Construction & P3 Architectural Coating		**12.29**	**9.35**	**19.43**	**0.04**	**0.86**	**0.36**
MAX DAILY		**43**	**114**	**104**	**0.35**	**25**	**12**
Year 2023		***6.62***	***102.85***	***59.06***	***0.30***	***21.75***	***11.11***
Year 2024		***8.69***	***114.11***	***82.17***	***0.35***	***24.74***	***12.43***
Year 2025		***42.52***	***62.54***	***63.54***	***0.15***	***13.07***	***6.66***
Year 2026		***6.29***	***48.38***	***63.09***	***0.18***	***18.43***	***8.13***
Year 2027		***41.23***	***83.55***	***103.73***	***0.27***	***21.32***	***8.87***
Year 2028		***4.05***	***38.47***	***44.24***	***0.09***	***6.03***	***3.17***
Year 2029		***12.39***	***14.18***	***19.41***	***0.04***	***1.28***	***0.74***
Year 2030		***12.29***	***9.35***	***19.43***	***0.04***	***0.86***	***0.36***
Regional Thresholds		**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?		No	Yes	No	No	No	No

Regional Construction Emissions Worksheet - Mitigated

*CalEEMod, Version 2020.4.0

Note: Emissions highlighted are mitigated emissions.

	Distance (mi)	Percent of Haul Route (%)
Total Haul Route Length:[1]	75	100%
Haul Route in the MDAB:[2]	21.9	29%
Haul Route in the SoCAB:	53.1	71%

[1] *Based on distance between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.*

[2] *Based on the distance at the MDAB and SoCAB border along to the haul route to Soil Safe of California.*

Western Remediation Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0162	0.5607	0.2325	2.88E-03	0.0986	3.06E-02
	Worker	0.0507	0.0325	0.5512	1.70E-03	0.1865	0.0504
	Total	**0.0669**	**0.5932**	**0.7837**	**4.58E-03**	**0.2851**	**0.081**
TOTAL		***0.76***	***12.76***	***23.74***	***0.04***	***8.75***	***4.46***
Onsite	**2023 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0156	0.5857	0.2399	2.88E-03	0.0986	3.06E-02
	Worker	0.0554	0.0356	0.5135	1.62E-03	0.1865	0.0504
	Total	**0.071**	**0.6214**	**0.7534**	**4.50E-03**	**0.2851**	**0.081**
TOTAL		***0.77***	***12.78***	***23.71***	***0.04***	***8.75***	***4.43***
Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	0.70	12.16	22.96	0.04	0.06	0.06
	Total	**0.70**	**12.16**	**22.96**	**0.04**	**8.47**	**4.38**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.59	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.55	0.00	0.19	0.05
	Total	**0.07**	**0.62**	**0.78**	**0.00**	**0.29**	**0.08**
TOTAL		***0.77***	***12.78***	***23.74***	***0.04***	***8.75***	***4.46***

Western Remediation Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					3.9862	1.5698
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.0877**	**1.6713**

Offsite							
	Hauling[1]	0.491352	37.7811456	11.0091168	0.19293	6.0249384	1.845402
	Vendor	0.0323	1.1215	0.465	5.75E-03	0.1972	6.12E-02
	Worker	0.0564	0.0361	0.6124	1.89E-03	0.2072	0.0561
	Total	**0.580052**	**38.9387456**	**12.0865168**	**2.01E-01**	**6.4293384**	**1.962702**
TOTAL		***1.59***	***58.21***	***48.81***	***0.26***	***10.52***	***3.63***
Onsite	**2023 Winter**						
	Fugitive Dust					3.9862	1.5698
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.0877**	**1.6713**
Offsite							
	Hauling[1]	0.4797408	39.2694324	11.0441628	0.19293	6.0251508	1.8456144
	Vendor	0.0312	1.1715	0.4798	5.76E-03	0.1973	6.12E-02
	Worker	0.0616	0.0396	0.5705	1.80E-03	0.2072	0.0561
	Total	**0.5725408**	**40.4805324**	**12.0944628**	**2.00E-01**	**6.4296508**	**1.9629144**
TOTAL		***1.58***	***59.75***	***48.82***	***0.26***	***10.52***	***1.73***
Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.99	1.57
	Off-Road	1.01	19.27	36.72	0.06	0.10	0.10
	Total	**1.01**	**19.27**	**36.72**	**0.06**	**4.09**	**1.67**
Offsite							
	Hauling	0.49	39.27	11.04	0.19	6.03	1.85
	Vendor	0.03	1.17	0.48	0.01	0.20	0.06
	Worker	0.06	0.04	0.61	0.00	0.21	0.06
	Total	**0.58**	**40.48**	**12.09**	**0.20**	**6.43**	**1.96**
TOTAL		***1.59***	***59.75***	***48.82***	***0.26***	***10.52***	***3.63***

[1] *Proportioned based on the segment of the haul route within the South Coast Air Basin compared to the total haul route between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.*

Phase 1 Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	8.08E-03	0.2804	0.1162	1.44E-03	0.0493	1.53E-02
	Worker	0.0507	0.0325	0.5512	1.70E-03	0.1865	0.0504
	Total	**0.0588**	**0.3128**	**0.6674**	**3.14E-03**	**0.2358**	**0.0657**
TOTAL		***0.76***	***12.47***	***23.63***	***0.04***	***8.70***	***4.45***
Onsite	**2023 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.80E-03	0.2929	0.12	1.44E-03	0.0493	1.53E-02
	Worker	0.0554	0.0356	0.5135	1.62E-03	0.1865	0.0504
	Total	**0.0632**	**0.3285**	**0.6334**	**3.06E-03**	**0.2358**	**0.0657**
TOTAL		***0.76***	***12.49***	***23.59***	***0.04***	***8.70***	***4.43***

Onsite		**2023**					
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	0.70	12.16	22.96	0.04	0.06	0.06
	Total	**0.70**	**12.16**	**22.96**	**0.04**	**8.47**	**4.38**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.06	0.04	0.55	0.00	0.19	0.05
	Total	**0.06**	**0.33**	**0.67**	**0.00**	**0.24**	**0.07**
TOTAL		***0.76***	***12.49***	***23.63***	***0.04***	***8.70***	***4.45***
2023 West Remediation Site Preparation & P1 Site Preparation		**1.53**	**25.27**	**47.37**	**0.08**	**17.45**	**8.91**
2023 West Remediation Grading & P1 Site Preparation		**2.35**	**72.24**	**72.44**	**0.30**	**19.22**	**8.08**

Phase 1 Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.036**	**1.6635**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0162	0.5607	0.2325	2.88E-03	0.0986	3.06E-02
	Worker	0.0564	0.0361	0.6124	1.89E-03	0.2072	0.0561
	Total	**0.0725**	**0.5968**	**0.8449**	**4.77E-03**	**0.3058**	**0.0866**
TOTAL		***1.08***	***19.87***	***37.57***	***0.07***	***4.34***	***1.75***
Onsite	**2023 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.036**	**1.6635**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0156	0.5857	0.2399	2.88E-03	0.0986	3.06E-02
	Worker	0.0616	0.0396	0.5705	1.80E-03	0.2072	0.0561
	Total	**0.0772**	**0.6253**	**0.8104**	**4.68E-03**	**0.3058**	**0.0867**
TOTAL		***1.09***	***19.90***	***37.53***	***0.07***	***4.34***	***1.72***

Onsite	**2023**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	1.01	19.27	36.72	0.06	0.10	0.10
	Total	**1.01**	**19.27**	**36.72**	**0.06**	**4.04**	**1.66**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.59	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.61	0.00	0.21	0.06
	Total	**0.08**	**0.63**	**0.84**	**0.00**	**0.31**	**0.09**
TOTAL		***1.09***	***19.90***	***37.57***	***0.07***	***4.34***	***1.75***

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.036**	**1.6635**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0159	0.5591	0.2308	2.83E-03	0.0988	3.07E-02
	Worker	0.053	0.0324	0.5708	1.83E-03	0.2072	0.056
	Total	**0.0689**	**0.5915**	**0.8016**	**4.66E-03**	**0.3059**	**0.0867**
TOTAL		***1.08***	***19.86***	***37.52***	***0.07***	***4.34***	***1.75***
Onsite	**2024 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.036**	**1.6635**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0154	0.5841	0.238	2.83E-03	0.0988	3.07E-02
	Worker	0.0581	0.0356	0.5323	1.74E-03	0.2072	0.056
	Total	**0.0734**	**0.6196**	**0.7704**	**4.57E-03**	**0.3059**	**0.0867**
TOTAL		***1.08***	***19.89***	***37.49***	***0.07***	***4.34***	***1.72***
Onsite	**2024**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	1.01	19.27	36.72	0.06	0.10	0.10
	Total	**1.01**	**19.27**	**36.72**	**0.06**	**4.04**	**1.66**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.57	0.00	0.21	0.06
	Total	**0.07**	**0.62**	**0.80**	**0.00**	**0.31**	**0.09**
TOTAL		***1.08***	***19.89***	***37.52***	***0.07***	***4.34***	***1.75***

Phase 1 Utility Trenching

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2023 Summer**						
	Off-Road	0.5854	5.1948	6.6976	9.88E-03	0.3207	0.295
	Total	**0.5854**	**5.1948**	**6.6976**	**9.88E-03**	**0.3207**	**0.295**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0225	0.0144	0.245	7.50E-04	0.0829	0.0224
	Total	**0.0225**	**0.0144**	**0.245**	**7.50E-04**	**0.0829**	**0.0224**
TOTAL		***0.61***	***5.21***	***6.94***	***0.01***	***0.40***	***0.32***
Onsite	**2023 Winter**						
	Off-Road	0.5854	5.1948	6.6976	9.88E-03	0.3207	0.295
	Total	**0.5854**	**5.1948**	**6.6976**	**9.88E-03**	**0.3207**	**0.295**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0246	0.0158	0.2282	7.20E-04	0.0829	0.0224
	Total	**0.0246**	**0.0158**	**0.2282**	**7.20E-04**	**0.0829**	**0.0224**
TOTAL		***0.61***	***5.21***	***6.93***	***0.01***	***0.40***	***0.32***
Onsite	**2023**						
	Off-Road	0.59	5.19	6.70	0.01	0.32	0.30
	Total	**0.59**	**5.19**	**6.70**	**0.01**	**0.32**	**0.30**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.02	0.25	0.00	0.08	0.02
	Total	**0.02**	**0.02**	**0.25**	**0.00**	**0.08**	**0.02**
TOTAL		***0.61***	***5.21***	***6.94***	***0.01***	***0.40***	***0.32***
2023 P1 Rough Grading & P1 Utility Trenching		**1.70**	**25.11**	**44.51**	**0.08**	**4.75**	**2.07**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
Off-Road		0.5681	4.9375	6.7068	9.89E-03	0.3065	0.282
Total		**0.5681**	**4.9375**	**6.7068**	**9.89E-03**	**0.3065**	**0.282**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0212	0.013	0.2283	7.30E-04	0.0829	0.0224
Total		**0.0212**	**0.013**	**0.2283**	**7.30E-04**	**0.0829**	**0.0224**
TOTAL		***0.59***	***4.95***	***6.94***	***0.01***	***0.39***	***0.30***
Onsite	**2024 Winter**						
Off-Road		0.5681	4.9375	6.7068	9.89E-03	0.3065	0.282
Total		**0.5681**	**4.9375**	**6.7068**	**9.89E-03**	**0.3065**	**0.282**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0232	0.0142	0.2129	7.00E-04	0.0829	0.0224
Total		**0.0232**	**0.0142**	**0.2129**	**7.00E-04**	**0.0829**	**0.0224**
TOTAL		***0.59***	***4.95***	***6.92***	***0.01***	***0.39***	***0.30***

Onsite	**2024**						
	Off-Road	0.57	4.94	6.71	0.01	0.31	0.28
	Total	**0.57**	**4.94**	**6.71**	**0.01**	**0.31**	**0.28**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.23	0.00	0.08	0.02
	Total	**0.02**	**0.01**	**0.23**	**0.00**	**0.08**	**0.02**
TOTAL		***0.59***	***4.95***	***6.94***	***0.01***	***0.39***	***0.30***
2024 P1 Rough Grading & P1 Utility Trenching		**1.68**	**24.84**	**44.46**	**0.08**	**4.73**	**2.05**

Phase 1 Fine Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2024 Summer**						
Fugitive Dust						3.9345	1.562
Off-Road		3.2181	32.377	27.7228	0.0621	1.3354	1.2286
Total		**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.2699**	**2.7906**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0159	0.5591	0.2308	2.83E-03	0.0988	3.07E-02
Worker		0.053	0.0324	0.5708	1.83E-03	0.2072	0.056
Total		**0.0689**	**0.5915**	**0.8016**	**4.66E-03**	**0.3059**	**0.0867**
TOTAL		***3.29***	***32.97***	***28.52***	***0.07***	***5.58***	***2.88***

Onsite		**2024 Winter**					
	Fugitive Dust					3.9345	1.562
	Off-Road	3.2181	32.377	27.7228	0.0621	1.3354	1.2286
	Total	**3.2181**	**32.377**	**27.7228**	**0.0621**	**5.2699**	**2.7906**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0154	0.5841	0.238	2.83E-03	0.0988	3.07E-02
	Worker	0.0581	0.0356	0.5323	1.74E-03	0.2072	0.056
	Total	**0.0734**	**0.6196**	**0.7704**	**4.57E-03**	**0.3059**	**0.0867**
TOTAL		***3.29***	***33.00***	***28.49***	***0.07***	***5.58***	***2.85***
Onsite		**2024**					
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	3.22	32.38	27.72	0.06	1.34	1.23
	Total	**3.22**	**32.38**	**27.72**	**0.06**	**5.27**	**2.79**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.04	0.57	0.00	0.21	0.06
	Total	**0.07**	**0.62**	**0.80**	**0.00**	**0.31**	**0.09**
TOTAL		***3.29***	***33.00***	***28.52***	***0.07***	***5.58***	***2.88***
2024 P1 Rough Grading, P1 Utility Trenching, & P1 Fine Grading		**4.97**	**57.84**	**72.98**	**0.14**	**10.31**	**4.93**
2024 P1 Utility Trenching & P1 Fine Grading		**3.88**	**37.95**	**35.46**	**0.08**	**5.97**	**3.18**

Phase 1 Asphalt Paving

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**					
	Off-Road	0.9882	9.5246	14.6258	0.0228	0.4685	0.431
	Paving	3.02E-02				0	0
	Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**	**0.4685**	**0.431**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0397	0.0243	0.4281	1.37E-03	0.1554	0.042
	Total	**0.0397**	**0.0243**	**0.4281**	**1.37E-03**	**0.1554**	**0.042**
TOTAL		***1.06***	***9.55***	***15.05***	***0.02***	***0.62***	***0.47***
Onsite		**2024 Winter**					
	Off-Road	0.9882	9.5246	14.6258	0.0228	0.4685	0.431
	Paving	3.02E-02				0	0
	Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**	**0.4685**	**0.431**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0436	0.0267	0.3993	1.30E-03	0.1554	0.042
	Total	**0.0436**	**0.0267**	**0.3993**	**1.30E-03**	**0.1554**	**0.042**
TOTAL		***1.06***	***9.55***	***15.03***	***0.02***	***0.62***	***0.47***
Onsite		**2024**					
	Off-Road	0.99	9.52	14.63	0.02	0.47	0.43
	Paving	0.03	0.00	0.00	0.00	0.00	0.00
	Total	**1.02**	**9.52**	**14.63**	**0.02**	**0.47**	**0.43**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.04	0.03	0.43	0.00	0.16	0.04
	Total	**0.04**	**0.03**	**0.43**	**0.00**	**0.16**	**0.04**
TOTAL		***1.06***	***9.55***	***15.05***	***0.02***	***0.62***	***0.47***
2024 P1 Fine Grading & P1 Asphalt Paving		**4.35**	**42.55**	**43.58**	**0.09**	**6.20**	**3.35**

Phase 1 Finishing/Landscaping

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Off-Road		0.1433	1.4424	2.2265	3.10E-03	0.0662	0.0609
	Total		**0.1433**	**1.4424**	**2.2265**	**3.10E-03**	**0.0662**	**0.0609**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		7.95E-03	4.86E-03	0.0856	2.70E-04	0.0311	8.40E-03
	Total		**7.95E-03**	**4.86E-03**	**0.0856**	**2.70E-04**	**0.0311**	**8.40E-03**
TOTAL			***0.15***	***1.45***	***2.31***	***0.00***	***0.10***	***0.07***
Onsite		**2024 Winter**						
	Off-Road		0.1433	1.4424	2.2265	3.10E-03	0.0662	0.0609
	Total		**0.1433**	**1.4424**	**2.2265**	**3.10E-03**	**0.0662**	**0.0609**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		8.71E-03	5.33E-03	0.0799	2.60E-04	0.0311	8.40E-03
	Total		**8.71E-03**	**5.33E-03**	**0.0799**	**2.60E-04**	**0.0311**	**8.40E-03**
TOTAL			***0.15***	***1.45***	***2.31***	***0.00***	***0.10***	***0.07***

Onsite		**2024**						
	Off-Road		0.14	1.44	2.23	0.00	0.07	0.06
	Total		**0.14**	**1.44**	**2.23**	**0.00**	**0.07**	**0.06**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.01	0.01	0.09	0.00	0.03	0.01
	Total		**0.01**	**0.01**	**0.09**	**0.00**	**0.03**	**0.01**
TOTAL			***0.15***	***1.45***	***2.31***	***0.00***	***0.10***	***0.07***
2024 P1 Fine Grading, P1 Asphalt Paving, & P1 Finish/Landscape			**4.51**	**44.00**	**45.89**	**0.09**	**6.30**	**3.42**

Phase 1 Building Construction

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Off-Road		0.5335	10.9122	17.8738	0.027	0.0846	0.0846
	Total		**0.5335**	**10.9122**	**17.8738**	**0.027**	**0.0846**	**0.0846**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0.0597	2.0966	0.8654	1.06E-02	0.3703	0.1152
	Worker		0.6251	0.3822	6.7356	0.0216	2.4444	0.6607
	Total		**0.6848**	**2.4788**	**7.601**	**0.0322**	**2.8147**	**0.7759**
TOTAL			***1.22***	***13.39***	***25.47***	***0.06***	***2.90***	***0.86***

Onsite		**2024 Winter**					
	Off-Road	0.5335	10.9122	17.8738	0.027	0.0846	0.0846
	Total	**0.5335**	**10.9122**	**17.8738**	**0.027**	**0.0846**	**0.0846**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0576	2.1903	0.8926	1.06E-02	0.3704	0.1152
	Worker	0.6855	0.4196	6.2816	0.0205	2.4444	0.6607
	Total	**0.7431**	**2.6099**	**7.1742**	**0.0311**	**2.8147**	**0.776**
TOTAL		***1.28***	***13.52***	***25.05***	***0.06***	***2.90***	***0.86***
Onsite		**2024**					
	Off-Road	0.53	10.91	17.87	0.03	0.08	0.08
	Total	**0.53**	**10.91**	**17.87**	**0.03**	**0.08**	**0.08**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.06	2.19	0.89	0.01	0.37	0.12
	Worker	0.69	0.42	6.74	0.02	2.44	0.66
	Total	**0.74**	**2.61**	**7.60**	**0.03**	**2.81**	**0.78**
TOTAL		***1.28***	***13.52***	***25.47***	***0.06***	***2.90***	***0.86***
2024 P1 Asphalt Paving, P1 Finish/Landscape, & P1 Building		**2.49**	**24.52**	**42.84**	**0.09**	**3.62**	**1.40**
2024 P1 Finish/Landscape & P1 Building		**1.43**	**14.97**	**27.79**	**0.06**	**3.00**	**0.93**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**					
	Off-Road	0.5335	10.9122	17.8738	0.027	0.0846	0.0846
	Total	**0.5335**	**10.9122**	**17.8738**	**0.027**	**0.0846**	**0.0846**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0588	2.0863	0.8619	1.04E-02	0.3704	0.1152
	Worker	0.5904	0.3464	6.336	0.0208	2.4438	0.6602
	Total	**0.6492**	**2.4327**	**7.1978**	**0.0312**	**2.8142**	**0.7755**
TOTAL		***1.18***	***13.34***	***25.07***	***0.06***	***2.90***	***0.86***
Onsite		**2025 Winter**					
	Off-Road	0.5335	10.9122	17.8738	0.027	0.0846	0.0846
	Total	**0.5335**	**10.9122**	**17.8738**	**0.027**	**0.0846**	**0.0846**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0567	2.1797	0.8885	1.04E-02	0.3704	0.1153
	Worker	0.6493	0.3802	5.9128	0.0198	2.4438	0.6602
	Total	**0.706**	**2.5599**	**6.8013**	**0.0302**	**2.8142**	**0.7755**
TOTAL		***1.24***	***13.47***	***24.68***	***0.06***	***2.90***	***0.86***
Onsite		**2025**					
	Off-Road	0.53	10.91	17.87	0.03	0.08	0.08
	Total	**0.53**	**10.91**	**17.87**	**0.03**	**0.08**	**0.08**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.06	2.18	0.89	0.01	0.37	0.12
	Worker	0.65	0.38	6.34	0.02	2.44	0.66
	Total	**0.71**	**2.56**	**7.20**	**0.03**	**2.81**	**0.78**
TOTAL		***1.24***	***13.47***	***25.07***	***0.06***	***2.90***	***0.86***

Phase 1 Architectural Coating

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**						
	Archit. Coating		36.3648				0	0
	Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total		**36.5357**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.1176	0.069	1.2618	4.15E-03	0.4867	0.1315
	Total		**0.1176**	**0.069**	**1.2618**	**4.15E-03**	**0.4867**	**0.1315**
TOTAL			***36.65***	***1.21***	***3.07***	***0.01***	***0.54***	***0.18***
Onsite		**2025 Winter**						
	Archit. Coating		36.3648				0	0
	Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
	Total		**36.5357**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.1293	0.0757	1.1776	3.95E-03	0.4867	0.1315
	Total		**0.1293**	**0.0757**	**1.1776**	**3.95E-03**	**0.4867**	**0.1315**
TOTAL			***36.67***	***1.22***	***2.99***	***0.01***	***0.54***	***0.18***
Onsite		**2025**						
	Archit. Coating		36.36	0.00	0.00	0.00	0.00	0.00
	Off-Road		0.17	1.15	1.81	0.00	0.05	0.05
	Total		**36.54**	**1.15**	**1.81**	**0.00**	**0.05**	**0.05**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.13	0.08	1.26	0.00	0.49	0.13
	Total		**0.13**	**0.08**	**1.26**	**0.00**	**0.49**	**0.13**
TOTAL			***36.67***	***1.22***	***3.07***	***0.01***	***0.54***	***0.18***

Eastern Remediation Site Preparation

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Fugitive Dust						8.4034	4.3188
	Off-Road		0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total		**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0.0318	1.1182	0.4615	5.65E-03	0.1975	6.14E-02
	Worker		0.0477	0.0292	0.5137	1.64E-03	0.1864	0.0504
	Total		**0.0795**	**1.1473**	**0.9753**	**7.29E-03**	**0.3839**	**0.1118**
TOTAL			***0.78***	***13.31***	***23.94***	***0.05***	***8.85***	***4.49***
Onsite		**2024 Winter**						
	Fugitive Dust						8.4034	4.3188
	Off-Road		0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total		**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0.0307	1.1681	0.4761	5.66E-03	0.1975	6.15E-02
	Worker		0.0523	0.032	0.4791	1.57E-03	0.1864	0.0504
	Total		**0.083**	**1.2002**	**0.9552**	**7.23E-03**	**0.384**	**0.1119**
TOTAL			***0.78***	***13.36***	***23.92***	***0.05***	***8.85***	***4.43***

Onsite		**2024**						
	Fugitive Dust		0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road		0.70	12.16	22.96	0.04	0.06	0.06
	Total		**0.70**	**12.16**	**22.96**	**0.04**	**8.47**	**4.38**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.03	1.17	0.48	0.01	0.20	0.06
	Worker		0.05	0.03	0.51	0.00	0.19	0.05
	Total		**0.08**	**1.20**	**0.98**	**0.01**	**0.38**	**0.11**
TOTAL			***0.78***	***13.36***	***23.94***	***0.05***	***8.85***	***4.49***

Eastern Remediation Rough Grading

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Fugitive Dust						3.9843	1.5695
	Off-Road		1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total		**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.0858**	**1.671**
Offsite								
	Hauling[1]		0.4660764	36.1350456	10.915236	0.1828764	5.8157244	1.7886912
	Vendor		0.0159	0.5591	0.2308	2.83E-03	0.0988	3.07E-02
	Worker		0.053	0.0324	0.5708	1.83E-03	0.2072	0.056
	Total		**0.5349764**	**36.7265456**	**11.716836**	**1.88E-01**	**6.1217244**	**1.8753912**
TOTAL			***1.55***	***56.00***	***48.44***	***0.25***	***10.21***	***3.55***
Onsite		**2024 Winter**						
	Fugitive Dust						3.9843	1.5695
	Off-Road		1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total		**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.0858**	**1.671**
Offsite								
	Hauling[1]		0.45489	37.5581256	10.9479456	0.1828764	5.815866	1.7888328
	Vendor		0.0154	0.5841	0.238	2.83E-03	0.0988	3.07E-02
	Worker		0.0581	0.0356	0.5323	1.74E-03	0.2072	0.056
	Total		**0.52839**	**38.1778256**	**11.7182456**	**1.87E-01**	**6.121866**	**1.8755328**
TOTAL			***1.54***	***57.45***	***48.44***	***0.25***	***10.21***	***1.73***

Onsite		**2024**						
	Fugitive Dust		0.00	0.00	0.00	0.00	3.98	1.57
	Off-Road		1.01	19.27	36.72	0.06	0.10	0.10
	Total		**1.01**	**19.27**	**36.72**	**0.06**	**4.09**	**1.67**
Offsite								
	Hauling		0.47	37.56	10.95	0.18	5.82	1.79
	Vendor		0.02	0.58	0.24	0.00	0.10	0.03
	Worker		0.06	0.04	0.57	0.00	0.21	0.06
	Total		**0.53**	**38.18**	**11.72**	**0.19**	**6.12**	**1.88**
TOTAL			***1.55***	***57.45***	***48.44***	***0.25***	***10.21***	***3.55***

[1] Proportioned based on the segment of the haul route within the South Coast Air Basin compared to the total haul route between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.

Phase 2 Site Preparation

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2024 Summer**						
	Fugitive Dust						8.4034	4.3188
	Off-Road		0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total		**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.96E-03	0.2795	0.1154	1.41E-03	0.0494	1.54E-02
	Worker	0.0477	0.0292	0.5137	1.64E-03	0.1864	0.0504
	Total	**0.0556**	**0.3087**	**0.6291**	**3.05E-03**	**0.2358**	**0.0658**
TOTAL		***0.75***	***12.47***	***23.59***	***0.04***	***8.70***	***4.45***
Onsite		**2024 Winter**					
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.68E-03	0.292	0.119	1.42E-03	0.0494	1.54E-02
	Worker	0.0523	0.032	0.4791	1.57E-03	0.1864	0.0504
	Total	**0.06**	**0.324**	**0.5981**	**2.99E-03**	**0.2358**	**0.0658**
TOTAL		***0.76***	***12.49***	***23.56***	***0.04***	***8.70***	***4.43***
Onsite		**2024**					
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	0.70	12.16	22.96	0.04	0.06	0.06
	Total	**0.70**	**12.16**	**22.96**	**0.04**	**8.47**	**4.38**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.05	0.03	0.51	0.00	0.19	0.05
	Total	**0.06**	**0.32**	**0.63**	**0.00**	**0.24**	**0.07**
TOTAL		***0.76***	***12.49***	***23.59***	***0.04***	***8.70***	***4.45***
2024 P1 Building Construction, P2 Site Preparation, & East Remediation Site Preparation		**2.81**	**39.37**	**73.00**	**0.15**	**20.45**	**9.80**
2024 P1 Building Construction, P2 Site Preparation, & East Remediation Grading		**3.58**	**83.46**	**97.50**	**0.35**	**21.81**	**8.85**
2024 P1 Building Construction & P2 Site Preparation		**2.03**	**26.01**	**49.06**	**0.10**	**11.60**	**5.31**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**					
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.84E-03	0.2782	0.1149	1.38E-03	0.0494	1.54E-02
	Worker	0.045	0.0264	0.4833	1.59E-03	0.1864	0.0504
	Total	**0.0529**	**0.3046**	**0.5982**	**2.97E-03**	**0.2358**	**0.0657**
TOTAL		***0.75***	***12.47***	***23.56***	***0.04***	***8.70***	***4.45***
Onsite		**2025 Winter**					
	Fugitive Dust					8.4034	4.3188
	Off-Road	0.6967	12.162	22.96	0.0381	0.0621	0.0621
	Total	**0.6967**	**12.162**	**22.96**	**0.0381**	**8.4655**	**4.3809**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.56E-03	0.2906	0.1185	1.39E-03	0.0494	1.54E-02
	Worker	0.0495	0.029	0.451	1.51E-03	0.1864	0.0504
	Total	**0.0571**	**0.3196**	**0.5695**	**2.90E-03**	**0.2358**	**0.0657**
TOTAL		***0.75***	***12.48***	***23.53***	***0.04***	***8.70***	***4.43***
Onsite	**2025**						
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	0.70	12.16	22.96	0.04	0.06	0.06
	Total	**0.70**	**12.16**	**22.96**	**0.04**	**8.47**	**4.38**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.05	0.03	0.48	0.00	0.19	0.05
	Total	**0.06**	**0.32**	**0.60**	**0.00**	**0.24**	**0.07**
TOTAL		***0.75***	***12.48***	***23.56***	***0.04***	***8.70***	***4.45***
2025 P1 Building Construction & P2 Site Preparation		**1.99**	**25.95**	**48.63**	**0.10**	**11.60**	**5.31**

Phase 2 Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.0361**	**1.6635**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0157	0.5563	0.2298	2.77E-03	0.0988	3.07E-02
	Worker	0.05	0.0294	0.5369	1.76E-03	0.2071	0.056
	Total	**0.0657**	**0.5857**	**0.7668**	**4.53E-03**	**0.3059**	**0.0867**
TOTAL		***1.08***	***19.86***	***37.49***	***0.07***	***4.34***	***1.75***
Onsite	**2025 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	1.011	19.2707	36.7226	0.0621	0.1015	0.1015
	Total	**1.011**	**19.2707**	**36.7226**	**0.0621**	**4.0361**	**1.6635**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0151	0.5813	0.2369	2.77E-03	0.0988	3.07E-02
	Worker	0.055	0.0322	0.5011	1.68E-03	0.2071	0.056
	Total	**0.0702**	**0.6135**	**0.738**	**4.45E-03**	**0.3059**	**0.0867**
TOTAL		***1.08***	***19.88***	***37.46***	***0.07***	***4.34***	***1.72***
Onsite	**2025**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	1.01	19.27	36.72	0.06	0.10	0.10
	Total	**1.01**	**19.27**	**36.72**	**0.06**	**4.04**	**1.66**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.06	0.03	0.54	0.00	0.21	0.06
	Total	**0.07**	**0.61**	**0.77**	**0.00**	**0.31**	**0.09**
TOTAL		***1.08***	***19.88***	***37.49***	***0.07***	***4.34***	***1.75***
2025 P1 Building Construction & P2 Rough Grading		**2.36**	**33.41**	**62.96**	**0.13**	**7.24**	**2.61**

2025 P1 Building Construction, P1 Architectural Coating, & P2 Rough Grading		**39.02**	**34.63**	**66.04**	**0.13**	**7.78**	**2.79**

Phase 2 Utility Trenching

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
Off-Road		0.6515	5.4135	9.1328	0.0138	0.3174	0.292
Total		**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.02	0.0117	0.2148	7.10E-04	0.0828	0.0224
Total		**0.02**	**0.0117**	**0.2148**	**7.10E-04**	**0.0828**	**0.0224**
TOTAL		***0.67***	***5.43***	***9.35***	***0.01***	***0.40***	***0.31***
Onsite	**2025 Winter**						
Off-Road		0.6515	5.4135	9.1328	0.0138	0.3174	0.292
Total		**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.022	0.0129	0.2004	6.70E-04	0.0828	0.0224
Total		**0.022**	**0.0129**	**0.2004**	**6.70E-04**	**0.0828**	**0.0224**
TOTAL		***0.67***	***5.43***	***9.33***	***0.01***	***0.40***	***0.31***
Onsite	**2025**						
Off-Road		0.65	5.41	9.13	0.01	0.32	0.29
Total		**0.65**	**5.41**	**9.13**	**0.01**	**0.32**	**0.29**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.02	0.01	0.21	0.00	0.08	0.02
Total		**0.02**	**0.01**	**0.21**	**0.00**	**0.08**	**0.02**
TOTAL		***0.67***	***5.43***	***9.35***	***0.01***	***0.40***	***0.31***

2025 P1 Building Construction, P2 Rough Grading, P1 Architectural Coating, & P2 Utility Trenching		**39.70**	**40.05**	**75.38**	**0.15**	**8.18**	**3.11**
2025 P2 Rough Grading & P2 Utility Trenching		**1.75**	**25.31**	**46.84**	**0.08**	**4.74**	**2.06**

Phase 2 Fine Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
Fugitive Dust						3.9345	1.562
Off-Road		2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
Total		**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0157	0.5563	0.2298	2.77E-03	0.0988	3.07E-02
Worker		0.05	0.0294	0.5369	1.76E-03	0.2071	0.056
Total		**0.0657**	**0.5857**	**0.7668**	**4.53E-03**	**0.3059**	**0.0867**
TOTAL		***2.97***	***28.53***	***27.10***	***0.07***	***5.37***	***2.69***
Onsite	**2025 Winter**						
Fugitive Dust						3.9345	1.562
Off-Road		2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
Total		**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**

Offsite							
	Hauling		0	0	0	0	0	0
	Vendor		0.0151	0.5813	0.2369	2.77E-03	0.0988	3.07E-02
	Worker		0.055	0.0322	0.5011	1.68E-03	0.2071	0.056
	Total		**0.0702**	**0.6135**	**0.738**	**4.45E-03**	**0.3059**	**0.0867**
TOTAL			***2.97***	***28.56***	***27.07***	***0.07***	***5.37***	***2.66***
Onsite		**2025**						
	Fugitive Dust		0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road		2.90	27.94	26.33	0.06	1.13	1.04
	Total		**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.02	0.58	0.24	0.00	0.10	0.03
	Worker		0.06	0.03	0.54	0.00	0.21	0.06
	Total		**0.07**	**0.61**	**0.77**	**0.00**	**0.31**	**0.09**
TOTAL			***2.97***	***28.56***	***27.10***	***0.07***	***5.37***	***2.69***
2025 P2 Rough Grading, P2 Trenching & P2 Fine Grading			**4.73**	**53.87**	**73.93**	**0.15**	**10.11**	**4.75**
2025 P2 Trenching & P2 Fine Grading			**3.64**	**33.98**	**36.45**	**0.08**	**5.77**	**3.00**

Phase 2 Asphalt Paving

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**						
	Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving		0.0445				0	0
	Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0375	0.022	0.4027	1.32E-03	0.1553	0.042
	Total		**0.0375**	**0.022**	**0.4027**	**1.32E-03**	**0.1553**	**0.042**
TOTAL			***1.00***	***8.60***	***14.98***	***0.02***	***0.57***	***0.43***
Onsite		**2025 Winter**						
	Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving		0.0445				0	0
	Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0413	0.0242	0.3758	1.26E-03	0.1553	0.042
	Total		**0.0413**	**0.0242**	**0.3758**	**1.26E-03**	**0.1553**	**0.042**
TOTAL			***1.00***	***8.61***	***14.95***	***0.02***	***0.57***	***0.43***
Onsite		**2025**						
	Off-Road		0.92	8.58	14.58	0.02	0.42	0.39
	Paving		0.04	0.00	0.00	0.00	0.00	0.00
	Total		**0.96**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.04	0.02	0.40	0.00	0.16	0.04
	Total		**0.04**	**0.02**	**0.40**	**0.00**	**0.16**	**0.04**
TOTAL			***1.00***	***8.61***	***14.98***	***0.02***	***0.57***	***0.43***

2025 P2 Fine Grading & P2 Asphalt Paving		**3.97**	**37.16**	**42.08**	**0.09**	**5.95**	**3.12**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2026 Summer**						
Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
Paving		0.0445				0	0
Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0356	0.0202	0.3814	1.28E-03	0.1553	0.0419
Total		**0.0356**	**0.0202**	**0.3814**	**1.28E-03**	**0.1553**	**0.0419**
TOTAL		***1.00***	***8.60***	***14.96***	***0.02***	***0.57***	***0.43***
Onsite	**2026 Winter**						
Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
Paving		0.0445				0	0
Total		**0.9597**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0393	0.0221	0.3561	1.22E-03	0.1553	0.0419
Total		**0.0393**	**0.0221**	**0.3561**	**1.22E-03**	**0.1553**	**0.0419**
TOTAL		***1.00***	***8.60***	***14.93***	***0.02***	***0.57***	***0.43***
Onsite	**2026**						
Off-Road		0.92	8.58	14.58	0.02	0.42	0.39
Paving		0.04	0.00	0.00	0.00	0.00	0.00
Total		**0.96**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.04	0.02	0.38	0.00	0.16	0.04
Total		**0.04**	**0.02**	**0.38**	**0.00**	**0.16**	**0.04**
TOTAL		***1.00***	***8.60***	***14.96***	***0.02***	***0.57***	***0.43***

Phase 2 Finishing/Landscaping							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2025 Summer**						
Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		7.50E-03	4.40E-03	0.0805	2.60E-04	0.0311	8.39E-03
Total		**7.50E-03**	**4.40E-03**	**0.0805**	**2.60E-04**	**0.0311**	**8.39E-03**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***
Onsite	**2025 Winter**						
Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		8.25E-03	4.83E-03	0.0752	2.50E-04	0.0311	8.39E-03
Total		**8.25E-03**	**4.83E-03**	**0.0752**	**2.50E-04**	**0.0311**	**8.39E-03**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***

Onsite		**2025**					
	Off-Road	0.13	1.33	2.22	0.00	0.05	0.05
	Total	**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.01	0.00	0.08	0.00	0.03	0.01
	Total	**0.01**	**0.00**	**0.08**	**0.00**	**0.03**	**0.01**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***
2025 P2 Fine Grading, P2 Asphalt Paving, & P2 Finish/Landscape		**4.11**	**38.50**	**44.38**	**0.09**	**6.03**	**3.17**
2025 P2 Asphalt Paving, & P2 Finish/Landscape		**1.14**	**9.94**	**17.28**	**0.03**	**0.66**	**0.48**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2026 Summer**					
	Off-Road	0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total	**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	7.12E-03	4.03E-03	0.0763	2.60E-04	0.0311	8.39E-03
	Total	**7.12E-03**	**4.03E-03**	**0.0763**	**2.60E-04**	**0.0311**	**8.39E-03**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***
Onsite		**2026 Winter**					
	Off-Road	0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total	**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	7.85E-03	4.42E-03	0.0712	2.40E-04	0.0311	8.39E-03
	Total	**7.85E-03**	**4.42E-03**	**0.0712**	**2.40E-04**	**0.0311**	**8.39E-03**
TOTAL		***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***

Onsite		**2026**					
	Off-Road	0.13	1.33	2.22	0.00	0.05	0.05
	Total	**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.01	0.00	0.08	0.00	0.03	0.01
	Total	**0.01**	**0.00**	**0.08**	**0.00**	**0.03**	**0.01**
TOTAL		***0.14***	***1.33***	***2.30***	***0.00***	***0.09***	***0.06***

Phase 2 Building Construction

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2025 Summer**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1725	6.1197	2.5282	0.0305	1.0864	0.338
	Worker	1.7136	1.0055	18.3904	0.0604	7.0933	1.9164
	Total	**1.8861**	**7.1252**	**20.9186**	**0.0909**	**8.1797**	**2.2544**
TOTAL		***3.25***	***19.59***	***37.00***	***0.12***	***8.71***	***2.75***

Onsite		**2025 Winter**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1663	6.3938	2.6063	0.0305	1.0866	0.3382
	Worker	1.8847	1.1037	17.1622	0.0576	7.0933	1.9164
	Total	**2.051**	**7.4974**	**19.7685**	**0.0881**	**8.1799**	**2.2545**
TOTAL		***3.42***	***19.97***	***35.85***	***0.12***	***8.71***	***2.75***
Onsite		**2025**					
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.17	6.39	2.61	0.03	1.09	0.34
	Worker	1.88	1.10	18.39	0.06	7.09	1.92
	Total	**2.05**	**7.50**	**20.92**	**0.09**	**8.18**	**2.25**
TOTAL		***3.42***	***19.97***	***37.00***	***0.12***	***8.71***	***2.75***
2025 P2 Asphalt Paving, P2 Finishing/Landscaping, & P2 Building Construction		**4.56**	**29.91**	**54.29**	**0.15**	**9.37**	**3.24**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2026 Summer**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.17	6.0757	2.5201	0.0298	1.0864	0.338
	Worker	1.6255	0.9205	17.4164	0.0586	7.0916	1.9148
	Total	**1.7954**	**6.9962**	**19.9365**	**0.0884**	**8.178**	**2.2528**
TOTAL		***3.16***	***19.47***	***36.02***	***0.12***	***8.71***	***2.75***
Onsite		**2026 Winter**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.1637	6.3486	2.5966	0.0299	1.0865	0.3381
	Worker	1.7932	1.0101	16.2603	0.0558	7.0916	1.9148
	Total	**1.9569**	**7.3587**	**18.8569**	**0.0857**	**8.1781**	**2.253**
TOTAL		***3.32***	***19.83***	***34.94***	***0.11***	***8.71***	***2.75***
Onsite		**2026**					
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.17	6.35	2.60	0.03	1.09	0.34
	Worker	1.79	1.01	17.42	0.06	7.09	1.91
	Total	**1.96**	**7.36**	**19.94**	**0.09**	**8.18**	**2.25**
TOTAL		***3.32***	***19.83***	***36.02***	***0.12***	***8.71***	***2.75***
2026 P2 Asphalt Paving, P2 Finishing/Landscaping, & P2 Building Construction		**4.46**	**29.77**	**53.28**	**0.14**	**9.36**	**3.23**
2026 P2 Finish/Landscape & P2 Building		**3.46**	**21.16**	**38.32**	**0.12**	**8.79**	**2.81**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
Off-Road		1.3674	12.4697	16.0847	0.027	0.5276	0.4963
Total		**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.1677	6.0304	2.5125	0.0292	1.0863	0.3379
Worker		1.5441	0.849	16.5928	0.0569	7.0896	1.913
Total		**1.7117**	**6.8794**	**19.1054**	**0.0861**	**8.1759**	**2.2509**
TOTAL		***3.08***	***19.35***	***35.19***	***0.11***	***8.70***	***2.75***
Onsite	**2027 Winter**						
Off-Road		1.3674	12.4697	16.0847	0.027	0.5276	0.4963
Total		**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.1614	6.302	2.5874	0.0292	1.0864	0.338
Worker		1.7079	0.9315	15.4967	0.0542	7.0896	1.913
Total		**1.8692**	**7.2335**	**18.0841**	**0.0834**	**8.1761**	**2.2511**
TOTAL		***3.24***	***19.70***	***34.17***	***0.11***	***8.70***	***2.75***
Onsite	**2027**						
Off-Road		1.37	12.47	16.08	0.03	0.53	0.50
Total		**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.17	6.30	2.59	0.03	1.09	0.34
Worker		1.71	0.93	16.59	0.06	7.09	1.91
Total		**1.87**	**7.23**	**19.11**	**0.09**	**8.18**	**2.25**
TOTAL		***3.24***	***19.70***	***35.19***	***0.11***	***8.70***	***2.75***

Phase 2 Architectural Coating

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
Archit. Coating		30.8767				0	0
Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
Total		**31.0475**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.3088	0.1698	3.3186	1.14E-02	1.4179	0.3826
Total		**0.3088**	**0.1698**	**3.3186**	**1.14E-02**	**1.4179**	**0.3826**
TOTAL		***31.36***	***1.32***	***5.13***	***0.01***	***1.47***	***0.43***
Onsite	**2027 Winter**						
Archit. Coating		30.8767				0	0
Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
Total		**31.0475**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.3416	0.1863	3.0993	1.08E-02	1.4179	0.3826
Total		**0.3416**	**0.1863**	**3.0993**	**1.08E-02**	**1.4179**	**0.3826**
TOTAL		***31.39***	***1.33***	***4.91***	***0.01***	***1.47***	***0.43***

Onsite		**2027**					
	Archit. Coating	30.88	0.00	0.00	0.00	0.00	0.00
	Off-Road	0.17	1.15	1.81	0.00	0.05	0.05
	Total	**31.05**	**1.15**	**1.81**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.34	0.19	3.32	0.01	1.42	0.38
	Total	**0.34**	**0.19**	**3.32**	**0.01**	**1.42**	**0.38**
TOTAL		***31.39***	***1.33***	***5.13***	***0.01***	***1.47***	***0.43***

Phase 3 Site Preparation

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2026 Summer**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.4727	25.2339	17.9118	0.0381	1.0868	0.9999
	Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**9.4902**	**5.3187**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.73E-03	0.2762	0.1146	1.36E-03	0.0494	1.54E-02
	Worker	0.0427	0.0242	0.4577	1.54E-03	0.1864	0.0503
	Total	**0.0504**	**0.3004**	**0.5722**	**2.90E-03**	**0.2357**	**0.0657**
TOTAL		***2.52***	***25.53***	***18.48***	***0.04***	***9.73***	***5.38***
Onsite	**2026 Winter**						
	Fugitive Dust					8.4034	4.3188
	Off-Road	2.4727	25.2339	17.9118	0.0381	1.0868	0.9999
	Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**9.4902**	**5.3187**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	7.44E-03	0.2886	0.118	1.36E-03	0.0494	1.54E-02
	Worker	0.0471	0.0265	0.4273	1.47E-03	0.1864	0.0503
	Total	**0.0546**	**0.3151**	**0.5453**	**2.83E-03**	**0.2357**	**0.0657**
TOTAL		***2.53***	***25.55***	***18.46***	***0.04***	***9.73***	***5.37***

Onsite		**2026**					
	Fugitive Dust	0.00	0.00	0.00	0.00	8.40	4.32
	Off-Road	2.47	25.23	17.91	0.04	1.09	1.00
	Total	**2.47**	**25.23**	**17.91**	**0.04**	**9.49**	**5.32**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.29	0.12	0.00	0.05	0.02
	Worker	0.05	0.03	0.46	0.00	0.19	0.05
	Total	**0.05**	**0.32**	**0.57**	**0.00**	**0.24**	**0.07**
TOTAL		***2.53***	***25.55***	***18.48***	***0.04***	***9.73***	***5.38***

2026 P2 Building & P3 Site Preparation		**5.85**	**45.38**	**54.51**	**0.16**	**18.43**	**8.13**

Phase 3 Rough Grading

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2026 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0155	0.5523	0.2291	2.71E-03	0.0988	3.07E-02
	Worker	0.0475	0.0269	0.5085	1.71E-03	0.2071	0.0559
	Total	**0.0629**	**0.5792**	**0.7376**	**4.42E-03**	**0.3058**	**0.0866**
TOTAL		***2.96***	***28.52***	***27.07***	***0.07***	***5.37***	***2.69***
Onsite		**2026 Winter**					
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0149	0.5772	0.2361	2.72E-03	0.0988	3.07E-02
	Worker	0.0524	0.0295	0.4748	1.63E-03	0.2071	0.0559
	Total	**0.0673**	**0.6066**	**0.7108**	**4.35E-03**	**0.3058**	**0.0867**
TOTAL		***2.97***	***28.55***	***27.04***	***0.07***	***5.37***	***2.66***
Onsite		**2026**					
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.58	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.51	0.00	0.21	0.06
	Total	**0.07**	**0.61**	**0.74**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.55***	***27.07***	***0.07***	***5.37***	***2.69***
2026 P2 Building & P3 Rough Grading		**6.29**	**48.38**	**63.09**	**0.18**	**14.08**	**5.44**

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2027 Summer**						
	Fugitive Dust						3.9345	1.562
	Off-Road		2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total		**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0.0152	0.5482	0.2284	2.65E-03	0.0988	3.07E-02
	Worker		0.0451	0.0248	0.4845	1.66E-03	0.207	0.0559
	Total		**0.0603**	**0.573**	**0.7129**	**4.31E-03**	**0.3058**	**0.0866**
TOTAL			***2.96***	***28.52***	***27.04***	***0.07***	***5.37***	***2.69***
Onsite		**2027 Winter**						
	Fugitive Dust						3.9345	1.562
	Off-Road		2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total		**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0.0147	0.5729	0.2352	2.66E-03	0.0988	3.07E-02
	Worker		0.0499	0.0272	0.4525	1.58E-03	0.207	0.0559
	Total		**0.0645**	**0.6001**	**0.6877**	**4.24E-03**	**0.3058**	**0.0866**
TOTAL			***2.97***	***28.54***	***27.02***	***0.07***	***5.37***	***2.66***
Onsite		**2027**						
	Fugitive Dust		0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road		2.90	27.94	26.33	0.06	1.13	1.04
	Total		**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**

Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.57	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.48	0.00	0.21	0.06
	Total	**0.06**	**0.60**	**0.71**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.54***	***27.04***	***0.07***	***5.37***	***2.69***
2027 P2 Building & P3 Rough Grading		**6.20**	**48.25**	**62.23**	**0.18**	**14.07**	**5.44**
2027 P2 Building Construction, P3 Rough Grading, & P2 Architectural Coating		**37.59**	**49.58**	**67.36**	**0.19**	**15.54**	**5.87**
Phase 3 Utility Trenching							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
	Off-Road	0.6515	5.4135	9.1328	0.0138	0.3174	0.292
	Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.018	9.92E-03	0.1938	6.60E-04	0.0828	0.0223
	Total	**0.018**	**9.92E-03**	**0.1938**	**6.60E-04**	**0.0828**	**0.0223**
TOTAL		***0.67***	***5.42***	***9.33***	***0.01***	***0.40***	***0.31***
Onsite	**2027 Winter**						
	Off-Road	0.6515	5.4135	9.1328	0.0138	0.3174	0.292
	Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**	**0.3174**	**0.292**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.02	0.0109	0.181	6.30E-04	0.0828	0.0223
	Total	**0.02**	**0.0109**	**0.181**	**6.30E-04**	**0.0828**	**0.0223**
TOTAL		***0.67***	***5.42***	***9.31***	***0.01***	***0.40***	***0.31***
Onsite	**2027**						
	Off-Road	0.65	5.41	9.13	0.01	0.32	0.29
	Total	**0.65**	**5.41**	**9.13**	**0.01**	**0.32**	**0.29**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.19	0.00	0.08	0.02
	Total	**0.02**	**0.01**	**0.19**	**0.00**	**0.08**	**0.02**
TOTAL		***0.67***	***5.42***	***9.33***	***0.01***	***0.40***	***0.31***
2027 P2 Building Construction, P3 Rough Grading, P2 Architectural Coating, & P3 Utility Trenching		**38.26**	**55.00**	**76.69**	**0.21**	**15.94**	**6.18**
Phase 3 Fine Grading							
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2027 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	1.52E-02	0.5482	0.2284	2.65E-03	0.0988	3.07E-02
	Worker	0.0451	0.0248	0.4845	1.66E-03	0.207	0.0559
	Total	**0.0603**	**0.573**	**0.7129**	**4.31E-03**	**0.3058**	**0.0866**
TOTAL		***2.96***	***28.52***	***27.04***	***0.07***	***5.37***	***2.69***
Onsite	**2027 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	1.47E-02	0.5729	0.2352	2.66E-03	0.0988	3.07E-02
	Worker	0.0499	0.0272	0.4525	1.58E-03	0.207	0.0559
	Total	**0.0645**	**0.6001**	**0.6877**	**4.24E-03**	**0.3058**	**0.0866**
TOTAL		***2.97***	***28.54***	***27.02***	***0.07***	***5.37***	***2.66***
Onsite	**2027**						
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.57	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.48	0.00	0.21	0.06
	Total	**0.06**	**0.60**	**0.71**	**0.00**	**0.31**	**0.09**
TOTAL		***2.97***	***28.54***	***27.04***	***0.07***	***5.37***	***2.69***
2027 P2 Building Construction, P3 Rough Grading, P2 Architectural Coating, P3 Utility Trenching, & P3 Fine Grading		**41.23**	**83.55**	**103.73**	**0.27**	**21.32**	**8.87**
2027 P3 Rough Grading, P3 Utility Trenching, & P3 Fine Grading		**6.60**	**62.51**	**63.41**	**0.15**	**11.14**	**5.69**
2027 P3 Utility Trenching & P3 Fine Grading		**3.64**	**33.97**	**36.37**	**0.08**	**5.77**	**3.00**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2028 Summer**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	1.51E-02	0.5445	0.2283	2.59E-03	0.0987	3.07E-02
	Worker	0.0429	0.023	0.4643	1.62E-03	0.2069	0.0558
	Total	**0.0579**	**0.5675**	**0.6926**	**4.21E-03**	**0.3057**	**0.0865**
TOTAL		***2.96***	***28.51***	***27.02***	***0.07***	***5.37***	***2.69***
Onsite	**2028 Winter**						
	Fugitive Dust					3.9345	1.562
	Off-Road	2.9012	27.9429	26.3311	0.0621	1.1309	1.0404
	Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**5.0654**	**2.6024**

Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	1.45E-02	0.5691	0.235	2.60E-03	0.0988	3.07E-02
	Worker	0.0475	0.0253	0.4338	1.54E-03	0.2069	0.0558
	Total	**0.062**	**0.5944**	**0.6687**	**4.14E-03**	**0.3057**	**0.0865**
TOTAL		***2.96***	***28.54***	***27.00***	***0.07***	***5.37***	***2.66***
Onsite		**2028**					
	Fugitive Dust	0.00	0.00	0.00	0.00	3.93	1.56
	Off-Road	2.90	27.94	26.33	0.06	1.13	1.04
	Total	**2.90**	**27.94**	**26.33**	**0.06**	**5.07**	**2.60**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.02	0.57	0.24	0.00	0.10	0.03
	Worker	0.05	0.03	0.46	0.00	0.21	0.06
	Total	**0.06**	**0.59**	**0.69**	**0.00**	**0.31**	**0.09**
TOTAL		***2.96***	***28.54***	***27.02***	***0.07***	***5.37***	***2.69***

Phase 3 Asphalt Paving

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2027 Summer**						
	Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving		0				0	0
	Total		**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0338	0.0186	0.3634	1.25E-03	0.1553	0.0419
	Total		**0.0338**	**0.0186**	**0.3634**	**1.25E-03**	**0.1553**	**0.0419**
TOTAL			***0.95***	***8.60***	***14.94***	***0.02***	***0.57***	***0.43***
Onsite		**2027 Winter**						
	Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving		0				0	0
	Total		**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0374	0.0204	0.3393	1.19E-03	0.1553	0.0419
	Total		**0.0374**	**0.0204**	**0.3393**	**1.19E-03**	**0.1553**	**0.0419**
TOTAL			***0.95***	***8.60***	***14.92***	***0.02***	***0.57***	***0.43***
Onsite		**2027**						
	Off-Road		0.92	8.58	14.58	0.02	0.42	0.39
	Paving		0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.92**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.04	0.02	0.36	0.00	0.16	0.04
	Total		**0.04**	**0.02**	**0.36**	**0.00**	**0.16**	**0.04**
TOTAL			***0.95***	***8.60***	***14.94***	***0.02***	***0.57***	***0.43***
2027 P3 Uility Trenching, P3 Fine Grading, & P3 Asphalt Paving			**4.59**	**42.57**	**51.31**	**0.10**	**6.35**	**3.43**
2027 P3 Fine Grading & P3 Asphalt Paving			**3.92**	**37.15**	**41.99**	**0.09**	**5.95**	**3.12**

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2028 Summer**						
	Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving		0				0	0
	Total		**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0322	0.0173	0.3482	1.21E-03	0.1552	0.0419
	Total		**0.0322**	**0.0173**	**0.3482**	**1.21E-03**	**0.1552**	**0.0419**
TOTAL			***0.95***	***8.60***	***14.93***	***0.02***	***0.57***	***0.43***
Onsite		**2028 Winter**						
	Off-Road		0.9152	8.5816	14.578	0.0228	0.4185	0.385
	Paving		0				0	0
	Total		**0.9152**	**8.5816**	**14.578**	**0.0228**	**0.4185**	**0.385**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		0.0357	0.019	0.3253	1.16E-03	0.1552	0.0419
	Total		**0.0357**	**0.019**	**0.3253**	**1.16E-03**	**0.1552**	**0.0419**
TOTAL			***0.95***	***8.60***	***14.90***	***0.02***	***0.57***	***0.43***
Onsite		**2028**						
	Off-Road		0.92	8.58	14.58	0.02	0.42	0.39
	Paving		0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.92**	**8.58**	**14.58**	**0.02**	**0.42**	**0.39**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.04	0.02	0.35	0.00	0.16	0.04
	Total		**0.04**	**0.02**	**0.35**	**0.00**	**0.16**	**0.04**
TOTAL			***0.95***	***8.60***	***14.93***	***0.02***	***0.57***	***0.43***

Phase 3 Finishing/Landscaping

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2027 Summer**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		6.76E-03	3.72E-03	0.0727	2.50E-04	0.0311	8.38E-03
	Total		**6.76E-03**	**3.72E-03**	**0.0727**	**2.50E-04**	**0.0311**	**8.38E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***
Onsite		**2027 Winter**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		7.48E-03	4.08E-03	0.0679	2.40E-04	0.0311	8.38E-03
	Total		**7.48E-03**	**4.08E-03**	**0.0679**	**2.40E-04**	**0.0311**	**8.38E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***

Onsite		**2027**						
	Off-Road		0.13	1.33	2.22	0.00	0.05	0.05
	Total		**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.01	0.00	0.07	0.00	0.03	0.01
	Total		**0.01**	**0.00**	**0.07**	**0.00**	**0.03**	**0.01**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.09***	***0.06***
2027 P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping			**4.06**	**38.48**	**44.28**	**0.09**	**6.03**	**3.17**

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2028 Summer**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		6.43E-03	3.46E-03	0.0697	2.40E-04	0.031	8.37E-03
	Total		**6.43E-03**	**3.46E-03**	**0.0697**	**2.40E-04**	**0.031**	**8.37E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.08***	***0.06***
Onsite		**2028 Winter**						
	Off-Road		0.1316	1.3297	2.2206	3.11E-03	0.0539	0.0496
	Total		**0.1316**	**1.3297**	**2.2206**	**3.11E-03**	**0.0539**	**0.0496**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0	0	0	0	0	0
	Worker		7.13E-03	3.79E-03	0.0651	2.30E-04	0.031	8.37E-03
	Total		**7.13E-03**	**3.79E-03**	**0.0651**	**2.30E-04**	**0.031**	**8.37E-03**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.08***	***0.06***

Onsite		**2028**						
	Off-Road		0.13	1.33	2.22	0.00	0.05	0.05
	Total		**0.13**	**1.33**	**2.22**	**0.00**	**0.05**	**0.05**
Offsite								
	Hauling		0.00	0.00	0.00	0.00	0.00	0.00
	Vendor		0.00	0.00	0.00	0.00	0.00	0.00
	Worker		0.01	0.00	0.07	0.00	0.03	0.01
	Total		**0.01**	**0.00**	**0.07**	**0.00**	**0.03**	**0.01**
TOTAL			***0.14***	***1.33***	***2.29***	***0.00***	***0.08***	***0.06***
2028 P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping			**4.05**	**38.47**	**44.24**	**0.09**	**6.03**	**3.17**

Phase 3 Building Construction

			ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2028 Summer**						
	Off-Road		1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total		**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite								
	Hauling		0	0	0	0	0	0
	Vendor		0.0132	0.4764	0.1997	2.27E-03	0.0864	0.0269
	Worker		0.105	0.0565	1.1376	3.97E-03	0.507	0.1367
	Total		**0.1182**	**0.5329**	**1.3373**	**6.24E-03**	**0.5934**	**0.1636**
TOTAL			***1.49***	***13.00***	***17.42***	***0.03***	***1.12***	***0.66***

Onsite		**2028 Winter**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0127	0.498	0.2056	2.27E-03	0.0864	0.0269
	Worker	0.1164	0.0619	1.0627	3.78E-03	0.507	0.1367
	Total	**0.1291**	**0.5599**	**1.2683**	**6.05E-03**	**0.5934**	**0.1636**
TOTAL		***1.50***	***13.03***	***17.35***	***0.03***	***1.12***	***0.66***
Onsite		**2028**					
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.50	0.21	0.00	0.09	0.03
	Worker	0.12	0.06	1.14	0.00	0.51	0.14
	Total	**0.13**	**0.56**	**1.34**	**0.01**	**0.59**	**0.16**
TOTAL		***1.50***	***13.03***	***17.42***	***0.03***	***1.12***	***0.66***
2028 P3 Finish/Landscape & P3 Building Construction		**1.64**	**14.36**	**19.71**	**0.04**	**1.21**	**0.72**
		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2029 Summer**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.013	0.4733	0.1997	2.22E-03	0.0864	0.0269
	Worker	0.0997	0.0528	1.0944	3.87E-03	0.5069	0.1366
	Total	**0.1127**	**0.5261**	**1.2941**	**6.09E-03**	**0.5932**	**0.1634**
TOTAL		***1.48***	***13.00***	***17.38***	***0.03***	***1.12***	***0.66***
Onsite		**2029 Winter**					
	Off-Road	1.3674	12.4697	16.0847	0.027	0.5276	0.4963
	Total	**1.3674**	**12.4697**	**16.0847**	**0.027**	**0.5276**	**0.4963**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0.0125	0.4947	0.2054	2.23E-03	0.0864	0.0269
	Worker	0.1108	0.0579	1.0226	3.69E-03	0.5069	0.1366
	Total	**0.1233**	**0.5526**	**1.228**	**5.92E-03**	**0.5933**	**0.1634**
TOTAL		***1.49***	***13.02***	***17.31***	***0.03***	***1.12***	***0.66***
Onsite		**2029**					
	Off-Road	1.37	12.47	16.08	0.03	0.53	0.50
	Total	**1.37**	**12.47**	**16.08**	**0.03**	**0.53**	**0.50**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.01	0.49	0.21	0.00	0.09	0.03
	Worker	0.11	0.06	1.09	0.00	0.51	0.14
	Total	**0.12**	**0.55**	**1.29**	**0.01**	**0.59**	**0.16**
TOTAL		***1.49***	***13.02***	***17.38***	***0.03***	***1.12***	***0.66***

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2030 Summer**						
Off-Road		1.3091	7.9346	16.157	0.031	0.1481	0.1481
Total		**1.3091**	**7.9346**	**16.157**	**0.031**	**0.1481**	**0.1481**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0129	0.4703	0.1996	2.18E-03	0.0864	0.0269
Worker		0.0946	0.0496	1.0573	3.79E-03	0.5067	0.1365
Total		**0.1075**	**0.5199**	**1.2569**	**5.97E-03**	**0.5931**	**0.1633**
TOTAL		***1.42***	***8.45***	***17.41***	***0.04***	***0.74***	***0.31***
Onsite	**2030 Winter**						
Off-Road		1.3091	7.9346	16.157	0.031	0.1481	0.1481
Total		**1.3091**	**7.9346**	**16.157**	**0.031**	**0.1481**	**0.1481**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0.0124	0.4917	0.2052	2.18E-03	0.0864	0.0269
Worker		0.1053	0.0543	0.988	3.61E-03	0.5067	0.1365
Total		**0.1177**	**0.546**	**1.1932**	**5.79E-03**	**0.5931**	**0.1633**
TOTAL		***1.43***	***8.48***	***17.35***	***0.04***	***0.74***	***0.31***
Onsite	**2030**						
Off-Road		1.31	7.93	16.16	0.03	0.15	0.15
Total		**1.31**	**7.93**	**16.16**	**0.03**	**0.15**	**0.15**
Offsite							
Hauling		0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.01	0.49	0.21	0.00	0.09	0.03
Worker		0.11	0.05	1.06	0.00	0.51	0.14
Total		**0.12**	**0.55**	**1.26**	**0.01**	**0.59**	**0.16**
TOTAL		***1.43***	***8.48***	***17.41***	***0.04***	***0.74***	***0.31***

Phase 3 Architectural Coating

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite	**2029 Summer**						
Archit. Coating		10.7078				0	0
Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
Total		**10.8787**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0204	0.0108	0.2234	7.90E-04	0.1034	0.0279
Total		**0.0204**	**0.0108**	**0.2234**	**7.90E-04**	**0.1034**	**0.0279**
TOTAL		***10.90***	***1.16***	***2.03***	***0.00***	***0.15***	***0.08***
Onsite	**2029 Winter**						
Archit. Coating		10.7078				0	0
Off-Road		0.1709	1.1455	1.8091	2.97E-03	0.0515	0.0515
Total		**10.8787**	**1.1455**	**1.8091**	**2.97E-03**	**0.0515**	**0.0515**
Offsite							
Hauling		0	0	0	0	0	0
Vendor		0	0	0	0	0	0
Worker		0.0226	0.0118	0.2087	7.50E-04	0.1034	0.0279
Total		**0.0226**	**0.0118**	**0.2087**	**7.50E-04**	**0.1034**	**0.0279**
TOTAL		***10.90***	***1.16***	***2.02***	***0.00***	***0.15***	***0.08***

Onsite		**2029**					
	Archit. Coating	10.71	0.00	0.00	0.00	0.00	0.00
	Off-Road	0.17	1.15	1.81	0.00	0.05	0.05
	Total	**10.88**	**1.15**	**1.81**	**0.00**	**0.05**	**0.05**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.22	0.00	0.10	0.03
	Total	**0.02**	**0.01**	**0.22**	**0.00**	**0.10**	**0.03**
TOTAL		***10.90***	***1.16***	***2.03***	***0.00***	***0.15***	***0.08***
2029 P3 Building Construction & P3 Architectural Coating		**12.39**	**14.18**	**19.41**	**0.04**	**1.28**	**0.74**

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite		**2030 Summer**					
	Archit. Coating	10.7078				0	0
	Off-Road	0.1308	0.8563	1.7977	2.97E-03	0.0203	0.0203
	Total	**10.8386**	**0.8563**	**1.7977**	**2.97E-03**	**0.0203**	**0.0203**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0193	0.0101	0.2158	7.70E-04	0.1034	0.0279
	Total	**0.0193**	**0.0101**	**0.2158**	**7.70E-04**	**0.1034**	**0.0279**
TOTAL		***10.86***	***0.87***	***2.01***	***0.00***	***0.12***	***0.05***
Onsite		**2030 Winter**					
	Archit. Coating	10.7078				0	0
	Off-Road	0.1308	0.8563	1.7977	2.97E-03	0.0203	0.0203
	Total	**10.8386**	**0.8563**	**1.7977**	**2.97E-03**	**0.0203**	**0.0203**
Offsite							
	Hauling	0	0	0	0	0	0
	Vendor	0	0	0	0	0	0
	Worker	0.0215	0.0111	0.2016	7.40E-04	0.1034	0.0279
	Total	**0.0215**	**0.0111**	**0.2016**	**7.40E-04**	**0.1034**	**0.0279**
TOTAL		***10.86***	***0.87***	***2.00***	***0.00***	***0.12***	***0.05***

Onsite		**2030**					
	Archit. Coating	10.71	0.00	0.00	0.00	0.00	0.00
	Off-Road	0.13	0.86	1.80	0.00	0.02	0.02
	Total	**10.84**	**0.86**	**1.80**	**0.00**	**0.02**	**0.02**
Offsite							
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	0.02	0.01	0.22	0.00	0.10	0.03
	Total	**0.02**	**0.01**	**0.22**	**0.00**	**0.10**	**0.03**
TOTAL		***10.86***	***0.87***	***2.01***	***0.00***	***0.12***	***0.05***
2030 P3 Building Construction & P3 Architectural Coating		**12.29**	**9.35**	**19.43**	**0.04**	**0.86**	**0.36**

MAX DAILY	**41**	**84**	**104**	**0.35**	**22**	**10**
Year 2023	***2.35***	***72.24***	***72.44***	***0.30***	***19.22***	***8.91***
Year 2024	***4.97***	***83.46***	***97.50***	***0.35***	***21.81***	***9.80***
Year 2025	***39.70***	***53.87***	***75.38***	***0.15***	***11.60***	***5.31***
Year 2026	***6.29***	***48.38***	***63.09***	***0.18***	***18.43***	***8.13***
Year 2027	***41.23***	***83.55***	***103.73***	***0.27***	***21.32***	***8.87***
Year 2028	***4.05***	***38.47***	***44.24***	***0.09***	***6.03***	***3.17***
Year 2029	***12.39***	***14.18***	***19.41***	***0.04***	***1.28***	***0.74***
Year 2030	***12.29***	***9.35***	***19.43***	***0.04***	***0.86***	***0.36***
Regional Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	No	No	No	No	No

Localized Construction Emissions Worksheet

*CalEEMod, Version 2020.4.0

Western Remediation Site Preparation

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2023**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		27.5242	18.2443	1.266	1.1647
	Total		**27.5242**	**18.2443**	**9.6694**	**5.4835**
TOTAL			***27.52***	***18.24***	***9.67***	***5.48***
Onsite		**2023**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		27.5242	18.2443	1.266	1.1647
	Total		**27.5242**	**18.2443**	**9.6694**	**5.4835**
TOTAL			***27.52***	***18.24***	***9.67***	***5.48***
Onsite		**2023**				
	Fugitive Dust		0.00	0.00	8.40	4.32
	Off-Road		27.52	18.24	1.27	1.16
	Total		**27.52**	**18.24**	**9.67**	**5.48**
TOTAL			***27.52***	***18.24***	***9.67***	***5.48***
3.50-acre LST			**184**	**1,036**	**8.50**	**5.00**
Exceed Threshold?			No	No	Yes	Yes

Western Remediation Rough Grading

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2023**				
	Fugitive Dust				3.9862	1.5698
	Off-Road		34.5156	28.0512	1.4245	1.3105
	Total		**34.5156**	**28.0512**	**5.4107**	**2.8803**
TOTAL			***34.52***	***28.05***	***5.41***	***2.88***
Onsite		**2023**				
	Fugitive Dust				3.9862	1.5698
	Off-Road		34.5156	28.0512	1.4245	1.3105
	Total		**34.5156**	**28.0512**	**5.4107**	**2.8803**
TOTAL			***34.52***	***28.05***	***5.41***	***2.88***
Onsite		**2023**				
	Fugitive Dust		0.00	0.00	3.99	1.57
	Off-Road		34.52	28.05	1.42	1.31
	Total		**34.52**	**28.05**	**5.41**	**2.88**
TOTAL			***34.52***	***28.05***	***5.41***	***2.88***
4.00-acre LST			**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?			No	No	No	No

Phase 1 Site Preparation

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2023**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		27.5242	18.2443	1.266	1.1647
	Total		**27.5242**	**18.2443**	**9.6694**	**5.4835**
TOTAL			***27.52***	***18.24***	***9.67***	***5.48***
Onsite		**2023**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		27.5242	18.2443	1.266	1.1647
	Total		**27.5242**	**18.2443**	**9.6694**	**5.4835**
TOTAL			***27.52***	***18.24***	***9.67***	***5.48***
Onsite		**2023**				
	Fugitive Dust		0.00	0.00	8.40	4.32
	Off-Road		27.52	18.24	1.27	1.16
	Total		**27.52**	**18.24**	**9.67**	**5.48**
TOTAL			***27.52***	***18.24***	***9.67***	***5.48***
3.50-acre LST			**184**	**1,036**	**8.50**	**5.00**
Exceed Threshold?			No	No	Yes	Yes

Phase 1 Rough Grading

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2023**				
	Fugitive Dust				3.9345	1.562
	Off-Road		34.5156	28.0512	1.4245	1.3105
	Total		**34.5156**	**28.0512**	**5.359**	**2.8725**
TOTAL			***34.52***	***28.05***	***5.36***	***2.87***
Onsite		**2023**				
	Fugitive Dust				3.9345	1.562
	Off-Road		34.5156	28.0512	1.4245	1.3105
	Total		**34.5156**	**28.0512**	**5.359**	**2.8725**
TOTAL			***34.52***	***28.05***	***5.36***	***2.87***
Onsite		**2023**				
	Fugitive Dust		0.00	0.00	3.93	1.56
	Off-Road		34.52	28.05	1.42	1.31
	Total		**34.52**	**28.05**	**5.36**	**2.87**
TOTAL			***34.52***	***28.05***	***5.36***	***2.87***
4.00-acre LST			**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?			No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2024**				
	Fugitive Dust				3.9345	1.562
	Off-Road		32.377	27.7228	1.3354	1.2286
	Total		**32.377**	**27.7228**	**5.2699**	**2.7906**
TOTAL			***32.38***	***27.72***	***5.27***	***2.79***

Onsite		**2024**				
	Fugitive Dust				3.9345	1.562
	Off-Road		32.377	27.7228	1.3354	1.2286
	Total		**32.377**	**27.7228**	**5.2699**	**2.7906**
TOTAL			***32.38***	***27.72***	***5.27***	***2.79***

Onsite		**2024**				
	Fugitive Dust		0.00	0.00	3.93	1.56
	Off-Road		32.38	27.72	1.34	1.23
	Total		**32.38**	**27.72**	**5.27**	**2.79**
TOTAL			***32.38***	***27.72***	***5.27***	***2.79***

Phase 1 Utility Trenching

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2023**				
	Off-Road		5.1948	6.6976	0.3207	0.295
	Total		**5.1948**	**6.6976**	**0.3207**	**0.295**
TOTAL			***5.19***	***6.70***	***0.32***	***0.30***

Onsite		**2023**				
	Off-Road		5.1948	6.6976	0.3207	0.295
	Total		**5.1948**	**6.6976**	**0.3207**	**0.295**
TOTAL			***5.19***	***6.70***	***0.32***	***0.30***

Onsite		**2023**				
	Off-Road		5.19	6.70	0.32	0.30
	Total		**5.19**	**6.70**	**0.32**	**0.30**
TOTAL			***5.19***	***6.70***	***0.32***	***0.30***

2023 P1 Rough Grading & P1 Utility Trenching	**39.71**	**34.75**	**5.68**	**3.17**

4.00-acre LST	**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?	No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2024**				
	Off-Road		4.9375	6.7068	0.3065	0.282
	Total		**4.9375**	**6.7068**	**0.3065**	**0.282**
TOTAL			***4.94***	***6.71***	***0.31***	***0.28***

Onsite		**2024**				
	Off-Road		4.9375	6.7068	0.3065	0.282
	Total		**4.9375**	**6.7068**	**0.3065**	**0.282**
TOTAL			***4.94***	***6.71***	***0.31***	***0.28***
Onsite		**2024**				
	Off-Road		4.94	6.71	0.31	0.28
	Total		**4.94**	**6.71**	**0.31**	**0.28**
TOTAL			***4.94***	***6.71***	***0.31***	***0.28***
2024 P1 Rough Grading & P1 Utility Trenching			**37.31**	**34.43**	**5.58**	**3.07**
4.00-acre LST			**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?			No	No	No	No

Phase 1 Fine Grading						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2024**				
	Fugitive Dust				3.9345	1.562
	Off-Road		32.377	27.7228	1.3354	1.2286
	Total		**32.377**	**27.7228**	**5.2699**	**2.7906**
TOTAL			***32.38***	***27.72***	***5.27***	***2.79***
Onsite		**2024**				
	Fugitive Dust				3.9345	1.562
	Off-Road		32.377	27.7228	1.3354	1.2286
	Total		**32.377**	**27.7228**	**5.2699**	**2.7906**
TOTAL			***32.38***	***27.72***	***5.27***	***2.79***
Onsite		**2024**				
	Fugitive Dust		0.00	0.00	3.93	1.56
	Off-Road		32.38	27.72	1.34	1.23
	Total		**32.38**	**27.72**	**5.27**	**2.79**
TOTAL			***32.38***	***27.72***	***5.27***	***2.79***
2024 P1 Rough Grading, P1 Utility Trenching, & P1 Fine Grading			**69.69**	**62.15**	**10.85**	**5.86**
5.00-acre LST			**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?			No	No	No	No
2024 P1 Utility Trenching & P1 Fine Grading			**37.31**	**34.43**	**5.58**	**3.07**
4.00-acre LST			**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?			No	No	No	No

Phase 1 Asphalt Paving						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		2024				
	Off-Road		9.5246	14.6258	0.4685	0.431
	Paving				0	0
	Total		**9.5246**	**14.6258**	**0.4685**	**0.431**
TOTAL			***9.52***	***14.63***	***0.47***	***0.43***
Onsite		2024				
	Off-Road		9.5246	14.6258	0.4685	0.431
	Paving				0	0
	Total		**9.5246**	**14.6258**	**0.4685**	**0.431**
TOTAL			***9.52***	***14.63***	***0.47***	***0.43***
Onsite		2024				
	Off-Road		9.52	14.63	0.47	0.43
	Paving		0.00	0.00	0.00	0.00
	Total		**9.52**	**14.63**	**0.47**	**0.43**
TOTAL			***9.52***	***14.63***	***0.47***	***0.43***
2024 P1 Fine Grading & P1 Asphalt Paving			**41.90**	**42.35**	**5.74**	**3.22**
4.00-acre LST			**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?			No	No	No	No

Phase 1 Finishing/Landscaping						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		2024				
	Off-Road		1.4424	2.2265	0.0662	0.0609
	Total		**1.4424**	**2.2265**	**0.0662**	**0.0609**
TOTAL			***1.44***	***2.23***	***0.07***	***0.06***
Onsite		2024				
	Off-Road		1.4424	2.2265	0.0662	0.0609
	Total		**1.4424**	**2.2265**	**0.0662**	**0.0609**
TOTAL			***1.44***	***2.23***	***0.07***	***0.06***
Onsite		2024				
	Off-Road		1.44	2.23	0.07	0.06
	Total		**1.44**	**2.23**	**0.07**	**0.06**
TOTAL			***1.44***	***2.23***	***0.07***	***0.06***
2024 P1 Fine Grading, P1 Asphalt Paving, & P1 Finish/Landscape			**43.34**	**44.58**	**5.80**	**3.28**
4.50-acre LST			**209**	**1,219**	**10.16**	**5.67**
Exceed Threshold?			No	No	No	No

Phase 1 Building Construction						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		2024				
	Off-Road		13.4438	16.1668	0.6133	0.5769
	Total		**13.4438**	**16.1668**	**0.6133**	**0.5769**
TOTAL			***13.44***	***16.17***	***0.61***	***0.58***
Onsite		2024				
	Off-Road		13.4438	16.1668	0.6133	0.5769
	Total		**13.4438**	**16.1668**	**0.6133**	**0.5769**
TOTAL			***13.44***	***16.17***	***0.61***	***0.58***
Onsite		2024				
	Off-Road		13.44	16.17	0.61	0.58
	Total		**13.44**	**16.17**	**0.61**	**0.58**
TOTAL			***13.44***	***16.17***	***0.61***	***0.58***
1.31-acre LST			**117**	**597**	**4.62**	**3.31**
Exceed Threshold?			No	No	No	No
2024 P1 Asphalt Paving, P1 Finish/Landscape, & P1 Building			**24.41**	**33.02**	**1.15**	**1.07**
1.81-acre LST			**139**	**717**	**5.62**	**3.81**
Exceed Threshold?			No	No	No	No
2024 P1 Finish/Landscape & P1 Building			**14.89**	**18.39**	**0.68**	**0.64**
1.81-acre LST			**139**	**717**	**5.62**	**3.81**
Exceed Threshold?			No	No	No	No
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		2025				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		2025				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		2025				
	Off-Road		12.47	16.08	0.53	0.50
	Total		**12.47**	**16.08**	**0.53**	**0.50**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
1.31-acre LST			**117**	**597**	**4.62**	**3.31**
Exceed Threshold?			No	No	No	No

Phase 1 Architectural Coating						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2025**				
	Archit. Coating				0	0
	Off-Road		1.1455	1.8091	0.0515	0.0515
	Total		**1.1455**	**1.8091**	**0.0515**	**0.0515**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
Onsite		**2025**				
	Archit. Coating				0	0
	Off-Road		1.1455	1.8091	0.0515	0.0515
	Total		**1.1455**	**1.8091**	**0.0515**	**0.0515**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
Onsite		**2025**				
	Archit. Coating		0.00	0.00	0.00	0.00
	Off-Road		1.15	1.81	0.05	0.05
	Total		**1.15**	**1.81**	**0.05**	**0.05**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
2025 *P1 Building Construction, P1 Architectural Coating,* & P2 Rough Grading			**13.62**	**17.89**	**0.58**	**0.55**
1.31-acre LST			**117**	**597**	**4.62**	**3.31**
Exceed Threshold?			No	No	No	No

Eastern Remediation Site Preparation						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2024**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		27.176	18.3356	1.2294	1.131
	Total		**27.176**	**18.3356**	**9.6327**	**5.4498**
Offsite						
	Hauling					
	Vendor					
	Worker					
	Total					
TOTAL			***27.18***	***18.34***	***9.63***	***5.45***
Onsite		**2024**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		27.176	18.3356	1.2294	1.131
	Total		**27.176**	**18.3356**	**9.6327**	**5.4498**
TOTAL			***27.18***	***18.34***	***9.63***	***5.45***
Onsite		**2024**				
	Fugitive Dust		0.00	0.00	8.40	4.32
	Off-Road		27.18	18.34	1.23	1.13
	Total		**27.18**	**18.34**	**9.63**	**5.45**
TOTAL			***27.18***	***18.34***	***9.63***	***5.45***

Eastern Remediation Rough Grading					
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2024**				
Fugitive Dust				3.9843	1.5695
Off-Road		32.377	27.7228	1.3354	1.2286
Total		**32.377**	**27.7228**	**5.3197**	**2.7981**
TOTAL		***32.38***	***27.72***	***5.32***	***2.80***
Onsite	**2024**				
Fugitive Dust				3.9843	1.5695
Off-Road		32.377	27.7228	1.3354	1.2286
Total		**32.377**	**27.7228**	**5.3197**	**2.7981**
TOTAL		***32.38***	***27.72***	***5.32***	***2.80***
Onsite	**2024**				
Fugitive Dust		0.00	0.00	3.98	1.57
Off-Road		32.38	27.72	1.34	1.23
Total		**32.38**	**27.72**	**5.32**	**2.80**
TOTAL		***32.38***	***27.72***	***5.32***	***2.80***

Phase 2 Site Preparation					
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2024**				
Fugitive Dust				8.4034	4.3188
Off-Road		27.176	18.3356	1.2294	1.131
Total		**27.176**	**18.3356**	**9.6327**	**5.4498**
TOTAL		***27.18***	***18.34***	***9.63***	***5.45***
Onsite	**2024**				
Fugitive Dust				8.4034	4.3188
Off-Road		27.176	18.3356	1.2294	1.131
Total		**27.176**	**18.3356**	**9.6327**	**5.4498**
TOTAL		***27.18***	***18.34***	***9.63***	***5.45***
Onsite	**2024**				
Fugitive Dust		0.00	0.00	8.40	4.32
Off-Road		27.18	18.34	1.23	1.13
Total		**27.18**	**18.34**	**9.63**	**5.45**
TOTAL		***27.18***	***18.34***	***9.63***	***5.45***

3.50-acre LST	**184**	**1,036**	**8.50**	**5.00**
Exceed Threshold?	No	No	Yes	Yes
2024 P1 Building Construction, P2 Site Preparation, & East Remediation Site Preparation	**67.80**	**52.84**	**19.88**	**11.48**
5.00-acre LST	**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?	No	No	Yes	Yes

2024 P1 Building Construction, P2 Site Preparation, & East Remediation Grading		**73.00**	**62.23**	**15.57**	**8.82**
5.00-acre LST		**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?		No	No	Yes	Yes
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2025**				
Fugitive Dust				8.4034	4.3188
Off-Road		25.2339	17.9118	1.0868	0.9999
Total		**25.2339**	**17.9118**	**9.4902**	**5.3187**
TOTAL		***25.23***	***17.91***	***9.49***	***5.32***
Onsite	**2025**				
Fugitive Dust				8.4034	4.3188
Off-Road		25.2339	17.9118	1.0868	0.9999
Total		**25.2339**	**17.9118**	**9.4902**	**5.3187**
TOTAL		***25.23***	***17.91***	***9.49***	***5.32***
Onsite	**2025**				
Fugitive Dust		0.00	0.00	8.40	4.32
Off-Road		25.23	17.91	1.09	1.00
Total		**25.23**	**17.91**	**9.49**	**5.32**
TOTAL		***25.23***	***17.91***	***9.49***	***5.32***
3.50-acre LST		**184**	**1,036**	**8.50**	**5.00**
Exceed Threshold?		No	No	Yes	Yes
Phase 2 Rough Grading					
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2025**				
Fugitive Dust				3.9345	1.562
Off-Road		27.9429	26.3311	1.1309	1.0404
Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***
Onsite	**2025**				
Fugitive Dust				3.9345	1.562
Off-Road		27.9429	26.3311	1.1309	1.0404
Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***
Onsite	**2025**				
Fugitive Dust		0.00	0.00	3.93	1.56
Off-Road		27.94	26.33	1.13	1.04
Total		**27.94**	**26.33**	**5.07**	**2.60**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***

4.00-acre LST		**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?		No	No	No	No
2025 P1 Building Construction & P2 Rough Grading		**41.39**	**42.50**	**5.68**	**3.18**
5.00-acre LST		**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?		No	No	No	No

Phase 2 Utility Trenching

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2025**				
	Off-Road		5.4135	9.1328	0.3174	0.292
	Total		**5.4135**	**9.1328**	**0.3174**	**0.292**
TOTAL			***5.41***	***9.13***	***0.32***	***0.29***
Onsite		**2025**				
	Off-Road		5.4135	9.1328	0.3174	0.292
	Total		**5.4135**	**9.1328**	**0.3174**	**0.292**
TOTAL			***5.41***	***9.13***	***0.32***	***0.29***
Onsite		**2025**				
	Off-Road		5.41	9.13	0.32	0.29
	Total		**5.41**	**9.13**	**0.32**	**0.29**
TOTAL			***5.41***	***9.13***	***0.32***	***0.29***

2025 P1 Building Construction, *P2 Rough Grading,* P1 Architectural Coating, & *P2 Utility Trenching*		**33.36**	**35.46**	**5.38**	**2.89**
4.00-acre LST		**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?		No	No	No	No

Phase 2 Fine Grading

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2025**				
	Fugitive Dust				3.9345	1.562
	Off-Road		27.9429	26.3311	1.1309	1.0404
	Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***
Onsite		**2025**				
	Fugitive Dust				3.9345	1.562
	Off-Road		27.9429	26.3311	1.1309	1.0404
	Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***
Onsite		**2025**				
	Fugitive Dust		0.00	0.00	3.93	1.56
	Off-Road		27.94	26.33	1.13	1.04
	Total		**27.94**	**26.33**	**5.07**	**2.60**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***

4.00-acre LST		**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?		No	No	No	No
2025 P2 Rough Grading, P2 Trenching & P2 Fine Grading		**61.30**	**61.80**	**10.45**	**5.50**
5.00-acre LST		**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?		No	No	No	No
2025 P2 Trenching & P2 Fine Grading		**33.36**	**35.46**	**5.38**	**2.89**
4.00-acre LST		**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?		No	No	No	No
Phase 2 Asphalt Paving					
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2025**				
Off-Road		8.5816	14.578	0.4185	0.385
Paving				0	0
Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL		***8.58***	***14.58***	***0.42***	***0.39***
Onsite	**2025**				
Off-Road		8.5816	14.578	0.4185	0.385
Paving				0	0
Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL		***8.58***	***14.58***	***0.42***	***0.39***
Onsite	**2025**				
Off-Road		8.58	14.58	0.42	0.39
Paving		0.00	0.00	0.00	0.00
Total		**8.58**	**14.58**	**0.42**	**0.39**
TOTAL		***8.58***	***14.58***	***0.42***	***0.39***
2025 P2 Fine Grading & P2 Asphalt Paving		**36.52**	**40.91**	**5.48**	**2.99**
4.00-acre LST		**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?		No	No	No	No
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2026**				
Off-Road		8.5816	14.578	0.4185	0.385
Paving				0	0
Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL		***8.58***	***14.58***	***0.42***	***0.39***

Onsite		**2026**			
	Off-Road	8.5816	14.578	0.4185	0.385
	Paving			0	0
	Total	**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL		***8.58***	***14.58***	***0.42***	***0.39***

Onsite		**2026**			
	Off-Road	8.58	14.58	0.42	0.39
	Paving	0.00	0.00	0.00	0.00
	Total	**8.58**	**14.58**	**0.42**	**0.39**
TOTAL		***8.58***	***14.58***	***0.42***	***0.39***

Phase 2 Finishing/Landscaping

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2025**				
Off-Road		1.3297	2.2206	0.0539	0.0496
Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL		***1.33***	***2.22***	***0.05***	***0.05***

Onsite	**2025**				
Off-Road		1.3297	2.2206	0.0539	0.0496
Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL		***1.33***	***2.22***	***0.05***	***0.05***

Onsite	**2025**				
Off-Road		1.33	2.22	0.05	0.05
Total		**1.33**	**2.22**	**0.05**	**0.05**
TOTAL		***1.33***	***2.22***	***0.05***	***0.05***

2025 P2 Fine Grading, P2 Asphalt Paving, & P2 Finish/Landscape	**37.85**	**43.13**	**5.54**	**3.04**
4.50-acre LST	**209**	**1,219**	**10.16**	**5.67**
Exceed Threshold?	No	No	No	No
2025 P2 Asphalt Paving & P2 Finish/Landscape	**9.91**	**16.80**	**0.47**	**0.43**
<=1.00-acre LST	**103**	**522**	**4.00**	**3.00**
Exceed Threshold?	No	No	No	No

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2026**				
Off-Road		1.3297	2.2206	0.0539	0.0496
Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL		***1.33***	***2.22***	***0.05***	***0.05***

Onsite		**2026**				
	Off-Road		1.3297	2.2206	0.0539	0.0496
	Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***
Onsite		**2026**				
	Off-Road		1.33	2.22	0.05	0.05
	Total		**1.33**	**2.22**	**0.05**	**0.05**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***

Phase 2 Building Construction

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2025**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2025**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2025**				
	Off-Road		12.47	16.08	0.53	0.50
	Total		**12.47**	**16.08**	**0.53**	**0.50**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
2025 P2 Asphalt Paving, P2 Finishing/Landscaping, & P2 Building Construction			**22.38**	**32.88**	**1.00**	**0.93**
1.81-acre LST			**139**	**717**	**5.62**	**3.81**
Exceed Threshold?			No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2026**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2026**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2026**				
	Off-Road		12.47	16.08	0.53	0.50
	Total		**12.47**	**16.08**	**0.53**	**0.50**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***

1.31-acre LST		**117**	**597**	**4.62**	**3.31**
Exceed Threshold?		No	No	No	No
2026 P2 Asphalt Paving, P2 Finishing/Landscaping, & P2 Building Construction		**22.38**	**32.88**	**1.00**	**0.93**
1.81-acre LST		**139**	**717**	**5.62**	**3.81**
Exceed Threshold?		No	No	No	No
2026 P2 Finish/Landscape & P2 Building		**13.80**	**18.31**	**0.58**	**0.55**
1.81-acre LST		**139**	**717**	**5.62**	**3.81**
Exceed Threshold?		No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2027**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2027**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2027**				
	Off-Road		12.47	16.08	0.53	0.50
	Total		**12.47**	**16.08**	**0.53**	**0.50**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***

Phase 2 Architectural Coating

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2027**				
	Archit. Coating				0	0
	Off-Road		1.1455	1.8091	0.0515	0.0515
	Total		**1.1455**	**1.8091**	**0.0515**	**0.0515**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
Onsite		**2027**				
	Archit. Coating				0	0
	Off-Road		1.1455	1.8091	0.0515	0.0515
	Total		**1.1455**	**1.8091**	**0.0515**	**0.0515**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
Onsite		**2027**				
	Archit. Coating		0.00	0.00	0.00	0.00
	Off-Road		1.15	1.81	0.05	0.05
	Total		**1.15**	**1.81**	**0.05**	**0.05**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***

Phase 3 Site Preparation						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2026**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		25.2339	17.9118	1.0868	0.9999
	Total		**25.2339**	**17.9118**	**9.4902**	**5.3187**
TOTAL			***25.23***	***17.91***	***9.49***	***5.32***
Onsite		**2026**				
	Fugitive Dust				8.4034	4.3188
	Off-Road		25.2339	17.9118	1.0868	0.9999
	Total		**25.2339**	**17.9118**	**9.4902**	**5.3187**
TOTAL			***25.23***	***17.91***	***9.49***	***5.32***
Onsite		**2026**				
	Fugitive Dust		0.00	0.00	8.40	4.32
	Off-Road		25.23	17.91	1.09	1.00
	Total		**25.23**	**17.91**	**9.49**	**5.32**
TOTAL			***25.23***	***17.91***	***9.49***	***5.32***
2026 P2 Building & P3 Site Preparation			**37.70**	**34.00**	**10.02**	**5.82**
4.81-acre LST			**216**	**1,277**	**10.68**	**5.87**
Exceed Threshold?			No	No	No	No

Phase 3 Rough Grading						
			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2026**				
	Fugitive Dust				3.9345	1.562
	Off-Road		27.9429	26.3311	1.1309	1.0404
	Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***
Onsite		**2026**				
	Fugitive Dust				3.9345	1.562
	Off-Road		27.9429	26.3311	1.1309	1.0404
	Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***
Onsite		**2026**				
	Fugitive Dust		0.00	0.00	3.93	1.56
	Off-Road		27.94	26.33	1.13	1.04
	Total		**27.94**	**26.33**	**5.07**	**2.60**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***
2026 P2 Building & P3 Rough Grading			**40.41**	**42.42**	**5.59**	**3.10**

5.00-acre LST		**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?		No	No	No	No

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Fugitive Dust				3.9345	1.562
Off-Road		27.9429	26.3311	1.1309	1.0404
Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Fugitive Dust				3.9345	1.562
Off-Road		27.9429	26.3311	1.1309	1.0404
Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Fugitive Dust		0.00	0.00	3.93	1.56
Off-Road		27.94	26.33	1.13	1.04
Total		**27.94**	**26.33**	**5.07**	**2.60**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***

2027 P2 Building & P3 Rough Grading		**40.41**	**42.42**	**5.59**	**3.10**

5.00-acre LST		**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?		No	No	No	No

2027 P2 Building Construction, P3 Rough Grading, & P2 Architectural Coating		**41.56**	**44.22**	**5.64**	**3.15**

5.00-acre LST		**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?		No	No	No	No

Phase 3 Utility Trenching

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Off-Road		5.4135	9.1328	0.3174	0.292
Total		**5.4135**	**9.1328**	**0.3174**	**0.292**
TOTAL		***5.41***	***9.13***	***0.32***	***0.29***

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Off-Road		5.4135	9.1328	0.3174	0.292
Total		**5.4135**	**9.1328**	**0.3174**	**0.292**
TOTAL		***5.41***	***9.13***	***0.32***	***0.29***

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Off-Road		5.41	9.13	0.32	0.29
Total		**5.41**	**9.13**	**0.32**	**0.29**
TOTAL		***5.41***	***9.13***	***0.32***	***0.29***

2027 P2 Building Construction, P3 Rough Grading, P2 Architectural Coating, & P3 Utility Trenching		**46.97**	**53.36**	**5.96**	**3.44**
5.00-acre LST		**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?		No	No	No	No

Phase 3 Fine Grading

		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2027**				
Fugitive Dust				3.9345	1.562
Off-Road		27.9429	26.3311	1.1309	1.0404
Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***
Onsite	**2027**				
Fugitive Dust				3.9345	1.562
Off-Road		27.9429	26.3311	1.1309	1.0404
Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***
Onsite	**2027**				
Fugitive Dust		0.00	0.00	3.93	1.56
Off-Road		27.94	26.33	1.13	1.04
Total		**27.94**	**26.33**	**5.07**	**2.60**
TOTAL		***27.94***	***26.33***	***5.07***	***2.60***

2027 P2 Building Construction, P3 Rough Grading, P2 Architectural Coating, P3 Utility Trenching, & P3 Fine Grading	**74.91**	**79.69**	**11.03**	**6.04**
5.00-acre LST	**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?	No	No	Yes	Yes
2027 P3 Rough Grading, P3 Utility Trenching, & P3 Fine Grading	**61.30**	**61.80**	**10.45**	**5.50**
5.00-acre LST	**221**	**1,311**	**10.99**	**6.00**
Exceed Threshold?	No	No	No	No
2027 P3 Utility Trenching & P3 Fine Grading	**33.36**	**35.46**	**5.38**	**2.89**
4.00-acre LST	**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?	No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2028**				
	Fugitive Dust				3.9345	1.562
	Off-Road		27.9429	26.3311	1.1309	1.0404
	Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***

Onsite		**2028**				
	Fugitive Dust				3.9345	1.562
	Off-Road		27.9429	26.3311	1.1309	1.0404
	Total		**27.9429**	**26.3311**	**5.0654**	**2.6024**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***

Onsite		**2028**				
	Fugitive Dust		0.00	0.00	3.93	1.56
	Off-Road		27.94	26.33	1.13	1.04
	Total		**27.94**	**26.33**	**5.07**	**2.60**
TOTAL			***27.94***	***26.33***	***5.07***	***2.60***

Phase 3 Asphalt Paving

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2027**				
	Off-Road		8.5816	14.578	0.4185	0.385
	Paving				0	0
	Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL			***8.58***	***14.58***	***0.42***	***0.39***

Onsite		**2027**				
	Off-Road		8.5816	14.578	0.4185	0.385
	Paving				0	0
	Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL			***8.58***	***14.58***	***0.42***	***0.39***

Onsite		**2027**				
	Off-Road		8.58	14.58	0.42	0.39
	Paving		0.00	0.00	0.00	0.00
	Total		**8.58**	**14.58**	**0.42**	**0.39**
TOTAL			***8.58***	***14.58***	***0.42***	***0.39***

2027 P3 Uility Trenching, P3 Fine Grading, & P3 Asphalt Paving	**41.94**	**50.04**	**5.80**	**3.28**
4.00-acre LST	**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?	No	No	No	No
2027 P3 Fine Grading & P3 Asphalt Paving	**36.52**	**40.91**	**5.48**	**2.99**
4.00-acre LST	**196**	**1,128**	**9.33**	**5.33**
Exceed Threshold?	No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2028**				
	Off-Road		8.5816	14.578	0.4185	0.385
	Paving				0	0
	Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL			***8.58***	***14.58***	***0.42***	***0.39***

Onsite		**2028**				
	Off-Road		8.5816	14.578	0.4185	0.385
	Paving				0	0
	Total		**8.5816**	**14.578**	**0.4185**	**0.385**
TOTAL			***8.58***	***14.58***	***0.42***	***0.39***
Onsite		**2028**				
	Off-Road		8.58	14.58	0.42	0.39
	Paving		0.00	0.00	0.00	0.00
	Total		**8.58**	**14.58**	**0.42**	**0.39**
TOTAL			***8.58***	***14.58***	***0.42***	***0.39***

Phase 3 Finishing/Landscaping

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2027**				
	Off-Road		1.3297	2.2206	0.0539	0.0496
	Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***
Onsite		**2027**				
	Off-Road		1.3297	2.2206	0.0539	0.0496
	Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***

Onsite		**2027**				
	Off-Road		1.33	2.22	0.05	0.05
	Total		**1.33**	**2.22**	**0.05**	**0.05**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***

2027 P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping	**37.85**	**43.13**	**5.54**	**3.04**
4.50-acre LST	**209**	**1,219**	**10.16**	**5.67**
Exceed Threshold?	No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2028**				
	Off-Road		1.3297	2.2206	0.0539	0.0496
	Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***

Onsite		**2028**				
	Off-Road		1.3297	2.2206	0.0539	0.0496
	Total		**1.3297**	**2.2206**	**0.0539**	**0.0496**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***
Onsite		**2028**				
	Off-Road		1.33	2.22	0.05	0.05
	Total		**1.33**	**2.22**	**0.05**	**0.05**
TOTAL			***1.33***	***2.22***	***0.05***	***0.05***
<=1.00-acre LST			**103**	**522**	**4.00**	**3.00**
Exceed Threshold?			No	No	No	No
2028 P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping			**37.85**	**43.13**	**5.54**	**3.04**
4.50-acre LST			**209**	**1,219**	**10.16**	**5.67**
Exceed Threshold?			No	No	No	No

Phase 3 Building Construction

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2028**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2028**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2028**				
	Off-Road		12.47	16.08	0.53	0.50
	Total		**12.47**	**16.08**	**0.53**	**0.50**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
1.31-acre LST			**117**	**597**	**4.62**	**3.31**
Exceed Threshold?			No	No	No	No
2028 P3 Finish/Landscape & P3 Building Construction			**13.80**	**18.31**	**0.58**	**0.55**
1.81-acre LST			**139**	**717**	**5.62**	**3.81**
Exceed Threshold?			No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2029**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***

Onsite		**2029**				
	Off-Road		12.4697	16.0847	0.5276	0.4963
	Total		**12.4697**	**16.0847**	**0.5276**	**0.4963**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
Onsite		**2029**				
	Off-Road		12.47	16.08	0.53	0.50
	Total		**12.47**	**16.08**	**0.53**	**0.50**
TOTAL			***12.47***	***16.08***	***0.53***	***0.50***
1.31-acre LST			**117**	**597**	**4.62**	**3.31**
Exceed Threshold?			No	No	No	No

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2030**				
	Off-Road		7.9346	16.157	0.1481	0.1481
	Total		**7.9346**	**16.157**	**0.1481**	**0.1481**
TOTAL			***7.93***	***16.16***	***0.15***	***0.15***
Onsite		**2030**				
	Off-Road		7.9346	16.157	0.1481	0.1481
	Total		**7.9346**	**16.157**	**0.1481**	**0.1481**
TOTAL			***7.93***	***16.16***	***0.15***	***0.15***
Onsite		**2030**				
	Off-Road		7.93	16.16	0.15	0.15
	Total		**7.93**	**16.16**	**0.15**	**0.15**
TOTAL			***7.93***	***16.16***	***0.15***	***0.15***

Phase 3 Architectural Coating

			NOx	CO	PM10 Total	PM2.5 Total
Onsite		**2029**				
	Archit. Coating				0	0
	Off-Road		1.1455	1.8091	0.0515	0.0515
	Total		**1.1455**	**1.8091**	**0.0515**	**0.0515**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
Onsite		**2029**				
	Archit. Coating				0	0
	Off-Road		1.1455	1.8091	0.0515	0.0515
	Total		**1.1455**	**1.8091**	**0.0515**	**0.0515**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***
Onsite		**2029**				
	Archit. Coating		0.00	0.00	0.00	0.00
	Off-Road		1.15	1.81	0.05	0.05
	Total		**1.15**	**1.81**	**0.05**	**0.05**
TOTAL			***1.15***	***1.81***	***0.05***	***0.05***

2029 P3 Building Construction & P3 Architectural Coating		**13.62**	**17.89**	**0.58**	**0.55**
1.31-acre LST		**117**	**597**	**4.62**	**3.31**
Exceed Threshold?		No	No	No	No
		NOx	CO	PM10 Total	PM2.5 Total
Onsite	**2030**				
Archit. Coating				0	0
Off-Road		0.8563	1.7977	0.0203	0.0203
Total		**0.8563**	**1.7977**	**0.0203**	**0.0203**
TOTAL		***0.86***	***1.80***	***0.02***	***0.02***
Onsite	**2030**				
Archit. Coating				0	0
Off-Road		0.8563	1.7977	0.0203	0.0203
Total		**0.8563**	**1.7977**	**0.0203**	**0.0203**
TOTAL		***0.86***	***1.80***	***0.02***	***0.02***
Onsite	**2030**				
Archit. Coating		0.00	0.00	0.00	0.00
Off-Road		0.86	1.80	0.02	0.02
Total		**0.86**	**1.80**	**0.02**	**0.02**
TOTAL		***0.86***	***1.80***	***0.02***	***0.02***
2030 P3 Building Construction & P3 Architectural Coating		**8.79**	**17.95**	**0.17**	**0.17**
1.31-acre LST		**117**	**597**	**4.62**	**3.31**
Exceed Threshold?		No	No	No	No

Regional Operation Emissions Worksheet: Unmitigated*

*CalEEMod, Version 2020.4.0

Summer

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Area	36.34	19.29	98.21	0.12	1.98	1.98
Energy	0.63	5.42	2.31	0.03	0.44	0.44
Mobile	26.60	15.95	263.13	0.58	84.79	22.71
Total	**63.57**	**40.66**	**363.65**	**0.73**	**87.20**	**25.13**

Winter

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Area	36.34	19.29	98.21	0.12	1.98	1.98
Energy	0.63	5.42	2.31	0.03	0.44	0.44
Mobile	26.33	17.38	262.06	0.55	84.79	22.71
Total	**63.31**	**42.10**	**362.58**	**0.71**	**87.20**	**25.13**

Max Daily

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Area	36.343900	19.290500	98.210100	0.121300	1.978600	1.978600
Energy	0.634700	5.424000	2.308100	0.034600	0.438500	0.438500
Mobile	26.595500	17.381700	263.133500	0.576000	84.786100	22.708200
Total	**63.57**	**42.10**	**363.65**	**0.73**	**87.20**	**25.13**
Regional Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	Yes	No	No	No	No	No

Regional Operation Emissions Worksheet: Mitigated*

*CalEEMod, Version 2020.4.0

Summer

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Area[1]	34.21	1.04	90.45	0.00	0.50	0.50
Energy[1]	0	0	0	0	0	0
Mobile	26.60	15.95	263.13	0.58	84.79	22.71
Total	**60.80**	**16.99**	**353.58**	**0.58**	**85.29**	**23.21**

Winter

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Area[1]	34.21	1.04	90.45	0.00	0.50	0.50
Energy[1]	0	0	0	0	0	0
Mobile	26.33	17.38	262.06	0.55	84.79	22.71
Total	**60.54**	**18.43**	**352.50**	**0.56**	**85.29**	**23.21**

Max Daily

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Area[1]	34.208600	1.043500	90.445300	0.004790	0.503300	0.503300
Energy[1]	0	0	0	0	0	0
Mobile	26.595500	17.381700	263.133500	0.576000	84.786100	22.708200
Total	**60.80**	**18.43**	**353.58**	**0.58**	**85.29**	**23.21**
Regional Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	Yes	No	No	No	No	No

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Unmitigated Emissions	63.57	42.10	363.65	0.73	87.20	25.13
Mitigation Emissions	60.80	18.43	353.58	0.58	85.29	23.21
Net Change	**2.77**	**23.67**	**10.07**	**0.15**	**1.91**	**1.91**

[1] Incorporates Mitigation Measure GHG-1 which prohibits woodburning and natural gas fire places, and requires all homes to be designed and built to be all electric.

GHG Emissions Inventory

Construction[1]

	GHG Emissions ($MTCO_2e$)[2]					
	Western Remediation	Phase 1	Eastern Remediation	Phase 2	Phase 3	$MTCO_2e$ Total
2023	316.5751	286.6528				603
2024		938.0731	302.3021	121.1022		1,361
2025		316.5106		1073.0532		1,390
2026				1499.1844	270.0155	1,769
2027				901.6288	1116.4596	2,018
2028					537.2259	537
2029					388.2577	388
2030					193.5435	194
Total Construction	**317**	**1,541**	**302**	**3,595**	**2,506**	**8,261**

[1]CalEEMod, Version 2020.4.0

[2]MTCO2e=metric tons of carbon dioxide equivalent.

Operation[1]

	Annual Emissions ($MTCO_2e$/Yr)		
	Unmitigated	Mitigated	
Area	**285**	**19**	**-266**
Energy	**2,285**	**1,809**	**-477**
Mobile - Passenger	**8,228**	**8,228**	**0**
Solid Waste	**1,480**	**1,480**	**0**
Water	**340**	**340**	**0**
Amortized Construction Emissions[2]	**275**	**275**	**0**
Total	**12,894**	**12,152**	**-742**
South Coast AQMD Bright-Line Screening Threshold	3,000	3,000	
Exceed Threshold?	**Yes**	**Yes**	

[1]CalEEMod, Version 2020.4.0

[2]Total construction emissions are amortized over 30 years per South Coast AQMD methodology; SCAQMD. 2009, November 19. Greenhouse Gases (GHG) CEQA Significance Thresholds Working Group Meeting 14. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-14/ghg-meeting-14-main-presentation.pdf?sfvrsn=2.

Daily Regional Construction Emissions Worksheet - Mojave Desert Air Basin

*CalEEMod, Version 2020.4.0

	Distance (mi)	Percent of Haul Route (%)
Total Haul Route Length:[1]	75	100%
Haul Route in the MDAB:[2]	21.9	29%
Haul Route in the SoCAB:	53.1	71%

[1] *Based on distance between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.*

[2] *Based on the distance at the MDAB and SoCAB border along to the haul route to Soil Safe of California.*

Western Remediation Rough Grading

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
	Summer					
Total Hauling Emissions	0.6940	53.3632	15.5496	0.2725	8.5098	2.6065
Adjusted MDAB Hauling Emissions	**0.2026**	**15.5821**	**4.5405**	**0.0796**	**2.4849**	**0.7611**
	Winter					
Total Hauling Emissions	0.6776	55.4653	15.5991	0.2725	8.5101	2.6068
Adjusted MDAB Hauling Emissions	**0.1979**	**16.1959**	**4.5549**	**0.0796**	**2.4849**	**0.7612**
	Maximum Emissions					
Total Hauling Emissions	0.6940	55.4653	15.5991	0.2725	8.5101	2.6068
Adjusted MDAB Hauling Emissions	**0.2026**	**16.1959**	**4.5549**	**0.0796**	**2.4849**	**0.7612**

Eastern Remediation Rough Grading

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
2024	**Summer**					
Total Hauling Emissions	0.6583	51.0382	15.4170	0.2583	8.2143	2.5264
Adjusted MDAB Hauling Emissions	**0.1922**	**14.9032**	**4.5018**	**0.0754**	**2.3986**	**0.7377**
2024	**Winter**					
Total Hauling Emissions	0.6425	53.0482	15.4632	0.2583	8.2145	2.5266
Adjusted MDAB Hauling Emissions	**0.1876**	**15.4901**	**4.5153**	**0.0754**	**2.3986**	**0.7378**
	Maximum Emissions					
Total Hauling Emissions	0.6583	53.0482	15.4632	0.2583	8.2145	2.5266
Adjusted MDAB Hauling Emissions	**0.1922**	**15.4901**	**4.5153**	**0.0754**	**2.3986**	**0.7378**
MAX DAILY	**0.20**	**16.20**	**4.55**	**0.08**	**2.48**	**0.76**
Regional Thresholds	**137**	**137**	**548**	**137**	**82**	**82**
Exceeds Thresholds?	No	No	No	No	No	No

Greenhouse Gas Emissions

	Total Hauling Emissions[1] (lb/day)	Adjusted MDAB Hauling Emissions (lb/day)
2023	39,569.33	11,554.25
2024	37,606.78	10,981.18
MDAQMD Threshold	**n/a**	**548,000**
Exceeds Threshold?	n/a	No

[1] *The summer emissions are shown here, which represent the higher emissions between the summer and winter emissions.*

Annual Regional Construction Emissions Worksheet - Mojave Desert Air Basin

*CalEEMod, Version 2020.4.0

	Distance (mi)	Percent of Haul Route (%)
Total Haul Route Length:[1]	75	100%
Haul Route in the MDAB:[2]	21.9	29%
Haul Route in the SoCAB:	53.1	71%

[1] *Based on distance between the project site and Soil Safe of California at 12328 Hibiscus Road in the City of Adelanto.*

[2] *Based on the distance at the MDAB and SoCAB border along to the haul route to Soil Safe of California.*

Western Remediation Rough Grading	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Total Hauling Emissions (ton/yr)	0.0058	0.4784	0.1323	0.0023	0.0713	0.0219
Adjusted MDAB Hauling Emissions (ton/yr)	**0.0017**	**0.1397**	**0.0386**	**0.0007**	**0.0208**	**0.0064**

Eastern Remediation Rough Grading	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Total Hauling Emissions	0.0055	0.4576	0.1312	0.0022	0.0688	0.0212
Adjusted MDAB Hauling Emissions	**0.0016**	**0.1336**	**0.0383**	**0.0006**	**0.0201**	**0.0062**

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
MAX DAILY	**0.0017**	**0.1397**	**0.0386**	**0.0007**	**0.0208**	**0.0064**
Regional Thresholds	**137**	**137**	**548**	**137**	**82**	**82**
Exceeds Thresholds?	No	No	No	No	No	No

Greenhouse Gas Emissions

	Total Hauling Emissions (metric ton/yr)	Total Hauling Emissions (ton/yr)	Adjusted MDAB Hauling Emissions (ton/yr)
2023	251.83	277.5971825	81.06
2024	239.33	263.8166416	186.78
MDAQMD Threshold	**n/a**	**n/a**	**100,000**
Exceeds Threshold?	n/a	n/a	No

metric ton to ton conversion factor: 0.907185 metric ton/ton

2. Criteria Air Pollutant and GHG Modeling Inputs and Assumptions

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CalEEMod Land Use Inputs: Project

Type	Land Use Type	Land Use Unit Amount	Land Use Size Metric	Lot Acreage	Land Use Square Feet
Residential	Single Family[1]	450	DU	135.10	810,000
Residential	Condo/Townhouse[2]	650	DU	62.90	650,000
Recreational	City Park	15.10	acre	15.10	657,756
Parking	Parking Lot[3]	1.49	acre	1.49	64,800
Parking	Other Asphalt Surfaces	2.0	acre	2.00	87,120
Parking	Other NonAsphalt Surfaces	45.51	acre	45.51	0
				262.10	**2,269,676.00**

[1] Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.

[2] Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.

[3] Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.

Project Location:	Orange County SC
Climate Zone:	8
Operation Year	2035
Land Use Setting	Urban
Utility Company	SCE
Source Receptor Area:	16 - North Orange County

Land Uses/Development

Buildings

	Phase 1	Phase 2	Phase 3	Total	
Plan Area Acreage	68.80	94.90	98.40	262.1	acres
Single Family (DU)	210	105	135	450	dwelling units (DU)
Size (BSF)[1]	*378,000*	*189,000*	*243,000*	*810,000*	*building square feet (BSF)*
Acres	*35.4*	*25.2*	*74.5*	*135.1*	
Townhomes (DU)	143	507	0	650	DU
Size (BSF)[2]	*143,000*	*507,000*	*0*	*650,000*	*BSF*
Acres	*13.9*	*49.0*	*0.0*	*62.9*	
Parks/Recreation(PR)	2.1	13	0	15.1	acres
Open Space (OS)	16.6	6.5	23.9	47.0	acres
Right-of-Way (ROW)	0.8	1.2	0.0	2.0	acres
Number of Surface Lot Parking Spaces	28	134	--	162	parking spaces
Surface Parking Lot Area[3]	11,200	53,600	--	64,800	square feet
	0.257	1.230	--	1.488	acres

[1] Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.

[2] Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.

[3] Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.

Trip Generation

Land Use	Unit Amount	Weekday Trip Generation Rate*	Trips Per Day	Saturday Trip Generation Rate*	Trips Per Day	Sunday Trip Generation Rate[1]	Trips Per Day
Single Family Detached (DU)	450	9.4289	4,243	9.4800	4,266	8.4800	3,816
Condo/Townhouse (DU)	650	7.2000	4,680	8.7600	5,694	7.1692	4,660
City Park (AC)	15.1	28.3444	428	160.8609	2,429	122.9801	1,857
			9,351		**12,389**		**10,333**

[1] *Based on information provided by Linscott, Law, & Greenspan*

Vehicle Miles Traveled

	Weekday[1]	Saturday[1,2]	Sunday[1,2]
Total Daily VMT:[1]	83,659	110,838	92,444
Total Daily ADT:[2]	9,351	12,389	10,333
Average Trip Length (mile/trip):	8.9465	8.9465	8.9465

[1] *Weekday VMT provided by Linscott, Law, & Greenspan (LLG) 2022. For purposes of this analysis, the weekday average trip length is also used to calculate the total daily VMT for Saturday and Sunday.*

[2] *Provided by Linscott, Law, & Greenspan (LLG) 2022.*

Water Use*

Water Demand

Land Use	Average Use Per Day (gpd)	Annual Average (gpy)
Single Family	185,130	67,572,450
Condo/Townhouse	104,000	37,960,000
City Park	30,805	11,243,825
Common Areas	132,602	48,399,730
Total	**452,537**	**165,176,005**

Wastewater Generation

Land Use	Average Use Per Day (gpd)	Annual Average (gpy)
Single Family	115,980	42,332,700
Condo/Townhouse	153,400	55,991,000
Total	**269,380**	**98,323,700**

Total Annual Water Demand:	165,176,005	gpy
Total Annual Wastewater:	98,323,700	gpy
Total Annual Outdoor Water Use:	66,852,305	gpy

CalEEMod Inputs

Land Use	Indoor[3]	Outdoor[4]	Total
Single Family	49,161,850.00	22,284,101.67	71,445,951.67
Condo/Townhouse	49,161,850.00	22,284,101.67	71,445,951.67
City Park	0	22,284,101.67	22,284,101.67
Other Asphalt Surfaces	0	0	0
Other NonAsphalt Surfaces	0	0	0
Total	**98,323,700**	**66,852,305**	**165,176,005**

[1] *Psomas 2022.*

[2] *Based on 365 days per year.*

[3] *For purposes of this analysis, indoor water use is assigned and proportioned equally between the residential uses.*

[4] *For purposes of this analysis, outdoor water use is assigned and proportioned equally between the residential and park uses.*

Solid Waste*

Solid Waste Generation

Land Uses	Pounds Per Day[1]	Pounds Per Year[2]	Tons Per Year
Residential Solid Waste:	16,130	5,887,596	2,944

Land Use	Annual Solid Waste Generated (tpy)[3]
Single Family	1,471.90
Condo/Townhouse	1,471.90
Total	**2,944**

[1] *See Impact 5.19-4 of Chapter 5.19, Utilities and Service Systems, of the DEIR for further details.*

[2] *Based on 365 days per year.*

[3] *For purposes of this analysis,solid waste generation is proportioned equally among the residential land uses.*

Electricity (Buildings)

Buildings constructed after January 1, 2020 are required to meet the 2019 Building Energy Efficiency Standards.

Fuel Switching (Mitigation Measure GHG-1)[1]

Residential Energy Use Categories	Percent of Annual Energy - Gas			
	Single Family	Townhomes	Low-Rise Apartments (2-4 Unit buildings)	Mid-Rise Apartments (5+ Units buildings)
Water Heaters	47%	68%	65%	75%
Space Heaters	44%	21%	24%	13%
Cooking (Oven + Cooktop)	9%	11%	11%	12%
Total	100%	100%	100%	100%

	Energy Use Index (KwH/DU/yr)			
	Single Family	Townhomes	Low-Rise Apartments (2-4 Unit buildings)	Mid-Rise Apartments (5+ Units buildings)
Water Heaters	3,169	2,190	1,301	1,543
Conventional Heat	1,171	501	552	570
Cooking (Oven + Cooktop)	310	234	218	165
Water Heater (Electric Backup)	*1,877*	*2,075*		
Heat Pump	*994*	*320*	*324*	*522*
Total (Water Heater, Conventional Heat, Cooking)[2,3]	4,650	2,925	2,071	2,278

Notes

[1] Sacramento Metropolitan Air Quality Management Distrct. 2020, June 1. Greenhouse Gas Thresholds for Sacramento County.

[2] For residential projects that comply with BMP 1, the electricity use rates should be increased by this total per DU. For projects that do not comply with BMP 1 and instead commit to one or two of the appliance groups to be electric, the electricity use can be increased by just the rate shown for the relevant appliance groups and the natural gas use can be reduced by the percent of natural gas from the appliance groups shown above. Heat pumps are more efficient than conventional electric heating, so projects that plan to use heat pumps can use the heat pump values instead of the conventional heat values.

[3] Space heating and water heating are included in the Title 24 electricity and Title 24 natural gas energy usage categories of CalEEMod, while cooking and appliances are included in the non-title 24 electricity and natural gas energy usage categories.

Additional Electricity Demand from Fuel Switching

Land Use	Number of Dwelling Units	Kwh/DU/Yr	T24E	NT24E	Additional Kwh/yr
Condo/Townhouse	650.0	2,925	2,691	234	1,901,250
Single Family	450.0	4,650	4,340	310	2,092,500

CalEEMod Defaults

EnergyUseLandUseSubType	T24E	NT24E	LightingElect	T24NG	NT24NG
	Kwh/DU			kBTU/DU	
Condo/Townhouse	36.21	3,795.01	1,001.10	10,989.44	5,516.00
Single-Family	53.28	6,155.97	1,608.84	18,381.75	5,516.00
Parking Lot	0	0	0.35	0	0

Changes to the Defaults

EnergyUseLandUseSubType	T24E	NT24E	LightingElect	T24NG	NT24NG
	Kwh/DU			kBTU/DU	
Condo/Townhouse	2,727.21	4,029.01	1,001.10	0	0
Single-Family	4,393.28	6,465.97	1,608.84	0	0
Parking Lot			0.35		

Architectural Coating

Land Use	Land Use Amount (BSF)	CalEEMod Paintable Surface Area Multiplier*	Total Paintable Surface Area (BSF)	Total Paintable Interior Surface Area (BSF)*	Total Paintable Exterior Surface Area (BSF)*
Single Family	810,000	2.7	2,187,000	1,640,250	546,750
Condo/Townhouse	650,000	2.7	1,755,000	1,316,250	438,750
			Residential Sub-Total	***2,956,500***	***985,500***
Parking Lot	64,800	6%	3,888	0	3,888

*Based on CalEEMod methodology in calculating the paintable surface areas for a residential building and surface parking lot.

Hearths

	Dwelling Units with Gas Fireplace	Dwelling Units W/O Fireplace
Single Family	450	0
Condominium/Townhome	650	0

** Assumed no fireplaces for multi-family dwellings based on SCAQMD Rule 445, Wood-Burning Devices.*

Carbon Intensity Factors

Southern California Edison Carbon Intensity Factors

SCE CO_2e Intensity Factor[1] 512 pounds per megawatt hour

	2020[1]	2027[2]	Adjusted Carbon Intensity (lbs of CO_2e/MWh)
Assumed Percent Renewable	34.2%	52%	**373.495441**
CO_2e MTons/Mwh without Renewable	778.1155015		

CO2:[1,3]	371.4784407	pounds per megawatt hour
CH4:[4]	0.033	pound per megawatt hour
N2O:[4]	0.004	pound per megawatt hour

[1] *Based on CO_2e intensity factor of 512 pounds per megawatt hour; Southern California Edison. 2020. 2020 Sustainability Report. https://www.edison.com/content/dam/eix/documents/sustainability/eix-2020-sustainability-report.pdf*

[2] For purposes of the analysis, as the project could be built out betweeh years 2030 through 2035, it is anticipated that SCE would meet the 2027 RPS target of 52 percent renewables as established under Senate Bill 100.

[3] Based on Intergovernmental Panel on Climate Change Fourth Assessment Report global warming potentials for CH4 and N2O; Intergovernmental Panel on Climate Change (IPCC). 2007. Fourth Assessment Report: Climate Change 2007.

[4] CalEEMod default values.

General Conversion Factors	
lbs to kg	0.4536
kg to MTons	0.001
Mmbtu to Therm	0.1
Therms to kwh	29.30711111
kilowatt hrs to megawatt hrs	0.001
lbs to Tons	2000
Tons to MTon	0.9071847

Source: California Air Resources Board (CARB). 2010. Local Government Operations Protocol. Version 1.1. Appendix F, Standard Conversion Factors

	Global Warming Potentials (GWP)
CO_2	1
CH_4	25
N_2O	298

Based on Intergovernmental Panel on Climate Change Fourth Assessment Report global warming potentials for CH4 and N2O; Intergovernmental Panel on Climate Change (IPCC). 2007. Fourth Assessment Report: Climate Change 2007.

Changes to the CalEEMod Defaults - Year 2035

Total ADTs: 9,351

Commercial Default	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	
FleetMix (Model Default)	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397	100%
Trips	5,166	601	1,691	1,119	227	68	142	44	6	3	246	6	32	9,351
Percent	98%						2%	0%						100%
Proportion	0.566629	0.065952	0.185454	0.122700	0.024905	0.007415	0.747855	1.000000	0.033577	0.017306	0.026945	0.033774	0.167488	
Assumed Mix	99.50%						0.50%	0.00%						100.00%
adjusted with Assumed	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837	100%
Trips	5,272	614	1,726	1,142	232	69	35	0	2	1	251	2	8	9,351
	56%	7%	18%	12%	2%	1%	0%	0%	0%	0%	3%	0%	0%	100%
Modified	**0.563796**	**0.065622**	**0.184527**	**0.122087**	**0.024780**	**0.007378**	**0.003739**	**0.000000**	**0.000168**	**0.000087**	**0.026810**	**0.000169**	**0.000837**	**100.0%**
Final Check Trips	5,272	614	1,726	1,142	232	69	35	0	2	1	251	2	8	9,351

Construction Activities and Schedule Assumptions*

* Based on information provided.

Construction Activities	Construction Schedule			
	Start Date	End Date	Duration (Calendar Days)	Duration (Work Days)
Western Remediation Area				
Site Preparation	8/1/2023	8/8/2023	7	6
Rough Grading	8/9/2023	8/31/2023	22	17
Phase 1				
Site Preparation	8/1/2023	10/3/2023	63	46
Rough Grading	10/4/2023	2/7/2024	126	91
Utility Trenching	11/20/2023	3/9/2024	110	80
Fine Grading	1/6/2024	5/12/2024	127	90
Asphalt Paving	3/10/2024	7/16/2024	128	92
Finishing/Landscaping	4/12/2024	8/17/2024	127	91
Building Construction	5/13/2024	5/31/2025	383	275
Architectural Coating	1/25/2025	5/31/2025	126	90
Eastern Remediation Area				
Site Preparation	10/1/2024	10/8/2024	7	6
Rough Grading	10/9/2024	10/31/2024	22	17
Phase 2				
Site Preparation	10/1/2024	1/6/2025	97	70
Rough Grading	1/7/2025	7/20/2025	194	139
Utility Trenching	3/21/2025	9/7/2025	170	121
Fine Grading	6/2/2025	12/15/2025	196	141
Asphalt Paving	9/9/2025	3/26/2026	198	143
Finishing/Landscaping	10/29/2025	5/13/2026	196	141
Building Construction	12/17/2025	7/31/2027	591	423
Architectural Coating	1/14/2027	7/31/2027	198	142
Phase 3				
Site Preparation	8/1/2026	10/6/2026	66	47
Rough Grading	10/7/2026	8/31/2027	328	235
Utility Trenching	3/20/2027	11/5/2027	230	165
Fine Grading	6/27/2027	3/18/2028	265	190
Asphalt Paving	9/3/2027	3/18/2028	197	141
Finishing/Landscaping	11/8/2027	5/25/2028	199	144
Building Construction	3/21/2028	5/31/2030	801	574
Architectural Coating	11/15/2029	5/31/2030	197	142

Construction CalEEMod Inputs: Western Remediation Area

Type	Land Use Type	Land Use Unit Amount	Land Use Size Metric	Lot Acreage	Land Use Square Feet
Parking	Other NonAsphalt Surfaces	94.90	acre	94.90	0
				94.90	**0.00**
Project Location:	Orange County SC				
Climate Zone:	8				
Operation Year	2026				
Land Use Setting	Urban				
Utility Company	SCE				
Source Receptor Area:	16 - North Orange County				

Land Uses/Development

Buildings

	Phase 1	Phase 2	Phase 3	Total	
Plan Area Acreage	68.80	94.90	98.40	262.1	acres
Single Family (DU)	210	105	135	450	dwelling units (DU)
Size (BSF) [1]	*378,000*	*189,000*	*243,000*	*810,000*	*building square feet (BSF)*
Acres	*35.4*	*25.2*	*74.5*	*135.1*	
Townhomes (DU)	143	507	0	650	DU
Size (BSF) [2]	*143,000*	*507,000*	*0*	*650,000*	*BSF*
Acres	*13.9*	*49.0*	*0.0*	*62.9*	
Parks/Recreation	2.1	13	0	15.1	acres
Open Space/Slopes (AC)	16.6	6.5	23.9	47.0	acres
Recreational/Commercial (AC)				0.0	acres
Master Plan Roadways (AC)	0.8	1.2	0.0	2.0	acres
Number of Surface Lot Parking Spaces	28	134		162	parking spaces
Surface Parking Lot Area (SF)[3]	11,200	53,600		64,800	SF
	0.257	1.230		1.488	acres

[1] *Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.*

[2] *Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.*

[3] *Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.*

Soil Haul

	Export (CY)[1]	Haul Truck Capacity (CY)	Total Haul Trips	Haul Trip Duration (Workday)	Daily Haul Trips	Haul Trip Distance[2] (mi/trip)
Site Preparation	0	16	0	6	0	75
Rough Grading	18,157	16	2,270	17	138	75

[1] *Based on 20 percent of the anticipated 90,384 cubic yards of impacted soil.*

[2] *Based on transferring soil to a thermal treatment facility at 12328 Hibiscus Road in the City of Adelanto.*

Construction Equipment Mix: Western Remediation Area*

Equipment	Pieces of Equipment	Hrs Op	HP	LF	Worker Trips/ Day	Vendor Trips
Site Preparation					**Default**	**16**
Rubber Tired Dozers	**3**	8	**247**	**0.40**		
Tractors/Loaders/Backhoes	**4**	8	**97**	**0.37**		
Water truck**	**4**					**16**
Rough Grading					**Default**	**32**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**32**

*Information provided by Applicant.

***Based on 10,000 gallons per acres disturbed and a 4,000 gallon water truck. 2005, June 5. Maricopa Air Quality Department.*

Construction CalEEMod Inputs: Eastern Remediation Area

Type	Land Use Type	Land Use Unit Amount	Land Use Size Metric	Lot Acreage	Land Use Square Feet
Parking	Other NonAsphalt Surfaces	167.20	acre	167.20	0
				167.20	**0.00**
Project Location:	Orange County SC				
Climate Zone:	8				
Operation Year	2026				
Land Use Setting	Urban				
Utility Company	SCE				
Source Receptor Area:	16 - North Orange County				

Land Uses/Development

Buildings

	Phase 1	Phase 2	Phase 3	Total	
Plan Area Acreage	68.80	94.90	98.40	262.1	acres
Single Family (DU)	210	105	135	450	dwelling units (DU)
Size (BSF) [1]	*378,000*	*189,000*	*243,000*	*810,000*	*building square feet (BSF)*
Acres	*35.4*	*25.2*	*74.5*	*135.1*	
Townhomes (DU)	143	507	0	650	DU
Size (BSF) [2]	*143,000*	*507,000*	*0*	*650,000*	*BSF*
Acres	*13.9*	*49.0*	*0.0*	*62.9*	
Parks/Recreation	2.1	13	0	15.1	acres
Open Space/Slopes (AC)	16.6	6.5	23.9	47.0	acres
Recreational/Commercial (AC)				0.0	acres
Master Plan Roadways (AC)	0.8	1.2	0.0	2.0	acres
Number of Surface Lot Parking Spaces	28	134		162	parking spaces
Surface Parking Lot Area (SF)[3]	11,200	53,600		64,800	SF
	0.257	1.230		1.488	acres

[1] *Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.*

[2] *Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.*

[3] *Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.*

Soil Haul

	Export (CY)[1]	Haul Truck Capacity (CY)	Total Haul Trips	Haul Trip Duration (Workday)	Daily Haul Trips	Haul Trip Distance[2] (mi/trip)
Site Preparation	0	16	0	6	0	75
Rough Grading	17,498	16	2,187	17	132	75

[1] *Based on 20 percent of the anticipated 87,491 cubic yards of impacted soil.*

[2] *Based on transferring soil to a thermal treatment facility at 12328 Hibiscus Road in the City of Adelanto.*

Construction Equipment Mix: Eastern Remediation Area*

Equipment	Pieces of Equipment	Hrs Op	HP	LF	Worker Trips/ Day	Vendor Trips
Site Preparation					**Default**	**16**
Rubber Tired Dozers	**3**	8	**247**	**0.40**		
Tractors/Loaders/Backhoes	**4**	8	**97**	**0.37**		
Water truck**	**4**					**16**
Rough Grading					**Default**	**32**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**187**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**32**

*Information provided by Applicant.

***Based on 10,000 gallons per acres disturbed and a 4,000 gallon water truck. 2005, June 5. Maricopa Air Quality Department.*

Construction CalEEMod Inputs: Phase 1

Type	Land Use Type	Land Use Unit Amount	Land Use Size Metric	Lot Acreage	Land Use Square Feet
Residential	Single Family[1]	210	DU	35.40	378,000
Residential	Condo/Townhouse[2]	143	DU	13.90	143,000
Recreational	City Park	2.10	acre	2.10	91,476
Parking	Parking Lot	0.26	acre	0.26	11,200
Parking	Other Asphalt Surfaces	0.8	acre	0.80	34,848
Parking	Other NonAsphalt Surfaces	16.34	acre	16.34	0
				68.80	**658,524.00**

[1] Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.

[2] Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.

Project Location:	Orange County SC
Climate Zone:	8
Operation Year	2026
Land Use Setting	Urban
Utility Company	SCE
Source Receptor Area:	16 - North Orange County

Land Uses/Development

Buildings

	Phase 1	Phase 2	Phase 3	Total	
Plan Area Acreage	68.80	94.90	98.40	262.1	acres
Single Family (DU)	210	105	135	450	dwelling units (DU)
Size (BSF) [1]	*378,000*	*189,000*	*243,000*	*810,000*	*building square feet (BSF)*
Acres	*35.4*	*25.2*	*74.5*	*135.1*	
Townhomes (DU)	143	507	0	650	DU
Size (BSF) [2]	*143,000*	*507,000*	*0*	*650,000*	*BSF*
Acres	*13.9*	*49.0*	*0.0*	*62.9*	
Parks/Recreation	2.1	13	0	15.1	acres
Open Space/Slopes (AC)	16.60	6.5	23.9	47.0	acres
Master Plan Roadways (AC)	0.80	1.2	0.0	2.0	acres
Number of Surface Lot Parking Spaces	28	134		162	parking spaces
Surface Parking Lot Area (SF)[3]	11,200	53,600		64,800	SF
	0.257	1.230		1.488	acres

[1] Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.

[2] Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.

[3] Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.

Architectural Coating

Land Use	Land Use Amount (BSF)	CalEEMod Paintable Surface Area Multiplier*	Total Paintable Surface Area (BSF)	Total Paintable Interior Surface Area (BSF)*	Total Paintable Exterior Surface Area (BSF)*
Single Family	378,000	2.7	1,020,600	765,450	255,150
Condo/Townhome	143,000	2.7	386,100	289,575	96,525
			Residential Sub-Total	***1,055,025***	***351,675***
Parking Lot	11,200	6%	672	0	672

*Based on CalEEMod methodology in calculating the paintable surface areas for a residential building and surface parking lot.

Construction Equipment Mix: Phase 1*

Equipment	Pieces of Equipment	Hrs Op	HP	LF	Worker Trips/ Day	Vendor Trips/Day
Site Preparation					**Default**	**8**
Rubber Tired Dozers	**3**	8	**247**	**0.40**		
Tractors/Loaders/Backhoes	**4**	8	**97**	**0.37**		
Water truck**	**4**					**8**
Rough Grading					**Default**	**16**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**16**
Utility Trenching***					**Default**	**Default**
Excavators	**2**	8	**158**	**0.38**		
Trenchers	**1**	8	**78**	**0.50**		
Fine Grading					**Default**	**16**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**16**
Asphalt Paving					**Default**	**Default**
Pavers	**2**	8	**130**	**0.42**		
Paving Equipment	**2**	8	**132**	**0.36**		
Rollers	**2**	8	**80**	**0.38**		
Finishing/Landscaping***					**Default**	**Default**
Tractors/Loaders/Backhoes	**1**	8	**97**	**0.37**		
Building Construction					**Default**	**Default**
Cranes	**1**	7	**231**	**0.29**		
Forklifts	**3**	8	**89**	**0.20**		
Generator Sets	**1**	8	**84**	**0.74**		
Tractors/Loaders/Backhoes	**3**	7	**97**	**0.37**		
Welders	**1**	8	**46**	**0.45**		
Architectural Coating					**Default**	**Default**
Air Compressors	**1**	6	**78**	**0.48**		

*CalEEMod default unless otherwise noted.

***Based on 10,000 gallons per acre disturbed and a 4,000 gallon water truck. 2005, June 5. Maricopa Air Quality Department. Guidance for Application for Dust Control Permit. https://www.epa.gov/sites/default/files/2019-04/documents/mr_guidanceforapplicationfordustcontrolpermit.pdf*

***Assumed.

Construction Activities and Schedule Assumptions: Phase 1*

* Based on information provided.

Construction Activities	Construction Schedule			
	Start Date	End Date	Duration (Calendar Days)	Duration (Work Days)
Phase 1				
Site Preparation	8/1/2023	10/3/2023	63	46
Rough Grading	10/4/2023	2/7/2024	126	91
Utility Trenching	11/20/2023	3/9/2024	110	80
Fine Grading	1/6/2024	5/12/2024	127	90
Asphalt Paving	3/10/2024	7/16/2024	128	92
Finishing/Landscaping	4/12/2024	8/17/2024	127	91
Building Construction	5/13/2024	5/31/2025	383	275
Architectural Coating	1/25/2025	5/31/2025	126	90

Construction CalEEMod Inputs: Phase 2

Type	Land Use Type	Land Use Unit Amount	Land Use Size Metric	Lot Acreage	Land Use Square Feet
Residential	Single Family[1]	105	DU	25.20	189,000
Residential	Condo/Townhouse[2]	507	DU	49.00	507,000
Recreational	City Park	13.00	acre	13.00	566,280
Parking	Parking Lot	53.60	1000SF	1.23	53,600
Parking	Other Asphalt Surfaces	1.2	acre	1.20	52,272
Parking	Other NonAsphalt Surfaces	5.27	acre	5.27	0
				94.90	**1,368,152.00**

[1] Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.

[2] Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.

Project Location:	Orange County SC
Climate Zone:	8
Operation Year	2026
Land Use Setting	Urban
Utility Company	SCE
Source Receptor Area:	16 - North Orange County

Land Uses/Development

Buildings

	Phase 1	Phase 2	Phase 3	Total	
Plan Area Acreage	68.80	94.90	98.40	262.1	acres
Single Family (DU)	210	105	135	450	dwelling units (DU)
Size (BSF) [1]	*378,000*	*189,000*	*243,000*	*810,000*	*building square feet (BSF)*
Acres	*35.4*	*25.2*	*74.5*	*135.1*	
Townhomes (DU)	143	507	0	650	DU
Size (BSF) [2]	*143,000*	*507,000*	*0*	*650,000*	*BSF*
Acres	*13.9*	*49.0*	*0.0*	*62.9*	
Parks/Recreation	2.1	13	0	15.1	acres
Open Space/Slopes (AC)	16.6	6.5	23.9	47.0	acres
Right of Way	0.8	1.2	0.0	2.0	acres
Number of Surface Lot Parking Spaces	28	134		162	parking spaces
Surface Parking Lot Area (SF)[3]	11,200	53,600		64,800	SF
	0.257	1.230		1.488	acres

[1] Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.

[2] Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.

[3] Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.

Architectural Coating

Land Use	Land Use Amount (BSF)	CalEEMod Paintable Surface Area Multiplier*	Total Paintable Surface Area (BSF)	Total Paintable Interior Surface Area (BSF)*	Total Paintable Exterior Surface Area (BSF)*
Single Family	189,000	2.7	510,300	382,725	127,575
Condo/Townhouse	507,000	2.7	1,368,900	1,026,675	342,225
			Residential Sub-Total	***1,409,400***	***469,800***
Parking Lot	53,600	6%	3,216	0	3,216

*Based on CalEEMod methodology in calculating the paintable surface areas for a residential building and surface parking lot.

Construction Equipment Mix: Phase 2*

Equipment	Pieces of Equipment	Hrs Op	HP	LF	Worker Trips/ Day	Vendor Trips/Day
Site Preparation					**Default**	**Default+4**
Rubber Tired Dozers	**3**	8	**247**	**0.40**		
Tractors/Loaders/Backhoes	**4**	8	**97**	**0.37**		
Water truck**	**4**					**8**
Rough Grading					**Default**	**Default+4**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**16**
Utility Trenching***					**Default**	**Default**
Excavators	**2**	8	**158**	**0.38**		
Trenchers	**1**	8	**78**	**0.50**		
Fine Grading					**Default**	**Default+4**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**16**
Asphalt Paving					**Default**	**Default**
Pavers	**2**	8	**130**	**0.42**		
Paving Equipment	**2**	8	**132**	**0.36**		
Rollers	**2**	8	**80**	**0.38**		
Finishing/Landscaping***					**Default**	**Default**
Tractors/Loaders/Backhoes	**1**	8	**97**	**0.37**		
Building Construction					**Default**	**Default**
Cranes	**1**	7	**231**	**0.29**		
Forklifts	**3**	8	**89**	**0.20**		
Generator Sets	**1**	8	**84**	**0.74**		
Tractors/Loaders/Backhoes	**3**	7	**97**	**0.37**		
Welders	**1**	8	**46**	**0.45**		
Architectural Coating					**Default**	**Default**
Air Compressors	**1**	6	**78**	**0.48**		

*CalEEMod default unless otherwise noted.

***Based on 10,000 gallons per acres disturbed and a 4,000 gallon water truck. 2005, June 5. Maricopa Air Quality Department.*

***Assumed.

Construction Activities and Schedule Assumptions*

* Based on information provided.

Construction Activities	Construction Schedule			
	Start Date	End Date	Duration (Calendar Days)	Duration (Work Days)
Phase 2				
Site Preparation	10/1/2024	1/6/2025	97	70
Rough Grading	1/7/2025	7/20/2025	194	139
Utility Trenching	3/21/2025	9/7/2025	170	121
Fine Grading	6/2/2025	12/15/2025	196	141
Asphalt Paving	9/9/2025	3/26/2026	198	143
Finishing/Landscaping	10/29/2025	5/13/2026	196	141
Building Construction	12/17/2025	7/31/2027	591	423
Architectural Coating	1/14/2027	7/31/2027	198	142

Construction CalEEMod Inputs: Phase 3

Type	Land Use Type	Land Use Unit Amount	Land Use Size Metric	Lot Acreage	Land Use Square Feet
Residential	Single Family[1]	135	DU	74.50	243,000
Parking	Other NonAsphalt Surfaces	23.90	acre	23.90	0
				98.40	**243,000.00**

[1] *Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.*

Project Location:	Orange County SC
Climate Zone:	8
Operation Year	2026
Land Use Setting	Urban
Utility Company	SCE
Source Receptor Area:	16 - North Orange County

Land Uses/Development

Buildings

	Phase 1	Phase 2	Phase 3	Total	
Plan Area Acreage	68.80	94.90	98.40	262.1	acres
Single Family (DU)	210	105	135	450	dwelling units (DU)
Size (BSF) [1]	*378,000*	*189,000*	*243,000*	*810,000*	*building square feet (BSF)*
Acres	*35.4*	*25.2*	*74.5*	*135.1*	
Townhomes (DU)	143	507	0	650	DU
Size (BSF) [2]	*143,000*	*507,000*	*0*	*650,000*	*BSF*
Acres	*13.9*	*49.0*	*0.0*	*62.9*	
Parks/Recreation	2.1	13	0	15.1	acres
Open Space/Slopes (AC)	16.6	6.5	23.9	47.0	acres
Right of Way	0.8	1.2	0.0	2.0	acres
Number of Surface Lot Parking Spaces	28	134		162	parking spaces
Surface Parking Lot Area (SF)[3]	11,200	53,600		64,800	SF
	0.257	1.230		1.488	acres

[1] *Total land use square feet based on CalEEMod default assumption of 1,800 sf/dwelling unit.*

[2] *Total land use square feet based on CalEEMod default assumption of 1,000 sf/dwelling unit.*

[3] *Total parking lot square feet based on CalEEMod default assumption of 400 sf/parking space.*

Architectural Coating

Land Use	Land Use Amount (BSF)	CalEEMod Paintable Surface Area Multiplier*	Total Paintable Surface Area (BSF)	Total Paintable Interior Surface Area (BSF)*	Total Paintable Exterior Surface Area (BSF)*
Single Family	243,000	2.7	656,100	492,075	164,025
			Residential Sub-Total	***492,075***	***164,025***

*Based on CalEEMod methodology in calculating the paintable surface areas for a residential building.

Construction Equipment Mix: Phase 3*

Equipment	Pieces of Equipment	Hrs Op	HP	LF	Worker Trips/ Day	Vendor Trips/Day
Site Preparation					**Default**	**8**
Rubber Tired Dozers	**3**	8	**247**	**0.40**		
Tractors/Loaders/Backhoes	**4**	8	**97**	**0.37**		
Water truck**	**4**					**8**
Rough Grading					**Default**	**16**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**16**
Utility Trenching***					**Default**	**Default**
Excavators	**2**	8	**158**	**0.38**		
Trenchers	**1**	8	**78**	**0.50**		
Fine Grading					**Default**	**16**
Excavators	**2**	8	**158**	**0.38**		
Graders	**1**	8	**157**	**0.41**		
Rubber Tired Dozers	**1**	8	**247**	**0.40**		
Scrapers	**2**	8	**367**	**0.48**		
Tractors/Loaders/Backhoes	**2**	8	**97**	**0.37**		
Water truck**	**8**					**16**
Asphalt Paving					**Default**	**Default**
Pavers	**2**	8	**130**	**0.42**		
Paving Equipment	**2**	8	**132**	**0.36**		
Rollers	**2**	8	**80**	**0.38**		
Finishing/Landscaping***					**Default**	**Default**
Tractors/Loaders/Backhoes	**1**	8	**97**	**0.37**		
Building Construction					**Default**	**Default**
Cranes	**1**	7	**231**	**0.29**		
Forklifts	**3**	8	**89**	**0.20**		
Generator Sets	**1**	8	**84**	**0.74**		
Tractors/Loaders/Backhoes	**3**	7	**97**	**0.37**		
Welders	**1**	8	**46**	**0.45**		
Architectural Coating					**Default**	**Default**
Air Compressors	**1**	6	**78**	**0.48**		

*CalEEMod default unless otherwise noted.

***Based on 10,000 gallons per acres disturbed and a 4,000 gallon water truck. 2005, June 5. Maricopa Air Quality Department.*

***Assumed.

Construction Activities and Schedule Assumptions: Phase 3*

* Based on information provided.

Construction Activities	Construction Schedule			
	Start Date	End Date	Duration (Calendar Days)	Duration (Work Days)
Phase 3				
Site Preparation	8/1/2026	10/6/2026	66	47
Rough Grading	10/7/2026	8/31/2027	328	235
Utility Trenching	3/20/2027	11/5/2027	230	165
Fine Grading	6/27/2027	3/18/2028	265	190
Asphalt Paving	9/3/2027	3/18/2028	197	141
Finishing/Landscaping	11/8/2027	5/25/2028	199	144
Building Construction	3/21/2028	5/31/2030	801	574
Architectural Coating	11/15/2029	5/31/2030	197	142

3. CalEEMod Output: Phase 1 Construction

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Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 Construction

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse	143.00	Dwelling Unit	13.90	143,000.00	409
Single Family Housing	210.00	Dwelling Unit	35.40	378,000.00	601
City Park	2.10	Acre	2.10	91,476.00	0
Parking Lot	11.20	1000sqft	0.26	11,200.00	0
Other Asphalt Surfaces	34.85	1000sqft	0.80	34,848.00	0
Other Non-Asphalt Surfaces	16.34	Acre	16.34	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2025
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - Based information provided.

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	75.00	90.00
tblConstructionPhase	NumDays	1,110.00	275.00
tblConstructionPhase	NumDays	110.00	91.00
tblConstructionPhase	NumDays	75.00	92.00
tblConstructionPhase	NumDays	40.00	46.00
tblConstructionPhase	NumDays	110.00	90.00
tblConstructionPhase	PhaseEndDate	4/2/2029	5/30/2025
tblConstructionPhase	PhaseEndDate	9/4/2028	5/30/2025
tblConstructionPhase	PhaseEndDate	6/3/2024	2/7/2024
tblConstructionPhase	PhaseEndDate	12/18/2028	7/16/2024
tblConstructionPhase	PhaseEndDate	1/1/2024	10/3/2023
tblConstructionPhase	PhaseStartDate	12/19/2028	1/25/2025
tblConstructionPhase	PhaseStartDate	6/4/2024	5/13/2024
tblConstructionPhase	PhaseStartDate	1/2/2024	10/4/2023
tblConstructionPhase	PhaseStartDate	9/5/2028	3/10/2024
tblConstructionPhase	PhaseStartDate	11/7/2023	8/1/2023
tblLandUse	LandUseSquareFeet	711,770.40	0.00
tblLandUse	LotAcreage	8.94	13.90
tblLandUse	LotAcreage	68.18	35.40
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0022	40.3216	35.8386	0.0775	19.9094	1.7496	21.1779	10.1705	1.6098	11.3376	0.0000	7,554.7773	7,554.7773	2.2784	0.0511	7,626.9649
2024	7.1634	70.8874	63.9839	0.1441	19.1483	2.9859	22.1342	7.5087	2.7473	10.2559	0.0000	14,050.9902	14,050.9902	4.2440	0.2170	14,186.5566
2025	38.6699	16.1169	26.3535	0.0653	3.5469	0.6052	4.1521	0.9493	0.5722	1.5215	0.0000	6,583.3201	6,583.3201	0.7372	0.2169	6,666.3852
Maximum	**38.6699**	**70.8874**	**63.9839**	**0.1441**	**19.9094**	**2.9859**	**22.1342**	**10.1705**	**2.7473**	**11.3376**	**0.0000**	**14,050.9902**	**14,050.9902**	**4.2440**	**0.2170**	**14,186.5566**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0022	40.3216	35.8386	0.0775	8.6367	1.7496	9.9052	4.3822	1.6098	5.5493	0.0000	7,554.7773	7,554.7773	2.2784	0.0511	7,626.9649
2024	7.1634	70.8874	63.9839	0.1441	8.5551	2.9859	11.5410	3.3116	2.7473	6.0589	0.0000	14,050.9902	14,050.9902	4.2440	0.2170	14,186.5566
2025	38.6699	16.1169	26.3535	0.0653	3.2748	0.6052	3.8799	0.8825	0.5722	1.4547	0.0000	6,583.3201	6,583.3201	0.7372	0.2169	6,666.3852
Maximum	**38.6699**	**70.8874**	**63.9839**	**0.1441**	**8.6367**	**2.9859**	**11.5410**	**4.3822**	**2.7473**	**6.0589**	**0.0000**	**14,050.9902**	**14,050.9902**	**4.2440**	**0.2170**	**14,186.5566**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.96**	**0.00**	**46.64**	**53.96**	**0.00**	**43.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	10/3/2023	5	46	
2	Rough Grading	Grading	10/4/2023	2/7/2024	5	91	
3	Utility Trenching	Trenching	11/20/2023	3/9/2024	5	80	
4	Fine Grading	Grading	1/6/2024	5/12/2024	5	90	
5	Paving	Paving	3/10/2024	7/16/2024	5	92	
6	Finishing/Landscaping	Trenching	4/12/2024	8/16/2024	5	91	
7	Building Construction	Building Construction	5/13/2024	5/30/2025	5	275	
8	Architectural Coating	Architectural Coating	1/25/2025	5/30/2025	5	90	

Acres of Grading (Site Preparation Phase): 69

Acres of Grading (Grading Phase): 273

Acres of Paving: 17.4

Residential Indoor: 1,055,025; Residential Outdoor: 351,675; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,763

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	5.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	60.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0800e-003	0.2804	0.1162	1.4400e-003	0.0512	1.4400e-003	0.0526	0.0147	1.3800e-003	0.0161		157.9595	157.9595	9.3900e-003	0.0227	164.9485
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0588**	**0.3128**	**0.6674**	**3.1400e-003**	**0.2524**	**2.4700e-003**	**0.2548**	**0.0681**	**2.3300e-003**	**0.0704**		**331.7154**	**331.7154**	**0.0132**	**0.0264**	**339.9035**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**8.4034**	**1.2660**	**9.6694**	**4.3188**	**1.1647**	**5.4835**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0800e-003	0.2804	0.1162	1.4400e-003	0.0479	1.4400e-003	0.0493	0.0139	1.3800e-003	0.0153		157.9595	157.9595	9.3900e-003	0.0227	164.9485
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0588**	**0.3128**	**0.6674**	**3.1400e-003**	**0.2333**	**2.4700e-003**	**0.2358**	**0.0634**	**2.3300e-003**	**0.0657**		**331.7154**	**331.7154**	**0.0132**	**0.0264**	**339.9035**

3.3 Rough Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2036**	**1.4245**	**10.6281**	**3.6538**	**1.3105**	**4.9643**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.1023	2.8800e-003	0.1052	0.0294	2.7500e-003	0.0322		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.0725**	**0.5968**	**0.8449**	**4.7700e-003**	**0.3259**	**4.0200e-003**	**0.3299**	**0.0887**	**3.8000e-003**	**0.0925**		**508.9811**	**508.9811**	**0.0230**	**0.0495**	**524.2914**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.9345**	**1.4245**	**5.3590**	**1.5620**	**1.3105**	**2.8725**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.0957	2.8800e-003	0.0986	0.0278	2.7500e-003	0.0306		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.0725**	**0.5968**	**0.8449**	**4.7700e-003**	**0.3018**	**4.0200e-003**	**0.3058**	**0.0828**	**3.8000e-003**	**0.0866**		**508.9811**	**508.9811**	**0.0230**	**0.0495**	**524.2914**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Rough Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3259**	**4.1000e-003**	**0.3300**	**0.0887**	**3.8800e-003**	**0.0926**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**3.9345**	**1.3354**	**5.2699**	**1.5620**	**1.2286**	**2.7906**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.0957	3.0100e-003	0.0988	0.0278	2.8800e-003	0.0307		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3018**	**4.1000e-003**	**0.3059**	**0.0828**	**3.8800e-003**	**0.0867**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

3.4 Utility Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5854	5.1948	6.6976	9.8800e-003		0.3207	0.3207		0.2950	0.2950		957.0936	957.0936	0.3095		964.8322
Total	**0.5854**	**5.1948**	**6.6976**	**9.8800e-003**		**0.3207**	**0.3207**		**0.2950**	**0.2950**		**957.0936**	**957.0936**	**0.3095**		**964.8322**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0225	0.0144	0.2450	7.5000e-004	0.0894	4.6000e-004	0.0899	0.0237	4.2000e-004	0.0241		77.2248	77.2248	1.6800e-003	1.6500e-003	77.7578
Total	**0.0225**	**0.0144**	**0.2450**	**7.5000e-004**	**0.0894**	**4.6000e-004**	**0.0899**	**0.0237**	**4.2000e-004**	**0.0241**		**77.2248**	**77.2248**	**1.6800e-003**	**1.6500e-003**	**77.7578**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5854	5.1948	6.6976	9.8800e-003		0.3207	0.3207		0.2950	0.2950	0.0000	957.0936	957.0936	0.3095		964.8322
Total	**0.5854**	**5.1948**	**6.6976**	**9.8800e-003**		**0.3207**	**0.3207**		**0.2950**	**0.2950**	**0.0000**	**957.0936**	**957.0936**	**0.3095**		**964.8322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0225	0.0144	0.2450	7.5000e-004	0.0824	4.6000e-004	0.0829	0.0220	4.2000e-004	0.0224		77.2248	77.2248	1.6800e-003	1.6500e-003	77.7578
Total	**0.0225**	**0.0144**	**0.2450**	**7.5000e-004**	**0.0824**	**4.6000e-004**	**0.0829**	**0.0220**	**4.2000e-004**	**0.0224**		**77.2248**	**77.2248**	**1.6800e-003**	**1.6500e-003**	**77.7578**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Utility Trenching - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5681	4.9375	6.7068	9.8900e-003		0.3065	0.3065		0.2820	0.2820		957.2542	957.2542	0.3096		964.9941
Total	**0.5681**	**4.9375**	**6.7068**	**9.8900e-003**		**0.3065**	**0.3065**		**0.2820**	**0.2820**		**957.2542**	**957.2542**	**0.3096**		**964.9941**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0212	0.0130	0.2283	7.3000e-004	0.0894	4.4000e-004	0.0899	0.0237	4.0000e-004	0.0241		75.3671	75.3671	1.5200e-003	1.5400e-003	75.8643
Total	**0.0212**	**0.0130**	**0.2283**	**7.3000e-004**	**0.0894**	**4.4000e-004**	**0.0899**	**0.0237**	**4.0000e-004**	**0.0241**		**75.3671**	**75.3671**	**1.5200e-003**	**1.5400e-003**	**75.8643**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5681	4.9375	6.7068	9.8900e-003		0.3065	0.3065		0.2820	0.2820	0.0000	957.2542	957.2542	0.3096		964.9941
Total	**0.5681**	**4.9375**	**6.7068**	**9.8900e-003**		**0.3065**	**0.3065**		**0.2820**	**0.2820**	**0.0000**	**957.2542**	**957.2542**	**0.3096**		**964.9941**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0212	0.0130	0.2283	7.3000e-004	0.0824	4.4000e-004	0.0829	0.0220	4.0000e-004	0.0224		75.3671	75.3671	1.5200e-003	1.5400e-003	75.8643
Total	**0.0212**	**0.0130**	**0.2283**	**7.3000e-004**	**0.0824**	**4.4000e-004**	**0.0829**	**0.0220**	**4.0000e-004**	**0.0224**		**75.3671**	**75.3671**	**1.5200e-003**	**1.5400e-003**	**75.8643**

3.5 Fine Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3259**	**4.1000e-003**	**0.3300**	**0.0887**	**3.8800e-003**	**0.0926**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**3.9345**	**1.3354**	**5.2699**	**1.5620**	**1.2286**	**2.7906**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.0957	3.0100e-003	0.0988	0.0278	2.8800e-003	0.0307		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3018**	**4.1000e-003**	**0.3059**	**0.0828**	**3.8800e-003**	**0.0867**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0397	0.0243	0.4281	1.3700e-003	0.1677	8.2000e-004	0.1685	0.0445	7.5000e-004	0.0452		141.3132	141.3132	2.8500e-003	2.8900e-003	142.2455
Total	**0.0397**	**0.0243**	**0.4281**	**1.3700e-003**	**0.1677**	**8.2000e-004**	**0.1685**	**0.0445**	**7.5000e-004**	**0.0452**		**141.3132**	**141.3132**	**2.8500e-003**	**2.8900e-003**	**142.2455**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0397	0.0243	0.4281	1.3700e-003	0.1546	8.2000e-004	0.1554	0.0413	7.5000e-004	0.0420		141.3132	141.3132	2.8500e-003	2.8900e-003	142.2455
Total	**0.0397**	**0.0243**	**0.4281**	**1.3700e-003**	**0.1546**	**8.2000e-004**	**0.1554**	**0.0413**	**7.5000e-004**	**0.0420**		**141.3132**	**141.3132**	**2.8500e-003**	**2.8900e-003**	**142.2455**

3.7 Finishing/Landscaping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1433	1.4424	2.2265	3.1000e-003		0.0662	0.0662		0.0609	0.0609		300.5434	300.5434	0.0972		302.9734
Total	**0.1433**	**1.4424**	**2.2265**	**3.1000e-003**		**0.0662**	**0.0662**		**0.0609**	**0.0609**		**300.5434**	**300.5434**	**0.0972**		**302.9734**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9500e-003	4.8600e-003	0.0856	2.7000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.5000e-004	9.0400e-003		28.2626	28.2626	5.7000e-004	5.8000e-004	28.4491
Total	**7.9500e-003**	**4.8600e-003**	**0.0856**	**2.7000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.5000e-004**	**9.0400e-003**		**28.2626**	**28.2626**	**5.7000e-004**	**5.8000e-004**	**28.4491**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1433	1.4424	2.2265	3.1000e-003		0.0662	0.0662		0.0609	0.0609	0.0000	300.5434	300.5434	0.0972		302.9734
Total	**0.1433**	**1.4424**	**2.2265**	**3.1000e-003**		**0.0662**	**0.0662**		**0.0609**	**0.0609**	**0.0000**	**300.5434**	**300.5434**	**0.0972**		**302.9734**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9500e-003	4.8600e-003	0.0856	2.7000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.5000e-004	8.4000e-003		28.2626	28.2626	5.7000e-004	5.8000e-004	28.4491
Total	**7.9500e-003**	**4.8600e-003**	**0.0856**	**2.7000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.5000e-004**	**8.4000e-003**		**28.2626**	**28.2626**	**5.7000e-004**	**5.8000e-004**	**28.4491**

3.8 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0597	2.0966	0.8654	0.0106	0.3836	0.0113	0.3949	0.1104	0.0108	0.1212		1,166.3182	1,166.3182	0.0712	0.1681	1,218.1799
Worker	0.6251	0.3822	6.7356	0.0216	2.6379	0.0128	2.6508	0.6996	0.0118	0.7114		2,223.3279	2,223.3279	0.0448	0.0455	2,237.9953
Total	**0.6848**	**2.4788**	**7.6010**	**0.0322**	**3.0216**	**0.0241**	**3.0457**	**0.8100**	**0.0226**	**0.8326**		**3,389.6461**	**3,389.6461**	**0.1160**	**0.2135**	**3,456.1752**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0597	2.0966	0.8654	0.0106	0.3590	0.0113	0.3703	0.1044	0.0108	0.1152		1,166.3182	1,166.3182	0.0712	0.1681	1,218.1799
Worker	0.6251	0.3822	6.7356	0.0216	2.4315	0.0128	2.4444	0.6489	0.0118	0.6607		2,223.3279	2,223.3279	0.0448	0.0455	2,237.9953
Total	**0.6848**	**2.4788**	**7.6010**	**0.0322**	**2.7905**	**0.0241**	**2.8147**	**0.7533**	**0.0226**	**0.7759**		**3,389.6461**	**3,389.6461**	**0.1160**	**0.2135**	**3,456.1752**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0588	2.0863	0.8619	0.0104	0.3836	0.0114	0.3950	0.1104	0.0109	0.1213		1,144.4835	1,144.4835	0.0721	0.1656	1,195.6383
Worker	0.5904	0.3464	6.3360	0.0208	2.6379	0.0123	2.6502	0.6996	0.0113	0.7109		2,168.9602	2,168.9602	0.0407	0.0428	2,182.7223
Total	**0.6492**	**2.4327**	**7.1978**	**0.0312**	**3.0216**	**0.0237**	**3.0452**	**0.8100**	**0.0222**	**0.8322**		**3,313.4438**	**3,313.4438**	**0.1128**	**0.2084**	**3,378.3606**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0588	2.0863	0.8619	0.0104	0.3590	0.0114	0.3704	0.1044	0.0109	0.1152		1,144.4835	1,144.4835	0.0721	0.1656	1,195.6383
Worker	0.5904	0.3464	6.3360	0.0208	2.4315	0.0123	2.4438	0.6489	0.0113	0.6602		2,168.9602	2,168.9602	0.0407	0.0428	2,182.7223
Total	**0.6492**	**2.4327**	**7.1978**	**0.0312**	**2.7905**	**0.0237**	**2.8142**	**0.7533**	**0.0222**	**0.7755**		**3,313.4438**	**3,313.4438**	**0.1128**	**0.2084**	**3,378.3606**

3.9 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**36.5357**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Phase 1 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1176	0.0690	1.2618	4.1500e-003	0.5254	2.4500e-003	0.5278	0.1393	2.2500e-003	0.1416		431.9540	431.9540	8.1100e-003	8.5200e-003	434.6947
Total	**0.1176**	**0.0690**	**1.2618**	**4.1500e-003**	**0.5254**	**2.4500e-003**	**0.5278**	**0.1393**	**2.2500e-003**	**0.1416**		**431.9540**	**431.9540**	**8.1100e-003**	**8.5200e-003**	**434.6947**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**36.5357**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1176	0.0690	1.2618	4.1500e-003	0.4842	2.4500e-003	0.4867	0.1292	2.2500e-003	0.1315		431.9540	431.9540	8.1100e-003	8.5200e-003	434.6947
Total	**0.1176**	**0.0690**	**1.2618**	**4.1500e-003**	**0.4842**	**2.4500e-003**	**0.4867**	**0.1292**	**2.2500e-003**	**0.1315**		**431.9540**	**431.9540**	**8.1100e-003**	**8.5200e-003**	**434.6947**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 Construction

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse	143.00	Dwelling Unit	13.90	143,000.00	409
Single Family Housing	210.00	Dwelling Unit	35.40	378,000.00	601
City Park	2.10	Acre	2.10	91,476.00	0
Parking Lot	11.20	1000sqft	0.26	11,200.00	0
Other Asphalt Surfaces	34.85	1000sqft	0.80	34,848.00	0
Other Non-Asphalt Surfaces	16.34	Acre	16.34	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2025
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - Based information provided.

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	75.00	90.00
tblConstructionPhase	NumDays	1,110.00	275.00
tblConstructionPhase	NumDays	110.00	91.00
tblConstructionPhase	NumDays	75.00	92.00
tblConstructionPhase	NumDays	40.00	46.00
tblConstructionPhase	NumDays	110.00	90.00
tblConstructionPhase	PhaseEndDate	4/2/2029	5/30/2025
tblConstructionPhase	PhaseEndDate	9/4/2028	5/30/2025
tblConstructionPhase	PhaseEndDate	6/3/2024	2/7/2024
tblConstructionPhase	PhaseEndDate	12/18/2028	7/16/2024
tblConstructionPhase	PhaseEndDate	1/1/2024	10/3/2023
tblConstructionPhase	PhaseStartDate	12/19/2028	1/25/2025
tblConstructionPhase	PhaseStartDate	6/4/2024	5/13/2024
tblConstructionPhase	PhaseStartDate	1/2/2024	10/4/2023
tblConstructionPhase	PhaseStartDate	9/5/2028	3/10/2024
tblConstructionPhase	PhaseStartDate	11/7/2023	8/1/2023
tblLandUse	LandUseSquareFeet	711,770.40	0.00
tblLandUse	LotAcreage	8.94	13.90
tblLandUse	LotAcreage	68.18	35.40
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0090	40.3516	35.7874	0.0774	19.9094	1.7496	21.1779	10.1705	1.6098	11.3376	0.0000	7,542.3188	7,542.3188	2.2785	0.0516	7,614.6493
2024	7.1745	70.9449	63.9061	0.1439	19.1483	2.9859	22.1343	7.5087	2.7473	10.2560	0.0000	14,030.3408	14,030.3408	4.2442	0.2205	14,166.1460
2025	38.7384	16.2509	25.8727	0.0641	3.5469	0.6052	4.1521	0.9493	0.5723	1.5216	0.0000	6,461.1755	6,461.1755	0.7384	0.2205	6,545.3478
Maximum	**38.7384**	**70.9449**	**63.9061**	**0.1439**	**19.9094**	**2.9859**	**22.1343**	**10.1705**	**2.7473**	**11.3376**	**0.0000**	**14,030.3408**	**14,030.3408**	**4.2442**	**0.2205**	**14,166.1460**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0090	40.3516	35.7874	0.0774	8.6367	1.7496	9.9052	4.3822	1.6098	5.5493	0.0000	7,542.3188	7,542.3188	2.2785	0.0516	7,614.6492
2024	7.1745	70.9449	63.9061	0.1439	8.5551	2.9859	11.5410	3.3116	2.7473	6.0589	0.0000	14,030.3408	14,030.3408	4.2442	0.2205	14,166.1460
2025	38.7384	16.2509	25.8727	0.0641	3.2748	0.6052	3.8800	0.8825	0.5723	1.4548	0.0000	6,461.1755	6,461.1755	0.7384	0.2205	6,545.3478
Maximum	**38.7384**	**70.9449**	**63.9061**	**0.1439**	**8.6367**	**2.9859**	**11.5410**	**4.3822**	**2.7473**	**6.0589**	**0.0000**	**14,030.3408**	**14,030.3408**	**4.2442**	**0.2205**	**14,166.1460**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.96**	**0.00**	**46.64**	**53.96**	**0.00**	**43.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	10/3/2023	5	46	
2	Rough Grading	Grading	10/4/2023	2/7/2024	5	91	
3	Utility Trenching	Trenching	11/20/2023	3/9/2024	5	80	
4	Fine Grading	Grading	1/6/2024	5/12/2024	5	90	
5	Paving	Paving	3/10/2024	7/16/2024	5	92	
6	Finishing/Landscaping	Trenching	4/12/2024	8/16/2024	5	91	
7	Building Construction	Building Construction	5/13/2024	5/30/2025	5	275	
8	Architectural Coating	Architectural Coating	1/25/2025	5/30/2025	5	90	

Acres of Grading (Site Preparation Phase): 69

Acres of Grading (Grading Phase): 273

Acres of Paving: 17.4

Residential Indoor: 1,055,025; Residential Outdoor: 351,675; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,763

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	5.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	60.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8000e-003	0.2929	0.1200	1.4400e-003	0.0512	1.4500e-003	0.0526	0.0147	1.3800e-003	0.0161		158.1918	158.1918	9.3700e-003	0.0227	165.1956
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0632**	**0.3285**	**0.6334**	**3.0600e-003**	**0.2524**	**2.4800e-003**	**0.2548**	**0.0681**	**2.3300e-003**	**0.0704**		**323.6400**	**323.6400**	**0.0132**	**0.0267**	**331.9157**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**8.4034**	**1.2660**	**9.6694**	**4.3188**	**1.1647**	**5.4835**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8000e-003	0.2929	0.1200	1.4400e-003	0.0479	1.4500e-003	0.0493	0.0139	1.3800e-003	0.0153		158.1918	158.1918	9.3700e-003	0.0227	165.1956
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0632**	**0.3285**	**0.6334**	**3.0600e-003**	**0.2333**	**2.4800e-003**	**0.2358**	**0.0634**	**2.3300e-003**	**0.0657**		**323.6400**	**323.6400**	**0.0132**	**0.0267**	**331.9157**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Rough Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2036**	**1.4245**	**10.6281**	**3.6538**	**1.3105**	**4.9643**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.1023	2.9000e-003	0.1052	0.0294	2.7700e-003	0.0322		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.0772**	**0.6253**	**0.8104**	**4.6800e-003**	**0.3259**	**4.0400e-003**	**0.3299**	**0.0887**	**3.8200e-003**	**0.0926**		**500.2150**	**500.2150**	**0.0230**	**0.0498**	**515.6357**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.9345**	**1.4245**	**5.3590**	**1.5620**	**1.3105**	**2.8725**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.0957	2.9000e-003	0.0986	0.0278	2.7700e-003	0.0306		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.0772**	**0.6253**	**0.8104**	**4.6800e-003**	**0.3018**	**4.0400e-003**	**0.3058**	**0.0828**	**3.8200e-003**	**0.0867**		**500.2150**	**500.2150**	**0.0230**	**0.0498**	**515.6357**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Rough Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3259**	**4.1200e-003**	**0.3300**	**0.0887**	**3.9000e-003**	**0.0926**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**3.9345**	**1.3354**	**5.2699**	**1.5620**	**1.2286**	**2.7906**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3018**	**4.1200e-003**	**0.3059**	**0.0828**	**3.9000e-003**	**0.0867**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Utility Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5854	5.1948	6.6976	9.8800e-003		0.3207	0.3207		0.2950	0.2950		957.0936	957.0936	0.3095		964.8322
Total	**0.5854**	**5.1948**	**6.6976**	**9.8800e-003**		**0.3207**	**0.3207**		**0.2950**	**0.2950**		**957.0936**	**957.0936**	**0.3095**		**964.8322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0246	0.0158	0.2282	7.2000e-004	0.0894	4.6000e-004	0.0899	0.0237	4.2000e-004	0.0241		73.5325	73.5325	1.7200e-003	1.7500e-003	74.0978
Total	**0.0246**	**0.0158**	**0.2282**	**7.2000e-004**	**0.0894**	**4.6000e-004**	**0.0899**	**0.0237**	**4.2000e-004**	**0.0241**		**73.5325**	**73.5325**	**1.7200e-003**	**1.7500e-003**	**74.0978**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5854	5.1948	6.6976	9.8800e-003		0.3207	0.3207		0.2950	0.2950	0.0000	957.0936	957.0936	0.3095		964.8322
Total	**0.5854**	**5.1948**	**6.6976**	**9.8800e-003**		**0.3207**	**0.3207**		**0.2950**	**0.2950**	**0.0000**	**957.0936**	**957.0936**	**0.3095**		**964.8322**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0246	0.0158	0.2282	7.2000e-004	0.0824	4.6000e-004	0.0829	0.0220	4.2000e-004	0.0224		73.5325	73.5325	1.7200e-003	1.7500e-003	74.0978
Total	**0.0246**	**0.0158**	**0.2282**	**7.2000e-004**	**0.0824**	**4.6000e-004**	**0.0829**	**0.0220**	**4.2000e-004**	**0.0224**		**73.5325**	**73.5325**	**1.7200e-003**	**1.7500e-003**	**74.0978**

3.4 Utility Trenching - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5681	4.9375	6.7068	9.8900e-003		0.3065	0.3065		0.2820	0.2820		957.2542	957.2542	0.3096		964.9941
Total	**0.5681**	**4.9375**	**6.7068**	**9.8900e-003**		**0.3065**	**0.3065**		**0.2820**	**0.2820**		**957.2542**	**957.2542**	**0.3096**		**964.9941**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0232	0.0142	0.2129	7.0000e-004	0.0894	4.4000e-004	0.0899	0.0237	4.0000e-004	0.0241		71.7692	71.7692	1.5600e-003	1.6400e-003	72.2966
Total	**0.0232**	**0.0142**	**0.2129**	**7.0000e-004**	**0.0894**	**4.4000e-004**	**0.0899**	**0.0237**	**4.0000e-004**	**0.0241**		**71.7692**	**71.7692**	**1.5600e-003**	**1.6400e-003**	**72.2966**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5681	4.9375	6.7068	9.8900e-003		0.3065	0.3065		0.2820	0.2820	0.0000	957.2542	957.2542	0.3096		964.9941
Total	**0.5681**	**4.9375**	**6.7068**	**9.8900e-003**		**0.3065**	**0.3065**		**0.2820**	**0.2820**	**0.0000**	**957.2542**	**957.2542**	**0.3096**		**964.9941**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0232	0.0142	0.2129	7.0000e-004	0.0824	4.4000e-004	0.0829	0.0220	4.0000e-004	0.0224		71.7692	71.7692	1.5600e-003	1.6400e-003	72.2966
Total	**0.0232**	**0.0142**	**0.2129**	**7.0000e-004**	**0.0824**	**4.4000e-004**	**0.0829**	**0.0220**	**4.0000e-004**	**0.0224**		**71.7692**	**71.7692**	**1.5600e-003**	**1.6400e-003**	**72.2966**

3.5 Fine Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3259**	**4.1200e-003**	**0.3300**	**0.0887**	**3.9000e-003**	**0.0926**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**3.9345**	**1.3354**	**5.2699**	**1.5620**	**1.2286**	**2.7906**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3018**	**4.1200e-003**	**0.3059**	**0.0828**	**3.9000e-003**	**0.0867**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0436	0.0267	0.3993	1.3000e-003	0.1677	8.2000e-004	0.1685	0.0445	7.5000e-004	0.0452		134.5673	134.5673	2.9200e-003	3.0700e-003	135.5562
Total	**0.0436**	**0.0267**	**0.3993**	**1.3000e-003**	**0.1677**	**8.2000e-004**	**0.1685**	**0.0445**	**7.5000e-004**	**0.0452**		**134.5673**	**134.5673**	**2.9200e-003**	**3.0700e-003**	**135.5562**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0436	0.0267	0.3993	1.3000e-003	0.1546	8.2000e-004	0.1554	0.0413	7.5000e-004	0.0420		134.5673	134.5673	2.9200e-003	3.0700e-003	135.5562
Total	**0.0436**	**0.0267**	**0.3993**	**1.3000e-003**	**0.1546**	**8.2000e-004**	**0.1554**	**0.0413**	**7.5000e-004**	**0.0420**		**134.5673**	**134.5673**	**2.9200e-003**	**3.0700e-003**	**135.5562**

3.7 Finishing/Landscaping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1433	1.4424	2.2265	3.1000e-003		0.0662	0.0662		0.0609	0.0609		300.5434	300.5434	0.0972		302.9734
Total	**0.1433**	**1.4424**	**2.2265**	**3.1000e-003**		**0.0662**	**0.0662**		**0.0609**	**0.0609**		**300.5434**	**300.5434**	**0.0972**		**302.9734**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7100e-003	5.3300e-003	0.0799	2.6000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.5000e-004	9.0400e-003		26.9135	26.9135	5.8000e-004	6.1000e-004	27.1112
Total	**8.7100e-003**	**5.3300e-003**	**0.0799**	**2.6000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.5000e-004**	**9.0400e-003**		**26.9135**	**26.9135**	**5.8000e-004**	**6.1000e-004**	**27.1112**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1433	1.4424	2.2265	3.1000e-003		0.0662	0.0662		0.0609	0.0609	0.0000	300.5434	300.5434	0.0972		302.9734
Total	**0.1433**	**1.4424**	**2.2265**	**3.1000e-003**		**0.0662**	**0.0662**		**0.0609**	**0.0609**	**0.0000**	**300.5434**	**300.5434**	**0.0972**		**302.9734**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7100e-003	5.3300e-003	0.0799	2.6000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.5000e-004	8.4000e-003		26.9135	26.9135	5.8000e-004	6.1000e-004	27.1112
Total	**8.7100e-003**	**5.3300e-003**	**0.0799**	**2.6000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.5000e-004**	**8.4000e-003**		**26.9135**	**26.9135**	**5.8000e-004**	**6.1000e-004**	**27.1112**

3.8 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0576	2.1903	0.8926	0.0106	0.3836	0.0114	0.3950	0.1104	0.0109	0.1213		1,168.0759	1,168.0759	0.0710	0.1684	1,220.0457
Worker	0.6855	0.4196	6.2816	0.0205	2.6379	0.0128	2.6508	0.6996	0.0118	0.7114		2,117.1925	2,117.1925	0.0460	0.0484	2,132.7504
Total	**0.7431**	**2.6099**	**7.1742**	**0.0311**	**3.0216**	**0.0242**	**3.0458**	**0.8100**	**0.0227**	**0.8327**		**3,285.2684**	**3,285.2684**	**0.1170**	**0.2168**	**3,352.7962**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0576	2.1903	0.8926	0.0106	0.3590	0.0114	0.3704	0.1044	0.0109	0.1152		1,168.0759	1,168.0759	0.0710	0.1684	1,220.0457
Worker	0.6855	0.4196	6.2816	0.0205	2.4315	0.0128	2.4444	0.6489	0.0118	0.6607		2,117.1925	2,117.1925	0.0460	0.0484	2,132.7504
Total	**0.7431**	**2.6099**	**7.1742**	**0.0311**	**2.7905**	**0.0242**	**2.8147**	**0.7533**	**0.0227**	**0.7760**		**3,285.2684**	**3,285.2684**	**0.1170**	**0.2168**	**3,352.7962**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0567	2.1797	0.8885	0.0104	0.3836	0.0114	0.3951	0.1104	0.0109	0.1213		1,146.2456	1,146.2456	0.0719	0.1660	1,197.5061
Worker	0.6493	0.3802	5.9128	0.0198	2.6379	0.0123	2.6502	0.6996	0.0113	0.7109		2,065.6317	2,065.6317	0.0418	0.0455	2,080.2289
Total	**0.7060**	**2.5599**	**6.8013**	**0.0302**	**3.0216**	**0.0237**	**3.0453**	**0.8100**	**0.0222**	**0.8322**		**3,211.8773**	**3,211.8773**	**0.1137**	**0.2115**	**3,277.7350**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0567	2.1797	0.8885	0.0104	0.3590	0.0114	0.3704	0.1044	0.0109	0.1153		1,146.2456	1,146.2456	0.0719	0.1660	1,197.5061
Worker	0.6493	0.3802	5.9128	0.0198	2.4315	0.0123	2.4438	0.6489	0.0113	0.6602		2,065.6317	2,065.6317	0.0418	0.0455	2,080.2289
Total	**0.7060**	**2.5599**	**6.8013**	**0.0302**	**2.7905**	**0.0237**	**2.8142**	**0.7533**	**0.0222**	**0.7755**		**3,211.8773**	**3,211.8773**	**0.1137**	**0.2115**	**3,277.7350**

3.9 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**36.5357**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1293	0.0757	1.1776	3.9500e-003	0.5254	2.4500e-003	0.5278	0.1393	2.2500e-003	0.1416		411.3758	411.3758	8.3300e-003	9.0600e-003	414.2829
Total	**0.1293**	**0.0757**	**1.1776**	**3.9500e-003**	**0.5254**	**2.4500e-003**	**0.5278**	**0.1393**	**2.2500e-003**	**0.1416**		**411.3758**	**411.3758**	**8.3300e-003**	**9.0600e-003**	**414.2829**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**36.5357**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Phase 1 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1293	0.0757	1.1776	3.9500e-003	0.4842	2.4500e-003	0.4867	0.1292	2.2500e-003	0.1315		411.3758	411.3758	8.3300e-003	9.0600e-003	414.2829
Total	**0.1293**	**0.0757**	**1.1776**	**3.9500e-003**	**0.4842**	**2.4500e-003**	**0.4867**	**0.1292**	**2.2500e-003**	**0.1315**		**411.3758**	**411.3758**	**8.3300e-003**	**9.0600e-003**	**414.2829**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 Construction

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse	143.00	Dwelling Unit	13.90	143,000.00	409
Single Family Housing	210.00	Dwelling Unit	35.40	378,000.00	601
City Park	2.10	Acre	2.10	91,476.00	0
Parking Lot	11.20	1000sqft	0.26	11,200.00	0
Other Asphalt Surfaces	34.85	1000sqft	0.80	34,848.00	0
Other Non-Asphalt Surfaces	16.34	Acre	16.34	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2025
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - Based information provided.

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	75.00	90.00
tblConstructionPhase	NumDays	1,110.00	275.00
tblConstructionPhase	NumDays	110.00	91.00
tblConstructionPhase	NumDays	75.00	92.00
tblConstructionPhase	NumDays	40.00	46.00
tblConstructionPhase	NumDays	110.00	90.00
tblConstructionPhase	PhaseEndDate	4/2/2029	5/30/2025
tblConstructionPhase	PhaseEndDate	9/4/2028	5/30/2025
tblConstructionPhase	PhaseEndDate	6/3/2024	2/7/2024
tblConstructionPhase	PhaseEndDate	12/18/2028	7/16/2024
tblConstructionPhase	PhaseEndDate	1/1/2024	10/3/2023
tblConstructionPhase	PhaseStartDate	12/19/2028	1/25/2025
tblConstructionPhase	PhaseStartDate	6/4/2024	5/13/2024
tblConstructionPhase	PhaseStartDate	1/2/2024	10/4/2023
tblConstructionPhase	PhaseStartDate	9/5/2028	3/10/2024
tblConstructionPhase	PhaseStartDate	11/7/2023	8/1/2023
tblLandUse	LandUseSquareFeet	711,770.40	0.00
tblLandUse	LotAcreage	8.94	13.90
tblLandUse	LotAcreage	68.18	35.40
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1786	1.8258	1.4478	3.2100e-003	0.8037	0.0790	0.8827	0.3569	0.0727	0.4296	0.0000	283.9152	283.9152	0.0856	2.0100e-003	286.6531
2024	0.4444	3.9177	4.6108	0.0103	0.9213	0.1645	1.0858	0.3011	0.1525	0.4536	0.0000	927.3059	927.3059	0.2009	0.0193	938.0739
2025	1.7584	0.8673	1.3778	3.4200e-003	0.1835	0.0322	0.2157	0.0492	0.0304	0.0796	0.0000	312.4057	312.4057	0.0360	0.0108	316.5108
Maximum	**1.7584**	**3.9177**	**4.6108**	**0.0103**	**0.9213**	**0.1645**	**1.0858**	**0.3569**	**0.1525**	**0.4536**	**0.0000**	**927.3059**	**927.3059**	**0.2009**	**0.0193**	**938.0739**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1786	1.8258	1.4478	3.2100e-003	0.3521	0.0790	0.4311	0.1549	0.0727	0.2276	0.0000	283.9149	283.9149	0.0856	2.0100e-003	286.6528
2024	0.4444	3.9177	4.6108	0.0103	0.5319	0.1645	0.6964	0.1663	0.1525	0.3188	0.0000	927.3051	927.3051	0.2009	0.0193	938.0731
2025	1.7584	0.8673	1.3778	3.4200e-003	0.1695	0.0322	0.2017	0.0458	0.0304	0.0762	0.0000	312.4055	312.4055	0.0360	0.0108	316.5106
Maximum	**1.7584**	**3.9177**	**4.6108**	**0.0103**	**0.5319**	**0.1645**	**0.6964**	**0.1663**	**0.1525**	**0.3188**	**0.0000**	**927.3051**	**927.3051**	**0.2009**	**0.0193**	**938.0731**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	44.80	0.00	39.15	48.11	0.00	35.34	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2023	10-31-2023	1.0838	1.0838
2	11-1-2023	1-31-2024	1.7270	1.7270
3	2-1-2024	4-30-2024	1.5399	1.5399
4	5-1-2024	7-31-2024	1.0161	1.0161
5	8-1-2024	10-31-2024	0.6053	0.6053
6	11-1-2024	1-31-2025	0.6821	0.6821
7	2-1-2025	4-30-2025	1.7457	1.7457
8	5-1-2025	7-31-2025	0.5870	0.5870
		Highest	1.7457	1.7457

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	10/3/2023	5	46	
2	Rough Grading	Grading	10/4/2023	2/7/2024	5	91	
3	Utility Trenching	Trenching	11/20/2023	3/9/2024	5	80	
4	Fine Grading	Grading	1/6/2024	5/12/2024	5	90	
5	Paving	Paving	3/10/2024	7/16/2024	5	92	
6	Finishing/Landscaping	Trenching	4/12/2024	8/16/2024	5	91	
7	Building Construction	Building Construction	5/13/2024	5/30/2025	5	275	
8	Architectural Coating	Architectural Coating	1/25/2025	5/30/2025	5	90	

Acres of Grading (Site Preparation Phase): 69

Acres of Grading (Grading Phase): 273

Acres of Paving: 17.4

Residential Indoor: 1,055,025; Residential Outdoor: 351,675; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,763

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	5.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	60.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4521	0.0000	0.4521	0.2324	0.0000	0.2324	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0612	0.6331	0.4196	8.8000e-004		0.0291	0.0291		0.0268	0.0268	0.0000	76.9366	76.9366	0.0249	0.0000	77.5587
Total	**0.0612**	**0.6331**	**0.4196**	**8.8000e-004**	**0.4521**	**0.0291**	**0.4812**	**0.2324**	**0.0268**	**0.2592**	**0.0000**	**76.9366**	**76.9366**	**0.0249**	**0.0000**	**77.5587**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8000e-004	6.7500e-003	2.7100e-003	3.0000e-005	1.1600e-003	3.0000e-005	1.1900e-003	3.3000e-004	3.0000e-005	3.7000e-004	0.0000	3.2979	3.2979	2.0000e-004	4.7000e-004	3.4439
Worker	1.1700e-003	8.4000e-004	0.0121	4.0000e-005	4.5400e-003	2.0000e-005	4.5700e-003	1.2100e-003	2.0000e-005	1.2300e-003	0.0000	3.4989	3.4989	8.0000e-005	8.0000e-005	3.5258
Total	**1.3500e-003**	**7.5900e-003**	**0.0148**	**7.0000e-005**	**5.7000e-003**	**5.0000e-005**	**5.7600e-003**	**1.5400e-003**	**5.0000e-005**	**1.6000e-003**	**0.0000**	**6.7968**	**6.7968**	**2.8000e-004**	**5.5000e-004**	**6.9697**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1933	0.0000	0.1933	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0612	0.6331	0.4196	8.8000e-004		0.0291	0.0291		0.0268	0.0268	0.0000	76.9365	76.9365	0.0249	0.0000	77.5586
Total	**0.0612**	**0.6331**	**0.4196**	**8.8000e-004**	**0.1933**	**0.0291**	**0.2224**	**0.0993**	**0.0268**	**0.1261**	**0.0000**	**76.9365**	**76.9365**	**0.0249**	**0.0000**	**77.5586**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8000e-004	6.7500e-003	2.7100e-003	3.0000e-005	1.0900e-003	3.0000e-005	1.1200e-003	3.2000e-004	3.0000e-005	3.5000e-004	0.0000	3.2979	3.2979	2.0000e-004	4.7000e-004	3.4439
Worker	1.1700e-003	8.4000e-004	0.0121	4.0000e-005	4.1900e-003	2.0000e-005	4.2100e-003	1.1200e-003	2.0000e-005	1.1400e-003	0.0000	3.4989	3.4989	8.0000e-005	8.0000e-005	3.5258
Total	**1.3500e-003**	**7.5900e-003**	**0.0148**	**7.0000e-005**	**5.2800e-003**	**5.0000e-005**	**5.3300e-003**	**1.4400e-003**	**5.0000e-005**	**1.4900e-003**	**0.0000**	**6.7968**	**6.7968**	**2.8000e-004**	**5.5000e-004**	**6.9697**

3.3 Rough Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3345	0.0000	0.3345	0.1199	0.0000	0.1199	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1046	1.0872	0.8836	1.9600e-003		0.0449	0.0449		0.0413	0.0413	0.0000	171.7859	171.7859	0.0556	0.0000	173.1749
Total	**0.1046**	**1.0872**	**0.8836**	**1.9600e-003**	**0.3345**	**0.0449**	**0.3793**	**0.1199**	**0.0413**	**0.1612**	**0.0000**	**171.7859**	**171.7859**	**0.0556**	**0.0000**	**173.1749**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0185	7.4300e-003	9.0000e-005	3.1800e-003	9.0000e-005	3.2700e-003	9.2000e-004	9.0000e-005	1.0000e-003	0.0000	9.0334	9.0334	5.4000e-004	1.3000e-003	9.4334
Worker	1.7800e-003	1.2700e-003	0.0184	6.0000e-005	6.9200e-003	4.0000e-005	6.9500e-003	1.8400e-003	3.0000e-005	1.8700e-003	0.0000	5.3244	5.3244	1.2000e-004	1.3000e-004	5.3653
Total	**2.2800e-003**	**0.0198**	**0.0258**	**1.5000e-004**	**0.0101**	**1.3000e-004**	**0.0102**	**2.7600e-003**	**1.2000e-004**	**2.8700e-003**	**0.0000**	**14.3578**	**14.3578**	**6.6000e-004**	**1.4300e-003**	**14.7987**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1430	0.0000	0.1430	0.0513	0.0000	0.0513	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1046	1.0872	0.8836	1.9600e-003		0.0449	0.0449		0.0413	0.0413	0.0000	171.7857	171.7857	0.0556	0.0000	173.1747
Total	**0.1046**	**1.0872**	**0.8836**	**1.9600e-003**	**0.1430**	**0.0449**	**0.1879**	**0.0513**	**0.0413**	**0.0925**	**0.0000**	**171.7857**	**171.7857**	**0.0556**	**0.0000**	**173.1747**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0185	7.4300e-003	9.0000e-005	2.9700e-003	9.0000e-005	3.0600e-003	8.7000e-004	9.0000e-005	9.5000e-004	0.0000	9.0334	9.0334	5.4000e-004	1.3000e-003	9.4334
Worker	1.7800e-003	1.2700e-003	0.0184	6.0000e-005	6.3800e-003	4.0000e-005	6.4100e-003	1.7000e-003	3.0000e-005	1.7400e-003	0.0000	5.3244	5.3244	1.2000e-004	1.3000e-004	5.3653
Total	**2.2800e-003**	**0.0198**	**0.0258**	**1.5000e-004**	**9.3500e-003**	**1.3000e-004**	**9.4700e-003**	**2.5700e-003**	**1.2000e-004**	**2.6900e-003**	**0.0000**	**14.3578**	**14.3578**	**6.6000e-004**	**1.4300e-003**	**14.7987**

3.3 Rough Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2291	0.0000	0.2291	0.0620	0.0000	0.0620	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0451	0.4533	0.3881	8.7000e-004		0.0187	0.0187		0.0172	0.0172	0.0000	76.3273	76.3273	0.0247	0.0000	76.9445
Total	**0.0451**	**0.4533**	**0.3881**	**8.7000e-004**	**0.2291**	**0.0187**	**0.2478**	**0.0620**	**0.0172**	**0.0792**	**0.0000**	**76.3273**	**76.3273**	**0.0247**	**0.0000**	**76.9445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.2000e-004	8.2000e-003	3.2800e-003	4.0000e-005	1.4100e-003	4.0000e-005	1.4500e-003	4.1000e-004	4.0000e-005	4.5000e-004	0.0000	3.9526	3.9526	2.4000e-004	5.7000e-004	4.1285
Worker	7.4000e-004	5.1000e-004	7.6200e-003	2.0000e-005	3.0700e-003	2.0000e-005	3.0900e-003	8.2000e-004	1.0000e-005	8.3000e-004	0.0000	2.3096	2.3096	5.0000e-005	5.0000e-005	2.3266
Total	**9.6000e-004**	**8.7100e-003**	**0.0109**	**6.0000e-005**	**4.4800e-003**	**6.0000e-005**	**4.5400e-003**	**1.2300e-003**	**5.0000e-005**	**1.2800e-003**	**0.0000**	**6.2622**	**6.2622**	**2.9000e-004**	**6.2000e-004**	**6.4551**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0979	0.0000	0.0979	0.0265	0.0000	0.0265	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0451	0.4533	0.3881	8.7000e-004		0.0187	0.0187		0.0172	0.0172	0.0000	76.3272	76.3272	0.0247	0.0000	76.9444
Total	**0.0451**	**0.4533**	**0.3881**	**8.7000e-004**	**0.0979**	**0.0187**	**0.1166**	**0.0265**	**0.0172**	**0.0437**	**0.0000**	**76.3272**	**76.3272**	**0.0247**	**0.0000**	**76.9444**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.2000e-004	8.2000e-003	3.2800e-003	4.0000e-005	1.3200e-003	4.0000e-005	1.3600e-003	3.8000e-004	4.0000e-005	4.3000e-004	0.0000	3.9526	3.9526	2.4000e-004	5.7000e-004	4.1285
Worker	7.4000e-004	5.1000e-004	7.6200e-003	2.0000e-005	2.8300e-003	2.0000e-005	2.8500e-003	7.6000e-004	1.0000e-005	7.7000e-004	0.0000	2.3096	2.3096	5.0000e-005	5.0000e-005	2.3266
Total	**9.6000e-004**	**8.7100e-003**	**0.0109**	**6.0000e-005**	**4.1500e-003**	**6.0000e-005**	**4.2100e-003**	**1.1400e-003**	**5.0000e-005**	**1.2000e-003**	**0.0000**	**6.2622**	**6.2622**	**2.9000e-004**	**6.2000e-004**	**6.4551**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Utility Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.7800e-003	0.0779	0.1005	1.5000e-004		4.8100e-003	4.8100e-003		4.4200e-003	4.4200e-003	0.0000	13.0239	13.0239	4.2100e-003	0.0000	13.1292
Total	**8.7800e-003**	**0.0779**	**0.1005**	**1.5000e-004**		**4.8100e-003**	**4.8100e-003**		**4.4200e-003**	**4.4200e-003**	**0.0000**	**13.0239**	**13.0239**	**4.2100e-003**	**0.0000**	**13.1292**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.4000e-004	3.5000e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3200e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.0142	1.0142	2.0000e-005	2.0000e-005	1.0220
Total	**3.4000e-004**	**2.4000e-004**	**3.5000e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3200e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.0142**	**1.0142**	**2.0000e-005**	**2.0000e-005**	**1.0220**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.7800e-003	0.0779	0.1005	1.5000e-004		4.8100e-003	4.8100e-003		4.4200e-003	4.4200e-003	0.0000	13.0239	13.0239	4.2100e-003	0.0000	13.1292
Total	**8.7800e-003**	**0.0779**	**0.1005**	**1.5000e-004**		**4.8100e-003**	**4.8100e-003**		**4.4200e-003**	**4.4200e-003**	**0.0000**	**13.0239**	**13.0239**	**4.2100e-003**	**0.0000**	**13.1292**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.4000e-004	3.5000e-003	1.0000e-005	1.2100e-003	1.0000e-005	1.2200e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0142	1.0142	2.0000e-005	2.0000e-005	1.0220
Total	**3.4000e-004**	**2.4000e-004**	**3.5000e-003**	**1.0000e-005**	**1.2100e-003**	**1.0000e-005**	**1.2200e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0142**	**1.0142**	**2.0000e-005**	**2.0000e-005**	**1.0220**

3.4 Utility Trenching - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0142	0.1234	0.1677	2.5000e-004		7.6600e-003	7.6600e-003		7.0500e-003	7.0500e-003	0.0000	21.7102	21.7102	7.0200e-003	0.0000	21.8857
Total	**0.0142**	**0.1234**	**0.1677**	**2.5000e-004**		**7.6600e-003**	**7.6600e-003**		**7.0500e-003**	**7.0500e-003**	**0.0000**	**21.7102**	**21.7102**	**7.0200e-003**	**0.0000**	**21.8857**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3000e-004	3.6000e-004	5.4400e-003	2.0000e-005	2.2000e-003	1.0000e-005	2.2100e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.6497	1.6497	4.0000e-005	4.0000e-005	1.6618
Total	**5.3000e-004**	**3.6000e-004**	**5.4400e-003**	**2.0000e-005**	**2.2000e-003**	**1.0000e-005**	**2.2100e-003**	**5.8000e-004**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**1.6497**	**1.6497**	**4.0000e-005**	**4.0000e-005**	**1.6618**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0142	0.1234	0.1677	2.5000e-004		7.6600e-003	7.6600e-003		7.0500e-003	7.0500e-003	0.0000	21.7101	21.7101	7.0200e-003	0.0000	21.8857
Total	**0.0142**	**0.1234**	**0.1677**	**2.5000e-004**		**7.6600e-003**	**7.6600e-003**		**7.0500e-003**	**7.0500e-003**	**0.0000**	**21.7101**	**21.7101**	**7.0200e-003**	**0.0000**	**21.8857**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3000e-004	3.6000e-004	5.4400e-003	2.0000e-005	2.0200e-003	1.0000e-005	2.0400e-003	5.4000e-004	1.0000e-005	5.5000e-004	0.0000	1.6497	1.6497	4.0000e-005	4.0000e-005	1.6618
Total	**5.3000e-004**	**3.6000e-004**	**5.4400e-003**	**2.0000e-005**	**2.0200e-003**	**1.0000e-005**	**2.0400e-003**	**5.4000e-004**	**1.0000e-005**	**5.5000e-004**	**0.0000**	**1.6497**	**1.6497**	**4.0000e-005**	**4.0000e-005**	**1.6618**

3.5 Fine Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4142	0.0000	0.4142	0.1644	0.0000	0.1644	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1448	1.4570	1.2475	2.7900e-003		0.0601	0.0601		0.0553	0.0553	0.0000	245.3379	245.3379	0.0794	0.0000	247.3215
Total	**0.1448**	**1.4570**	**1.2475**	**2.7900e-003**	**0.4142**	**0.0601**	**0.4743**	**0.1644**	**0.0553**	**0.2197**	**0.0000**	**245.3379**	**245.3379**	**0.0794**	**0.0000**	**247.3215**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.0000e-004	0.0264	0.0105	1.3000e-004	4.5400e-003	1.4000e-004	4.6700e-003	1.3100e-003	1.3000e-004	1.4400e-003	0.0000	12.7049	12.7049	7.7000e-004	1.8300e-003	13.2702
Worker	2.3900e-003	1.6300e-003	0.0245	8.0000e-005	9.8800e-003	5.0000e-005	9.9300e-003	2.6200e-003	5.0000e-005	2.6700e-003	0.0000	7.4237	7.4237	1.6000e-004	1.7000e-004	7.4782
Total	**3.0900e-003**	**0.0280**	**0.0350**	**2.1000e-004**	**0.0144**	**1.9000e-004**	**0.0146**	**3.9300e-003**	**1.8000e-004**	**4.1100e-003**	**0.0000**	**20.1286**	**20.1286**	**9.3000e-004**	**2.0000e-003**	**20.7484**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1771	0.0000	0.1771	0.0703	0.0000	0.0703	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1448	1.4570	1.2475	2.7900e-003		0.0601	0.0601		0.0553	0.0553	0.0000	245.3376	245.3376	0.0794	0.0000	247.3212
Total	**0.1448**	**1.4570**	**1.2475**	**2.7900e-003**	**0.1771**	**0.0601**	**0.2371**	**0.0703**	**0.0553**	**0.1256**	**0.0000**	**245.3376**	**245.3376**	**0.0794**	**0.0000**	**247.3212**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.0000e-004	0.0264	0.0105	1.3000e-004	4.2500e-003	1.4000e-004	4.3800e-003	1.2400e-003	1.3000e-004	1.3700e-003	0.0000	12.7049	12.7049	7.7000e-004	1.8300e-003	13.2702
Worker	2.3900e-003	1.6300e-003	0.0245	8.0000e-005	9.1100e-003	5.0000e-005	9.1600e-003	2.4300e-003	5.0000e-005	2.4800e-003	0.0000	7.4237	7.4237	1.6000e-004	1.7000e-004	7.4782
Total	**3.0900e-003**	**0.0280**	**0.0350**	**2.1000e-004**	**0.0134**	**1.9000e-004**	**0.0135**	**3.6700e-003**	**1.8000e-004**	**3.8500e-003**	**0.0000**	**20.1286**	**20.1286**	**9.3000e-004**	**2.0000e-003**	**20.7484**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0455	0.4381	0.6728	1.0500e-003		0.0216	0.0216		0.0198	0.0198	0.0000	92.1220	92.1220	0.0298	0.0000	92.8669
Paving	1.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0469**	**0.4381**	**0.6728**	**1.0500e-003**		**0.0216**	**0.0216**		**0.0198**	**0.0198**	**0.0000**	**92.1220**	**92.1220**	**0.0298**	**0.0000**	**92.8669**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.2500e-003	0.0188	6.0000e-005	7.5700e-003	4.0000e-005	7.6100e-003	2.0100e-003	3.0000e-005	2.0500e-003	0.0000	5.6915	5.6915	1.2000e-004	1.3000e-004	5.7333
Total	**1.8400e-003**	**1.2500e-003**	**0.0188**	**6.0000e-005**	**7.5700e-003**	**4.0000e-005**	**7.6100e-003**	**2.0100e-003**	**3.0000e-005**	**2.0500e-003**	**0.0000**	**5.6915**	**5.6915**	**1.2000e-004**	**1.3000e-004**	**5.7333**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0455	0.4381	0.6728	1.0500e-003		0.0216	0.0216		0.0198	0.0198	0.0000	92.1219	92.1219	0.0298	0.0000	92.8668
Paving	1.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0469**	**0.4381**	**0.6728**	**1.0500e-003**		**0.0216**	**0.0216**		**0.0198**	**0.0198**	**0.0000**	**92.1219**	**92.1219**	**0.0298**	**0.0000**	**92.8668**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.2500e-003	0.0188	6.0000e-005	6.9800e-003	4.0000e-005	7.0200e-003	1.8700e-003	3.0000e-005	1.9000e-003	0.0000	5.6915	5.6915	1.2000e-004	1.3000e-004	5.7333
Total	**1.8400e-003**	**1.2500e-003**	**0.0188**	**6.0000e-005**	**6.9800e-003**	**4.0000e-005**	**7.0200e-003**	**1.8700e-003**	**3.0000e-005**	**1.9000e-003**	**0.0000**	**5.6915**	**5.6915**	**1.2000e-004**	**1.3000e-004**	**5.7333**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Finishing/Landscaping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5200e-003	0.0656	0.1013	1.4000e-004		3.0100e-003	3.0100e-003		2.7700e-003	2.7700e-003	0.0000	12.4055	12.4055	4.0100e-003	0.0000	12.5058
Total	**6.5200e-003**	**0.0656**	**0.1013**	**1.4000e-004**		**3.0100e-003**	**3.0100e-003**		**2.7700e-003**	**2.7700e-003**	**0.0000**	**12.4055**	**12.4055**	**4.0100e-003**	**0.0000**	**12.5058**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	2.5000e-004	3.7100e-003	1.0000e-005	1.5000e-003	1.0000e-005	1.5100e-003	4.0000e-004	1.0000e-005	4.0000e-004	0.0000	1.1259	1.1259	2.0000e-005	3.0000e-005	1.1342
Total	**3.6000e-004**	**2.5000e-004**	**3.7100e-003**	**1.0000e-005**	**1.5000e-003**	**1.0000e-005**	**1.5100e-003**	**4.0000e-004**	**1.0000e-005**	**4.0000e-004**	**0.0000**	**1.1259**	**1.1259**	**2.0000e-005**	**3.0000e-005**	**1.1342**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5200e-003	0.0656	0.1013	1.4000e-004		3.0100e-003	3.0100e-003		2.7700e-003	2.7700e-003	0.0000	12.4055	12.4055	4.0100e-003	0.0000	12.5058
Total	**6.5200e-003**	**0.0656**	**0.1013**	**1.4000e-004**		**3.0100e-003**	**3.0100e-003**		**2.7700e-003**	**2.7700e-003**	**0.0000**	**12.4055**	**12.4055**	**4.0100e-003**	**0.0000**	**12.5058**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	2.5000e-004	3.7100e-003	1.0000e-005	1.3800e-003	1.0000e-005	1.3900e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.1259	1.1259	2.0000e-005	3.0000e-005	1.1342
Total	**3.6000e-004**	**2.5000e-004**	**3.7100e-003**	**1.0000e-005**	**1.3800e-003**	**1.0000e-005**	**1.3900e-003**	**3.7000e-004**	**1.0000e-005**	**3.8000e-004**	**0.0000**	**1.1259**	**1.1259**	**2.0000e-005**	**3.0000e-005**	**1.1342**

3.8 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1229	1.1226	1.3499	2.2500e-003		0.0512	0.0512		0.0482	0.0482	0.0000	193.5940	193.5940	0.0458	0.0000	194.7385
Total	**0.1229**	**1.1226**	**1.3499**	**2.2500e-003**		**0.0512**	**0.0512**		**0.0482**	**0.0482**	**0.0000**	**193.5940**	**193.5940**	**0.0458**	**0.0000**	**194.7385**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8900e-003	0.1834	0.0733	8.9000e-004	0.0316	9.4000e-004	0.0325	9.1000e-003	9.0000e-004	0.0100	0.0000	88.4046	88.4046	5.3900e-003	0.0128	92.3381
Worker	0.0524	0.0357	0.5363	1.7400e-003	0.2163	1.0700e-003	0.2174	0.0575	9.9000e-004	0.0584	0.0000	162.5464	162.5464	3.4800e-003	3.7100e-003	163.7401
Total	**0.0573**	**0.2191**	**0.6096**	**2.6300e-003**	**0.2479**	**2.0100e-003**	**0.2499**	**0.0666**	**1.8900e-003**	**0.0685**	**0.0000**	**250.9510**	**250.9510**	**8.8700e-003**	**0.0165**	**256.0782**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1229	1.1226	1.3499	2.2500e-003		0.0512	0.0512		0.0482	0.0482	0.0000	193.5938	193.5938	0.0458	0.0000	194.7383
Total	**0.1229**	**1.1226**	**1.3499**	**2.2500e-003**		**0.0512**	**0.0512**		**0.0482**	**0.0482**	**0.0000**	**193.5938**	**193.5938**	**0.0458**	**0.0000**	**194.7383**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8900e-003	0.1834	0.0733	8.9000e-004	0.0296	9.4000e-004	0.0305	8.6100e-003	9.0000e-004	9.5100e-003	0.0000	88.4046	88.4046	5.3900e-003	0.0128	92.3381
Worker	0.0524	0.0357	0.5363	1.7400e-003	0.1995	1.0700e-003	0.2005	0.0533	9.9000e-004	0.0543	0.0000	162.5464	162.5464	3.4800e-003	3.7100e-003	163.7401
Total	**0.0573**	**0.2191**	**0.6096**	**2.6300e-003**	**0.2290**	**2.0100e-003**	**0.2310**	**0.0619**	**1.8900e-003**	**0.0638**	**0.0000**	**250.9510**	**250.9510**	**8.8700e-003**	**0.0165**	**256.0782**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0738	0.6734	0.8686	1.4600e-003		0.0285	0.0285		0.0268	0.0268	0.0000	125.2365	125.2365	0.0294	0.0000	125.9725
Total	**0.0738**	**0.6734**	**0.8686**	**1.4600e-003**		**0.0285**	**0.0285**		**0.0268**	**0.0268**	**0.0000**	**125.2365**	**125.2365**	**0.0294**	**0.0000**	**125.9725**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1200e-003	0.1180	0.0472	5.6000e-004	0.0204	6.1000e-004	0.0210	5.8900e-003	5.9000e-004	6.4800e-003	0.0000	56.1023	56.1023	3.5300e-003	8.1200e-003	58.6114
Worker	0.0320	0.0209	0.3264	1.0900e-003	0.1399	6.6000e-004	0.1406	0.0372	6.1000e-004	0.0378	0.0000	102.5569	102.5569	2.0400e-003	2.2600e-003	103.2811
Total	**0.0352**	**0.1390**	**0.3736**	**1.6500e-003**	**0.1603**	**1.2700e-003**	**0.1616**	**0.0430**	**1.2000e-003**	**0.0442**	**0.0000**	**158.6592**	**158.6592**	**5.5700e-003**	**0.0104**	**161.8924**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0738	0.6734	0.8686	1.4600e-003		0.0285	0.0285		0.0268	0.0268	0.0000	125.2364	125.2364	0.0294	0.0000	125.9723
Total	**0.0738**	**0.6734**	**0.8686**	**1.4600e-003**		**0.0285**	**0.0285**		**0.0268**	**0.0268**	**0.0000**	**125.2364**	**125.2364**	**0.0294**	**0.0000**	**125.9723**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1200e-003	0.1180	0.0472	5.6000e-004	0.0191	6.1000e-004	0.0197	5.5700e-003	5.9000e-004	6.1600e-003	0.0000	56.1023	56.1023	3.5300e-003	8.1200e-003	58.6114
Worker	0.0320	0.0209	0.3264	1.0900e-003	0.1290	6.6000e-004	0.1297	0.0345	6.1000e-004	0.0351	0.0000	102.5569	102.5569	2.0400e-003	2.2600e-003	103.2811
Total	**0.0352**	**0.1390**	**0.3736**	**1.6500e-003**	**0.1481**	**1.2700e-003**	**0.1494**	**0.0400**	**1.2000e-003**	**0.0412**	**0.0000**	**158.6592**	**158.6592**	**5.5700e-003**	**0.0104**	**161.8924**

3.9 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.6364					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.6900e-003	0.0516	0.0814	1.3000e-004		2.3200e-003	2.3200e-003		2.3200e-003	2.3200e-003	0.0000	11.4896	11.4896	6.3000e-004	0.0000	11.5053
Total	**1.6441**	**0.0516**	**0.0814**	**1.3000e-004**		**2.3200e-003**	**2.3200e-003**		**2.3200e-003**	**2.3200e-003**	**0.0000**	**11.4896**	**11.4896**	**6.3000e-004**	**0.0000**	**11.5053**

Phase 1 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3200e-003	3.4700e-003	0.0542	1.8000e-004	0.0232	1.1000e-004	0.0233	6.1700e-003	1.0000e-004	6.2700e-003	0.0000	17.0204	17.0204	3.4000e-004	3.7000e-004	17.1406
Total	**5.3200e-003**	**3.4700e-003**	**0.0542**	**1.8000e-004**	**0.0232**	**1.1000e-004**	**0.0233**	**6.1700e-003**	**1.0000e-004**	**6.2700e-003**	**0.0000**	**17.0204**	**17.0204**	**3.4000e-004**	**3.7000e-004**	**17.1406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.6364					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.6900e-003	0.0516	0.0814	1.3000e-004		2.3200e-003	2.3200e-003		2.3200e-003	2.3200e-003	0.0000	11.4896	11.4896	6.3000e-004	0.0000	11.5053
Total	**1.6441**	**0.0516**	**0.0814**	**1.3000e-004**		**2.3200e-003**	**2.3200e-003**		**2.3200e-003**	**2.3200e-003**	**0.0000**	**11.4896**	**11.4896**	**6.3000e-004**	**0.0000**	**11.5053**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3200e-003	3.4700e-003	0.0542	1.8000e-004	0.0214	1.1000e-004	0.0215	5.7200e-003	1.0000e-004	5.8200e-003	0.0000	17.0204	17.0204	3.4000e-004	3.7000e-004	17.1406
Total	**5.3200e-003**	**3.4700e-003**	**0.0542**	**1.8000e-004**	**0.0214**	**1.1000e-004**	**0.0215**	**5.7200e-003**	**1.0000e-004**	**5.8200e-003**	**0.0000**	**17.0204**	**17.0204**	**3.4000e-004**	**3.7000e-004**	**17.1406**

Phase 1 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rough Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	No Change	0	1	No Change	0.00
Trenchers	Diesel	No Change	0	1	No Change	0.00
Cranes	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	6	No Change	0.00
Forklifts	Diesel	No Change	0	3	No Change	0.00
Generator Sets	Diesel	No Change	0	1	No Change	0.00
Graders	Diesel	No Change	0	2	No Change	0.00
Pavers	Diesel	No Change	0	2	No Change	0.00
Paving Equipment	Diesel	No Change	0	2	No Change	0.00
Rollers	Diesel	No Change	0	2	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	5	No Change	0.00
Scrapers	Diesel	No Change	0	4	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	12	No Change	0.00

Phase 1 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Welders	Diesel	No Change	0	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	7.69000E-003	5.15500E-002	8.14100E-002	1.30000E-004	2.32000E-003	2.32000E-003	0.00000E+000	1.14896E+001	1.14896E+001	6.30000E-004	0.00000E+000	1.15053E+001
Cranes	3.90200E-002	4.05720E-001	2.11710E-001	6.90000E-004	1.70200E-002	1.56500E-002	0.00000E+000	6.09922E+001	6.09922E+001	1.97300E-002	0.00000E+000	6.14854E+001
Excavators	4.23700E-002	3.36340E-001	7.54450E-001	1.20000E-003	1.65300E-002	1.52100E-002	0.00000E+000	1.04937E+002	1.04937E+002	3.39400E-002	0.00000E+000	1.05786E+002
Forklifts	3.76700E-002	3.53930E-001	4.69060E-001	6.30000E-004	1.98800E-002	1.82900E-002	0.00000E+000	5.53952E+001	5.53952E+001	1.79200E-002	0.00000E+000	5.58431E+001
Generator Sets	3.81900E-002	3.41820E-001	5.03550E-001	9.00000E-004	1.44000E-002	1.44000E-002	0.00000E+000	7.77160E+001	7.77160E+001	3.04000E-003	0.00000E+000	7.77920E+001
Graders	3.30000E-002	3.91760E-001	1.51050E-001	6.00000E-004	1.27000E-002	1.16800E-002	0.00000E+000	5.25957E+001	5.25957E+001	1.70100E-002	0.00000E+000	5.30210E+001
Pavers	1.68900E-002	1.60250E-001	2.66150E-001	4.30000E-004	7.48000E-003	6.88000E-003	0.00000E+000	3.79883E+001	3.79883E+001	1.22900E-002	0.00000E+000	3.82954E+001
Paving Equipment	1.51600E-002	1.37640E-001	2.36430E-001	3.70000E-004	6.65000E-003	6.12000E-003	0.00000E+000	3.29225E+001	3.29225E+001	1.06500E-002	0.00000E+000	3.31887E+001
Rollers	1.34100E-002	1.40240E-001	1.70210E-001	2.40000E-004	7.42000E-003	6.83000E-003	0.00000E+000	2.12113E+001	2.12113E+001	6.86000E-003	0.00000E+000	2.13828E+001
Rubber Tired Dozers	1.09820E-001	1.13681E+000	4.96920E-001	1.36000E-003	5.12000E-002	4.71100E-002	0.00000E+000	1.19663E+002	1.19663E+002	3.87000E-002	0.00000E+000	1.20630E+002
Scrapers	1.39250E-001	1.42995E+000	1.09074E+000	2.75000E-003	5.63500E-002	5.18500E-002	0.00000E+000	2.41285E+002	2.41285E+002	7.80400E-002	0.00000E+000	2.43236E+002
Tractors/Loaders/Backhoes	9.72400E-002	9.81240E-001	1.51703E+000	2.12000E-003	4.48400E-002	4.12600E-002	0.00000E+000	1.85962E+002	1.85962E+002	6.01400E-002	0.00000E+000	1.87465E+002
Trenchers	1.37700E-002	1.28120E-001	1.04200E-001	1.40000E-004	8.87000E-003	8.16000E-003	0.00000E+000	1.19317E+001	1.19317E+001	3.86000E-003	0.00000E+000	1.20282E+001
Welders	3.15600E-002	1.87760E-001	2.28110E-001	3.50000E-004	6.17000E-003	6.17000E-003	0.00000E+000	2.58803E+001	2.58803E+001	2.57000E-003	0.00000E+000	2.59446E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	7.69000E-003	5.15500E-002	8.14100E-002	1.30000E-004	2.32000E-003	2.32000E-003	0.00000E+000	1.14896E+001	1.14896E+001	6.30000E-004	0.00000E+000	1.15053E+001
Cranes	3.90200E-002	4.05720E-001	2.11710E-001	6.90000E-004	1.70200E-002	1.56500E-002	0.00000E+000	6.09921E+001	6.09921E+001	1.97300E-002	0.00000E+000	6.14853E+001
Excavators	4.23700E-002	3.36340E-001	7.54440E-001	1.20000E-003	1.65300E-002	1.52100E-002	0.00000E+000	1.04937E+002	1.04937E+002	3.39400E-002	0.00000E+000	1.05785E+002
Forklifts	3.76700E-002	3.53930E-001	4.69060E-001	6.30000E-004	1.98800E-002	1.82900E-002	0.00000E+000	5.53951E+001	5.53951E+001	1.79200E-002	0.00000E+000	5.58430E+001
Generator Sets	3.81900E-002	3.41820E-001	5.03550E-001	9.00000E-004	1.44000E-002	1.44000E-002	0.00000E+000	7.77159E+001	7.77159E+001	3.04000E-003	0.00000E+000	7.77919E+001
Graders	3.30000E-002	3.91760E-001	1.51050E-001	6.00000E-004	1.27000E-002	1.16800E-002	0.00000E+000	5.25957E+001	5.25957E+001	1.70100E-002	0.00000E+000	5.30209E+001
Pavers	1.68900E-002	1.60250E-001	2.66150E-001	4.30000E-004	7.48000E-003	6.88000E-003	0.00000E+000	3.79882E+001	3.79882E+001	1.22900E-002	0.00000E+000	3.82954E+001
Paving Equipment	1.51600E-002	1.37640E-001	2.36420E-001	3.70000E-004	6.65000E-003	6.12000E-003	0.00000E+000	3.29225E+001	3.29225E+001	1.06500E-002	0.00000E+000	3.31887E+001

Phase 1 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rollers	1.34100E-002	1.40240E-001	1.70210E-001	2.40000E-004	7.42000E-003	6.83000E-003	0.00000E+000	2.12112E+001	2.12112E+001	6.86000E-003	0.00000E+000	2.13827E+001
Rubber Tired Dozers	1.09820E-001	1.13681E+000	4.96920E-001	1.36000E-003	5.12000E-002	4.71100E-002	0.00000E+000	1.19662E+002	1.19662E+002	3.87000E-002	0.00000E+000	1.20630E+002
Scrapers	1.39250E-001	1.42994E+000	1.09074E+000	2.75000E-003	5.63500E-002	5.18500E-002	0.00000E+000	2.41285E+002	2.41285E+002	7.80400E-002	0.00000E+000	2.43236E+002
Tractors/Loaders/Backhoes	9.72400E-002	9.81240E-001	1.51703E+000	2.12000E-003	4.48400E-002	4.12500E-002	0.00000E+000	1.85961E+002	1.85961E+002	6.01400E-002	0.00000E+000	1.87465E+002
Trenchers	1.37700E-002	1.28120E-001	1.04200E-001	1.40000E-004	8.87000E-003	8.16000E-003	0.00000E+000	1.19317E+001	1.19317E+001	3.86000E-003	0.00000E+000	1.20282E+001
Welders	3.15600E-002	1.87760E-001	2.28110E-001	3.50000E-004	6.17000E-003	6.17000E-003	0.00000E+000	2.58803E+001	2.58803E+001	2.57000E-003	0.00000E+000	2.59446E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
						Percent Reduction						
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	8.70349E-007	8.70349E-007	0.00000E+000	0.00000E+000	8.69164E-007
Cranes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.14769E-006	1.14769E-006	0.00000E+000	0.00000E+000	1.13848E-006
Excavators	0.00000E+000	0.00000E+000	1.32547E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.23884E-006	1.23884E-006	0.00000E+000	0.00000E+000	1.22890E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.26365E-006	1.26365E-006	0.00000E+000	0.00000E+000	1.07444E-006
Generator Sets	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15806E-006	1.15806E-006	0.00000E+000	0.00000E+000	1.15693E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.14078E-006	1.14078E-006	0.00000E+000	0.00000E+000	1.13163E-006
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.31620E-006	1.31620E-006	0.00000E+000	0.00000E+000	1.04451E-006
Paving Equipment	0.00000E+000	0.00000E+000	4.22958E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.21497E-006	1.21497E-006	0.00000E+000	0.00000E+000	1.20523E-006
Rollers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	9.42896E-007	9.42896E-007	0.00000E+000	0.00000E+000	1.40300E-006
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.16996E-006	1.16996E-006	0.00000E+000	0.00000E+000	1.16057E-006
Scrapers	0.00000E+000	6.99325E-006	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.20190E-006	1.20190E-006	0.00000E+000	0.00000E+000	1.19226E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	2.42365E-004	0.00000E+000	1.18304E-006	1.18304E-006	0.00000E+000	0.00000E+000	1.22690E-006
Trenchers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.67621E-006	1.67621E-006	0.00000E+000	0.00000E+000	8.31382E-007
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15918E-006	1.15918E-006	0.00000E+000	0.00000E+000	1.15631E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		

Phase 1 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.02	0.01	0.02	0.01	0.08	0.07
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	0.41	0.11	0.38	0.10	0.08	0.07
Fine Grading	Fugitive Dust	0.41	0.16	0.18	0.07	0.57	0.57
Fine Grading	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Finishing/Landscaping	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	Roads	0.00	0.00	0.00	0.00	0.08	0.08
Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.01	0.00	0.01	0.00	0.08	0.07
Rough Grading	Fugitive Dust	0.56	0.18	0.24	0.08	0.57	0.57
Rough Grading	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Site Preparation	Fugitive Dust	0.45	0.23	0.19	0.10	0.57	0.57
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.07	0.06
Utility Trenching	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	Roads	0.00	0.00	0.00	0.00	0.08	0.06

CalEEMod Output: Phase 2 Construction

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Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 Construction

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	105.00	Dwelling Unit	25.20	189,000.00	300
Condo/Townhouse	507.00	Dwelling Unit	49.00	507,000.00	1450
City Park	13.00	Acre	13.00	566,280.00	0
Parking Lot	53.60	1000sqft	1.23	53,600.00	0
Other Asphalt Surfaces	1.20	Acre	1.20	52,272.00	0
Other Non-Asphalt Surfaces	5.27	Acre	5.27	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2027
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumption in the AQ/GHG Appendix of the DEIR.

Construction Phase - See

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	110.00	142.00
tblConstructionPhase	NumDays	1,550.00	423.00
tblConstructionPhase	NumDays	155.00	139.00
tblConstructionPhase	NumDays	110.00	143.00
tblConstructionPhase	NumDays	60.00	70.00
tblConstructionPhase	NumDays	155.00	141.00
tblConstructionPhase	PhaseEndDate	9/27/2032	7/31/2027
tblConstructionPhase	PhaseEndDate	11/24/2031	7/31/2027
tblConstructionPhase	PhaseEndDate	12/15/2025	7/20/2025
tblConstructionPhase	PhaseEndDate	4/26/2032	3/26/2026
tblConstructionPhase	PhaseEndDate	5/12/2025	1/6/2025
tblConstructionPhase	PhaseStartDate	4/27/2032	1/14/2027
tblConstructionPhase	PhaseStartDate	12/16/2025	12/17/2025
tblConstructionPhase	PhaseStartDate	5/13/2025	1/7/2025
tblConstructionPhase	PhaseStartDate	11/25/2031	9/9/2025
tblConstructionPhase	PhaseStartDate	2/18/2025	10/1/2024
tblLandUse	LandUseSquareFeet	229,561.20	0.00
tblLandUse	LotAcreage	34.09	25.20
tblLandUse	LotAcreage	31.69	49.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	2.7165	27.4847	18.9647	0.0411	19.9094	1.2318	21.1412	10.1705	1.1333	11.3039	0.0000	4,013.0949	4,013.0949	1.2057	0.0259	4,050.9479
2025	6.6054	62.4824	63.5433	0.1477	19.9094	2.5877	21.7360	10.1705	2.3809	11.1727	0.0000	14,882.1307	14,882.1307	4.3648	0.6132	15,108.4780
2026	4.2968	29.4014	53.2774	0.1428	8.9832	1.0681	10.0513	2.4078	0.9948	3.4026	0.0000	14,669.9621	14,669.9621	1.7366	0.5992	14,891.9288
2027	34.4355	20.6644	40.3177	0.1274	10.3133	0.6507	10.9641	2.7606	0.6149	3.3755	0.0000	13,291.6521	13,291.6521	0.9506	0.6052	13,495.7806
Maximum	**34.4355**	**62.4824**	**63.5433**	**0.1477**	**19.9094**	**2.5877**	**21.7360**	**10.1705**	**2.3809**	**11.3039**	**0.0000**	**14,882.1307**	**14,882.1307**	**4.3648**	**0.6132**	**15,108.4780**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	2.7165	27.4847	18.9647	0.0411	8.6367	1.2318	9.8685	4.3822	1.1333	5.5156	0.0000	4,013.0949	4,013.0949	1.2057	0.0259	4,050.9479
2025	6.6054	62.4824	63.5433	0.1477	8.6367	2.5877	11.1428	4.3822	2.3809	5.6925	0.0000	14,882.1307	14,882.1307	4.3648	0.6132	15,108.4780
2026	4.2968	29.4014	53.2774	0.1428	8.2961	1.0681	9.3643	2.2392	0.9948	3.2340	0.0000	14,669.9621	14,669.9621	1.7366	0.5992	14,891.9288
2027	34.4355	20.6644	40.3177	0.1274	9.5222	0.6507	10.1729	2.5664	0.6149	3.1813	0.0000	13,291.6521	13,291.6521	0.9506	0.6052	13,495.7806
Maximum	**34.4355**	**62.4824**	**63.5433**	**0.1477**	**9.5222**	**2.5877**	**11.1428**	**4.3822**	**2.3809**	**5.6925**	**0.0000**	**14,882.1307**	**14,882.1307**	**4.3648**	**0.6132**	**15,108.4780**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	40.64	0.00	36.54	46.80	0.00	39.76	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	1/6/2025	5	70	
2	Rough Grading	Grading	1/7/2025	7/20/2025	5	139	
3	Utility Trenching	Trenching	3/21/2025	9/7/2025	5	121	
4	Fine Grading	Grading	6/2/2025	12/15/2025	5	141	
5	Paving	Paving	9/9/2025	3/26/2026	5	143	
6	Finishing/Landscaping	Trenching	10/29/2025	5/13/2026	5	141	
7	Building Construction	Building Construction	12/17/2025	7/31/2027	5	423	
8	Architectural Coating	Architectural Coating	1/14/2027	7/31/2027	5	142	

Acres of Grading (Site Preparation Phase): 105

Acres of Grading (Grading Phase): 417

Acres of Paving: 7.7

Residential Indoor: 1,409,400; Residential Outdoor: 469,800; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 6,352

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	685.00	176.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.9600e-003	0.2795	0.1154	1.4100e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4400e-003	0.0162		155.5091	155.5091	9.4900e-003	0.0224	162.4240
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0556**	**0.3087**	**0.6291**	**3.0500e-003**	**0.2524**	**2.4900e-003**	**0.2548**	**0.0681**	**2.3400e-003**	**0.0704**		**325.0850**	**325.0850**	**0.0129**	**0.0259**	**333.1185**

Mitigated Construction On-Site

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**8.4034**	**1.2294**	**9.6327**	**4.3188**	**1.1310**	**5.4498**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.9600e-003	0.2795	0.1154	1.4100e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4400e-003	0.0154		155.5091	155.5091	9.4900e-003	0.0224	162.4240
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0556**	**0.3087**	**0.6291**	**3.0500e-003**	**0.2333**	**2.4900e-003**	**0.2358**	**0.0634**	**2.3400e-003**	**0.0658**		**325.0850**	**325.0850**	**0.0129**	**0.0259**	**333.1185**

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8400e-003	0.2782	0.1149	1.3800e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4500e-003	0.0162		152.5978	152.5978	9.6100e-003	0.0221	159.4184
Worker	0.0450	0.0264	0.4833	1.5900e-003	0.2012	9.4000e-004	0.2021	0.0534	8.6000e-004	0.0542		165.4292	165.4292	3.1100e-003	3.2600e-003	166.4788
Total	**0.0529**	**0.3046**	**0.5982**	**2.9700e-003**	**0.2524**	**2.4500e-003**	**0.2548**	**0.0681**	**2.3100e-003**	**0.0704**		**318.0270**	**318.0270**	**0.0127**	**0.0253**	**325.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**8.4034**	**1.0868**	**9.4902**	**4.3188**	**0.9999**	**5.3187**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8400e-003	0.2782	0.1149	1.3800e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4500e-003	0.0154		152.5978	152.5978	9.6100e-003	0.0221	159.4184
Worker	0.0450	0.0264	0.4833	1.5900e-003	0.1855	9.4000e-004	0.1864	0.0495	8.6000e-004	0.0504		165.4292	165.4292	3.1100e-003	3.2600e-003	166.4788
Total	**0.0529**	**0.3046**	**0.5982**	**2.9700e-003**	**0.2333**	**2.4500e-003**	**0.2358**	**0.0634**	**2.3100e-003**	**0.0657**		**318.0270**	**318.0270**	**0.0127**	**0.0253**	**325.8973**

3.3 Rough Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3259**	**4.0700e-003**	**0.3299**	**0.0887**	**3.8600e-003**	**0.0926**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3018**	**4.0700e-003**	**0.3059**	**0.0828**	**3.8600e-003**	**0.0867**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

3.4 Utility Trenching - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920		1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**		**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0200	0.0117	0.2148	7.1000e-004	0.0894	4.2000e-004	0.0898	0.0237	3.8000e-004	0.0241		73.5241	73.5241	1.3800e-003	1.4500e-003	73.9906
Total	**0.0200**	**0.0117**	**0.2148**	**7.1000e-004**	**0.0894**	**4.2000e-004**	**0.0898**	**0.0237**	**3.8000e-004**	**0.0241**		**73.5241**	**73.5241**	**1.3800e-003**	**1.4500e-003**	**73.9906**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920	0.0000	1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**	**0.0000**	**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0200	0.0117	0.2148	7.1000e-004	0.0824	4.2000e-004	0.0828	0.0220	3.8000e-004	0.0224		73.5241	73.5241	1.3800e-003	1.4500e-003	73.9906
Total	**0.0200**	**0.0117**	**0.2148**	**7.1000e-004**	**0.0824**	**4.2000e-004**	**0.0828**	**0.0220**	**3.8000e-004**	**0.0224**		**73.5241**	**73.5241**	**1.3800e-003**	**1.4500e-003**	**73.9906**

3.5 Fine Grading - 2025

Unmitigated Construction On-Site

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3259**	**4.0700e-003**	**0.3299**	**0.0887**	**3.8600e-003**	**0.0926**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3018**	**4.0700e-003**	**0.3059**	**0.0828**	**3.8600e-003**	**0.0867**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0375	0.0220	0.4027	1.3200e-003	0.1677	7.8000e-004	0.1685	0.0445	7.2000e-004	0.0452		137.8576	137.8576	2.5900e-003	2.7200e-003	138.7324
Total	**0.0375**	**0.0220**	**0.4027**	**1.3200e-003**	**0.1677**	**7.8000e-004**	**0.1685**	**0.0445**	**7.2000e-004**	**0.0452**		**137.8576**	**137.8576**	**2.5900e-003**	**2.7200e-003**	**138.7324**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0375	0.0220	0.4027	1.3200e-003	0.1546	7.8000e-004	0.1553	0.0413	7.2000e-004	0.0420		137.8576	137.8576	2.5900e-003	2.7200e-003	138.7324
Total	**0.0375**	**0.0220**	**0.4027**	**1.3200e-003**	**0.1546**	**7.8000e-004**	**0.1553**	**0.0413**	**7.2000e-004**	**0.0420**		**137.8576**	**137.8576**	**2.5900e-003**	**2.7200e-003**	**138.7324**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	0.0356	0.0202	0.3814	1.2800e-003	0.1677	7.4000e-004	0.1684	0.0445	6.9000e-004	0.0452		134.7032	134.7032	2.3600e-003	2.5800e-003	135.5305
Total	**0.0356**	**0.0202**	**0.3814**	**1.2800e-003**	**0.1677**	**7.4000e-004**	**0.1684**	**0.0445**	**6.9000e-004**	**0.0452**		**134.7032**	**134.7032**	**2.3600e-003**	**2.5800e-003**	**135.5305**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0356	0.0202	0.3814	1.2800e-003	0.1546	7.4000e-004	0.1553	0.0413	6.9000e-004	0.0419		134.7032	134.7032	2.3600e-003	2.5800e-003	135.5305
Total	**0.0356**	**0.0202**	**0.3814**	**1.2800e-003**	**0.1546**	**7.4000e-004**	**0.1553**	**0.0413**	**6.9000e-004**	**0.0419**		**134.7032**	**134.7032**	**2.3600e-003**	**2.5800e-003**	**135.5305**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Finishing/Landscaping - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-003	4.4000e-003	0.0805	2.6000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.4000e-004	9.0400e-003		27.5715	27.5715	5.2000e-004	5.4000e-004	27.7465
Total	**7.5000e-003**	**4.4000e-003**	**0.0805**	**2.6000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0400e-003**		**27.5715**	**27.5715**	**5.2000e-004**	**5.4000e-004**	**27.7465**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-003	4.4000e-003	0.0805	2.6000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		27.5715	27.5715	5.2000e-004	5.4000e-004	27.7465
Total	**7.5000e-003**	**4.4000e-003**	**0.0805**	**2.6000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**27.5715**	**27.5715**	**5.2000e-004**	**5.4000e-004**	**27.7465**

3.7 Finishing/Landscaping - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1200e-003	4.0300e-003	0.0763	2.6000e-004	0.0335	1.5000e-004	0.0337	8.8900e-003	1.4000e-004	9.0300e-003		26.9407	26.9407	4.7000e-004	5.2000e-004	27.1061
Total	**7.1200e-003**	**4.0300e-003**	**0.0763**	**2.6000e-004**	**0.0335**	**1.5000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0300e-003**		**26.9407**	**26.9407**	**4.7000e-004**	**5.2000e-004**	**27.1061**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1200e-003	4.0300e-003	0.0763	2.6000e-004	0.0309	1.5000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		26.9407	26.9407	4.7000e-004	5.2000e-004	27.1061
Total	**7.1200e-003**	**4.0300e-003**	**0.0763**	**2.6000e-004**	**0.0309**	**1.5000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**26.9407**	**26.9407**	**4.7000e-004**	**5.2000e-004**	**27.1061**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1725	6.1197	2.5282	0.0305	1.1253	0.0333	1.1586	0.3239	0.0319	0.3557		3,357.1517	3,357.1517	0.2115	0.4858	3,507.2057
Worker	1.7136	1.0055	18.3904	0.0604	7.6567	0.0357	7.6924	2.0306	0.0328	2.0634		6,295.4990	6,295.4990	0.1182	0.1241	6,335.4440

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.8861**	**7.1252**	**20.9186**	**0.0909**	**8.7820**	**0.0690**	**8.8510**	**2.3545**	**0.0647**	**2.4192**		**9,652.6507**	**9,652.6507**	**0.3297**	**0.6099**	**9,842.6496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1725	6.1197	2.5282	0.0305	1.0531	0.0333	1.0864	0.3061	0.0319	0.3380		3,357.1517	3,357.1517	0.2115	0.4858	3,507.2057
Worker	1.7136	1.0055	18.3904	0.0604	7.0576	0.0357	7.0933	1.8835	0.0328	1.9164		6,295.4990	6,295.4990	0.1182	0.1241	6,335.4440
Total	**1.8861**	**7.1252**	**20.9186**	**0.0909**	**8.1107**	**0.0690**	**8.1797**	**2.1897**	**0.0647**	**2.2544**		**9,652.6507**	**9,652.6507**	**0.3297**	**0.6099**	**9,842.6496**

3.8 Building Construction - 2026

Unmitigated Construction On-Site

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1700	6.0757	2.5201	0.0298	1.1253	0.0333	1.1586	0.3239	0.0318	0.3557		3,292.8201	3,292.8201	0.2138	0.4784	3,440.7165
Worker	1.6255	0.9205	17.4164	0.0586	7.6567	0.0340	7.6907	2.0306	0.0313	2.0619		6,151.4474	6,151.4474	0.1080	0.1177	6,189.2261
Total	**1.7954**	**6.9962**	**19.9365**	**0.0884**	**8.7820**	**0.0673**	**8.8493**	**2.3545**	**0.0631**	**2.4176**		**9,444.2675**	**9,444.2675**	**0.3218**	**0.5961**	**9,629.9426**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1700	6.0757	2.5201	0.0298	1.0531	0.0333	1.0864	0.3061	0.0318	0.3380		3,292.8201	3,292.8201	0.2138	0.4784	3,440.7165
Worker	1.6255	0.9205	17.4164	0.0586	7.0576	0.0340	7.0916	1.8835	0.0313	1.9148		6,151.4474	6,151.4474	0.1080	0.1177	6,189.2261
Total	**1.7954**	**6.9962**	**19.9365**	**0.0884**	**8.1107**	**0.0673**	**8.1780**	**2.1897**	**0.0631**	**2.2528**		**9,444.2675**	**9,444.2675**	**0.3218**	**0.5961**	**9,629.9426**

3.8 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1677	6.0304	2.5125	0.0292	1.1253	0.0332	1.1585	0.3239	0.0318	0.3556		3,225.4361	3,225.4361	0.2153	0.4704	3,370.9958
Worker	1.5441	0.8490	16.5928	0.0569	7.6567	0.0320	7.6887	2.0306	0.0295	2.0601		6,023.5780	6,023.5780	0.0992	0.1124	6,059.5457
Total	**1.7117**	**6.8794**	**19.1054**	**0.0861**	**8.7820**	**0.0653**	**8.8472**	**2.3545**	**0.0613**	**2.4157**		**9,249.0141**	**9,249.0141**	**0.3145**	**0.5828**	**9,430.5415**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.1677	6.0304	2.5125	0.0292	1.0530	0.0332	1.0863	0.3061	0.0318	0.3379		3,225.4361	3,225.4361	0.2153	0.4704	3,370.9958
Worker	1.5441	0.8490	16.5928	0.0569	7.0576	0.0320	7.0896	1.8835	0.0295	1.9130		6,023.5780	6,023.5780	0.0992	0.1124	6,059.5457
Total	**1.7117**	**6.8794**	**19.1054**	**0.0861**	**8.1106**	**0.0653**	**8.1759**	**2.1897**	**0.0613**	**2.2509**		**9,249.0141**	**9,249.0141**	**0.3145**	**0.5828**	**9,430.5415**

3.9 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**31.0475**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3088	0.1698	3.3186	0.0114	1.5313	6.4100e-003	1.5378	0.4061	5.9000e-003	0.4120		1,204.7156	1,204.7156	0.0198	0.0225	1,211.9091
Total	**0.3088**	**0.1698**	**3.3186**	**0.0114**	**1.5313**	**6.4100e-003**	**1.5378**	**0.4061**	**5.9000e-003**	**0.4120**		**1,204.7156**	**1,204.7156**	**0.0198**	**0.0225**	**1,211.9091**

Phase 2 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**31.0475**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3088	0.1698	3.3186	0.0114	1.4115	6.4100e-003	1.4179	0.3767	5.9000e-003	0.3826		1,204.7156	1,204.7156	0.0198	0.0225	1,211.9091
Total	**0.3088**	**0.1698**	**3.3186**	**0.0114**	**1.4115**	**6.4100e-003**	**1.4179**	**0.3767**	**5.9000e-003**	**0.3826**		**1,204.7156**	**1,204.7156**	**0.0198**	**0.0225**	**1,211.9091**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 Construction

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	105.00	Dwelling Unit	25.20	189,000.00	300
Condo/Townhouse	507.00	Dwelling Unit	49.00	507,000.00	1450
City Park	13.00	Acre	13.00	566,280.00	0
Parking Lot	53.60	1000sqft	1.23	53,600.00	0
Other Asphalt Surfaces	1.20	Acre	1.20	52,272.00	0
Other Non-Asphalt Surfaces	5.27	Acre	5.27	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2027
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumption in the AQ/GHG Appendix of the DEIR.

Construction Phase - See

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	110.00	142.00
tblConstructionPhase	NumDays	1,550.00	423.00
tblConstructionPhase	NumDays	155.00	139.00
tblConstructionPhase	NumDays	110.00	143.00
tblConstructionPhase	NumDays	60.00	70.00
tblConstructionPhase	NumDays	155.00	141.00
tblConstructionPhase	PhaseEndDate	9/27/2032	7/31/2027
tblConstructionPhase	PhaseEndDate	11/24/2031	7/31/2027
tblConstructionPhase	PhaseEndDate	12/15/2025	7/20/2025
tblConstructionPhase	PhaseEndDate	4/26/2032	3/26/2026
tblConstructionPhase	PhaseEndDate	5/12/2025	1/6/2025
tblConstructionPhase	PhaseStartDate	4/27/2032	1/14/2027
tblConstructionPhase	PhaseStartDate	12/16/2025	12/17/2025
tblConstructionPhase	PhaseStartDate	5/13/2025	1/7/2025
tblConstructionPhase	PhaseStartDate	11/25/2031	9/9/2025
tblConstructionPhase	PhaseStartDate	2/18/2025	10/1/2024
tblLandUse	LandUseSquareFeet	229,561.20	0.00
tblLandUse	LotAcreage	34.09	25.20
tblLandUse	LotAcreage	31.69	49.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	2.7209	27.5000	18.9337	0.0411	19.9094	1.2318	21.1412	10.1705	1.1334	11.3039	0.0000	4,005.2342	4,005.2342	1.2058	0.0262	4,043.1696
2025	6.6163	62.5391	63.4715	0.1475	19.9094	2.5878	21.7361	10.1705	2.3810	11.1727	0.0000	14,579.5030	14,579.5030	4.3649	0.6224	14,808.6482
2026	4.4627	29.7662	52.1675	0.1400	8.9832	1.0683	10.0515	2.4078	0.9950	3.4028	0.0000	14,374.8212	14,374.8212	1.7392	0.6079	14,599.4428
2027	34.6257	21.0350	39.0773	0.1242	10.3133	0.6509	10.9642	2.7606	0.6151	3.3757	0.0000	12,953.2978	12,953.2978	0.9535	0.6148	13,160.3401
Maximum	**34.6257**	**62.5391**	**63.4715**	**0.1475**	**19.9094**	**2.5878**	**21.7361**	**10.1705**	**2.3810**	**11.3039**	**0.0000**	**14,579.5030**	**14,579.5030**	**4.3649**	**0.6224**	**14,808.6482**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	2.7209	27.5000	18.9337	0.0411	8.6367	1.2318	9.8685	4.3822	1.1334	5.5156	0.0000	4,005.2342	4,005.2342	1.2058	0.0262	4,043.1696
2025	6.6163	62.5391	63.4715	0.1475	8.6367	2.5878	11.1428	4.3822	2.3810	5.6926	0.0000	14,579.5030	14,579.5030	4.3649	0.6224	14,808.6482
2026	4.4627	29.7662	52.1675	0.1400	8.2961	1.0683	9.3644	2.2392	0.9950	3.2342	0.0000	14,374.8212	14,374.8212	1.7392	0.6079	14,599.4428
2027	34.6257	21.0350	39.0773	0.1242	9.5222	0.6509	10.1731	2.5664	0.6151	3.1815	0.0000	12,953.2978	12,953.2978	0.9535	0.6148	13,160.3401
Maximum	**34.6257**	**62.5391**	**63.4715**	**0.1475**	**9.5222**	**2.5878**	**11.1428**	**4.3822**	**2.3810**	**5.6926**	**0.0000**	**14,579.5030**	**14,579.5030**	**4.3649**	**0.6224**	**14,808.6482**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	40.64	0.00	36.54	46.80	0.00	39.76	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	1/6/2025	5	70	
2	Rough Grading	Grading	1/7/2025	7/20/2025	5	139	
3	Utility Trenching	Trenching	3/21/2025	9/7/2025	5	121	
4	Fine Grading	Grading	6/2/2025	12/15/2025	5	141	
5	Paving	Paving	9/9/2025	3/26/2026	5	143	
6	Finishing/Landscaping	Trenching	10/29/2025	5/13/2026	5	141	
7	Building Construction	Building Construction	12/17/2025	7/31/2027	5	423	
8	Architectural Coating	Architectural Coating	1/14/2027	7/31/2027	5	142	

Acres of Grading (Site Preparation Phase): 105

Acres of Grading (Grading Phase): 417

Acres of Paving: 7.7

Residential Indoor: 1,409,400; Residential Outdoor: 469,800; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 6,352

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	685.00	176.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6800e-003	0.2920	0.1190	1.4200e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4500e-003	0.0162		155.7435	155.7435	9.4700e-003	0.0225	162.6728
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0600**	**0.3240**	**0.5981**	**2.9900e-003**	**0.2524**	**2.4900e-003**	**0.2549**	**0.0681**	**2.3500e-003**	**0.0704**		**317.2242**	**317.2242**	**0.0130**	**0.0262**	**325.3402**

Mitigated Construction On-Site

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**8.4034**	**1.2294**	**9.6327**	**4.3188**	**1.1310**	**5.4498**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6800e-003	0.2920	0.1190	1.4200e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4500e-003	0.0154		155.7435	155.7435	9.4700e-003	0.0225	162.6728
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0600**	**0.3240**	**0.5981**	**2.9900e-003**	**0.2333**	**2.4900e-003**	**0.2358**	**0.0634**	**2.3500e-003**	**0.0658**		**317.2242**	**317.2242**	**0.0130**	**0.0262**	**325.3402**

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.5600e-003	0.2906	0.1185	1.3900e-003	0.0512	1.5200e-003	0.0527	0.0147	1.4600e-003	0.0162		152.8327	152.8327	9.5900e-003	0.0221	159.6675
Worker	0.0495	0.0290	0.4510	1.5100e-003	0.2012	9.4000e-004	0.2021	0.0534	8.6000e-004	0.0542		157.5482	157.5482	3.1900e-003	3.4700e-003	158.6615
Total	**0.0571**	**0.3196**	**0.5695**	**2.9000e-003**	**0.2524**	**2.4600e-003**	**0.2548**	**0.0681**	**2.3200e-003**	**0.0704**		**310.3809**	**310.3809**	**0.0128**	**0.0256**	**318.3290**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**8.4034**	**1.0868**	**9.4902**	**4.3188**	**0.9999**	**5.3187**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.5600e-003	0.2906	0.1185	1.3900e-003	0.0479	1.5200e-003	0.0494	0.0139	1.4600e-003	0.0154		152.8327	152.8327	9.5900e-003	0.0221	159.6675
Worker	0.0495	0.0290	0.4510	1.5100e-003	0.1855	9.4000e-004	0.1864	0.0495	8.6000e-004	0.0504		157.5482	157.5482	3.1900e-003	3.4700e-003	158.6615
Total	**0.0571**	**0.3196**	**0.5695**	**2.9000e-003**	**0.2333**	**2.4600e-003**	**0.2358**	**0.0634**	**2.3200e-003**	**0.0657**		**310.3809**	**310.3809**	**0.0128**	**0.0256**	**318.3290**

3.3 Rough Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.1023	3.0400e-003	0.1054	0.0294	2.9100e-003	0.0324		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3259**	**4.0800e-003**	**0.3299**	**0.0887**	**3.8700e-003**	**0.0926**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.0957	3.0400e-003	0.0988	0.0278	2.9100e-003	0.0307		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3018**	**4.0800e-003**	**0.3059**	**0.0828**	**3.8700e-003**	**0.0867**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

3.4 Utility Trenching - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920		1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**		**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0220	0.0129	0.2004	6.7000e-004	0.0894	4.2000e-004	0.0898	0.0237	3.8000e-004	0.0241		70.0214	70.0214	1.4200e-003	1.5400e-003	70.5162
Total	**0.0220**	**0.0129**	**0.2004**	**6.7000e-004**	**0.0894**	**4.2000e-004**	**0.0898**	**0.0237**	**3.8000e-004**	**0.0241**		**70.0214**	**70.0214**	**1.4200e-003**	**1.5400e-003**	**70.5162**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920	0.0000	1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**	**0.0000**	**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0220	0.0129	0.2004	6.7000e-004	0.0824	4.2000e-004	0.0828	0.0220	3.8000e-004	0.0224		70.0214	70.0214	1.4200e-003	1.5400e-003	70.5162
Total	**0.0220**	**0.0129**	**0.2004**	**6.7000e-004**	**0.0824**	**4.2000e-004**	**0.0828**	**0.0220**	**3.8000e-004**	**0.0224**		**70.0214**	**70.0214**	**1.4200e-003**	**1.5400e-003**	**70.5162**

3.5 Fine Grading - 2025

Unmitigated Construction On-Site

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.1023	3.0400e-003	0.1054	0.0294	2.9100e-003	0.0324		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3259**	**4.0800e-003**	**0.3299**	**0.0887**	**3.8700e-003**	**0.0926**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.0957	3.0400e-003	0.0988	0.0278	2.9100e-003	0.0307		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3018**	**4.0800e-003**	**0.3059**	**0.0828**	**3.8700e-003**	**0.0867**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0413	0.0242	0.3758	1.2600e-003	0.1677	7.8000e-004	0.1685	0.0445	7.2000e-004	0.0452		131.2902	131.2902	2.6600e-003	2.8900e-003	132.2179
Total	**0.0413**	**0.0242**	**0.3758**	**1.2600e-003**	**0.1677**	**7.8000e-004**	**0.1685**	**0.0445**	**7.2000e-004**	**0.0452**		**131.2902**	**131.2902**	**2.6600e-003**	**2.8900e-003**	**132.2179**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0413	0.0242	0.3758	1.2600e-003	0.1546	7.8000e-004	0.1553	0.0413	7.2000e-004	0.0420		131.2902	131.2902	2.6600e-003	2.8900e-003	132.2179
Total	**0.0413**	**0.0242**	**0.3758**	**1.2600e-003**	**0.1546**	**7.8000e-004**	**0.1553**	**0.0413**	**7.2000e-004**	**0.0420**		**131.2902**	**131.2902**	**2.6600e-003**	**2.8900e-003**	**132.2179**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	0.0393	0.0221	0.3561	1.2200e-003	0.1677	7.4000e-004	0.1684	0.0445	6.9000e-004	0.0452		128.2955	128.2955	2.4300e-003	2.7400e-003	129.1730
Total	**0.0393**	**0.0221**	**0.3561**	**1.2200e-003**	**0.1677**	**7.4000e-004**	**0.1684**	**0.0445**	**6.9000e-004**	**0.0452**		**128.2955**	**128.2955**	**2.4300e-003**	**2.7400e-003**	**129.1730**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0393	0.0221	0.3561	1.2200e-003	0.1546	7.4000e-004	0.1553	0.0413	6.9000e-004	0.0419		128.2955	128.2955	2.4300e-003	2.7400e-003	129.1730
Total	**0.0393**	**0.0221**	**0.3561**	**1.2200e-003**	**0.1546**	**7.4000e-004**	**0.1553**	**0.0413**	**6.9000e-004**	**0.0419**		**128.2955**	**128.2955**	**2.4300e-003**	**2.7400e-003**	**129.1730**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Finishing/Landscaping - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2500e-003	4.8300e-003	0.0752	2.5000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.4000e-004	9.0400e-003		26.2580	26.2580	5.3000e-004	5.8000e-004	26.4436
Total	**8.2500e-003**	**4.8300e-003**	**0.0752**	**2.5000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0400e-003**		**26.2580**	**26.2580**	**5.3000e-004**	**5.8000e-004**	**26.4436**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2500e-003	4.8300e-003	0.0752	2.5000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		26.2580	26.2580	5.3000e-004	5.8000e-004	26.4436
Total	**8.2500e-003**	**4.8300e-003**	**0.0752**	**2.5000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**26.2580**	**26.2580**	**5.3000e-004**	**5.8000e-004**	**26.4436**

3.7 Finishing/Landscaping - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.8500e-003	4.4200e-003	0.0712	2.4000e-004	0.0335	1.5000e-004	0.0337	8.8900e-003	1.4000e-004	9.0300e-003		25.6591	25.6591	4.9000e-004	5.5000e-004	25.8346
Total	**7.8500e-003**	**4.4200e-003**	**0.0712**	**2.4000e-004**	**0.0335**	**1.5000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0300e-003**		**25.6591**	**25.6591**	**4.9000e-004**	**5.5000e-004**	**25.8346**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.8500e-003	4.4200e-003	0.0712	2.4000e-004	0.0309	1.5000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		25.6591	25.6591	4.9000e-004	5.5000e-004	25.8346
Total	**7.8500e-003**	**4.4200e-003**	**0.0712**	**2.4000e-004**	**0.0309**	**1.5000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**25.6591**	**25.6591**	**4.9000e-004**	**5.5000e-004**	**25.8346**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1663	6.3938	2.6063	0.0305	1.1253	0.0335	1.1588	0.3239	0.0320	0.3559		3,362.3204	3,362.3204	0.2109	0.4869	3,512.6846
Worker	1.8847	1.1037	17.1622	0.0576	7.6567	0.0357	7.6924	2.0306	0.0328	2.0634		5,995.5837	5,995.5837	0.1214	0.1320	6,037.9524

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**2.0510**	**7.4974**	**19.7685**	**0.0881**	**8.7820**	**0.0692**	**8.8512**	**2.3545**	**0.0649**	**2.4193**		**9,357.9040**	**9,357.9040**	**0.3323**	**0.6189**	**9,550.6371**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1663	6.3938	2.6063	0.0305	1.0531	0.0335	1.0866	0.3061	0.0320	0.3382		3,362.3204	3,362.3204	0.2109	0.4869	3,512.6846
Worker	1.8847	1.1037	17.1622	0.0576	7.0576	0.0357	7.0933	1.8835	0.0328	1.9164		5,995.5837	5,995.5837	0.1214	0.1320	6,037.9524
Total	**2.0510**	**7.4974**	**19.7685**	**0.0881**	**8.1107**	**0.0692**	**8.1799**	**2.1897**	**0.0649**	**2.2545**		**9,357.9040**	**9,357.9040**	**0.3323**	**0.6189**	**9,550.6371**

3.8 Building Construction - 2026

Unmitigated Construction On-Site

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1637	6.3486	2.5966	0.0299	1.1253	0.0335	1.1588	0.3239	0.0320	0.3559		3,297.9865	3,297.9865	0.2132	0.4794	3,446.1868
Worker	1.7932	1.0101	16.2603	0.0558	7.6567	0.0340	7.6907	2.0306	0.0313	2.0619		5,858.8293	5,858.8293	0.1111	0.1252	5,898.8989
Total	**1.9569**	**7.3587**	**18.8569**	**0.0857**	**8.7820**	**0.0675**	**8.8495**	**2.3545**	**0.0633**	**2.4177**		**9,156.8158**	**9,156.8158**	**0.3243**	**0.6046**	**9,345.0857**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1637	6.3486	2.5966	0.0299	1.0531	0.0335	1.0865	0.3061	0.0320	0.3381		3,297.9865	3,297.9865	0.2132	0.4794	3,446.1868
Worker	1.7932	1.0101	16.2603	0.0558	7.0576	0.0340	7.0916	1.8835	0.0313	1.9148		5,858.8293	5,858.8293	0.1111	0.1252	5,898.8989
Total	**1.9569**	**7.3587**	**18.8569**	**0.0857**	**8.1107**	**0.0675**	**8.1781**	**2.1897**	**0.0633**	**2.2530**		**9,156.8158**	**9,156.8158**	**0.3243**	**0.6046**	**9,345.0857**

3.8 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1614	6.3020	2.5874	0.0292	1.1253	0.0334	1.1587	0.3239	0.0319	0.3558		3,230.5897	3,230.5897	0.2147	0.4715	3,376.4473
Worker	1.7079	0.9315	15.4967	0.0542	7.6567	0.0320	7.6887	2.0306	0.0295	2.0601		5,737.3214	5,737.3214	0.1021	0.1195	5,775.4691
Total	**1.8692**	**7.2335**	**18.0841**	**0.0834**	**8.7820**	**0.0654**	**8.8474**	**2.3545**	**0.0614**	**2.4159**		**8,967.9111**	**8,967.9111**	**0.3168**	**0.5909**	**9,151.9163**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.1614	6.3020	2.5874	0.0292	1.0530	0.0334	1.0864	0.3061	0.0319	0.3380		3,230.5897	3,230.5897	0.2147	0.4715	3,376.4473
Worker	1.7079	0.9315	15.4967	0.0542	7.0576	0.0320	7.0896	1.8835	0.0295	1.9130		5,737.3214	5,737.3214	0.1021	0.1195	5,775.4691
Total	**1.8692**	**7.2335**	**18.0841**	**0.0834**	**8.1106**	**0.0654**	**8.1761**	**2.1897**	**0.0614**	**2.2511**		**8,967.9111**	**8,967.9111**	**0.3168**	**0.5909**	**9,151.9163**

3.9 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**31.0475**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3416	0.1863	3.0993	0.0108	1.5313	6.4100e-003	1.5378	0.4061	5.9000e-003	0.4120		1,147.4643	1,147.4643	0.0204	0.0239	1,155.0938
Total	**0.3416**	**0.1863**	**3.0993**	**0.0108**	**1.5313**	**6.4100e-003**	**1.5378**	**0.4061**	**5.9000e-003**	**0.4120**		**1,147.4643**	**1,147.4643**	**0.0204**	**0.0239**	**1,155.0938**

Phase 2 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**31.0475**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3416	0.1863	3.0993	0.0108	1.4115	6.4100e-003	1.4179	0.3767	5.9000e-003	0.3826		1,147.4643	1,147.4643	0.0204	0.0239	1,155.0938
Total	**0.3416**	**0.1863**	**3.0993**	**0.0108**	**1.4115**	**6.4100e-003**	**1.4179**	**0.3767**	**5.9000e-003**	**0.3826**		**1,147.4643**	**1,147.4643**	**0.0204**	**0.0239**	**1,155.0938**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 Construction

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	105.00	Dwelling Unit	25.20	189,000.00	300
Condo/Townhouse	507.00	Dwelling Unit	49.00	507,000.00	1450
City Park	13.00	Acre	13.00	566,280.00	0
Parking Lot	53.60	1000sqft	1.23	53,600.00	0
Other Asphalt Surfaces	1.20	Acre	1.20	52,272.00	0
Other Non-Asphalt Surfaces	5.27	Acre	5.27	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2027
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumption in the AQ/GHG Appendix of the DEIR.

Construction Phase - See

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	110.00	142.00
tblConstructionPhase	NumDays	1,550.00	423.00
tblConstructionPhase	NumDays	155.00	139.00
tblConstructionPhase	NumDays	110.00	143.00
tblConstructionPhase	NumDays	60.00	70.00
tblConstructionPhase	NumDays	155.00	141.00
tblConstructionPhase	PhaseEndDate	9/27/2032	7/31/2027
tblConstructionPhase	PhaseEndDate	11/24/2031	7/31/2027
tblConstructionPhase	PhaseEndDate	12/15/2025	7/20/2025
tblConstructionPhase	PhaseEndDate	4/26/2032	3/26/2026
tblConstructionPhase	PhaseEndDate	5/12/2025	1/6/2025
tblConstructionPhase	PhaseStartDate	4/27/2032	1/14/2027
tblConstructionPhase	PhaseStartDate	12/16/2025	12/17/2025
tblConstructionPhase	PhaseStartDate	5/13/2025	1/7/2025
tblConstructionPhase	PhaseStartDate	11/25/2031	9/9/2025
tblConstructionPhase	PhaseStartDate	2/18/2025	10/1/2024
tblLandUse	LandUseSquareFeet	229,561.20	0.00
tblLandUse	LotAcreage	34.09	25.20
tblLandUse	LotAcreage	31.69	49.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0897	0.9076	0.6251	1.3600e-003	0.6601	0.0407	0.7007	0.3359	0.0374	0.3733	0.0000	119.9664	119.9664	0.0361	7.8000e-004	121.1024
2025	0.5231	4.8712	5.2580	0.0120	1.4859	0.2020	1.6880	0.5659	0.1859	0.7519	0.0000	1,062.5103	1,062.5103	0.3090	9.4600e-003	1,073.0544
2026	0.4506	2.9180	5.1662	0.0157	1.1326	0.0930	1.2256	0.3041	0.0871	0.3912	0.0000	1,474.4412	1,474.4412	0.1336	0.0718	1,499.1849
2027	2.4595	1.5848	2.9559	9.3800e-003	0.7583	0.0489	0.8071	0.2033	0.0462	0.2495	0.0000	887.4502	887.4502	0.0652	0.0421	901.6290
Maximum	**2.4595**	**4.8712**	**5.2580**	**0.0157**	**1.4859**	**0.2020**	**1.6880**	**0.5659**	**0.1859**	**0.7519**	**0.0000**	**1,474.4412**	**1,474.4412**	**0.3090**	**0.0718**	**1,499.1849**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0897	0.9076	0.6251	1.3600e-003	0.2862	0.0407	0.3269	0.1447	0.0374	0.1821	0.0000	119.9663	119.9663	0.0361	7.8000e-004	121.1022
2025	0.5231	4.8712	5.2580	0.0120	0.6878	0.2020	0.8898	0.2563	0.1859	0.4422	0.0000	1,062.5092	1,062.5092	0.3090	9.4600e-003	1,073.0532
2026	0.4506	2.9180	5.1662	0.0157	1.0463	0.0930	1.1393	0.2829	0.0871	0.3700	0.0000	1,474.4408	1,474.4408	0.1336	0.0718	1,499.1844
2027	2.4595	1.5848	2.9559	9.3800e-003	0.7003	0.0489	0.7492	0.1891	0.0462	0.2352	0.0000	887.4499	887.4499	0.0652	0.0421	901.6288
Maximum	**2.4595**	**4.8712**	**5.2580**	**0.0157**	**1.0463**	**0.2020**	**1.1393**	**0.2829**	**0.1859**	**0.4422**	**0.0000**	**1,474.4408**	**1,474.4408**	**0.3090**	**0.0718**	**1,499.1844**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	32.61	0.00	29.77	38.05	0.00	30.37	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	10-1-2024	12-31-2024	0.9930	0.9930
2	1-1-2025	3-31-2025	1.0300	1.0300
3	4-1-2025	6-30-2025	1.5480	1.5480
4	7-1-2025	9-30-2025	1.4855	1.4855
5	10-1-2025	12-31-2025	1.3304	1.3304
6	1-1-2026	3-31-2026	1.0831	1.0831
7	4-1-2026	6-30-2026	0.7580	0.7580
8	7-1-2026	9-30-2026	0.7435	0.7435
9	10-1-2026	12-31-2026	0.7607	0.7607
10	1-1-2027	3-31-2027	1.6372	1.6372
11	4-1-2027	6-30-2027	1.7907	1.7907
12	7-1-2027	9-30-2027	0.6100	0.6100
		Highest	1.7907	1.7907

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	1/6/2025	5	70	
2	Rough Grading	Grading	1/7/2025	7/20/2025	5	139	
3	Utility Trenching	Trenching	3/21/2025	9/7/2025	5	121	
4	Fine Grading	Grading	6/2/2025	12/15/2025	5	141	
5	Paving	Paving	9/9/2025	3/26/2026	5	143	
6	Finishing/Landscaping	Trenching	10/29/2025	5/13/2026	5	141	
7	Building Construction	Building Construction	12/17/2025	7/31/2027	5	423	
8	Architectural Coating	Architectural Coating	1/14/2027	7/31/2027	5	142	

Acres of Grading (Site Preparation Phase): 105

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 417

Acres of Paving: 7.7

Residential Indoor: 1,409,400; Residential Outdoor: 469,800; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 6,352

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	685.00	176.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6519	0.0000	0.6519	0.3337	0.0000	0.3337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0878	0.8968	0.6051	1.2600e-003		0.0406	0.0406		0.0373	0.0373	0.0000	110.4083	110.4083	0.0357	0.0000	111.3010
Total	**0.0878**	**0.8968**	**0.6051**	**1.2600e-003**	**0.6519**	**0.0406**	**0.6924**	**0.3337**	**0.0373**	**0.3710**	**0.0000**	**110.4083**	**110.4083**	**0.0357**	**0.0000**	**111.3010**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6000e-004	9.6600e-003	3.8600e-003	5.0000e-005	1.6600e-003	5.0000e-005	1.7100e-003	4.8000e-004	5.0000e-005	5.3000e-004	0.0000	4.6585	4.6585	2.8000e-004	6.7000e-004	4.8657
Worker	1.5800e-003	1.0800e-003	0.0162	5.0000e-005	6.5200e-003	3.0000e-005	6.5500e-003	1.7300e-003	3.0000e-005	1.7600e-003	0.0000	4.8997	4.8997	1.0000e-004	1.1000e-004	4.9356
Total	**1.8400e-003**	**0.0107**	**0.0200**	**1.0000e-004**	**8.1800e-003**	**8.0000e-005**	**8.2600e-003**	**2.2100e-003**	**8.0000e-005**	**2.2900e-003**	**0.0000**	**9.5581**	**9.5581**	**3.8000e-004**	**7.8000e-004**	**9.8014**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2787	0.0000	0.2787	0.1427	0.0000	0.1427	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0878	0.8968	0.6051	1.2600e-003		0.0406	0.0406		0.0373	0.0373	0.0000	110.4082	110.4082	0.0357	0.0000	111.3009
Total	**0.0878**	**0.8968**	**0.6051**	**1.2600e-003**	**0.2787**	**0.0406**	**0.3192**	**0.1427**	**0.0373**	**0.1800**	**0.0000**	**110.4082**	**110.4082**	**0.0357**	**0.0000**	**111.3009**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6000e-004	9.6600e-003	3.8600e-003	5.0000e-005	1.5600e-003	5.0000e-005	1.6100e-003	4.5000e-004	5.0000e-005	5.0000e-004	0.0000	4.6585	4.6585	2.8000e-004	6.7000e-004	4.8657
Worker	1.5800e-003	1.0800e-003	0.0162	5.0000e-005	6.0100e-003	3.0000e-005	6.0400e-003	1.6100e-003	3.0000e-005	1.6400e-003	0.0000	4.8997	4.8997	1.0000e-004	1.1000e-004	4.9356
Total	**1.8400e-003**	**0.0107**	**0.0200**	**1.0000e-004**	**7.5700e-003**	**8.0000e-005**	**7.6500e-003**	**2.0600e-003**	**8.0000e-005**	**2.1400e-003**	**0.0000**	**9.5581**	**9.5581**	**3.8000e-004**	**7.8000e-004**	**9.8014**

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0918	0.0000	0.0918	0.0259	0.0000	0.0259	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9500e-003	0.0505	0.0358	8.0000e-005		2.1700e-003	2.1700e-003		2.0000e-003	2.0000e-003	0.0000	6.6934	6.6934	2.1600e-003	0.0000	6.7475
Total	**4.9500e-003**	**0.0505**	**0.0358**	**8.0000e-005**	**0.0918**	**2.1700e-003**	**0.0940**	**0.0259**	**2.0000e-003**	**0.0279**	**0.0000**	**6.6934**	**6.6934**	**2.1600e-003**	**0.0000**	**6.7475**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-005	5.8000e-004	2.3000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.2771	0.2771	2.0000e-005	4.0000e-005	0.2894
Worker	9.0000e-005	6.0000e-005	9.2000e-004	0.0000	4.0000e-004	0.0000	4.0000e-004	1.0000e-004	0.0000	1.1000e-004	0.0000	0.2897	0.2897	1.0000e-005	1.0000e-005	0.2918
Total	**1.1000e-004**	**6.4000e-004**	**1.1500e-003**	**0.0000**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.5668**	**0.5668**	**3.0000e-005**	**5.0000e-005**	**0.5812**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0393	0.0000	0.0393	0.0111	0.0000	0.0111	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9500e-003	0.0505	0.0358	8.0000e-005		2.1700e-003	2.1700e-003		2.0000e-003	2.0000e-003	0.0000	6.6934	6.6934	2.1600e-003	0.0000	6.7475
Total	**4.9500e-003**	**0.0505**	**0.0358**	**8.0000e-005**	**0.0393**	**2.1700e-003**	**0.0414**	**0.0111**	**2.0000e-003**	**0.0131**	**0.0000**	**6.6934**	**6.6934**	**2.1600e-003**	**0.0000**	**6.7475**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-005	5.8000e-004	2.3000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.2771	0.2771	2.0000e-005	4.0000e-005	0.2894
Worker	9.0000e-005	6.0000e-005	9.2000e-004	0.0000	3.6000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2897	0.2897	1.0000e-005	1.0000e-005	0.2918
Total	**1.1000e-004**	**6.4000e-004**	**1.1500e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.7000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.5668**	**0.5668**	**3.0000e-005**	**5.0000e-005**	**0.5812**

3.3 Rough Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6397	0.0000	0.6397	0.2539	0.0000	0.2539	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2016	1.9420	1.8300	4.3100e-003		0.0786	0.0786		0.0723	0.0723	0.0000	378.8182	378.8182	0.1225	0.0000	381.8811
Total	**0.2016**	**1.9420**	**1.8300**	**4.3100e-003**	**0.6397**	**0.0786**	**0.7183**	**0.2539**	**0.0723**	**0.3263**	**0.0000**	**378.8182**	**378.8182**	**0.1225**	**0.0000**	**381.8811**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0700e-003	0.0405	0.0162	1.9000e-004	7.0100e-003	2.1000e-004	7.2200e-003	2.0200e-003	2.0000e-004	2.2200e-003	0.0000	19.2549	19.2549	1.2100e-003	2.7900e-003	20.1160
Worker	3.4900e-003	2.2800e-003	0.0356	1.2000e-004	0.0153	7.0000e-005	0.0153	4.0500e-003	7.0000e-005	4.1200e-003	0.0000	11.1860	11.1860	2.2000e-004	2.5000e-004	11.2650
Total	**4.5600e-003**	**0.0428**	**0.0518**	**3.1000e-004**	**0.0223**	**2.8000e-004**	**0.0226**	**6.0700e-003**	**2.7000e-004**	**6.3400e-003**	**0.0000**	**30.4408**	**30.4408**	**1.4300e-003**	**3.0400e-003**	**31.3810**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2735	0.0000	0.2735	0.1086	0.0000	0.1086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2016	1.9420	1.8300	4.3100e-003		0.0786	0.0786		0.0723	0.0723	0.0000	378.8177	378.8177	0.1225	0.0000	381.8807
Total	**0.2016**	**1.9420**	**1.8300**	**4.3100e-003**	**0.2735**	**0.0786**	**0.3521**	**0.1086**	**0.0723**	**0.1809**	**0.0000**	**378.8177**	**378.8177**	**0.1225**	**0.0000**	**381.8807**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0700e-003	0.0405	0.0162	1.9000e-004	6.5600e-003	2.1000e-004	6.7700e-003	1.9100e-003	2.0000e-004	2.1100e-003	0.0000	19.2549	19.2549	1.2100e-003	2.7900e-003	20.1160
Worker	3.4900e-003	2.2800e-003	0.0356	1.2000e-004	0.0141	7.0000e-005	0.0141	3.7600e-003	7.0000e-005	3.8300e-003	0.0000	11.1860	11.1860	2.2000e-004	2.5000e-004	11.2650
Total	**4.5600e-003**	**0.0428**	**0.0518**	**3.1000e-004**	**0.0206**	**2.8000e-004**	**0.0209**	**5.6700e-003**	**2.7000e-004**	**5.9400e-003**	**0.0000**	**30.4408**	**30.4408**	**1.4300e-003**	**3.0400e-003**	**31.3810**

3.4 Utility Trenching - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0394	0.3275	0.5525	8.3000e-004		0.0192	0.0192		0.0177	0.0177	0.0000	73.2524	73.2524	0.0237	0.0000	73.8447
Total	**0.0394**	**0.3275**	**0.5525**	**8.3000e-004**		**0.0192**	**0.0192**		**0.0177**	**0.0177**	**0.0000**	**73.2524**	**73.2524**	**0.0237**	**0.0000**	**73.8447**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2200e-003	8.0000e-004	0.0124	4.0000e-005	5.3100e-003	3.0000e-005	5.3400e-003	1.4100e-003	2.0000e-005	1.4300e-003	0.0000	3.8950	3.8950	8.0000e-005	9.0000e-005	3.9225
Total	**1.2200e-003**	**8.0000e-004**	**0.0124**	**4.0000e-005**	**5.3100e-003**	**3.0000e-005**	**5.3400e-003**	**1.4100e-003**	**2.0000e-005**	**1.4300e-003**	**0.0000**	**3.8950**	**3.8950**	**8.0000e-005**	**9.0000e-005**	**3.9225**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0394	0.3275	0.5525	8.3000e-004		0.0192	0.0192		0.0177	0.0177	0.0000	73.2524	73.2524	0.0237	0.0000	73.8446
Total	**0.0394**	**0.3275**	**0.5525**	**8.3000e-004**		**0.0192**	**0.0192**		**0.0177**	**0.0177**	**0.0000**	**73.2524**	**73.2524**	**0.0237**	**0.0000**	**73.8446**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2200e-003	8.0000e-004	0.0124	4.0000e-005	4.9000e-003	3.0000e-005	4.9200e-003	1.3100e-003	2.0000e-005	1.3300e-003	0.0000	3.8950	3.8950	8.0000e-005	9.0000e-005	3.9225
Total	**1.2200e-003**	**8.0000e-004**	**0.0124**	**4.0000e-005**	**4.9000e-003**	**3.0000e-005**	**4.9200e-003**	**1.3100e-003**	**2.0000e-005**	**1.3300e-003**	**0.0000**	**3.8950**	**3.8950**	**8.0000e-005**	**9.0000e-005**	**3.9225**

3.5 Fine Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6489	0.0000	0.6489	0.2576	0.0000	0.2576	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2045	1.9700	1.8563	4.3800e-003		0.0797	0.0797		0.0734	0.0734	0.0000	384.2688	384.2688	0.1243	0.0000	387.3758
Total	**0.2045**	**1.9700**	**1.8563**	**4.3800e-003**	**0.6489**	**0.0797**	**0.7286**	**0.2576**	**0.0734**	**0.3309**	**0.0000**	**384.2688**	**384.2688**	**0.1243**	**0.0000**	**387.3758**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0900e-003	0.0411	0.0164	2.0000e-004	7.1100e-003	2.1000e-004	7.3200e-003	2.0500e-003	2.0000e-004	2.2500e-003	0.0000	19.5319	19.5319	1.2300e-003	2.8300e-003	20.4054
Worker	3.5400e-003	2.3200e-003	0.0361	1.2000e-004	0.0155	7.0000e-005	0.0156	4.1100e-003	7.0000e-005	4.1800e-003	0.0000	11.3469	11.3469	2.3000e-004	2.5000e-004	11.4271
Total	**4.6300e-003**	**0.0434**	**0.0526**	**3.2000e-004**	**0.0226**	**2.8000e-004**	**0.0229**	**6.1600e-003**	**2.7000e-004**	**6.4300e-003**	**0.0000**	**30.8788**	**30.8788**	**1.4600e-003**	**3.0800e-003**	**31.8325**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2774	0.0000	0.2774	0.1101	0.0000	0.1101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2045	1.9700	1.8563	4.3800e-003		0.0797	0.0797		0.0734	0.0734	0.0000	384.2683	384.2683	0.1243	0.0000	387.3753
Total	**0.2045**	**1.9700**	**1.8563**	**4.3800e-003**	**0.2774**	**0.0797**	**0.3571**	**0.1101**	**0.0734**	**0.1835**	**0.0000**	**384.2683**	**384.2683**	**0.1243**	**0.0000**	**387.3753**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0900e-003	0.0411	0.0164	2.0000e-004	6.6500e-003	2.1000e-004	6.8700e-003	1.9400e-003	2.0000e-004	2.1400e-003	0.0000	19.5319	19.5319	1.2300e-003	2.8300e-003	20.4054
Worker	3.5400e-003	2.3200e-003	0.0361	1.2000e-004	0.0143	7.0000e-005	0.0143	3.8100e-003	7.0000e-005	3.8800e-003	0.0000	11.3469	11.3469	2.3000e-004	2.5000e-004	11.4271
Total	**4.6300e-003**	**0.0434**	**0.0526**	**3.2000e-004**	**0.0209**	**2.8000e-004**	**0.0212**	**5.7500e-003**	**2.7000e-004**	**6.0200e-003**	**0.0000**	**30.8788**	**30.8788**	**1.4600e-003**	**3.0800e-003**	**31.8325**

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0375	0.3519	0.5977	9.3000e-004		0.0172	0.0172		0.0158	0.0158	0.0000	82.0790	82.0790	0.0266	0.0000	82.7426
Paving	1.8300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0394**	**0.3519**	**0.5977**	**9.3000e-004**		**0.0172**	**0.0172**		**0.0158**	**0.0158**	**0.0000**	**82.0790**	**82.0790**	**0.0266**	**0.0000**	**82.7426**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5500e-003	1.0100e-003	0.0158	5.0000e-005	6.7500e-003	3.0000e-005	6.7800e-003	1.7900e-003	3.0000e-005	1.8200e-003	0.0000	4.9492	4.9492	1.0000e-004	1.1000e-004	4.9841
Total	**1.5500e-003**	**1.0100e-003**	**0.0158**	**5.0000e-005**	**6.7500e-003**	**3.0000e-005**	**6.7800e-003**	**1.7900e-003**	**3.0000e-005**	**1.8200e-003**	**0.0000**	**4.9492**	**4.9492**	**1.0000e-004**	**1.1000e-004**	**4.9841**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0375	0.3519	0.5977	9.3000e-004		0.0172	0.0172		0.0158	0.0158	0.0000	82.0789	82.0789	0.0266	0.0000	82.7425
Paving	1.8300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0394**	**0.3519**	**0.5977**	**9.3000e-004**		**0.0172**	**0.0172**		**0.0158**	**0.0158**	**0.0000**	**82.0789**	**82.0789**	**0.0266**	**0.0000**	**82.7425**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5500e-003	1.0100e-003	0.0158	5.0000e-005	6.2200e-003	3.0000e-005	6.2600e-003	1.6600e-003	3.0000e-005	1.6900e-003	0.0000	4.9492	4.9492	1.0000e-004	1.1000e-004	4.9841
Total	**1.5500e-003**	**1.0100e-003**	**0.0158**	**5.0000e-005**	**6.2200e-003**	**3.0000e-005**	**6.2600e-003**	**1.6600e-003**	**3.0000e-005**	**1.6900e-003**	**0.0000**	**4.9492**	**4.9492**	**1.0000e-004**	**1.1000e-004**	**4.9841**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0279	0.2617	0.4446	7.0000e-004		0.0128	0.0128		0.0117	0.0117	0.0000	61.0587	61.0587	0.0198	0.0000	61.5524
Paving	1.3600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0293**	**0.2617**	**0.4446**	**7.0000e-004**		**0.0128**	**0.0128**		**0.0117**	**0.0117**	**0.0000**	**61.0587**	**61.0587**	**0.0198**	**0.0000**	**61.5524**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0900e-003	6.9000e-004	0.0111	4.0000e-005	5.0200e-003	2.0000e-005	5.0500e-003	1.3300e-003	2.0000e-005	1.3500e-003	0.0000	3.5977	3.5977	7.0000e-005	8.0000e-005	3.6223
Total	**1.0900e-003**	**6.9000e-004**	**0.0111**	**4.0000e-005**	**5.0200e-003**	**2.0000e-005**	**5.0500e-003**	**1.3300e-003**	**2.0000e-005**	**1.3500e-003**	**0.0000**	**3.5977**	**3.5977**	**7.0000e-005**	**8.0000e-005**	**3.6223**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0279	0.2617	0.4446	7.0000e-004		0.0128	0.0128		0.0117	0.0117	0.0000	61.0587	61.0587	0.0198	0.0000	61.5524
Paving	1.3600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0293**	**0.2617**	**0.4446**	**7.0000e-004**		**0.0128**	**0.0128**		**0.0117**	**0.0117**	**0.0000**	**61.0587**	**61.0587**	**0.0198**	**0.0000**	**61.5524**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0900e-003	6.9000e-004	0.0111	4.0000e-005	4.6300e-003	2.0000e-005	4.6500e-003	1.2400e-003	2.0000e-005	1.2600e-003	0.0000	3.5977	3.5977	7.0000e-005	8.0000e-005	3.6223
Total	**1.0900e-003**	**6.9000e-004**	**0.0111**	**4.0000e-005**	**4.6300e-003**	**2.0000e-005**	**4.6500e-003**	**1.2400e-003**	**2.0000e-005**	**1.2600e-003**	**0.0000**	**3.5977**	**3.5977**	**7.0000e-005**	**8.0000e-005**	**3.6223**

3.7 Finishing/Landscaping - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.0300e-003	0.0306	0.0511	7.0000e-005		1.2400e-003	1.2400e-003		1.1400e-003	1.1400e-003	0.0000	6.2769	6.2769	2.0300e-003	0.0000	6.3277
Total	**3.0300e-003**	**0.0306**	**0.0511**	**7.0000e-005**		**1.2400e-003**	**1.2400e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**6.2769**	**6.2769**	**2.0300e-003**	**0.0000**	**6.3277**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.1000e-004	1.7700e-003	1.0000e-005	7.6000e-004	0.0000	7.6000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.5553	0.5553	1.0000e-005	1.0000e-005	0.5592
Total	**1.7000e-004**	**1.1000e-004**	**1.7700e-003**	**1.0000e-005**	**7.6000e-004**	**0.0000**	**7.6000e-004**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5553**	**0.5553**	**1.0000e-005**	**1.0000e-005**	**0.5592**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.0300e-003	0.0306	0.0511	7.0000e-005		1.2400e-003	1.2400e-003		1.1400e-003	1.1400e-003	0.0000	6.2769	6.2769	2.0300e-003	0.0000	6.3277
Total	**3.0300e-003**	**0.0306**	**0.0511**	**7.0000e-005**		**1.2400e-003**	**1.2400e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**6.2769**	**6.2769**	**2.0300e-003**	**0.0000**	**6.3277**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.1000e-004	1.7700e-003	1.0000e-005	7.0000e-004	0.0000	7.0000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5553	0.5553	1.0000e-005	1.0000e-005	0.5592
Total	**1.7000e-004**	**1.1000e-004**	**1.7700e-003**	**1.0000e-005**	**7.0000e-004**	**0.0000**	**7.0000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5553**	**0.5553**	**1.0000e-005**	**1.0000e-005**	**0.5592**

3.7 Finishing/Landscaping - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2500e-003	0.0632	0.1055	1.5000e-004		2.5600e-003	2.5600e-003		2.3500e-003	2.3500e-003	0.0000	12.9632	12.9632	4.1900e-003	0.0000	13.0680
Total	**6.2500e-003**	**0.0632**	**0.1055**	**1.5000e-004**		**2.5600e-003**	**2.5600e-003**		**2.3500e-003**	**2.3500e-003**	**0.0000**	**12.9632**	**12.9632**	**4.1900e-003**	**0.0000**	**13.0680**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.1000e-004	3.4600e-003	1.0000e-005	1.5600e-003	1.0000e-005	1.5700e-003	4.2000e-004	1.0000e-005	4.2000e-004	0.0000	1.1206	1.1206	2.0000e-005	2.0000e-005	1.1282
Total	**3.4000e-004**	**2.1000e-004**	**3.4600e-003**	**1.0000e-005**	**1.5600e-003**	**1.0000e-005**	**1.5700e-003**	**4.2000e-004**	**1.0000e-005**	**4.2000e-004**	**0.0000**	**1.1206**	**1.1206**	**2.0000e-005**	**2.0000e-005**	**1.1282**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2500e-003	0.0632	0.1055	1.5000e-004		2.5600e-003	2.5600e-003		2.3500e-003	2.3500e-003	0.0000	12.9632	12.9632	4.1900e-003	0.0000	13.0680
Total	**6.2500e-003**	**0.0632**	**0.1055**	**1.5000e-004**		**2.5600e-003**	**2.5600e-003**		**2.3500e-003**	**2.3500e-003**	**0.0000**	**12.9632**	**12.9632**	**4.1900e-003**	**0.0000**	**13.0680**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.1000e-004	3.4600e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.9000e-004	1.0000e-005	3.9000e-004	0.0000	1.1206	1.1206	2.0000e-005	2.0000e-005	1.1282
Total	**3.4000e-004**	**2.1000e-004**	**3.4600e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.9000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.1206**	**1.1206**	**2.0000e-005**	**2.0000e-005**	**1.1282**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.5200e-003	0.0686	0.0885	1.5000e-004		2.9000e-003	2.9000e-003		2.7300e-003	2.7300e-003	0.0000	12.7556	12.7556	3.0000e-003	0.0000	12.8305
Total	**7.5200e-003**	**0.0686**	**0.0885**	**1.5000e-004**		**2.9000e-003**	**2.9000e-003**		**2.7300e-003**	**2.7300e-003**	**0.0000**	**12.7556**	**12.7556**	**3.0000e-003**	**0.0000**	**12.8305**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.3000e-004	0.0353	0.0141	1.7000e-004	6.1000e-003	1.8000e-004	6.2800e-003	1.7600e-003	1.8000e-004	1.9300e-003	0.0000	16.7614	16.7614	1.0500e-003	2.4300e-003	17.5111
Worker	9.4700e-003	6.1900e-003	0.0965	3.2000e-004	0.0414	2.0000e-004	0.0416	0.0110	1.8000e-004	0.0112	0.0000	30.3188	30.3188	6.0000e-004	6.7000e-004	30.5329
Total	**0.0104**	**0.0415**	**0.1106**	**4.9000e-004**	**0.0475**	**3.8000e-004**	**0.0478**	**0.0127**	**3.6000e-004**	**0.0131**	**0.0000**	**47.0802**	**47.0802**	**1.6500e-003**	**3.1000e-003**	**48.0440**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.5200e-003	0.0686	0.0885	1.5000e-004		2.9000e-003	2.9000e-003		2.7300e-003	2.7300e-003	0.0000	12.7556	12.7556	3.0000e-003	0.0000	12.8305
Total	**7.5200e-003**	**0.0686**	**0.0885**	**1.5000e-004**		**2.9000e-003**	**2.9000e-003**		**2.7300e-003**	**2.7300e-003**	**0.0000**	**12.7556**	**12.7556**	**3.0000e-003**	**0.0000**	**12.8305**

Mitigated Construction Off-Site

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.3000e-004	0.0353	0.0141	1.7000e-004	5.7100e-003	1.8000e-004	5.8900e-003	1.6600e-003	1.8000e-004	1.8400e-003	0.0000	16.7614	16.7614	1.0500e-003	2.4300e-003	17.5111
Worker	9.4700e-003	6.1900e-003	0.0965	3.2000e-004	0.0381	2.0000e-004	0.0383	0.0102	1.8000e-004	0.0104	0.0000	30.3188	30.3188	6.0000e-004	6.7000e-004	30.5329
Total	**0.0104**	**0.0415**	**0.1106**	**4.9000e-004**	**0.0438**	**3.8000e-004**	**0.0442**	**0.0119**	**3.6000e-004**	**0.0122**	**0.0000**	**47.0802**	**47.0802**	**1.6500e-003**	**3.1000e-003**	**48.0440**

3.8 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1785	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6549	302.6549	0.0711	0.0000	304.4335
Total	**0.1785**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6549**	**302.6549**	**0.0711**	**0.0000**	**304.4335**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0218	0.8305	0.3335	3.8900e-003	0.1447	4.3500e-003	0.1491	0.0417	4.1600e-003	0.0459	0.0000	390.0867	390.0867	0.0253	0.0567	407.6169
Worker	0.2134	0.1344	2.1690	7.3800e-003	0.9814	4.4400e-003	0.9858	0.2606	4.0800e-003	0.2647	0.0000	702.9595	702.9595	0.0131	0.0150	707.7636
Total	**0.2352**	**0.9649**	**2.5025**	**0.0113**	**1.1261**	**8.7900e-003**	**1.1348**	**0.3024**	**8.2400e-003**	**0.3106**	**0.0000**	**1,093.0462**	**1,093.0462**	**0.0384**	**0.0717**	**1,115.3805**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1784	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6545	302.6545	0.0711	0.0000	304.4331
Total	**0.1784**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6545**	**302.6545**	**0.0711**	**0.0000**	**304.4331**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0218	0.8305	0.3335	3.8900e-003	0.1355	4.3500e-003	0.1398	0.0395	4.1600e-003	0.0436	0.0000	390.0867	390.0867	0.0253	0.0567	407.6169
Worker	0.2134	0.1344	2.1690	7.3800e-003	0.9048	4.4400e-003	0.9092	0.2418	4.0800e-003	0.2459	0.0000	702.9595	702.9595	0.0131	0.0150	707.7636
Total	**0.2352**	**0.9649**	**2.5025**	**0.0113**	**1.0402**	**8.7900e-003**	**1.0490**	**0.2813**	**8.2400e-003**	**0.2895**	**0.0000**	**1,093.0462**	**1,093.0462**	**0.0384**	**0.0717**	**1,115.3805**

3.8 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1032	0.9415	1.2144	2.0400e-003		0.0398	0.0398		0.0375	0.0375	0.0000	175.0992	175.0992	0.0412	0.0000	176.1282
Total	**0.1032**	**0.9415**	**1.2144**	**2.0400e-003**		**0.0398**	**0.0398**		**0.0375**	**0.0375**	**0.0000**	**175.0992**	**175.0992**	**0.0412**	**0.0000**	**176.1282**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0124	0.4769	0.1923	2.2000e-003	0.0837	2.5100e-003	0.0862	0.0242	2.4000e-003	0.0266	0.0000	221.0667	221.0667	0.0147	0.0323	231.0482
Worker	0.1174	0.0717	1.1958	4.1500e-003	0.5678	2.4200e-003	0.5702	0.1508	2.2300e-003	0.1530	0.0000	398.2530	398.2530	6.9700e-003	8.2900e-003	400.8990
Total	**0.1298**	**0.5486**	**1.3882**	**6.3500e-003**	**0.6515**	**4.9300e-003**	**0.6564**	**0.1749**	**4.6300e-003**	**0.1796**	**0.0000**	**619.3197**	**619.3197**	**0.0217**	**0.0406**	**631.9472**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1032	0.9415	1.2144	2.0400e-003		0.0398	0.0398		0.0375	0.0375	0.0000	175.0990	175.0990	0.0412	0.0000	176.1280
Total	**0.1032**	**0.9415**	**1.2144**	**2.0400e-003**		**0.0398**	**0.0398**		**0.0375**	**0.0375**	**0.0000**	**175.0990**	**175.0990**	**0.0412**	**0.0000**	**176.1280**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0124	0.4769	0.1923	2.2000e-003	0.0784	2.5100e-003	0.0809	0.0228	2.4000e-003	0.0252	0.0000	221.0667	221.0667	0.0147	0.0323	231.0482
Worker	0.1174	0.0717	1.1958	4.1500e-003	0.5235	2.4200e-003	0.5259	0.1399	2.2300e-003	0.1421	0.0000	398.2530	398.2530	6.9700e-003	8.2900e-003	400.8990
Total	**0.1298**	**0.5486**	**1.3882**	**6.3500e-003**	**0.6018**	**4.9300e-003**	**0.6068**	**0.1627**	**4.6300e-003**	**0.1674**	**0.0000**	**619.3197**	**619.3197**	**0.0217**	**0.0406**	**631.9472**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.9 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.1922					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.0813	0.1285	2.1000e-004		3.6600e-003	3.6600e-003		3.6600e-003	3.6600e-003	0.0000	18.1281	18.1281	9.9000e-004	0.0000	18.1528
Total	**2.2044**	**0.0813**	**0.1285**	**2.1000e-004**		**3.6600e-003**	**3.6600e-003**		**3.6600e-003**	**3.6600e-003**	**0.0000**	**18.1281**	**18.1281**	**9.9000e-004**	**0.0000**	**18.1528**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0221	0.0135	0.2249	7.8000e-004	0.1068	4.6000e-004	0.1072	0.0284	4.2000e-004	0.0288	0.0000	74.9032	74.9032	1.3100e-003	1.5600e-003	75.4009
Total	**0.0221**	**0.0135**	**0.2249**	**7.8000e-004**	**0.1068**	**4.6000e-004**	**0.1072**	**0.0284**	**4.2000e-004**	**0.0288**	**0.0000**	**74.9032**	**74.9032**	**1.3100e-003**	**1.5600e-003**	**75.4009**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.1922					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.0813	0.1285	2.1000e-004		3.6600e-003	3.6600e-003		3.6600e-003	3.6600e-003	0.0000	18.1281	18.1281	9.9000e-004	0.0000	18.1528
Total	**2.2044**	**0.0813**	**0.1285**	**2.1000e-004**		**3.6600e-003**	**3.6600e-003**		**3.6600e-003**	**3.6600e-003**	**0.0000**	**18.1281**	**18.1281**	**9.9000e-004**	**0.0000**	**18.1528**

Phase 2 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0221	0.0135	0.2249	7.8000e-004	0.0985	4.6000e-004	0.0989	0.0263	4.2000e-004	0.0267	0.0000	74.9032	74.9032	1.3100e-003	1.5600e-003	75.4009
Total	**0.0221**	**0.0135**	**0.2249**	**7.8000e-004**	**0.0985**	**4.6000e-004**	**0.0989**	**0.0263**	**4.2000e-004**	**0.0267**	**0.0000**	**74.9032**	**74.9032**	**1.3100e-003**	**1.5600e-003**	**75.4009**

Phase 2 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rough Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	6	No Change	0.00
Trenchers	Diesel	No Change	0	1	No Change	0.00
Cranes	Diesel	No Change	0	1	No Change	0.00

Phase 2 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Forklifts	Diesel	No Change	0	3	No Change	0.00
Graders	Diesel	No Change	0	2	No Change	0.00
Pavers	Diesel	No Change	0	2	No Change	0.00
Rollers	Diesel	No Change	0	2	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	5	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	12	No Change	0.00
Generator Sets	Diesel	No Change	0	1	No Change	0.00
Paving Equipment	Diesel	No Change	0	2	No Change	0.00
Scrapers	Diesel	No Change	0	4	No Change	0.00
Welders	Diesel	No Change	0	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	1.21300E-002	8.13300E-002	1.28450E-001	2.10000E-004	3.66000E-003	3.66000E-003	0.00000E+000	1.81281E+001	1.81281E+001	9.90000E-004	0.00000E+000	1.81528E+001
Cranes	5.78900E-002	5.86270E-001	3.21350E-001	1.07000E-003	2.49200E-002	2.29300E-002	0.00000E+000	9.38190E+001	9.38190E+001	3.03400E-002	0.00000E+000	9.45776E+001
Excavators	6.71100E-002	4.90620E-001	1.30898E+000	2.08000E-003	2.40500E-002	2.21300E-002	0.00000E+000	1.82288E+002	1.82288E+002	5.89600E-002	0.00000E+000	1.83762E+002
Forklifts	5.51300E-002	5.19360E-001	7.19370E-001	9.70000E-004	2.78000E-002	2.55800E-002	0.00000E+000	8.52078E+001	8.52078E+001	2.75600E-002	0.00000E+000	8.58968E+001
Generator Sets	5.63400E-002	5.06640E-001	7.73980E-001	1.39000E-003	2.01700E-002	2.01700E-002	0.00000E+000	1.19541E+002	1.19541E+002	4.42000E-003	0.00000E+000	1.19652E+002
Graders	4.35500E-002	4.83940E-001	2.23180E-001	9.30000E-004	1.55800E-002	1.43300E-002	0.00000E+000	8.13142E+001	8.13142E+001	2.63000E-002	0.00000E+000	8.19717E+001
Pavers	2.48500E-002	2.26380E-001	4.14100E-001	6.70000E-004	1.06000E-002	9.75000E-003	0.00000E+000	5.90251E+001	5.90251E+001	1.90900E-002	0.00000E+000	5.95024E+001
Paving Equipment	2.09900E-002	1.80850E-001	3.64150E-001	5.80000E-004	8.94000E-003	8.23000E-003	0.00000E+000	5.11538E+001	5.11538E+001	1.65400E-002	0.00000E+000	5.15674E+001

Phase 2 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rollers	1.95800E-002	2.06350E-001	2.64080E-001	3.80000E-004	1.03800E-002	9.55000E-003	0.00000E+000	3.29588E+001	3.29588E+001	1.06600E-002	0.00000E+000	3.32253E+001
Rubber Tired Dozers	1.63430E-001	1.67379E+000	7.47640E-001	2.09000E-003	7.41500E-002	6.82200E-002	0.00000E+000	1.83802E+002	1.83802E+002	5.94500E-002	0.00000E+000	1.85288E+002
Scrapers	1.88100E-001	1.78382E+000	1.50657E+000	4.25000E-003	7.02100E-002	6.46000E-002	0.00000E+000	3.72927E+002	3.72927E+002	1.20610E-001	0.00000E+000	3.75942E+002
Tractors/Loaders/Backhoes	1.39680E-001	1.41065E+000	2.33168E+000	3.26000E-003	5.81900E-002	5.35300E-002	0.00000E+000	2.86427E+002	2.86427E+002	9.26400E-002	0.00000E+000	2.88743E+002
Trenchers	1.90900E-002	1.78960E-001	1.56180E-001	2.10000E-004	1.19200E-002	1.09700E-002	0.00000E+000	1.80561E+001	1.80561E+001	5.84000E-003	0.00000E+000	1.82021E+001
Welders	4.64800E-002	2.83840E-001	3.49320E-001	5.40000E-004	8.65000E-003	8.65000E-003	0.00000E+000	3.98087E+001	3.98087E+001	3.78000E-003	0.00000E+000	3.99032E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	1.21300E-002	8.13300E-002	1.28450E-001	2.10000E-004	3.66000E-003	3.66000E-003	0.00000E+000	1.81281E+001	1.81281E+001	9.90000E-004	0.00000E+000	1.81528E+001
Cranes	5.78900E-002	5.86270E-001	3.21350E-001	1.07000E-003	2.49200E-002	2.29300E-002	0.00000E+000	9.38189E+001	9.38189E+001	3.03400E-002	0.00000E+000	9.45775E+001
Excavators	6.71100E-002	4.90620E-001	1.30898E+000	2.08000E-003	2.40500E-002	2.21300E-002	0.00000E+000	1.82288E+002	1.82288E+002	5.89600E-002	0.00000E+000	1.83762E+002
Forklifts	5.51300E-002	5.19360E-001	7.19360E-001	9.70000E-004	2.78000E-002	2.55800E-002	0.00000E+000	8.52077E+001	8.52077E+001	2.75600E-002	0.00000E+000	8.58967E+001
Generator Sets	5.63400E-002	5.06640E-001	7.73980E-001	1.39000E-003	2.01700E-002	2.01700E-002	0.00000E+000	1.19541E+002	1.19541E+002	4.42000E-003	0.00000E+000	1.19652E+002
Graders	4.35500E-002	4.83930E-001	2.23180E-001	9.30000E-004	1.55800E-002	1.43300E-002	0.00000E+000	8.13141E+001	8.13141E+001	2.63000E-002	0.00000E+000	8.19716E+001
Pavers	2.48500E-002	2.26380E-001	4.14100E-001	6.70000E-004	1.06000E-002	9.75000E-003	0.00000E+000	5.90250E+001	5.90250E+001	1.90900E-002	0.00000E+000	5.95023E+001
Paving Equipment	2.09900E-002	1.80850E-001	3.64150E-001	5.80000E-004	8.94000E-003	8.23000E-003	0.00000E+000	5.11537E+001	5.11537E+001	1.65400E-002	0.00000E+000	5.15673E+001
Rollers	1.95800E-002	2.06350E-001	2.64080E-001	3.80000E-004	1.03800E-002	9.55000E-003	0.00000E+000	3.29588E+001	3.29588E+001	1.06600E-002	0.00000E+000	3.32253E+001
Rubber Tired Dozers	1.63430E-001	1.67379E+000	7.47640E-001	2.09000E-003	7.41500E-002	6.82200E-002	0.00000E+000	1.83802E+002	1.83802E+002	5.94500E-002	0.00000E+000	1.85288E+002
Scrapers	1.88100E-001	1.78382E+000	1.50657E+000	4.25000E-003	7.02100E-002	6.46000E-002	0.00000E+000	3.72926E+002	3.72926E+002	1.20610E-001	0.00000E+000	3.75941E+002
Tractors/Loaders/Backhoes	1.39680E-001	1.41064E+000	2.33167E+000	3.26000E-003	5.81900E-002	5.35300E-002	0.00000E+000	2.86426E+002	2.86426E+002	9.26400E-002	0.00000E+000	2.88742E+002

Phase 2 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trenchers	1.90900E-002	1.78960E-001	1.56180E-001	2.10000E-004	1.19200E-002	1.09700E-002	0.00000E+000	1.80560E+001	1.80560E+001	5.84000E-003	0.00000E+000	1.82020E+001
Welders	4.64800E-002	2.83840E-001	3.49320E-001	5.40000E-004	8.65000E-003	8.65000E-003	0.00000E+000	3.98086E+001	3.98086E+001	3.78000E-003	0.00000E+000	3.99032E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.10326E-006	1.10326E-006	0.00000E+000	0.00000E+000	1.10176E-006
Cranes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17247E-006	1.17247E-006	0.00000E+000	0.00000E+000	1.26880E-006
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.20688E-006	1.20688E-006	0.00000E+000	0.00000E+000	1.19720E-006
Forklifts	0.00000E+000	0.00000E+000	1.39011E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17360E-006	1.17360E-006	0.00000E+000	0.00000E+000	1.28061E-006
Generator Sets	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.25480E-006	1.25480E-006	0.00000E+000	0.00000E+000	1.17006E-006
Graders	0.00000E+000	2.06637E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.22980E-006	1.22980E-006	0.00000E+000	0.00000E+000	1.21993E-006
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18594E-006	1.18594E-006	0.00000E+000	0.00000E+000	1.17642E-006
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17293E-006	1.17293E-006	0.00000E+000	0.00000E+000	1.16353E-006
Rollers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.21364E-006	1.21364E-006	0.00000E+000	0.00000E+000	1.20390E-006
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19694E-006	1.19694E-006	0.00000E+000	0.00000E+000	1.18734E-006
Scrapers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.20667E-006	1.20667E-006	0.00000E+000	0.00000E+000	1.19699E-006
Tractors/Loaders/Backhoes	0.00000E+000	7.08893E-006	4.28875E-006	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18704E-006	1.18704E-006	0.00000E+000	0.00000E+000	1.21215E-006
Trenchers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.10766E-006	1.10766E-006	0.00000E+000	0.00000E+000	1.09878E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.00481E-006	1.00481E-006	0.00000E+000	0.00000E+000	1.25303E-006

Phase 2 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.11	0.03	0.10	0.03	0.08	0.07
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	1.82	0.49	1.69	0.46	0.08	0.07
Fine Grading	Fugitive Dust	0.65	0.26	0.28	0.11	0.57	0.57
Fine Grading	Roads	0.02	0.01	0.02	0.01	0.07	0.07
Finishing/Landscaping	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	Roads	0.00	0.00	0.00	0.00	0.08	0.08

Phase 2 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.01	0.00	0.01	0.00	0.08	0.07
Rough Grading	Fugitive Dust	0.64	0.25	0.27	0.11	0.57	0.57
Rough Grading	Roads	0.02	0.01	0.02	0.01	0.07	0.07
Site Preparation	Fugitive Dust	0.74	0.36	0.32	0.15	0.57	0.57
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Utility Trenching	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	Roads	0.01	0.00	0.00	0.00	0.08	0.07

CalEEMod Output: Phase 3 Construction

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Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 3 Construction

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	135.00	Dwelling Unit	74.50	243,000.00	386
Other Non-Asphalt Surfaces	23.90	Acre	23.90	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2030
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - See assumptions file in the AQ/GHG appendix of the DEIR.

Off-road Equipment - Assume for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assume for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	110.00	142.00
tblConstructionPhase	NumDays	1,550.00	574.00
tblConstructionPhase	NumDays	155.00	235.00
tblConstructionPhase	NumDays	110.00	141.00
tblConstructionPhase	NumDays	60.00	47.00
tblConstructionPhase	NumDays	155.00	190.00
tblConstructionPhase	PhaseEndDate	7/28/2034	5/31/2030
tblConstructionPhase	PhaseEndDate	9/23/2033	5/31/2030
tblConstructionPhase	PhaseEndDate	10/15/2027	8/31/2027
tblConstructionPhase	PhaseEndDate	2/24/2034	3/18/2028
tblConstructionPhase	PhaseEndDate	3/12/2027	10/6/2026
tblConstructionPhase	PhaseStartDate	2/25/2034	11/15/2029
tblConstructionPhase	PhaseStartDate	10/16/2027	3/21/2028
tblConstructionPhase	PhaseStartDate	3/13/2027	10/7/2026
tblConstructionPhase	PhaseStartDate	9/24/2033	9/3/2027
tblConstructionPhase	PhaseStartDate	12/19/2026	8/1/2026
tblLandUse	LandUseSquareFeet	1,041,084.00	0.00
tblLandUse	LotAcreage	43.83	74.50
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2026	2.9642	28.5221	27.0687	0.0665	19.9094	1.1349	20.9986	10.1705	1.0442	11.1727	0.0000	6,487.2330	6,487.2330	1.9658	0.0469	6,550.3612
2027	6.5926	62.4552	63.4145	0.1472	19.1483	2.5875	21.7358	7.5087	2.3807	9.8894	0.0000	14,359.7569	14,359.7569	4.3642	0.0934	14,496.6941
2028	4.0445	38.4425	44.2402	0.0936	9.7306	1.6080	11.3386	3.7958	1.4794	5.2753	0.0000	9,131.2152	9,131.2152	2.7791	0.0480	9,215.0084
2029	12.3792	14.1520	19.4113	0.0368	0.7490	0.5841	1.3331	0.2007	0.5525	0.7532	0.0000	3,585.2624	3,585.2624	0.6411	0.0452	3,614.7503
2030	12.2745	9.3209	19.4274	0.0407	0.7490	0.1733	0.9223	0.2007	0.1730	0.3737	0.0000	3,914.3155	3,914.3155	0.1520	0.0443	3,931.3219
Maximum	**12.3792**	**62.4552**	**63.4145**	**0.1472**	**19.9094**	**2.5875**	**21.7358**	**10.1705**	**2.3807**	**11.1727**	**0.0000**	**14,359.7569**	**14,359.7569**	**4.3642**	**0.0934**	**14,496.6941**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2026	2.9642	28.5221	27.0687	0.0665	8.6367	1.1349	9.7259	4.3822	1.0442	5.3843	0.0000	6,487.2330	6,487.2330	1.9658	0.0469	6,550.3612
2027	6.5926	62.4552	63.4145	0.1472	8.5551	2.5875	11.1425	3.3116	2.3807	5.6923	0.0000	14,359.7569	14,359.7569	4.3642	0.0934	14,496.6941
2028	4.0445	38.4425	44.2402	0.0936	4.4218	1.6080	6.0297	1.6943	1.4794	3.1737	0.0000	9,131.2151	9,131.2151	2.7791	0.0480	9,215.0084
2029	12.3792	14.1520	19.4113	0.0368	0.6916	0.5841	1.2758	0.1866	0.5525	0.7391	0.0000	3,585.2624	3,585.2624	0.6411	0.0452	3,614.7503
2030	12.2745	9.3209	19.4274	0.0407	0.6916	0.1733	0.8650	0.1866	0.1730	0.3596	0.0000	3,914.3155	3,914.3155	0.1520	0.0443	3,931.3219
Maximum	**12.3792**	**62.4552**	**63.4145**	**0.1472**	**8.6367**	**2.5875**	**11.1425**	**4.3822**	**2.3807**	**5.6923**	**0.0000**	**14,359.7569**	**14,359.7569**	**4.3642**	**0.0934**	**14,496.6941**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	54.27	0.00	48.45	55.38	0.00	44.11	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2026	10/6/2026	5	47	
2	Rough Grading	Grading	10/7/2026	8/31/2027	5	235	
3	Utility Trenching	Trenching	3/20/2027	11/5/2027	5	165	
4	Fine Grading	Grading	6/27/2027	3/18/2028	5	190	
5	Paving	Paving	9/3/2027	3/18/2028	5	141	
6	Finishing/Landscaping	Trenching	11/8/2027	5/25/2028	5	144	
7	Building Construction	Building Construction	3/21/2028	5/31/2030	5	574	
8	Architectural Coating	Architectural Coating	11/15/2029	5/31/2030	5	142	

Acres of Grading (Site Preparation Phase): 70.5

Acres of Grading (Grading Phase): 705

Acres of Paving: 23.9

Residential Indoor: 492,075; Residential Outdoor: 164,025; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	49.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Clean Paved Roads

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.7300e-003	0.2762	0.1146	1.3600e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4500e-003	0.0162		149.6736	149.6736	9.7200e-003	0.0217	156.3962
Worker	0.0427	0.0242	0.4577	1.5400e-003	0.2012	8.9000e-004	0.2021	0.0534	8.2000e-004	0.0542		161.6439	161.6439	2.8400e-003	3.0900e-003	162.6366
Total	**0.0504**	**0.3004**	**0.5722**	**2.9000e-003**	**0.2524**	**2.4000e-003**	**0.2548**	**0.0681**	**2.2700e-003**	**0.0704**		**311.3175**	**311.3175**	**0.0126**	**0.0248**	**319.0328**

Mitigated Construction On-Site

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**8.4034**	**1.0868**	**9.4902**	**4.3188**	**0.9999**	**5.3187**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.7300e-003	0.2762	0.1146	1.3600e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4500e-003	0.0154		149.6736	149.6736	9.7200e-003	0.0217	156.3962
Worker	0.0427	0.0242	0.4577	1.5400e-003	0.1855	8.9000e-004	0.1864	0.0495	8.2000e-004	0.0503		161.6439	161.6439	2.8400e-003	3.0900e-003	162.6366
Total	**0.0504**	**0.3004**	**0.5722**	**2.9000e-003**	**0.2333**	**2.4000e-003**	**0.2357**	**0.0634**	**2.2700e-003**	**0.0657**		**311.3175**	**311.3175**	**0.0126**	**0.0248**	**319.0328**

3.3 Rough Grading - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0155	0.5523	0.2291	2.7100e-003	0.1023	3.0300e-003	0.1053	0.0294	2.8900e-003	0.0323		299.3473	299.3473	0.0194	0.0435	312.7924
Worker	0.0475	0.0269	0.5085	1.7100e-003	0.2236	9.9000e-004	0.2246	0.0593	9.1000e-004	0.0602		179.6043	179.6043	3.1500e-003	3.4400e-003	180.7073
Total	**0.0629**	**0.5792**	**0.7376**	**4.4200e-003**	**0.3259**	**4.0200e-003**	**0.3299**	**0.0887**	**3.8000e-003**	**0.0925**		**478.9516**	**478.9516**	**0.0226**	**0.0469**	**493.4997**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0155	0.5523	0.2291	2.7100e-003	0.0957	3.0300e-003	0.0988	0.0278	2.8900e-003	0.0307		299.3473	299.3473	0.0194	0.0435	312.7924
Worker	0.0475	0.0269	0.5085	1.7100e-003	0.2061	9.9000e-004	0.2071	0.0550	9.1000e-004	0.0559		179.6043	179.6043	3.1500e-003	3.4400e-003	180.7073
Total	**0.0629**	**0.5792**	**0.7376**	**4.4200e-003**	**0.3018**	**4.0200e-003**	**0.3058**	**0.0828**	**3.8000e-003**	**0.0866**		**478.9516**	**478.9516**	**0.0226**	**0.0469**	**493.4997**

3.3 Rough Grading - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0152	0.5482	0.2284	2.6500e-003	0.1023	3.0200e-003	0.1053	0.0294	2.8900e-003	0.0323		293.2215	293.2215	0.0196	0.0428	306.4542
Worker	0.0451	0.0248	0.4845	1.6600e-003	0.2236	9.4000e-004	0.2245	0.0593	8.6000e-004	0.0602		175.8709	175.8709	2.9000e-003	3.2800e-003	176.9210
Total	**0.0603**	**0.5730**	**0.7129**	**4.3100e-003**	**0.3259**	**3.9600e-003**	**0.3298**	**0.0887**	**3.7500e-003**	**0.0925**		**469.0924**	**469.0924**	**0.0225**	**0.0460**	**483.3752**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0152	0.5482	0.2284	2.6500e-003	0.0957	3.0200e-003	0.0988	0.0278	2.8900e-003	0.0307		293.2215	293.2215	0.0196	0.0428	306.4542
Worker	0.0451	0.0248	0.4845	1.6600e-003	0.2061	9.4000e-004	0.2070	0.0550	8.6000e-004	0.0559		175.8709	175.8709	2.9000e-003	3.2800e-003	176.9210
Total	**0.0603**	**0.5730**	**0.7129**	**4.3100e-003**	**0.3018**	**3.9600e-003**	**0.3058**	**0.0828**	**3.7500e-003**	**0.0866**		**469.0924**	**469.0924**	**0.0225**	**0.0460**	**483.3752**

3.4 Utility Trenching - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920		1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**		**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0180	9.9200e-003	0.1938	6.6000e-004	0.0894	3.7000e-004	0.0898	0.0237	3.4000e-004	0.0241		70.3484	70.3484	1.1600e-003	1.3100e-003	70.7684
Total	**0.0180**	**9.9200e-003**	**0.1938**	**6.6000e-004**	**0.0894**	**3.7000e-004**	**0.0898**	**0.0237**	**3.4000e-004**	**0.0241**		**70.3484**	**70.3484**	**1.1600e-003**	**1.3100e-003**	**70.7684**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920	0.0000	1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**	**0.0000**	**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0180	9.9200e-003	0.1938	6.6000e-004	0.0824	3.7000e-004	0.0828	0.0220	3.4000e-004	0.0223		70.3484	70.3484	1.1600e-003	1.3100e-003	70.7684
Total	**0.0180**	**9.9200e-003**	**0.1938**	**6.6000e-004**	**0.0824**	**3.7000e-004**	**0.0828**	**0.0220**	**3.4000e-004**	**0.0223**		**70.3484**	**70.3484**	**1.1600e-003**	**1.3100e-003**	**70.7684**

3.5 Fine Grading - 2027

Unmitigated Construction On-Site

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0152	0.5482	0.2284	2.6500e-003	0.1023	3.0200e-003	0.1053	0.0294	2.8900e-003	0.0323		293.2215	293.2215	0.0196	0.0428	306.4542
Worker	0.0451	0.0248	0.4845	1.6600e-003	0.2236	9.4000e-004	0.2245	0.0593	8.6000e-004	0.0602		175.8709	175.8709	2.9000e-003	3.2800e-003	176.9210
Total	**0.0603**	**0.5730**	**0.7129**	**4.3100e-003**	**0.3259**	**3.9600e-003**	**0.3298**	**0.0887**	**3.7500e-003**	**0.0925**		**469.0924**	**469.0924**	**0.0225**	**0.0460**	**483.3752**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0152	0.5482	0.2284	2.6500e-003	0.0957	3.0200e-003	0.0988	0.0278	2.8900e-003	0.0307		293.2215	293.2215	0.0196	0.0428	306.4542
Worker	0.0451	0.0248	0.4845	1.6600e-003	0.2061	9.4000e-004	0.2070	0.0550	8.6000e-004	0.0559		175.8709	175.8709	2.9000e-003	3.2800e-003	176.9210
Total	**0.0603**	**0.5730**	**0.7129**	**4.3100e-003**	**0.3018**	**3.9600e-003**	**0.3058**	**0.0828**	**3.7500e-003**	**0.0866**		**469.0924**	**469.0924**	**0.0225**	**0.0460**	**483.3752**

3.5 Fine Grading - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5445	0.2283	2.5900e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		287.3722	287.3722	0.0198	0.0421	300.3992
Worker	0.0429	0.0230	0.4643	1.6200e-003	0.2236	8.7000e-004	0.2244	0.0593	8.0000e-004	0.0601		172.6237	172.6237	2.6800e-003	3.1500e-003	173.6296
Total	**0.0579**	**0.5675**	**0.6926**	**4.2100e-003**	**0.3259**	**3.8800e-003**	**0.3297**	**0.0887**	**3.6800e-003**	**0.0924**		**459.9959**	**459.9959**	**0.0225**	**0.0452**	**474.0288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5445	0.2283	2.5900e-003	0.0957	3.0100e-003	0.0987	0.0278	2.8800e-003	0.0307		287.3722	287.3722	0.0198	0.0421	300.3992
Worker	0.0429	0.0230	0.4643	1.6200e-003	0.2061	8.7000e-004	0.2069	0.0550	8.0000e-004	0.0558		172.6237	172.6237	2.6800e-003	3.1500e-003	173.6296
Total	**0.0579**	**0.5675**	**0.6926**	**4.2100e-003**	**0.3018**	**3.8800e-003**	**0.3057**	**0.0828**	**3.6800e-003**	**0.0865**		**459.9959**	**459.9959**	**0.0225**	**0.0452**	**474.0288**

3.6 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	0.0338	0.0186	0.3634	1.2500e-003	0.1677	7.0000e-004	0.1684	0.0445	6.5000e-004	0.0451		131.9032	131.9032	2.1700e-003	2.4600e-003	132.6908
Total	**0.0338**	**0.0186**	**0.3634**	**1.2500e-003**	**0.1677**	**7.0000e-004**	**0.1684**	**0.0445**	**6.5000e-004**	**0.0451**		**131.9032**	**131.9032**	**2.1700e-003**	**2.4600e-003**	**132.6908**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0338	0.0186	0.3634	1.2500e-003	0.1546	7.0000e-004	0.1553	0.0413	6.5000e-004	0.0419		131.9032	131.9032	2.1700e-003	2.4600e-003	132.6908
Total	**0.0338**	**0.0186**	**0.3634**	**1.2500e-003**	**0.1546**	**7.0000e-004**	**0.1553**	**0.0413**	**6.5000e-004**	**0.0419**		**131.9032**	**131.9032**	**2.1700e-003**	**2.4600e-003**	**132.6908**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0322	0.0173	0.3482	1.2100e-003	0.1677	6.6000e-004	0.1683	0.0445	6.0000e-004	0.0451		129.4678	129.4678	2.0100e-003	2.3600e-003	130.2222
Total	**0.0322**	**0.0173**	**0.3482**	**1.2100e-003**	**0.1677**	**6.6000e-004**	**0.1683**	**0.0445**	**6.0000e-004**	**0.0451**		**129.4678**	**129.4678**	**2.0100e-003**	**2.3600e-003**	**130.2222**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0322	0.0173	0.3482	1.2100e-003	0.1546	6.6000e-004	0.1552	0.0413	6.0000e-004	0.0419		129.4678	129.4678	2.0100e-003	2.3600e-003	130.2222
Total	**0.0322**	**0.0173**	**0.3482**	**1.2100e-003**	**0.1546**	**6.6000e-004**	**0.1552**	**0.0413**	**6.0000e-004**	**0.0419**		**129.4678**	**129.4678**	**2.0100e-003**	**2.3600e-003**	**130.2222**

3.7 Finishing/Landscaping - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7600e-003	3.7200e-003	0.0727	2.5000e-004	0.0335	1.4000e-004	0.0337	8.8900e-003	1.3000e-004	9.0200e-003		26.3806	26.3806	4.3000e-004	4.9000e-004	26.5382
Total	**6.7600e-003**	**3.7200e-003**	**0.0727**	**2.5000e-004**	**0.0335**	**1.4000e-004**	**0.0337**	**8.8900e-003**	**1.3000e-004**	**9.0200e-003**		**26.3806**	**26.3806**	**4.3000e-004**	**4.9000e-004**	**26.5382**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7600e-003	3.7200e-003	0.0727	2.5000e-004	0.0309	1.4000e-004	0.0311	8.2500e-003	1.3000e-004	8.3800e-003		26.3806	26.3806	4.3000e-004	4.9000e-004	26.5382
Total	**6.7600e-003**	**3.7200e-003**	**0.0727**	**2.5000e-004**	**0.0309**	**1.4000e-004**	**0.0311**	**8.2500e-003**	**1.3000e-004**	**8.3800e-003**		**26.3806**	**26.3806**	**4.3000e-004**	**4.9000e-004**	**26.5382**

3.7 Finishing/Landscaping - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	6.4300e-003	3.4600e-003	0.0697	2.4000e-004	0.0335	1.3000e-004	0.0337	8.8900e-003	1.2000e-004	9.0100e-003		25.8936	25.8936	4.0000e-004	4.7000e-004	26.0444
Total	**6.4300e-003**	**3.4600e-003**	**0.0697**	**2.4000e-004**	**0.0335**	**1.3000e-004**	**0.0337**	**8.8900e-003**	**1.2000e-004**	**9.0100e-003**		**25.8936**	**25.8936**	**4.0000e-004**	**4.7000e-004**	**26.0444**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.4300e-003	3.4600e-003	0.0697	2.4000e-004	0.0309	1.3000e-004	0.0310	8.2500e-003	1.2000e-004	8.3700e-003		25.8936	25.8936	4.0000e-004	4.7000e-004	26.0444
Total	**6.4300e-003**	**3.4600e-003**	**0.0697**	**2.4000e-004**	**0.0309**	**1.3000e-004**	**0.0310**	**8.2500e-003**	**1.2000e-004**	**8.3700e-003**		**25.8936**	**25.8936**	**4.0000e-004**	**4.7000e-004**	**26.0444**

3.8 Building Construction - 2028

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0132	0.4764	0.1997	2.2700e-003	0.0895	2.6300e-003	0.0921	0.0258	2.5200e-003	0.0283		251.4507	251.4507	0.0173	0.0368	262.8493
Worker	0.1050	0.0565	1.1376	3.9700e-003	0.5477	2.1400e-003	0.5498	0.1453	1.9700e-003	0.1472		422.9281	422.9281	6.5600e-003	7.7200e-003	425.3925
Total	**0.1182**	**0.5329**	**1.3373**	**6.2400e-003**	**0.6372**	**4.7700e-003**	**0.6420**	**0.1710**	**4.4900e-003**	**0.1755**		**674.3788**	**674.3788**	**0.0239**	**0.0445**	**688.2418**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0132	0.4764	0.1997	2.2700e-003	0.0838	2.6300e-003	0.0864	0.0244	2.5200e-003	0.0269		251.4507	251.4507	0.0173	0.0368	262.8493
Worker	0.1050	0.0565	1.1376	3.9700e-003	0.5049	2.1400e-003	0.5070	0.1347	1.9700e-003	0.1367		422.9281	422.9281	6.5600e-003	7.7200e-003	425.3925
Total	**0.1182**	**0.5329**	**1.3373**	**6.2400e-003**	**0.5886**	**4.7700e-003**	**0.5934**	**0.1591**	**4.4900e-003**	**0.1636**		**674.3788**	**674.3788**	**0.0239**	**0.0445**	**688.2418**

3.8 Building Construction - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0130	0.4733	0.1997	2.2200e-003	0.0895	2.6200e-003	0.0921	0.0258	2.5100e-003	0.0283		246.5409	246.5409	0.0174	0.0362	257.7655
Worker	0.0997	0.0528	1.0944	3.8700e-003	0.5477	2.0000e-003	0.5497	0.1453	1.8400e-003	0.1471		415.9179	415.9179	6.0800e-003	7.4500e-003	418.2896
Total	**0.1127**	**0.5261**	**1.2941**	**6.0900e-003**	**0.6372**	**4.6200e-003**	**0.6418**	**0.1710**	**4.3500e-003**	**0.1754**		**662.4588**	**662.4588**	**0.0235**	**0.0437**	**676.0551**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0130	0.4733	0.1997	2.2200e-003	0.0838	2.6200e-003	0.0864	0.0244	2.5100e-003	0.0269		246.5409	246.5409	0.0174	0.0362	257.7655
Worker	0.0997	0.0528	1.0944	3.8700e-003	0.5049	2.0000e-003	0.5069	0.1347	1.8400e-003	0.1366		415.9179	415.9179	6.0800e-003	7.4500e-003	418.2896
Total	**0.1127**	**0.5261**	**1.2941**	**6.0900e-003**	**0.5886**	**4.6200e-003**	**0.5932**	**0.1591**	**4.3500e-003**	**0.1634**		**662.4588**	**662.4588**	**0.0235**	**0.0437**	**676.0551**

3.8 Building Construction - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346	16.1570	0.0310		0.1481	0.1481		0.1481	0.1481		2,897.5468	2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**	**16.1570**	**0.0310**		**0.1481**	**0.1481**		**0.1481**	**0.1481**		**2,897.5468**	**2,897.5468**	**0.1162**		**2,900.4529**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0129	0.4703	0.1996	2.1800e-003	0.0895	2.6100e-003	0.0921	0.0258	2.5000e-003	0.0283		241.8298	241.8298	0.0176	0.0356	252.8850
Worker	0.0946	0.0496	1.0573	3.7900e-003	0.5477	1.8700e-003	0.5496	0.1453	1.7200e-003	0.1470		409.8484	409.8484	5.6500e-003	7.2200e-003	412.1409
Total	**0.1075**	**0.5199**	**1.2569**	**5.9700e-003**	**0.6372**	**4.4800e-003**	**0.6417**	**0.1710**	**4.2200e-003**	**0.1752**		**651.6782**	**651.6782**	**0.0232**	**0.0429**	**665.0259**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346	16.1570	0.0310		0.1481	0.1481		0.1481	0.1481	0.0000	2,897.5468	2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**	**16.1570**	**0.0310**		**0.1481**	**0.1481**		**0.1481**	**0.1481**	**0.0000**	**2,897.5468**	**2,897.5468**	**0.1162**		**2,900.4529**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0129	0.4703	0.1996	2.1800e-003	0.0838	2.6100e-003	0.0864	0.0244	2.5000e-003	0.0269		241.8298	241.8298	0.0176	0.0356	252.8850
Worker	0.0946	0.0496	1.0573	3.7900e-003	0.5049	1.8700e-003	0.5067	0.1347	1.7200e-003	0.1365		409.8484	409.8484	5.6500e-003	7.2200e-003	412.1409
Total	**0.1075**	**0.5199**	**1.2569**	**5.9700e-003**	**0.5886**	**4.4800e-003**	**0.5931**	**0.1591**	**4.2200e-003**	**0.1633**		**651.6782**	**651.6782**	**0.0232**	**0.0429**	**665.0259**

3.9 Architectural Coating - 2029

Unmitigated Construction On-Site

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**10.8787**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0204	0.0108	0.2234	7.9000e-004	0.1118	4.1000e-004	0.1122	0.0296	3.8000e-004	0.0300		84.8812	84.8812	1.2400e-003	1.5200e-003	85.3652
Total	**0.0204**	**0.0108**	**0.2234**	**7.9000e-004**	**0.1118**	**4.1000e-004**	**0.1122**	**0.0296**	**3.8000e-004**	**0.0300**		**84.8812**	**84.8812**	**1.2400e-003**	**1.5200e-003**	**85.3652**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**10.8787**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0204	0.0108	0.2234	7.9000e-004	0.1030	4.1000e-004	0.1034	0.0275	3.8000e-004	0.0279		84.8812	84.8812	1.2400e-003	1.5200e-003	85.3652
Total	**0.0204**	**0.0108**	**0.2234**	**7.9000e-004**	**0.1030**	**4.1000e-004**	**0.1034**	**0.0275**	**3.8000e-004**	**0.0279**		**84.8812**	**84.8812**	**1.2400e-003**	**1.5200e-003**	**85.3652**

3.9 Architectural Coating - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1308	0.8563	1.7977	2.9700e-003		0.0203	0.0203		0.0203	0.0203		281.4481	281.4481	0.0114		281.7328
Total	**10.8386**	**0.8563**	**1.7977**	**2.9700e-003**		**0.0203**	**0.0203**		**0.0203**	**0.0203**		**281.4481**	**281.4481**	**0.0114**		**281.7328**

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0193	0.0101	0.2158	7.7000e-004	0.1118	3.8000e-004	0.1122	0.0296	3.5000e-004	0.0300		83.6425	83.6425	1.1500e-003	1.4700e-003	84.1104
Total	**0.0193**	**0.0101**	**0.2158**	**7.7000e-004**	**0.1118**	**3.8000e-004**	**0.1122**	**0.0296**	**3.5000e-004**	**0.0300**		**83.6425**	**83.6425**	**1.1500e-003**	**1.4700e-003**	**84.1104**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1308	0.8563	1.7977	2.9700e-003		0.0203	0.0203		0.0203	0.0203	0.0000	281.4481	281.4481	0.0114		281.7328
Total	**10.8386**	**0.8563**	**1.7977**	**2.9700e-003**		**0.0203**	**0.0203**		**0.0203**	**0.0203**	**0.0000**	**281.4481**	**281.4481**	**0.0114**		**281.7328**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 3 Construction - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0193	0.0101	0.2158	7.7000e-004	0.1030	3.8000e-004	0.1034	0.0275	3.5000e-004	0.0279		83.6425	83.6425	1.1500e-003	1.4700e-003	84.1104
Total	**0.0193**	**0.0101**	**0.2158**	**7.7000e-004**	**0.1030**	**3.8000e-004**	**0.1034**	**0.0275**	**3.5000e-004**	**0.0279**		**83.6425**	**83.6425**	**1.1500e-003**	**1.4700e-003**	**84.1104**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 3 Construction

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	135.00	Dwelling Unit	74.50	243,000.00	386
Other Non-Asphalt Surfaces	23.90	Acre	23.90	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2030
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - See assumptions file in the AQ/GHG appendix of the DEIR.

Off-road Equipment - Assume for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assume for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	110.00	142.00
tblConstructionPhase	NumDays	1,550.00	574.00
tblConstructionPhase	NumDays	155.00	235.00
tblConstructionPhase	NumDays	110.00	141.00
tblConstructionPhase	NumDays	60.00	47.00
tblConstructionPhase	NumDays	155.00	190.00
tblConstructionPhase	PhaseEndDate	7/28/2034	5/31/2030
tblConstructionPhase	PhaseEndDate	9/23/2033	5/31/2030
tblConstructionPhase	PhaseEndDate	10/15/2027	8/31/2027
tblConstructionPhase	PhaseEndDate	2/24/2034	3/18/2028
tblConstructionPhase	PhaseEndDate	3/12/2027	10/6/2026
tblConstructionPhase	PhaseStartDate	2/25/2034	11/15/2029
tblConstructionPhase	PhaseStartDate	10/16/2027	3/21/2028
tblConstructionPhase	PhaseStartDate	3/13/2027	10/7/2026
tblConstructionPhase	PhaseStartDate	9/24/2033	9/3/2027
tblConstructionPhase	PhaseStartDate	12/19/2026	8/1/2026
tblLandUse	LandUseSquareFeet	1,041,084.00	0.00
tblLandUse	LotAcreage	43.83	74.50
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2026	2.9685	28.5495	27.0419	0.0664	19.9094	1.1349	20.9986	10.1705	1.0442	11.1727	0.0000	6,479.1591	6,479.1591	1.9658	0.0472	6,542.3818
2027	6.6030	62.5104	63.3514	0.1470	19.1483	2.5875	21.7358	7.5087	2.3807	9.8894	0.0000	14,340.6351	14,340.6351	4.3643	0.0941	14,477.7792
2028	4.0528	38.4713	44.1888	0.0935	9.7306	1.6080	11.3386	3.7958	1.4795	5.2753	0.0000	9,116.1036	9,116.1036	2.7792	0.0485	9,200.0391
2029	12.3920	14.1796	19.3305	0.0366	0.7490	0.5841	1.3331	0.2007	0.5525	0.7532	0.0000	3,561.8862	3,561.8862	0.6412	0.0458	3,591.5698
2030	12.2869	9.3480	19.3495	0.0405	0.7490	0.1733	0.9223	0.2007	0.1730	0.3737	0.0000	3,891.2819	3,891.2819	0.1522	0.0450	3,908.4778
Maximum	**12.3920**	**62.5104**	**63.3514**	**0.1470**	**19.9094**	**2.5875**	**21.7358**	**10.1705**	**2.3807**	**11.1727**	**0.0000**	**14,340.6351**	**14,340.6351**	**4.3643**	**0.0941**	**14,477.7792**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2026	2.9685	28.5495	27.0419	0.0664	8.6367	1.1349	9.7259	4.3822	1.0442	5.3843	0.0000	6,479.1591	6,479.1591	1.9658	0.0472	6,542.3818
2027	6.6030	62.5104	63.3514	0.1470	8.5551	2.5875	11.1426	3.3116	2.3807	5.6923	0.0000	14,340.6351	14,340.6351	4.3643	0.0941	14,477.7792
2028	4.0528	38.4713	44.1888	0.0935	4.4218	1.6080	6.0297	1.6943	1.4795	3.1738	0.0000	9,116.1036	9,116.1036	2.7792	0.0485	9,200.0391
2029	12.3920	14.1796	19.3305	0.0366	0.6916	0.5841	1.2758	0.1866	0.5525	0.7391	0.0000	3,561.8862	3,561.8862	0.6412	0.0458	3,591.5698
2030	12.2869	9.3480	19.3495	0.0405	0.6916	0.1733	0.8650	0.1866	0.1730	0.3596	0.0000	3,891.2819	3,891.2819	0.1522	0.0450	3,908.4778
Maximum	**12.3920**	**62.5104**	**63.3514**	**0.1470**	**8.6367**	**2.5875**	**11.1426**	**4.3822**	**2.3807**	**5.6923**	**0.0000**	**14,340.6351**	**14,340.6351**	**4.3643**	**0.0941**	**14,477.7792**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	54.27	0.00	48.45	55.38	0.00	44.11	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2026	10/6/2026	5	47	
2	Rough Grading	Grading	10/7/2026	8/31/2027	5	235	
3	Utility Trenching	Trenching	3/20/2027	11/5/2027	5	165	
4	Fine Grading	Grading	6/27/2027	3/18/2028	5	190	
5	Paving	Paving	9/3/2027	3/18/2028	5	141	
6	Finishing/Landscaping	Trenching	11/8/2027	5/25/2028	5	144	
7	Building Construction	Building Construction	3/21/2028	5/31/2030	5	574	
8	Architectural Coating	Architectural Coating	11/15/2029	5/31/2030	5	142	

Acres of Grading (Site Preparation Phase): 70.5

Acres of Grading (Grading Phase): 705

Acres of Paving: 23.9

Residential Indoor: 492,075; Residential Outdoor: 164,025; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	49.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Clean Paved Roads

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.4400e-003	0.2886	0.1180	1.3600e-003	0.0512	1.5200e-003	0.0527	0.0147	1.4500e-003	0.0162		149.9085	149.9085	9.6900e-003	0.0218	156.6449
Worker	0.0471	0.0265	0.4273	1.4700e-003	0.2012	8.9000e-004	0.2021	0.0534	8.2000e-004	0.0542		153.9546	153.9546	2.9200e-003	3.2900e-003	155.0076
Total	**0.0546**	**0.3151**	**0.5453**	**2.8300e-003**	**0.2524**	**2.4100e-003**	**0.2548**	**0.0681**	**2.2700e-003**	**0.0704**		**303.8631**	**303.8631**	**0.0126**	**0.0251**	**311.6524**

Mitigated Construction On-Site

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**8.4034**	**1.0868**	**9.4902**	**4.3188**	**0.9999**	**5.3187**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.4400e-003	0.2886	0.1180	1.3600e-003	0.0479	1.5200e-003	0.0494	0.0139	1.4500e-003	0.0154		149.9085	149.9085	9.6900e-003	0.0218	156.6449
Worker	0.0471	0.0265	0.4273	1.4700e-003	0.1855	8.9000e-004	0.1864	0.0495	8.2000e-004	0.0503		153.9546	153.9546	2.9200e-003	3.2900e-003	155.0076
Total	**0.0546**	**0.3151**	**0.5453**	**2.8300e-003**	**0.2333**	**2.4100e-003**	**0.2357**	**0.0634**	**2.2700e-003**	**0.0657**		**303.8631**	**303.8631**	**0.0126**	**0.0251**	**311.6524**

3.3 Rough Grading - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0149	0.5772	0.2361	2.7200e-003	0.1023	3.0400e-003	0.1053	0.0294	2.9100e-003	0.0324		299.8170	299.8170	0.0194	0.0436	313.2897
Worker	0.0524	0.0295	0.4748	1.6300e-003	0.2236	9.9000e-004	0.2246	0.0593	9.1000e-004	0.0602		171.0607	171.0607	3.2400e-003	3.6500e-003	172.2306
Total	**0.0673**	**0.6066**	**0.7108**	**4.3500e-003**	**0.3259**	**4.0300e-003**	**0.3299**	**0.0887**	**3.8200e-003**	**0.0926**		**470.8777**	**470.8777**	**0.0226**	**0.0472**	**485.5203**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0149	0.5772	0.2361	2.7200e-003	0.0957	3.0400e-003	0.0988	0.0278	2.9100e-003	0.0307		299.8170	299.8170	0.0194	0.0436	313.2897
Worker	0.0524	0.0295	0.4748	1.6300e-003	0.2061	9.9000e-004	0.2071	0.0550	9.1000e-004	0.0559		171.0607	171.0607	3.2400e-003	3.6500e-003	172.2306
Total	**0.0673**	**0.6066**	**0.7108**	**4.3500e-003**	**0.3018**	**4.0300e-003**	**0.3058**	**0.0828**	**3.8200e-003**	**0.0867**		**470.8777**	**470.8777**	**0.0226**	**0.0472**	**485.5203**

3.3 Rough Grading - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0147	0.5729	0.2352	2.6600e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		293.6900	293.6900	0.0195	0.0429	306.9498
Worker	0.0499	0.0272	0.4525	1.5800e-003	0.2236	9.4000e-004	0.2245	0.0593	8.6000e-004	0.0602		167.5130	167.5130	2.9800e-003	3.4900e-003	168.6268
Total	**0.0645**	**0.6001**	**0.6877**	**4.2400e-003**	**0.3259**	**3.9700e-003**	**0.3298**	**0.0887**	**3.7600e-003**	**0.0925**		**461.2030**	**461.2030**	**0.0225**	**0.0464**	**475.5766**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0147	0.5729	0.2352	2.6600e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		293.6900	293.6900	0.0195	0.0429	306.9498
Worker	0.0499	0.0272	0.4525	1.5800e-003	0.2061	9.4000e-004	0.2070	0.0550	8.6000e-004	0.0559		167.5130	167.5130	2.9800e-003	3.4900e-003	168.6268
Total	**0.0645**	**0.6001**	**0.6877**	**4.2400e-003**	**0.3018**	**3.9700e-003**	**0.3058**	**0.0828**	**3.7600e-003**	**0.0866**		**461.2030**	**461.2030**	**0.0225**	**0.0464**	**475.5766**

3.4 Utility Trenching - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920		1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**		**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0200	0.0109	0.1810	6.3000e-004	0.0894	3.7000e-004	0.0898	0.0237	3.4000e-004	0.0241		67.0052	67.0052	1.1900e-003	1.3900e-003	67.4507
Total	**0.0200**	**0.0109**	**0.1810**	**6.3000e-004**	**0.0894**	**3.7000e-004**	**0.0898**	**0.0237**	**3.4000e-004**	**0.0241**		**67.0052**	**67.0052**	**1.1900e-003**	**1.3900e-003**	**67.4507**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6515	5.4135	9.1328	0.0138		0.3174	0.3174		0.2920	0.2920	0.0000	1,334.6610	1,334.6610	0.4317		1,345.4524
Total	**0.6515**	**5.4135**	**9.1328**	**0.0138**		**0.3174**	**0.3174**		**0.2920**	**0.2920**	**0.0000**	**1,334.6610**	**1,334.6610**	**0.4317**		**1,345.4524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0200	0.0109	0.1810	6.3000e-004	0.0824	3.7000e-004	0.0828	0.0220	3.4000e-004	0.0223		67.0052	67.0052	1.1900e-003	1.3900e-003	67.4507
Total	**0.0200**	**0.0109**	**0.1810**	**6.3000e-004**	**0.0824**	**3.7000e-004**	**0.0828**	**0.0220**	**3.4000e-004**	**0.0223**		**67.0052**	**67.0052**	**1.1900e-003**	**1.3900e-003**	**67.4507**

3.5 Fine Grading - 2027

Unmitigated Construction On-Site

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0147	0.5729	0.2352	2.6600e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		293.6900	293.6900	0.0195	0.0429	306.9498
Worker	0.0499	0.0272	0.4525	1.5800e-003	0.2236	9.4000e-004	0.2245	0.0593	8.6000e-004	0.0602		167.5130	167.5130	2.9800e-003	3.4900e-003	168.6268
Total	**0.0645**	**0.6001**	**0.6877**	**4.2400e-003**	**0.3259**	**3.9700e-003**	**0.3298**	**0.0887**	**3.7600e-003**	**0.0925**		**461.2030**	**461.2030**	**0.0225**	**0.0464**	**475.5766**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0147	0.5729	0.2352	2.6600e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		293.6900	293.6900	0.0195	0.0429	306.9498
Worker	0.0499	0.0272	0.4525	1.5800e-003	0.2061	9.4000e-004	0.2070	0.0550	8.6000e-004	0.0559		167.5130	167.5130	2.9800e-003	3.4900e-003	168.6268
Total	**0.0645**	**0.6001**	**0.6877**	**4.2400e-003**	**0.3018**	**3.9700e-003**	**0.3058**	**0.0828**	**3.7600e-003**	**0.0866**		**461.2030**	**461.2030**	**0.0225**	**0.0464**	**475.5766**

3.5 Fine Grading - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0145	0.5691	0.2350	2.6000e-003	0.1023	3.0200e-003	0.1053	0.0294	2.8900e-003	0.0323		287.8387	287.8387	0.0197	0.0422	300.8923
Worker	0.0475	0.0253	0.4338	1.5400e-003	0.2236	8.7000e-004	0.2244	0.0593	8.0000e-004	0.0601		164.4247	164.4247	2.7600e-003	3.3500e-003	165.4915
Total	**0.0620**	**0.5944**	**0.6687**	**4.1400e-003**	**0.3259**	**3.8900e-003**	**0.3298**	**0.0887**	**3.6900e-003**	**0.0924**		**452.2634**	**452.2634**	**0.0225**	**0.0455**	**466.3838**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**3.9345**	**1.1309**	**5.0654**	**1.5620**	**1.0404**	**2.6024**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0145	0.5691	0.2350	2.6000e-003	0.0957	3.0200e-003	0.0988	0.0278	2.8900e-003	0.0307		287.8387	287.8387	0.0197	0.0422	300.8923
Worker	0.0475	0.0253	0.4338	1.5400e-003	0.2061	8.7000e-004	0.2069	0.0550	8.0000e-004	0.0558		164.4247	164.4247	2.7600e-003	3.3500e-003	165.4915
Total	**0.0620**	**0.5944**	**0.6687**	**4.1400e-003**	**0.3018**	**3.8900e-003**	**0.3057**	**0.0828**	**3.6900e-003**	**0.0865**		**452.2634**	**452.2634**	**0.0225**	**0.0455**	**466.3838**

3.6 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	0.0374	0.0204	0.3393	1.1900e-003	0.1677	7.0000e-004	0.1684	0.0445	6.5000e-004	0.0451		125.6348	125.6348	2.2400e-003	2.6200e-003	126.4701
Total	**0.0374**	**0.0204**	**0.3393**	**1.1900e-003**	**0.1677**	**7.0000e-004**	**0.1684**	**0.0445**	**6.5000e-004**	**0.0451**		**125.6348**	**125.6348**	**2.2400e-003**	**2.6200e-003**	**126.4701**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0374	0.0204	0.3393	1.1900e-003	0.1546	7.0000e-004	0.1553	0.0413	6.5000e-004	0.0419		125.6348	125.6348	2.2400e-003	2.6200e-003	126.4701
Total	**0.0374**	**0.0204**	**0.3393**	**1.1900e-003**	**0.1546**	**7.0000e-004**	**0.1553**	**0.0413**	**6.5000e-004**	**0.0419**		**125.6348**	**125.6348**	**2.2400e-003**	**2.6200e-003**	**126.4701**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0357	0.0190	0.3253	1.1600e-003	0.1677	6.6000e-004	0.1683	0.0445	6.0000e-004	0.0451		123.3185	123.3185	2.0700e-003	2.5100e-003	124.1187
Total	**0.0357**	**0.0190**	**0.3253**	**1.1600e-003**	**0.1677**	**6.6000e-004**	**0.1683**	**0.0445**	**6.0000e-004**	**0.0451**		**123.3185**	**123.3185**	**2.0700e-003**	**2.5100e-003**	**124.1187**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0357	0.0190	0.3253	1.1600e-003	0.1546	6.6000e-004	0.1552	0.0413	6.0000e-004	0.0419		123.3185	123.3185	2.0700e-003	2.5100e-003	124.1187
Total	**0.0357**	**0.0190**	**0.3253**	**1.1600e-003**	**0.1546**	**6.6000e-004**	**0.1552**	**0.0413**	**6.0000e-004**	**0.0419**		**123.3185**	**123.3185**	**2.0700e-003**	**2.5100e-003**	**124.1187**

3.7 Finishing/Landscaping - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4800e-003	4.0800e-003	0.0679	2.4000e-004	0.0335	1.4000e-004	0.0337	8.8900e-003	1.3000e-004	9.0200e-003		25.1270	25.1270	4.5000e-004	5.2000e-004	25.2940
Total	**7.4800e-003**	**4.0800e-003**	**0.0679**	**2.4000e-004**	**0.0335**	**1.4000e-004**	**0.0337**	**8.8900e-003**	**1.3000e-004**	**9.0200e-003**		**25.1270**	**25.1270**	**4.5000e-004**	**5.2000e-004**	**25.2940**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4800e-003	4.0800e-003	0.0679	2.4000e-004	0.0309	1.4000e-004	0.0311	8.2500e-003	1.3000e-004	8.3800e-003		25.1270	25.1270	4.5000e-004	5.2000e-004	25.2940
Total	**7.4800e-003**	**4.0800e-003**	**0.0679**	**2.4000e-004**	**0.0309**	**1.4000e-004**	**0.0311**	**8.2500e-003**	**1.3000e-004**	**8.3800e-003**		**25.1270**	**25.1270**	**4.5000e-004**	**5.2000e-004**	**25.2940**

3.7 Finishing/Landscaping - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496		300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**		**300.8313**	**300.8313**	**0.0973**		**303.2637**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	7.1300e-003	3.7900e-003	0.0651	2.3000e-004	0.0335	1.3000e-004	0.0337	8.8900e-003	1.2000e-004	9.0100e-003		24.6637	24.6637	4.1000e-004	5.0000e-004	24.8237
Total	**7.1300e-003**	**3.7900e-003**	**0.0651**	**2.3000e-004**	**0.0335**	**1.3000e-004**	**0.0337**	**8.8900e-003**	**1.2000e-004**	**9.0100e-003**		**24.6637**	**24.6637**	**4.1000e-004**	**5.0000e-004**	**24.8237**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1316	1.3297	2.2206	3.1100e-003		0.0539	0.0539		0.0496	0.0496	0.0000	300.8313	300.8313	0.0973		303.2637
Total	**0.1316**	**1.3297**	**2.2206**	**3.1100e-003**		**0.0539**	**0.0539**		**0.0496**	**0.0496**	**0.0000**	**300.8313**	**300.8313**	**0.0973**		**303.2637**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1300e-003	3.7900e-003	0.0651	2.3000e-004	0.0309	1.3000e-004	0.0310	8.2500e-003	1.2000e-004	8.3700e-003		24.6637	24.6637	4.1000e-004	5.0000e-004	24.8237
Total	**7.1300e-003**	**3.7900e-003**	**0.0651**	**2.3000e-004**	**0.0309**	**1.3000e-004**	**0.0310**	**8.2500e-003**	**1.2000e-004**	**8.3700e-003**		**24.6637**	**24.6637**	**4.1000e-004**	**5.0000e-004**	**24.8237**

3.8 Building Construction - 2028

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0127	0.4980	0.2056	2.2700e-003	0.0895	2.6400e-003	0.0922	0.0258	2.5300e-003	0.0283		251.8589	251.8589	0.0173	0.0369	263.2808
Worker	0.1164	0.0619	1.0627	3.7800e-003	0.5477	2.1400e-003	0.5498	0.1453	1.9700e-003	0.1472		402.8406	402.8406	6.7500e-003	8.2000e-003	405.4543
Total	**0.1291**	**0.5599**	**1.2683**	**6.0500e-003**	**0.6372**	**4.7800e-003**	**0.6420**	**0.1710**	**4.5000e-003**	**0.1755**		**654.6994**	**654.6994**	**0.0240**	**0.0451**	**668.7350**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0127	0.4980	0.2056	2.2700e-003	0.0838	2.6400e-003	0.0864	0.0244	2.5300e-003	0.0269		251.8589	251.8589	0.0173	0.0369	263.2808
Worker	0.1164	0.0619	1.0627	3.7800e-003	0.5049	2.1400e-003	0.5070	0.1347	1.9700e-003	0.1367		402.8406	402.8406	6.7500e-003	8.2000e-003	405.4543
Total	**0.1291**	**0.5599**	**1.2683**	**6.0500e-003**	**0.5886**	**4.7800e-003**	**0.5934**	**0.1591**	**4.5000e-003**	**0.1636**		**654.6994**	**654.6994**	**0.0240**	**0.0451**	**668.7350**

3.8 Building Construction - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0125	0.4947	0.2054	2.2300e-003	0.0895	2.6300e-003	0.0921	0.0258	2.5200e-003	0.0283		246.9466	246.9466	0.0174	0.0363	258.1941
Worker	0.1108	0.0579	1.0226	3.6900e-003	0.5477	2.0000e-003	0.5497	0.1453	1.8400e-003	0.1471		396.1668	396.1668	6.2700e-003	7.9100e-003	398.6821
Total	**0.1233**	**0.5526**	**1.2280**	**5.9200e-003**	**0.6372**	**4.6300e-003**	**0.6418**	**0.1710**	**4.3600e-003**	**0.1754**		**643.1134**	**643.1134**	**0.0237**	**0.0442**	**656.8762**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0125	0.4947	0.2054	2.2300e-003	0.0838	2.6300e-003	0.0864	0.0244	2.5200e-003	0.0269		246.9466	246.9466	0.0174	0.0363	258.1941
Worker	0.1108	0.0579	1.0226	3.6900e-003	0.5049	2.0000e-003	0.5069	0.1347	1.8400e-003	0.1366		396.1668	396.1668	6.2700e-003	7.9100e-003	398.6821
Total	**0.1233**	**0.5526**	**1.2280**	**5.9200e-003**	**0.5886**	**4.6300e-003**	**0.5933**	**0.1591**	**4.3600e-003**	**0.1634**		**643.1134**	**643.1134**	**0.0237**	**0.0442**	**656.8762**

3.8 Building Construction - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346	16.1570	0.0310		0.1481	0.1481		0.1481	0.1481		2,897.5468	2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**	**16.1570**	**0.0310**		**0.1481**	**0.1481**		**0.1481**	**0.1481**		**2,897.5468**	**2,897.5468**	**0.1162**		**2,900.4529**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0124	0.4917	0.2052	2.1800e-003	0.0895	2.6200e-003	0.0921	0.0258	2.5100e-003	0.0283		242.2333	242.2333	0.0175	0.0357	253.3110
Worker	0.1053	0.0543	0.9880	3.6100e-003	0.5477	1.8700e-003	0.5496	0.1453	1.7200e-003	0.1470		390.3837	390.3837	5.8300e-003	7.6700e-003	392.8148
Total	**0.1177**	**0.5460**	**1.1932**	**5.7900e-003**	**0.6372**	**4.4900e-003**	**0.6417**	**0.1710**	**4.2300e-003**	**0.1752**		**632.6169**	**632.6169**	**0.0233**	**0.0434**	**646.1258**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346	16.1570	0.0310		0.1481	0.1481		0.1481	0.1481	0.0000	2,897.5468	2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**	**16.1570**	**0.0310**		**0.1481**	**0.1481**		**0.1481**	**0.1481**	**0.0000**	**2,897.5468**	**2,897.5468**	**0.1162**		**2,900.4529**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0124	0.4917	0.2052	2.1800e-003	0.0838	2.6200e-003	0.0864	0.0244	2.5100e-003	0.0269		242.2333	242.2333	0.0175	0.0357	253.3110
Worker	0.1053	0.0543	0.9880	3.6100e-003	0.5049	1.8700e-003	0.5067	0.1347	1.7200e-003	0.1365		390.3837	390.3837	5.8300e-003	7.6700e-003	392.8148
Total	**0.1177**	**0.5460**	**1.1932**	**5.7900e-003**	**0.5886**	**4.4900e-003**	**0.5931**	**0.1591**	**4.2300e-003**	**0.1633**		**632.6169**	**632.6169**	**0.0233**	**0.0434**	**646.1258**

3.9 Architectural Coating - 2029

Unmitigated Construction On-Site

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**10.8787**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0226	0.0118	0.2087	7.5000e-004	0.1118	4.1000e-004	0.1122	0.0296	3.8000e-004	0.0300		80.8504	80.8504	1.2800e-003	1.6200e-003	81.3637
Total	**0.0226**	**0.0118**	**0.2087**	**7.5000e-004**	**0.1118**	**4.1000e-004**	**0.1122**	**0.0296**	**3.8000e-004**	**0.0300**		**80.8504**	**80.8504**	**1.2800e-003**	**1.6200e-003**	**81.3637**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**10.8787**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0226	0.0118	0.2087	7.5000e-004	0.1030	4.1000e-004	0.1034	0.0275	3.8000e-004	0.0279		80.8504	80.8504	1.2800e-003	1.6200e-003	81.3637
Total	**0.0226**	**0.0118**	**0.2087**	**7.5000e-004**	**0.1030**	**4.1000e-004**	**0.1034**	**0.0275**	**3.8000e-004**	**0.0279**		**80.8504**	**80.8504**	**1.2800e-003**	**1.6200e-003**	**81.3637**

3.9 Architectural Coating - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1308	0.8563	1.7977	2.9700e-003		0.0203	0.0203		0.0203	0.0203		281.4481	281.4481	0.0114		281.7328
Total	**10.8386**	**0.8563**	**1.7977**	**2.9700e-003**		**0.0203**	**0.0203**		**0.0203**	**0.0203**		**281.4481**	**281.4481**	**0.0114**		**281.7328**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0215	0.0111	0.2016	7.4000e-004	0.1118	3.8000e-004	0.1122	0.0296	3.5000e-004	0.0300		79.6701	79.6701	1.1900e-003	1.5700e-003	80.1663
Total	**0.0215**	**0.0111**	**0.2016**	**7.4000e-004**	**0.1118**	**3.8000e-004**	**0.1122**	**0.0296**	**3.5000e-004**	**0.0300**		**79.6701**	**79.6701**	**1.1900e-003**	**1.5700e-003**	**80.1663**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	10.7078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1308	0.8563	1.7977	2.9700e-003		0.0203	0.0203		0.0203	0.0203	0.0000	281.4481	281.4481	0.0114		281.7328
Total	**10.8386**	**0.8563**	**1.7977**	**2.9700e-003**		**0.0203**	**0.0203**		**0.0203**	**0.0203**	**0.0000**	**281.4481**	**281.4481**	**0.0114**		**281.7328**

Phase 3 Construction - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0215	0.0111	0.2016	7.4000e-004	0.1030	3.8000e-004	0.1034	0.0275	3.5000e-004	0.0279		79.6701	79.6701	1.1900e-003	1.5700e-003	80.1663
Total	**0.0215**	**0.0111**	**0.2016**	**7.4000e-004**	**0.1030**	**3.8000e-004**	**0.1034**	**0.0275**	**3.5000e-004**	**0.0279**		**79.6701**	**79.6701**	**1.1900e-003**	**1.5700e-003**	**80.1663**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 3 Construction

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	135.00	Dwelling Unit	74.50	243,000.00	386
Other Non-Asphalt Surfaces	23.90	Acre	23.90	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2030
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - See assumptions file in the AQ/GHG appendix of the DEIR.

Off-road Equipment - Assume for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assume for modeling purposes.

Off-road Equipment -

Off-road Equipment -

Grading -

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	110.00	142.00
tblConstructionPhase	NumDays	1,550.00	574.00
tblConstructionPhase	NumDays	155.00	235.00
tblConstructionPhase	NumDays	110.00	141.00
tblConstructionPhase	NumDays	60.00	47.00
tblConstructionPhase	NumDays	155.00	190.00
tblConstructionPhase	PhaseEndDate	7/28/2034	5/31/2030
tblConstructionPhase	PhaseEndDate	9/23/2033	5/31/2030
tblConstructionPhase	PhaseEndDate	10/15/2027	8/31/2027
tblConstructionPhase	PhaseEndDate	2/24/2034	3/18/2028
tblConstructionPhase	PhaseEndDate	3/12/2027	10/6/2026
tblConstructionPhase	PhaseStartDate	2/25/2034	11/15/2029
tblConstructionPhase	PhaseStartDate	10/16/2027	3/21/2028
tblConstructionPhase	PhaseStartDate	3/13/2027	10/7/2026
tblConstructionPhase	PhaseStartDate	9/24/2033	9/3/2027
tblConstructionPhase	PhaseStartDate	12/19/2026	8/1/2026
tblLandUse	LandUseSquareFeet	1,041,084.00	0.00
tblLandUse	LotAcreage	43.83	74.50
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2026	0.1512	1.4855	1.2724	3.0200e-003	1.0382	0.0608	1.0990	0.3847	0.0559	0.4406	0.0000	267.4356	267.4356	0.0810	1.8600e-003	270.0158
2027	0.5549	5.2400	5.6182	0.0125	1.6678	0.2201	1.8879	0.6002	0.2025	0.8027	0.0000	1,106.0478	1,106.0478	0.3367	6.6900e-003	1,116.4608
2028	0.2662	2.4199	3.0437	6.0300e-003	0.5468	0.0998	0.6466	0.1449	0.0930	0.2379	0.0000	532.3833	532.3833	0.1293	5.4000e-003	537.2264
2029	0.3731	1.7188	2.2952	4.3600e-003	0.0835	0.0703	0.1538	0.0224	0.0662	0.0886	0.0000	384.8340	384.8340	0.0742	5.2700e-003	388.2580
2030	0.6690	0.5096	1.0558	2.2100e-003	0.0401	9.4500e-003	0.0496	0.0108	9.4300e-003	0.0202	0.0000	192.6922	192.6922	7.5200e-003	2.2300e-003	193.5437
Maximum	**0.6690**	**5.2400**	**5.6182**	**0.0125**	**1.6678**	**0.2201**	**1.8879**	**0.6002**	**0.2025**	**0.8027**	**0.0000**	**1,106.0478**	**1,106.0478**	**0.3367**	**6.6900e-003**	**1,116.4608**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2026	0.1512	1.4855	1.2724	3.0200e-003	0.4517	0.0608	0.5125	0.1666	0.0559	0.2225	0.0000	267.4353	267.4353	0.0810	1.8600e-003	270.0155
2027	0.5549	5.2400	5.6182	0.0125	0.7450	0.2201	0.9651	0.2654	0.2025	0.4679	0.0000	1,106.0465	1,106.0465	0.3367	6.6900e-003	1,116.4596
2028	0.2662	2.4199	3.0437	6.0300e-003	0.2729	0.0998	0.3728	0.0726	0.0930	0.1656	0.0000	532.3828	532.3828	0.1293	5.4000e-003	537.2259
2029	0.3731	1.7188	2.2952	4.3600e-003	0.0772	0.0703	0.1475	0.0209	0.0662	0.0871	0.0000	384.8336	384.8336	0.0742	5.2700e-003	388.2577
2030	0.6690	0.5096	1.0558	2.2100e-003	0.0371	9.4500e-003	0.0465	0.0100	9.4300e-003	0.0194	0.0000	192.6920	192.6920	7.5200e-003	2.2300e-003	193.5435
Maximum	**0.6690**	**5.2400**	**5.6182**	**0.0125**	**0.7450**	**0.2201**	**0.9651**	**0.2654**	**0.2025**	**0.4679**	**0.0000**	**1,106.0465**	**1,106.0465**	**0.3367**	**6.6900e-003**	**1,116.4596**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	53.09	0.00	46.72	53.95	0.00	39.46	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2026	10-31-2026	0.9528	0.9528
2	11-1-2026	1-31-2027	1.0355	1.0355
3	2-1-2027	4-30-2027	1.0926	1.0926
4	5-1-2027	7-31-2027	1.6279	1.6279
5	8-1-2027	10-31-2027	1.7846	1.7846
6	11-1-2027	1-31-2028	1.4047	1.4047
7	2-1-2028	4-30-2028	0.9487	0.9487
8	5-1-2028	7-31-2028	0.4892	0.4892
9	8-1-2028	10-31-2028	0.4765	0.4765
10	11-1-2028	1-31-2029	0.4771	0.4771
11	2-1-2029	4-30-2029	0.4609	0.4609
12	5-1-2029	7-31-2029	0.4756	0.4756
13	8-1-2029	10-31-2029	0.4760	0.4760
14	11-1-2029	1-31-2030	0.7581	0.7581
15	2-1-2030	4-30-2030	0.6873	0.6873
16	5-1-2030	7-31-2030	0.2391	0.2391
		Highest	1.7846	1.7846

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2026	10/6/2026	5	47	
2	Rough Grading	Grading	10/7/2026	8/31/2027	5	235	
3	Utility Trenching	Trenching	3/20/2027	11/5/2027	5	165	
4	Fine Grading	Grading	6/27/2027	3/18/2028	5	190	
5	Paving	Paving	9/3/2027	3/18/2028	5	141	
6	Finishing/Landscaping	Trenching	11/8/2027	5/25/2028	5	144	

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7	Building Construction	Building Construction	3/21/2028	5/31/2030	5	574	
8	Architectural Coating	Architectural Coating	11/15/2029	5/31/2030	5	142	

Acres of Grading (Site Preparation Phase): 70.5

Acres of Grading (Grading Phase): 705

Acres of Paving: 23.9

Residential Indoor: 492,075; Residential Outdoor: 164,025; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Fine Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Fine Grading	Graders	1	8.00	187	0.41
Rough Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Rough Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	49.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4619	0.0000	0.4619	0.2374	0.0000	0.2374	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0581	0.5930	0.4209	9.0000e-004		0.0255	0.0255		0.0235	0.0235	0.0000	78.6474	78.6474	0.0254	0.0000	79.2833
Total	**0.0581**	**0.5930**	**0.4209**	**9.0000e-004**	**0.4619**	**0.0255**	**0.4875**	**0.2374**	**0.0235**	**0.2609**	**0.0000**	**78.6474**	**78.6474**	**0.0254**	**0.0000**	**79.2833**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8000e-004	6.8000e-003	2.7300e-003	3.0000e-005	1.1800e-003	4.0000e-005	1.2200e-003	3.4000e-004	3.0000e-005	3.8000e-004	0.0000	3.1930	3.1930	2.1000e-004	4.6000e-004	3.3365
Worker	1.0100e-003	6.4000e-004	0.0103	3.0000e-005	4.6400e-003	2.0000e-005	4.6600e-003	1.2300e-003	2.0000e-005	1.2500e-003	0.0000	3.3264	3.3264	6.0000e-005	7.0000e-005	3.3491
Total	**1.1900e-003**	**7.4400e-003**	**0.0130**	**6.0000e-005**	**5.8200e-003**	**6.0000e-005**	**5.8800e-003**	**1.5700e-003**	**5.0000e-005**	**1.6300e-003**	**0.0000**	**6.5193**	**6.5193**	**2.7000e-004**	**5.3000e-004**	**6.6856**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1975	0.0000	0.1975	0.1015	0.0000	0.1015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0581	0.5930	0.4209	9.0000e-004		0.0255	0.0255		0.0235	0.0235	0.0000	78.6473	78.6473	0.0254	0.0000	79.2832
Total	**0.0581**	**0.5930**	**0.4209**	**9.0000e-004**	**0.1975**	**0.0255**	**0.2230**	**0.1015**	**0.0235**	**0.1250**	**0.0000**	**78.6473**	**78.6473**	**0.0254**	**0.0000**	**79.2832**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8000e-004	6.8000e-003	2.7300e-003	3.0000e-005	1.1100e-003	4.0000e-005	1.1400e-003	3.2000e-004	3.0000e-005	3.6000e-004	0.0000	3.1930	3.1930	2.1000e-004	4.6000e-004	3.3365
Worker	1.0100e-003	6.4000e-004	0.0103	3.0000e-005	4.2800e-003	2.0000e-005	4.3000e-003	1.1400e-003	2.0000e-005	1.1600e-003	0.0000	3.3264	3.3264	6.0000e-005	7.0000e-005	3.3491
Total	**1.1900e-003**	**7.4400e-003**	**0.0130**	**6.0000e-005**	**5.3900e-003**	**6.0000e-005**	**5.4400e-003**	**1.4600e-003**	**5.0000e-005**	**1.5200e-003**	**0.0000**	**6.5193**	**6.5193**	**2.7000e-004**	**5.3000e-004**	**6.6856**

3.3 Rough Grading - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5605	0.0000	0.5605	0.1430	0.0000	0.1430	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0899	0.8662	0.8163	1.9200e-003		0.0351	0.0351		0.0323	0.0323	0.0000	168.9693	168.9693	0.0547	0.0000	170.3355
Total	**0.0899**	**0.8662**	**0.8163**	**1.9200e-003**	**0.5605**	**0.0351**	**0.5956**	**0.1430**	**0.0323**	**0.1752**	**0.0000**	**168.9693**	**168.9693**	**0.0547**	**0.0000**	**170.3355**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.7000e-004	0.0179	7.2000e-003	8.0000e-005	3.1200e-003	9.0000e-005	3.2200e-003	9.0000e-004	9.0000e-005	9.9000e-004	0.0000	8.4240	8.4240	5.5000e-004	1.2200e-003	8.8026

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	1.4800e-003	9.3000e-004	0.0150	5.0000e-005	6.8100e-003	3.0000e-005	6.8400e-003	1.8100e-003	3.0000e-005	1.8400e-003	0.0000	4.8755	4.8755	9.0000e-005	1.0000e-004	4.9088
Total	**1.9500e-003**	**0.0189**	**0.0222**	**1.3000e-004**	**9.9300e-003**	**1.2000e-004**	**0.0101**	**2.7100e-003**	**1.2000e-004**	**2.8300e-003**	**0.0000**	**13.2996**	**13.2996**	**6.4000e-004**	**1.3200e-003**	**13.7114**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2396	0.0000	0.2396	0.0611	0.0000	0.0611	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0899	0.8662	0.8163	1.9200e-003		0.0351	0.0351		0.0323	0.0323	0.0000	168.9691	168.9691	0.0547	0.0000	170.3353
Total	**0.0899**	**0.8662**	**0.8163**	**1.9200e-003**	**0.2396**	**0.0351**	**0.2747**	**0.0611**	**0.0323**	**0.0934**	**0.0000**	**168.9691**	**168.9691**	**0.0547**	**0.0000**	**170.3353**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.7000e-004	0.0179	7.2000e-003	8.0000e-005	2.9300e-003	9.0000e-005	3.0200e-003	8.5000e-004	9.0000e-005	9.4000e-004	0.0000	8.4240	8.4240	5.5000e-004	1.2200e-003	8.8026
Worker	1.4800e-003	9.3000e-004	0.0150	5.0000e-005	6.2800e-003	3.0000e-005	6.3100e-003	1.6800e-003	3.0000e-005	1.7100e-003	0.0000	4.8755	4.8755	9.0000e-005	1.0000e-004	4.9088
Total	**1.9500e-003**	**0.0189**	**0.0222**	**1.3000e-004**	**9.2100e-003**	**1.2000e-004**	**9.3300e-003**	**2.5300e-003**	**1.2000e-004**	**2.6500e-003**	**0.0000**	**13.2996**	**13.2996**	**6.4000e-004**	**1.3200e-003**	**13.7114**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Rough Grading - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.8947	0.0000	0.8947	0.3267	0.0000	0.3267	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2510	2.4171	2.2776	5.3700e-003		0.0978	0.0978		0.0900	0.0900	0.0000	471.4787	471.4787	0.1525	0.0000	475.2909
Total	**0.2510**	**2.4171**	**2.2776**	**5.3700e-003**	**0.8947**	**0.0978**	**0.9926**	**0.3267**	**0.0900**	**0.4167**	**0.0000**	**471.4787**	**471.4787**	**0.1525**	**0.0000**	**475.2909**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2900e-003	0.0497	0.0200	2.3000e-004	8.7200e-003	2.6000e-004	8.9800e-003	2.5100e-003	2.5000e-004	2.7700e-003	0.0000	23.0250	23.0250	1.5300e-003	3.3600e-003	24.0646
Worker	3.9300e-003	2.4000e-003	0.0400	1.4000e-004	0.0190	8.0000e-005	0.0191	5.0400e-003	7.0000e-005	5.1200e-003	0.0000	13.3219	13.3219	2.3000e-004	2.8000e-004	13.4105
Total	**5.2200e-003**	**0.0521**	**0.0600**	**3.7000e-004**	**0.0277**	**3.4000e-004**	**0.0281**	**7.5500e-003**	**3.2000e-004**	**7.8900e-003**	**0.0000**	**36.3470**	**36.3470**	**1.7600e-003**	**3.6400e-003**	**37.4751**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					0.3825	0.0000	0.3825	0.1397	0.0000	0.1397	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2510	2.4171	2.2776	5.3700e-003		0.0978	0.0978		0.0900	0.0900	0.0000	471.4782	471.4782	0.1525	0.0000	475.2903
Total	**0.2510**	**2.4171**	**2.2776**	**5.3700e-003**	**0.3825**	**0.0978**	**0.4803**	**0.1397**	**0.0900**	**0.2297**	**0.0000**	**471.4782**	**471.4782**	**0.1525**	**0.0000**	**475.2903**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2900e-003	0.0497	0.0200	2.3000e-004	8.1600e-003	2.6000e-004	8.4200e-003	2.3800e-003	2.5000e-004	2.6300e-003	0.0000	23.0250	23.0250	1.5300e-003	3.3600e-003	24.0646
Worker	3.9300e-003	2.4000e-003	0.0400	1.4000e-004	0.0175	8.0000e-005	0.0176	4.6800e-003	7.0000e-005	4.7500e-003	0.0000	13.3219	13.3219	2.3000e-004	2.8000e-004	13.4105
Total	**5.2200e-003**	**0.0521**	**0.0600**	**3.7000e-004**	**0.0257**	**3.4000e-004**	**0.0260**	**7.0600e-003**	**3.2000e-004**	**7.3800e-003**	**0.0000**	**36.3470**	**36.3470**	**1.7600e-003**	**3.6400e-003**	**37.4751**

3.4 Utility Trenching - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0538	0.4466	0.7535	1.1400e-003		0.0262	0.0262		0.0241	0.0241	0.0000	99.8897	99.8897	0.0323	0.0000	100.6974
Total	**0.0538**	**0.4466**	**0.7535**	**1.1400e-003**		**0.0262**	**0.0262**		**0.0241**	**0.0241**	**0.0000**	**99.8897**	**99.8897**	**0.0323**	**0.0000**	**100.6974**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-003	9.1000e-004	0.0153	5.0000e-005	7.2500e-003	3.0000e-005	7.2800e-003	1.9200e-003	3.0000e-005	1.9500e-003	0.0000	5.0824	5.0824	9.0000e-005	1.1000e-004	5.1161
Total	**1.5000e-003**	**9.1000e-004**	**0.0153**	**5.0000e-005**	**7.2500e-003**	**3.0000e-005**	**7.2800e-003**	**1.9200e-003**	**3.0000e-005**	**1.9500e-003**	**0.0000**	**5.0824**	**5.0824**	**9.0000e-005**	**1.1000e-004**	**5.1161**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0538	0.4466	0.7535	1.1400e-003		0.0262	0.0262		0.0241	0.0241	0.0000	99.8896	99.8896	0.0323	0.0000	100.6972
Total	**0.0538**	**0.4466**	**0.7535**	**1.1400e-003**		**0.0262**	**0.0262**		**0.0241**	**0.0241**	**0.0000**	**99.8896**	**99.8896**	**0.0323**	**0.0000**	**100.6972**

Mitigated Construction Off-Site

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-003	9.1000e-004	0.0153	5.0000e-005	6.6800e-003	3.0000e-005	6.7100e-003	1.7900e-003	3.0000e-005	1.8100e-003	0.0000	5.0824	5.0824	9.0000e-005	1.1000e-004	5.1161
Total	**1.5000e-003**	**9.1000e-004**	**0.0153**	**5.0000e-005**	**6.6800e-003**	**3.0000e-005**	**6.7100e-003**	**1.7900e-003**	**3.0000e-005**	**1.8100e-003**	**0.0000**	**5.0824**	**5.0824**	**9.0000e-005**	**1.1000e-004**	**5.1161**

3.5 Fine Grading - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7087	0.0000	0.7087	0.2561	0.0000	0.2561	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1958	1.8862	1.7774	4.1900e-003		0.0763	0.0763		0.0702	0.0702	0.0000	367.9169	367.9169	0.1190	0.0000	370.8917
Total	**0.1958**	**1.8862**	**1.7774**	**4.1900e-003**	**0.7087**	**0.0763**	**0.7851**	**0.2561**	**0.0702**	**0.3263**	**0.0000**	**367.9169**	**367.9169**	**0.1190**	**0.0000**	**370.8917**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	1.0100e-003	0.0388	0.0156	1.8000e-004	6.8000e-003	2.0000e-004	7.0100e-003	1.9600e-003	2.0000e-004	2.1600e-003	0.0000	17.9675	17.9675	1.2000e-003	2.6200e-003	18.7788
Worker	3.0600e-003	1.8700e-003	0.0312	1.1000e-004	0.0148	6.0000e-005	0.0149	3.9400e-003	6.0000e-005	3.9900e-003	0.0000	10.3957	10.3957	1.8000e-004	2.2000e-004	10.4648
Total	**4.0700e-003**	**0.0406**	**0.0469**	**2.9000e-004**	**0.0216**	**2.6000e-004**	**0.0219**	**5.9000e-003**	**2.6000e-004**	**6.1500e-003**	**0.0000**	**28.3632**	**28.3632**	**1.3800e-003**	**2.8400e-003**	**29.2436**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3030	0.0000	0.3030	0.1095	0.0000	0.1095	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1958	1.8861	1.7774	4.1900e-003		0.0763	0.0763		0.0702	0.0702	0.0000	367.9165	367.9165	0.1190	0.0000	370.8913
Total	**0.1958**	**1.8861**	**1.7774**	**4.1900e-003**	**0.3030**	**0.0763**	**0.3793**	**0.1095**	**0.0702**	**0.1797**	**0.0000**	**367.9165**	**367.9165**	**0.1190**	**0.0000**	**370.8913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0100e-003	0.0388	0.0156	1.8000e-004	6.3700e-003	2.0000e-004	6.5700e-003	1.8600e-003	2.0000e-004	2.0500e-003	0.0000	17.9675	17.9675	1.2000e-003	2.6200e-003	18.7788
Worker	3.0600e-003	1.8700e-003	0.0312	1.1000e-004	0.0137	6.0000e-005	0.0137	3.6500e-003	6.0000e-005	3.7100e-003	0.0000	10.3957	10.3957	1.8000e-004	2.2000e-004	10.4648
Total	**4.0700e-003**	**0.0406**	**0.0469**	**2.9000e-004**	**0.0200**	**2.6000e-004**	**0.0203**	**5.5100e-003**	**2.6000e-004**	**5.7600e-003**	**0.0000**	**28.3632**	**28.3632**	**1.3800e-003**	**2.8400e-003**	**29.2436**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Fine Grading - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4679	0.0000	0.4679	0.1237	0.0000	0.1237	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0798	0.7684	0.7241	1.7100e-003		0.0311	0.0311		0.0286	0.0286	0.0000	149.8921	149.8921	0.0485	0.0000	151.1040
Total	**0.0798**	**0.7684**	**0.7241**	**1.7100e-003**	**0.4679**	**0.0311**	**0.4990**	**0.1237**	**0.0286**	**0.1523**	**0.0000**	**149.8921**	**149.8921**	**0.0485**	**0.0000**	**151.1040**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.1000e-004	0.0157	6.3600e-003	7.0000e-005	2.7700e-003	8.0000e-005	2.8500e-003	8.0000e-004	8.0000e-005	8.8000e-004	0.0000	7.1741	7.1741	4.9000e-004	1.0500e-003	7.4995
Worker	1.1900e-003	7.1000e-004	0.0122	4.0000e-005	6.0400e-003	2.0000e-005	6.0600e-003	1.6000e-003	2.0000e-005	1.6300e-003	0.0000	4.1572	4.1572	7.0000e-005	8.0000e-005	4.1841
Total	**1.6000e-003**	**0.0164**	**0.0186**	**1.1000e-004**	**8.8100e-003**	**1.0000e-004**	**8.9100e-003**	**2.4000e-003**	**1.0000e-004**	**2.5100e-003**	**0.0000**	**11.3313**	**11.3313**	**5.6000e-004**	**1.1300e-003**	**11.6837**

Mitigated Construction On-Site

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2000	0.0000	0.2000	0.0529	0.0000	0.0529	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0798	0.7684	0.7241	1.7100e-003		0.0311	0.0311		0.0286	0.0286	0.0000	149.8919	149.8919	0.0485	0.0000	151.1039
Total	**0.0798**	**0.7684**	**0.7241**	**1.7100e-003**	**0.2000**	**0.0311**	**0.2311**	**0.0529**	**0.0286**	**0.0815**	**0.0000**	**149.8919**	**149.8919**	**0.0485**	**0.0000**	**151.1039**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.1000e-004	0.0157	6.3600e-003	7.0000e-005	2.6000e-003	8.0000e-005	2.6800e-003	7.6000e-004	8.0000e-005	8.4000e-004	0.0000	7.1741	7.1741	4.9000e-004	1.0500e-003	7.4995
Worker	1.1900e-003	7.1000e-004	0.0122	4.0000e-005	5.5700e-003	2.0000e-005	5.5900e-003	1.4900e-003	2.0000e-005	1.5100e-003	0.0000	4.1572	4.1572	7.0000e-005	8.0000e-005	4.1841
Total	**1.6000e-003**	**0.0164**	**0.0186**	**1.1000e-004**	**8.1700e-003**	**1.0000e-004**	**8.2700e-003**	**2.2500e-003**	**1.0000e-004**	**2.3500e-003**	**0.0000**	**11.3313**	**11.3313**	**5.6000e-004**	**1.1300e-003**	**11.6837**

3.6 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.0394	0.3690	0.6269	9.8000e-004		0.0180	0.0180		0.0166	0.0166	0.0000	86.0828	86.0828	0.0278	0.0000	86.7788
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0394**	**0.3690**	**0.6269**	**9.8000e-004**		**0.0180**	**0.0180**		**0.0166**	**0.0166**	**0.0000**	**86.0828**	**86.0828**	**0.0278**	**0.0000**	**86.7788**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	8.9000e-004	0.0149	5.0000e-005	7.0800e-003	3.0000e-005	7.1100e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	4.9669	4.9669	9.0000e-005	1.0000e-004	4.9999
Total	**1.4600e-003**	**8.9000e-004**	**0.0149**	**5.0000e-005**	**7.0800e-003**	**3.0000e-005**	**7.1100e-003**	**1.8800e-003**	**3.0000e-005**	**1.9100e-003**	**0.0000**	**4.9669**	**4.9669**	**9.0000e-005**	**1.0000e-004**	**4.9999**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0394	0.3690	0.6269	9.8000e-004		0.0180	0.0180		0.0166	0.0166	0.0000	86.0827	86.0827	0.0278	0.0000	86.7787
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0394**	**0.3690**	**0.6269**	**9.8000e-004**		**0.0180**	**0.0180**		**0.0166**	**0.0166**	**0.0000**	**86.0827**	**86.0827**	**0.0278**	**0.0000**	**86.7787**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	8.9000e-004	0.0149	5.0000e-005	6.5300e-003	3.0000e-005	6.5600e-003	1.7400e-003	3.0000e-005	1.7700e-003	0.0000	4.9669	4.9669	9.0000e-005	1.0000e-004	4.9999
Total	**1.4600e-003**	**8.9000e-004**	**0.0149**	**5.0000e-005**	**6.5300e-003**	**3.0000e-005**	**6.5600e-003**	**1.7400e-003**	**3.0000e-005**	**1.7700e-003**	**0.0000**	**4.9669**	**4.9669**	**9.0000e-005**	**1.0000e-004**	**4.9999**

3.6 Paving - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0252	0.2360	0.4009	6.3000e-004		0.0115	0.0115		0.0106	0.0106	0.0000	55.0530	55.0530	0.0178	0.0000	55.4981
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0252**	**0.2360**	**0.4009**	**6.3000e-004**		**0.0115**	**0.0115**		**0.0106**	**0.0106**	**0.0000**	**55.0530**	**55.0530**	**0.0178**	**0.0000**	**55.4981**

Unmitigated Construction Off-Site

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.9000e-004	5.3000e-004	9.1400e-003	3.0000e-005	4.5300e-003	2.0000e-005	4.5500e-003	1.2000e-003	2.0000e-005	1.2200e-003	0.0000	3.1179	3.1179	5.0000e-005	6.0000e-005	3.1381
Total	**8.9000e-004**	**5.3000e-004**	**9.1400e-003**	**3.0000e-005**	**4.5300e-003**	**2.0000e-005**	**4.5500e-003**	**1.2000e-003**	**2.0000e-005**	**1.2200e-003**	**0.0000**	**3.1179**	**3.1179**	**5.0000e-005**	**6.0000e-005**	**3.1381**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0252	0.2360	0.4009	6.3000e-004		0.0115	0.0115		0.0106	0.0106	0.0000	55.0529	55.0529	0.0178	0.0000	55.4980
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0252**	**0.2360**	**0.4009**	**6.3000e-004**		**0.0115**	**0.0115**		**0.0106**	**0.0106**	**0.0000**	**55.0529**	**55.0529**	**0.0178**	**0.0000**	**55.4980**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.9000e-004	5.3000e-004	9.1400e-003	3.0000e-005	4.1800e-003	2.0000e-005	4.1900e-003	1.1200e-003	2.0000e-005	1.1300e-003	0.0000	3.1179	3.1179	5.0000e-005	6.0000e-005	3.1381
Total	**8.9000e-004**	**5.3000e-004**	**9.1400e-003**	**3.0000e-005**	**4.1800e-003**	**2.0000e-005**	**4.1900e-003**	**1.1200e-003**	**2.0000e-005**	**1.1300e-003**	**0.0000**	**3.1179**	**3.1179**	**5.0000e-005**	**6.0000e-005**	**3.1381**

3.7 Finishing/Landscaping - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6300e-003	0.0266	0.0444	6.0000e-005		1.0800e-003	1.0800e-003		9.9000e-004	9.9000e-004	0.0000	5.4582	5.4582	1.7700e-003	0.0000	5.5023
Total	**2.6300e-003**	**0.0266**	**0.0444**	**6.0000e-005**		**1.0800e-003**	**1.0800e-003**		**9.9000e-004**	**9.9000e-004**	**0.0000**	**5.4582**	**5.4582**	**1.7700e-003**	**0.0000**	**5.5023**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	8.0000e-005	1.3900e-003	0.0000	6.6000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.4620	0.4620	1.0000e-005	1.0000e-005	0.4651
Total	**1.4000e-004**	**8.0000e-005**	**1.3900e-003**	**0.0000**	**6.6000e-004**	**0.0000**	**6.6000e-004**	**1.7000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.4620**	**0.4620**	**1.0000e-005**	**1.0000e-005**	**0.4651**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6300e-003	0.0266	0.0444	6.0000e-005		1.0800e-003	1.0800e-003		9.9000e-004	9.9000e-004	0.0000	5.4582	5.4582	1.7700e-003	0.0000	5.5023
Total	**2.6300e-003**	**0.0266**	**0.0444**	**6.0000e-005**		**1.0800e-003**	**1.0800e-003**		**9.9000e-004**	**9.9000e-004**	**0.0000**	**5.4582**	**5.4582**	**1.7700e-003**	**0.0000**	**5.5023**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	8.0000e-005	1.3900e-003	0.0000	6.1000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4620	0.4620	1.0000e-005	1.0000e-005	0.4651
Total	**1.4000e-004**	**8.0000e-005**	**1.3900e-003**	**0.0000**	**6.1000e-004**	**0.0000**	**6.1000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4620**	**0.4620**	**1.0000e-005**	**1.0000e-005**	**0.4651**

3.7 Finishing/Landscaping - 2028

Unmitigated Construction On-Site

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.8400e-003	0.0691	0.1155	1.6000e-004		2.8000e-003	2.8000e-003		2.5800e-003	2.5800e-003	0.0000	14.1913	14.1913	4.5900e-003	0.0000	14.3060
Total	**6.8400e-003**	**0.0691**	**0.1155**	**1.6000e-004**		**2.8000e-003**	**2.8000e-003**		**2.5800e-003**	**2.5800e-003**	**0.0000**	**14.1913**	**14.1913**	**4.5900e-003**	**0.0000**	**14.3060**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.0000e-004	3.4600e-003	1.0000e-005	1.7100e-003	1.0000e-005	1.7200e-003	4.5000e-004	1.0000e-005	4.6000e-004	0.0000	1.1791	1.1791	2.0000e-005	2.0000e-005	1.1868
Total	**3.4000e-004**	**2.0000e-004**	**3.4600e-003**	**1.0000e-005**	**1.7100e-003**	**1.0000e-005**	**1.7200e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**	**0.0000**	**1.1791**	**1.1791**	**2.0000e-005**	**2.0000e-005**	**1.1868**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.8400e-003	0.0691	0.1155	1.6000e-004		2.8000e-003	2.8000e-003		2.5800e-003	2.5800e-003	0.0000	14.1913	14.1913	4.5900e-003	0.0000	14.3060
Total	**6.8400e-003**	**0.0691**	**0.1155**	**1.6000e-004**		**2.8000e-003**	**2.8000e-003**		**2.5800e-003**	**2.5800e-003**	**0.0000**	**14.1913**	**14.1913**	**4.5900e-003**	**0.0000**	**14.3060**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.0000e-004	3.4600e-003	1.0000e-005	1.5800e-003	1.0000e-005	1.5900e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.1791	1.1791	2.0000e-005	2.0000e-005	1.1868
Total	**3.4000e-004**	**2.0000e-004**	**3.4600e-003**	**1.0000e-005**	**1.5800e-003**	**1.0000e-005**	**1.5900e-003**	**4.2000e-004**	**1.0000e-005**	**4.3000e-004**	**0.0000**	**1.1791**	**1.1791**	**2.0000e-005**	**2.0000e-005**	**1.1868**

3.8 Building Construction - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1395	1.2719	1.6406	2.7500e-003		0.0538	0.0538		0.0506	0.0506	0.0000	236.5578	236.5578	0.0556	0.0000	237.9480
Total	**0.1395**	**1.2719**	**1.6406**	**2.7500e-003**		**0.0538**	**0.0538**		**0.0506**	**0.0506**	**0.0000**	**236.5578**	**236.5578**	**0.0556**	**0.0000**	**237.9480**

Unmitigated Construction Off-Site

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3200e-003	0.0509	0.0207	2.3000e-004	9.0000e-003	2.7000e-004	9.2700e-003	2.5900e-003	2.6000e-004	2.8500e-003	0.0000	23.2834	23.2834	1.6000e-003	3.4100e-003	24.3393
Worker	0.0108	6.4400e-003	0.1108	3.9000e-004	0.0549	2.2000e-004	0.0551	0.0146	2.0000e-004	0.0148	0.0000	37.7775	37.7775	6.2000e-004	7.7000e-004	38.0224
Total	**0.0121**	**0.0573**	**0.1314**	**6.2000e-004**	**0.0639**	**4.9000e-004**	**0.0644**	**0.0172**	**4.6000e-004**	**0.0176**	**0.0000**	**61.0608**	**61.0608**	**2.2200e-003**	**4.1800e-003**	**62.3617**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1395	1.2719	1.6406	2.7500e-003		0.0538	0.0538		0.0506	0.0506	0.0000	236.5576	236.5576	0.0556	0.0000	237.9478
Total	**0.1395**	**1.2719**	**1.6406**	**2.7500e-003**		**0.0538**	**0.0538**		**0.0506**	**0.0506**	**0.0000**	**236.5576**	**236.5576**	**0.0556**	**0.0000**	**237.9478**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3200e-003	0.0509	0.0207	2.3000e-004	8.4200e-003	2.7000e-004	8.6900e-003	2.4500e-003	2.6000e-004	2.7100e-003	0.0000	23.2834	23.2834	1.6000e-003	3.4100e-003	24.3393

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	0.0108	6.4400e-003	0.1108	3.9000e-004	0.0506	2.2000e-004	0.0508	0.0135	2.0000e-004	0.0137	0.0000	37.7775	37.7775	6.2000e-004	7.7000e-004	38.0224
Total	**0.0121**	**0.0573**	**0.1314**	**6.2000e-004**	**0.0590**	**4.9000e-004**	**0.0595**	**0.0160**	**4.6000e-004**	**0.0164**	**0.0000**	**61.0608**	**61.0608**	**2.2200e-003**	**4.1800e-003**	**62.3617**

3.8 Building Construction - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1785	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6549	302.6549	0.0711	0.0000	304.4335
Total	**0.1785**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6549**	**302.6549**	**0.0711**	**0.0000**	**304.4335**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6700e-003	0.0647	0.0264	2.9000e-004	0.0115	3.4000e-004	0.0119	3.3200e-003	3.3000e-004	3.6500e-003	0.0000	29.2076	29.2076	2.0600e-003	4.2900e-003	30.5380
Worker	0.0131	7.6900e-003	0.1364	4.9000e-004	0.0702	2.6000e-004	0.0705	0.0186	2.4000e-004	0.0189	0.0000	47.5321	47.5321	7.4000e-004	9.5000e-004	47.8336
Total	**0.0148**	**0.0724**	**0.1628**	**7.8000e-004**	**0.0817**	**6.0000e-004**	**0.0823**	**0.0220**	**5.7000e-004**	**0.0225**	**0.0000**	**76.7397**	**76.7397**	**2.8000e-003**	**5.2400e-003**	**78.3716**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1784	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6545	302.6545	0.0711	0.0000	304.4331
Total	**0.1784**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6545**	**302.6545**	**0.0711**	**0.0000**	**304.4331**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6700e-003	0.0647	0.0264	2.9000e-004	0.0108	3.4000e-004	0.0111	3.1400e-003	3.3000e-004	3.4700e-003	0.0000	29.2076	29.2076	2.0600e-003	4.2900e-003	30.5380
Worker	0.0131	7.6900e-003	0.1364	4.9000e-004	0.0647	2.6000e-004	0.0650	0.0173	2.4000e-004	0.0175	0.0000	47.5321	47.5321	7.4000e-004	9.5000e-004	47.8336
Total	**0.0148**	**0.0724**	**0.1628**	**7.8000e-004**	**0.0755**	**6.0000e-004**	**0.0761**	**0.0204**	**5.7000e-004**	**0.0210**	**0.0000**	**76.7397**	**76.7397**	**2.8000e-003**	**5.2400e-003**	**78.3716**

3.8 Building Construction - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.0714	0.4324	0.8806	1.6900e-003		8.0700e-003	8.0700e-003		8.0700e-003	8.0700e-003	0.0000	143.2593	143.2593	5.7500e-003	0.0000	143.4029
Total	**0.0714**	**0.4324**	**0.8806**	**1.6900e-003**		**8.0700e-003**	**8.0700e-003**		**8.0700e-003**	**8.0700e-003**	**0.0000**	**143.2593**	**143.2593**	**5.7500e-003**	**0.0000**	**143.4029**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.9000e-004	0.0268	0.0110	1.2000e-004	4.8100e-003	1.4000e-004	4.9500e-003	1.3900e-003	1.4000e-004	1.5200e-003	0.0000	11.9648	11.9648	8.7000e-004	1.7600e-003	12.5121
Worker	5.2000e-003	3.0200e-003	0.0550	2.0000e-004	0.0293	1.0000e-004	0.0294	7.7900e-003	9.0000e-005	7.8800e-003	0.0000	19.5608	19.5608	2.9000e-004	3.8000e-004	19.6825
Total	**5.8900e-003**	**0.0299**	**0.0661**	**3.2000e-004**	**0.0341**	**2.4000e-004**	**0.0344**	**9.1800e-003**	**2.3000e-004**	**9.4000e-003**	**0.0000**	**31.5257**	**31.5257**	**1.1600e-003**	**2.1400e-003**	**32.1946**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0714	0.4324	0.8806	1.6900e-003		8.0700e-003	8.0700e-003		8.0700e-003	8.0700e-003	0.0000	143.2591	143.2591	5.7500e-003	0.0000	143.4028
Total	**0.0714**	**0.4324**	**0.8806**	**1.6900e-003**		**8.0700e-003**	**8.0700e-003**		**8.0700e-003**	**8.0700e-003**	**0.0000**	**143.2591**	**143.2591**	**5.7500e-003**	**0.0000**	**143.4028**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.9000e-004	0.0268	0.0110	1.2000e-004	4.5000e-003	1.4000e-004	4.6400e-003	1.3100e-003	1.4000e-004	1.4500e-003	0.0000	11.9648	11.9648	8.7000e-004	1.7600e-003	12.5121
Worker	5.2000e-003	3.0200e-003	0.0550	2.0000e-004	0.0270	1.0000e-004	0.0271	7.2200e-003	9.0000e-005	7.3200e-003	0.0000	19.5608	19.5608	2.9000e-004	3.8000e-004	19.6825
Total	**5.8900e-003**	**0.0299**	**0.0661**	**3.2000e-004**	**0.0315**	**2.4000e-004**	**0.0318**	**8.5300e-003**	**2.3000e-004**	**8.7700e-003**	**0.0000**	**31.5257**	**31.5257**	**1.1600e-003**	**2.1400e-003**	**32.1946**

3.9 Architectural Coating - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1767					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8200e-003	0.0189	0.0299	5.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	4.2129	4.2129	2.3000e-004	0.0000	4.2186
Total	**0.1795**	**0.0189**	**0.0299**	**5.0000e-005**		**8.5000e-004**	**8.5000e-004**		**8.5000e-004**	**8.5000e-004**	**0.0000**	**4.2129**	**4.2129**	**2.3000e-004**	**0.0000**	**4.2186**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.0000e-004	3.5200e-003	1.0000e-005	1.8100e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.2265	1.2265	2.0000e-005	2.0000e-005	1.2343
Total	**3.4000e-004**	**2.0000e-004**	**3.5200e-003**	**1.0000e-005**	**1.8100e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.2265**	**1.2265**	**2.0000e-005**	**2.0000e-005**	**1.2343**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1767					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8200e-003	0.0189	0.0299	5.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	4.2129	4.2129	2.3000e-004	0.0000	4.2186
Total	**0.1795**	**0.0189**	**0.0299**	**5.0000e-005**		**8.5000e-004**	**8.5000e-004**		**8.5000e-004**	**8.5000e-004**	**0.0000**	**4.2129**	**4.2129**	**2.3000e-004**	**0.0000**	**4.2186**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	3.4000e-004	2.0000e-004	3.5200e-003	1.0000e-005	1.6700e-003	1.0000e-005	1.6800e-003	4.5000e-004	1.0000e-005	4.5000e-004	0.0000	1.2265	1.2265	2.0000e-005	2.0000e-005	1.2343
Total	**3.4000e-004**	**2.0000e-004**	**3.5200e-003**	**1.0000e-005**	**1.6700e-003**	**1.0000e-005**	**1.6800e-003**	**4.5000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.2265**	**1.2265**	**2.0000e-005**	**2.0000e-005**	**1.2343**

3.9 Architectural Coating - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5836					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.1300e-003	0.0467	0.0980	1.6000e-004		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	13.9152	13.9152	5.6000e-004	0.0000	13.9293
Total	**0.5907**	**0.0467**	**0.0980**	**1.6000e-004**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**	**0.0000**	**13.9152**	**13.9152**	**5.6000e-004**	**0.0000**	**13.9293**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0600e-003	6.2000e-004	0.0112	4.0000e-005	5.9800e-003	2.0000e-005	6.0000e-003	1.5900e-003	2.0000e-005	1.6100e-003	0.0000	3.9920	3.9920	6.0000e-005	8.0000e-005	4.0168
Total	**1.0600e-003**	**6.2000e-004**	**0.0112**	**4.0000e-005**	**5.9800e-003**	**2.0000e-005**	**6.0000e-003**	**1.5900e-003**	**2.0000e-005**	**1.6100e-003**	**0.0000**	**3.9920**	**3.9920**	**6.0000e-005**	**8.0000e-005**	**4.0168**

Phase 3 Construction - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5836					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.1300e-003	0.0467	0.0980	1.6000e-004		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	13.9152	13.9152	5.6000e-004	0.0000	13.9293
Total	**0.5907**	**0.0467**	**0.0980**	**1.6000e-004**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**	**0.0000**	**13.9152**	**13.9152**	**5.6000e-004**	**0.0000**	**13.9293**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0600e-003	6.2000e-004	0.0112	4.0000e-005	5.5200e-003	2.0000e-005	5.5400e-003	1.4700e-003	2.0000e-005	1.4900e-003	0.0000	3.9920	3.9920	6.0000e-005	8.0000e-005	4.0168
Total	**1.0600e-003**	**6.2000e-004**	**0.0112**	**4.0000e-005**	**5.5200e-003**	**2.0000e-005**	**5.5400e-003**	**1.4700e-003**	**2.0000e-005**	**1.4900e-003**	**0.0000**	**3.9920**	**3.9920**	**6.0000e-005**	**8.0000e-005**	**4.0168**

Phase 3 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rough Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	No Change	0	1	No Change	0.00
Trenchers	Diesel	No Change	0	1	No Change	0.00
Cranes	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	6	No Change	0.00
Forklifts	Diesel	No Change	0	3	No Change	0.00
Generator Sets	Diesel	No Change	0	1	No Change	0.00
Graders	Diesel	No Change	0	2	No Change	0.00
Pavers	Diesel	No Change	0	2	No Change	0.00
Paving Equipment	Diesel	No Change	0	2	No Change	0.00
Rollers	Diesel	No Change	0	2	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	5	No Change	0.00
Scrapers	Diesel	No Change	0	4	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	12	No Change	0.00

Phase 3 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Welders	Diesel	No Change	0	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	9.94000E-003	6.55700E-002	1.27830E-001	2.10000E-004	1.96000E-003	1.96000E-003	0.00000E+000	1.81281E+001	1.81281E+001	7.90000E-004	0.00000E+000	1.81479E+001
Cranes	7.62600E-002	6.86620E-001	4.17890E-001	1.51000E-003	2.87500E-002	2.65600E-002	0.00000E+000	1.32182E+002	1.32182E+002	3.43800E-002	0.00000E+000	1.33042E+002
Excavators	9.87300E-002	7.21780E-001	1.92572E+000	3.05000E-003	3.53900E-002	3.25600E-002	0.00000E+000	2.68175E+002	2.68175E+002	8.67300E-002	0.00000E+000	2.70343E+002
Forklifts	7.51300E-002	6.50750E-001	9.85790E-001	1.37000E-003	3.16400E-002	2.92000E-002	0.00000E+000	1.20131E+002	1.20131E+002	3.14600E-002	0.00000E+000	1.20917E+002
Generator Sets	7.25700E-002	6.55230E-001	1.04896E+000	1.89000E-003	2.42100E-002	2.42100E-002	0.00000E+000	1.62215E+002	1.62215E+002	5.72000E-003	0.00000E+000	1.62358E+002
Graders	6.61100E-002	7.34540E-001	3.38750E-001	1.41000E-003	2.36400E-002	2.17500E-002	0.00000E+000	1.23423E+002	1.23423E+002	3.99200E-002	0.00000E+000	1.24421E+002
Pavers	2.45100E-002	2.23220E-001	4.08300E-001	6.60000E-004	1.04500E-002	9.62000E-003	0.00000E+000	5.81996E+001	5.81996E+001	1.88200E-002	0.00000E+000	5.86702E+001
Paving Equipment	2.07000E-002	1.78320E-001	3.59050E-001	5.70000E-004	8.82000E-003	8.11000E-003	0.00000E+000	5.04383E+001	5.04383E+001	1.63100E-002	0.00000E+000	5.08462E+001
Rollers	1.93100E-002	2.03470E-001	2.60390E-001	3.70000E-004	1.02300E-002	9.41000E-003	0.00000E+000	3.24978E+001	3.24978E+001	1.05100E-002	0.00000E+000	3.27606E+001
Rubber Tired Dozers	1.83400E-001	1.87662E+000	8.48350E-001	2.42000E-003	8.21100E-002	7.55400E-002	0.00000E+000	2.12308E+002	2.12308E+002	6.86600E-002	0.00000E+000	2.14025E+002
Scrapers	2.85520E-001	2.70758E+000	2.28675E+000	6.45000E-003	1.06570E-001	9.80500E-002	0.00000E+000	5.66049E+002	5.66049E+002	1.83070E-001	0.00000E+000	5.70626E+002
Tractors/Loaders/Backhoes	1.83320E-001	1.75054E+000	3.01339E+000	4.29000E-003	6.76900E-002	6.24900E-002	0.00000E+000	3.75791E+002	3.75791E+002	1.08410E-001	0.00000E+000	3.78502E+002
Trenchers	2.60400E-002	2.44030E-001	2.12970E-001	2.80000E-004	1.62500E-002	1.49500E-002	0.00000E+000	2.46219E+001	2.46219E+001	7.96000E-003	0.00000E+000	2.48210E+001
Welders	6.00300E-002	3.77150E-001	4.71300E-001	7.30000E-004	1.04000E-002	1.04000E-002	0.00000E+000	5.40193E+001	5.40193E+001	4.88000E-003	0.00000E+000	5.41413E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	9.94000E-003	6.55700E-002	1.27830E-001	2.10000E-004	1.96000E-003	1.96000E-003	0.00000E+000	1.81281E+001	1.81281E+001	7.90000E-004	0.00000E+000	1.81479E+001
Cranes	7.62600E-002	6.86620E-001	4.17880E-001	1.51000E-003	2.87500E-002	2.65600E-002	0.00000E+000	1.32182E+002	1.32182E+002	3.43800E-002	0.00000E+000	1.33041E+002
Excavators	9.87300E-002	7.21780E-001	1.92572E+000	3.05000E-003	3.53900E-002	3.25600E-002	0.00000E+000	2.68175E+002	2.68175E+002	8.67300E-002	0.00000E+000	2.70343E+002
Forklifts	7.51300E-002	6.50750E-001	9.85790E-001	1.37000E-003	3.16400E-002	2.92000E-002	0.00000E+000	1.20131E+002	1.20131E+002	3.14600E-002	0.00000E+000	1.20917E+002
Generator Sets	7.25700E-002	6.55230E-001	1.04896E+000	1.89000E-003	2.42100E-002	2.42100E-002	0.00000E+000	1.62214E+002	1.62214E+002	5.72000E-003	0.00000E+000	1.62357E+002
Graders	6.61100E-002	7.34540E-001	3.38750E-001	1.41000E-003	2.36400E-002	2.17500E-002	0.00000E+000	1.23423E+002	1.23423E+002	3.99200E-002	0.00000E+000	1.24421E+002
Pavers	2.45100E-002	2.23220E-001	4.08300E-001	6.60000E-004	1.04500E-002	9.62000E-003	0.00000E+000	5.81995E+001	5.81995E+001	1.88200E-002	0.00000E+000	5.86701E+001
Paving Equipment	2.07000E-002	1.78320E-001	3.59050E-001	5.70000E-004	8.82000E-003	8.11000E-003	0.00000E+000	5.04383E+001	5.04383E+001	1.63100E-002	0.00000E+000	5.08461E+001

Phase 3 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rollers	1.93100E-002	2.03460E-001	2.60390E-001	3.70000E-004	1.02300E-002	9.41000E-003	0.00000E+000	3.24978E+001	3.24978E+001	1.05100E-002	0.00000E+000	3.27606E+001
Rubber Tired Dozers	1.83400E-001	1.87662E+000	8.48350E-001	2.42000E-003	8.21100E-002	7.55400E-002	0.00000E+000	2.12308E+002	2.12308E+002	6.86600E-002	0.00000E+000	2.14025E+002
Scrapers	2.85520E-001	2.70758E+000	2.28675E+000	6.45000E-003	1.06570E-001	9.80500E-002	0.00000E+000	5.66049E+002	5.66049E+002	1.83070E-001	0.00000E+000	5.70625E+002
Tractors/Loaders/Backhoes	1.83320E-001	1.75054E+000	3.01338E+000	4.29000E-003	6.76900E-002	6.24900E-002	0.00000E+000	3.75791E+002	3.75791E+002	1.08410E-001	0.00000E+000	3.78501E+002
Trenchers	2.60400E-002	2.44030E-001	2.12970E-001	2.80000E-004	1.62500E-002	1.49500E-002	0.00000E+000	2.46219E+001	2.46219E+001	7.96000E-003	0.00000E+000	2.48210E+001
Welders	6.00300E-002	3.77150E-001	4.71300E-001	7.30000E-004	1.04000E-002	1.04000E-002	0.00000E+000	5.40193E+001	5.40193E+001	4.88000E-003	0.00000E+000	5.41413E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Percent Reduction											
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.10326E-006	1.10326E-006	0.00000E+000	0.00000E+000	1.65308E-006
Cranes	0.00000E+000	0.00000E+000	2.39297E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.13480E-006	1.13480E-006	0.00000E+000	0.00000E+000	1.12747E-006
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15596E-006	1.15596E-006	0.00000E+000	0.00000E+000	1.18368E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.16540E-006	1.16540E-006	0.00000E+000	0.00000E+000	1.24052E-006
Generator Sets	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17129E-006	1.17129E-006	0.00000E+000	0.00000E+000	1.17026E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.21533E-006	1.21533E-006	0.00000E+000	0.00000E+000	1.20558E-006
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.20276E-006	1.20276E-006	0.00000E+000	0.00000E+000	1.19311E-006
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18957E-006	1.18957E-006	0.00000E+000	0.00000E+000	1.18003E-006
Rollers	0.00000E+000	4.91473E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.23085E-006	1.23085E-006	0.00000E+000	0.00000E+000	1.22098E-006
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17753E-006	1.17753E-006	0.00000E+000	0.00000E+000	1.16809E-006
Scrapers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18364E-006	1.18364E-006	0.00000E+000	0.00000E+000	1.19167E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	3.31852E-006	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19747E-006	1.19747E-006	0.00000E+000	0.00000E+000	1.18890E-006
Trenchers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.21843E-006	1.21843E-006	0.00000E+000	0.00000E+000	1.20865E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.11071E-006	1.11071E-006	0.00000E+000	0.00000E+000	1.29291E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		

Phase 3 Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.01	0.00	0.01	0.00	0.08	0.07
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	0.18	0.05	0.17	0.04	0.08	0.07
Fine Grading	Fugitive Dust	1.18	0.38	0.50	0.16	0.57	0.57
Fine Grading	Roads	0.03	0.01	0.03	0.01	0.07	0.07
Finishing/Landscaping	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	Roads	0.00	0.00	0.00	0.00	0.08	0.08
Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.01	0.00	0.01	0.00	0.08	0.07
Rough Grading	Fugitive Dust	1.46	0.47	0.62	0.20	0.57	0.57
Rough Grading	Roads	0.04	0.01	0.03	0.01	0.07	0.07
Site Preparation	Fugitive Dust	0.46	0.24	0.20	0.10	0.57	0.57
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Utility Trenching	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	Roads	0.01	0.00	0.01	0.00	0.08	0.07

CalEEMod Output: Western Remediation Construction

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Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Western Remediation Area

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	94.90	Acre	94.90	4,133,844.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2023
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on an overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	155.00	17.00
tblConstructionPhase	NumDays	60.00	6.00
tblGrading	MaterialExported	0.00	18,157.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.1044	89.0363	44.6782	0.3422	19.9605	1.8120	21.2304	10.1853	1.6812	11.3537	0.0000	37,925.0350	37,925.0350	5.1805	5.0832	39,569.3327
Maximum	**4.1044**	**89.0363**	**44.6782**	**0.3422**	**19.9605**	**1.8120**	**21.2304**	**10.1853**	**1.6812**	**11.3537**	**0.0000**	**37,925.0350**	**37,925.0350**	**5.1805**	**5.0832**	**39,569.3327**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.1044	89.0363	44.6782	0.3422	12.5129	1.8120	14.3249	4.3961	1.6812	5.6040	0.0000	37,925.0350	37,925.0350	5.1805	5.0832	39,569.3327
Maximum	**4.1044**	**89.0363**	**44.6782**	**0.3422**	**12.5129**	**1.8120**	**14.3249**	**4.3961**	**1.6812**	**5.6040**	**0.0000**	**37,925.0350**	**37,925.0350**	**5.1805**	**5.0832**	**39,569.3327**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**37.31**	**0.00**	**32.53**	**56.84**	**0.00**	**50.64**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	8/8/2023	5	6	
2	Grading	Grading	8/9/2023	8/31/2023	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 94.9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	32.00	2,270.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.1023	2.8800e-003	0.1052	0.0294	2.7500e-003	0.0322		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0669**	**0.5932**	**0.7837**	**4.5800e-003**	**0.3035**	**3.9100e-003**	**0.3074**	**0.0828**	**3.7000e-003**	**0.0865**		**489.6749**	**489.6749**	**0.0226**	**0.0490**	**504.8520**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**8.4034**	**1.2660**	**9.6694**	**4.3188**	**1.1647**	**5.4835**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.0957	2.8800e-003	0.0986	0.0278	2.7500e-003	0.0306		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0669**	**0.5932**	**0.7837**	**4.5800e-003**	**0.2812**	**3.9100e-003**	**0.2851**	**0.0773**	**3.7000e-003**	**0.0810**		**489.6749**	**489.6749**	**0.0226**	**0.0490**	**504.8520**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3244	0.0000	9.3244	3.6721	0.0000	3.6721			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836

Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.3244**	**1.4245**	**10.7489**	**3.6721**	**1.3105**	**4.9826**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6940	53.3632	15.5496	0.2725	8.7250	0.3806	9.1056	2.3886	0.3641	2.7527		31,088.6572	31,088.6572	3.1945	4.9884	32,655.0607
Vendor	0.0323	1.1215	0.4650	5.7500e-003	0.2046	5.7500e-003	0.2104	0.0589	5.5000e-003	0.0644		631.8380	631.8380	0.0376	0.0907	659.7941
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.7827**	**54.5207**	**16.6270**	**0.2801**	**9.1532**	**0.3875**	**9.5407**	**2.5068**	**0.3707**	**2.8775**		**31,913.5573**	**31,913.5573**	**3.2363**	**5.0832**	**33,509.2492**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9862	0.0000	3.9862	1.5698	0.0000	1.5698			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.9862**	**1.4245**	**5.4107**	**1.5698**	**1.3105**	**2.8803**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Western Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6940	53.3632	15.5496	0.2725	8.1292	0.3806	8.5098	2.2424	0.3641	2.6065		31,088.6572	31,088.6572	3.1945	4.9884	32,655.0607
Vendor	0.0323	1.1215	0.4650	5.7500e-003	0.1915	5.7500e-003	0.1972	0.0557	5.5000e-003	0.0612		631.8380	631.8380	0.0376	0.0907	659.7941
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.7827**	**54.5207**	**16.6270**	**0.2801**	**8.5267**	**0.3875**	**8.9142**	**2.3530**	**0.3707**	**2.7237**		**31,913.5573**	**31,913.5573**	**3.2363**	**5.0832**	**33,509.2492**

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Western Remediation Area

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	94.90	Acre	94.90	4,133,844.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2023
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on an overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	155.00	17.00
tblConstructionPhase	NumDays	60.00	6.00
tblGrading	MaterialExported	0.00	18,157.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0921	91.1920	44.7005	0.3422	19.9605	1.8123	21.2305	10.1853	1.6815	11.3537	0.0000	37,924.4355	37,924.4355	5.1795	5.0850	39,569.2640
Maximum	**4.0921**	**91.1920**	**44.7005**	**0.3422**	**19.9605**	**1.8123**	**21.2305**	**10.1853**	**1.6815**	**11.3537**	**0.0000**	**37,924.4355**	**37,924.4355**	**5.1795**	**5.0850**	**39,569.2640**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0921	91.1920	44.7005	0.3422	12.5129	1.8123	14.3252	4.3961	1.6815	5.6043	0.0000	37,924.4355	37,924.4355	5.1795	5.0850	39,569.2640
Maximum	**4.0921**	**91.1920**	**44.7005**	**0.3422**	**12.5129**	**1.8123**	**14.3252**	**4.3961**	**1.6815**	**5.6043**	**0.0000**	**37,924.4355**	**37,924.4355**	**5.1795**	**5.0850**	**39,569.2640**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**37.31**	**0.00**	**32.53**	**56.84**	**0.00**	**50.64**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	8/8/2023	5	6	
2	Grading	Grading	8/9/2023	8/31/2023	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 94.9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	32.00	2,270.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.1023	2.9000e-003	0.1052	0.0294	2.7700e-003	0.0322		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0710**	**0.6214**	**0.7534**	**4.5000e-003**	**0.3035**	**3.9300e-003**	**0.3074**	**0.0828**	**3.7200e-003**	**0.0865**		**481.8318**	**481.8318**	**0.0226**	**0.0494**	**497.1112**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**8.4034**	**1.2660**	**9.6694**	**4.3188**	**1.1647**	**5.4835**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.0957	2.9000e-003	0.0986	0.0278	2.7700e-003	0.0306		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0710**	**0.6214**	**0.7534**	**4.5000e-003**	**0.2812**	**3.9300e-003**	**0.2851**	**0.0773**	**3.7200e-003**	**0.0810**		**481.8318**	**481.8318**	**0.0226**	**0.0494**	**497.1112**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3244	0.0000	9.3244	3.6721	0.0000	3.6721			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.3244**	**1.4245**	**10.7489**	**3.6721**	**1.3105**	**4.9826**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6776	55.4653	15.5991	0.2725	8.7250	0.3809	9.1059	2.3886	0.3644	2.7530		31,096.3591	31,096.3591	3.1935	4.9898	32,663.1536
Vendor	0.0312	1.1715	0.4798	5.7600e-003	0.2046	5.7900e-003	0.2104	0.0589	5.5400e-003	0.0644		632.7673	632.7673	0.0375	0.0909	660.7823
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.7704**	**56.6764**	**16.6494**	**0.2801**	**9.1532**	**0.3878**	**9.5410**	**2.5068**	**0.3710**	**2.8778**		**31,912.9577**	**31,912.9577**	**3.2352**	**5.0850**	**33,509.1804**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9862	0.0000	3.9862	1.5698	0.0000	1.5698			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.9862**	**1.4245**	**5.4107**	**1.5698**	**1.3105**	**2.8803**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Western Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6776	55.4653	15.5991	0.2725	8.1292	0.3809	8.5101	2.2424	0.3644	2.6068		31,096.3591	31,096.3591	3.1935	4.9898	32,663.1536
Vendor	0.0312	1.1715	0.4798	5.7600e-003	0.1915	5.7900e-003	0.1973	0.0557	5.5400e-003	0.0612		632.7673	632.7673	0.0375	0.0909	660.7823
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.7704**	**56.6764**	**16.6494**	**0.2801**	**8.5267**	**0.3878**	**8.9145**	**2.3530**	**0.3710**	**2.7240**		**31,912.9577**	**31,912.9577**	**3.2352**	**5.0850**	**33,509.1804**

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Western Remediation Area

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	94.90	Acre	94.90	4,133,844.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2023
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on an overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	155.00	17.00
tblConstructionPhase	NumDays	60.00	6.00
tblGrading	MaterialExported	0.00	18,157.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0430	0.8666	0.4367	3.0400e-003	0.2157	0.0192	0.2349	0.0828	0.0178	0.1006	0.0000	303.7705	303.7705	0.0433	0.0393	316.5752
Maximum	**0.0430**	**0.8666**	**0.4367**	**3.0400e-003**	**0.2157**	**0.0192**	**0.2349**	**0.0828**	**0.0178**	**0.1006**	**0.0000**	**303.7705**	**303.7705**	**0.0433**	**0.0393**	**316.5752**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0430	0.8666	0.4367	3.0400e-003	0.1313	0.0192	0.1505	0.0463	0.0178	0.0641	0.0000	303.7704	303.7704	0.0433	0.0393	316.5751
Maximum	**0.0430**	**0.8666**	**0.4367**	**3.0400e-003**	**0.1313**	**0.0192**	**0.1505**	**0.0463**	**0.0178**	**0.0641**	**0.0000**	**303.7704**	**303.7704**	**0.0433**	**0.0393**	**316.5751**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.14**	**0.00**	**35.93**	**44.11**	**0.00**	**36.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2023	9-30-2023	0.8532	0.8532
		Highest	0.8532	0.8532

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	8/8/2023	5	6	
2	Grading	Grading	8/9/2023	8/31/2023	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 94.9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	32.00	2,270.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0590	0.0000	0.0590	0.0303	0.0000	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0826	0.0547	1.1000e-004		3.8000e-003	3.8000e-003		3.4900e-003	3.4900e-003	0.0000	10.0352	10.0352	3.2500e-003	0.0000	10.1164
Total	**7.9800e-003**	**0.0826**	**0.0547**	**1.1000e-004**	**0.0590**	**3.8000e-003**	**0.0628**	**0.0303**	**3.4900e-003**	**0.0338**	**0.0000**	**10.0352**	**10.0352**	**3.2500e-003**	**0.0000**	**10.1164**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-005	1.7600e-003	7.1000e-004	1.0000e-005	3.0000e-004	1.0000e-005	3.1000e-004	9.0000e-005	1.0000e-005	1.0000e-004	0.0000	0.8603	0.8603	5.0000e-005	1.2000e-004	0.8984
Worker	1.5000e-004	1.1000e-004	1.5800e-003	0.0000	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4564	0.4564	1.0000e-005	1.0000e-005	0.4599
Total	**2.0000e-004**	**1.8700e-003**	**2.2900e-003**	**1.0000e-005**	**8.9000e-004**	**1.0000e-005**	**9.1000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**1.3167**	**1.3167**	**6.0000e-005**	**1.3000e-004**	**1.3583**

Mitigated Construction On-Site

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	0.0130	0.0000	0.0130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0826	0.0547	1.1000e-004		3.8000e-003	3.8000e-003		3.4900e-003	3.4900e-003	0.0000	10.0352	10.0352	3.2500e-003	0.0000	10.1163
Total	**7.9800e-003**	**0.0826**	**0.0547**	**1.1000e-004**	**0.0252**	**3.8000e-003**	**0.0290**	**0.0130**	**3.4900e-003**	**0.0165**	**0.0000**	**10.0352**	**10.0352**	**3.2500e-003**	**0.0000**	**10.1163**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-005	1.7600e-003	7.1000e-004	1.0000e-005	2.8000e-004	1.0000e-005	2.9000e-004	8.0000e-005	1.0000e-005	9.0000e-005	0.0000	0.8603	0.8603	5.0000e-005	1.2000e-004	0.8984
Worker	1.5000e-004	1.1000e-004	1.5800e-003	0.0000	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4564	0.4564	1.0000e-005	1.0000e-005	0.4599
Total	**2.0000e-004**	**1.8700e-003**	**2.2900e-003**	**1.0000e-005**	**8.3000e-004**	**1.0000e-005**	**8.4000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**1.3167**	**1.3167**	**6.0000e-005**	**1.3000e-004**	**1.3583**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					0.0793	0.0000	0.0793	0.0312	0.0000	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0282	0.2934	0.2384	5.3000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	46.3549	46.3549	0.0150	0.0000	46.7297
Total	**0.0282**	**0.2934**	**0.2384**	**5.3000e-004**	**0.0793**	**0.0121**	**0.0914**	**0.0312**	**0.0111**	**0.0424**	**0.0000**	**46.3549**	**46.3549**	**0.0150**	**0.0000**	**46.7297**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8400e-003	0.4784	0.1323	2.3200e-003	0.0730	3.2400e-003	0.0762	0.0200	3.1000e-003	0.0231	0.0000	239.7517	239.7517	0.0246	0.0385	251.8320
Vendor	2.7000e-004	9.9900e-003	4.0100e-003	5.0000e-005	1.7100e-003	5.0000e-005	1.7600e-003	4.9000e-004	5.0000e-005	5.4000e-004	0.0000	4.8752	4.8752	2.9000e-004	7.0000e-004	5.0910
Worker	4.8000e-004	3.4000e-004	4.9600e-003	2.0000e-005	1.8700e-003	1.0000e-005	1.8800e-003	5.0000e-004	1.0000e-005	5.0000e-004	0.0000	1.4367	1.4367	3.0000e-005	3.0000e-005	1.4478
Total	**6.5900e-003**	**0.4887**	**0.1413**	**2.3900e-003**	**0.0766**	**3.3000e-003**	**0.0799**	**0.0210**	**3.1600e-003**	**0.0242**	**0.0000**	**246.0636**	**246.0636**	**0.0250**	**0.0392**	**258.3708**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0339	0.0000	0.0339	0.0133	0.0000	0.0133	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0282	0.2934	0.2384	5.3000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	46.3549	46.3549	0.0150	0.0000	46.7297
Total	**0.0282**	**0.2934**	**0.2384**	**5.3000e-004**	**0.0339**	**0.0121**	**0.0460**	**0.0133**	**0.0111**	**0.0245**	**0.0000**	**46.3549**	**46.3549**	**0.0150**	**0.0000**	**46.7297**

Western Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8400e-003	0.4784	0.1323	2.3200e-003	0.0681	3.2400e-003	0.0713	0.0188	3.1000e-003	0.0219	0.0000	239.7517	239.7517	0.0246	0.0385	251.8320
Vendor	2.7000e-004	9.9900e-003	4.0100e-003	5.0000e-005	1.6000e-003	5.0000e-005	1.6500e-003	4.7000e-004	5.0000e-005	5.1000e-004	0.0000	4.8752	4.8752	2.9000e-004	7.0000e-004	5.0910
Worker	4.8000e-004	3.4000e-004	4.9600e-003	2.0000e-005	1.7200e-003	1.0000e-005	1.7300e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4367	1.4367	3.0000e-005	3.0000e-005	1.4478
Total	**6.5900e-003**	**0.4887**	**0.1413**	**2.3900e-003**	**0.0714**	**3.3000e-003**	**0.0747**	**0.0197**	**3.1600e-003**	**0.0229**	**0.0000**	**246.0636**	**246.0636**	**0.0250**	**0.0392**	**258.3708**

Western Remediation Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Excavators	Diesel	No Change	0	2	No Change	0.00
Graders	Diesel	No Change	0	1	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	4	No Change	0.00
Scrapers	Diesel	No Change	0	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	6	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Unmitigated tons/yr							Unmitigated mt/yr					
Excavators	3.21000E-003	2.63300E-002	5.53800E-002	9.00000E-005	1.29000E-003	1.19000E-003	0.00000E+000	7.71270E+000	7.71270E+000	2.49000E-003	0.00000E+000	7.77506E+000
Graders	3.26000E-003	3.95500E-002	1.43900E-002	6.00000E-005	1.28000E-003	1.18000E-003	0.00000E+000	4.94168E+000	4.94168E+000	1.60000E-003	0.00000E+000	4.98164E+000
Rubber Tired Dozers	1.19800E-002	1.24730E-001	5.43600E-002	1.50000E-004	5.62000E-003	5.17000E-003	0.00000E+000	1.31292E+001	1.31292E+001	4.25000E-003	0.00000E+000	1.32354E+001
Scrapers	1.33800E-002	1.40820E-001	1.04330E-001	2.60000E-004	5.52000E-003	5.08000E-003	0.00000E+000	2.26725E+001	2.26725E+001	7.33000E-003	0.00000E+000	2.28559E+001
Tractors/Loaders/Backhoes	4.39000E-003	4.45300E-002	6.47100E-002	9.00000E-005	2.20000E-003	2.02000E-003	0.00000E+000	7.93398E+000	7.93398E+000	2.57000E-003	0.00000E+000	7.99813E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					
Excavators	3.21000E-003	2.63300E-002	5.53800E-002	9.00000E-005	1.29000E-003	1.19000E-003	0.00000E+000	7.71269E+000	7.71269E+000	2.49000E-003	0.00000E+000	7.77505E+000
Graders	3.26000E-003	3.95500E-002	1.43900E-002	6.00000E-005	1.28000E-003	1.18000E-003	0.00000E+000	4.94167E+000	4.94167E+000	1.60000E-003	0.00000E+000	4.98163E+000

Western Remediation Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rubber Tired Dozers	1.19800E-002	1.24720E-001	5.43600E-002	1.50000E-004	5.62000E-003	5.17000E-003	0.00000E+000	1.31292E+001	1.31292E+001	4.25000E-003	0.00000E+000	1.32354E+001
Scrapers	1.33700E-002	1.40820E-001	1.04330E-001	2.60000E-004	5.52000E-003	5.08000E-003	0.00000E+000	2.26725E+001	2.26725E+001	7.33000E-003	0.00000E+000	2.28558E+001
Tractors/Loaders/Backhoes	4.39000E-003	4.45300E-002	6.47100E-002	9.00000E-005	2.20000E-003	2.02000E-003	0.00000E+000	7.93397E+000	7.93397E+000	2.57000E-003	0.00000E+000	7.99812E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Percent Reduction											
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.29656E-006	1.29656E-006	0.00000E+000	0.00000E+000	1.28616E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	2.02360E-006	2.02360E-006	0.00000E+000	0.00000E+000	2.00737E-006
Rubber Tired Dozers	0.00000E+000	8.01732E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	7.61659E-007	7.61659E-007	0.00000E+000	0.00000E+000	1.51110E-006
Scrapers	7.47384E-004	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	8.82125E-007	8.82125E-007	0.00000E+000	0.00000E+000	1.31257E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.26040E-006	1.26040E-006	0.00000E+000	0.00000E+000	1.25029E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grading	Fugitive Dust	0.08	0.03	0.03	0.01	0.57	0.57
Grading	Roads	0.08	0.02	0.07	0.02	0.07	0.06
Site Preparation	Fugitive Dust	0.06	0.03	0.03	0.01	0.57	0.57
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.07	0.08

CalEEMod Output: Eastern Remediation Construction

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Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Eastern Remediation Area

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	167.20	Acre	167.20	7,283,232.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on total overall duration of 1 month.

Grading -

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	310.00	17.00
tblConstructionPhase	NumDays	120.00	6.00
tblConstructionPhase	PhaseEndDate	3/1/2027	10/31/2024
tblConstructionPhase	PhaseEndDate	12/22/2025	10/8/2024
tblConstructionPhase	PhaseStartDate	12/23/2025	10/9/2024
tblConstructionPhase	PhaseStartDate	7/8/2025	10/1/2024
tblGrading	MaterialExported	0.00	17,498.00

Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	3.9453	84.0066	43.9414	0.3250	20.0628	1.7222	21.2992	10.2147	1.5986	11.3524	0.0000	36,051.6731	36,051.6731	5.0836	4.7920	37,606.7793
Maximum	**3.9453**	**84.0066**	**43.9414**	**0.3250**	**20.0628**	**1.7222**	**21.2992**	**10.2147**	**1.5986**	**11.3524**	**0.0000**	**36,051.6731**	**36,051.6731**	**5.0836**	**4.7920**	**37,606.7793**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	3.9453	84.0066	43.9414	0.3250	12.1177	1.7222	13.8399	4.4240	1.5986	5.5616	0.0000	36,051.6731	36,051.6731	5.0836	4.7920	37,606.7793
Maximum	**3.9453**	**84.0066**	**43.9414**	**0.3250**	**12.1177**	**1.7222**	**13.8399**	**4.4240**	**1.5986**	**5.5616**	**0.0000**	**36,051.6731**	**36,051.6731**	**5.0836**	**4.7920**	**37,606.7793**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.60**	**0.00**	**35.02**	**56.69**	**0.00**	**51.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	10/8/2024	5	6	
2	Grading	Grading	10/9/2024	10/31/2024	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 167.2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	16.00	2,187.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0318	1.1182	0.4615	5.6500e-003	0.2046	6.0200e-003	0.2106	0.0589	5.7600e-003	0.0647		622.0364	622.0364	0.0380	0.0896	649.6959
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0795**	**1.1473**	**0.9753**	**7.2900e-003**	**0.4058**	**7.0000e-003**	**0.4128**	**0.1123**	**6.6600e-003**	**0.1189**		**791.6122**	**791.6122**	**0.0414**	**0.0931**	**820.3905**

Mitigated Construction On-Site

Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**8.4034**	**1.2294**	**9.6327**	**4.3188**	**1.1310**	**5.4498**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0318	1.1182	0.4615	5.6500e-003	0.1915	6.0200e-003	0.1975	0.0557	5.7600e-003	0.0614		622.0364	622.0364	0.0380	0.0896	649.6959
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0795**	**1.1473**	**0.9753**	**7.2900e-003**	**0.3769**	**7.0000e-003**	**0.3839**	**0.1052**	**6.6600e-003**	**0.1118**		**791.6122**	**791.6122**	**0.0414**	**0.0931**	**820.3905**

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					9.3200	0.0000	9.3200	3.6714	0.0000	3.6714			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.3200**	**1.3354**	**10.6554**	**3.6714**	**1.2286**	**4.9000**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6583	51.0382	15.4170	0.2583	8.4056	0.3827	8.7883	2.3012	0.3661	2.6673		29,542.4886	29,542.4886	3.1171	4.7433	31,033.9302
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.7272**	**51.6296**	**16.2185**	**0.2629**	**8.7315**	**0.3868**	**9.1183**	**2.3899**	**0.3700**	**2.7599**		**30,041.9244**	**30,041.9244**	**3.1399**	**4.7920**	**31,548.4388**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9843	0.0000	3.9843	1.5695	0.0000	1.5695			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**3.9843**	**1.3354**	**5.3197**	**1.5695**	**1.2286**	**2.7981**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

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Eastern Remediation Area - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6583	51.0382	15.4170	0.2583	7.8316	0.3827	8.2143	2.1603	0.3661	2.5264		29,542.4886	29,542.4886	3.1171	4.7433	31,033.9302
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.0957	3.0100e-003	0.0988	0.0278	2.8800e-003	0.0307		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.7272**	**51.6296**	**16.2185**	**0.2629**	**8.1334**	**0.3868**	**8.5202**	**2.2431**	**0.3700**	**2.6131**		**30,041.9244**	**30,041.9244**	**3.1399**	**4.7920**	**31,548.4388**

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Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Eastern Remediation Area

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	167.20	Acre	167.20	7,283,232.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on total overall duration of 1 month.

Grading -

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible].

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	310.00	17.00
tblConstructionPhase	NumDays	120.00	6.00
tblConstructionPhase	PhaseEndDate	3/1/2027	10/31/2024
tblConstructionPhase	PhaseEndDate	12/22/2025	10/8/2024
tblConstructionPhase	PhaseStartDate	12/23/2025	10/9/2024
tblConstructionPhase	PhaseStartDate	7/8/2025	10/1/2024
tblGrading	MaterialExported	0.00	17,498.00

Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	3.9341	86.0448	43.9564	0.3250	20.0628	1.7225	21.2992	10.2147	1.5988	11.3524	0.0000	36,050.6003	36,050.6003	5.0826	4.7937	37,606.1894
Maximum	**3.9341**	**86.0448**	**43.9564**	**0.3250**	**20.0628**	**1.7225**	**21.2992**	**10.2147**	**1.5988**	**11.3524**	**0.0000**	**36,050.6003**	**36,050.6003**	**5.0826**	**4.7937**	**37,606.1894**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	3.9341	86.0448	43.9564	0.3250	12.1177	1.7225	13.8402	4.4240	1.5988	5.5617	0.0000	36,050.6002	36,050.6002	5.0826	4.7937	37,606.1894
Maximum	**3.9341**	**86.0448**	**43.9564**	**0.3250**	**12.1177**	**1.7225**	**13.8402**	**4.4240**	**1.5988**	**5.5617**	**0.0000**	**36,050.6002**	**36,050.6002**	**5.0826**	**4.7937**	**37,606.1894**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.60**	**0.00**	**35.02**	**56.69**	**0.00**	**51.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	10/8/2024	5	6	
2	Grading	Grading	10/9/2024	10/31/2024	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 167.2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	16.00	2,187.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0307	1.1681	0.4761	5.6600e-003	0.2046	6.0600e-003	0.2107	0.0589	5.7900e-003	0.0647		622.9738	622.9738	0.0379	0.0898	650.6911
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0830**	**1.2002**	**0.9552**	**7.2300e-003**	**0.4058**	**7.0400e-003**	**0.4129**	**0.1123**	**6.6900e-003**	**0.1189**		**784.4546**	**784.4546**	**0.0414**	**0.0935**	**813.3585**

Mitigated Construction On-Site

Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**8.4034**	**1.2294**	**9.6327**	**4.3188**	**1.1310**	**5.4498**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0307	1.1681	0.4761	5.6600e-003	0.1915	6.0600e-003	0.1975	0.0557	5.7900e-003	0.0615		622.9738	622.9738	0.0379	0.0898	650.6911
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0830**	**1.2002**	**0.9552**	**7.2300e-003**	**0.3769**	**7.0400e-003**	**0.3840**	**0.1052**	**6.6900e-003**	**0.1119**		**784.4546**	**784.4546**	**0.0414**	**0.0935**	**813.3585**

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					9.3200	0.0000	9.3200	3.6714	0.0000	3.6714			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.3200**	**1.3354**	**10.6554**	**3.6714**	**1.2286**	**4.9000**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6425	53.0482	15.4632	0.2583	8.4056	0.3829	8.7886	2.3012	0.3664	2.6675		29,549.9416	29,549.9416	3.1161	4.7447	31,041.7618
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.7159**	**53.6678**	**16.2336**	**0.2629**	**8.7315**	**0.3871**	**9.1186**	**2.3899**	**0.3703**	**2.7602**		**30,040.8516**	**30,040.8516**	**3.1389**	**4.7937**	**31,547.8489**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9843	0.0000	3.9843	1.5695	0.0000	1.5695			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**3.9843**	**1.3354**	**5.3197**	**1.5695**	**1.2286**	**2.7981**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

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Eastern Remediation Area - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6425	53.0482	15.4632	0.2583	7.8316	0.3829	8.2145	2.1603	0.3664	2.5266		29,549.9416	29,549.9416	3.1161	4.7447	31,041.7618
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.7159**	**53.6678**	**16.2336**	**0.2629**	**8.1334**	**0.3871**	**8.5205**	**2.2431**	**0.3703**	**2.6134**		**30,040.8516**	**30,040.8516**	**3.1389**	**4.7937**	**31,547.8489**

Eastern Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Eastern Remediation Area

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	167.20	Acre	167.20	7,283,232.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on total overall duration of 1 month.

Grading -

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	310.00	17.00
tblConstructionPhase	NumDays	120.00	6.00
tblConstructionPhase	PhaseEndDate	3/1/2027	10/31/2024
tblConstructionPhase	PhaseEndDate	12/22/2025	10/8/2024
tblConstructionPhase	PhaseStartDate	12/23/2025	10/9/2024
tblConstructionPhase	PhaseStartDate	7/8/2025	10/1/2024
tblGrading	MaterialExported	0.00	17,498.00

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0417	0.8232	0.4313	2.9000e-003	0.2125	0.0184	0.2308	0.0819	0.0170	0.0989	0.0000	290.1485	290.1485	0.0426	0.0372	302.3022
Maximum	**0.0417**	**0.8232**	**0.4313**	**2.9000e-003**	**0.2125**	**0.0184**	**0.2308**	**0.0819**	**0.0170**	**0.0989**	**0.0000**	**290.1485**	**290.1485**	**0.0426**	**0.0372**	**302.3022**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0417	0.8232	0.4313	2.9000e-003	0.1283	0.0184	0.1466	0.0454	0.0170	0.0624	0.0000	290.1484	290.1484	0.0426	0.0372	302.3021
Maximum	**0.0417**	**0.8232**	**0.4313**	**2.9000e-003**	**0.1283**	**0.0184**	**0.1466**	**0.0454**	**0.0170**	**0.0624**	**0.0000**	**290.1484**	**290.1484**	**0.0426**	**0.0372**	**302.3021**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.62**	**0.00**	**36.47**	**44.53**	**0.00**	**36.87**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Eastern Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	10/8/2024	5	6	
2	Grading	Grading	10/9/2024	10/31/2024	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 167.2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	16.00	2,187.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0590	0.0000	0.0590	0.0303	0.0000	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0815	0.0550	1.1000e-004		3.6900e-003	3.6900e-003		3.3900e-003	3.3900e-003	0.0000	10.0371	10.0371	3.2500e-003	0.0000	10.1183
Total	**7.9800e-003**	**0.0815**	**0.0550**	**1.1000e-004**	**0.0590**	**3.6900e-003**	**0.0627**	**0.0303**	**3.3900e-003**	**0.0337**	**0.0000**	**10.0371**	**10.0371**	**3.2500e-003**	**0.0000**	**10.1183**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.5100e-003	1.4000e-003	2.0000e-005	6.0000e-004	2.0000e-005	6.2000e-004	1.7000e-004	2.0000e-005	1.9000e-004	0.0000	1.6940	1.6940	1.0000e-004	2.4000e-004	1.7694
Worker	1.4000e-004	1.0000e-004	1.4700e-003	0.0000	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4454	0.4454	1.0000e-005	1.0000e-005	0.4487
Total	**2.3000e-004**	**3.6100e-003**	**2.8700e-003**	**2.0000e-005**	**1.1900e-003**	**2.0000e-005**	**1.2200e-003**	**3.3000e-004**	**2.0000e-005**	**3.5000e-004**	**0.0000**	**2.1394**	**2.1394**	**1.1000e-004**	**2.5000e-004**	**2.2180**

Eastern Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	0.0130	0.0000	0.0130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0815	0.0550	1.1000e-004		3.6900e-003	3.6900e-003		3.3900e-003	3.3900e-003	0.0000	10.0371	10.0371	3.2500e-003	0.0000	10.1183
Total	**7.9800e-003**	**0.0815**	**0.0550**	**1.1000e-004**	**0.0252**	**3.6900e-003**	**0.0289**	**0.0130**	**3.3900e-003**	**0.0164**	**0.0000**	**10.0371**	**10.0371**	**3.2500e-003**	**0.0000**	**10.1183**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.5100e-003	1.4000e-003	2.0000e-005	5.7000e-004	2.0000e-005	5.8000e-004	1.6000e-004	2.0000e-005	1.8000e-004	0.0000	1.6940	1.6940	1.0000e-004	2.4000e-004	1.7694
Worker	1.4000e-004	1.0000e-004	1.4700e-003	0.0000	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4454	0.4454	1.0000e-005	1.0000e-005	0.4487
Total	**2.3000e-004**	**3.6100e-003**	**2.8700e-003**	**2.0000e-005**	**1.1200e-003**	**2.0000e-005**	**1.1300e-003**	**3.1000e-004**	**2.0000e-005**	**3.3000e-004**	**0.0000**	**2.1394**	**2.1394**	**1.1000e-004**	**2.5000e-004**	**2.2180**

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					0.0792	0.0000	0.0792	0.0312	0.0000	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0274	0.2752	0.2356	5.3000e-004		0.0114	0.0114		0.0104	0.0104	0.0000	46.3416	46.3416	0.0150	0.0000	46.7163
Total	**0.0274**	**0.2752**	**0.2356**	**5.3000e-004**	**0.0792**	**0.0114**	**0.0906**	**0.0312**	**0.0104**	**0.0417**	**0.0000**	**46.3416**	**46.3416**	**0.0150**	**0.0000**	**46.7163**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.5400e-003	0.4576	0.1312	2.2000e-003	0.0703	3.2500e-003	0.0736	0.0193	3.1100e-003	0.0224	0.0000	227.8283	227.8283	0.0240	0.0366	239.3305
Vendor	1.3000e-004	4.9800e-003	1.9900e-003	2.0000e-005	8.6000e-004	3.0000e-005	8.8000e-004	2.5000e-004	2.0000e-005	2.7000e-004	0.0000	2.3998	2.3998	1.5000e-004	3.5000e-004	2.5066
Worker	4.5000e-004	3.1000e-004	4.6300e-003	1.0000e-005	1.8700e-003	1.0000e-005	1.8800e-003	5.0000e-004	1.0000e-005	5.0000e-004	0.0000	1.4023	1.4023	3.0000e-005	3.0000e-005	1.4126
Total	**6.1200e-003**	**0.4628**	**0.1378**	**2.2300e-003**	**0.0731**	**3.2900e-003**	**0.0764**	**0.0200**	**3.1400e-003**	**0.0232**	**0.0000**	**231.6304**	**231.6304**	**0.0242**	**0.0370**	**243.2496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0339	0.0000	0.0339	0.0133	0.0000	0.0133	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0274	0.2752	0.2356	5.3000e-004		0.0114	0.0114		0.0104	0.0104	0.0000	46.3415	46.3415	0.0150	0.0000	46.7162
Total	**0.0274**	**0.2752**	**0.2356**	**5.3000e-004**	**0.0339**	**0.0114**	**0.0452**	**0.0133**	**0.0104**	**0.0238**	**0.0000**	**46.3415**	**46.3415**	**0.0150**	**0.0000**	**46.7162**

Eastern Remediation Area - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.5400e-003	0.4576	0.1312	2.2000e-003	0.0656	3.2500e-003	0.0688	0.0181	3.1100e-003	0.0212	0.0000	227.8283	227.8283	0.0240	0.0366	239.3305
Vendor	1.3000e-004	4.9800e-003	1.9900e-003	2.0000e-005	8.0000e-004	3.0000e-005	8.3000e-004	2.3000e-004	2.0000e-005	2.6000e-004	0.0000	2.3998	2.3998	1.5000e-004	3.5000e-004	2.5066
Worker	4.5000e-004	3.1000e-004	4.6300e-003	1.0000e-005	1.7200e-003	1.0000e-005	1.7300e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4023	1.4023	3.0000e-005	3.0000e-005	1.4126
Total	**6.1200e-003**	**0.4628**	**0.1378**	**2.2300e-003**	**0.0681**	**3.2900e-003**	**0.0714**	**0.0188**	**3.1400e-003**	**0.0220**	**0.0000**	**231.6304**	**231.6304**	**0.0242**	**0.0370**	**243.2496**

Eastern Remediation Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Excavators	Diesel	No Change	0	2	No Change	0.00
Graders	Diesel	No Change	0	1	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	4	No Change	0.00
Scrapers	Diesel	No Change	0	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	6	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Unmitigated tons/yr							Unmitigated mt/yr					
Excavators	3.06000E-003	2.38500E-002	5.55100E-002	9.00000E-005	1.17000E-003	1.08000E-003	0.00000E+000	7.71516E+000	7.71516E+000	2.50000E-003	0.00000E+000	7.77754E+000
Graders	3.01000E-003	3.53200E-002	1.40800E-002	6.00000E-005	1.15000E-003	1.05000E-003	0.00000E+000	4.93900E+000	4.93900E+000	1.60000E-003	0.00000E+000	4.97893E+000
Rubber Tired Dozers	1.21600E-002	1.24730E-001	5.47900E-002	1.50000E-004	5.62000E-003	5.17000E-003	0.00000E+000	1.31289E+001	1.31289E+001	4.25000E-003	0.00000E+000	1.32351E+001
Scrapers	1.29200E-002	1.30830E-001	1.01440E-001	2.60000E-004	5.17000E-003	4.76000E-003	0.00000E+000	2.26566E+001	2.26566E+001	7.33000E-003	0.00000E+000	2.28398E+001
Tractors/Loaders/Backhoes	4.17000E-003	4.20000E-002	6.48300E-002	9.00000E-005	1.93000E-003	1.77000E-003	0.00000E+000	7.93899E+000	7.93899E+000	2.57000E-003	0.00000E+000	8.00318E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					
Excavators	3.06000E-003	2.38500E-002	5.55100E-002	9.00000E-005	1.17000E-003	1.08000E-003	0.00000E+000	7.71515E+000	7.71515E+000	2.50000E-003	0.00000E+000	7.77753E+000
Graders	3.01000E-003	3.53200E-002	1.40800E-002	6.00000E-005	1.15000E-003	1.05000E-003	0.00000E+000	4.93899E+000	4.93899E+000	1.60000E-003	0.00000E+000	4.97893E+000

Eastern Remediation Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rubber Tired Dozers	1.21600E-002	1.24730E-001	5.47900E-002	1.50000E-004	5.62000E-003	5.17000E-003	0.00000E+000	1.31289E+001	1.31289E+001	4.25000E-003	0.00000E+000	1.32351E+001
Scrapers	1.29200E-002	1.30830E-001	1.01440E-001	2.60000E-004	5.17000E-003	4.76000E-003	0.00000E+000	2.26566E+001	2.26566E+001	7.33000E-003	0.00000E+000	2.28398E+001
Tractors/Loaders/Backhoes	4.17000E-003	4.20000E-002	6.48300E-002	9.00000E-005	1.93000E-003	1.77000E-003	0.00000E+000	7.93898E+000	7.93898E+000	2.57000E-003	0.00000E+000	8.00317E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.29615E-006	1.29615E-006	0.00000E+000	0.00000E+000	1.28575E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	2.02470E-006	2.02470E-006	0.00000E+000	0.00000E+000	0.00000E+000
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.52335E-006	1.52335E-006	0.00000E+000	0.00000E+000	7.55568E-007
Scrapers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.32412E-006	1.32412E-006	0.00000E+000	0.00000E+000	1.31349E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.25961E-006	1.25961E-006	0.00000E+000	0.00000E+000	1.24950E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grading	Fugitive Dust	0.08	0.03	0.03	0.01	0.57	0.57
Grading	Roads	0.07	0.02	0.07	0.02	0.07	0.06
Site Preparation	Fugitive Dust	0.06	0.03	0.03	0.01	0.57	0.57
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.06	0.06

CalEEMod Output: Phase 1 Construction – Mitigated

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Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 Construction - Mitigated Tier 4 Interim

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	34.85	1000sqft	0.80	34,848.00	0
Other Non-Asphalt Surfaces	16.34	Acre	16.34	0.00	0
Parking Lot	11.20	1000sqft	0.26	11,200.00	0
City Park	2.10	Acre	2.10	91,476.00	0
Condo/Townhouse	143.00	Dwelling Unit	13.90	143,000.00	409
Single Family Housing	210.00	Dwelling Unit	35.40	378,000.00	601

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2025
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - Based information provided.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Grading -

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	75.00	90.00

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	1,110.00	275.00
tblConstructionPhase	NumDays	110.00	91.00
tblConstructionPhase	NumDays	110.00	90.00
tblConstructionPhase	NumDays	75.00	92.00
tblConstructionPhase	NumDays	40.00	46.00
tblLandUse	LandUseSquareFeet	34,850.00	34,848.00
tblLandUse	LandUseSquareFeet	711,770.40	0.00
tblLandUse	LotAcreage	8.94	13.90
tblLandUse	LotAcreage	68.18	35.40
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	3.9993	40.2958	35.8053	0.0774	19.9094	1.7480	21.1779	10.1705	1.6083	11.3376	0.0000	7,550.0156	7,550.0156	2.2769	0.0511	7,622.1647
2024	7.1606	70.8628	63.9506	0.1440	19.1483	2.9844	22.1327	7.5087	2.7459	10.2545	0.0000	14,046.2278	14,046.2278	4.2425	0.2170	14,181.7557
2025	38.6699	16.1169	26.3535	0.0653	3.5469	0.6052	4.1521	0.9493	0.5722	1.5215	0.0000	6,583.3201	6,583.3201	0.7372	0.2169	6,666.3852
Maximum	**38.6699**	**70.8628**	**63.9506**	**0.1440**	**19.9094**	**2.9844**	**22.1327**	**10.1705**	**2.7459**	**11.3376**	**0.0000**	**14,046.2278**	**14,046.2278**	**4.2425**	**0.2170**	**14,181.7557**

Mitigated Construction

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	1.2612	24.1998	45.2550	0.0774	8.6367	0.1221	8.7012	4.3822	0.1219	4.4466	0.0000	7,550.0156	7,550.0156	2.2769	0.0511	7,622.1647
2024	2.3361	44.0552	82.7192	0.1440	8.5551	0.2278	8.7829	3.3116	0.2273	3.5390	0.0000	14,046.2278	14,046.2278	4.2425	0.2170	14,181.7556
2025	37.7196	14.4737	28.1658	0.0653	3.2748	0.1147	3.3894	0.8825	0.1130	0.9955	0.0000	6,583.3201	6,583.3201	0.7372	0.2169	6,666.3852
Maximum	**37.7196**	**44.0552**	**82.7192**	**0.1440**	**8.6367**	**0.2278**	**8.7829**	**4.3822**	**0.2273**	**4.4466**	**0.0000**	**14,046.2278**	**14,046.2278**	**4.2425**	**0.2170**	**14,181.7556**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**17.08**	**35.00**	**-23.81**	**0.00**	**51.96**	**91.30**	**56.02**	**53.96**	**90.62**	**61.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	10/3/2023	5	46	
2	Rough Grading	Grading	10/4/2023	2/7/2024	5	91	
3	Utility Trenching	Trenching	11/20/2023	3/9/2024	5	80	
4	Fine Grading	Grading	1/6/2024	5/12/2024	5	90	
5	Paving	Paving	3/10/2024	7/16/2024	5	92	
6	Finishing/Landscaping	Trenching	4/12/2024	8/16/2024	5	91	
7	Building Construction	Building Construction	5/13/2024	5/30/2025	5	275	
8	Architectural Coating	Architectural Coating	1/25/2025	5/30/2025	5	90	

Acres of Grading (Site Preparation Phase): 69

Acres of Grading (Grading Phase): 273

Acres of Paving: 17.4

Residential Indoor: 1,055,025; Residential Outdoor: 351,675; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,763

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Rough Grading	Excavators	2	8.00	158	0.38
Rough Grading	Graders	1	8.00	187	0.41
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	5.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Fine Grading	Excavators	2	8.00	158	0.38
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	60.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0800e-003	0.2804	0.1162	1.4400e-003	0.0512	1.4400e-003	0.0526	0.0147	1.3800e-003	0.0161		157.9595	157.9595	9.3900e-003	0.0227	164.9485
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0588**	**0.3128**	**0.6674**	**3.1400e-003**	**0.2524**	**2.4700e-003**	**0.2548**	**0.0681**	**2.3300e-003**	**0.0704**		**331.7154**	**331.7154**	**0.0132**	**0.0264**	**339.9035**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0800e-003	0.2804	0.1162	1.4400e-003	0.0479	1.4400e-003	0.0493	0.0139	1.3800e-003	0.0153		157.9595	157.9595	9.3900e-003	0.0227	164.9485
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0588**	**0.3128**	**0.6674**	**3.1400e-003**	**0.2333**	**2.4700e-003**	**0.2358**	**0.0634**	**2.3300e-003**	**0.0657**		**331.7154**	**331.7154**	**0.0132**	**0.0264**	**339.9035**

3.3 Rough Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2036**	**1.4245**	**10.6281**	**3.6538**	**1.3105**	**4.9643**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.1023	2.8800e-003	0.1052	0.0294	2.7500e-003	0.0322		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.0725**	**0.5968**	**0.8449**	**4.7700e-003**	**0.3259**	**4.0200e-003**	**0.3299**	**0.0887**	**3.8000e-003**	**0.0925**		**508.9811**	**508.9811**	**0.0230**	**0.0495**	**524.2914**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.0957	2.8800e-003	0.0986	0.0278	2.7500e-003	0.0306		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.0725**	**0.5968**	**0.8449**	**4.7700e-003**	**0.3018**	**4.0200e-003**	**0.3058**	**0.0828**	**3.8000e-003**	**0.0866**		**508.9811**	**508.9811**	**0.0230**	**0.0495**	**524.2914**

3.3 Rough Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3259**	**4.1000e-003**	**0.3300**	**0.0887**	**3.8800e-003**	**0.0926**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.0957	3.0100e-003	0.0988	0.0278	2.8800e-003	0.0307		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3018**	**4.1000e-003**	**0.3059**	**0.0828**	**3.8800e-003**	**0.0867**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

3.4 Utility Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5825	5.1690	6.6643	9.8300e-003		0.3191	0.3191		0.2935	0.2935		952.3319	952.3319	0.3080		960.0320
Total	**0.5825**	**5.1690**	**6.6643**	**9.8300e-003**		**0.3191**	**0.3191**		**0.2935**	**0.2935**		**952.3319**	**952.3319**	**0.3080**		**960.0320**

Unmitigated Construction Off-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0225	0.0144	0.2450	7.5000e-004	0.0894	4.6000e-004	0.0899	0.0237	4.2000e-004	0.0241		77.2248	77.2248	1.6800e-003	1.6500e-003	77.7578
Total	**0.0225**	**0.0144**	**0.2450**	**7.5000e-004**	**0.0894**	**4.6000e-004**	**0.0899**	**0.0237**	**4.2000e-004**	**0.0241**		**77.2248**	**77.2248**	**1.6800e-003**	**1.6500e-003**	**77.7578**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1551	4.3178	7.4425	9.8300e-003		0.0161	0.0161		0.0161	0.0161	0.0000	952.3319	952.3319	0.3080		960.0320
Total	**0.1551**	**4.3178**	**7.4425**	**9.8300e-003**		**0.0161**	**0.0161**		**0.0161**	**0.0161**	**0.0000**	**952.3319**	**952.3319**	**0.3080**		**960.0320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0225	0.0144	0.2450	7.5000e-004	0.0824	4.6000e-004	0.0829	0.0220	4.2000e-004	0.0224		77.2248	77.2248	1.6800e-003	1.6500e-003	77.7578
Total	**0.0225**	**0.0144**	**0.2450**	**7.5000e-004**	**0.0824**	**4.6000e-004**	**0.0829**	**0.0220**	**4.2000e-004**	**0.0224**		**77.2248**	**77.2248**	**1.6800e-003**	**1.6500e-003**	**77.7578**

3.4 Utility Trenching - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5653	4.9130	6.6735	9.8400e-003		0.3050	0.3050		0.2806	0.2806		952.4918	952.4918	0.3081		960.1931
Total	**0.5653**	**4.9130**	**6.6735**	**9.8400e-003**		**0.3050**	**0.3050**		**0.2806**	**0.2806**		**952.4918**	**952.4918**	**0.3081**		**960.1931**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0212	0.0130	0.2283	7.3000e-004	0.0894	4.4000e-004	0.0899	0.0237	4.0000e-004	0.0241		75.3671	75.3671	1.5200e-003	1.5400e-003	75.8643
Total	**0.0212**	**0.0130**	**0.2283**	**7.3000e-004**	**0.0894**	**4.4000e-004**	**0.0899**	**0.0237**	**4.0000e-004**	**0.0241**		**75.3671**	**75.3671**	**1.5200e-003**	**1.5400e-003**	**75.8643**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1551	4.3178	7.4425	9.8400e-003		0.0161	0.0161		0.0161	0.0161	0.0000	952.4918	952.4918	0.3081		960.1931
Total	**0.1551**	**4.3178**	**7.4425**	**9.8400e-003**		**0.0161**	**0.0161**		**0.0161**	**0.0161**	**0.0000**	**952.4918**	**952.4918**	**0.3081**		**960.1931**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0212	0.0130	0.2283	7.3000e-004	0.0824	4.4000e-004	0.0829	0.0220	4.0000e-004	0.0224		75.3671	75.3671	1.5200e-003	1.5400e-003	75.8643
Total	**0.0212**	**0.0130**	**0.2283**	**7.3000e-004**	**0.0824**	**4.4000e-004**	**0.0829**	**0.0220**	**4.0000e-004**	**0.0224**		**75.3671**	**75.3671**	**1.5200e-003**	**1.5400e-003**	**75.8643**

3.5 Fine Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3259**	**4.1000e-003**	**0.3300**	**0.0887**	**3.8800e-003**	**0.0926**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.0957	3.0100e-003	0.0988	0.0278	2.8800e-003	0.0307		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.0689**	**0.5915**	**0.8016**	**4.6600e-003**	**0.3018**	**4.1000e-003**	**0.3059**	**0.0828**	**3.8800e-003**	**0.0867**		**499.4358**	**499.4358**	**0.0228**	**0.0487**	**514.5086**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0397	0.0243	0.4281	1.3700e-003	0.1677	8.2000e-004	0.1685	0.0445	7.5000e-004	0.0452		141.3132	141.3132	2.8500e-003	2.8900e-003	142.2455
Total	**0.0397**	**0.0243**	**0.4281**	**1.3700e-003**	**0.1677**	**8.2000e-004**	**0.1685**	**0.0445**	**7.5000e-004**	**0.0452**		**141.3132**	**141.3132**	**2.8500e-003**	**2.8900e-003**	**142.2455**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	10.0395	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3643**	**10.0395**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0397	0.0243	0.4281	1.3700e-003	0.1546	8.2000e-004	0.1554	0.0413	7.5000e-004	0.0420		141.3132	141.3132	2.8500e-003	2.8900e-003	142.2455
Total	**0.0397**	**0.0243**	**0.4281**	**1.3700e-003**	**0.1546**	**8.2000e-004**	**0.1554**	**0.0413**	**7.5000e-004**	**0.0420**		**141.3132**	**141.3132**	**2.8500e-003**	**2.8900e-003**	**142.2455**

3.7 Finishing/Landscaping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	0.1439	1.4483	2.2356	3.1200e-003		0.0665	0.0665		0.0612	0.0612		301.7667	301.7667	0.0976		304.2067
Total	**0.1439**	**1.4483**	**2.2356**	**3.1200e-003**		**0.0665**	**0.0665**		**0.0612**	**0.0612**		**301.7667**	**301.7667**	**0.0976**		**304.2067**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9500e-003	4.8600e-003	0.0856	2.7000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.5000e-004	9.0400e-003		28.2626	28.2626	5.7000e-004	5.8000e-004	28.4491

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**7.9500e-003**	**4.8600e-003**	**0.0856**	**2.7000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.5000e-004**	**9.0400e-003**		**28.2626**	**28.2626**	**5.7000e-004**	**5.8000e-004**	**28.4491**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0696	1.3546	2.3421	3.1200e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	301.7667	301.7667	0.0976		304.2067
Total	**0.0696**	**1.3546**	**2.3421**	**3.1200e-003**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**301.7667**	**301.7667**	**0.0976**		**304.2067**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9500e-003	4.8600e-003	0.0856	2.7000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.5000e-004	8.4000e-003		28.2626	28.2626	5.7000e-004	5.8000e-004	28.4491
Total	**7.9500e-003**	**4.8600e-003**	**0.0856**	**2.7000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.5000e-004**	**8.4000e-003**		**28.2626**	**28.2626**	**5.7000e-004**	**5.8000e-004**	**28.4491**

3.8 Building Construction - 2024

Unmitigated Construction On-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0597	2.0966	0.8654	0.0106	0.3836	0.0113	0.3949	0.1104	0.0108	0.1212		1,166.3182	1,166.3182	0.0712	0.1681	1,218.1799
Worker	0.6251	0.3822	6.7356	0.0216	2.6379	0.0128	2.6508	0.6996	0.0118	0.7114		2,223.3279	2,223.3279	0.0448	0.0455	2,237.9953
Total	**0.6848**	**2.4788**	**7.6010**	**0.0322**	**3.0216**	**0.0241**	**3.0457**	**0.8100**	**0.0226**	**0.8326**		**3,389.6461**	**3,389.6461**	**0.1160**	**0.2135**	**3,456.1752**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0597	2.0966	0.8654	0.0106	0.3590	0.0113	0.3703	0.1044	0.0108	0.1152		1,166.3182	1,166.3182	0.0712	0.1681	1,218.1799
Worker	0.6251	0.3822	6.7356	0.0216	2.4315	0.0128	2.4444	0.6489	0.0118	0.6607		2,223.3279	2,223.3279	0.0448	0.0455	2,237.9953
Total	**0.6848**	**2.4788**	**7.6010**	**0.0322**	**2.7905**	**0.0241**	**2.8147**	**0.7533**	**0.0226**	**0.7759**		**3,389.6461**	**3,389.6461**	**0.1160**	**0.2135**	**3,456.1752**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0588	2.0863	0.8619	0.0104	0.3836	0.0114	0.3950	0.1104	0.0109	0.1213		1,144.4835	1,144.4835	0.0721	0.1656	1,195.6383
Worker	0.5904	0.3464	6.3360	0.0208	2.6379	0.0123	2.6502	0.6996	0.0113	0.7109		2,168.9602	2,168.9602	0.0407	0.0428	2,182.7223
Total	**0.6492**	**2.4327**	**7.1978**	**0.0312**	**3.0216**	**0.0237**	**3.0452**	**0.8100**	**0.0222**	**0.8322**		**3,313.4438**	**3,313.4438**	**0.1128**	**0.2084**	**3,378.3606**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0588	2.0863	0.8619	0.0104	0.3590	0.0114	0.3704	0.1044	0.0109	0.1152		1,144.4835	1,144.4835	0.0721	0.1656	1,195.6383
Worker	0.5904	0.3464	6.3360	0.0208	2.4315	0.0123	2.4438	0.6489	0.0113	0.6602		2,168.9602	2,168.9602	0.0407	0.0428	2,182.7223
Total	**0.6492**	**2.4327**	**7.1978**	**0.0312**	**2.7905**	**0.0237**	**2.8142**	**0.7533**	**0.0222**	**0.7755**		**3,313.4438**	**3,313.4438**	**0.1128**	**0.2084**	**3,378.3606**

3.9 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**36.5357**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1176	0.0690	1.2618	4.1500e-003	0.5254	2.4500e-003	0.5278	0.1393	2.2500e-003	0.1416		431.9540	431.9540	8.1100e-003	8.5200e-003	434.6947
Total	**0.1176**	**0.0690**	**1.2618**	**4.1500e-003**	**0.5254**	**2.4500e-003**	**0.5278**	**0.1393**	**2.2500e-003**	**0.1416**		**431.9540**	**431.9540**	**8.1100e-003**	**8.5200e-003**	**434.6947**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0545	1.0598	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**36.4193**	**1.0598**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1176	0.0690	1.2618	4.1500e-003	0.4842	2.4500e-003	0.4867	0.1292	2.2500e-003	0.1315		431.9540	431.9540	8.1100e-003	8.5200e-003	434.6947
Total	**0.1176**	**0.0690**	**1.2618**	**4.1500e-003**	**0.4842**	**2.4500e-003**	**0.4867**	**0.1292**	**2.2500e-003**	**0.1315**		**431.9540**	**431.9540**	**8.1100e-003**	**8.5200e-003**	**434.6947**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 Construction - Mitigated Tier 4 Interim

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	34.85	1000sqft	0.80	34,848.00	0
Other Non-Asphalt Surfaces	16.34	Acre	16.34	0.00	0
Parking Lot	11.20	1000sqft	0.26	11,200.00	0
City Park	2.10	Acre	2.10	91,476.00	0
Condo/Townhouse	143.00	Dwelling Unit	13.90	143,000.00	409
Single Family Housing	210.00	Dwelling Unit	35.40	378,000.00	601

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2025
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - Based information provided.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Grading -

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	75.00	90.00

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	1,110.00	275.00
tblConstructionPhase	NumDays	110.00	91.00
tblConstructionPhase	NumDays	110.00	90.00
tblConstructionPhase	NumDays	75.00	92.00
tblConstructionPhase	NumDays	40.00	46.00
tblLandUse	LandUseSquareFeet	34,850.00	34,848.00
tblLandUse	LandUseSquareFeet	711,770.40	0.00
tblLandUse	LotAcreage	8.94	13.90
tblLandUse	LotAcreage	68.18	35.40
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0061	40.3257	35.7541	0.0773	19.9094	1.7480	21.1779	10.1705	1.6083	11.3376	0.0000	7,537.5571	7,537.5571	2.2770	0.0516	7,609.8491
2024	7.1717	70.9204	63.8728	0.1438	19.1483	2.9844	22.1327	7.5087	2.7459	10.2546	0.0000	14,025.5784	14,025.5784	4.2426	0.2205	14,161.3450
2025	38.7384	16.2509	25.8727	0.0641	3.5469	0.6052	4.1521	0.9493	0.5723	1.5216	0.0000	6,461.1755	6,461.1755	0.7384	0.2205	6,545.3478
Maximum	**38.7384**	**70.9204**	**63.8728**	**0.1438**	**19.9094**	**2.9844**	**22.1327**	**10.1705**	**2.7459**	**11.3376**	**0.0000**	**14,025.5784**	**14,025.5784**	**4.2426**	**0.2205**	**14,161.3450**

Mitigated Construction

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	1.2679	24.2297	45.2037	0.0773	8.6367	0.1221	8.7013	4.3822	0.1219	4.4466	0.0000	7,537.5571	7,537.5571	2.2770	0.0516	7,609.8491
2024	2.3472	44.1127	82.6414	0.1438	8.5551	0.2278	8.7829	3.3116	0.2274	3.5390	0.0000	14,025.5783	14,025.5783	4.2426	0.2205	14,161.3450
2025	37.7881	14.6077	27.6851	0.0641	3.2748	0.1147	3.3895	0.8825	0.1131	0.9956	0.0000	6,461.1755	6,461.1755	0.7384	0.2205	6,545.3478
Maximum	**37.7881**	**44.1127**	**82.6414**	**0.1438**	**8.6367**	**0.2278**	**8.7829**	**4.3822**	**0.2274**	**4.4466**	**0.0000**	**14,025.5783**	**14,025.5783**	**4.2426**	**0.2205**	**14,161.3450**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**17.05**	**34.94**	**-23.93**	**0.00**	**51.96**	**91.29**	**56.02**	**53.96**	**90.62**	**61.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	10/3/2023	5	46	
2	Rough Grading	Grading	10/4/2023	2/7/2024	5	91	
3	Utility Trenching	Trenching	11/20/2023	3/9/2024	5	80	
4	Fine Grading	Grading	1/6/2024	5/12/2024	5	90	
5	Paving	Paving	3/10/2024	7/16/2024	5	92	
6	Finishing/Landscaping	Trenching	4/12/2024	8/16/2024	5	91	
7	Building Construction	Building Construction	5/13/2024	5/30/2025	5	275	
8	Architectural Coating	Architectural Coating	1/25/2025	5/30/2025	5	90	

Acres of Grading (Site Preparation Phase): 69

Acres of Grading (Grading Phase): 273

Acres of Paving: 17.4

Residential Indoor: 1,055,025; Residential Outdoor: 351,675; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,763

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Rough Grading	Excavators	2	8.00	158	0.38
Rough Grading	Graders	1	8.00	187	0.41
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	5.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Fine Grading	Excavators	2	8.00	158	0.38
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	60.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8000e-003	0.2929	0.1200	1.4400e-003	0.0512	1.4500e-003	0.0526	0.0147	1.3800e-003	0.0161		158.1918	158.1918	9.3700e-003	0.0227	165.1956
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0632**	**0.3285**	**0.6334**	**3.0600e-003**	**0.2524**	**2.4800e-003**	**0.2548**	**0.0681**	**2.3300e-003**	**0.0704**		**323.6400**	**323.6400**	**0.0132**	**0.0267**	**331.9157**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8000e-003	0.2929	0.1200	1.4400e-003	0.0479	1.4500e-003	0.0493	0.0139	1.3800e-003	0.0153		158.1918	158.1918	9.3700e-003	0.0227	165.1956
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0632**	**0.3285**	**0.6334**	**3.0600e-003**	**0.2333**	**2.4800e-003**	**0.2358**	**0.0634**	**2.3300e-003**	**0.0657**		**323.6400**	**323.6400**	**0.0132**	**0.0267**	**331.9157**

3.3 Rough Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2036**	**1.4245**	**10.6281**	**3.6538**	**1.3105**	**4.9643**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.1023	2.9000e-003	0.1052	0.0294	2.7700e-003	0.0322		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.0772**	**0.6253**	**0.8104**	**4.6800e-003**	**0.3259**	**4.0400e-003**	**0.3299**	**0.0887**	**3.8200e-003**	**0.0926**		**500.2150**	**500.2150**	**0.0230**	**0.0498**	**515.6357**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.0957	2.9000e-003	0.0986	0.0278	2.7700e-003	0.0306		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.0772**	**0.6253**	**0.8104**	**4.6800e-003**	**0.3018**	**4.0400e-003**	**0.3058**	**0.0828**	**3.8200e-003**	**0.0867**		**500.2150**	**500.2150**	**0.0230**	**0.0498**	**515.6357**

3.3 Rough Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3259**	**4.1200e-003**	**0.3300**	**0.0887**	**3.9000e-003**	**0.0926**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3018**	**4.1200e-003**	**0.3059**	**0.0828**	**3.9000e-003**	**0.0867**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

3.4 Utility Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5825	5.1690	6.6643	9.8300e-003		0.3191	0.3191		0.2935	0.2935		952.3319	952.3319	0.3080		960.0320
Total	**0.5825**	**5.1690**	**6.6643**	**9.8300e-003**		**0.3191**	**0.3191**		**0.2935**	**0.2935**		**952.3319**	**952.3319**	**0.3080**		**960.0320**

Unmitigated Construction Off-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0246	0.0158	0.2282	7.2000e-004	0.0894	4.6000e-004	0.0899	0.0237	4.2000e-004	0.0241		73.5325	73.5325	1.7200e-003	1.7500e-003	74.0978
Total	**0.0246**	**0.0158**	**0.2282**	**7.2000e-004**	**0.0894**	**4.6000e-004**	**0.0899**	**0.0237**	**4.2000e-004**	**0.0241**		**73.5325**	**73.5325**	**1.7200e-003**	**1.7500e-003**	**74.0978**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1551	4.3178	7.4425	9.8300e-003		0.0161	0.0161		0.0161	0.0161	0.0000	952.3319	952.3319	0.3080		960.0320
Total	**0.1551**	**4.3178**	**7.4425**	**9.8300e-003**		**0.0161**	**0.0161**		**0.0161**	**0.0161**	**0.0000**	**952.3319**	**952.3319**	**0.3080**		**960.0320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0246	0.0158	0.2282	7.2000e-004	0.0824	4.6000e-004	0.0829	0.0220	4.2000e-004	0.0224		73.5325	73.5325	1.7200e-003	1.7500e-003	74.0978
Total	**0.0246**	**0.0158**	**0.2282**	**7.2000e-004**	**0.0824**	**4.6000e-004**	**0.0829**	**0.0220**	**4.2000e-004**	**0.0224**		**73.5325**	**73.5325**	**1.7200e-003**	**1.7500e-003**	**74.0978**

3.4 Utility Trenching - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5653	4.9130	6.6735	9.8400e-003		0.3050	0.3050		0.2806	0.2806		952.4918	952.4918	0.3081		960.1931
Total	**0.5653**	**4.9130**	**6.6735**	**9.8400e-003**		**0.3050**	**0.3050**		**0.2806**	**0.2806**		**952.4918**	**952.4918**	**0.3081**		**960.1931**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0232	0.0142	0.2129	7.0000e-004	0.0894	4.4000e-004	0.0899	0.0237	4.0000e-004	0.0241		71.7692	71.7692	1.5600e-003	1.6400e-003	72.2966
Total	**0.0232**	**0.0142**	**0.2129**	**7.0000e-004**	**0.0894**	**4.4000e-004**	**0.0899**	**0.0237**	**4.0000e-004**	**0.0241**		**71.7692**	**71.7692**	**1.5600e-003**	**1.6400e-003**	**72.2966**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1551	4.3178	7.4425	9.8400e-003		0.0161	0.0161		0.0161	0.0161	0.0000	952.4918	952.4918	0.3081		960.1931
Total	**0.1551**	**4.3178**	**7.4425**	**9.8400e-003**		**0.0161**	**0.0161**		**0.0161**	**0.0161**	**0.0000**	**952.4918**	**952.4918**	**0.3081**		**960.1931**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0232	0.0142	0.2129	7.0000e-004	0.0824	4.4000e-004	0.0829	0.0220	4.0000e-004	0.0224		71.7692	71.7692	1.5600e-003	1.6400e-003	72.2966
Total	**0.0232**	**0.0142**	**0.2129**	**7.0000e-004**	**0.0824**	**4.4000e-004**	**0.0829**	**0.0220**	**4.0000e-004**	**0.0224**		**71.7692**	**71.7692**	**1.5600e-003**	**1.6400e-003**	**72.2966**

3.5 Fine Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.2036**	**1.3354**	**10.5390**	**3.6538**	**1.2286**	**4.8823**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3259**	**4.1200e-003**	**0.3300**	**0.0887**	**3.9000e-003**	**0.0926**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.0734**	**0.6196**	**0.7704**	**4.5700e-003**	**0.3018**	**4.1200e-003**	**0.3059**	**0.0828**	**3.9000e-003**	**0.0867**		**490.9100**	**490.9100**	**0.0228**	**0.0490**	**506.0871**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0184**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0436	0.0267	0.3993	1.3000e-003	0.1677	8.2000e-004	0.1685	0.0445	7.5000e-004	0.0452		134.5673	134.5673	2.9200e-003	3.0700e-003	135.5562
Total	**0.0436**	**0.0267**	**0.3993**	**1.3000e-003**	**0.1677**	**8.2000e-004**	**0.1685**	**0.0445**	**7.5000e-004**	**0.0452**		**134.5673**	**134.5673**	**2.9200e-003**	**3.0700e-003**	**135.5562**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	10.0395	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0302					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3643**	**10.0395**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0436	0.0267	0.3993	1.3000e-003	0.1546	8.2000e-004	0.1554	0.0413	7.5000e-004	0.0420		134.5673	134.5673	2.9200e-003	3.0700e-003	135.5562
Total	**0.0436**	**0.0267**	**0.3993**	**1.3000e-003**	**0.1546**	**8.2000e-004**	**0.1554**	**0.0413**	**7.5000e-004**	**0.0420**		**134.5673**	**134.5673**	**2.9200e-003**	**3.0700e-003**	**135.5562**

3.7 Finishing/Landscaping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	0.1439	1.4483	2.2356	3.1200e-003		0.0665	0.0665		0.0612	0.0612		301.7667	301.7667	0.0976		304.2067
Total	**0.1439**	**1.4483**	**2.2356**	**3.1200e-003**		**0.0665**	**0.0665**		**0.0612**	**0.0612**		**301.7667**	**301.7667**	**0.0976**		**304.2067**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7100e-003	5.3300e-003	0.0799	2.6000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.5000e-004	9.0400e-003		26.9135	26.9135	5.8000e-004	6.1000e-004	27.1112

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**8.7100e-003**	**5.3300e-003**	**0.0799**	**2.6000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.5000e-004**	**9.0400e-003**		**26.9135**	**26.9135**	**5.8000e-004**	**6.1000e-004**	**27.1112**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0696	1.3546	2.3421	3.1200e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	301.7667	301.7667	0.0976		304.2067
Total	**0.0696**	**1.3546**	**2.3421**	**3.1200e-003**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**301.7667**	**301.7667**	**0.0976**		**304.2067**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7100e-003	5.3300e-003	0.0799	2.6000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.5000e-004	8.4000e-003		26.9135	26.9135	5.8000e-004	6.1000e-004	27.1112
Total	**8.7100e-003**	**5.3300e-003**	**0.0799**	**2.6000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.5000e-004**	**8.4000e-003**		**26.9135**	**26.9135**	**5.8000e-004**	**6.1000e-004**	**27.1112**

3.8 Building Construction - 2024

Unmitigated Construction On-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0576	2.1903	0.8926	0.0106	0.3836	0.0114	0.3950	0.1104	0.0109	0.1213		1,168.0759	1,168.0759	0.0710	0.1684	1,220.0457
Worker	0.6855	0.4196	6.2816	0.0205	2.6379	0.0128	2.6508	0.6996	0.0118	0.7114		2,117.1925	2,117.1925	0.0460	0.0484	2,132.7504
Total	**0.7431**	**2.6099**	**7.1742**	**0.0311**	**3.0216**	**0.0242**	**3.0458**	**0.8100**	**0.0227**	**0.8327**		**3,285.2684**	**3,285.2684**	**0.1170**	**0.2168**	**3,352.7962**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0576	2.1903	0.8926	0.0106	0.3590	0.0114	0.3704	0.1044	0.0109	0.1152		1,168.0759	1,168.0759	0.0710	0.1684	1,220.0457
Worker	0.6855	0.4196	6.2816	0.0205	2.4315	0.0128	2.4444	0.6489	0.0118	0.6607		2,117.1925	2,117.1925	0.0460	0.0484	2,132.7504
Total	**0.7431**	**2.6099**	**7.1742**	**0.0311**	**2.7905**	**0.0242**	**2.8147**	**0.7533**	**0.0227**	**0.7760**		**3,285.2684**	**3,285.2684**	**0.1170**	**0.2168**	**3,352.7962**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0567	2.1797	0.8885	0.0104	0.3836	0.0114	0.3951	0.1104	0.0109	0.1213		1,146.2456	1,146.2456	0.0719	0.1660	1,197.5061
Worker	0.6493	0.3802	5.9128	0.0198	2.6379	0.0123	2.6502	0.6996	0.0113	0.7109		2,065.6317	2,065.6317	0.0418	0.0455	2,080.2289
Total	**0.7060**	**2.5599**	**6.8013**	**0.0302**	**3.0216**	**0.0237**	**3.0453**	**0.8100**	**0.0222**	**0.8322**		**3,211.8773**	**3,211.8773**	**0.1137**	**0.2115**	**3,277.7350**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0567	2.1797	0.8885	0.0104	0.3590	0.0114	0.3704	0.1044	0.0109	0.1153		1,146.2456	1,146.2456	0.0719	0.1660	1,197.5061
Worker	0.6493	0.3802	5.9128	0.0198	2.4315	0.0123	2.4438	0.6489	0.0113	0.6602		2,065.6317	2,065.6317	0.0418	0.0455	2,080.2289
Total	**0.7060**	**2.5599**	**6.8013**	**0.0302**	**2.7905**	**0.0237**	**2.8142**	**0.7533**	**0.0222**	**0.7755**		**3,211.8773**	**3,211.8773**	**0.1137**	**0.2115**	**3,277.7350**

3.9 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**36.5357**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1293	0.0757	1.1776	3.9500e-003	0.5254	2.4500e-003	0.5278	0.1393	2.2500e-003	0.1416		411.3758	411.3758	8.3300e-003	9.0600e-003	414.2829
Total	**0.1293**	**0.0757**	**1.1776**	**3.9500e-003**	**0.5254**	**2.4500e-003**	**0.5278**	**0.1393**	**2.2500e-003**	**0.1416**		**411.3758**	**411.3758**	**8.3300e-003**	**9.0600e-003**	**414.2829**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0545	1.0598	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**36.4193**	**1.0598**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1293	0.0757	1.1776	3.9500e-003	0.4842	2.4500e-003	0.4867	0.1292	2.2500e-003	0.1315		411.3758	411.3758	8.3300e-003	9.0600e-003	414.2829
Total	**0.1293**	**0.0757**	**1.1776**	**3.9500e-003**	**0.4842**	**2.4500e-003**	**0.4867**	**0.1292**	**2.2500e-003**	**0.1315**		**411.3758**	**411.3758**	**8.3300e-003**	**9.0600e-003**	**414.2829**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 Construction - Mitigated Tier 4 Interim

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	34.85	1000sqft	0.80	34,848.00	0
Other Non-Asphalt Surfaces	16.34	Acre	16.34	0.00	0
Parking Lot	11.20	1000sqft	0.26	11,200.00	0
City Park	2.10	Acre	2.10	91,476.00	0
Condo/Townhouse	143.00	Dwelling Unit	13.90	143,000.00	409
Single Family Housing	210.00	Dwelling Unit	35.40	378,000.00	601

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2025
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumptions file in the AQ/GHG appendix of the DEIR.

Construction Phase - Based information provided.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Grading -

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	75.00	90.00

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	1,110.00	275.00
tblConstructionPhase	NumDays	110.00	91.00
tblConstructionPhase	NumDays	110.00	90.00
tblConstructionPhase	NumDays	75.00	92.00
tblConstructionPhase	NumDays	40.00	46.00
tblLandUse	LandUseSquareFeet	34,850.00	34,848.00
tblLandUse	LandUseSquareFeet	711,770.40	0.00
tblLandUse	LotAcreage	8.94	13.90
tblLandUse	LotAcreage	68.18	35.40
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1785	1.8254	1.4473	3.2100e-003	0.8037	0.0790	0.8826	0.3569	0.0727	0.4296	0.0000	283.8504	283.8504	0.0856	2.0100e-003	286.5878
2024	0.4444	3.9173	4.6104	0.0103	0.9213	0.1645	1.0858	0.3011	0.1525	0.4536	0.0000	927.2484	927.2484	0.2009	0.0193	938.0159
2025	1.7584	0.8673	1.3778	3.4200e-003	0.1835	0.0322	0.2157	0.0492	0.0304	0.0796	0.0000	312.4057	312.4057	0.0360	0.0108	316.5108
Maximum	**1.7584**	**3.9173**	**4.6104**	**0.0103**	**0.9213**	**0.1645**	**1.0858**	**0.3569**	**0.1525**	**0.4536**	**0.0000**	**927.2484**	**927.2484**	**0.2009**	**0.0193**	**938.0159**

Mitigated Construction

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0542	0.9791	1.8406	3.2100e-003	0.3521	5.0600e-003	0.3572	0.1549	5.0500e-003	0.1600	0.0000	283.8501	283.8501	0.0856	2.0100e-003	286.5875
2024	0.1921	2.9372	5.4308	0.0103	0.5319	0.0177	0.5496	0.1663	0.0176	0.1839	0.0000	927.2476	927.2476	0.2009	0.0193	938.0151
2025	1.7082	0.7794	1.4754	3.4200e-003	0.1695	6.1400e-003	0.1756	0.0458	6.0500e-003	0.0518	0.0000	312.4055	312.4055	0.0360	0.0108	316.5106
Maximum	**1.7082**	**2.9372**	**5.4308**	**0.0103**	**0.5319**	**0.0177**	**0.5496**	**0.1663**	**0.0176**	**0.1839**	**0.0000**	**927.2476**	**927.2476**	**0.2009**	**0.0193**	**938.0151**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**17.93**	**28.96**	**-17.64**	**0.00**	**44.80**	**89.51**	**50.44**	**48.11**	**88.78**	**58.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2023	10-31-2023	1.0838	0.5123
2	11-1-2023	1-31-2024	1.7263	1.0018
3	2-1-2024	4-30-2024	1.5396	0.9917
4	5-1-2024	7-31-2024	1.0163	0.8422
5	8-1-2024	10-31-2024	0.6053	0.4903
6	11-1-2024	1-31-2025	0.6821	0.5795
7	2-1-2025	4-30-2025	1.7457	1.6633
8	5-1-2025	7-31-2025	0.5870	0.5592
		Highest	1.7457	1.6633

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	10/3/2023	5	46	
2	Rough Grading	Grading	10/4/2023	2/7/2024	5	91	
3	Utility Trenching	Trenching	11/20/2023	3/9/2024	5	80	
4	Fine Grading	Grading	1/6/2024	5/12/2024	5	90	

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5	Paving	Paving	3/10/2024	7/16/2024	5	92	
6	Finishing/Landscaping	Trenching	4/12/2024	8/16/2024	5	91	
7	Building Construction	Building Construction	5/13/2024	5/30/2025	5	275	
8	Architectural Coating	Architectural Coating	1/25/2025	5/30/2025	5	90	

Acres of Grading (Site Preparation Phase): 69

Acres of Grading (Grading Phase): 273

Acres of Paving: 17.4

Residential Indoor: 1,055,025; Residential Outdoor: 351,675; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,763

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Rough Grading	Excavators	2	8.00	158	0.38
Rough Grading	Graders	1	8.00	187	0.41
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	5.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Fine Grading	Excavators	2	8.00	158	0.38
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	60.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4521	0.0000	0.4521	0.2324	0.0000	0.2324	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0612	0.6331	0.4196	8.8000e-004		0.0291	0.0291		0.0268	0.0268	0.0000	76.9366	76.9366	0.0249	0.0000	77.5587

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0612**	**0.6331**	**0.4196**	**8.8000e-004**	**0.4521**	**0.0291**	**0.4812**	**0.2324**	**0.0268**	**0.2592**	**0.0000**	**76.9366**	**76.9366**	**0.0249**	**0.0000**	**77.5587**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8000e-004	6.7500e-003	2.7100e-003	3.0000e-005	1.1600e-003	3.0000e-005	1.1900e-003	3.3000e-004	3.0000e-005	3.7000e-004	0.0000	3.2979	3.2979	2.0000e-004	4.7000e-004	3.4439
Worker	1.1700e-003	8.4000e-004	0.0121	4.0000e-005	4.5400e-003	2.0000e-005	4.5700e-003	1.2100e-003	2.0000e-005	1.2300e-003	0.0000	3.4989	3.4989	8.0000e-005	8.0000e-005	3.5258
Total	**1.3500e-003**	**7.5900e-003**	**0.0148**	**7.0000e-005**	**5.7000e-003**	**5.0000e-005**	**5.7600e-003**	**1.5400e-003**	**5.0000e-005**	**1.6000e-003**	**0.0000**	**6.7968**	**6.7968**	**2.8000e-004**	**5.5000e-004**	**6.9697**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1933	0.0000	0.1933	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0160	0.2797	0.5281	8.8000e-004		1.4300e-003	1.4300e-003		1.4300e-003	1.4300e-003	0.0000	76.9365	76.9365	0.0249	0.0000	77.5586
Total	**0.0160**	**0.2797**	**0.5281**	**8.8000e-004**	**0.1933**	**1.4300e-003**	**0.1947**	**0.0993**	**1.4300e-003**	**0.1008**	**0.0000**	**76.9365**	**76.9365**	**0.0249**	**0.0000**	**77.5586**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8000e-004	6.7500e-003	2.7100e-003	3.0000e-005	1.0900e-003	3.0000e-005	1.1200e-003	3.2000e-004	3.0000e-005	3.5000e-004	0.0000	3.2979	3.2979	2.0000e-004	4.7000e-004	3.4439
Worker	1.1700e-003	8.4000e-004	0.0121	4.0000e-005	4.1900e-003	2.0000e-005	4.2100e-003	1.1200e-003	2.0000e-005	1.1400e-003	0.0000	3.4989	3.4989	8.0000e-005	8.0000e-005	3.5258
Total	**1.3500e-003**	**7.5900e-003**	**0.0148**	**7.0000e-005**	**5.2800e-003**	**5.0000e-005**	**5.3300e-003**	**1.4400e-003**	**5.0000e-005**	**1.4900e-003**	**0.0000**	**6.7968**	**6.7968**	**2.8000e-004**	**5.5000e-004**	**6.9697**

3.3 Rough Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3345	0.0000	0.3345	0.1199	0.0000	0.1199	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1046	1.0872	0.8836	1.9600e-003		0.0449	0.0449		0.0413	0.0413	0.0000	171.7859	171.7859	0.0556	0.0000	173.1749
Total	**0.1046**	**1.0872**	**0.8836**	**1.9600e-003**	**0.3345**	**0.0449**	**0.3793**	**0.1199**	**0.0413**	**0.1612**	**0.0000**	**171.7859**	**171.7859**	**0.0556**	**0.0000**	**173.1749**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0185	7.4300e-003	9.0000e-005	3.1800e-003	9.0000e-005	3.2700e-003	9.2000e-004	9.0000e-005	1.0000e-003	0.0000	9.0334	9.0334	5.4000e-004	1.3000e-003	9.4334
Worker	1.7800e-003	1.2700e-003	0.0184	6.0000e-005	6.9200e-003	4.0000e-005	6.9500e-003	1.8400e-003	3.0000e-005	1.8700e-003	0.0000	5.3244	5.3244	1.2000e-004	1.3000e-004	5.3653
Total	**2.2800e-003**	**0.0198**	**0.0258**	**1.5000e-004**	**0.0101**	**1.3000e-004**	**0.0102**	**2.7600e-003**	**1.2000e-004**	**2.8700e-003**	**0.0000**	**14.3578**	**14.3578**	**6.6000e-004**	**1.4300e-003**	**14.7987**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1430	0.0000	0.1430	0.0513	0.0000	0.0513	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0319	0.6070	1.1568	1.9600e-003		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	171.7857	171.7857	0.0556	0.0000	173.1747
Total	**0.0319**	**0.6070**	**1.1568**	**1.9600e-003**	**0.1430**	**3.2000e-003**	**0.1462**	**0.0513**	**3.2000e-003**	**0.0545**	**0.0000**	**171.7857**	**171.7857**	**0.0556**	**0.0000**	**173.1747**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0185	7.4300e-003	9.0000e-005	2.9700e-003	9.0000e-005	3.0600e-003	8.7000e-004	9.0000e-005	9.5000e-004	0.0000	9.0334	9.0334	5.4000e-004	1.3000e-003	9.4334

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	1.7800e-003	1.2700e-003	0.0184	6.0000e-005	6.3800e-003	4.0000e-005	6.4100e-003	1.7000e-003	3.0000e-005	1.7400e-003	0.0000	5.3244	5.3244	1.2000e-004	1.3000e-004	5.3653
Total	**2.2800e-003**	**0.0198**	**0.0258**	**1.5000e-004**	**9.3500e-003**	**1.3000e-004**	**9.4700e-003**	**2.5700e-003**	**1.2000e-004**	**2.6900e-003**	**0.0000**	**14.3578**	**14.3578**	**6.6000e-004**	**1.4300e-003**	**14.7987**

3.3 Rough Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2291	0.0000	0.2291	0.0620	0.0000	0.0620	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0451	0.4533	0.3881	8.7000e-004		0.0187	0.0187		0.0172	0.0172	0.0000	76.3273	76.3273	0.0247	0.0000	76.9445
Total	**0.0451**	**0.4533**	**0.3881**	**8.7000e-004**	**0.2291**	**0.0187**	**0.2478**	**0.0620**	**0.0172**	**0.0792**	**0.0000**	**76.3273**	**76.3273**	**0.0247**	**0.0000**	**76.9445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.2000e-004	8.2000e-003	3.2800e-003	4.0000e-005	1.4100e-003	4.0000e-005	1.4500e-003	4.1000e-004	4.0000e-005	4.5000e-004	0.0000	3.9526	3.9526	2.4000e-004	5.7000e-004	4.1285
Worker	7.4000e-004	5.1000e-004	7.6200e-003	2.0000e-005	3.0700e-003	2.0000e-005	3.0900e-003	8.2000e-004	1.0000e-005	8.3000e-004	0.0000	2.3096	2.3096	5.0000e-005	5.0000e-005	2.3266
Total	**9.6000e-004**	**8.7100e-003**	**0.0109**	**6.0000e-005**	**4.4800e-003**	**6.0000e-005**	**4.5400e-003**	**1.2300e-003**	**5.0000e-005**	**1.2800e-003**	**0.0000**	**6.2622**	**6.2622**	**2.9000e-004**	**6.2000e-004**	**6.4551**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0979	0.0000	0.0979	0.0265	0.0000	0.0265	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0142	0.2698	0.5141	8.7000e-004		1.4200e-003	1.4200e-003		1.4200e-003	1.4200e-003	0.0000	76.3272	76.3272	0.0247	0.0000	76.9444
Total	**0.0142**	**0.2698**	**0.5141**	**8.7000e-004**	**0.0979**	**1.4200e-003**	**0.0994**	**0.0265**	**1.4200e-003**	**0.0279**	**0.0000**	**76.3272**	**76.3272**	**0.0247**	**0.0000**	**76.9444**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.2000e-004	8.2000e-003	3.2800e-003	4.0000e-005	1.3200e-003	4.0000e-005	1.3600e-003	3.8000e-004	4.0000e-005	4.3000e-004	0.0000	3.9526	3.9526	2.4000e-004	5.7000e-004	4.1285
Worker	7.4000e-004	5.1000e-004	7.6200e-003	2.0000e-005	2.8300e-003	2.0000e-005	2.8500e-003	7.6000e-004	1.0000e-005	7.7000e-004	0.0000	2.3096	2.3096	5.0000e-005	5.0000e-005	2.3266
Total	**9.6000e-004**	**8.7100e-003**	**0.0109**	**6.0000e-005**	**4.1500e-003**	**6.0000e-005**	**4.2100e-003**	**1.1400e-003**	**5.0000e-005**	**1.2000e-003**	**0.0000**	**6.2622**	**6.2622**	**2.9000e-004**	**6.2000e-004**	**6.4551**

3.4 Utility Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Off-Road	8.7400e-003	0.0775	0.1000	1.5000e-004		4.7900e-003	4.7900e-003		4.4000e-003	4.4000e-003	0.0000	12.9591	12.9591	4.1900e-003	0.0000	13.0639
Total	**8.7400e-003**	**0.0775**	**0.1000**	**1.5000e-004**		**4.7900e-003**	**4.7900e-003**		**4.4000e-003**	**4.4000e-003**	**0.0000**	**12.9591**	**12.9591**	**4.1900e-003**	**0.0000**	**13.0639**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.4000e-004	3.5000e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3200e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.0142	1.0142	2.0000e-005	2.0000e-005	1.0220
Total	**3.4000e-004**	**2.4000e-004**	**3.5000e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3200e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.0142**	**1.0142**	**2.0000e-005**	**2.0000e-005**	**1.0220**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.3300e-003	0.0648	0.1116	1.5000e-004		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	12.9591	12.9591	4.1900e-003	0.0000	13.0639
Total	**2.3300e-003**	**0.0648**	**0.1116**	**1.5000e-004**		**2.4000e-004**	**2.4000e-004**		**2.4000e-004**	**2.4000e-004**	**0.0000**	**12.9591**	**12.9591**	**4.1900e-003**	**0.0000**	**13.0639**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.4000e-004	3.5000e-003	1.0000e-005	1.2100e-003	1.0000e-005	1.2200e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0142	1.0142	2.0000e-005	2.0000e-005	1.0220
Total	**3.4000e-004**	**2.4000e-004**	**3.5000e-003**	**1.0000e-005**	**1.2100e-003**	**1.0000e-005**	**1.2200e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0142**	**1.0142**	**2.0000e-005**	**2.0000e-005**	**1.0220**

3.4 Utility Trenching - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0141	0.1228	0.1668	2.5000e-004		7.6200e-003	7.6200e-003		7.0100e-003	7.0100e-003	0.0000	21.6022	21.6022	6.9900e-003	0.0000	21.7768
Total	**0.0141**	**0.1228**	**0.1668**	**2.5000e-004**		**7.6200e-003**	**7.6200e-003**		**7.0100e-003**	**7.0100e-003**	**0.0000**	**21.6022**	**21.6022**	**6.9900e-003**	**0.0000**	**21.7768**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3000e-004	3.6000e-004	5.4400e-003	2.0000e-005	2.2000e-003	1.0000e-005	2.2100e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.6497	1.6497	4.0000e-005	4.0000e-005	1.6618
Total	**5.3000e-004**	**3.6000e-004**	**5.4400e-003**	**2.0000e-005**	**2.2000e-003**	**1.0000e-005**	**2.2100e-003**	**5.8000e-004**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**1.6497**	**1.6497**	**4.0000e-005**	**4.0000e-005**	**1.6618**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8800e-003	0.1080	0.1861	2.5000e-004		4.0000e-004	4.0000e-004		4.0000e-004	4.0000e-004	0.0000	21.6021	21.6021	6.9900e-003	0.0000	21.7768
Total	**3.8800e-003**	**0.1080**	**0.1861**	**2.5000e-004**		**4.0000e-004**	**4.0000e-004**		**4.0000e-004**	**4.0000e-004**	**0.0000**	**21.6021**	**21.6021**	**6.9900e-003**	**0.0000**	**21.7768**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3000e-004	3.6000e-004	5.4400e-003	2.0000e-005	2.0200e-003	1.0000e-005	2.0400e-003	5.4000e-004	1.0000e-005	5.5000e-004	0.0000	1.6497	1.6497	4.0000e-005	4.0000e-005	1.6618

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**5.3000e-004**	**3.6000e-004**	**5.4400e-003**	**2.0000e-005**	**2.0200e-003**	**1.0000e-005**	**2.0400e-003**	**5.4000e-004**	**1.0000e-005**	**5.5000e-004**	**0.0000**	**1.6497**	**1.6497**	**4.0000e-005**	**4.0000e-005**	**1.6618**

3.5 Fine Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4142	0.0000	0.4142	0.1644	0.0000	0.1644	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1448	1.4570	1.2475	2.7900e-003		0.0601	0.0601		0.0553	0.0553	0.0000	245.3379	245.3379	0.0794	0.0000	247.3215
Total	**0.1448**	**1.4570**	**1.2475**	**2.7900e-003**	**0.4142**	**0.0601**	**0.4743**	**0.1644**	**0.0553**	**0.2197**	**0.0000**	**245.3379**	**245.3379**	**0.0794**	**0.0000**	**247.3215**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.0000e-004	0.0264	0.0105	1.3000e-004	4.5400e-003	1.4000e-004	4.6700e-003	1.3100e-003	1.3000e-004	1.4400e-003	0.0000	12.7049	12.7049	7.7000e-004	1.8300e-003	13.2702
Worker	2.3900e-003	1.6300e-003	0.0245	8.0000e-005	9.8800e-003	5.0000e-005	9.9300e-003	2.6200e-003	5.0000e-005	2.6700e-003	0.0000	7.4237	7.4237	1.6000e-004	1.7000e-004	7.4782
Total	**3.0900e-003**	**0.0280**	**0.0350**	**2.1000e-004**	**0.0144**	**1.9000e-004**	**0.0146**	**3.9300e-003**	**1.8000e-004**	**4.1100e-003**	**0.0000**	**20.1286**	**20.1286**	**9.3000e-004**	**2.0000e-003**	**20.7484**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1771	0.0000	0.1771	0.0703	0.0000	0.0703	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0455	0.8672	1.6525	2.7900e-003		4.5700e-003	4.5700e-003		4.5700e-003	4.5700e-003	0.0000	245.3376	245.3376	0.0794	0.0000	247.3212
Total	**0.0455**	**0.8672**	**1.6525**	**2.7900e-003**	**0.1771**	**4.5700e-003**	**0.1816**	**0.0703**	**4.5700e-003**	**0.0749**	**0.0000**	**245.3376**	**245.3376**	**0.0794**	**0.0000**	**247.3212**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.0000e-004	0.0264	0.0105	1.3000e-004	4.2500e-003	1.4000e-004	4.3800e-003	1.2400e-003	1.3000e-004	1.3700e-003	0.0000	12.7049	12.7049	7.7000e-004	1.8300e-003	13.2702
Worker	2.3900e-003	1.6300e-003	0.0245	8.0000e-005	9.1100e-003	5.0000e-005	9.1600e-003	2.4300e-003	5.0000e-005	2.4800e-003	0.0000	7.4237	7.4237	1.6000e-004	1.7000e-004	7.4782
Total	**3.0900e-003**	**0.0280**	**0.0350**	**2.1000e-004**	**0.0134**	**1.9000e-004**	**0.0135**	**3.6700e-003**	**1.8000e-004**	**3.8500e-003**	**0.0000**	**20.1286**	**20.1286**	**9.3000e-004**	**2.0000e-003**	**20.7484**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Off-Road	0.0455	0.4381	0.6728	1.0500e-003		0.0216	0.0216		0.0198	0.0198	0.0000	92.1220	92.1220	0.0298	0.0000	92.8669
Paving	1.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0469**	**0.4381**	**0.6728**	**1.0500e-003**		**0.0216**	**0.0216**		**0.0198**	**0.0198**	**0.0000**	**92.1220**	**92.1220**	**0.0298**	**0.0000**	**92.8669**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.2500e-003	0.0188	6.0000e-005	7.5700e-003	4.0000e-005	7.6100e-003	2.0100e-003	3.0000e-005	2.0500e-003	0.0000	5.6915	5.6915	1.2000e-004	1.3000e-004	5.7333
Total	**1.8400e-003**	**1.2500e-003**	**0.0188**	**6.0000e-005**	**7.5700e-003**	**4.0000e-005**	**7.6100e-003**	**2.0100e-003**	**3.0000e-005**	**2.0500e-003**	**0.0000**	**5.6915**	**5.6915**	**1.2000e-004**	**1.3000e-004**	**5.7333**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0154	0.4618	0.7956	1.0500e-003		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	92.1219	92.1219	0.0298	0.0000	92.8668
Paving	1.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0168**	**0.4618**	**0.7956**	**1.0500e-003**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**92.1219**	**92.1219**	**0.0298**	**0.0000**	**92.8668**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.2500e-003	0.0188	6.0000e-005	6.9800e-003	4.0000e-005	7.0200e-003	1.8700e-003	3.0000e-005	1.9000e-003	0.0000	5.6915	5.6915	1.2000e-004	1.3000e-004	5.7333
Total	**1.8400e-003**	**1.2500e-003**	**0.0188**	**6.0000e-005**	**6.9800e-003**	**4.0000e-005**	**7.0200e-003**	**1.8700e-003**	**3.0000e-005**	**1.9000e-003**	**0.0000**	**5.6915**	**5.6915**	**1.2000e-004**	**1.3000e-004**	**5.7333**

3.7 Finishing/Landscaping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5500e-003	0.0659	0.1017	1.4000e-004		3.0200e-003	3.0200e-003		2.7800e-003	2.7800e-003	0.0000	12.4560	12.4560	4.0300e-003	0.0000	12.5567
Total	**6.5500e-003**	**0.0659**	**0.1017**	**1.4000e-004**		**3.0200e-003**	**3.0200e-003**		**2.7800e-003**	**2.7800e-003**	**0.0000**	**12.4560**	**12.4560**	**4.0300e-003**	**0.0000**	**12.5567**

Unmitigated Construction Off-Site

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	2.5000e-004	3.7100e-003	1.0000e-005	1.5000e-003	1.0000e-005	1.5100e-003	4.0000e-004	1.0000e-005	4.0000e-004	0.0000	1.1259	1.1259	2.0000e-005	3.0000e-005	1.1342
Total	**3.6000e-004**	**2.5000e-004**	**3.7100e-003**	**1.0000e-005**	**1.5000e-003**	**1.0000e-005**	**1.5100e-003**	**4.0000e-004**	**1.0000e-005**	**4.0000e-004**	**0.0000**	**1.1259**	**1.1259**	**2.0000e-005**	**3.0000e-005**	**1.1342**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.1700e-003	0.0616	0.1066	1.4000e-004		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004	0.0000	12.4560	12.4560	4.0300e-003	0.0000	12.5567
Total	**3.1700e-003**	**0.0616**	**0.1066**	**1.4000e-004**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**	**0.0000**	**12.4560**	**12.4560**	**4.0300e-003**	**0.0000**	**12.5567**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	2.5000e-004	3.7100e-003	1.0000e-005	1.3800e-003	1.0000e-005	1.3900e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.1259	1.1259	2.0000e-005	3.0000e-005	1.1342
Total	**3.6000e-004**	**2.5000e-004**	**3.7100e-003**	**1.0000e-005**	**1.3800e-003**	**1.0000e-005**	**1.3900e-003**	**3.7000e-004**	**1.0000e-005**	**3.8000e-004**	**0.0000**	**1.1259**	**1.1259**	**2.0000e-005**	**3.0000e-005**	**1.1342**

3.8 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1229	1.1226	1.3499	2.2500e-003		0.0512	0.0512		0.0482	0.0482	0.0000	193.5940	193.5940	0.0458	0.0000	194.7385
Total	**0.1229**	**1.1226**	**1.3499**	**2.2500e-003**		**0.0512**	**0.0512**		**0.0482**	**0.0482**	**0.0000**	**193.5940**	**193.5940**	**0.0458**	**0.0000**	**194.7385**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8900e-003	0.1834	0.0733	8.9000e-004	0.0316	9.4000e-004	0.0325	9.1000e-003	9.0000e-004	0.0100	0.0000	88.4046	88.4046	5.3900e-003	0.0128	92.3381
Worker	0.0524	0.0357	0.5363	1.7400e-003	0.2163	1.0700e-003	0.2174	0.0575	9.9000e-004	0.0584	0.0000	162.5464	162.5464	3.4800e-003	3.7100e-003	163.7401
Total	**0.0573**	**0.2191**	**0.6096**	**2.6300e-003**	**0.2479**	**2.0100e-003**	**0.2499**	**0.0666**	**1.8900e-003**	**0.0685**	**0.0000**	**250.9510**	**250.9510**	**8.8700e-003**	**0.0165**	**256.0782**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0446	0.9112	1.4925	2.2500e-003		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	193.5938	193.5938	0.0458	0.0000	194.7383
Total	**0.0446**	**0.9112**	**1.4925**	**2.2500e-003**		**7.0600e-003**	**7.0600e-003**		**7.0600e-003**	**7.0600e-003**	**0.0000**	**193.5938**	**193.5938**	**0.0458**	**0.0000**	**194.7383**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8900e-003	0.1834	0.0733	8.9000e-004	0.0296	9.4000e-004	0.0305	8.6100e-003	9.0000e-004	9.5100e-003	0.0000	88.4046	88.4046	5.3900e-003	0.0128	92.3381
Worker	0.0524	0.0357	0.5363	1.7400e-003	0.1995	1.0700e-003	0.2005	0.0533	9.9000e-004	0.0543	0.0000	162.5464	162.5464	3.4800e-003	3.7100e-003	163.7401
Total	**0.0573**	**0.2191**	**0.6096**	**2.6300e-003**	**0.2290**	**2.0100e-003**	**0.2310**	**0.0619**	**1.8900e-003**	**0.0638**	**0.0000**	**250.9510**	**250.9510**	**8.8700e-003**	**0.0165**	**256.0782**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Off-Road	0.0738	0.6734	0.8686	1.4600e-003		0.0285	0.0285		0.0268	0.0268	0.0000	125.2365	125.2365	0.0294	0.0000	125.9725
Total	**0.0738**	**0.6734**	**0.8686**	**1.4600e-003**		**0.0285**	**0.0285**		**0.0268**	**0.0268**	**0.0000**	**125.2365**	**125.2365**	**0.0294**	**0.0000**	**125.9725**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1200e-003	0.1180	0.0472	5.6000e-004	0.0204	6.1000e-004	0.0210	5.8900e-003	5.9000e-004	6.4800e-003	0.0000	56.1023	56.1023	3.5300e-003	8.1200e-003	58.6114
Worker	0.0320	0.0209	0.3264	1.0900e-003	0.1399	6.6000e-004	0.1406	0.0372	6.1000e-004	0.0378	0.0000	102.5569	102.5569	2.0400e-003	2.2600e-003	103.2811
Total	**0.0352**	**0.1390**	**0.3736**	**1.6500e-003**	**0.1603**	**1.2700e-003**	**0.1616**	**0.0430**	**1.2000e-003**	**0.0442**	**0.0000**	**158.6592**	**158.6592**	**5.5700e-003**	**0.0104**	**161.8924**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0288	0.5893	0.9652	1.4600e-003		4.5700e-003	4.5700e-003		4.5700e-003	4.5700e-003	0.0000	125.2364	125.2364	0.0294	0.0000	125.9723
Total	**0.0288**	**0.5893**	**0.9652**	**1.4600e-003**		**4.5700e-003**	**4.5700e-003**		**4.5700e-003**	**4.5700e-003**	**0.0000**	**125.2364**	**125.2364**	**0.0294**	**0.0000**	**125.9723**

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1200e-003	0.1180	0.0472	5.6000e-004	0.0191	6.1000e-004	0.0197	5.5700e-003	5.9000e-004	6.1600e-003	0.0000	56.1023	56.1023	3.5300e-003	8.1200e-003	58.6114
Worker	0.0320	0.0209	0.3264	1.0900e-003	0.1290	6.6000e-004	0.1297	0.0345	6.1000e-004	0.0351	0.0000	102.5569	102.5569	2.0400e-003	2.2600e-003	103.2811
Total	**0.0352**	**0.1390**	**0.3736**	**1.6500e-003**	**0.1481**	**1.2700e-003**	**0.1494**	**0.0400**	**1.2000e-003**	**0.0412**	**0.0000**	**158.6592**	**158.6592**	**5.5700e-003**	**0.0104**	**161.8924**

3.9 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.6364					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.6900e-003	0.0516	0.0814	1.3000e-004		2.3200e-003	2.3200e-003		2.3200e-003	2.3200e-003	0.0000	11.4896	11.4896	6.3000e-004	0.0000	11.5053
Total	**1.6441**	**0.0516**	**0.0814**	**1.3000e-004**		**2.3200e-003**	**2.3200e-003**		**2.3200e-003**	**2.3200e-003**	**0.0000**	**11.4896**	**11.4896**	**6.3000e-004**	**0.0000**	**11.5053**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 1 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3200e-003	3.4700e-003	0.0542	1.8000e-004	0.0232	1.1000e-004	0.0233	6.1700e-003	1.0000e-004	6.2700e-003	0.0000	17.0204	17.0204	3.4000e-004	3.7000e-004	17.1406
Total	**5.3200e-003**	**3.4700e-003**	**0.0542**	**1.8000e-004**	**0.0232**	**1.1000e-004**	**0.0233**	**6.1700e-003**	**1.0000e-004**	**6.2700e-003**	**0.0000**	**17.0204**	**17.0204**	**3.4000e-004**	**3.7000e-004**	**17.1406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.6364					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4500e-003	0.0477	0.0825	1.3000e-004		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	11.4896	11.4896	6.3000e-004	0.0000	11.5053
Total	**1.6389**	**0.0477**	**0.0825**	**1.3000e-004**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**	**0.0000**	**11.4896**	**11.4896**	**6.3000e-004**	**0.0000**	**11.5053**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3200e-003	3.4700e-003	0.0542	1.8000e-004	0.0214	1.1000e-004	0.0215	5.7200e-003	1.0000e-004	5.8200e-003	0.0000	17.0204	17.0204	3.4000e-004	3.7000e-004	17.1406
Total	**5.3200e-003**	**3.4700e-003**	**0.0542**	**1.8000e-004**	**0.0214**	**1.1000e-004**	**0.0215**	**5.7200e-003**	**1.0000e-004**	**5.8200e-003**	**0.0000**	**17.0204**	**17.0204**	**3.4000e-004**	**3.7000e-004**	**17.1406**

Phase 1 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.07	-0.01	0.00	0.88	0.88	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.43	0.14	-0.07	0.00	0.82	0.81	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading	0.67	0.40	-0.32	0.00	0.92	0.91	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	0.49	0.06	-0.05	0.00	0.92	0.91	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.62	-0.05	-0.18	0.00	0.92	0.91	0.00	0.00	0.00	0.00	0.00	0.00
Rough Grading	0.68	0.42	-0.31	0.00	0.92	0.92	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.72	0.55	-0.25	0.00	0.95	0.94	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	0.70	0.14	-0.11	0.00	0.95	0.94	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	Tier 4 Interim	1	1	No Change	0.00
Cranes	Diesel	Tier 4 Interim	1	1	No Change	0.00
Excavators	Diesel	Tier 4 Interim	6	6	No Change	0.00
Forklifts	Diesel	Tier 4 Interim	3	3	No Change	0.00
Generator Sets	Diesel	Tier 4 Interim	1	1	No Change	0.00
Graders	Diesel	Tier 4 Interim	2	2	No Change	0.00
Pavers	Diesel	Tier 4 Interim	2	2	No Change	0.00
Paving Equipment	Diesel	Tier 4 Interim	2	2	No Change	0.00
Rollers	Diesel	Tier 4 Interim	2	2	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Interim	5	5	No Change	0.00
Scrapers	Diesel	Tier 4 Interim	4	4	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Interim	12	12	No Change	0.00
Trenchers	Diesel	Tier 4 Interim	1	1	No Change	0.00

Phase 1 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Welders	Diesel	Tier 4 Interim	1	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	7.69000E-003	5.15500E-002	8.14100E-002	1.30000E-004	2.32000E-003	2.32000E-003	0.00000E+000	1.14896E+001	1.14896E+001	6.30000E-004	0.00000E+000	1.15053E+001
Cranes	3.90200E-002	4.05720E-001	2.11710E-001	6.90000E-004	1.70200E-002	1.56500E-002	0.00000E+000	6.09922E+001	6.09922E+001	1.97300E-002	0.00000E+000	6.14854E+001
Excavators	4.23300E-002	3.35980E-001	7.53630E-001	1.19000E-003	1.65100E-002	1.51900E-002	0.00000E+000	1.04824E+002	1.04824E+002	3.39000E-002	0.00000E+000	1.05671E+002
Forklifts	3.76700E-002	3.53930E-001	4.69060E-001	6.30000E-004	1.98800E-002	1.82900E-002	0.00000E+000	5.53952E+001	5.53952E+001	1.79200E-002	0.00000E+000	5.58431E+001
Generator Sets	3.81900E-002	3.41820E-001	5.03550E-001	9.00000E-004	1.44000E-002	1.44000E-002	0.00000E+000	7.77160E+001	7.77160E+001	3.04000E-003	0.00000E+000	7.77920E+001
Graders	3.30000E-002	3.91760E-001	1.51050E-001	6.00000E-004	1.27000E-002	1.16800E-002	0.00000E+000	5.25957E+001	5.25957E+001	1.70100E-002	0.00000E+000	5.30210E+001
Pavers	1.68900E-002	1.60250E-001	2.66150E-001	4.30000E-004	7.48000E-003	6.88000E-003	0.00000E+000	3.79883E+001	3.79883E+001	1.22900E-002	0.00000E+000	3.82954E+001
Paving Equipment	1.51600E-002	1.37640E-001	2.36430E-001	3.70000E-004	6.65000E-003	6.12000E-003	0.00000E+000	3.29225E+001	3.29225E+001	1.06500E-002	0.00000E+000	3.31887E+001
Rollers	1.34100E-002	1.40240E-001	1.70210E-001	2.40000E-004	7.42000E-003	6.83000E-003	0.00000E+000	2.12113E+001	2.12113E+001	6.86000E-003	0.00000E+000	2.13828E+001
Rubber Tired Dozers	1.09820E-001	1.13681E+000	4.96920E-001	1.36000E-003	5.12000E-002	4.71100E-002	0.00000E+000	1.19663E+002	1.19663E+002	3.87000E-002	0.00000E+000	1.20630E+002
Scrapers	1.39250E-001	1.42995E+000	1.09074E+000	2.75000E-003	5.63500E-002	5.18500E-002	0.00000E+000	2.41285E+002	2.41285E+002	7.80400E-002	0.00000E+000	2.43236E+002
Tractors/Loaders/Backhoes	9.72700E-002	9.81510E-001	1.51745E+000	2.12000E-003	4.48500E-002	4.12700E-002	0.00000E+000	1.86012E+002	1.86012E+002	6.01600E-002	0.00000E+000	1.87516E+002
Trenchers	1.37000E-002	1.27480E-001	1.03690E-001	1.40000E-004	8.83000E-003	8.12000E-003	0.00000E+000	1.18723E+001	1.18723E+001	3.84000E-003	0.00000E+000	1.19683E+001
Welders	3.15600E-002	1.87760E-001	2.28110E-001	3.50000E-004	6.17000E-003	6.17000E-003	0.00000E+000	2.58803E+001	2.58803E+001	2.57000E-003	0.00000E+000	2.59446E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	2.45000E-003	4.76900E-002	8.24600E-002	1.30000E-004	1.80000E-004	1.80000E-004	0.00000E+000	1.14896E+001	1.14896E+001	6.30000E-004	0.00000E+000	1.15053E+001
Cranes	1.13700E-002	1.83370E-001	3.69590E-001	6.90000E-004	1.14000E-003	1.14000E-003	0.00000E+000	6.09921E+001	6.09921E+001	1.97300E-002	0.00000E+000	6.14853E+001
Excavators	1.46800E-002	5.25910E-001	9.05060E-001	1.19000E-003	1.96000E-003	1.96000E-003	0.00000E+000	1.04823E+002	1.04823E+002	3.39000E-002	0.00000E+000	1.05671E+002
Forklifts	1.42400E-002	2.77130E-001	4.79150E-001	6.30000E-004	1.04000E-003	1.04000E-003	0.00000E+000	5.53951E+001	5.53951E+001	1.79200E-002	0.00000E+000	5.58430E+001
Generator Sets	1.65800E-002	3.22590E-001	5.57750E-001	9.00000E-004	1.21000E-003	1.21000E-003	0.00000E+000	7.77159E+001	7.77159E+001	3.04000E-003	0.00000E+000	7.77919E+001
Graders	9.79000E-003	1.57870E-001	3.18180E-001	6.00000E-004	9.80000E-004	9.80000E-004	0.00000E+000	5.25957E+001	5.25957E+001	1.70100E-002	0.00000E+000	5.30209E+001
Pavers	5.32000E-003	1.90480E-001	3.27800E-001	4.30000E-004	7.10000E-004	7.10000E-004	0.00000E+000	3.79882E+001	3.79882E+001	1.22900E-002	0.00000E+000	3.82954E+001
Paving Equipment	4.63000E-003	1.65780E-001	2.85290E-001	3.70000E-004	6.20000E-004	6.20000E-004	0.00000E+000	3.29225E+001	3.29225E+001	1.06500E-002	0.00000E+000	3.31887E+001

Phase 1 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rollers	5.43000E-003	1.05560E-001	1.82510E-001	2.40000E-004	3.90000E-004	3.90000E-004	0.00000E+000	2.12112E+001	2.12112E+001	6.86000E-003	0.00000E+000	2.13827E+001
Rubber Tired Dozers	2.22300E-002	3.58530E-001	7.22630E-001	1.36000E-003	2.22000E-003	2.22000E-003	0.00000E+000	1.19662E+002	1.19662E+002	3.87000E-002	0.00000E+000	1.20630E+002
Scrapers	4.49900E-002	7.25440E-001	1.46212E+000	2.75000E-003	4.50000E-003	4.50000E-003	0.00000E+000	2.41285E+002	2.41285E+002	7.80400E-002	0.00000E+000	2.43236E+002
Tractors/Loaders/Backhoes	4.73100E-002	9.20370E-001	1.59129E+000	2.12000E-003	3.44000E-003	3.44000E-003	0.00000E+000	1.86012E+002	1.86012E+002	6.01600E-002	0.00000E+000	1.87516E+002
Trenchers	3.03000E-003	5.88800E-002	1.01800E-001	1.40000E-004	2.20000E-004	2.20000E-004	0.00000E+000	1.18723E+001	1.18723E+001	3.84000E-003	0.00000E+000	1.19683E+001
Welders	6.02000E-003	2.28410E-001	2.05820E-001	3.50000E-004	6.43000E-003	6.43000E-003	0.00000E+000	2.58803E+001	2.58803E+001	2.57000E-003	0.00000E+000	2.59446E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Air Compressors	6.81404E-001	7.48788E-002	-1.28977E-002	0.00000E+000	9.22414E-001	9.22414E-001	0.00000E+000	8.70349E-007	8.70349E-007	0.00000E+000	0.00000E+000	8.69164E-007
Cranes	7.08611E-001	5.48038E-001	-7.45737E-001	0.00000E+000	9.33020E-001	9.27157E-001	0.00000E+000	1.14769E-006	1.14769E-006	0.00000E+000	0.00000E+000	1.13848E-006
Excavators	6.53201E-001	-5.65302E-001	-2.00934E-001	0.00000E+000	8.81284E-001	8.70968E-001	0.00000E+000	1.14478E-006	1.14478E-006	0.00000E+000	0.00000E+000	1.13560E-006
Forklifts	6.21980E-001	2.16992E-001	-2.15111E-002	0.00000E+000	9.47686E-001	9.43138E-001	0.00000E+000	1.26365E-006	1.26365E-006	0.00000E+000	0.00000E+000	1.07444E-006
Generator Sets	5.65855E-001	5.62577E-002	-1.07636E-001	0.00000E+000	9.15972E-001	9.15972E-001	0.00000E+000	1.15806E-006	1.15806E-006	0.00000E+000	0.00000E+000	1.15693E-006
Graders	7.03333E-001	5.97024E-001	-1.10645E+000	0.00000E+000	9.22835E-001	9.16096E-001	0.00000E+000	1.14078E-006	1.14078E-006	0.00000E+000	0.00000E+000	1.13163E-006
Pavers	6.85021E-001	-1.88643E-001	-2.31636E-001	0.00000E+000	9.05080E-001	8.96802E-001	0.00000E+000	1.31620E-006	1.31620E-006	0.00000E+000	0.00000E+000	1.04451E-006
Paving Equipment	6.94591E-001	-2.04446E-001	-2.06657E-001	0.00000E+000	9.06767E-001	8.98693E-001	0.00000E+000	1.21497E-006	1.21497E-006	0.00000E+000	0.00000E+000	1.20523E-006
Rollers	5.95078E-001	2.47290E-001	-7.22637E-002	0.00000E+000	9.47439E-001	9.42899E-001	0.00000E+000	9.42896E-007	9.42896E-007	0.00000E+000	0.00000E+000	1.40300E-006
Rubber Tired Dozers	7.97578E-001	6.84617E-001	-4.54218E-001	0.00000E+000	9.56641E-001	9.52876E-001	0.00000E+000	1.16996E-006	1.16996E-006	0.00000E+000	0.00000E+000	1.16057E-006
Scrapers	6.76912E-001	4.92682E-001	-3.40484E-001	0.00000E+000	9.20142E-001	9.13211E-001	0.00000E+000	1.20190E-006	1.20190E-006	0.00000E+000	0.00000E+000	1.19226E-006
Tractors/Loaders/Backhoes	5.13622E-001	6.22918E-002	-4.86606E-002	0.00000E+000	9.23300E-001	9.16646E-001	0.00000E+000	1.18272E-006	1.18272E-006	0.00000E+000	0.00000E+000	1.17323E-006
Trenchers	7.78832E-001	5.38124E-001	1.82274E-002	0.00000E+000	9.75085E-001	9.72906E-001	0.00000E+000	1.68459E-006	1.68459E-006	0.00000E+000	0.00000E+000	8.35539E-007
Welders	8.09252E-001	-2.16500E-001	9.77160E-002	0.00000E+000	-4.21394E-002	-4.21394E-002	0.00000E+000	1.15918E-006	1.15918E-006	0.00000E+000	0.00000E+000	1.15631E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			

Phase 1 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.02	0.01	0.02	0.01	0.08	0.07
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	0.41	0.11	0.38	0.10	0.08	0.07
Fine Grading	Fugitive Dust	0.41	0.16	0.18	0.07	0.57	0.57
Fine Grading	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Finishing/Landscaping	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	Roads	0.00	0.00	0.00	0.00	0.08	0.08
Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.01	0.00	0.01	0.00	0.08	0.07
Rough Grading	Fugitive Dust	0.56	0.18	0.24	0.08	0.57	0.57
Rough Grading	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Site Preparation	Fugitive Dust	0.45	0.23	0.19	0.10	0.57	0.57
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.07	0.06
Utility Trenching	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	Roads	0.00	0.00	0.00	0.00	0.08	0.06

CalEEMod Output: Phase 2 Construction – Mitigated

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Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 Construction - Mitigated Tier 4 Interim

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.20	Acre	1.20	52,272.00	0
Other Non-Asphalt Surfaces	5.27	Acre	5.27	0.00	0
Parking Lot	53.60	1000sqft	1.23	53,600.00	0
City Park	13.00	Acre	13.00	566,280.00	0
Condo/Townhouse	507.00	Dwelling Unit	49.00	507,000.00	1450
Single Family Housing	105.00	Dwelling Unit	25.20	189,000.00	300

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2027
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumption in the AQ/GHG Appendix of the DEIR.

Construction Phase - See

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Grading -

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
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tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	60.00	70.00

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	155.00	139.00
tblConstructionPhase	NumDays	155.00	141.00
tblConstructionPhase	NumDays	110.00	143.00
tblConstructionPhase	NumDays	1,550.00	423.00
tblConstructionPhase	NumDays	110.00	142.00
tblLandUse	LandUseSquareFeet	229,561.20	0.00
tblLandUse	LotAcreage	31.69	49.00
tblLandUse	LotAcreage	34.09	25.20
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	2.7165	27.4847	18.9647	0.0411	19.9094	1.2318	21.1412	10.1705	1.1333	11.3039	0.0000	4,013.0949	4,013.0949	1.2057	0.0259	4,050.9479
2025	6.6022	62.4555	63.4979	0.1476	19.9094	2.5862	21.7345	10.1705	2.3795	11.1727	0.0000	14,883.3552	14,883.3552	4.3626	0.6132	15,109.7124
2026	4.2974	29.4068	53.2864	0.1428	8.9832	1.0684	10.0516	2.4078	0.9950	3.4028	0.0000	14,671.1867	14,671.1867	1.7370	0.5992	14,893.1632
2027	34.4355	20.6644	40.3177	0.1274	10.3133	0.6507	10.9641	2.7606	0.6149	3.3755	0.0000	13,291.6521	13,291.6521	0.9506	0.6052	13,495.7806
Maximum	**34.4355**	**62.4555**	**63.4979**	**0.1476**	**19.9094**	**2.5862**	**21.7345**	**10.1705**	**2.3795**	**11.3039**	**0.0000**	**14,883.3552**	**14,883.3552**	**4.3626**	**0.6132**	**15,109.7124**

Mitigated Construction

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	0.7524	12.4707	23.5891	0.0411	8.6367	0.0646	8.7013	4.3822	0.0644	4.4466	0.0000	4,013.0949	4,013.0949	1.2057	0.0259	4,050.9479
2025	2.9129	45.7499	85.5746	0.1476	8.6367	0.2341	8.7892	4.3822	0.2336	4.4466	0.0000	14,883.3552	14,883.3552	4.3626	0.6132	15,109.7124
2026	2.8199	29.3266	57.9057	0.1428	8.2961	0.1952	8.4914	2.2392	0.1910	2.4302	0.0000	14,671.1867	14,671.1867	1.7370	0.5992	14,893.1632
2027	33.4852	19.0212	42.1301	0.1274	9.5222	0.1602	9.6824	2.5664	0.1557	2.7221	0.0000	13,291.6521	13,291.6521	0.9506	0.6052	13,495.7806
Maximum	**33.4852**	**45.7499**	**85.5746**	**0.1476**	**9.5222**	**0.2341**	**9.6824**	**4.3822**	**0.2336**	**4.4466**	**0.0000**	**14,883.3552**	**14,883.3552**	**4.3626**	**0.6132**	**15,109.7124**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**16.82**	**23.89**	**-18.82**	**0.00**	**40.64**	**88.19**	**44.18**	**46.80**	**87.41**	**51.99**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	1/6/2025	5	70	
2	Rough Grading	Grading	1/7/2025	7/20/2025	5	139	
3	Utility Trenching	Trenching	3/21/2025	9/7/2025	5	121	
4	Fine Grading	Grading	6/2/2025	12/15/2025	5	141	
5	Paving	Paving	9/9/2025	3/26/2026	5	143	
6	Finishing/Landscaping	Trenching	10/29/2025	5/13/2026	5	141	
7	Building Construction	Building Construction	12/17/2025	7/31/2027	5	423	
8	Architectural Coating	Architectural Coating	1/14/2027	7/31/2027	5	142	

Acres of Grading (Site Preparation Phase): 105

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 417

Acres of Paving: 7.7

Residential Indoor: 1,409,400; Residential Outdoor: 469,800; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 6,352

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Rough Grading	Excavators	2	8.00	158	0.38
Rough Grading	Graders	1	8.00	187	0.41
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Fine Grading	Excavators	2	8.00	158	0.38
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	685.00	176.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.9600e-003	0.2795	0.1154	1.4100e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4400e-003	0.0162		155.5091	155.5091	9.4900e-003	0.0224	162.4240
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0556**	**0.3087**	**0.6291**	**3.0500e-003**	**0.2524**	**2.4900e-003**	**0.2548**	**0.0681**	**2.3400e-003**	**0.0704**		**325.0850**	**325.0850**	**0.0129**	**0.0259**	**333.1185**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.9600e-003	0.2795	0.1154	1.4100e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4400e-003	0.0154		155.5091	155.5091	9.4900e-003	0.0224	162.4240
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0556**	**0.3087**	**0.6291**	**3.0500e-003**	**0.2333**	**2.4900e-003**	**0.2358**	**0.0634**	**2.3400e-003**	**0.0658**		**325.0850**	**325.0850**	**0.0129**	**0.0259**	**333.1185**

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8400e-003	0.2782	0.1149	1.3800e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4500e-003	0.0162		152.5978	152.5978	9.6100e-003	0.0221	159.4184
Worker	0.0450	0.0264	0.4833	1.5900e-003	0.2012	9.4000e-004	0.2021	0.0534	8.6000e-004	0.0542		165.4292	165.4292	3.1100e-003	3.2600e-003	166.4788

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0529**	**0.3046**	**0.5982**	**2.9700e-003**	**0.2524**	**2.4500e-003**	**0.2548**	**0.0681**	**2.3100e-003**	**0.0704**		**318.0270**	**318.0270**	**0.0127**	**0.0253**	**325.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.8400e-003	0.2782	0.1149	1.3800e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4500e-003	0.0154		152.5978	152.5978	9.6100e-003	0.0221	159.4184
Worker	0.0450	0.0264	0.4833	1.5900e-003	0.1855	9.4000e-004	0.1864	0.0495	8.6000e-004	0.0504		165.4292	165.4292	3.1100e-003	3.2600e-003	166.4788
Total	**0.0529**	**0.3046**	**0.5982**	**2.9700e-003**	**0.2333**	**2.4500e-003**	**0.2358**	**0.0634**	**2.3100e-003**	**0.0657**		**318.0270**	**318.0270**	**0.0127**	**0.0253**	**325.8973**

3.3 Rough Grading - 2025

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3259**	**4.0700e-003**	**0.3299**	**0.0887**	**3.8600e-003**	**0.0926**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3018**	**4.0700e-003**	**0.3059**	**0.0828**	**3.8600e-003**	**0.0867**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

3.4 Utility Trenching - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6482	5.3866	9.0874	0.0137		0.3158	0.3158		0.2906	0.2906		1,328.0209	1,328.0209	0.4295		1,338.7586
Total	**0.6482**	**5.3866**	**9.0874**	**0.0137**		**0.3158**	**0.3158**		**0.2906**	**0.2906**		**1,328.0209**	**1,328.0209**	**0.4295**		**1,338.7586**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0200	0.0117	0.2148	7.1000e-004	0.0894	4.2000e-004	0.0898	0.0237	3.8000e-004	0.0241		73.5241	73.5241	1.3800e-003	1.4500e-003	73.9906
Total	**0.0200**	**0.0117**	**0.2148**	**7.1000e-004**	**0.0894**	**4.2000e-004**	**0.0898**	**0.0237**	**3.8000e-004**	**0.0241**		**73.5241**	**73.5241**	**1.3800e-003**	**1.4500e-003**	**73.9906**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2027	6.0254	10.3811	0.0137		0.0225	0.0225		0.0225	0.0225	0.0000	1,328.0209	1,328.0209	0.4295		1,338.7586
Total	**0.2027**	**6.0254**	**10.3811**	**0.0137**		**0.0225**	**0.0225**		**0.0225**	**0.0225**	**0.0000**	**1,328.0209**	**1,328.0209**	**0.4295**		**1,338.7586**

Mitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0200	0.0117	0.2148	7.1000e-004	0.0824	4.2000e-004	0.0828	0.0220	3.8000e-004	0.0224		73.5241	73.5241	1.3800e-003	1.4500e-003	73.9906
Total	**0.0200**	**0.0117**	**0.2148**	**7.1000e-004**	**0.0824**	**4.2000e-004**	**0.0828**	**0.0220**	**3.8000e-004**	**0.0224**		**73.5241**	**73.5241**	**1.3800e-003**	**1.4500e-003**	**73.9906**

3.5 Fine Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3259**	**4.0700e-003**	**0.3299**	**0.0887**	**3.8600e-003**	**0.0926**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0157	0.5563	0.2298	2.7700e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		305.1956	305.1956	0.0192	0.0442	318.8369
Worker	0.0500	0.0294	0.5369	1.7600e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		183.8102	183.8102	3.4500e-003	3.6200e-003	184.9765
Total	**0.0657**	**0.5857**	**0.7668**	**4.5300e-003**	**0.3018**	**4.0700e-003**	**0.3059**	**0.0828**	**3.8600e-003**	**0.0867**		**489.0058**	**489.0058**	**0.0227**	**0.0478**	**503.8134**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0375	0.0220	0.4027	1.3200e-003	0.1677	7.8000e-004	0.1685	0.0445	7.2000e-004	0.0452		137.8576	137.8576	2.5900e-003	2.7200e-003	138.7324
Total	**0.0375**	**0.0220**	**0.4027**	**1.3200e-003**	**0.1677**	**7.8000e-004**	**0.1685**	**0.0445**	**7.2000e-004**	**0.0452**		**137.8576**	**137.8576**	**2.5900e-003**	**2.7200e-003**	**138.7324**

Mitigated Construction On-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	10.0395	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3786**	**10.0395**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0375	0.0220	0.4027	1.3200e-003	0.1546	7.8000e-004	0.1553	0.0413	7.2000e-004	0.0420		137.8576	137.8576	2.5900e-003	2.7200e-003	138.7324
Total	**0.0375**	**0.0220**	**0.4027**	**1.3200e-003**	**0.1546**	**7.8000e-004**	**0.1553**	**0.0413**	**7.2000e-004**	**0.0420**		**137.8576**	**137.8576**	**2.5900e-003**	**2.7200e-003**	**138.7324**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0356	0.0202	0.3814	1.2800e-003	0.1677	7.4000e-004	0.1684	0.0445	6.9000e-004	0.0452		134.7032	134.7032	2.3600e-003	2.5800e-003	135.5305
Total	**0.0356**	**0.0202**	**0.3814**	**1.2800e-003**	**0.1677**	**7.4000e-004**	**0.1684**	**0.0445**	**6.9000e-004**	**0.0452**		**134.7032**	**134.7032**	**2.3600e-003**	**2.5800e-003**	**135.5305**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	10.0395	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3786**	**10.0395**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0356	0.0202	0.3814	1.2800e-003	0.1546	7.4000e-004	0.1553	0.0413	6.9000e-004	0.0419		134.7032	134.7032	2.3600e-003	2.5800e-003	135.5305
Total	**0.0356**	**0.0202**	**0.3814**	**1.2800e-003**	**0.1546**	**7.4000e-004**	**0.1553**	**0.0413**	**6.9000e-004**	**0.0419**		**134.7032**	**134.7032**	**2.3600e-003**	**2.5800e-003**	**135.5305**

3.7 Finishing/Landscaping - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1321	1.3351	2.2297	3.1200e-003		0.0541	0.0541		0.0498	0.0498		302.0559	302.0559	0.0977		304.4981
Total	**0.1321**	**1.3351**	**2.2297**	**3.1200e-003**		**0.0541**	**0.0541**		**0.0498**	**0.0498**		**302.0559**	**302.0559**	**0.0977**		**304.4981**

Unmitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-003	4.4000e-003	0.0805	2.6000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.4000e-004	9.0400e-003		27.5715	27.5715	5.2000e-004	5.4000e-004	27.7465
Total	**7.5000e-003**	**4.4000e-003**	**0.0805**	**2.6000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0400e-003**		**27.5715**	**27.5715**	**5.2000e-004**	**5.4000e-004**	**27.7465**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0696	1.3546	2.3421	3.1200e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	302.0559	302.0559	0.0977		304.4981
Total	**0.0696**	**1.3546**	**2.3421**	**3.1200e-003**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**302.0559**	**302.0559**	**0.0977**		**304.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	7.5000e-003	4.4000e-003	0.0805	2.6000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		27.5715	27.5715	5.2000e-004	5.4000e-004	27.7465
Total	**7.5000e-003**	**4.4000e-003**	**0.0805**	**2.6000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**27.5715**	**27.5715**	**5.2000e-004**	**5.4000e-004**	**27.7465**

3.7 Finishing/Landscaping - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1321	1.3351	2.2297	3.1200e-003		0.0541	0.0541		0.0498	0.0498		302.0559	302.0559	0.0977		304.4981
Total	**0.1321**	**1.3351**	**2.2297**	**3.1200e-003**		**0.0541**	**0.0541**		**0.0498**	**0.0498**		**302.0559**	**302.0559**	**0.0977**		**304.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1200e-003	4.0300e-003	0.0763	2.6000e-004	0.0335	1.5000e-004	0.0337	8.8900e-003	1.4000e-004	9.0300e-003		26.9407	26.9407	4.7000e-004	5.2000e-004	27.1061
Total	**7.1200e-003**	**4.0300e-003**	**0.0763**	**2.6000e-004**	**0.0335**	**1.5000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0300e-003**		**26.9407**	**26.9407**	**4.7000e-004**	**5.2000e-004**	**27.1061**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0696	1.3546	2.3421	3.1200e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	302.0559	302.0559	0.0977		304.4981
Total	**0.0696**	**1.3546**	**2.3421**	**3.1200e-003**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**302.0559**	**302.0559**	**0.0977**		**304.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1200e-003	4.0300e-003	0.0763	2.6000e-004	0.0309	1.5000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		26.9407	26.9407	4.7000e-004	5.2000e-004	27.1061
Total	**7.1200e-003**	**4.0300e-003**	**0.0763**	**2.6000e-004**	**0.0309**	**1.5000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**26.9407**	**26.9407**	**4.7000e-004**	**5.2000e-004**	**27.1061**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1725	6.1197	2.5282	0.0305	1.1253	0.0333	1.1586	0.3239	0.0319	0.3557		3,357.1517	3,357.1517	0.2115	0.4858	3,507.2057
Worker	1.7136	1.0055	18.3904	0.0604	7.6567	0.0357	7.6924	2.0306	0.0328	2.0634		6,295.4990	6,295.4990	0.1182	0.1241	6,335.4440
Total	**1.8861**	**7.1252**	**20.9186**	**0.0909**	**8.7820**	**0.0690**	**8.8510**	**2.3545**	**0.0647**	**2.4192**		**9,652.6507**	**9,652.6507**	**0.3297**	**0.6099**	**9,842.6496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1725	6.1197	2.5282	0.0305	1.0531	0.0333	1.0864	0.3061	0.0319	0.3380		3,357.1517	3,357.1517	0.2115	0.4858	3,507.2057
Worker	1.7136	1.0055	18.3904	0.0604	7.0576	0.0357	7.0933	1.8835	0.0328	1.9164		6,295.4990	6,295.4990	0.1182	0.1241	6,335.4440
Total	**1.8861**	**7.1252**	**20.9186**	**0.0909**	**8.1107**	**0.0690**	**8.1797**	**2.1897**	**0.0647**	**2.2544**		**9,652.6507**	**9,652.6507**	**0.3297**	**0.6099**	**9,842.6496**

3.8 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1700	6.0757	2.5201	0.0298	1.1253	0.0333	1.1586	0.3239	0.0318	0.3557		3,292.8201	3,292.8201	0.2138	0.4784	3,440.7165
Worker	1.6255	0.9205	17.4164	0.0586	7.6567	0.0340	7.6907	2.0306	0.0313	2.0619		6,151.4474	6,151.4474	0.1080	0.1177	6,189.2261
Total	**1.7954**	**6.9962**	**19.9365**	**0.0884**	**8.7820**	**0.0673**	**8.8493**	**2.3545**	**0.0631**	**2.4176**		**9,444.2675**	**9,444.2675**	**0.3218**	**0.5961**	**9,629.9426**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1700	6.0757	2.5201	0.0298	1.0531	0.0333	1.0864	0.3061	0.0318	0.3380		3,292.8201	3,292.8201	0.2138	0.4784	3,440.7165
Worker	1.6255	0.9205	17.4164	0.0586	7.0576	0.0340	7.0916	1.8835	0.0313	1.9148		6,151.4474	6,151.4474	0.1080	0.1177	6,189.2261
Total	**1.7954**	**6.9962**	**19.9365**	**0.0884**	**8.1107**	**0.0673**	**8.1780**	**2.1897**	**0.0631**	**2.2528**		**9,444.2675**	**9,444.2675**	**0.3218**	**0.5961**	**9,629.9426**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1677	6.0304	2.5125	0.0292	1.1253	0.0332	1.1585	0.3239	0.0318	0.3556		3,225.4361	3,225.4361	0.2153	0.4704	3,370.9958
Worker	1.5441	0.8490	16.5928	0.0569	7.6567	0.0320	7.6887	2.0306	0.0295	2.0601		6,023.5780	6,023.5780	0.0992	0.1124	6,059.5457
Total	**1.7117**	**6.8794**	**19.1054**	**0.0861**	**8.7820**	**0.0653**	**8.8472**	**2.3545**	**0.0613**	**2.4157**		**9,249.0141**	**9,249.0141**	**0.3145**	**0.5828**	**9,430.5415**

Mitigated Construction On-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1677	6.0304	2.5125	0.0292	1.0530	0.0332	1.0863	0.3061	0.0318	0.3379		3,225.4361	3,225.4361	0.2153	0.4704	3,370.9958
Worker	1.5441	0.8490	16.5928	0.0569	7.0576	0.0320	7.0896	1.8835	0.0295	1.9130		6,023.5780	6,023.5780	0.0992	0.1124	6,059.5457
Total	**1.7117**	**6.8794**	**19.1054**	**0.0861**	**8.1106**	**0.0653**	**8.1759**	**2.1897**	**0.0613**	**2.2509**		**9,249.0141**	**9,249.0141**	**0.3145**	**0.5828**	**9,430.5415**

3.9 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**31.0475**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3088	0.1698	3.3186	0.0114	1.5313	6.4100e-003	1.5378	0.4061	5.9000e-003	0.4120		1,204.7156	1,204.7156	0.0198	0.0225	1,211.9091
Total	**0.3088**	**0.1698**	**3.3186**	**0.0114**	**1.5313**	**6.4100e-003**	**1.5378**	**0.4061**	**5.9000e-003**	**0.4120**		**1,204.7156**	**1,204.7156**	**0.0198**	**0.0225**	**1,211.9091**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0545	1.0598	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**30.9312**	**1.0598**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3088	0.1698	3.3186	0.0114	1.4115	6.4100e-003	1.4179	0.3767	5.9000e-003	0.3826		1,204.7156	1,204.7156	0.0198	0.0225	1,211.9091
Total	**0.3088**	**0.1698**	**3.3186**	**0.0114**	**1.4115**	**6.4100e-003**	**1.4179**	**0.3767**	**5.9000e-003**	**0.3826**		**1,204.7156**	**1,204.7156**	**0.0198**	**0.0225**	**1,211.9091**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 Construction - Mitigated Tier 4 Interim

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.20	Acre	1.20	52,272.00	0
Other Non-Asphalt Surfaces	5.27	Acre	5.27	0.00	0
Parking Lot	53.60	1000sqft	1.23	53,600.00	0
City Park	13.00	Acre	13.00	566,280.00	0
Condo/Townhouse	507.00	Dwelling Unit	49.00	507,000.00	1450
Single Family Housing	105.00	Dwelling Unit	25.20	189,000.00	300

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2027
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumption in the AQ/GHG Appendix of the DEIR.

Construction Phase - See

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Grading -

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	60.00	70.00

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	155.00	139.00
tblConstructionPhase	NumDays	155.00	141.00
tblConstructionPhase	NumDays	110.00	143.00
tblConstructionPhase	NumDays	1,550.00	423.00
tblConstructionPhase	NumDays	110.00	142.00
tblLandUse	LandUseSquareFeet	229,561.20	0.00
tblLandUse	LotAcreage	31.69	49.00
tblLandUse	LotAcreage	34.09	25.20
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	2.7209	27.5000	18.9337	0.0411	19.9094	1.2318	21.1412	10.1705	1.1334	11.3039	0.0000	4,005.2342	4,005.2342	1.2058	0.0262	4,043.1696
2025	6.6130	62.5122	63.4261	0.1474	19.9094	2.5862	21.7345	10.1705	2.3795	11.1727	0.0000	14,580.7276	14,580.7276	4.3628	0.6224	14,809.8826
2026	4.4632	29.7716	52.1765	0.1400	8.9832	1.0685	10.0517	2.4078	0.9952	3.4030	0.0000	14,376.0458	14,376.0458	1.7396	0.6079	14,600.6773
2027	34.6257	21.0350	39.0773	0.1242	10.3133	0.6509	10.9642	2.7606	0.6151	3.3757	0.0000	12,953.2978	12,953.2978	0.9535	0.6148	13,160.3401
Maximum	**34.6257**	**62.5122**	**63.4261**	**0.1474**	**19.9094**	**2.5862**	**21.7345**	**10.1705**	**2.3795**	**11.3039**	**0.0000**	**14,580.7276**	**14,580.7276**	**4.3628**	**0.6224**	**14,809.8826**

Mitigated Construction

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	0.7567	12.4861	23.5581	0.0411	8.6367	0.0646	8.7013	4.3822	0.0644	4.4466	0.0000	4,005.2342	4,005.2342	1.2058	0.0262	4,043.1696
2025	3.0822	45.8066	85.5027	0.1474	8.6367	0.2341	8.7892	4.3822	0.2337	4.4466	0.0000	14,580.7276	14,580.7276	4.3628	0.6224	14,809.8826
2026	2.9858	29.6915	56.7957	0.1400	8.2961	0.1954	8.4915	2.2392	0.1912	2.4304	0.0000	14,376.0458	14,376.0458	1.7396	0.6079	14,600.6773
2027	33.6754	19.3918	40.8897	0.1242	9.5222	0.1604	9.6825	2.5664	0.1559	2.7222	0.0000	12,953.2978	12,953.2978	0.9535	0.6148	13,160.3401
Maximum	**33.6754**	**45.8066**	**85.5027**	**0.1474**	**9.5222**	**0.2341**	**9.6825**	**4.3822**	**0.2337**	**4.4466**	**0.0000**	**14,580.7276**	**14,580.7276**	**4.3628**	**0.6224**	**14,809.8826**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**16.36**	**23.75**	**-19.08**	**0.00**	**40.64**	**88.18**	**44.18**	**46.80**	**87.41**	**51.99**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	1/6/2025	5	70	
2	Rough Grading	Grading	1/7/2025	7/20/2025	5	139	
3	Utility Trenching	Trenching	3/21/2025	9/7/2025	5	121	
4	Fine Grading	Grading	6/2/2025	12/15/2025	5	141	
5	Paving	Paving	9/9/2025	3/26/2026	5	143	
6	Finishing/Landscaping	Trenching	10/29/2025	5/13/2026	5	141	
7	Building Construction	Building Construction	12/17/2025	7/31/2027	5	423	
8	Architectural Coating	Architectural Coating	1/14/2027	7/31/2027	5	142	

Acres of Grading (Site Preparation Phase): 105

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 417

Acres of Paving: 7.7

Residential Indoor: 1,409,400; Residential Outdoor: 469,800; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 6,352

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Rough Grading	Excavators	2	8.00	158	0.38
Rough Grading	Graders	1	8.00	187	0.41
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Fine Grading	Excavators	2	8.00	158	0.38
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	685.00	176.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6800e-003	0.2920	0.1190	1.4200e-003	0.0512	1.5100e-003	0.0527	0.0147	1.4500e-003	0.0162		155.7435	155.7435	9.4700e-003	0.0225	162.6728
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0600**	**0.3240**	**0.5981**	**2.9900e-003**	**0.2524**	**2.4900e-003**	**0.2549**	**0.0681**	**2.3500e-003**	**0.0704**		**317.2242**	**317.2242**	**0.0130**	**0.0262**	**325.3402**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6800e-003	0.2920	0.1190	1.4200e-003	0.0479	1.5100e-003	0.0494	0.0139	1.4500e-003	0.0154		155.7435	155.7435	9.4700e-003	0.0225	162.6728
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0600**	**0.3240**	**0.5981**	**2.9900e-003**	**0.2333**	**2.4900e-003**	**0.2358**	**0.0634**	**2.3500e-003**	**0.0658**		**317.2242**	**317.2242**	**0.0130**	**0.0262**	**325.3402**

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.5600e-003	0.2906	0.1185	1.3900e-003	0.0512	1.5200e-003	0.0527	0.0147	1.4600e-003	0.0162		152.8327	152.8327	9.5900e-003	0.0221	159.6675
Worker	0.0495	0.0290	0.4510	1.5100e-003	0.2012	9.4000e-004	0.2021	0.0534	8.6000e-004	0.0542		157.5482	157.5482	3.1900e-003	3.4700e-003	158.6615

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0571**	**0.3196**	**0.5695**	**2.9000e-003**	**0.2524**	**2.4600e-003**	**0.2548**	**0.0681**	**2.3200e-003**	**0.0704**		**310.3809**	**310.3809**	**0.0128**	**0.0256**	**318.3290**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.5600e-003	0.2906	0.1185	1.3900e-003	0.0479	1.5200e-003	0.0494	0.0139	1.4600e-003	0.0154		152.8327	152.8327	9.5900e-003	0.0221	159.6675
Worker	0.0495	0.0290	0.4510	1.5100e-003	0.1855	9.4000e-004	0.1864	0.0495	8.6000e-004	0.0504		157.5482	157.5482	3.1900e-003	3.4700e-003	158.6615
Total	**0.0571**	**0.3196**	**0.5695**	**2.9000e-003**	**0.2333**	**2.4600e-003**	**0.2358**	**0.0634**	**2.3200e-003**	**0.0657**		**310.3809**	**310.3809**	**0.0128**	**0.0256**	**318.3290**

3.3 Rough Grading - 2025

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.1023	3.0400e-003	0.1054	0.0294	2.9100e-003	0.0324		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3259**	**4.0800e-003**	**0.3299**	**0.0887**	**3.8700e-003**	**0.0926**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.0957	3.0400e-003	0.0988	0.0278	2.9100e-003	0.0307		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3018**	**4.0800e-003**	**0.3059**	**0.0828**	**3.8700e-003**	**0.0867**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

3.4 Utility Trenching - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6482	5.3866	9.0874	0.0137		0.3158	0.3158		0.2906	0.2906		1,328.0209	1,328.0209	0.4295		1,338.7586
Total	**0.6482**	**5.3866**	**9.0874**	**0.0137**		**0.3158**	**0.3158**		**0.2906**	**0.2906**		**1,328.0209**	**1,328.0209**	**0.4295**		**1,338.7586**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0220	0.0129	0.2004	6.7000e-004	0.0894	4.2000e-004	0.0898	0.0237	3.8000e-004	0.0241		70.0214	70.0214	1.4200e-003	1.5400e-003	70.5162
Total	**0.0220**	**0.0129**	**0.2004**	**6.7000e-004**	**0.0894**	**4.2000e-004**	**0.0898**	**0.0237**	**3.8000e-004**	**0.0241**		**70.0214**	**70.0214**	**1.4200e-003**	**1.5400e-003**	**70.5162**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2027	6.0254	10.3811	0.0137		0.0225	0.0225		0.0225	0.0225	0.0000	1,328.0209	1,328.0209	0.4295		1,338.7586
Total	**0.2027**	**6.0254**	**10.3811**	**0.0137**		**0.0225**	**0.0225**		**0.0225**	**0.0225**	**0.0000**	**1,328.0209**	**1,328.0209**	**0.4295**		**1,338.7586**

Mitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0220	0.0129	0.2004	6.7000e-004	0.0824	4.2000e-004	0.0828	0.0220	3.8000e-004	0.0224		70.0214	70.0214	1.4200e-003	1.5400e-003	70.5162
Total	**0.0220**	**0.0129**	**0.2004**	**6.7000e-004**	**0.0824**	**4.2000e-004**	**0.0828**	**0.0220**	**3.8000e-004**	**0.0224**		**70.0214**	**70.0214**	**1.4200e-003**	**1.5400e-003**	**70.5162**

3.5 Fine Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.1023	3.0400e-003	0.1054	0.0294	2.9100e-003	0.0324		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2236	1.0400e-003	0.2246	0.0593	9.6000e-004	0.0603		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3259**	**4.0800e-003**	**0.3299**	**0.0887**	**3.8700e-003**	**0.0926**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9345	0.0000	3.9345	1.5620	0.0000	1.5620			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9345**	**0.1015**	**4.0361**	**1.5620**	**0.1015**	**1.6635**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0151	0.5813	0.2369	2.7700e-003	0.0957	3.0400e-003	0.0988	0.0278	2.9100e-003	0.0307		305.6655	305.6655	0.0192	0.0443	319.3350
Worker	0.0550	0.0322	0.5011	1.6800e-003	0.2061	1.0400e-003	0.2071	0.0550	9.6000e-004	0.0560		175.0535	175.0535	3.5400e-003	3.8500e-003	176.2906
Total	**0.0702**	**0.6135**	**0.7380**	**4.4500e-003**	**0.3018**	**4.0800e-003**	**0.3059**	**0.0828**	**3.8700e-003**	**0.0867**		**480.7190**	**480.7190**	**0.0227**	**0.0481**	**495.6256**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0413	0.0242	0.3758	1.2600e-003	0.1677	7.8000e-004	0.1685	0.0445	7.2000e-004	0.0452		131.2902	131.2902	2.6600e-003	2.8900e-003	132.2179
Total	**0.0413**	**0.0242**	**0.3758**	**1.2600e-003**	**0.1677**	**7.8000e-004**	**0.1685**	**0.0445**	**7.2000e-004**	**0.0452**		**131.2902**	**131.2902**	**2.6600e-003**	**2.8900e-003**	**132.2179**

Mitigated Construction On-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	10.0395	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3786**	**10.0395**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0413	0.0242	0.3758	1.2600e-003	0.1546	7.8000e-004	0.1553	0.0413	7.2000e-004	0.0420		131.2902	131.2902	2.6600e-003	2.8900e-003	132.2179
Total	**0.0413**	**0.0242**	**0.3758**	**1.2600e-003**	**0.1546**	**7.8000e-004**	**0.1553**	**0.0413**	**7.2000e-004**	**0.0420**		**131.2902**	**131.2902**	**2.6600e-003**	**2.8900e-003**	**132.2179**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9597**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0393	0.0221	0.3561	1.2200e-003	0.1677	7.4000e-004	0.1684	0.0445	6.9000e-004	0.0452		128.2955	128.2955	2.4300e-003	2.7400e-003	129.1730
Total	**0.0393**	**0.0221**	**0.3561**	**1.2200e-003**	**0.1677**	**7.4000e-004**	**0.1684**	**0.0445**	**6.9000e-004**	**0.0452**		**128.2955**	**128.2955**	**2.4300e-003**	**2.7400e-003**	**129.1730**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	10.0395	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0445					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3786**	**10.0395**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0393	0.0221	0.3561	1.2200e-003	0.1546	7.4000e-004	0.1553	0.0413	6.9000e-004	0.0419		128.2955	128.2955	2.4300e-003	2.7400e-003	129.1730
Total	**0.0393**	**0.0221**	**0.3561**	**1.2200e-003**	**0.1546**	**7.4000e-004**	**0.1553**	**0.0413**	**6.9000e-004**	**0.0419**		**128.2955**	**128.2955**	**2.4300e-003**	**2.7400e-003**	**129.1730**

3.7 Finishing/Landscaping - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1321	1.3351	2.2297	3.1200e-003		0.0541	0.0541		0.0498	0.0498		302.0559	302.0559	0.0977		304.4981
Total	**0.1321**	**1.3351**	**2.2297**	**3.1200e-003**		**0.0541**	**0.0541**		**0.0498**	**0.0498**		**302.0559**	**302.0559**	**0.0977**		**304.4981**

Unmitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2500e-003	4.8300e-003	0.0752	2.5000e-004	0.0335	1.6000e-004	0.0337	8.8900e-003	1.4000e-004	9.0400e-003		26.2580	26.2580	5.3000e-004	5.8000e-004	26.4436
Total	**8.2500e-003**	**4.8300e-003**	**0.0752**	**2.5000e-004**	**0.0335**	**1.6000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0400e-003**		**26.2580**	**26.2580**	**5.3000e-004**	**5.8000e-004**	**26.4436**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0696	1.3546	2.3421	3.1200e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	302.0559	302.0559	0.0977		304.4981
Total	**0.0696**	**1.3546**	**2.3421**	**3.1200e-003**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**302.0559**	**302.0559**	**0.0977**		**304.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	8.2500e-003	4.8300e-003	0.0752	2.5000e-004	0.0309	1.6000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		26.2580	26.2580	5.3000e-004	5.8000e-004	26.4436
Total	**8.2500e-003**	**4.8300e-003**	**0.0752**	**2.5000e-004**	**0.0309**	**1.6000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**26.2580**	**26.2580**	**5.3000e-004**	**5.8000e-004**	**26.4436**

3.7 Finishing/Landscaping - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1321	1.3351	2.2297	3.1200e-003		0.0541	0.0541		0.0498	0.0498		302.0559	302.0559	0.0977		304.4981
Total	**0.1321**	**1.3351**	**2.2297**	**3.1200e-003**		**0.0541**	**0.0541**		**0.0498**	**0.0498**		**302.0559**	**302.0559**	**0.0977**		**304.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.8500e-003	4.4200e-003	0.0712	2.4000e-004	0.0335	1.5000e-004	0.0337	8.8900e-003	1.4000e-004	9.0300e-003		25.6591	25.6591	4.9000e-004	5.5000e-004	25.8346
Total	**7.8500e-003**	**4.4200e-003**	**0.0712**	**2.4000e-004**	**0.0335**	**1.5000e-004**	**0.0337**	**8.8900e-003**	**1.4000e-004**	**9.0300e-003**		**25.6591**	**25.6591**	**4.9000e-004**	**5.5000e-004**	**25.8346**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0696	1.3546	2.3421	3.1200e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	302.0559	302.0559	0.0977		304.4981
Total	**0.0696**	**1.3546**	**2.3421**	**3.1200e-003**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**302.0559**	**302.0559**	**0.0977**		**304.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.8500e-003	4.4200e-003	0.0712	2.4000e-004	0.0309	1.5000e-004	0.0311	8.2500e-003	1.4000e-004	8.3900e-003		25.6591	25.6591	4.9000e-004	5.5000e-004	25.8346
Total	**7.8500e-003**	**4.4200e-003**	**0.0712**	**2.4000e-004**	**0.0309**	**1.5000e-004**	**0.0311**	**8.2500e-003**	**1.4000e-004**	**8.3900e-003**		**25.6591**	**25.6591**	**4.9000e-004**	**5.5000e-004**	**25.8346**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1663	6.3938	2.6063	0.0305	1.1253	0.0335	1.1588	0.3239	0.0320	0.3559		3,362.3204	3,362.3204	0.2109	0.4869	3,512.6846
Worker	1.8847	1.1037	17.1622	0.0576	7.6567	0.0357	7.6924	2.0306	0.0328	2.0634		5,995.5837	5,995.5837	0.1214	0.1320	6,037.9524
Total	**2.0510**	**7.4974**	**19.7685**	**0.0881**	**8.7820**	**0.0692**	**8.8512**	**2.3545**	**0.0649**	**2.4193**		**9,357.9040**	**9,357.9040**	**0.3323**	**0.6189**	**9,550.6371**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1663	6.3938	2.6063	0.0305	1.0531	0.0335	1.0866	0.3061	0.0320	0.3382		3,362.3204	3,362.3204	0.2109	0.4869	3,512.6846
Worker	1.8847	1.1037	17.1622	0.0576	7.0576	0.0357	7.0933	1.8835	0.0328	1.9164		5,995.5837	5,995.5837	0.1214	0.1320	6,037.9524
Total	**2.0510**	**7.4974**	**19.7685**	**0.0881**	**8.1107**	**0.0692**	**8.1799**	**2.1897**	**0.0649**	**2.2545**		**9,357.9040**	**9,357.9040**	**0.3323**	**0.6189**	**9,550.6371**

3.8 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1637	6.3486	2.5966	0.0299	1.1253	0.0335	1.1588	0.3239	0.0320	0.3559		3,297.9865	3,297.9865	0.2132	0.4794	3,446.1868
Worker	1.7932	1.0101	16.2603	0.0558	7.6567	0.0340	7.6907	2.0306	0.0313	2.0619		5,858.8293	5,858.8293	0.1111	0.1252	5,898.8989
Total	**1.9569**	**7.3587**	**18.8569**	**0.0857**	**8.7820**	**0.0675**	**8.8495**	**2.3545**	**0.0633**	**2.4177**		**9,156.8158**	**9,156.8158**	**0.3243**	**0.6046**	**9,345.0857**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1637	6.3486	2.5966	0.0299	1.0531	0.0335	1.0865	0.3061	0.0320	0.3381		3,297.9865	3,297.9865	0.2132	0.4794	3,446.1868
Worker	1.7932	1.0101	16.2603	0.0558	7.0576	0.0340	7.0916	1.8835	0.0313	1.9148		5,858.8293	5,858.8293	0.1111	0.1252	5,898.8989
Total	**1.9569**	**7.3587**	**18.8569**	**0.0857**	**8.1107**	**0.0675**	**8.1781**	**2.1897**	**0.0633**	**2.2530**		**9,156.8158**	**9,156.8158**	**0.3243**	**0.6046**	**9,345.0857**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1614	6.3020	2.5874	0.0292	1.1253	0.0334	1.1587	0.3239	0.0319	0.3558		3,230.5897	3,230.5897	0.2147	0.4715	3,376.4473
Worker	1.7079	0.9315	15.4967	0.0542	7.6567	0.0320	7.6887	2.0306	0.0295	2.0601		5,737.3214	5,737.3214	0.1021	0.1195	5,775.4691
Total	**1.8692**	**7.2335**	**18.0841**	**0.0834**	**8.7820**	**0.0654**	**8.8474**	**2.3545**	**0.0614**	**2.4159**		**8,967.9111**	**8,967.9111**	**0.3168**	**0.5909**	**9,151.9163**

Mitigated Construction On-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5335	10.9122	17.8738	0.0270		0.0846	0.0846		0.0846	0.0846	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**0.5335**	**10.9122**	**17.8738**	**0.0270**		**0.0846**	**0.0846**		**0.0846**	**0.0846**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1614	6.3020	2.5874	0.0292	1.0530	0.0334	1.0864	0.3061	0.0319	0.3380		3,230.5897	3,230.5897	0.2147	0.4715	3,376.4473
Worker	1.7079	0.9315	15.4967	0.0542	7.0576	0.0320	7.0896	1.8835	0.0295	1.9130		5,737.3214	5,737.3214	0.1021	0.1195	5,775.4691
Total	**1.8692**	**7.2335**	**18.0841**	**0.0834**	**8.1106**	**0.0654**	**8.1761**	**2.1897**	**0.0614**	**2.2511**		**8,967.9111**	**8,967.9111**	**0.3168**	**0.5909**	**9,151.9163**

3.9 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**31.0475**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3416	0.1863	3.0993	0.0108	1.5313	6.4100e-003	1.5378	0.4061	5.9000e-003	0.4120		1,147.4643	1,147.4643	0.0204	0.0239	1,155.0938
Total	**0.3416**	**0.1863**	**3.0993**	**0.0108**	**1.5313**	**6.4100e-003**	**1.5378**	**0.4061**	**5.9000e-003**	**0.4120**		**1,147.4643**	**1,147.4643**	**0.0204**	**0.0239**	**1,155.0938**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	30.8767					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0545	1.0598	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**30.9312**	**1.0598**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3416	0.1863	3.0993	0.0108	1.4115	6.4100e-003	1.4179	0.3767	5.9000e-003	0.3826		1,147.4643	1,147.4643	0.0204	0.0239	1,155.0938
Total	**0.3416**	**0.1863**	**3.0993**	**0.0108**	**1.4115**	**6.4100e-003**	**1.4179**	**0.3767**	**5.9000e-003**	**0.3826**		**1,147.4643**	**1,147.4643**	**0.0204**	**0.0239**	**1,155.0938**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 Construction - Mitigated Tier 4 Interim

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.20	Acre	1.20	52,272.00	0
Other Non-Asphalt Surfaces	5.27	Acre	5.27	0.00	0
Parking Lot	53.60	1000sqft	1.23	53,600.00	0
City Park	13.00	Acre	13.00	566,280.00	0
Condo/Townhouse	507.00	Dwelling Unit	49.00	507,000.00	1450
Single Family Housing	105.00	Dwelling Unit	25.20	189,000.00	300

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2027
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See assumption in the AQ/GHG Appendix of the DEIR.

Construction Phase - See

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Off-road Equipment -

Off-road Equipment - Assumed for modeling purposes.

Trips and VMT - See assumptions file in the AQ/GHG appendix of the DEIR.

Grading -

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	60.00	70.00

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstructionPhase	NumDays	155.00	139.00
tblConstructionPhase	NumDays	155.00	141.00
tblConstructionPhase	NumDays	110.00	143.00
tblConstructionPhase	NumDays	1,550.00	423.00
tblConstructionPhase	NumDays	110.00	142.00
tblLandUse	LandUseSquareFeet	229,561.20	0.00
tblLandUse	LotAcreage	31.69	49.00
tblLandUse	LotAcreage	34.09	25.20
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0897	0.9076	0.6251	1.3600e-003	0.6601	0.0407	0.7007	0.3359	0.0374	0.3733	0.0000	119.9664	119.9664	0.0361	7.8000e-004	121.1024
2025	0.5229	4.8697	5.2554	0.0120	1.4859	0.2019	1.6879	0.5659	0.1859	0.7518	0.0000	1,062.1715	1,062.1715	0.3089	9.4600e-003	1,072.7127
2026	0.4506	2.9182	5.1666	0.0157	1.1326	0.0930	1.2256	0.3041	0.0871	0.3912	0.0000	1,474.4940	1,474.4940	0.1336	0.0718	1,499.2381
2027	2.4595	1.5848	2.9559	9.3800e-003	0.7583	0.0489	0.8071	0.2033	0.0462	0.2495	0.0000	887.4502	887.4502	0.0652	0.0421	901.6290
Maximum	**2.4595**	**4.8697**	**5.2554**	**0.0157**	**1.4859**	**0.2019**	**1.6879**	**0.5659**	**0.1859**	**0.7518**	**0.0000**	**1,474.4940**	**1,474.4940**	**0.3089**	**0.0718**	**1,499.2381**

Mitigated Construction

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0248	0.4121	0.7777	1.3600e-003	0.2862	2.1300e-003	0.2884	0.1447	2.1300e-003	0.1469	0.0000	119.9663	119.9663	0.0361	7.8000e-004	121.1022
2025	0.1979	3.7197	6.9224	0.0120	0.6878	0.0188	0.7066	0.2563	0.0188	0.2751	0.0000	1,062.1703	1,062.1703	0.3089	9.4600e-003	1,072.7116
2026	0.3211	2.7604	5.4883	0.0157	1.0463	0.0212	1.0676	0.2829	0.0207	0.3036	0.0000	1,474.4936	1,474.4936	0.1336	0.0718	1,499.2376
2027	2.3883	1.4612	3.0926	9.3800e-003	0.7003	0.0121	0.7123	0.1891	0.0117	0.2008	0.0000	887.4499	887.4499	0.0652	0.0421	901.6288
Maximum	**2.3883**	**3.7197**	**6.9224**	**0.0157**	**1.0463**	**0.0212**	**1.0676**	**0.2829**	**0.0207**	**0.3036**	**0.0000**	**1,474.4936**	**1,474.4936**	**0.3089**	**0.0718**	**1,499.2376**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**16.76**	**18.74**	**-16.27**	**0.00**	**32.61**	**85.89**	**37.24**	**38.05**	**85.05**	**47.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	10-1-2024	12-31-2024	0.9930	0.4351
2	1-1-2025	3-31-2025	1.0299	0.6819
3	4-1-2025	6-30-2025	1.5470	1.1006
4	7-1-2025	9-30-2025	1.4848	1.0739
5	10-1-2025	12-31-2025	1.3305	1.0588
6	1-1-2026	3-31-2026	1.0833	1.0316
7	4-1-2026	6-30-2026	0.7581	0.6798
8	7-1-2026	9-30-2026	0.7435	0.6649
9	10-1-2026	12-31-2026	0.7607	0.6822
10	1-1-2027	3-31-2027	1.6372	1.5548
11	4-1-2027	6-30-2027	1.7907	1.7065
12	7-1-2027	9-30-2027	0.6100	0.5813
		Highest	1.7907	1.7065

3.0 Construction Detail

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	1/6/2025	5	70	
2	Rough Grading	Grading	1/7/2025	7/20/2025	5	139	
3	Utility Trenching	Trenching	3/21/2025	9/7/2025	5	121	
4	Fine Grading	Grading	6/2/2025	12/15/2025	5	141	
5	Paving	Paving	9/9/2025	3/26/2026	5	143	
6	Finishing/Landscaping	Trenching	10/29/2025	5/13/2026	5	141	
7	Building Construction	Building Construction	12/17/2025	7/31/2027	5	423	
8	Architectural Coating	Architectural Coating	1/14/2027	7/31/2027	5	142	

Acres of Grading (Site Preparation Phase): 105

Acres of Grading (Grading Phase): 417

Acres of Paving: 7.7

Residential Indoor: 1,409,400; Residential Outdoor: 469,800; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 6,352

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Rough Grading	Excavators	2	8.00	158	0.38
Rough Grading	Graders	1	8.00	187	0.41
Rough Grading	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading	Scrapers	2	8.00	367	0.48
Rough Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Utility Trenching	Excavators	2	8.00	158	0.38
Utility Trenching	Trenchers	1	8.00	78	0.50
Fine Grading	Excavators	2	8.00	158	0.38
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Scrapers	2	8.00	367	0.48
Fine Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Finishing/Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rough Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Trenching	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Fine Grading	8	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishing/Landscaping	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	685.00	176.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6519	0.0000	0.6519	0.3337	0.0000	0.3337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0878	0.8968	0.6051	1.2600e-003		0.0406	0.0406		0.0373	0.0373	0.0000	110.4083	110.4083	0.0357	0.0000	111.3010
Total	**0.0878**	**0.8968**	**0.6051**	**1.2600e-003**	**0.6519**	**0.0406**	**0.6924**	**0.3337**	**0.0373**	**0.3710**	**0.0000**	**110.4083**	**110.4083**	**0.0357**	**0.0000**	**111.3010**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6000e-004	9.6600e-003	3.8600e-003	5.0000e-005	1.6600e-003	5.0000e-005	1.7100e-003	4.8000e-004	5.0000e-005	5.3000e-004	0.0000	4.6585	4.6585	2.8000e-004	6.7000e-004	4.8657
Worker	1.5800e-003	1.0800e-003	0.0162	5.0000e-005	6.5200e-003	3.0000e-005	6.5500e-003	1.7300e-003	3.0000e-005	1.7600e-003	0.0000	4.8997	4.8997	1.0000e-004	1.1000e-004	4.9356
Total	**1.8400e-003**	**0.0107**	**0.0200**	**1.0000e-004**	**8.1800e-003**	**8.0000e-005**	**8.2600e-003**	**2.2100e-003**	**8.0000e-005**	**2.2900e-003**	**0.0000**	**9.5581**	**9.5581**	**3.8000e-004**	**7.8000e-004**	**9.8014**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fugitive Dust					0.2787	0.0000	0.2787	0.1427	0.0000	0.1427	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0230	0.4014	0.7577	1.2600e-003		2.0500e-003	2.0500e-003		2.0500e-003	2.0500e-003	0.0000	110.4082	110.4082	0.0357	0.0000	111.3009
Total	**0.0230**	**0.4014**	**0.7577**	**1.2600e-003**	**0.2787**	**2.0500e-003**	**0.2807**	**0.1427**	**2.0500e-003**	**0.1447**	**0.0000**	**110.4082**	**110.4082**	**0.0357**	**0.0000**	**111.3009**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6000e-004	9.6600e-003	3.8600e-003	5.0000e-005	1.5600e-003	5.0000e-005	1.6100e-003	4.5000e-004	5.0000e-005	5.0000e-004	0.0000	4.6585	4.6585	2.8000e-004	6.7000e-004	4.8657
Worker	1.5800e-003	1.0800e-003	0.0162	5.0000e-005	6.0100e-003	3.0000e-005	6.0400e-003	1.6100e-003	3.0000e-005	1.6400e-003	0.0000	4.8997	4.8997	1.0000e-004	1.1000e-004	4.9356
Total	**1.8400e-003**	**0.0107**	**0.0200**	**1.0000e-004**	**7.5700e-003**	**8.0000e-005**	**7.6500e-003**	**2.0600e-003**	**8.0000e-005**	**2.1400e-003**	**0.0000**	**9.5581**	**9.5581**	**3.8000e-004**	**7.8000e-004**	**9.8014**

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0918	0.0000	0.0918	0.0259	0.0000	0.0259	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9500e-003	0.0505	0.0358	8.0000e-005		2.1700e-003	2.1700e-003		2.0000e-003	2.0000e-003	0.0000	6.6934	6.6934	2.1600e-003	0.0000	6.7475
Total	**4.9500e-003**	**0.0505**	**0.0358**	**8.0000e-005**	**0.0918**	**2.1700e-003**	**0.0940**	**0.0259**	**2.0000e-003**	**0.0279**	**0.0000**	**6.6934**	**6.6934**	**2.1600e-003**	**0.0000**	**6.7475**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-005	5.8000e-004	2.3000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.2771	0.2771	2.0000e-005	4.0000e-005	0.2894
Worker	9.0000e-005	6.0000e-005	9.2000e-004	0.0000	4.0000e-004	0.0000	4.0000e-004	1.0000e-004	0.0000	1.1000e-004	0.0000	0.2897	0.2897	1.0000e-005	1.0000e-005	0.2918
Total	**1.1000e-004**	**6.4000e-004**	**1.1500e-003**	**0.0000**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.5668**	**0.5668**	**3.0000e-005**	**5.0000e-005**	**0.5812**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0393	0.0000	0.0393	0.0111	0.0000	0.0111	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3900e-003	0.0243	0.0459	8.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	6.6934	6.6934	2.1600e-003	0.0000	6.7475
Total	**1.3900e-003**	**0.0243**	**0.0459**	**8.0000e-005**	**0.0393**	**1.2000e-004**	**0.0394**	**0.0111**	**1.2000e-004**	**0.0112**	**0.0000**	**6.6934**	**6.6934**	**2.1600e-003**	**0.0000**	**6.7475**

Mitigated Construction Off-Site

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-005	5.8000e-004	2.3000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.2771	0.2771	2.0000e-005	4.0000e-005	0.2894
Worker	9.0000e-005	6.0000e-005	9.2000e-004	0.0000	3.6000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2897	0.2897	1.0000e-005	1.0000e-005	0.2918
Total	**1.1000e-004**	**6.4000e-004**	**1.1500e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.7000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.5668**	**0.5668**	**3.0000e-005**	**5.0000e-005**	**0.5812**

3.3 Rough Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6397	0.0000	0.6397	0.2539	0.0000	0.2539	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2016	1.9420	1.8300	4.3100e-003		0.0786	0.0786		0.0723	0.0723	0.0000	378.8182	378.8182	0.1225	0.0000	381.8811
Total	**0.2016**	**1.9420**	**1.8300**	**4.3100e-003**	**0.6397**	**0.0786**	**0.7183**	**0.2539**	**0.0723**	**0.3263**	**0.0000**	**378.8182**	**378.8182**	**0.1225**	**0.0000**	**381.8811**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

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Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0700e-003	0.0405	0.0162	1.9000e-004	7.0100e-003	2.1000e-004	7.2200e-003	2.0200e-003	2.0000e-004	2.2200e-003	0.0000	19.2549	19.2549	1.2100e-003	2.7900e-003	20.1160
Worker	3.4900e-003	2.2800e-003	0.0356	1.2000e-004	0.0153	7.0000e-005	0.0153	4.0500e-003	7.0000e-005	4.1200e-003	0.0000	11.1860	11.1860	2.2000e-004	2.5000e-004	11.2650
Total	**4.5600e-003**	**0.0428**	**0.0518**	**3.1000e-004**	**0.0223**	**2.8000e-004**	**0.0226**	**6.0700e-003**	**2.7000e-004**	**6.3400e-003**	**0.0000**	**30.4408**	**30.4408**	**1.4300e-003**	**3.0400e-003**	**31.3810**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2735	0.0000	0.2735	0.1086	0.0000	0.1086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0703	1.3393	2.5522	4.3100e-003		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	378.8177	378.8177	0.1225	0.0000	381.8807
Total	**0.0703**	**1.3393**	**2.5522**	**4.3100e-003**	**0.2735**	**7.0600e-003**	**0.2805**	**0.1086**	**7.0600e-003**	**0.1156**	**0.0000**	**378.8177**	**378.8177**	**0.1225**	**0.0000**	**381.8807**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0700e-003	0.0405	0.0162	1.9000e-004	6.5600e-003	2.1000e-004	6.7700e-003	1.9100e-003	2.0000e-004	2.1100e-003	0.0000	19.2549	19.2549	1.2100e-003	2.7900e-003	20.1160
Worker	3.4900e-003	2.2800e-003	0.0356	1.2000e-004	0.0141	7.0000e-005	0.0141	3.7600e-003	7.0000e-005	3.8300e-003	0.0000	11.1860	11.1860	2.2000e-004	2.5000e-004	11.2650

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**4.5600e-003**	**0.0428**	**0.0518**	**3.1000e-004**	**0.0206**	**2.8000e-004**	**0.0209**	**5.6700e-003**	**2.7000e-004**	**5.9400e-003**	**0.0000**	**30.4408**	**30.4408**	**1.4300e-003**	**3.0400e-003**	**31.3810**

3.4 Utility Trenching - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0392	0.3259	0.5498	8.3000e-004		0.0191	0.0191		0.0176	0.0176	0.0000	72.8880	72.8880	0.0236	0.0000	73.4773
Total	**0.0392**	**0.3259**	**0.5498**	**8.3000e-004**		**0.0191**	**0.0191**		**0.0176**	**0.0176**	**0.0000**	**72.8880**	**72.8880**	**0.0236**	**0.0000**	**73.4773**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2200e-003	8.0000e-004	0.0124	4.0000e-005	5.3100e-003	3.0000e-005	5.3400e-003	1.4100e-003	2.0000e-005	1.4300e-003	0.0000	3.8950	3.8950	8.0000e-005	9.0000e-005	3.9225
Total	**1.2200e-003**	**8.0000e-004**	**0.0124**	**4.0000e-005**	**5.3100e-003**	**3.0000e-005**	**5.3400e-003**	**1.4100e-003**	**2.0000e-005**	**1.4300e-003**	**0.0000**	**3.8950**	**3.8950**	**8.0000e-005**	**9.0000e-005**	**3.9225**

Mitigated Construction On-Site

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0123	0.3645	0.6281	8.3000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	72.8879	72.8879	0.0236	0.0000	73.4773
Total	**0.0123**	**0.3645**	**0.6281**	**8.3000e-004**		**1.3600e-003**	**1.3600e-003**		**1.3600e-003**	**1.3600e-003**	**0.0000**	**72.8879**	**72.8879**	**0.0236**	**0.0000**	**73.4773**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2200e-003	8.0000e-004	0.0124	4.0000e-005	4.9000e-003	3.0000e-005	4.9200e-003	1.3100e-003	2.0000e-005	1.3300e-003	0.0000	3.8950	3.8950	8.0000e-005	9.0000e-005	3.9225
Total	**1.2200e-003**	**8.0000e-004**	**0.0124**	**4.0000e-005**	**4.9000e-003**	**3.0000e-005**	**4.9200e-003**	**1.3100e-003**	**2.0000e-005**	**1.3300e-003**	**0.0000**	**3.8950**	**3.8950**	**8.0000e-005**	**9.0000e-005**	**3.9225**

3.5 Fine Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6489	0.0000	0.6489	0.2576	0.0000	0.2576	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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Off-Road	0.2045	1.9700	1.8563	4.3800e-003		0.0797	0.0797		0.0734	0.0734	0.0000	384.2688	384.2688	0.1243	0.0000	387.3758
Total	**0.2045**	**1.9700**	**1.8563**	**4.3800e-003**	**0.6489**	**0.0797**	**0.7286**	**0.2576**	**0.0734**	**0.3309**	**0.0000**	**384.2688**	**384.2688**	**0.1243**	**0.0000**	**387.3758**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0900e-003	0.0411	0.0164	2.0000e-004	7.1100e-003	2.1000e-004	7.3200e-003	2.0500e-003	2.0000e-004	2.2500e-003	0.0000	19.5319	19.5319	1.2300e-003	2.8300e-003	20.4054
Worker	3.5400e-003	2.3200e-003	0.0361	1.2000e-004	0.0155	7.0000e-005	0.0156	4.1100e-003	7.0000e-005	4.1800e-003	0.0000	11.3469	11.3469	2.3000e-004	2.5000e-004	11.4271
Total	**4.6300e-003**	**0.0434**	**0.0526**	**3.2000e-004**	**0.0226**	**2.8000e-004**	**0.0229**	**6.1600e-003**	**2.7000e-004**	**6.4300e-003**	**0.0000**	**30.8788**	**30.8788**	**1.4600e-003**	**3.0800e-003**	**31.8325**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2774	0.0000	0.2774	0.1101	0.0000	0.1101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0713	1.3586	2.5889	4.3800e-003		7.1600e-003	7.1600e-003		7.1600e-003	7.1600e-003	0.0000	384.2683	384.2683	0.1243	0.0000	387.3753
Total	**0.0713**	**1.3586**	**2.5889**	**4.3800e-003**	**0.2774**	**7.1600e-003**	**0.2845**	**0.1101**	**7.1600e-003**	**0.1173**	**0.0000**	**384.2683**	**384.2683**	**0.1243**	**0.0000**	**387.3753**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0900e-003	0.0411	0.0164	2.0000e-004	6.6500e-003	2.1000e-004	6.8700e-003	1.9400e-003	2.0000e-004	2.1400e-003	0.0000	19.5319	19.5319	1.2300e-003	2.8300e-003	20.4054
Worker	3.5400e-003	2.3200e-003	0.0361	1.2000e-004	0.0143	7.0000e-005	0.0143	3.8100e-003	7.0000e-005	3.8800e-003	0.0000	11.3469	11.3469	2.3000e-004	2.5000e-004	11.4271
Total	**4.6300e-003**	**0.0434**	**0.0526**	**3.2000e-004**	**0.0209**	**2.8000e-004**	**0.0212**	**5.7500e-003**	**2.7000e-004**	**6.0200e-003**	**0.0000**	**30.8788**	**30.8788**	**1.4600e-003**	**3.0800e-003**	**31.8325**

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0375	0.3519	0.5977	9.3000e-004		0.0172	0.0172		0.0158	0.0158	0.0000	82.0790	82.0790	0.0266	0.0000	82.7426
Paving	1.8300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0394**	**0.3519**	**0.5977**	**9.3000e-004**		**0.0172**	**0.0172**		**0.0158**	**0.0158**	**0.0000**	**82.0790**	**82.0790**	**0.0266**	**0.0000**	**82.7426**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5500e-003	1.0100e-003	0.0158	5.0000e-005	6.7500e-003	3.0000e-005	6.7800e-003	1.7900e-003	3.0000e-005	1.8200e-003	0.0000	4.9492	4.9492	1.0000e-004	1.1000e-004	4.9841
Total	**1.5500e-003**	**1.0100e-003**	**0.0158**	**5.0000e-005**	**6.7500e-003**	**3.0000e-005**	**6.7800e-003**	**1.7900e-003**	**3.0000e-005**	**1.8200e-003**	**0.0000**	**4.9492**	**4.9492**	**1.0000e-004**	**1.1000e-004**	**4.9841**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0137	0.4116	0.7091	9.3000e-004		1.5300e-003	1.5300e-003		1.5300e-003	1.5300e-003	0.0000	82.0789	82.0789	0.0266	0.0000	82.7425
Paving	1.8300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0155**	**0.4116**	**0.7091**	**9.3000e-004**		**1.5300e-003**	**1.5300e-003**		**1.5300e-003**	**1.5300e-003**	**0.0000**	**82.0789**	**82.0789**	**0.0266**	**0.0000**	**82.7425**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	1.5500e-003	1.0100e-003	0.0158	5.0000e-005	6.2200e-003	3.0000e-005	6.2600e-003	1.6600e-003	3.0000e-005	1.6900e-003	0.0000	4.9492	4.9492	1.0000e-004	1.1000e-004	4.9841
Total	**1.5500e-003**	**1.0100e-003**	**0.0158**	**5.0000e-005**	**6.2200e-003**	**3.0000e-005**	**6.2600e-003**	**1.6600e-003**	**3.0000e-005**	**1.6900e-003**	**0.0000**	**4.9492**	**4.9492**	**1.0000e-004**	**1.1000e-004**	**4.9841**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0279	0.2617	0.4446	7.0000e-004		0.0128	0.0128		0.0117	0.0117	0.0000	61.0587	61.0587	0.0198	0.0000	61.5524
Paving	1.3600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0293**	**0.2617**	**0.4446**	**7.0000e-004**		**0.0128**	**0.0128**		**0.0117**	**0.0117**	**0.0000**	**61.0587**	**61.0587**	**0.0198**	**0.0000**	**61.5524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0900e-003	6.9000e-004	0.0111	4.0000e-005	5.0200e-003	2.0000e-005	5.0500e-003	1.3300e-003	2.0000e-005	1.3500e-003	0.0000	3.5977	3.5977	7.0000e-005	8.0000e-005	3.6223
Total	**1.0900e-003**	**6.9000e-004**	**0.0111**	**4.0000e-005**	**5.0200e-003**	**2.0000e-005**	**5.0500e-003**	**1.3300e-003**	**2.0000e-005**	**1.3500e-003**	**0.0000**	**3.5977**	**3.5977**	**7.0000e-005**	**8.0000e-005**	**3.6223**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0102	0.3062	0.5275	7.0000e-004		1.1400e-003	1.1400e-003		1.1400e-003	1.1400e-003	0.0000	61.0587	61.0587	0.0198	0.0000	61.5524
Paving	1.3600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0116**	**0.3062**	**0.5275**	**7.0000e-004**		**1.1400e-003**	**1.1400e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**61.0587**	**61.0587**	**0.0198**	**0.0000**	**61.5524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0900e-003	6.9000e-004	0.0111	4.0000e-005	4.6300e-003	2.0000e-005	4.6500e-003	1.2400e-003	2.0000e-005	1.2600e-003	0.0000	3.5977	3.5977	7.0000e-005	8.0000e-005	3.6223
Total	**1.0900e-003**	**6.9000e-004**	**0.0111**	**4.0000e-005**	**4.6300e-003**	**2.0000e-005**	**4.6500e-003**	**1.2400e-003**	**2.0000e-005**	**1.2600e-003**	**0.0000**	**3.5977**	**3.5977**	**7.0000e-005**	**8.0000e-005**	**3.6223**

3.7 Finishing/Landscaping - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Off-Road	3.0400e-003	0.0307	0.0513	7.0000e-005		1.2400e-003	1.2400e-003		1.1400e-003	1.1400e-003	0.0000	6.3025	6.3025	2.0400e-003	0.0000	6.3534
Total	**3.0400e-003**	**0.0307**	**0.0513**	**7.0000e-005**		**1.2400e-003**	**1.2400e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**6.3025**	**6.3025**	**2.0400e-003**	**0.0000**	**6.3534**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.1000e-004	1.7700e-003	1.0000e-005	7.6000e-004	0.0000	7.6000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.5553	0.5553	1.0000e-005	1.0000e-005	0.5592
Total	**1.7000e-004**	**1.1000e-004**	**1.7700e-003**	**1.0000e-005**	**7.6000e-004**	**0.0000**	**7.6000e-004**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5553**	**0.5553**	**1.0000e-005**	**1.0000e-005**	**0.5592**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6000e-003	0.0312	0.0539	7.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	6.3025	6.3025	2.0400e-003	0.0000	6.3534
Total	**1.6000e-003**	**0.0312**	**0.0539**	**7.0000e-005**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**	**0.0000**	**6.3025**	**6.3025**	**2.0400e-003**	**0.0000**	**6.3534**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.1000e-004	1.7700e-003	1.0000e-005	7.0000e-004	0.0000	7.0000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5553	0.5553	1.0000e-005	1.0000e-005	0.5592
Total	**1.7000e-004**	**1.1000e-004**	**1.7700e-003**	**1.0000e-005**	**7.0000e-004**	**0.0000**	**7.0000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5553**	**0.5553**	**1.0000e-005**	**1.0000e-005**	**0.5592**

3.7 Finishing/Landscaping - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2800e-003	0.0634	0.1059	1.5000e-004		2.5700e-003	2.5700e-003		2.3600e-003	2.3600e-003	0.0000	13.0160	13.0160	4.2100e-003	0.0000	13.1212
Total	**6.2800e-003**	**0.0634**	**0.1059**	**1.5000e-004**		**2.5700e-003**	**2.5700e-003**		**2.3600e-003**	**2.3600e-003**	**0.0000**	**13.0160**	**13.0160**	**4.2100e-003**	**0.0000**	**13.1212**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.1000e-004	3.4600e-003	1.0000e-005	1.5600e-003	1.0000e-005	1.5700e-003	4.2000e-004	1.0000e-005	4.2000e-004	0.0000	1.1206	1.1206	2.0000e-005	2.0000e-005	1.1282
Total	**3.4000e-004**	**2.1000e-004**	**3.4600e-003**	**1.0000e-005**	**1.5600e-003**	**1.0000e-005**	**1.5700e-003**	**4.2000e-004**	**1.0000e-005**	**4.2000e-004**	**0.0000**	**1.1206**	**1.1206**	**2.0000e-005**	**2.0000e-005**	**1.1282**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.3100e-003	0.0643	0.1113	1.5000e-004		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	13.0160	13.0160	4.2100e-003	0.0000	13.1212
Total	**3.3100e-003**	**0.0643**	**0.1113**	**1.5000e-004**		**2.4000e-004**	**2.4000e-004**		**2.4000e-004**	**2.4000e-004**	**0.0000**	**13.0160**	**13.0160**	**4.2100e-003**	**0.0000**	**13.1212**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.1000e-004	3.4600e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.9000e-004	1.0000e-005	3.9000e-004	0.0000	1.1206	1.1206	2.0000e-005	2.0000e-005	1.1282

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**3.4000e-004**	**2.1000e-004**	**3.4600e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.9000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.1206**	**1.1206**	**2.0000e-005**	**2.0000e-005**	**1.1282**

3.8 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.5200e-003	0.0686	0.0885	1.5000e-004		2.9000e-003	2.9000e-003		2.7300e-003	2.7300e-003	0.0000	12.7556	12.7556	3.0000e-003	0.0000	12.8305
Total	**7.5200e-003**	**0.0686**	**0.0885**	**1.5000e-004**		**2.9000e-003**	**2.9000e-003**		**2.7300e-003**	**2.7300e-003**	**0.0000**	**12.7556**	**12.7556**	**3.0000e-003**	**0.0000**	**12.8305**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.3000e-004	0.0353	0.0141	1.7000e-004	6.1000e-003	1.8000e-004	6.2800e-003	1.7600e-003	1.8000e-004	1.9300e-003	0.0000	16.7614	16.7614	1.0500e-003	2.4300e-003	17.5111
Worker	9.4700e-003	6.1900e-003	0.0965	3.2000e-004	0.0414	2.0000e-004	0.0416	0.0110	1.8000e-004	0.0112	0.0000	30.3188	30.3188	6.0000e-004	6.7000e-004	30.5329
Total	**0.0104**	**0.0415**	**0.1106**	**4.9000e-004**	**0.0475**	**3.8000e-004**	**0.0478**	**0.0127**	**3.6000e-004**	**0.0131**	**0.0000**	**47.0802**	**47.0802**	**1.6500e-003**	**3.1000e-003**	**48.0440**

Mitigated Construction On-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.9300e-003	0.0600	0.0983	1.5000e-004		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004	0.0000	12.7556	12.7556	3.0000e-003	0.0000	12.8305
Total	**2.9300e-003**	**0.0600**	**0.0983**	**1.5000e-004**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**	**0.0000**	**12.7556**	**12.7556**	**3.0000e-003**	**0.0000**	**12.8305**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.3000e-004	0.0353	0.0141	1.7000e-004	5.7100e-003	1.8000e-004	5.8900e-003	1.6600e-003	1.8000e-004	1.8400e-003	0.0000	16.7614	16.7614	1.0500e-003	2.4300e-003	17.5111
Worker	9.4700e-003	6.1900e-003	0.0965	3.2000e-004	0.0381	2.0000e-004	0.0383	0.0102	1.8000e-004	0.0104	0.0000	30.3188	30.3188	6.0000e-004	6.7000e-004	30.5329
Total	**0.0104**	**0.0415**	**0.1106**	**4.9000e-004**	**0.0438**	**3.8000e-004**	**0.0442**	**0.0119**	**3.6000e-004**	**0.0122**	**0.0000**	**47.0802**	**47.0802**	**1.6500e-003**	**3.1000e-003**	**48.0440**

3.8 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1785	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6549	302.6549	0.0711	0.0000	304.4335

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.1785**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6549**	**302.6549**	**0.0711**	**0.0000**	**304.4335**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0218	0.8305	0.3335	3.8900e-003	0.1447	4.3500e-003	0.1491	0.0417	4.1600e-003	0.0459	0.0000	390.0867	390.0867	0.0253	0.0567	407.6169
Worker	0.2134	0.1344	2.1690	7.3800e-003	0.9814	4.4400e-003	0.9858	0.2606	4.0800e-003	0.2647	0.0000	702.9595	702.9595	0.0131	0.0150	707.7636
Total	**0.2352**	**0.9649**	**2.5025**	**0.0113**	**1.1261**	**8.7900e-003**	**1.1348**	**0.3024**	**8.2400e-003**	**0.3106**	**0.0000**	**1,093.0462**	**1,093.0462**	**0.0384**	**0.0717**	**1,115.3805**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0696	1.4240	2.3325	3.5200e-003		0.0110	0.0110		0.0110	0.0110	0.0000	302.6545	302.6545	0.0711	0.0000	304.4331
Total	**0.0696**	**1.4240**	**2.3325**	**3.5200e-003**		**0.0110**	**0.0110**		**0.0110**	**0.0110**	**0.0000**	**302.6545**	**302.6545**	**0.0711**	**0.0000**	**304.4331**

Mitigated Construction Off-Site

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0218	0.8305	0.3335	3.8900e-003	0.1355	4.3500e-003	0.1398	0.0395	4.1600e-003	0.0436	0.0000	390.0867	390.0867	0.0253	0.0567	407.6169
Worker	0.2134	0.1344	2.1690	7.3800e-003	0.9048	4.4400e-003	0.9092	0.2418	4.0800e-003	0.2459	0.0000	702.9595	702.9595	0.0131	0.0150	707.7636
Total	**0.2352**	**0.9649**	**2.5025**	**0.0113**	**1.0402**	**8.7900e-003**	**1.0490**	**0.2813**	**8.2400e-003**	**0.2895**	**0.0000**	**1,093.0462**	**1,093.0462**	**0.0384**	**0.0717**	**1,115.3805**

3.8 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1032	0.9415	1.2144	2.0400e-003		0.0398	0.0398		0.0375	0.0375	0.0000	175.0992	175.0992	0.0412	0.0000	176.1282
Total	**0.1032**	**0.9415**	**1.2144**	**2.0400e-003**		**0.0398**	**0.0398**		**0.0375**	**0.0375**	**0.0000**	**175.0992**	**175.0992**	**0.0412**	**0.0000**	**176.1282**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0124	0.4769	0.1923	2.2000e-003	0.0837	2.5100e-003	0.0862	0.0242	2.4000e-003	0.0266	0.0000	221.0667	221.0667	0.0147	0.0323	231.0482
Worker	0.1174	0.0717	1.1958	4.1500e-003	0.5678	2.4200e-003	0.5702	0.1508	2.2300e-003	0.1530	0.0000	398.2530	398.2530	6.9700e-003	8.2900e-003	400.8990
Total	**0.1298**	**0.5486**	**1.3882**	**6.3500e-003**	**0.6515**	**4.9300e-003**	**0.6564**	**0.1749**	**4.6300e-003**	**0.1796**	**0.0000**	**619.3197**	**619.3197**	**0.0217**	**0.0406**	**631.9472**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0403	0.8239	1.3495	2.0400e-003		6.3900e-003	6.3900e-003		6.3900e-003	6.3900e-003	0.0000	175.0990	175.0990	0.0412	0.0000	176.1280
Total	**0.0403**	**0.8239**	**1.3495**	**2.0400e-003**		**6.3900e-003**	**6.3900e-003**		**6.3900e-003**	**6.3900e-003**	**0.0000**	**175.0990**	**175.0990**	**0.0412**	**0.0000**	**176.1280**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0124	0.4769	0.1923	2.2000e-003	0.0784	2.5100e-003	0.0809	0.0228	2.4000e-003	0.0252	0.0000	221.0667	221.0667	0.0147	0.0323	231.0482
Worker	0.1174	0.0717	1.1958	4.1500e-003	0.5235	2.4200e-003	0.5259	0.1399	2.2300e-003	0.1421	0.0000	398.2530	398.2530	6.9700e-003	8.2900e-003	400.8990
Total	**0.1298**	**0.5486**	**1.3882**	**6.3500e-003**	**0.6018**	**4.9300e-003**	**0.6068**	**0.1627**	**4.6300e-003**	**0.1674**	**0.0000**	**619.3197**	**619.3197**	**0.0217**	**0.0406**	**631.9472**

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.9 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.1922					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.0813	0.1285	2.1000e-004		3.6600e-003	3.6600e-003		3.6600e-003	3.6600e-003	0.0000	18.1281	18.1281	9.9000e-004	0.0000	18.1528
Total	**2.2044**	**0.0813**	**0.1285**	**2.1000e-004**		**3.6600e-003**	**3.6600e-003**		**3.6600e-003**	**3.6600e-003**	**0.0000**	**18.1281**	**18.1281**	**9.9000e-004**	**0.0000**	**18.1528**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0221	0.0135	0.2249	7.8000e-004	0.1068	4.6000e-004	0.1072	0.0284	4.2000e-004	0.0288	0.0000	74.9032	74.9032	1.3100e-003	1.5600e-003	75.4009
Total	**0.0221**	**0.0135**	**0.2249**	**7.8000e-004**	**0.1068**	**4.6000e-004**	**0.1072**	**0.0284**	**4.2000e-004**	**0.0288**	**0.0000**	**74.9032**	**74.9032**	**1.3100e-003**	**1.5600e-003**	**75.4009**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Phase 2 Construction - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Archit. Coating	2.1922					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8700e-003	0.0753	0.1301	2.1000e-004		2.8000e-004	2.8000e-004		2.8000e-004	2.8000e-004	0.0000	18.1281	18.1281	9.9000e-004	0.0000	18.1528
Total	**2.1961**	**0.0753**	**0.1301**	**2.1000e-004**		**2.8000e-004**	**2.8000e-004**		**2.8000e-004**	**2.8000e-004**	**0.0000**	**18.1281**	**18.1281**	**9.9000e-004**	**0.0000**	**18.1528**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0221	0.0135	0.2249	7.8000e-004	0.0985	4.6000e-004	0.0989	0.0263	4.2000e-004	0.0267	0.0000	74.9032	74.9032	1.3100e-003	1.5600e-003	75.4009
Total	**0.0221**	**0.0135**	**0.2249**	**7.8000e-004**	**0.0985**	**4.6000e-004**	**0.0989**	**0.0263**	**4.2000e-004**	**0.0267**	**0.0000**	**74.9032**	**74.9032**	**1.3100e-003**	**1.5600e-003**	**75.4009**

Phase 2 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.06	-0.00	0.00	0.82	0.83	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.27	0.08	-0.05	0.00	0.75	0.74	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading	0.64	0.30	-0.38	0.00	0.91	0.90	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	0.45	-0.01	-0.05	0.00	0.90	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.58	-0.17	-0.18	0.00	0.91	0.90	0.00	0.00	0.00	0.00	0.00	0.00
Rough Grading	0.64	0.30	-0.38	0.00	0.91	0.90	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.72	0.54	-0.25	0.00	0.95	0.94	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	0.67	-0.12	-0.14	0.00	0.93	0.92	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	Tier 4 Interim	1	1	No Change	0.00
Cranes	Diesel	Tier 4 Interim	1	1	No Change	0.00
Excavators	Diesel	Tier 4 Interim	6	6	No Change	0.00
Forklifts	Diesel	Tier 4 Interim	3	3	No Change	0.00
Generator Sets	Diesel	Tier 4 Interim	1	1	No Change	0.00
Graders	Diesel	Tier 4 Interim	2	2	No Change	0.00
Pavers	Diesel	Tier 4 Interim	2	2	No Change	0.00
Paving Equipment	Diesel	Tier 4 Interim	2	2	No Change	0.00
Rollers	Diesel	Tier 4 Interim	2	2	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Interim	5	5	No Change	0.00
Scrapers	Diesel	Tier 4 Interim	4	4	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Interim	12	12	No Change	0.00
Trenchers	Diesel	Tier 4 Interim	1	1	No Change	0.00

Phase 2 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Welders	Diesel	Tier 4 Interim	1	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	1.21300E-002	8.13300E-002	1.28450E-001	2.10000E-004	3.66000E-003	3.66000E-003	0.00000E+000	1.81281E+001	1.81281E+001	9.90000E-004	0.00000E+000	1.81528E+001
Cranes	5.78900E-002	5.86270E-001	3.21350E-001	1.07000E-003	2.49200E-002	2.29300E-002	0.00000E+000	9.38190E+001	9.38190E+001	3.03400E-002	0.00000E+000	9.45776E+001
Excavators	6.70100E-002	4.89880E-001	1.30701E+000	2.07000E-003	2.40200E-002	2.21000E-002	0.00000E+000	1.82013E+002	1.82013E+002	5.88700E-002	0.00000E+000	1.83485E+002
Forklifts	5.51300E-002	5.19360E-001	7.19370E-001	9.70000E-004	2.78000E-002	2.55800E-002	0.00000E+000	8.52078E+001	8.52078E+001	2.75600E-002	0.00000E+000	8.58968E+001
Generator Sets	5.63400E-002	5.06640E-001	7.73980E-001	1.39000E-003	2.01700E-002	2.01700E-002	0.00000E+000	1.19541E+002	1.19541E+002	4.42000E-003	0.00000E+000	1.19652E+002
Graders	4.35500E-002	4.83940E-001	2.23180E-001	9.30000E-004	1.55800E-002	1.43300E-002	0.00000E+000	8.13142E+001	8.13142E+001	2.63000E-002	0.00000E+000	8.19717E+001
Pavers	2.48500E-002	2.26380E-001	4.14100E-001	6.70000E-004	1.06000E-002	9.75000E-003	0.00000E+000	5.90251E+001	5.90251E+001	1.90900E-002	0.00000E+000	5.95024E+001
Paving Equipment	2.09900E-002	1.80850E-001	3.64150E-001	5.80000E-004	8.94000E-003	8.23000E-003	0.00000E+000	5.11538E+001	5.11538E+001	1.65400E-002	0.00000E+000	5.15674E+001
Rollers	1.95800E-002	2.06350E-001	2.64080E-001	3.80000E-004	1.03800E-002	9.55000E-003	0.00000E+000	3.29588E+001	3.29588E+001	1.06600E-002	0.00000E+000	3.32253E+001
Rubber Tired Dozers	1.63430E-001	1.67379E+000	7.47640E-001	2.09000E-003	7.41500E-002	6.82200E-002	0.00000E+000	1.83802E+002	1.83802E+002	5.94500E-002	0.00000E+000	1.85288E+002
Scrapers	1.88100E-001	1.78382E+000	1.50657E+000	4.25000E-003	7.02100E-002	6.46000E-002	0.00000E+000	3.72927E+002	3.72927E+002	1.20610E-001	0.00000E+000	3.75942E+002
Tractors/Loaders/Backhoes	1.39720E-001	1.41103E+000	2.33231E+000	3.26000E-003	5.82000E-002	5.35500E-002	0.00000E+000	2.86505E+002	2.86505E+002	9.26600E-002	0.00000E+000	2.88822E+002
Trenchers	1.90000E-002	1.78070E-001	1.55400E-001	2.00000E-004	1.18600E-002	1.09100E-002	0.00000E+000	1.79662E+001	1.79662E+001	5.81000E-003	0.00000E+000	1.81115E+001
Welders	4.64800E-002	2.83840E-001	3.49320E-001	5.40000E-004	8.65000E-003	8.65000E-003	0.00000E+000	3.98087E+001	3.98087E+001	3.78000E-003	0.00000E+000	3.99032E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	3.87000E-003	7.52500E-002	1.30100E-001	2.10000E-004	2.80000E-004	2.80000E-004	0.00000E+000	1.81281E+001	1.81281E+001	9.90000E-004	0.00000E+000	1.81528E+001
Cranes	1.74900E-002	2.82060E-001	5.68490E-001	1.07000E-003	1.75000E-003	1.75000E-003	0.00000E+000	9.38189E+001	9.38189E+001	3.03400E-002	0.00000E+000	9.45775E+001
Excavators	2.54800E-002	9.12950E-001	1.57112E+000	2.07000E-003	3.40000E-003	3.40000E-003	0.00000E+000	1.82013E+002	1.82013E+002	5.88700E-002	0.00000E+000	1.83485E+002
Forklifts	2.19100E-002	4.26270E-001	7.37020E-001	9.70000E-004	1.59000E-003	1.59000E-003	0.00000E+000	8.52077E+001	8.52077E+001	2.75600E-002	0.00000E+000	8.58967E+001
Generator Sets	2.55100E-002	4.96200E-001	8.57920E-001	1.39000E-003	1.85000E-003	1.85000E-003	0.00000E+000	1.19541E+002	1.19541E+002	4.42000E-003	0.00000E+000	1.19652E+002
Graders	1.51400E-002	2.44210E-001	4.92210E-001	9.30000E-004	1.51000E-003	1.51000E-003	0.00000E+000	8.13141E+001	8.13141E+001	2.63000E-002	0.00000E+000	8.19716E+001
Pavers	8.26000E-003	2.96070E-001	5.09510E-001	6.70000E-004	1.10000E-003	1.10000E-003	0.00000E+000	5.90250E+001	5.90250E+001	1.90900E-002	0.00000E+000	5.95023E+001
Paving Equipment	7.19000E-003	2.57680E-001	4.43440E-001	5.80000E-004	9.60000E-004	9.60000E-004	0.00000E+000	5.11537E+001	5.11537E+001	1.65400E-002	0.00000E+000	5.15673E+001

Phase 2 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rollers	8.43000E-003	1.64080E-001	2.83680E-001	3.80000E-004	6.10000E-004	6.10000E-004	0.00000E+000	3.29588E+001	3.29588E+001	1.06600E-002	0.00000E+000	3.32253E+001
Rubber Tired Dozers	3.41500E-002	5.50730E-001	1.10999E+000	2.09000E-003	3.42000E-003	3.42000E-003	0.00000E+000	1.83802E+002	1.83802E+002	5.94500E-002	0.00000E+000	1.85288E+002
Scrapers	6.96000E-002	1.12222E+000	2.26184E+000	4.25000E-003	6.96000E-003	6.96000E-003	0.00000E+000	3.72926E+002	3.72926E+002	1.20610E-001	0.00000E+000	3.75941E+002
Tractors/Loaders/Backhoes	7.28100E-002	1.41649E+000	2.44907E+000	3.26000E-003	5.30000E-003	5.30000E-003	0.00000E+000	2.86505E+002	2.86505E+002	9.26600E-002	0.00000E+000	2.88821E+002
Trenchers	4.58000E-003	8.90500E-002	1.53970E-001	2.00000E-004	3.30000E-004	3.30000E-004	0.00000E+000	1.79662E+001	1.79662E+001	5.81000E-003	0.00000E+000	1.81115E+001
Welders	9.27000E-003	3.51330E-001	3.16580E-001	5.40000E-004	9.88000E-003	9.88000E-003	0.00000E+000	3.98086E+001	3.98086E+001	3.78000E-003	0.00000E+000	3.99032E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
					Percent Reduction							
Air Compressors	6.80956E-001	7.47572E-002	-1.28455E-002	0.00000E+000	9.23497E-001	9.23497E-001	0.00000E+000	1.10326E-006	1.10326E-006	0.00000E+000	0.00000E+000	1.10176E-006
Cranes	6.97875E-001	5.18891E-001	-7.69068E-001	0.00000E+000	9.29775E-001	9.23681E-001	0.00000E+000	1.17247E-006	1.17247E-006	0.00000E+000	0.00000E+000	1.26880E-006
Excavators	6.19758E-001	-8.63620E-001	-2.02072E-001	0.00000E+000	8.58451E-001	8.46154E-001	0.00000E+000	1.20870E-006	1.20870E-006	0.00000E+000	0.00000E+000	1.19901E-006
Forklifts	6.02576E-001	1.79240E-001	-2.45354E-002	0.00000E+000	9.42806E-001	9.37842E-001	0.00000E+000	1.17360E-006	1.17360E-006	0.00000E+000	0.00000E+000	1.28061E-006
Generator Sets	5.47213E-001	2.06063E-002	-1.08452E-001	0.00000E+000	9.08280E-001	9.08280E-001	0.00000E+000	1.25480E-006	1.25480E-006	0.00000E+000	0.00000E+000	1.17006E-006
Graders	6.52354E-001	4.95371E-001	-1.20544E+000	0.00000E+000	9.03081E-001	8.94627E-001	0.00000E+000	1.22980E-006	1.22980E-006	0.00000E+000	0.00000E+000	1.21993E-006
Pavers	6.67606E-001	-3.07845E-001	-2.30403E-001	0.00000E+000	8.96226E-001	8.87179E-001	0.00000E+000	1.18594E-006	1.18594E-006	0.00000E+000	0.00000E+000	1.17642E-006
Paving Equipment	6.57456E-001	-4.24827E-001	-2.17740E-001	0.00000E+000	8.92617E-001	8.83354E-001	0.00000E+000	1.17293E-006	1.17293E-006	0.00000E+000	0.00000E+000	1.16353E-006
Rollers	5.69459E-001	2.04846E-001	-7.42199E-002	0.00000E+000	9.41233E-001	9.36126E-001	0.00000E+000	1.21364E-006	1.21364E-006	0.00000E+000	0.00000E+000	1.20390E-006
Rubber Tired Dozers	7.91042E-001	6.70968E-001	-4.84658E-001	0.00000E+000	9.53877E-001	9.49868E-001	0.00000E+000	1.19694E-006	1.19694E-006	0.00000E+000	0.00000E+000	1.18734E-006
Scrapers	6.29984E-001	3.70889E-001	-5.01318E-001	0.00000E+000	9.00869E-001	8.92260E-001	0.00000E+000	1.20667E-006	1.20667E-006	0.00000E+000	0.00000E+000	1.19699E-006
Tractors/Loaders/Backhoes	4.78886E-001	-3.86951E-003	-5.00620E-002	0.00000E+000	9.08935E-001	9.01027E-001	0.00000E+000	1.18672E-006	1.18672E-006	0.00000E+000	0.00000E+000	1.17720E-006
Trenchers	7.58947E-001	4.99916E-001	9.20206E-003	0.00000E+000	9.72175E-001	9.69753E-001	0.00000E+000	1.11320E-006	1.11320E-006	0.00000E+000	0.00000E+000	1.10427E-006
Welders	8.00559E-001	-2.37775E-001	9.37250E-002	0.00000E+000	-1.42197E-001	-1.42197E-001	0.00000E+000	1.00481E-006	1.00481E-006	0.00000E+000	0.00000E+000	1.25303E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			

Phase 2 Construction - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.11	0.03	0.10	0.03	0.08	0.07
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	1.82	0.49	1.69	0.46	0.08	0.07
Fine Grading	Fugitive Dust	0.65	0.26	0.28	0.11	0.57	0.57
Fine Grading	Roads	0.02	0.01	0.02	0.01	0.07	0.07
Finishing/Landscaping	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Finishing/Landscaping	Roads	0.00	0.00	0.00	0.00	0.08	0.08
Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.01	0.00	0.01	0.00	0.08	0.07
Rough Grading	Fugitive Dust	0.64	0.25	0.27	0.11	0.57	0.57
Rough Grading	Roads	0.02	0.01	0.02	0.01	0.07	0.07
Site Preparation	Fugitive Dust	0.74	0.36	0.32	0.15	0.57	0.57
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.07	0.07
Utility Trenching	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Utility Trenching	Roads	0.01	0.00	0.00	0.00	0.08	0.07

CalEEMod Output: Western Remediation Construction – Mitigated

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Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Western Remediation Area - Mitigated Tier 4

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	94.90	Acre	94.90	4,133,844.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2023
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on an overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	155.00	17.00
tblConstructionPhase	NumDays	60.00	6.00
tblGrading	MaterialExported	0.00	18,157.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.1044	89.0363	44.6782	0.3422	19.9605	1.8120	21.2304	10.1853	1.6812	11.3537	0.0000	37,925.0350	37,925.0350	5.1805	5.0832	39,569.3327
Maximum	**4.1044**	**89.0363**	**44.6782**	**0.3422**	**19.9605**	**1.8120**	**21.2304**	**10.1853**	**1.6812**	**11.3537**	**0.0000**	**37,925.0350**	**37,925.0350**	**5.1805**	**5.0832**	**39,569.3327**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	1.7937	73.7914	53.3496	0.3422	12.5129	0.4890	13.0019	4.3961	0.4722	4.4619	0.0000	37,925.0350	37,925.0350	5.1805	5.0832	39,569.3327

Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Maximum	**1.7937**	**73.7914**	**53.3496**	**0.3422**	**12.5129**	**0.4890**	**13.0019**	**4.3961**	**0.4722**	**4.4619**	**0.0000**	**37,925.0350**	**37,925.0350**	**5.1805**	**5.0832**	**39,569.3327**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**56.30**	**17.12**	**-19.41**	**0.00**	**37.31**	**73.01**	**38.76**	**56.84**	**71.91**	**60.70**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	8/8/2023	5	6	
2	Grading	Grading	8/9/2023	8/31/2023	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 94.9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	32.00	2,270.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.1023	2.8800e-003	0.1052	0.0294	2.7500e-003	0.0322		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0669**	**0.5932**	**0.7837**	**4.5800e-003**	**0.3035**	**3.9100e-003**	**0.3074**	**0.0828**	**3.7000e-003**	**0.0865**		**489.6749**	**489.6749**	**0.0226**	**0.0490**	**504.8520**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5607	0.2325	2.8800e-003	0.0957	2.8800e-003	0.0986	0.0278	2.7500e-003	0.0306		315.9190	315.9190	0.0188	0.0453	329.8970
Worker	0.0507	0.0325	0.5512	1.7000e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		173.7559	173.7559	3.7700e-003	3.7100e-003	174.9549
Total	**0.0669**	**0.5932**	**0.7837**	**4.5800e-003**	**0.2812**	**3.9100e-003**	**0.2851**	**0.0773**	**3.7000e-003**	**0.0810**		**489.6749**	**489.6749**	**0.0226**	**0.0490**	**504.8520**

Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3244	0.0000	9.3244	3.6721	0.0000	3.6721			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.3244**	**1.4245**	**10.7489**	**3.6721**	**1.3105**	**4.9826**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6940	53.3632	15.5496	0.2725	8.7250	0.3806	9.1056	2.3886	0.3641	2.7527		31,088.6572	31,088.6572	3.1945	4.9884	32,655.0607
Vendor	0.0323	1.1215	0.4650	5.7500e-003	0.2046	5.7500e-003	0.2104	0.0589	5.5000e-003	0.0644		631.8380	631.8380	0.0376	0.0907	659.7941
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.7827**	**54.5207**	**16.6270**	**0.2801**	**9.1532**	**0.3875**	**9.5407**	**2.5068**	**0.3707**	**2.8775**		**31,913.5573**	**31,913.5573**	**3.2363**	**5.0832**	**33,509.2492**

Western Remediation Area - Mitigated Tier 4 - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9862	0.0000	3.9862	1.5698	0.0000	1.5698			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9862**	**0.1015**	**4.0877**	**1.5698**	**0.1015**	**1.6713**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6940	53.3632	15.5496	0.2725	8.1292	0.3806	8.5098	2.2424	0.3641	2.6065		31,088.6572	31,088.6572	3.1945	4.9884	32,655.0607
Vendor	0.0323	1.1215	0.4650	5.7500e-003	0.1915	5.7500e-003	0.1972	0.0557	5.5000e-003	0.0612		631.8380	631.8380	0.0376	0.0907	659.7941
Worker	0.0564	0.0361	0.6124	1.8900e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		193.0621	193.0621	4.1900e-003	4.1200e-003	194.3944
Total	**0.7827**	**54.5207**	**16.6270**	**0.2801**	**8.5267**	**0.3875**	**8.9142**	**2.3530**	**0.3707**	**2.7237**		**31,913.5573**	**31,913.5573**	**3.2363**	**5.0832**	**33,509.2492**

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Western Remediation Area - Mitigated Tier 4

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	94.90	Acre	94.90	4,133,844.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2023
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on an overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	155.00	17.00
tblConstructionPhase	NumDays	60.00	6.00
tblGrading	MaterialExported	0.00	18,157.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.0921	91.1920	44.7005	0.3422	19.9605	1.8123	21.2305	10.1853	1.6815	11.3537	0.0000	37,924.4355	37,924.4355	5.1795	5.0850	39,569.2640
Maximum	**4.0921**	**91.1920**	**44.7005**	**0.3422**	**19.9605**	**1.8123**	**21.2305**	**10.1853**	**1.6815**	**11.3537**	**0.0000**	**37,924.4355**	**37,924.4355**	**5.1795**	**5.0850**	**39,569.2640**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	1.7814	75.9471	53.3720	0.3422	12.5129	0.4893	13.0023	4.3961	0.4725	4.4619	0.0000	37,924.4355	37,924.4355	5.1795	5.0850	39,569.2640

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Maximum	1.7814	75.9471	53.3720	0.3422	12.5129	0.4893	13.0023	4.3961	0.4725	4.4619	0.0000	37,924.4355	37,924.4355	5.1795	5.0850	39,569.2640

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	56.47	16.72	-19.40	0.00	37.31	73.00	38.76	56.84	71.90	60.70	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	8/8/2023	5	6	
2	Grading	Grading	8/9/2023	8/31/2023	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 94.9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	32.00	2,270.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.1023	2.9000e-003	0.1052	0.0294	2.7700e-003	0.0322		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.2012	1.0300e-003	0.2022	0.0534	9.5000e-004	0.0543		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0710**	**0.6214**	**0.7534**	**4.5000e-003**	**0.3035**	**3.9300e-003**	**0.3074**	**0.0828**	**3.7200e-003**	**0.0865**		**481.8318**	**481.8318**	**0.0226**	**0.0494**	**497.1112**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.5857	0.2399	2.8800e-003	0.0957	2.9000e-003	0.0986	0.0278	2.7700e-003	0.0306		316.3837	316.3837	0.0187	0.0454	330.3911
Worker	0.0554	0.0356	0.5135	1.6200e-003	0.1855	1.0300e-003	0.1865	0.0495	9.5000e-004	0.0504		165.4482	165.4482	3.8600e-003	3.9400e-003	166.7201
Total	**0.0710**	**0.6214**	**0.7534**	**4.5000e-003**	**0.2812**	**3.9300e-003**	**0.2851**	**0.0773**	**3.7200e-003**	**0.0810**		**481.8318**	**481.8318**	**0.0226**	**0.0494**	**497.1112**

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3244	0.0000	9.3244	3.6721	0.0000	3.6721			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.3244**	**1.4245**	**10.7489**	**3.6721**	**1.3105**	**4.9826**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6776	55.4653	15.5991	0.2725	8.7250	0.3809	9.1059	2.3886	0.3644	2.7530		31,096.3591	31,096.3591	3.1935	4.9898	32,663.1536
Vendor	0.0312	1.1715	0.4798	5.7600e-003	0.2046	5.7900e-003	0.2104	0.0589	5.5400e-003	0.0644		632.7673	632.7673	0.0375	0.0909	660.7823
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2236	1.1400e-003	0.2247	0.0593	1.0500e-003	0.0603		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.7704**	**56.6764**	**16.6494**	**0.2801**	**9.1532**	**0.3878**	**9.5410**	**2.5068**	**0.3710**	**2.8778**		**31,912.9577**	**31,912.9577**	**3.2352**	**5.0850**	**33,509.1804**

Western Remediation Area - Mitigated Tier 4 - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9862	0.0000	3.9862	1.5698	0.0000	1.5698			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9862**	**0.1015**	**4.0877**	**1.5698**	**0.1015**	**1.6713**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6776	55.4653	15.5991	0.2725	8.1292	0.3809	8.5101	2.2424	0.3644	2.6068		31,096.3591	31,096.3591	3.1935	4.9898	32,663.1536
Vendor	0.0312	1.1715	0.4798	5.7600e-003	0.1915	5.7900e-003	0.1973	0.0557	5.5400e-003	0.0612		632.7673	632.7673	0.0375	0.0909	660.7823
Worker	0.0616	0.0396	0.5705	1.8000e-003	0.2061	1.1400e-003	0.2072	0.0550	1.0500e-003	0.0561		183.8313	183.8313	4.2900e-003	4.3800e-003	185.2446
Total	**0.7704**	**56.6764**	**16.6494**	**0.2801**	**8.5267**	**0.3878**	**8.9145**	**2.3530**	**0.3710**	**2.7240**		**31,912.9577**	**31,912.9577**	**3.2352**	**5.0850**	**33,509.1804**

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Western Remediation Area - Mitigated Tier 4

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	94.90	Acre	94.90	4,133,844.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2023
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on an overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	155.00	17.00
tblConstructionPhase	NumDays	60.00	6.00
tblGrading	MaterialExported	0.00	18,157.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0430	0.8666	0.4367	3.0400e-003	0.2157	0.0192	0.2349	0.0828	0.0178	0.1006	0.0000	303.7705	303.7705	0.0433	0.0393	316.5752
Maximum	**0.0430**	**0.8666**	**0.4367**	**3.0400e-003**	**0.2157**	**0.0192**	**0.2349**	**0.0828**	**0.0178**	**0.1006**	**0.0000**	**303.7705**	**303.7705**	**0.0433**	**0.0393**	**316.5752**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0175	0.6909	0.5246	3.0400e-003	0.1313	4.3600e-003	0.1357	0.0463	4.2100e-003	0.0505	0.0000	303.7704	303.7704	0.0433	0.0393	316.5751

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Maximum	0.0175	0.6909	0.5246	3.0400e-003	0.1313	4.3600e-003	0.1357	0.0463	4.2100e-003	0.0505	0.0000	303.7704	303.7704	0.0433	0.0393	316.5751

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	59.37	20.27	-20.12	0.00	39.14	77.30	42.26	44.11	76.35	49.82	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2023	9-30-2023	0.8532	0.6595
		Highest	0.8532	0.6595

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2023	8/8/2023	5	6	
2	Grading	Grading	8/9/2023	8/31/2023	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 94.9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	32.00	2,270.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0590	0.0000	0.0590	0.0303	0.0000	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0826	0.0547	1.1000e-004		3.8000e-003	3.8000e-003		3.4900e-003	3.4900e-003	0.0000	10.0352	10.0352	3.2500e-003	0.0000	10.1164
Total	**7.9800e-003**	**0.0826**	**0.0547**	**1.1000e-004**	**0.0590**	**3.8000e-003**	**0.0628**	**0.0303**	**3.4900e-003**	**0.0338**	**0.0000**	**10.0352**	**10.0352**	**3.2500e-003**	**0.0000**	**10.1164**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-005	1.7600e-003	7.1000e-004	1.0000e-005	3.0000e-004	1.0000e-005	3.1000e-004	9.0000e-005	1.0000e-005	1.0000e-004	0.0000	0.8603	0.8603	5.0000e-005	1.2000e-004	0.8984
Worker	1.5000e-004	1.1000e-004	1.5800e-003	0.0000	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4564	0.4564	1.0000e-005	1.0000e-005	0.4599
Total	**2.0000e-004**	**1.8700e-003**	**2.2900e-003**	**1.0000e-005**	**8.9000e-004**	**1.0000e-005**	**9.1000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**1.3167**	**1.3167**	**6.0000e-005**	**1.3000e-004**	**1.3583**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	0.0130	0.0000	0.0130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0900e-003	0.0365	0.0689	1.1000e-004		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	10.0352	10.0352	3.2500e-003	0.0000	10.1163
Total	**2.0900e-003**	**0.0365**	**0.0689**	**1.1000e-004**	**0.0252**	**1.9000e-004**	**0.0254**	**0.0130**	**1.9000e-004**	**0.0132**	**0.0000**	**10.0352**	**10.0352**	**3.2500e-003**	**0.0000**	**10.1163**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-005	1.7600e-003	7.1000e-004	1.0000e-005	2.8000e-004	1.0000e-005	2.9000e-004	8.0000e-005	1.0000e-005	9.0000e-005	0.0000	0.8603	0.8603	5.0000e-005	1.2000e-004	0.8984

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Worker	1.5000e-004	1.1000e-004	1.5800e-003	0.0000	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4564	0.4564	1.0000e-005	1.0000e-005	0.4599
Total	**2.0000e-004**	**1.8700e-003**	**2.2900e-003**	**1.0000e-005**	**8.3000e-004**	**1.0000e-005**	**8.4000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**1.3167**	**1.3167**	**6.0000e-005**	**1.3000e-004**	**1.3583**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0793	0.0000	0.0793	0.0312	0.0000	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0282	0.2934	0.2384	5.3000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	46.3549	46.3549	0.0150	0.0000	46.7297
Total	**0.0282**	**0.2934**	**0.2384**	**5.3000e-004**	**0.0793**	**0.0121**	**0.0914**	**0.0312**	**0.0111**	**0.0424**	**0.0000**	**46.3549**	**46.3549**	**0.0150**	**0.0000**	**46.7297**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8400e-003	0.4784	0.1323	2.3200e-003	0.0730	3.2400e-003	0.0762	0.0200	3.1000e-003	0.0231	0.0000	239.7517	239.7517	0.0246	0.0385	251.8320
Vendor	2.7000e-004	9.9900e-003	4.0100e-003	5.0000e-005	1.7100e-003	5.0000e-005	1.7600e-003	4.9000e-004	5.0000e-005	5.4000e-004	0.0000	4.8752	4.8752	2.9000e-004	7.0000e-004	5.0910
Worker	4.8000e-004	3.4000e-004	4.9600e-003	2.0000e-005	1.8700e-003	1.0000e-005	1.8800e-003	5.0000e-004	1.0000e-005	5.0000e-004	0.0000	1.4367	1.4367	3.0000e-005	3.0000e-005	1.4478
Total	**6.5900e-003**	**0.4887**	**0.1413**	**2.3900e-003**	**0.0766**	**3.3000e-003**	**0.0799**	**0.0210**	**3.1600e-003**	**0.0242**	**0.0000**	**246.0636**	**246.0636**	**0.0250**	**0.0392**	**258.3708**

Western Remediation Area - Mitigated Tier 4 - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0339	0.0000	0.0339	0.0133	0.0000	0.0133	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5900e-003	0.1638	0.3121	5.3000e-004		8.6000e-004	8.6000e-004		8.6000e-004	8.6000e-004	0.0000	46.3549	46.3549	0.0150	0.0000	46.7297
Total	**8.5900e-003**	**0.1638**	**0.3121**	**5.3000e-004**	**0.0339**	**8.6000e-004**	**0.0347**	**0.0133**	**8.6000e-004**	**0.0142**	**0.0000**	**46.3549**	**46.3549**	**0.0150**	**0.0000**	**46.7297**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8400e-003	0.4784	0.1323	2.3200e-003	0.0681	3.2400e-003	0.0713	0.0188	3.1000e-003	0.0219	0.0000	239.7517	239.7517	0.0246	0.0385	251.8320
Vendor	2.7000e-004	9.9900e-003	4.0100e-003	5.0000e-005	1.6000e-003	5.0000e-005	1.6500e-003	4.7000e-004	5.0000e-005	5.1000e-004	0.0000	4.8752	4.8752	2.9000e-004	7.0000e-004	5.0910
Worker	4.8000e-004	3.4000e-004	4.9600e-003	2.0000e-005	1.7200e-003	1.0000e-005	1.7300e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4367	1.4367	3.0000e-005	3.0000e-005	1.4478
Total	**6.5900e-003**	**0.4887**	**0.1413**	**2.3900e-003**	**0.0714**	**3.3000e-003**	**0.0747**	**0.0197**	**3.1600e-003**	**0.0229**	**0.0000**	**246.0636**	**246.0636**	**0.0250**	**0.0392**	**258.3708**

Western Remediation Area - Mitigated Tier 4

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Grading	0.56	0.17	-0.19	0.00	0.73	0.72	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.72	0.55	-0.25	0.00	0.95	0.94	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Excavators	Diesel	Tier 4 Interim	2	2	No Change	0.00
Graders	Diesel	Tier 4 Interim	1	1	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Interim	4	4	No Change	0.00
Scrapers	Diesel	Tier 4 Interim	2	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Interim	6	6	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Excavators	3.21000E-003	2.63300E-002	5.53800E-002	9.00000E-005	1.29000E-003	1.19000E-003	0.00000E+000	7.71270E+000	7.71270E+000	2.49000E-003	0.00000E+000	7.77506E+000
Graders	3.26000E-003	3.95500E-002	1.43900E-002	6.00000E-005	1.28000E-003	1.18000E-003	0.00000E+000	4.94168E+000	4.94168E+000	1.60000E-003	0.00000E+000	4.98164E+000
Rubber Tired Dozers	1.19800E-002	1.24730E-001	5.43600E-002	1.50000E-004	5.62000E-003	5.17000E-003	0.00000E+000	1.31292E+001	1.31292E+001	4.25000E-003	0.00000E+000	1.32354E+001
Scrapers	1.33800E-002	1.40820E-001	1.04330E-001	2.60000E-004	5.52000E-003	5.08000E-003	0.00000E+000	2.26725E+001	2.26725E+001	7.33000E-003	0.00000E+000	2.28559E+001
Tractors/Loaders/Backhoes	4.39000E-003	4.45300E-002	6.47100E-002	9.00000E-005	2.20000E-003	2.02000E-003	0.00000E+000	7.93398E+000	7.93398E+000	2.57000E-003	0.00000E+000	7.99813E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Excavators	1.08000E-003	3.87000E-002	6.66100E-002	9.00000E-005	1.40000E-004	1.40000E-004	0.00000E+000	7.71269E+000	7.71269E+000	2.49000E-003	0.00000E+000	7.77505E+000
Graders	9.20000E-004	1.48300E-002	2.98800E-002	6.00000E-005	9.00000E-005	9.00000E-005	0.00000E+000	4.94167E+000	4.94167E+000	1.60000E-003	0.00000E+000	4.98163E+000

Western Remediation Area - Mitigated Tier 4

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rubber Tired Dozers	2.44000E-003	3.93400E-002	7.92900E-002	1.50000E-004	2.40000E-004	2.40000E-004	0.00000E+000	1.31292E+001	1.31292E+001	4.25000E-003	0.00000E+000	1.32354E+001
Scrapers	4.23000E-003	6.81300E-002	1.37330E-001	2.60000E-004	4.20000E-004	4.20000E-004	0.00000E+000	2.26725E+001	2.26725E+001	7.33000E-003	0.00000E+000	2.28558E+001
Tractors/Loaders/Backhoes	2.02000E-003	3.92800E-002	6.79200E-002	9.00000E-005	1.50000E-004	1.50000E-004	0.00000E+000	7.93397E+000	7.93397E+000	2.57000E-003	0.00000E+000	7.99812E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Excavators	6.63551E-001	-4.69806E-001	-2.02781E-001	0.00000E+000	8.91473E-001	8.82353E-001	0.00000E+000	1.29656E-006	1.29656E-006	0.00000E+000	0.00000E+000	1.28616E-006
Graders	7.17791E-001	6.25032E-001	-1.07644E+000	0.00000E+000	9.29688E-001	9.23729E-001	0.00000E+000	2.02360E-006	2.02360E-006	0.00000E+000	0.00000E+000	2.00737E-006
Rubber Tired Dozers	7.96327E-001	6.84599E-001	-4.58609E-001	0.00000E+000	9.57295E-001	9.53578E-001	0.00000E+000	7.61659E-007	7.61659E-007	0.00000E+000	0.00000E+000	1.51110E-006
Scrapers	6.83857E-001	5.16191E-001	-3.16304E-001	0.00000E+000	9.23913E-001	9.17323E-001	0.00000E+000	8.82125E-007	8.82125E-007	0.00000E+000	0.00000E+000	1.31257E-006
Tractors/Loaders/Backhoes	5.39863E-001	1.17898E-001	-4.96059E-002	0.00000E+000	9.31818E-001	9.25743E-001	0.00000E+000	1.26040E-006	1.26040E-006	0.00000E+000	0.00000E+000	1.25029E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			
Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grading	Fugitive Dust	0.08	0.03	0.03	0.01	0.57	0.57
Grading	Roads	0.08	0.02	0.07	0.02	0.07	0.06
Site Preparation	Fugitive Dust	0.06	0.03	0.03	0.01	0.57	0.57
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.07	0.08

CalEEMod Output: Eastern Remediation Construction – Mitigated

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Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Eastern Remediation Area - Mitigated Tier 4 Interim

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	167.20	Acre	167.20	7,283,232.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on total overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the [illegible]

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	310.00	17.00
tblConstructionPhase	NumDays	120.00	6.00
tblGrading	MaterialExported	0.00	17,498.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	3.9453	84.0066	43.9414	0.3250	20.0628	1.7222	21.2992	10.2147	1.5986	11.3524	0.0000	36,051.6731	36,051.6731	5.0836	4.7920	37,606.7793
Maximum	**3.9453**	**84.0066**	**43.9414**	**0.3250**	**20.0628**	**1.7222**	**21.2992**	**10.2147**	**1.5986**	**11.3524**	**0.0000**	**36,051.6731**	**36,051.6731**	**5.0836**	**4.7920**	**37,606.7793**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	1.7382	70.9003	52.9411	0.3250	12.1177	0.4883	12.6060	4.4240	0.4715	4.4927	0.0000	36,051.6731	36,051.6731	5.0836	4.7920	37,606.7793

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Maximum	1.7382	70.9003	52.9411	0.3250	12.1177	0.4883	12.6060	4.4240	0.4715	4.4927	0.0000	36,051.6731	36,051.6731	5.0836	4.7920	37,606.7793

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	55.94	15.60	-20.48	0.00	39.60	71.65	40.81	56.69	70.50	60.42	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	10/8/2024	5	6	
2	Grading	Grading	10/9/2024	10/31/2024	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 167.2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	16.00	2,187.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0318	1.1182	0.4615	5.6500e-003	0.2046	6.0200e-003	0.2106	0.0589	5.7600e-003	0.0647		622.0364	622.0364	0.0380	0.0896	649.6959
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0795**	**1.1473**	**0.9753**	**7.2900e-003**	**0.4058**	**7.0000e-003**	**0.4128**	**0.1123**	**6.6600e-003**	**0.1189**		**791.6122**	**791.6122**	**0.0414**	**0.0931**	**820.3905**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0318	1.1182	0.4615	5.6500e-003	0.1915	6.0200e-003	0.1975	0.0557	5.7600e-003	0.0614		622.0364	622.0364	0.0380	0.0896	649.6959
Worker	0.0477	0.0292	0.5137	1.6400e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		169.5759	169.5759	3.4200e-003	3.4700e-003	170.6946
Total	**0.0795**	**1.1473**	**0.9753**	**7.2900e-003**	**0.3769**	**7.0000e-003**	**0.3839**	**0.1052**	**6.6600e-003**	**0.1118**		**791.6122**	**791.6122**	**0.0414**	**0.0931**	**820.3905**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3200	0.0000	9.3200	3.6714	0.0000	3.6714			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.3200**	**1.3354**	**10.6554**	**3.6714**	**1.2286**	**4.9000**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6583	51.0382	15.4170	0.2583	8.4056	0.3827	8.7883	2.3012	0.3661	2.6673		29,542.4886	29,542.4886	3.1171	4.7433	31,033.9302
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.1023	3.0100e-003	0.1053	0.0294	2.8800e-003	0.0323		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.7272**	**51.6296**	**16.2185**	**0.2629**	**8.7315**	**0.3868**	**9.1183**	**2.3899**	**0.3700**	**2.7599**		**30,041.9244**	**30,041.9244**	**3.1399**	**4.7920**	**31,548.4388**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9843	0.0000	3.9843	1.5695	0.0000	1.5695			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9843**	**0.1015**	**4.0858**	**1.5695**	**0.1015**	**1.6711**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6583	51.0382	15.4170	0.2583	7.8316	0.3827	8.2143	2.1603	0.3661	2.5264		29,542.4886	29,542.4886	3.1171	4.7433	31,033.9302
Vendor	0.0159	0.5591	0.2308	2.8300e-003	0.0957	3.0100e-003	0.0988	0.0278	2.8800e-003	0.0307		311.0182	311.0182	0.0190	0.0448	324.8480
Worker	0.0530	0.0324	0.5708	1.8300e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		188.4176	188.4176	3.8000e-003	3.8500e-003	189.6606
Total	**0.7272**	**51.6296**	**16.2185**	**0.2629**	**8.1334**	**0.3868**	**8.5202**	**2.2431**	**0.3700**	**2.6131**		**30,041.9244**	**30,041.9244**	**3.1399**	**4.7920**	**31,548.4388**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Eastern Remediation Area - Mitigated Tier 4 Interim

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	167.20	Acre	167.20	7,283,232.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on total overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	310.00	17.00
tblConstructionPhase	NumDays	120.00	6.00
tblGrading	MaterialExported	0.00	17,498.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	3.9341	86.0448	43.9564	0.3250	20.0628	1.7225	21.2992	10.2147	1.5988	11.3524	0.0000	36,050.6003	36,050.6003	5.0826	4.7937	37,606.1894
Maximum	**3.9341**	**86.0448**	**43.9564**	**0.3250**	**20.0628**	**1.7225**	**21.2992**	**10.2147**	**1.5988**	**11.3524**	**0.0000**	**36,050.6003**	**36,050.6003**	**5.0826**	**4.7937**	**37,606.1894**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	1.7269	72.9385	52.9562	0.3250	12.1177	0.4886	12.6063	4.4240	0.4718	4.4927	0.0000	36,050.6002	36,050.6002	5.0826	4.7937	37,606.1894

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Maximum	1.7269	72.9385	52.9562	0.3250	12.1177	0.4886	12.6063	4.4240	0.4718	4.4927	0.0000	36,050.6002	36,050.6002	5.0826	4.7937	37,606.1894

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	56.10	15.23	-20.47	0.00	39.60	71.63	40.81	56.69	70.49	60.42	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	10/8/2024	5	6	
2	Grading	Grading	10/9/2024	10/31/2024	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 167.2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	16.00	2,187.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6609	27.1760	18.3356	0.0381		1.2294	1.2294		1.1310	1.1310		3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**2.6609**	**27.1760**	**18.3356**	**0.0381**	**19.6570**	**1.2294**	**20.8864**	**10.1025**	**1.1310**	**11.2335**		**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	0.0307	1.1681	0.4761	5.6600e-003	0.2046	6.0600e-003	0.2107	0.0589	5.7900e-003	0.0647		622.9738	622.9738	0.0379	0.0898	650.6911
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.2012	9.8000e-004	0.2022	0.0534	9.0000e-004	0.0543		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0830**	**1.2002**	**0.9552**	**7.2300e-003**	**0.4058**	**7.0400e-003**	**0.4129**	**0.1123**	**6.6900e-003**	**0.1189**		**784.4546**	**784.4546**	**0.0414**	**0.0935**	**813.3585**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4034	0.0000	8.4034	4.3188	0.0000	4.3188			0.0000			0.0000
Off-Road	0.6967	12.1620	22.9600	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,688.0100	3,688.0100	1.1928		3,717.8294
Total	**0.6967**	**12.1620**	**22.9600**	**0.0381**	**8.4034**	**0.0621**	**8.4655**	**4.3188**	**0.0621**	**4.3809**	**0.0000**	**3,688.0100**	**3,688.0100**	**1.1928**		**3,717.8294**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0307	1.1681	0.4761	5.6600e-003	0.1915	6.0600e-003	0.1975	0.0557	5.7900e-003	0.0615		622.9738	622.9738	0.0379	0.0898	650.6911
Worker	0.0523	0.0320	0.4791	1.5700e-003	0.1855	9.8000e-004	0.1864	0.0495	9.0000e-004	0.0504		161.4808	161.4808	3.5100e-003	3.6900e-003	162.6674
Total	**0.0830**	**1.2002**	**0.9552**	**7.2300e-003**	**0.3769**	**7.0400e-003**	**0.3840**	**0.1052**	**6.6900e-003**	**0.1119**		**784.4546**	**784.4546**	**0.0414**	**0.0935**	**813.3585**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3200	0.0000	9.3200	3.6714	0.0000	3.6714			0.0000			0.0000
Off-Road	3.2181	32.3770	27.7228	0.0621		1.3354	1.3354		1.2286	1.2286		6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**3.2181**	**32.3770**	**27.7228**	**0.0621**	**9.3200**	**1.3354**	**10.6554**	**3.6714**	**1.2286**	**4.9000**		**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6425	53.0482	15.4632	0.2583	8.4056	0.3829	8.7886	2.3012	0.3664	2.6675		29,549.9416	29,549.9416	3.1161	4.7447	31,041.7618
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.1023	3.0300e-003	0.1053	0.0294	2.9000e-003	0.0323		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2236	1.0900e-003	0.2246	0.0593	1.0000e-003	0.0603		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.7159**	**53.6678**	**16.2336**	**0.2629**	**8.7315**	**0.3871**	**9.1186**	**2.3899**	**0.3703**	**2.7602**		**30,040.8516**	**30,040.8516**	**3.1389**	**4.7937**	**31,547.8489**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9843	0.0000	3.9843	1.5695	0.0000	1.5695			0.0000			0.0000
Off-Road	1.0110	19.2707	36.7226	0.0621		0.1015	0.1015		0.1015	0.1015	0.0000	6,009.7487	6,009.7487	1.9437		6,058.3405
Total	**1.0110**	**19.2707**	**36.7226**	**0.0621**	**3.9843**	**0.1015**	**4.0858**	**1.5695**	**0.1015**	**1.6711**	**0.0000**	**6,009.7487**	**6,009.7487**	**1.9437**		**6,058.3405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6425	53.0482	15.4632	0.2583	7.8316	0.3829	8.2145	2.1603	0.3664	2.5266		29,549.9416	29,549.9416	3.1161	4.7447	31,041.7618
Vendor	0.0154	0.5841	0.2380	2.8300e-003	0.0957	3.0300e-003	0.0988	0.0278	2.9000e-003	0.0307		311.4869	311.4869	0.0189	0.0449	325.3455
Worker	0.0581	0.0356	0.5323	1.7400e-003	0.2061	1.0900e-003	0.2072	0.0550	1.0000e-003	0.0560		179.4231	179.4231	3.9000e-003	4.1000e-003	180.7416
Total	**0.7159**	**53.6678**	**16.2336**	**0.2629**	**8.1334**	**0.3871**	**8.5205**	**2.2431**	**0.3703**	**2.6134**		**30,040.8516**	**30,040.8516**	**3.1389**	**4.7937**	**31,547.8489**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Eastern Remediation Area - Mitigated Tier 4 Interim

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	167.20	Acre	167.20	7,283,232.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on total overall duration of 1 month.

Trips and VMT - See modeling assumptions file in the AQ/GHG appendix of the EIR for vendor trip details. Haul distance based on distance from the project site to the

Grading -

Construction Off-road Equipment Mitigation - Based on South Coast AQMD Rules 403 and 1186 and mitigation.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	310.00	17.00
tblConstructionPhase	NumDays	120.00	6.00
tblGrading	MaterialExported	0.00	17,498.00
tblTripsAndVMT	HaulingTripLength	20.00	75.00
tblTripsAndVMT	VendorTripNumber	0.00	32.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0417	0.8232	0.4313	2.9000e-003	0.2125	0.0184	0.2308	0.0819	0.0170	0.0989	0.0000	290.1485	290.1485	0.0426	0.0372	302.3022
Maximum	**0.0417**	**0.8232**	**0.4313**	**2.9000e-003**	**0.2125**	**0.0184**	**0.2308**	**0.0819**	**0.0170**	**0.0989**	**0.0000**	**290.1485**	**290.1485**	**0.0426**	**0.0372**	**302.3022**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0170	0.6667	0.5217	2.9000e-003	0.1283	4.3600e-003	0.1326	0.0454	4.2200e-003	0.0496	0.0000	290.1484	290.1484	0.0426	0.0372	302.3021

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Maximum	0.0170	0.6667	0.5217	2.9000e-003	0.1283	4.3600e-003	0.1326	0.0454	4.2200e-003	0.0496	0.0000	290.1484	290.1484	0.0426	0.0372	302.3021

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	59.14	19.00	-20.95	0.00	39.62	76.24	42.53	44.53	75.18	49.81	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2024	10/8/2024	5	6	
2	Grading	Grading	10/9/2024	10/31/2024	5	17	

Acres of Grading (Site Preparation Phase): 9

Acres of Grading (Grading Phase): 51

Acres of Paving: 167.2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	16.00	2,187.00	14.70	6.90	75.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0590	0.0000	0.0590	0.0303	0.0000	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0815	0.0550	1.1000e-004		3.6900e-003	3.6900e-003		3.3900e-003	3.3900e-003	0.0000	10.0371	10.0371	3.2500e-003	0.0000	10.1183
Total	**7.9800e-003**	**0.0815**	**0.0550**	**1.1000e-004**	**0.0590**	**3.6900e-003**	**0.0627**	**0.0303**	**3.3900e-003**	**0.0337**	**0.0000**	**10.0371**	**10.0371**	**3.2500e-003**	**0.0000**	**10.1183**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.5100e-003	1.4000e-003	2.0000e-005	6.0000e-004	2.0000e-005	6.2000e-004	1.7000e-004	2.0000e-005	1.9000e-004	0.0000	1.6940	1.6940	1.0000e-004	2.4000e-004	1.7694
Worker	1.4000e-004	1.0000e-004	1.4700e-003	0.0000	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4454	0.4454	1.0000e-005	1.0000e-005	0.4487
Total	**2.3000e-004**	**3.6100e-003**	**2.8700e-003**	**2.0000e-005**	**1.1900e-003**	**2.0000e-005**	**1.2200e-003**	**3.3000e-004**	**2.0000e-005**	**3.5000e-004**	**0.0000**	**2.1394**	**2.1394**	**1.1000e-004**	**2.5000e-004**	**2.2180**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	0.0130	0.0000	0.0130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0900e-003	0.0365	0.0689	1.1000e-004		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	10.0371	10.0371	3.2500e-003	0.0000	10.1183
Total	**2.0900e-003**	**0.0365**	**0.0689**	**1.1000e-004**	**0.0252**	**1.9000e-004**	**0.0254**	**0.0130**	**1.9000e-004**	**0.0132**	**0.0000**	**10.0371**	**10.0371**	**3.2500e-003**	**0.0000**	**10.1183**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.5100e-003	1.4000e-003	2.0000e-005	5.7000e-004	2.0000e-005	5.8000e-004	1.6000e-004	2.0000e-005	1.8000e-004	0.0000	1.6940	1.6940	1.0000e-004	2.4000e-004	1.7694
Worker	1.4000e-004	1.0000e-004	1.4700e-003	0.0000	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4454	0.4454	1.0000e-005	1.0000e-005	0.4487

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**2.3000e-004**	**3.6100e-003**	**2.8700e-003**	**2.0000e-005**	**1.1200e-003**	**2.0000e-005**	**1.1300e-003**	**3.1000e-004**	**2.0000e-005**	**3.3000e-004**	**0.0000**	**2.1394**	**2.1394**	**1.1000e-004**	**2.5000e-004**	**2.2180**

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0792	0.0000	0.0792	0.0312	0.0000	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0274	0.2752	0.2356	5.3000e-004		0.0114	0.0114		0.0104	0.0104	0.0000	46.3416	46.3416	0.0150	0.0000	46.7163
Total	**0.0274**	**0.2752**	**0.2356**	**5.3000e-004**	**0.0792**	**0.0114**	**0.0906**	**0.0312**	**0.0104**	**0.0417**	**0.0000**	**46.3416**	**46.3416**	**0.0150**	**0.0000**	**46.7163**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.5400e-003	0.4576	0.1312	2.2000e-003	0.0703	3.2500e-003	0.0736	0.0193	3.1100e-003	0.0224	0.0000	227.8283	227.8283	0.0240	0.0366	239.3305
Vendor	1.3000e-004	4.9800e-003	1.9900e-003	2.0000e-005	8.6000e-004	3.0000e-005	8.8000e-004	2.5000e-004	2.0000e-005	2.7000e-004	0.0000	2.3998	2.3998	1.5000e-004	3.5000e-004	2.5066
Worker	4.5000e-004	3.1000e-004	4.6300e-003	1.0000e-005	1.8700e-003	1.0000e-005	1.8800e-003	5.0000e-004	1.0000e-005	5.0000e-004	0.0000	1.4023	1.4023	3.0000e-005	3.0000e-005	1.4126
Total	**6.1200e-003**	**0.4628**	**0.1378**	**2.2300e-003**	**0.0731**	**3.2900e-003**	**0.0764**	**0.0200**	**3.1400e-003**	**0.0232**	**0.0000**	**231.6304**	**231.6304**	**0.0242**	**0.0370**	**243.2496**

Eastern Remediation Area - Mitigated Tier 4 Interim - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0339	0.0000	0.0339	0.0133	0.0000	0.0133	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5900e-003	0.1638	0.3121	5.3000e-004		8.6000e-004	8.6000e-004		8.6000e-004	8.6000e-004	0.0000	46.3415	46.3415	0.0150	0.0000	46.7162
Total	**8.5900e-003**	**0.1638**	**0.3121**	**5.3000e-004**	**0.0339**	**8.6000e-004**	**0.0347**	**0.0133**	**8.6000e-004**	**0.0142**	**0.0000**	**46.3415**	**46.3415**	**0.0150**	**0.0000**	**46.7162**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.5400e-003	0.4576	0.1312	2.2000e-003	0.0656	3.2500e-003	0.0688	0.0181	3.1100e-003	0.0212	0.0000	227.8283	227.8283	0.0240	0.0366	239.3305
Vendor	1.3000e-004	4.9800e-003	1.9900e-003	2.0000e-005	8.0000e-004	3.0000e-005	8.3000e-004	2.3000e-004	2.0000e-005	2.6000e-004	0.0000	2.3998	2.3998	1.5000e-004	3.5000e-004	2.5066
Worker	4.5000e-004	3.1000e-004	4.6300e-003	1.0000e-005	1.7200e-003	1.0000e-005	1.7300e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4023	1.4023	3.0000e-005	3.0000e-005	1.4126
Total	**6.1200e-003**	**0.4628**	**0.1378**	**2.2300e-003**	**0.0681**	**3.2900e-003**	**0.0714**	**0.0188**	**3.1400e-003**	**0.0220**	**0.0000**	**231.6304**	**231.6304**	**0.0242**	**0.0370**	**243.2496**

Eastern Remediation Area - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Grading	0.56	0.15	-0.20	0.00	0.72	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.72	0.53	-0.24	0.00	0.94	0.94	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Excavators	Diesel	Tier 4 Interim	2	2	No Change	0.00
Graders	Diesel	Tier 4 Interim	1	1	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Interim	4	4	No Change	0.00
Scrapers	Diesel	Tier 4 Interim	2	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Interim	6	6	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Excavators	3.06000E-003	2.38500E-002	5.55100E-002	9.00000E-005	1.17000E-003	1.08000E-003	0.00000E+000	7.71516E+000	7.71516E+000	2.50000E-003	0.00000E+000	7.77754E+000
Graders	3.01000E-003	3.53200E-002	1.40800E-002	6.00000E-005	1.15000E-003	1.05000E-003	0.00000E+000	4.93900E+000	4.93900E+000	1.60000E-003	0.00000E+000	4.97893E+000
Rubber Tired Dozers	1.21600E-002	1.24730E-001	5.47900E-002	1.50000E-004	5.62000E-003	5.17000E-003	0.00000E+000	1.31289E+001	1.31289E+001	4.25000E-003	0.00000E+000	1.32351E+001
Scrapers	1.29200E-002	1.30830E-001	1.01440E-001	2.60000E-004	5.17000E-003	4.76000E-003	0.00000E+000	2.26566E+001	2.26566E+001	7.33000E-003	0.00000E+000	2.28398E+001
Tractors/Loaders/Backhoes	4.17000E-003	4.20000E-002	6.48300E-002	9.00000E-005	1.93000E-003	1.77000E-003	0.00000E+000	7.93899E+000	7.93899E+000	2.57000E-003	0.00000E+000	8.00318E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Excavators	1.08000E-003	3.87000E-002	6.66100E-002	9.00000E-005	1.40000E-004	1.40000E-004	0.00000E+000	7.71515E+000	7.71515E+000	2.50000E-003	0.00000E+000	7.77753E+000
Graders	9.20000E-004	1.48300E-002	2.98800E-002	6.00000E-005	9.00000E-005	9.00000E-005	0.00000E+000	4.93899E+000	4.93899E+000	1.60000E-003	0.00000E+000	4.97893E+000

Eastern Remediation Area - Mitigated Tier 4 Interim

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Rubber Tired Dozers	2.44000E-003	3.93400E-002	7.92900E-002	1.50000E-004	2.40000E-004	2.40000E-004	0.00000E+000	1.31289E+001	1.31289E+001	4.25000E-003	0.00000E+000	1.32351E+001
Scrapers	4.23000E-003	6.81300E-002	1.37330E-001	2.60000E-004	4.20000E-004	4.20000E-004	0.00000E+000	2.26566E+001	2.26566E+001	7.33000E-003	0.00000E+000	2.28398E+001
Tractors/Loaders/Backhoes	2.02000E-003	3.92800E-002	6.79200E-002	9.00000E-005	1.50000E-004	1.50000E-004	0.00000E+000	7.93898E+000	7.93898E+000	2.57000E-003	0.00000E+000	8.00317E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Excavators	6.47059E-001	-6.22642E-001	-1.99964E-001	0.00000E+000	8.80342E-001	8.70370E-001	0.00000E+000	1.29615E-006	1.29615E-006	0.00000E+000	0.00000E+000	1.28575E-006
Graders	6.94352E-001	5.80125E-001	-1.12216E+000	0.00000E+000	9.21739E-001	9.14286E-001	0.00000E+000	2.02470E-006	2.02470E-006	0.00000E+000	0.00000E+000	0.00000E+000
Rubber Tired Dozers	7.99342E-001	6.84599E-001	-4.47162E-001	0.00000E+000	9.57295E-001	9.53578E-001	0.00000E+000	1.52335E-006	1.52335E-006	0.00000E+000	0.00000E+000	7.55568E-007
Scrapers	6.72601E-001	4.79248E-001	-3.53805E-001	0.00000E+000	9.18762E-001	9.11765E-001	0.00000E+000	1.32412E-006	1.32412E-006	0.00000E+000	0.00000E+000	1.31349E-006
Tractors/Loaders/Backhoes	5.15588E-001	6.47619E-002	-4.76631E-002	0.00000E+000	9.22280E-001	9.15254E-001	0.00000E+000	1.25961E-006	1.25961E-006	0.00000E+000	0.00000E+000	1.24950E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			
Yes	Replace Ground Cover of Area Disturbed	PM10 Reduction	5.00	PM2.5 Reduction	5.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	15.00		
Yes	Clean Paved Road	% PM Reduction	9.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grading	Fugitive Dust	0.08	0.03	0.03	0.01	0.57	0.57
Grading	Roads	0.07	0.02	0.07	0.02	0.07	0.06
Site Preparation	Fugitive Dust	0.06	0.03	0.03	0.01	0.57	0.57
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.06	0.06

CalEEMod Output: Operation

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Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Proposed Project Operation

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	450.00	Dwelling Unit	135.10	810,000.00	1287
Condo/Townhouse	650.00	Dwelling Unit	62.90	650,000.00	1859
City Park	15.10	Acre	15.10	657,756.00	0
Parking Lot	64.80	1000sqft	1.49	64,800.00	0
Other Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0
Other Non-Asphalt Surfaces	45.51	Acre	45.51	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	371.48	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Land Use - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Construction Phase - Operation emissions modeling only.

Vehicle Trips - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Fleet Mix - See assumptions file (Changes to the CalEEMod Defaults - Year 2030) in the AQ/GHG appendix of the DEIR.

Woodstoves - Assumes gas fireplaces only per South Coast AQMD Rule 445.

Area Coating - See assumptions file (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Water And Wastewater - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Solid Waste - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Water Mitigation -

Table Name	Column Name	Default Value	New Value

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblAreaCoating	Area_Parking	9115	3888
tblConstructionPhase	NumDays	300.00	1.00
tblConstructionPhase	PhaseEndDate	3/31/2023	2/7/2022
tblFireplaces	NumberGas	552.50	650.00
tblFireplaces	NumberGas	382.50	450.00
tblFireplaces	NumberNoFireplace	65.00	0.00
tblFireplaces	NumberNoFireplace	45.00	0.00
tblFireplaces	NumberWood	32.50	0.00
tblFireplaces	NumberWood	22.50	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblLandUse	LandUseSquareFeet	1,982,415.60	0.00
tblLandUse	LotAcreage	146.10	135.10
tblLandUse	LotAcreage	40.63	62.90
tblProjectCharacteristics	CO2IntensityFactor	390.98	371.48
tblSolidWaste	SolidWasteGenerationRate	1.30	0.00
tblSolidWaste	SolidWasteGenerationRate	299.00	1,471.90
tblSolidWaste	SolidWasteGenerationRate	527.67	1,471.90
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	19.00	0.00
tblVehicleTrips	CW_TL	16.60	8.95
tblVehicleTrips	CW_TTP	33.00	100.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	0.00
tblVehicleTrips	HO_TTP	40.60	0.00

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	1.96	160.86
tblVehicleTrips	ST_TR	8.14	8.76
tblVehicleTrips	ST_TR	9.54	9.48
tblVehicleTrips	SU_TR	2.19	122.98
tblVehicleTrips	SU_TR	6.28	7.17
tblVehicleTrips	SU_TR	8.55	8.48
tblVehicleTrips	WD_TR	0.78	28.34
tblVehicleTrips	WD_TR	7.32	7.20
tblVehicleTrips	WD_TR	9.44	9.43
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	42,350,116.65	49,161,850.00
tblWater	IndoorWaterUseRate	29,319,311.53	49,161,850.00
tblWater	OutdoorWaterUseRate	17,991,368.38	22,284,101.67
tblWater	OutdoorWaterUseRate	26,698,986.59	22,284,101.67

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWater	OutdoorWaterUseRate	18,483,913.79	22,284,101.67
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	32.50	0.00
tblWoodstoves	NumberCatalytic	22.50	0.00
tblWoodstoves	NumberNoncatalytic	32.50	0.00
tblWoodstoves	NumberNoncatalytic	22.50	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690
Energy	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096
Mobile	26.5955	15.9479	263.1335	0.5760	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		63,473.7524	63,473.7524	3.2945	1.9687	64,142.7897
Total	**63.5742**	**40.6624**	**363.6516**	**0.7319**	**84.5118**	**2.6914**	**87.2032**	**22.4538**	**2.6715**	**25.1253**	**0.0000**	**93,855.5676**	**93,855.5676**	**4.0293**	**2.5227**	**94,708.0684**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690
Energy	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096
Mobile	26.5955	15.9479	263.1335	0.5760	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		63,473.7524	63,473.7524	3.2945	1.9687	64,142.7897
Total	**63.5742**	**40.6624**	**363.6516**	**0.7319**	**84.5118**	**2.6914**	**87.2032**	**22.4538**	**2.6715**	**25.1253**	**0.0000**	**93,855.5676**	**93,855.5676**	**4.0293**	**2.5227**	**94,708.0684**

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	26.5955	15.9479	263.1335	0.5760	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		63,473.752	63,473.752	3.2945	1.9687	64,142.789
Unmitigated	26.5955	15.9479	263.1335	0.5760	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		63,473.752	63,473.752	3.2945	1.9687	64,142.789

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	428.00	2,429.00	1857.00	2,989,491	2,989,491
Condo/Townhouse	4,680.00	5,694.00	4659.98	15,702,959	15,702,959
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.01	4,266.00	3816.00	13,629,503	13,629,503
Total	9,351.01	12,389.00	10,332.98	32,321,954	32,321,954

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Condo/Townhouse	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	8.95	5.90	8.70	100.00	0.00	0.00	100	0	0

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096
NaturalGas Unmitigated	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day											lb/day				
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	29393.2	0.3170	2.7088	1.1527	0.0173		0.2190	0.2190		0.2190	0.2190		3,458.0293	3,458.0293	0.0663	0.0634	3,478.5787
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	29463	0.3177	2.7152	1.1554	0.0173		0.2195	0.2195		0.2195	0.2195		3,466.2329	3,466.2329	0.0664	0.0636	3,486.8310
Total		**0.6347**	**5.4240**	**2.3081**	**0.0346**		**0.4385**	**0.4385**		**0.4385**	**0.4385**		**6,924.2622**	**6,924.2622**	**0.1327**	**0.1270**	**6,965.4096**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day											lb/day				
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	29.3932	0.3170	2.7088	1.1527	0.0173		0.2190	0.2190		0.2190	0.2190		3,458.0293	3,458.0293	0.0663	0.0634	3,478.5787
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	29.463	0.3177	2.7152	1.1554	0.0173		0.2195	0.2195		0.2195	0.2195		3,466.2329	3,466.2329	0.0664	0.0636	3,486.8310
Total		**0.6347**	**5.4240**	**2.3081**	**0.0346**		**0.4385**	**0.4385**		**0.4385**	**0.4385**		**6,924.2622**	**6,924.2622**	**0.1327**	**0.1270**	**6,965.4096**

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690
Unmitigated	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	2.1353	18.2471	7.7647	0.1165		1.4753	1.4753		1.4753	1.4753	0.0000	23,294.1177	23,294.1177	0.4465	0.4271	23,432.5429
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**36.3439**	**19.2905**	**98.2101**	**0.1213**		**1.9786**	**1.9786**		**1.9786**	**1.9786**	**0.0000**	**23,457.5531**	**23,457.5531**	**0.6021**	**0.4271**	**23,599.8690**

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	2.1353	18.2471	7.7647	0.1165		1.4753	1.4753		1.4753	1.4753	0.0000	23,294.1177	23,294.1177	0.4465	0.4271	23,432.5429
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**36.3439**	**19.2905**	**98.2101**	**0.1213**		**1.9786**	**1.9786**		**1.9786**	**1.9786**	**0.0000**	**23,457.5531**	**23,457.5531**	**0.6021**	**0.4271**	**23,599.8690**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

Proposed Project Operation - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Proposed Project Operation

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	450.00	Dwelling Unit	135.10	810,000.00	1287
Condo/Townhouse	650.00	Dwelling Unit	62.90	650,000.00	1859
City Park	15.10	Acre	15.10	657,756.00	0
Parking Lot	64.80	1000sqft	1.49	64,800.00	0
Other Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0
Other Non-Asphalt Surfaces	45.51	Acre	45.51	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	371.48	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Land Use - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Construction Phase - Operation emissions modeling only.
Vehicle Trips - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Fleet Mix - See assumptions file (Changes to the CalEEMod Defaults - Year 2030) in the AQ/GHG appendix of the DEIR.
Woodstoves - Assumes gas fireplaces only per South Coast AQMD Rule 445.
Area Coating - See assumptions file (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Water And Wastewater - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Solid Waste - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Water Mitigation -

Table Name	Column Name	Default Value	New Value

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblAreaCoating	Area_Parking	9115	3888
tblConstructionPhase	NumDays	300.00	1.00
tblConstructionPhase	PhaseEndDate	3/31/2023	2/7/2022
tblFireplaces	NumberGas	552.50	650.00
tblFireplaces	NumberGas	382.50	450.00
tblFireplaces	NumberNoFireplace	65.00	0.00
tblFireplaces	NumberNoFireplace	45.00	0.00
tblFireplaces	NumberWood	32.50	0.00
tblFireplaces	NumberWood	22.50	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblLandUse	LandUseSquareFeet	1,982,415.60	0.00
tblLandUse	LotAcreage	146.10	135.10
tblLandUse	LotAcreage	40.63	62.90
tblProjectCharacteristics	CO2IntensityFactor	390.98	371.48
tblSolidWaste	SolidWasteGenerationRate	1.30	0.00
tblSolidWaste	SolidWasteGenerationRate	299.00	1,471.90
tblSolidWaste	SolidWasteGenerationRate	527.67	1,471.90
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	19.00	0.00
tblVehicleTrips	CW_TL	16.60	8.95
tblVehicleTrips	CW_TTP	33.00	100.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	0.00
tblVehicleTrips	HO_TTP	40.60	0.00

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	1.96	160.86
tblVehicleTrips	ST_TR	8.14	8.76
tblVehicleTrips	ST_TR	9.54	9.48
tblVehicleTrips	SU_TR	2.19	122.98
tblVehicleTrips	SU_TR	6.28	7.17
tblVehicleTrips	SU_TR	8.55	8.48
tblVehicleTrips	WD_TR	0.78	28.34
tblVehicleTrips	WD_TR	7.32	7.20
tblVehicleTrips	WD_TR	9.44	9.43
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	42,350,116.65	49,161,850.00
tblWater	IndoorWaterUseRate	29,319,311.53	49,161,850.00
tblWater	OutdoorWaterUseRate	17,991,368.38	22,284,101.67
tblWater	OutdoorWaterUseRate	26,698,986.59	22,284,101.67

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWater	OutdoorWaterUseRate	18,483,913.79	22,284,101.67
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	32.50	0.00
tblWoodstoves	NumberCatalytic	22.50	0.00
tblWoodstoves	NumberNoncatalytic	32.50	0.00
tblWoodstoves	NumberNoncatalytic	22.50	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690
Energy	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096
Mobile	26.3286	17.3817	262.0568	0.5526	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		60,873.1264	60,873.1264	3.3974	2.0674	61,574.1597
Total	**63.3072**	**42.0962**	**362.5750**	**0.7085**	**84.5118**	**2.6914**	**87.2032**	**22.4538**	**2.6715**	**25.1253**	**0.0000**	**91,254.9417**	**91,254.9417**	**4.1323**	**2.6214**	**92,139.4383**

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690
Energy	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096
Mobile	26.3286	17.3817	262.0568	0.5526	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		60,873.1264	60,873.1264	3.3974	2.0674	61,574.1597
Total	**63.3072**	**42.0962**	**362.5750**	**0.7085**	**84.5118**	**2.6914**	**87.2032**	**22.4538**	**2.6715**	**25.1253**	**0.0000**	**91,254.9417**	**91,254.9417**	**4.1323**	**2.6214**	**92,139.4383**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	26.3286	17.3817	262.0568	0.5526	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		60,873.1264	60,873.1264	3.3974	2.0674	61,574.1597
Unmitigated	26.3286	17.3817	262.0568	0.5526	84.5118	0.2742	84.7861	22.4538	0.2543	22.7082		60,873.1264	60,873.1264	3.3974	2.0674	61,574.1597

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	428.00	2,429.00	1857.00	2,989,491	2,989,491
Condo/Townhouse	4,680.00	5,694.00	4659.98	15,702,959	15,702,959
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.01	4,266.00	3816.00	13,629,503	13,629,503
Total	9,351.01	12,389.00	10,332.98	32,321,954	32,321,954

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Condo/Townhouse	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	8.95	5.90	8.70	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096
NaturalGas Unmitigated	0.6347	5.4240	2.3081	0.0346		0.4385	0.4385		0.4385	0.4385		6,924.2622	6,924.2622	0.1327	0.1269	6,965.4096

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day											lb/day				
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	29393.2	0.3170	2.7088	1.1527	0.0173		0.2190	0.2190		0.2190	0.2190		3,458.0293	3,458.0293	0.0663	0.0634	3,478.5787
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	29463	0.3177	2.7152	1.1554	0.0173		0.2195	0.2195		0.2195	0.2195		3,466.2329	3,466.2329	0.0664	0.0636	3,486.8310
Total		**0.6347**	**5.4240**	**2.3081**	**0.0346**		**0.4385**	**0.4385**		**0.4385**	**0.4385**		**6,924.2622**	**6,924.2622**	**0.1327**	**0.1270**	**6,965.4096**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day											lb/day				
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	29.3932	0.3170	2.7088	1.1527	0.0173		0.2190	0.2190		0.2190	0.2190		3,458.0293	3,458.0293	0.0663	0.0634	3,478.5787
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	29.463	0.3177	2.7152	1.1554	0.0173		0.2195	0.2195		0.2195	0.2195		3,466.2329	3,466.2329	0.0664	0.0636	3,486.8310
Total		**0.6347**	**5.4240**	**2.3081**	**0.0346**		**0.4385**	**0.4385**		**0.4385**	**0.4385**		**6,924.2622**	**6,924.2622**	**0.1327**	**0.1270**	**6,965.4096**

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690
Unmitigated	36.3439	19.2905	98.2101	0.1213		1.9786	1.9786		1.9786	1.9786	0.0000	23,457.5531	23,457.5531	0.6021	0.4271	23,599.8690

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	2.1353	18.2471	7.7647	0.1165		1.4753	1.4753		1.4753	1.4753	0.0000	23,294.1177	23,294.1177	0.4465	0.4271	23,432.5429
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**36.3439**	**19.2905**	**98.2101**	**0.1213**		**1.9786**	**1.9786**		**1.9786**	**1.9786**	**0.0000**	**23,457.5531**	**23,457.5531**	**0.6021**	**0.4271**	**23,599.8690**

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	2.1353	18.2471	7.7647	0.1165		1.4753	1.4753		1.4753	1.4753	0.0000	23,294.1177	23,294.1177	0.4465	0.4271	23,432.5429
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**36.3439**	**19.2905**	**98.2101**	**0.1213**		**1.9786**	**1.9786**		**1.9786**	**1.9786**	**0.0000**	**23,457.5531**	**23,457.5531**	**0.6021**	**0.4271**	**23,599.8690**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

Proposed Project Operation - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Proposed Project Operation

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	450.00	Dwelling Unit	135.10	810,000.00	1287
Condo/Townhouse	650.00	Dwelling Unit	62.90	650,000.00	1859
City Park	15.10	Acre	15.10	657,756.00	0
Parking Lot	64.80	1000sqft	1.49	64,800.00	0
Other Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0
Other Non-Asphalt Surfaces	45.51	Acre	45.51	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	371.48	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Land Use - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Construction Phase - Operation emissions modeling only.
Vehicle Trips - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Fleet Mix - See assumptions file (Changes to the CalEEMod Defaults - Year 2030) in the AQ/GHG appendix of the DEIR.
Woodstoves - Assumes gas fireplaces only per South Coast AQMD Rule 445.
Area Coating - See assumptions file (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Water And Wastewater - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Solid Waste - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Water Mitigation -

Table Name	Column Name	Default Value	New Value

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblAreaCoating	Area_Parking	9115	3888
tblConstructionPhase	NumDays	300.00	1.00
tblConstructionPhase	PhaseEndDate	3/31/2023	2/7/2022
tblFireplaces	NumberGas	552.50	650.00
tblFireplaces	NumberGas	382.50	450.00
tblFireplaces	NumberNoFireplace	65.00	0.00
tblFireplaces	NumberNoFireplace	45.00	0.00
tblFireplaces	NumberWood	32.50	0.00
tblFireplaces	NumberWood	22.50	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblLandUse	LandUseSquareFeet	1,982,415.60	0.00
tblLandUse	LotAcreage	146.10	135.10
tblLandUse	LotAcreage	40.63	62.90
tblProjectCharacteristics	CO2IntensityFactor	390.98	371.48
tblSolidWaste	SolidWasteGenerationRate	1.30	0.00
tblSolidWaste	SolidWasteGenerationRate	299.00	1,471.90
tblSolidWaste	SolidWasteGenerationRate	527.67	1,471.90
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	19.00	0.00
tblVehicleTrips	CW_TL	16.60	8.95
tblVehicleTrips	CW_TTP	33.00	100.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	0.00
tblVehicleTrips	HO_TTP	40.60	0.00

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	1.96	160.86
tblVehicleTrips	ST_TR	8.14	8.76
tblVehicleTrips	ST_TR	9.54	9.48
tblVehicleTrips	SU_TR	2.19	122.98
tblVehicleTrips	SU_TR	6.28	7.17
tblVehicleTrips	SU_TR	8.55	8.48
tblVehicleTrips	WD_TR	0.78	28.34
tblVehicleTrips	WD_TR	7.32	7.20
tblVehicleTrips	WD_TR	9.44	9.43
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	42,350,116.65	49,161,850.00
tblWater	IndoorWaterUseRate	29,319,311.53	49,161,850.00
tblWater	OutdoorWaterUseRate	17,991,368.38	22,284,101.67
tblWater	OutdoorWaterUseRate	26,698,986.59	22,284,101.67

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWater	OutdoorWaterUseRate	18,483,913.79	22,284,101.67
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	32.50	0.00
tblWoodstoves	NumberCatalytic	22.50	0.00
tblWoodstoves	NumberNoncatalytic	32.50	0.00
tblWoodstoves	NumberNoncatalytic	22.50	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.1142	0.3585	11.4027	2.0600e-003		0.0814	0.0814		0.0814	0.0814	0.0000	282.6841	282.6841	0.0227	4.8400e-003	284.6950
Energy	0.1158	0.9899	0.4212	6.3200e-003		0.0800	0.0800		0.0800	0.0800	0.0000	2,272.2807	2,272.2807	0.1220	0.0331	2,285.2063
Mobile	3.7614	2.5748	38.3979	0.0814	12.1029	0.0399	12.1428	3.2200	0.0370	3.2571	0.0000	8,135.2569	8,135.2569	0.4467	0.2754	8,228.4986
Waste						0.0000	0.0000		0.0000	0.0000	597.5648	0.0000	597.5648	35.3151	0.0000	1,480.4415
Water						0.0000	0.0000		0.0000	0.0000	34.7871	340.8768	375.6639	0.1500	0.0793	403.0520
Total	**9.9915**	**3.9232**	**50.2219**	**0.0898**	**12.1029**	**0.2013**	**12.3042**	**3.2200**	**0.1984**	**3.4185**	**632.3519**	**11,031.0986**	**11,663.4504**	**36.0565**	**0.3927**	**12,681.8933**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.1142	0.3585	11.4027	2.0600e-003		0.0814	0.0814		0.0814	0.0814	0.0000	282.6841	282.6841	0.0227	4.8400e-003	284.6950
Energy	0.1158	0.9899	0.4212	6.3200e-003		0.0800	0.0800		0.0800	0.0800	0.0000	2,272.2807	2,272.2807	0.1220	0.0331	2,285.2063
Mobile	3.7614	2.5748	38.3979	0.0814	12.1029	0.0399	12.1428	3.2200	0.0370	3.2571	0.0000	8,135.2569	8,135.2569	0.4467	0.2754	8,228.4986
Waste						0.0000	0.0000		0.0000	0.0000	597.5648	0.0000	597.5648	35.3151	0.0000	1,480.4415
Water						0.0000	0.0000		0.0000	0.0000	27.8297	290.0974	317.9270	0.1216	0.0636	339.9319
Total	**9.9915**	**3.9232**	**50.2219**	**0.0898**	**12.1029**	**0.2013**	**12.3042**	**3.2200**	**0.1984**	**3.4185**	**625.3945**	**10,980.3191**	**11,605.7135**	**36.0281**	**0.3770**	**12,618.7733**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.10**	**0.46**	**0.50**	**0.08**	**3.99**	**0.50**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.7614	2.5748	38.3979	0.0814	12.1029	0.0399	12.1428	3.2200	0.0370	3.2571	0.0000	8,135.2569	8,135.2569	0.4467	0.2754	8,228.4986
Unmitigated	3.7614	2.5748	38.3979	0.0814	12.1029	0.0399	12.1428	3.2200	0.0370	3.2571	0.0000	8,135.2569	8,135.2569	0.4467	0.2754	8,228.4986

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	428.00	2,429.00	1857.00	2,989,491	2,989,491
Condo/Townhouse	4,680.00	5,694.00	4659.98	15,702,959	15,702,959
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.01	4,266.00	3816.00	13,629,503	13,629,503
Total	9,351.01	12,389.00	10,332.98	32,321,954	32,321,954

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Condo/Townhouse	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	8.95	5.90	8.70	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,125.8914	1,125.8914	0.1000	0.0121	1,132.0046
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,125.8914	1,125.8914	0.1000	0.0121	1,132.0046
NaturalGas Mitigated	0.1158	0.9899	0.4212	6.3200e-003		0.0800	0.0800		0.0800	0.0800	0.0000	1,146.3893	1,146.3893	0.0220	0.0210	1,153.2017
NaturalGas Unmitigated	0.1158	0.9899	0.4212	6.3200e-003		0.0800	0.0800		0.0800	0.0800	0.0000	1,146.3893	1,146.3893	0.0220	0.0210	1,153.2017

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1.07285e+007	0.0579	0.4944	0.2104	3.1600e-003		0.0400	0.0400		0.0400	0.0400	0.0000	572.5155	572.5155	0.0110	0.0105	575.9177
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.0754e+007	0.0580	0.4955	0.2109	3.1600e-003		0.0401	0.0401		0.0401	0.0401	0.0000	573.8737	573.8737	0.0110	0.0105	577.2840
Total		**0.1158**	**0.9899**	**0.4212**	**6.3200e-003**		**0.0800**	**0.0800**		**0.0800**	**0.0800**	**0.0000**	**1,146.3893**	**1,146.3893**	**0.0220**	**0.0210**	**1,153.2017**

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1.07285e+007	0.0579	0.4944	0.2104	3.1600e-003		0.0400	0.0400		0.0400	0.0400	0.0000	572.5155	572.5155	0.0110	0.0105	575.9177
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.0754e+007	0.0580	0.4955	0.2109	3.1600e-003		0.0401	0.0401		0.0401	0.0401	0.0000	573.8737	573.8737	0.0110	0.0105	577.2840
Total		**0.1158**	**0.9899**	**0.4212**	**6.3200e-003**		**0.0800**	**0.0800**		**0.0800**	**0.0800**	**0.0000**	**1,146.3893**	**1,146.3893**	**0.0220**	**0.0210**	**1,153.2017**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	3.14101e+006	529.2614	0.0470	5.7000e-003	532.1351
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	22680	3.8216	3.4000e-004	4.0000e-005	3.8423
Single Family Housing	3.51814e+006	592.8084	0.0527	6.3800e-003	596.0271
Total		**1,125.8914**	**0.1000**	**0.0121**	**1,132.0046**

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	3.14101e+006	529.2614	0.0470	5.7000e-003	532.1351
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	22680	3.8216	3.4000e-004	4.0000e-005	3.8423
Single Family Housing	3.51814e+006	592.8084	0.0527	6.3800e-003	596.0271
Total		**1,125.8914**	**0.1000**	**0.0121**	**1,132.0046**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.1142	0.3585	11.4027	2.0600e-003		0.0814	0.0814		0.0814	0.0814	0.0000	282.6841	282.6841	0.0227	4.8400e-003	284.6950
Unmitigated	6.1142	0.3585	11.4027	2.0600e-003		0.0814	0.0814		0.0814	0.0814	0.0000	282.6841	282.6841	0.0227	4.8400e-003	284.6950

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4577					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.2917					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0267	0.2281	0.0971	1.4600e-003		0.0184	0.0184		0.0184	0.0184	0.0000	264.1509	264.1509	5.0600e-003	4.8400e-003	265.7206
Landscaping	0.3381	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Total	**6.1142**	**0.3585**	**11.4027**	**2.0600e-003**		**0.0814**	**0.0814**		**0.0814**	**0.0814**	**0.0000**	**282.6841**	**282.6841**	**0.0227**	**4.8400e-003**	**284.6950**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4577					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.2917					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0267	0.2281	0.0971	1.4600e-003		0.0184	0.0184		0.0184	0.0184	0.0000	264.1509	264.1509	5.0600e-003	4.8400e-003	265.7206
Landscaping	0.3381	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Total	**6.1142**	**0.3585**	**11.4027**	**2.0600e-003**		**0.0814**	**0.0814**		**0.0814**	**0.0814**	**0.0000**	**282.6841**	**282.6841**	**0.0227**	**4.8400e-003**	**284.6950**

Proposed Project Operation - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	317.9270	0.1216	0.0636	339.9319
Unmitigated	375.6639	0.1500	0.0793	403.0520

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 22.2841	41.7167	3.7100e-003	4.5000e-004	41.9433
Condo/Townhouse	49.1619 / 22.2841	166.9736	0.0732	0.0394	180.5544
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	49.1619 / 22.2841	166.9736	0.0732	0.0394	180.5544
Total		**375.6639**	**0.1500**	**0.0793**	**403.0520**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 20.9248	39.1720	3.4800e-003	4.2000e-004	39.3847
Condo/Townhouse	39.3295 / 20.9248	139.3775	0.0590	0.0316	150.2736
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	39.3295 / 20.9248	139.3775	0.0590	0.0316	150.2736
Total		**317.9270**	**0.1216**	**0.0636**	**339.9319**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	597.5648	35.3151	0.0000	1,480.4415
Unmitigated	597.5648	35.3151	0.0000	1,480.4415

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1471.9	298.7824	17.6575	0.0000	740.2208
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1471.9	298.7824	17.6575	0.0000	740.2208
Total		**597.5648**	**35.3151**	**0.0000**	**1,480.4415**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1471.9	298.7824	17.6575	0.0000	740.2208
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1471.9	298.7824	17.6575	0.0000	740.2208
Total		**597.5648**	**35.3151**	**0.0000**	**1,480.4415**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed Project Operation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	20.00	14.90	15.37	18.97	19.77	15.66
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value 3
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.30	0.68		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			

Proposed Project Operation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00

Proposed Project Operation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy	0.00	0.00
No	Use Reclaimed Water	0.00	0.00
No	Use Grey Water	0.00	
Yes	Install low-flow bathroom faucet	32.00	
Yes	Install low-flow Kitchen faucet	18.00	
Yes	Install low-flow Toilet	20.00	
Yes	Install low-flow Shower	20.00	

Proposed Project Operation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

No	Turf Reduction	0.00	
Yes	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape	0.00	0.00

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

CalEEMod Output: Operation – Mitigated

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Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0
Other Non-Asphalt Surfaces	45.51	Acre	45.51	0.00	0
Parking Lot	64.80	1000sqft	1.49	64,800.00	0
City Park	15.10	Acre	15.10	657,756.00	0
Condo/Townhouse	650.00	Dwelling Unit	62.90	650,000.00	1859
Single Family Housing	450.00	Dwelling Unit	135.10	810,000.00	1287

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	371.48	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Land Use - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Construction Phase - Operation emissions modeling only.

Vehicle Trips - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Woodstoves - Mitigation

Area Coating - See assumptions file (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Water And Wastewater - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Solid Waste - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Water Mitigation -

Fleet Mix - See assumptions file (Changes to the CalEEMod Defaults - Year 2030) in the AQ/GHG appendix of the DEIR.

Energy Use - Mitigation. See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG Appendix of the DEIR.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	9115	3888
tblEnergyUse	NT24E	3,795.01	4,029.01
tblEnergyUse	NT24E	6,155.97	6,465.97
tblEnergyUse	NT24NG	5,516.00	0.00
tblEnergyUse	NT24NG	5,516.00	0.00
tblEnergyUse	T24E	36.21	2,727.21
tblEnergyUse	T24E	53.28	4,393.28
tblEnergyUse	T24NG	10,989.44	0.00
tblEnergyUse	T24NG	18,381.75	0.00
tblFireplaces	NumberGas	552.50	0.00
tblFireplaces	NumberGas	382.50	0.00
tblFireplaces	NumberNoFireplace	65.00	650.00
tblFireplaces	NumberNoFireplace	45.00	450.00
tblFireplaces	NumberWood	32.50	0.00
tblFireplaces	NumberWood	22.50	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblLandUse	LandUseSquareFeet	1,982,415.60	0.00
tblLandUse	LotAcreage	40.63	62.90
tblLandUse	LotAcreage	146.10	135.10
tblProjectCharacteristics	CO2IntensityFactor	390.98	371.48
tblSolidWaste	SolidWasteGenerationRate	1.30	0.00
tblSolidWaste	SolidWasteGenerationRate	299.00	1,471.90
tblSolidWaste	SolidWasteGenerationRate	527.67	1,471.90
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	19.00	0.00
tblVehicleTrips	CW_TL	16.60	8.95
tblVehicleTrips	CW_TTP	33.00	100.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	8.95

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	1.96	160.86
tblVehicleTrips	ST_TR	8.14	8.76
tblVehicleTrips	ST_TR	9.54	9.48
tblVehicleTrips	SU_TR	2.19	122.98
tblVehicleTrips	SU_TR	6.28	7.17
tblVehicleTrips	SU_TR	8.55	8.48
tblVehicleTrips	WD_TR	0.78	28.34
tblVehicleTrips	WD_TR	7.32	7.20
tblVehicleTrips	WD_TR	9.44	9.43
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	42,350,116.65	49,161,850.00
tblWater	IndoorWaterUseRate	29,319,311.53	49,161,850.00
tblWater	OutdoorWaterUseRate	17,991,368.38	22,284,101.67
tblWater	OutdoorWaterUseRate	26,698,986.59	22,284,101.67

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWater	OutdoorWaterUseRate	18,483,913.79	22,284,101.67
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	32.50	0.00
tblWoodstoves	NumberCatalytic	22.50	0.00
tblWoodstoves	NumberNoncatalytic	32.50	0.00
tblWoodstoves	NumberNoncatalytic	22.50	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	26.6016	15.9528	263.2199	0.5762	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		63,498.0192	63,498.0192	3.2955	1.9693	64,167.2555
Total	**60.8102**	**16.9963**	**353.6652**	**0.5810**	**84.5448**	**0.7776**	**85.3224**	**22.4626**	**0.7577**	**23.2203**	**0.0000**	**63,661.4547**	**63,661.4547**	**3.4511**	**1.9693**	**64,334.5815**

Mitigated Operational

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	26.6016	15.9528	263.2199	0.5762	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		63,498.0192	63,498.0192	3.2955	1.9693	64,167.2555
Total	**60.8102**	**16.9963**	**353.6652**	**0.5810**	**84.5448**	**0.7776**	**85.3224**	**22.4626**	**0.7577**	**23.2203**	**0.0000**	**63,661.4547**	**63,661.4547**	**3.4511**	**1.9693**	**64,334.5815**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	26.6016	15.9528	263.2199	0.5762	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		63,498.0192	63,498.0192	3.2955	1.9693	64,167.2555
Unmitigated	26.6016	15.9528	263.2199	0.5762	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		63,498.0192	63,498.0192	3.2955	1.9693	64,167.2555

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	427.93	2,428.99	1857.00	2,990,499	2,990,499
Condo/Townhouse	4,680.00	5,694.00	4660.50	15,709,344	15,709,344
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.50	4,266.00	3816.00	13,635,987	13,635,987
Total	9,351.43	12,388.99	10,333.50	32,335,831	32,335,831

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Condo/Townhouse	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	8.95	5.90	8.70	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261
Unmitigated	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**34.2086**	**1.0435**	**90.4453**	**4.7900e-003**		**0.5033**	**0.5033**		**0.5033**	**0.5033**	**0.0000**	**163.4354**	**163.4354**	**0.1556**	**0.0000**	**167.3261**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**34.2086**	**1.0435**	**90.4453**	**4.7900e-003**		**0.5033**	**0.5033**		**0.5033**	**0.5033**	**0.0000**	**163.4354**	**163.4354**	**0.1556**	**0.0000**	**167.3261**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet
Install Low Flow Kitchen Faucet
Install Low Flow Toilet
Install Low Flow Shower
Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0
Other Non-Asphalt Surfaces	45.51	Acre	45.51	0.00	0
Parking Lot	64.80	1000sqft	1.49	64,800.00	0
City Park	15.10	Acre	15.10	657,756.00	0
Condo/Townhouse	650.00	Dwelling Unit	62.90	650,000.00	1859
Single Family Housing	450.00	Dwelling Unit	135.10	810,000.00	1287

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	371.48	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Land Use - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Construction Phase - Operation emissions modeling only.
Vehicle Trips - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Woodstoves - Mitigation
Area Coating - See assumptions file (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Water And Wastewater - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Solid Waste - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.
Water Mitigation -
Fleet Mix - See assumptions file (Changes to the CalEEMod Defaults - Year 2030) in the AQ/GHG appendix of the DEIR.
Energy Use - Mitigation. See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG Appendix of the DEIR.

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	9115	3888
tblEnergyUse	NT24E	3,795.01	4,029.01
tblEnergyUse	NT24E	6,155.97	6,465.97
tblEnergyUse	NT24NG	5,516.00	0.00
tblEnergyUse	NT24NG	5,516.00	0.00
tblEnergyUse	T24E	36.21	2,727.21
tblEnergyUse	T24E	53.28	4,393.28
tblEnergyUse	T24NG	10,989.44	0.00
tblEnergyUse	T24NG	18,381.75	0.00
tblFireplaces	NumberGas	552.50	0.00
tblFireplaces	NumberGas	382.50	0.00
tblFireplaces	NumberNoFireplace	65.00	650.00
tblFireplaces	NumberNoFireplace	45.00	450.00
tblFireplaces	NumberWood	32.50	0.00
tblFireplaces	NumberWood	22.50	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblLandUse	LandUseSquareFeet	1,982,415.60	0.00
tblLandUse	LotAcreage	40.63	62.90
tblLandUse	LotAcreage	146.10	135.10
tblProjectCharacteristics	CO2IntensityFactor	390.98	371.48
tblSolidWaste	SolidWasteGenerationRate	1.30	0.00
tblSolidWaste	SolidWasteGenerationRate	299.00	1,471.90
tblSolidWaste	SolidWasteGenerationRate	527.67	1,471.90
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	19.00	0.00

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	CW_TL	16.60	8.95
tblVehicleTrips	CW_TTP	33.00	100.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	1.96	160.86
tblVehicleTrips	ST_TR	8.14	8.76
tblVehicleTrips	ST_TR	9.54	9.48
tblVehicleTrips	SU_TR	2.19	122.98
tblVehicleTrips	SU_TR	6.28	7.17
tblVehicleTrips	SU_TR	8.55	8.48
tblVehicleTrips	WD_TR	0.78	28.34
tblVehicleTrips	WD_TR	7.32	7.20
tblVehicleTrips	WD_TR	9.44	9.43
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	42,350,116.65	49,161,850.00
tblWater	IndoorWaterUseRate	29,319,311.53	49,161,850.00
tblWater	OutdoorWaterUseRate	17,991,368.38	22,284,101.67
tblWater	OutdoorWaterUseRate	26,698,986.59	22,284,101.67
tblWater	OutdoorWaterUseRate	18,483,913.79	22,284,101.67
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	32.50	0.00
tblWoodstoves	NumberCatalytic	22.50	0.00
tblWoodstoves	NumberNoncatalytic	32.50	0.00
tblWoodstoves	NumberNoncatalytic	22.50	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	26.3348	17.3870	262.1399	0.5528	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		60,896.3732	60,896.3732	3.3984	2.0681	61,597.6136
Total	**60.5434**	**18.4305**	**352.5853**	**0.5576**	**84.5448**	**0.7776**	**85.3224**	**22.4626**	**0.7577**	**23.2203**	**0.0000**	**61,059.8086**	**61,059.8086**	**3.5541**	**2.0681**	**61,764.9397**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	26.3348	17.3870	262.1399	0.5528	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		60,896.3732	60,896.3732	3.3984	2.0681	61,597.6136
Total	**60.5434**	**18.4305**	**352.5853**	**0.5576**	**84.5448**	**0.7776**	**85.3224**	**22.4626**	**0.7577**	**23.2203**	**0.0000**	**61,059.8086**	**61,059.8086**	**3.5541**	**2.0681**	**61,764.9397**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	26.3348	17.3870	262.1399	0.5528	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		60,896.3732	60,896.3732	3.3984	2.0681	61,597.6136
Unmitigated	26.3348	17.3870	262.1399	0.5528	84.5448	0.2743	84.8191	22.4626	0.2544	22.7170		60,896.3732	60,896.3732	3.3984	2.0681	61,597.6136

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	427.93	2,428.99	1857.00	2,990,499	2,990,499
Condo/Townhouse	4,680.00	5,694.00	4660.50	15,709,344	15,709,344
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.50	4,266.00	3816.00	13,635,987	13,635,987
Total	9,351.43	12,388.99	10,333.50	32,335,831	32,335,831

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Condo/Townhouse	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	8.95	5.90	8.70	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261
Unmitigated	34.2086	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033	0.0000	163.4354	163.4354	0.1556	0.0000	167.3261

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**34.2086**	**1.0435**	**90.4453**	**4.7900e-003**		**0.5033**	**0.5033**		**0.5033**	**0.5033**	**0.0000**	**163.4354**	**163.4354**	**0.1556**	**0.0000**	**167.3261**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5078					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	28.9957					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.7051	1.0435	90.4453	4.7900e-003		0.5033	0.5033		0.5033	0.5033		163.4354	163.4354	0.1556		167.3261
Total	**34.2086**	**1.0435**	**90.4453**	**4.7900e-003**		**0.5033**	**0.5033**		**0.5033**	**0.5033**	**0.0000**	**163.4354**	**163.4354**	**0.1556**	**0.0000**	**167.3261**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0
Other Non-Asphalt Surfaces	45.51	Acre	45.51	0.00	0
Parking Lot	64.80	1000sqft	1.49	64,800.00	0
City Park	15.10	Acre	15.10	657,756.00	0
Condo/Townhouse	650.00	Dwelling Unit	62.90	650,000.00	1859
Single Family Housing	450.00	Dwelling Unit	135.10	810,000.00	1287

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	371.48	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Land Use - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Construction Phase - Operation emissions modeling only.

Vehicle Trips - See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Woodstoves - Mitigation

Area Coating - See assumptions file (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Water And Wastewater - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Solid Waste - See assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG appendix of the DEIR.

Water Mitigation -

Fleet Mix - See assumptions file (Changes to the CalEEMod Defaults - Year 2030) in the AQ/GHG appendix of the DEIR.

Energy Use - Mitigation. See the assumptions worksheet (CalEEMod Land Use Inputs: Project) in the AQ/GHG Appendix of the DEIR.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	9115	3888
tblEnergyUse	NT24E	3,795.01	4,029.01
tblEnergyUse	NT24E	6,155.97	6,465.97
tblEnergyUse	NT24NG	5,516.00	0.00
tblEnergyUse	NT24NG	5,516.00	0.00
tblEnergyUse	T24E	36.21	2,727.21
tblEnergyUse	T24E	53.28	4,393.28
tblEnergyUse	T24NG	10,989.44	0.00
tblEnergyUse	T24NG	18,381.75	0.00
tblFireplaces	NumberGas	552.50	0.00
tblFireplaces	NumberGas	382.50	0.00
tblFireplaces	NumberNoFireplace	65.00	650.00
tblFireplaces	NumberNoFireplace	45.00	450.00
tblFireplaces	NumberWood	32.50	0.00
tblFireplaces	NumberWood	22.50	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	HHD	4.6850e-003	0.00
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56
tblFleetMix	LDA	0.55	0.56

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT1	0.06	0.07
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LDT2	0.18	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	LHD2	7.2300e-003	7.3780e-003
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MH	3.3970e-003	8.3700e-004
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	MHD	0.02	3.7390e-003
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	OBUS	6.8100e-004	1.6800e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	SBUS	6.8500e-004	1.6900e-004
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblFleetMix	UBUS	3.5100e-004	8.7000e-005
tblLandUse	LandUseSquareFeet	1,982,415.60	0.00
tblLandUse	LotAcreage	40.63	62.90
tblLandUse	LotAcreage	146.10	135.10
tblProjectCharacteristics	CO2IntensityFactor	390.98	371.48
tblSolidWaste	SolidWasteGenerationRate	1.30	0.00
tblSolidWaste	SolidWasteGenerationRate	299.00	1,471.90
tblSolidWaste	SolidWasteGenerationRate	527.67	1,471.90
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CNW_TTP	19.00	0.00
tblVehicleTrips	CW_TL	16.60	8.95
tblVehicleTrips	CW_TTP	33.00	100.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	8.95

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	HW_TL	14.70	8.95
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	1.96	160.86
tblVehicleTrips	ST_TR	8.14	8.76
tblVehicleTrips	ST_TR	9.54	9.48
tblVehicleTrips	SU_TR	2.19	122.98
tblVehicleTrips	SU_TR	6.28	7.17
tblVehicleTrips	SU_TR	8.55	8.48
tblVehicleTrips	WD_TR	0.78	28.34
tblVehicleTrips	WD_TR	7.32	7.20
tblVehicleTrips	WD_TR	9.44	9.43
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	42,350,116.65	49,161,850.00
tblWater	IndoorWaterUseRate	29,319,311.53	49,161,850.00
tblWater	OutdoorWaterUseRate	17,991,368.38	22,284,101.67
tblWater	OutdoorWaterUseRate	26,698,986.59	22,284,101.67

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWater	OutdoorWaterUseRate	18,483,913.79	22,284,101.67
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	32.50	0.00
tblWoodstoves	NumberCatalytic	22.50	0.00
tblWoodstoves	NumberNoncatalytic	32.50	0.00
tblWoodstoves	NumberNoncatalytic	22.50	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.0875	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1,798.8403	1,798.8403	0.1598	0.0194	1,808.6073
Mobile	3.7625	2.5757	38.4117	0.0815	12.1081	0.0400	12.1480	3.2214	0.0371	3.2585	0.0000	8,138.6837	8,138.6837	0.4469	0.2755	8,231.9567
Waste						0.0000	0.0000		0.0000	0.0000	597.5648	0.0000	597.5648	35.3151	0.0000	1,480.4415
Water						0.0000	0.0000		0.0000	0.0000	34.7871	340.8768	375.6639	0.1500	0.0793	403.0520
Total	**9.8500**	**2.7062**	**49.7174**	**0.0821**	**12.1081**	**0.1029**	**12.2110**	**3.2214**	**0.1000**	**3.3214**	**632.3519**	**10,296.9340**	**10,929.2859**	**36.0894**	**0.3742**	**11,943.0319**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.0875	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1,798.8403	1,798.8403	0.1598	0.0194	1,808.6073
Mobile	3.7625	2.5757	38.4117	0.0815	12.1081	0.0400	12.1480	3.2214	0.0371	3.2585	0.0000	8,138.6837	8,138.6837	0.4469	0.2755	8,231.9567
Waste						0.0000	0.0000		0.0000	0.0000	597.5648	0.0000	597.5648	35.3151	0.0000	1,480.4415
Water						0.0000	0.0000		0.0000	0.0000	27.8297	290.0974	317.9270	0.1216	0.0636	339.9319
Total	**9.8500**	**2.7062**	**49.7174**	**0.0821**	**12.1081**	**0.1029**	**12.2110**	**3.2214**	**0.1000**	**3.3214**	**625.3945**	**10,246.1545**	**10,871.5490**	**36.0610**	**0.3585**	**11,879.9119**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.10**	**0.49**	**0.53**	**0.08**	**4.19**	**0.53**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.7625	2.5757	38.4117	0.0815	12.1081	0.0400	12.1480	3.2214	0.0371	3.2585	0.0000	8,138.6837	8,138.6837	0.4469	0.2755	8,231.9567
Unmitigated	3.7625	2.5757	38.4117	0.0815	12.1081	0.0400	12.1480	3.2214	0.0371	3.2585	0.0000	8,138.6837	8,138.6837	0.4469	0.2755	8,231.9567

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	427.93	2,428.99	1857.00	2,990,499	2,990,499
Condo/Townhouse	4,680.00	5,694.00	4660.50	15,709,344	15,709,344
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.50	4,266.00	3816.00	13,635,987	13,635,987
Total	9,351.43	12,388.99	10,333.50	32,335,831	32,335,831

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Condo/Townhouse	8.95	0.00	0.00	100.00	0.00	0.00	100	0	0
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	8.95	5.90	8.70	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

5.0 Energy Detail

Historical Energy Use: N

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,798.8403	1,798.8403	0.1598	0.0194	1,808.6073
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,798.8403	1,798.8403	0.1598	0.0194	1,808.6073
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	5.04226e+006	849.6230	0.0755	9.1500e-003	854.2361
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	22680	3.8216	3.4000e-004	4.0000e-005	3.8423
Single Family Housing	5.61064e+006	945.3957	0.0840	0.0102	950.5289
Total		**1,798.8402**	**0.1598**	**0.0194**	**1,808.6073**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	5.04226e+006	849.6230	0.0755	9.1500e-003	854.2361
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	22680	3.8216	3.4000e-004	4.0000e-005	3.8423
Single Family Housing	5.61064e+006	945.3957	0.0840	0.0102	950.5289
Total		**1,798.8402**	**0.1598**	**0.0194**	**1,808.6073**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.0875	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Unmitigated	6.0875	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4577					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.2917					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.3381	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Total	**6.0875**	**0.1304**	**11.3057**	**6.0000e-004**		**0.0629**	**0.0629**		**0.0629**	**0.0629**	**0.0000**	**18.5333**	**18.5333**	**0.0177**	**0.0000**	**18.9745**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4577					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.2917					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.3381	0.1304	11.3057	6.0000e-004		0.0629	0.0629		0.0629	0.0629	0.0000	18.5333	18.5333	0.0177	0.0000	18.9745
Total	**6.0875**	**0.1304**	**11.3057**	**6.0000e-004**		**0.0629**	**0.0629**		**0.0629**	**0.0629**	**0.0000**	**18.5333**	**18.5333**	**0.0177**	**0.0000**	**18.9745**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	317.9270	0.1216	0.0636	339.9319
Unmitigated	375.6639	0.1500	0.0793	403.0520

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 22.2841	41.7167	3.7100e-003	4.5000e-004	41.9433
Condo/Townhouse	49.1619 / 22.2841	166.9736	0.0732	0.0394	180.5544
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	49.1619 / 22.2841	166.9736	0.0732	0.0394	180.5544
Total		**375.6639**	**0.1500**	**0.0793**	**403.0520**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 20.9248	39.1720	3.4800e-003	4.2000e-004	39.3847
Condo/Townhouse	39.3295 / 20.9248	139.3775	0.0590	0.0316	150.2736
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	39.3295 / 20.9248	139.3775	0.0590	0.0316	150.2736
Total		**317.9270**	**0.1216**	**0.0636**	**339.9319**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	597.5648	35.3151	0.0000	1,480.4415
Unmitigated	597.5648	35.3151	0.0000	1,480.4415

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1471.9	298.7824	17.6575	0.0000	740.2208
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1471.9	298.7824	17.6575	0.0000	740.2208
Total		**597.5648**	**35.3151**	**0.0000**	**1,480.4415**

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1471.9	298.7824	17.6575	0.0000	740.2208
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1471.9	298.7824	17.6575	0.0000	740.2208
Total		**597.5648**	**35.3151**	**0.0000**	**1,480.4415**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace) - Orange County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Orange County, Mitigation Report

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	20.00	14.90	15.37	18.97	19.77	15.66
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value 3
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.30	0.68		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy	0.00	0.00
No	Use Reclaimed Water	0.00	0.00
No	Use Grey Water	0.00	
Yes	Install low-flow bathroom faucet	32.00	
Yes	Install low-flow Kitchen faucet	18.00	
Yes	Install low-flow Toilet	20.00	
Yes	Install low-flow Shower	20.00	

Proposed Project Operation - Mitigated (All Electric and No Gas Fireplace)

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

No	Turf Reduction	0.00	
Yes	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape	0.00	0.00

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

4. Screening-Level Construction Localized Significance Thresholds Worksheets

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Construction Localized Significance Thresholds: Western Remediation Area Site Preparation

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	3.50	25	82	25	82	94.90

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**184**
CO	**1,036**
PM10	**8.50**
PM2.5	**5.00**

Equipment	**Acres/8-hr Day**		**Equipment U**	**Daily Hours**	**Acres**
Tractors	0.5	0.0625	4	8	2
Graders	0.5	0.0625			0
Dozers	0.5	0.0625	3	8	1.5
Scrapers	1	0.125			0
				Acres	3.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	3	172	166	179	207	285
	4	196	189	203	228	301
		184	178	191	218	293
CO	3	945	1250	1688	2831	7665
	4	1128	1491	1981	3218	8210
		1037	1371	1835	3025	7938
PM10	3	8	23	37	66	152
	4	9	28	43	72	158
		9	26	40	69	155
PM2.5	3	5	7	12	27	84
	4	5	8	14	31	90
		5	8	13	29	87

North Orange County

3.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	184	178	191	218	293
CO	1037	1371	1835	3025	7938
PM10	9	26	40	69	155
PM2.5	5	8	13	29	87

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	3	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Western Remediation Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	94.90

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**196**
CO	**1,128**
PM10	**9.33**
PM2.5	**5.33**

Equipment	**Acres/8-hr Day**		**Equipment L**	**Daily Hours**	**Acres**
Tractors	0.5	0.0625	2	8	1
Graders	0.5	0.0625	1	8	0.5
Dozers	0.5	0.0625	1	8	0.5
Scrapers	1	0.125	2	8	2
				Acres	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Site Preparation

		NOx & CO		PM10 & PM2.5		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	3.50	25	82	25	82	68.80

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**184**
CO	**1,036**
PM10	**8.50**
PM2.5	**5.00**

Equipment	**Acres/8-hr Day**		**Equipment L**	**Daily Hours**	**Acres**
Tractors	0.5	0.0625	4	8	2
Graders	0.5	0.0625			0
Dozers	0.5	0.0625	3	8	1.5
Scrapers	1	0.125			0
				Acres	3.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	3	172	166	179	207	285
	4	196	189	203	228	301
		184	178	191	218	293
CO	3	945	1250	1688	2831	7665
	4	1128	1491	1981	3218	8210
		1037	1371	1835	3025	7938
PM10	3	8	23	37	66	152
	4	9	28	43	72	158
		9	26	40	69	155
PM2.5	3	5	7	12	27	84
	4	5	8	14	31	90
		5	8	13	29	87

North Orange County

3.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	184	178	191	218	293
CO	1037	1371	1835	3025	7938
PM10	9	26	40	69	155
PM2.5	5	8	13	29	87

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	3	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Rough Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	68.80

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**196**
CO	**1,128**
PM10	**9.33**
PM2.5	**5.33**

Equipment	**Acres/8-hr Day**		**Equipment L**	**Daily Hours**	**Acres**
Tractors	0.5	0.0625	2	8	1
Graders	0.5	0.0625	1	8	0.5
Dozers	0.5	0.0625	1	8	0.5
Scrapers	1	0.125	2	8	2
				Acres	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Rough Grading & P1 Utility Trenching

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	68.80

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**196**
CO	**1,128**
PM10	**9.33**
PM2.5	**5.33**

Equipment	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
Tractors	0.5	0.0625	2	8	1
Graders	0.5	0.0625	1	8	0.5
Dozers	0.5	0.0625	1	8	0.5
Scrapers	1	0.125	2	8	2
				Acres	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Rough Grading, P1 Utility Trenching, & P1 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	4	8	2
NOx	**221**	Graders	0.5	0.0625	2	8	1
CO	**1,311**	Dozers	0.5	0.0625	2	8	1
PM10	**10.99**	Scrapers	1	0.125	4	8	4
PM2.5	**6.00**					**Acres**	8.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Utility Trenching & P1 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2.0
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Fine Grading & P1 Asphalt Paving

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Fine Grading, P1 Asphalt Paving, & P1 Finishing/Landscaping

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.50	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	8	1.5
NOx	**209**	Graders	0.5	0.0625	1	8	0.5
CO	**1,219**	Dozers	0.5	0.0625	1	8	0.5
PM10	**10.16**	Scrapers	1	0.125	2	8	2
PM2.5	**5.67**					**Acres**	4.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	5	221	212	226	249	317
		209	201	214	239	309
CO	4	1128	1491	1981	3218	8210
	5	1311	1731	2274	3605	8754
		1220	1611	2128	3412	8482
PM10	4	9	28	43	72	158
	5	11	34	49	78	165
		10	31	46	75	162
PM2.5	4	5	8	14	31	90
	5	6	9	15	34	95
		6	9	14	32	92

North Orange County

4.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	209	201	214	239	309
CO	1220	1611	2128	3412	8482
PM10	10	31	46	75	162
PM2.5	6	9	14	32	92

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Asphalt Paving, P1 Finishing/Landscaping, & P1 Building Construction

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.81	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**139**	Tractors	0.5	0.0625	3	7	1.3125
CO	**717**	Graders	0.5	0.0625			0
PM10	**5.62**	Dozers	0.5	0.0625			0
PM2.5	**3.81**	Scrapers	1	0.125			0
						Acres	1.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		139	136	149	181	266
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		717	949	1324	2356	7010
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		6	16	30	59	144
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		4	6	11	23	78

North Orange County

1.81 Acres

	25	**50**	**100**	**200**	**500**
NOx	139	136	149	181	266
CO	717	949	1324	2356	7010
PM10	6	16	30	59	144
PM2.5	4	6	11	23	78

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Finishing/Landscaping & P1 Building Construction

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.81	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**139**	Tractors	0.5	0.0625	3	7	1.3125
CO	**717**	Graders	0.5	0.0625			0
PM10	**5.62**	Dozers	0.5	0.0625			0
PM2.5	**3.81**	Scrapers	1	0.125			0
						Acres	1.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		139	136	149	181	266
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		717	949	1324	2356	7010
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		6	16	30	59	144
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		4	6	11	23	78

North Orange County

1.81 Acres

	25	**50**	**100**	**200**	**500**
NOx	139	136	149	181	266
CO	717	949	1324	2356	7010
PM10	6	16	30	59	144
PM2.5	4	6	11	23	78

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Building Construction

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.31	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**117**	Graders	0.5	0.0625			0
CO	**597**	Dozers	0.5	0.0625			0
PM10	**4.62**	Scrapers	1	0.125			0
PM2.5	**3.31**					**Acres**	1.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		117	116	132	167	257
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		597	787	1133	2122	6715
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		5	12	26	55	140
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		3	5	10	21	76

North Orange County

1.31 Acres

	25	**50**	**100**	**200**	**500**
NOx	117	116	132	167	257
CO	597	787	1133	2122	6715
PM10	5	12	26	55	140
PM2.5	3	5	10	21	76

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Building Construction, P2 Site Preparation, & Eastern Remediation Site Preparation

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	262.10

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**221**	Tractors	0.5	0.0625	8	8	4
CO	**1,311**	Graders	0.5	0.0625			0
PM10	**10.99**	Dozers	0.5	0.0625	6	8	3
PM2.5	**6.00**	Scrapers	1	0.125			0
						Acres	8.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Building Construction, P2 Site Preparation, & Eastern Remediation Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	262.10

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment U**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**221**	Tractors	0.5	0.0625	6	8	3
CO	**1,311**	Graders	0.5	0.0625	1	8	0.5
PM10	**10.99**	Dozers	0.5	0.0625	4	8	2
PM2.5	**6.00**	Scrapers	1	0.125	2	8	2
						Acres	8.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Buiding Construction & P2 Site Preparation

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	3.50	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625			0
NOx	**184**	Tractors	0.5	0.0625	4	8	2
CO	**1,036**	Graders	0.5	0.0625			0
PM10	**8.50**	Dozers	0.5	0.0625	3	8	1.5
PM2.5	**5.00**	Scrapers	1	0.125			0
						Acres	3.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	3	172	166	179	207	285
	4	196	189	203	228	301
		184	178	191	218	293
CO	3	945	1250	1688	2831	7665
	4	1128	1491	1981	3218	8210
		1037	1371	1835	3025	7938
PM10	3	8	23	37	66	152
	4	9	28	43	72	158
		9	26	40	69	155
PM2.5	3	5	7	12	27	84
	4	5	8	14	31	90
		5	8	13	29	87

North Orange County

3.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	184	178	191	218	293
CO	1037	1371	1835	3025	7938
PM10	9	26	40	69	155
PM2.5	5	8	13	29	87

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	3	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Rough Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	163.70

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625			0
NOx	**196**	Tractors	0.5	0.0625	2	8	1
CO	**1,128**	Graders	0.5	0.0625	1	8	0.5
PM10	**9.33**	Dozers	0.5	0.0625	1	8	0.5
PM2.5	**5.33**	Scrapers	1	0.125	2	8	2
						Acres	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P1 Building Construction & P1 Architectural Coating

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.31	25	82	25	82	68.80

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment L**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**117**	Tractors	0.5	0.0625			0
CO	**597**	Graders	0.5	0.0625			0
PM10	**4.62**	Dozers	0.5	0.0625			0
PM2.5	**3.31**	Scrapers	1	0.125			0
						Acres	1.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		117	116	132	167	257
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		597	787	1133	2122	6715
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		5	12	26	55	140
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		3	5	10	21	76

North Orange County

1.31 Acres

	25	**50**	**100**	**200**	**500**
NOx	117	116	132	167	257
CO	597	787	1133	2122	6715
PM10	5	12	26	55	140
PM2.5	3	5	10	21	76

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Rough Grading & P2 Utility Trenching

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	94.90

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**196**
CO	**1,128**
PM10	**9.33**
PM2.5	**5.33**

Equipment	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
Tractors	0.5	0.0625	2	8	1
Graders	0.5	0.0625	1	8	0.5
Dozers	0.5	0.0625	1	8	0.5
Scrapers	1	0.125	2	8	2
				Acres	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Rough Grading, P2 Utility Trenching, & P2 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	4	8	2
NOx	**221**	Graders	0.5	0.0625	2	8	1
CO	**1,311**	Dozers	0.5	0.0625	2	8	1.0
PM10	**10.99**	Scrapers	1	0.125	4	8	4.0
PM2.5	**6.00**					**Acres**	8.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Utility Trenching & P2 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	94.90

Source Receptor	**North Orange County**						
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	94.90

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**196**
CO	**1,128**
PM10	**9.33**
PM2.5	**5.33**

Equipment	Acres/8-hr Day		Equipment Used	Daily Hours	Acres
Tractors	0.5	0.0625	2	8	1
Graders	0.5	0.0625	1	8	0.5
Dozers	0.5	0.0625	1	8	0.5
Scrapers	1	0.125	2	8	2
				Acres	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Fine Grading & P2 Asphalt Paving

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Fine Grading, P2 Asphalt Paving, & P2 Finishing/Landscaping

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.50	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	8	1.5
NOx	**209**	Graders	0.5	0.0625	1	8	0.5
CO	**1,219**	Dozers	0.5	0.0625	1	8	0.5
PM10	**10.16**	Scrapers	1	0.125	2	8	2
PM2.5	**5.67**					**Acres**	4.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	5	221	212	226	249	317
		209	201	214	239	309
CO	4	1128	1491	1981	3218	8210
	5	1311	1731	2274	3605	8754
		1220	1611	2128	3412	8482
PM10	4	9	28	43	72	158
	5	11	34	49	78	165
		10	31	46	75	162
PM2.5	4	5	8	14	31	90
	5	6	9	15	34	95
		6	9	14	32	92

North Orange County

4.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	209	201	214	239	309
CO	1220	1611	2128	3412	8482
PM10	10	31	46	75	162
PM2.5	6	9	14	32	92

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Asphalt Paving & P2 Finishing/Landscaping

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	0.50	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**103**	Graders	0.5	0.0625			0
CO	**522**	Dozers	0.5	0.0625			0
PM10	**4.00**	Scrapers	1	0.125			0
PM2.5	**3.00**					**Acres**	0.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	1	103	104	121	159	252
		103	104	121	159	252
CO	1	522	685	1014	1975	6531
	1	522	685	1014	1975	6531
		522	685	1014	1975	6531
PM10	1	4	10	24	53	137
	1	4	10	24	53	137
		4	10	24	53	137
PM2.5	1	3	4	9	20	74
	1	3	4	9	20	74
		3	4	9	20	74

North Orange County

0.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	103	104	121	159	252
CO	522	685	1014	1975	6531
PM10	4	10	24	53	137
PM2.5	3	4	9	20	74

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	1
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

SRA No.	Acres	*NOx & CO* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	*PM10 & PM2.5* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.81	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**139**	Tractors	0.5	0.0625	3	7	1.3125
CO	**717**	Graders	0.5	0.0625			0
PM10	**5.62**	Dozers	0.5	0.0625			0
PM2.5	**3.81**	Scrapers	1	0.125			0
						Acres	1.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		139	136	149	181	266
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		717	949	1324	2356	7010
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		6	16	30	59	144
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		4	6	11	23	78

North Orange County

1.81 Acres

	25	**50**	**100**	**200**	**500**
NOx	139	136	149	181	266
CO	717	949	1324	2356	7010
PM10	6	16	30	59	144
PM2.5	4	6	11	23	78

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Finishing/Landscaping & P2 Building Construction

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.81	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**139**	Tractors	0.5	0.0625	3	7	1.3125
CO	**717**	Graders	0.5	0.0625			0
PM10	**5.62**	Dozers	0.5	0.0625			0
PM2.5	**3.81**	Scrapers	1	0.125			0
						Acres	1.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		139	136	149	181	266
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		717	949	1324	2356	7010
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		6	16	30	59	144
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		4	6	11	23	78

North Orange County

1.81 Acres

	25	**50**	**100**	**200**	**500**
NOx	139	136	149	181	266
CO	717	949	1324	2356	7010
PM10	6	16	30	59	144
PM2.5	4	6	11	23	78

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Building Construction

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.31	25	82	25	82	94.90

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**117**	Graders	0.5	0.0625			0
CO	**597**	Dozers	0.5	0.0625			0
PM10	**4.62**	Scrapers	1	0.125			0
PM2.5	**3.31**					**Acres**	1.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		117	116	132	167	257
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		597	787	1133	2122	6715
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		5	12	26	55	140
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		3	5	10	21	76

North Orange County

1.31 Acres

	25	**50**	**100**	**200**	**500**
NOx	117	116	132	167	257
CO	597	787	1133	2122	6715
PM10	5	12	26	55	140
PM2.5	3	5	10	21	76

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Building Construction & P3 Site Preparation

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.81	25	82	25	82	193.30

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**216**	Tractors	0.5	0.0625	4	8	2
CO	**1,277**	Graders	0.5	0.0625			0
PM10	**10.68**	Dozers	0.5	0.0625	3	8	1.5
PM2.5	**5.87**	Scrapers	1	0.125			0
						Acres	4.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	5	221	212	226	249	317
		216	208	222	245	314
CO	4	1128	1491	1981	3218	8210
	5	1311	1731	2274	3605	8754
		1277	1686	2219	3532	8652
PM10	4	9	28	43	72	158
	5	11	34	49	78	165
		11	33	48	77	164
PM2.5	4	5	8	14	31	90
	5	6	9	15	34	95
		6	9	15	33	94

North Orange County

4.81 Acres

	25	**50**	**100**	**200**	**500**
NOx	216	208	222	245	314
CO	1277	1686	2219	3532	8652
PM10	11	33	48	77	164
PM2.5	6	9	15	33	94

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Building Construction & P3 Rough Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	193.30

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**221**	Tractors	0.5	0.0625	2	8	1
CO	**1,311**	Graders	0.5	0.0625	1	8	0.5
PM10	**10.99**	Dozers	0.5	0.0625	1	8	0.5
PM2.5	**6.00**	Scrapers	1	0.125	2	8	2
						Acres	5.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Building Construction, P2 Architectural Coating, & P3 Rough Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5	25	82	25	82	193.30

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment U**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**221**	Tractors	0.5	0.0625	2	8	1
CO	**1,311**	Graders	0.5	0.0625	1	8	0.5
PM10	**10.99**	Dozers	0.5	0.0625	1	8	0.5
PM2.5	**6.00**	Scrapers	1	0.125	2	8	2
						Acres	5.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Building Construction, P2 Architectural Coating, P3 Rough Grading, & P3 Utility Trenching

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	193.30

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**221**	Tractors	0.5	0.0625	2	8	1
CO	**1,311**	Graders	0.5	0.0625	1	8	0.5
PM10	**10.99**	Dozers	0.5	0.0625	1	8	0.5
PM2.5	**6.00**	Scrapers	1	0.125	2	8	2
						Acres	5.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P2 Building Construction, P2 Architectural Coating, P3 Rough Grading, P3 Utility Trenching, & P3 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	262.10

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment L**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**221**	Tractors	0.5	0.0625	4	8	2
CO	**1,311**	Graders	0.5	0.0625	2	8	1
PM10	**10.99**	Dozers	0.5	0.0625	2	8	1
PM2.5	**6.00**	Scrapers	1	0.125	4	8	4
						Acres	9.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Rough Grading, P3 Utility Trenching, & P3 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	5.00	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	4	8	2
NOx	**221**	Graders	0.5	0.0625	2	8	1
CO	**1,311**	Dozers	0.5	0.0625	2	8	1
PM10	**10.99**	Scrapers	1	0.125	4	8	4
PM2.5	**6.00**					**Acres**	8.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	5	221	212	226	249	317
	5	221	212	226	249	317
		221	212	226	249	317
CO	5	1311	1731	2274	3605	8754
	5	1311	1731	2274	3605	8754
		1311	1731	2274	3605	8754
PM10	5	11	34	49	78	165
	5	11	34	49	78	165
		11	34	49	78	165
PM2.5	5	6	9	15	34	95
	5	6	9	15	34	95
		6	9	15	34	95

North Orange County

5.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	221	212	226	249	317
CO	1311	1731	2274	3605	8754
PM10	11	34	49	78	165
PM2.5	6	9	15	34	95

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	5	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Utility Trenching & P3 Fine Grading

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Utility Trenching, P3 Fine Grading, & P3 Asphalt Paving

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Fine Grading & P3 Asphalt Paving

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.00	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	2	8	1
NOx	**196**	Graders	0.5	0.0625	1	8	0.5
CO	**1,128**	Dozers	0.5	0.0625	1	8	0.5
PM10	**9.33**	Scrapers	1	0.125	2	8	2
PM2.5	**5.33**					**Acres**	4.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	4	196	189	203	228	301
		196	189	203	228	301
CO	4	1128	1491	1981	3218	8210
	4	1128	1491	1981	3218	8210
		1128	1491	1981	3218	8210
PM10	4	9	28	43	72	158
	4	9	28	43	72	158
		9	28	43	72	158
PM2.5	4	5	8	14	31	90
	4	5	8	14	31	90
		5	8	14	31	90

North Orange County

4.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	196	189	203	228	301
CO	1128	1491	1981	3218	8210
PM10	9	28	43	72	158
PM2.5	5	8	14	31	90

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Fine Grading, P3 Asphalt Paving, & P3 Finishing/Landscaping

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	4.50	25	82	25	82	98.40

Source Receptor	**North Orange County**
Distance (meters)	25
NOx	**209**
CO	**1,219**
PM10	**10.16**
PM2.5	**5.67**

Equipment	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Tractors	0.5	0.0625	3	8	1.5
Graders	0.5	0.0625	1	8	0.5
Dozers	0.5	0.0625	1	8	0.5
Scrapers	1	0.125	2	8	2
				Acres	4.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	4	196	189	203	228	301
	5	221	212	226	249	317
		209	201	214	239	309
CO	4	1128	1491	1981	3218	8210
	5	1311	1731	2274	3605	8754
		1220	1611	2128	3412	8482
PM10	4	9	28	43	72	158
	5	11	34	49	78	165
		10	31	46	75	162
PM2.5	4	5	8	14	31	90
	5	6	9	15	34	95
		6	9	14	32	92

North Orange County

4.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	209	201	214	239	309
CO	1220	1611	2128	3412	8482
PM10	10	31	46	75	162
PM2.5	6	9	14	32	92

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	4	16	5
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Finishing/Landscaping

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	0.5	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment U**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**103**	Graders	0.5	0.0625			0
CO	**522**	Dozers	0.5	0.0625			0
PM10	**4.00**	Scrapers	1	0.125			0
PM2.5	**3.00**					**Acres**	0.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	1	103	104	121	159	252
		103	104	121	159	252
CO	1	522	685	1014	1975	6531
	1	522	685	1014	1975	6531
		522	685	1014	1975	6531
PM10	1	4	10	24	53	137
	1	4	10	24	53	137
		4	10	24	53	137
PM2.5	1	3	4	9	20	74
	1	3	4	9	20	74
		3	4	9	20	74

North Orange County

0.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	103	104	121	159	252
CO	522	685	1014	1975	6531
PM10	4	10	24	53	137
PM2.5	3	4	9	20	74

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	1
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Finishing/Landscaping & P3 Building Construction

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.81	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	1	8	0.5
NOx	**139**	Tractors	0.5	0.0625	3	7	1.3125
CO	**717**	Graders	0.5	0.0625			0
PM10	**5.62**	Dozers	0.5	0.0625			0
PM2.5	**3.81**	Scrapers	1	0.125			0
						Acres	1.81

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		139	136	149	181	266
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		717	949	1324	2356	7010
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		6	16	30	59	144
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		4	6	11	23	78

North Orange County

1.81 Acres

	25	**50**	**100**	**200**	**500**
NOx	139	136	149	181	266
CO	717	949	1324	2356	7010
PM10	6	16	30	59	144
PM2.5	4	6	11	23	78

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Building Construction

		NOx & CO		PM10 & PM2.5		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.31	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment L**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**117**	Graders	0.5	0.0625			0
CO	**597**	Dozers	0.5	0.0625			0
PM10	**4.62**	Scrapers	1	0.125			0
PM2.5	**3.31**					**Acres**	1.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		117	116	132	167	257
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		597	787	1133	2122	6715
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		5	12	26	55	140
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		3	5	10	21	76

North Orange County

1.31 Acres

	25	**50**	**100**	**200**	**500**
NOx	117	116	132	167	257
CO	597	787	1133	2122	6715
PM10	5	12	26	55	140
PM2.5	3	5	10	21	76

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: P3 Building Construction & P3 Architectural Coating

		NOx & CO		*PM10 & PM2.5*		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
16	1.31	25	82	25	82	98.40

Source Receptor	**North Orange County**	**Equipment**	**Acres/8-hr Day**		**Equipment Used**	**Daily Hours**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	3	7	1.3125
NOx	**117**	Graders	0.5	0.0625			0
CO	**597**	Dozers	0.5	0.0625			0
PM10	**4.62**	Scrapers	1	0.125			0
PM2.5	**3.31**					**Acres**	1.31

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	103	104	121	159	252
	2	147	143	156	186	269
		117	116	132	167	257
CO	1	522	685	1014	1975	6531
	2	762	1010	1395	2444	7121
		597	787	1133	2122	6715
PM10	1	4	10	24	53	137
	2	6	17	31	60	145
		5	12	26	55	140
PM2.5	1	3	4	9	20	74
	2	4	6	11	24	79
		3	5	10	21	76

North Orange County

1.31 Acres

	25	**50**	**100**	**200**	**500**
NOx	117	116	132	167	257
CO	597	787	1133	2122	6715
PM10	5	12	26	55	140
PM2.5	3	5	10	21	76

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
16	1	16	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

5. South Coast Air Basin Air Quality Trends

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Air Quality Improvement Trends in the Air Basin

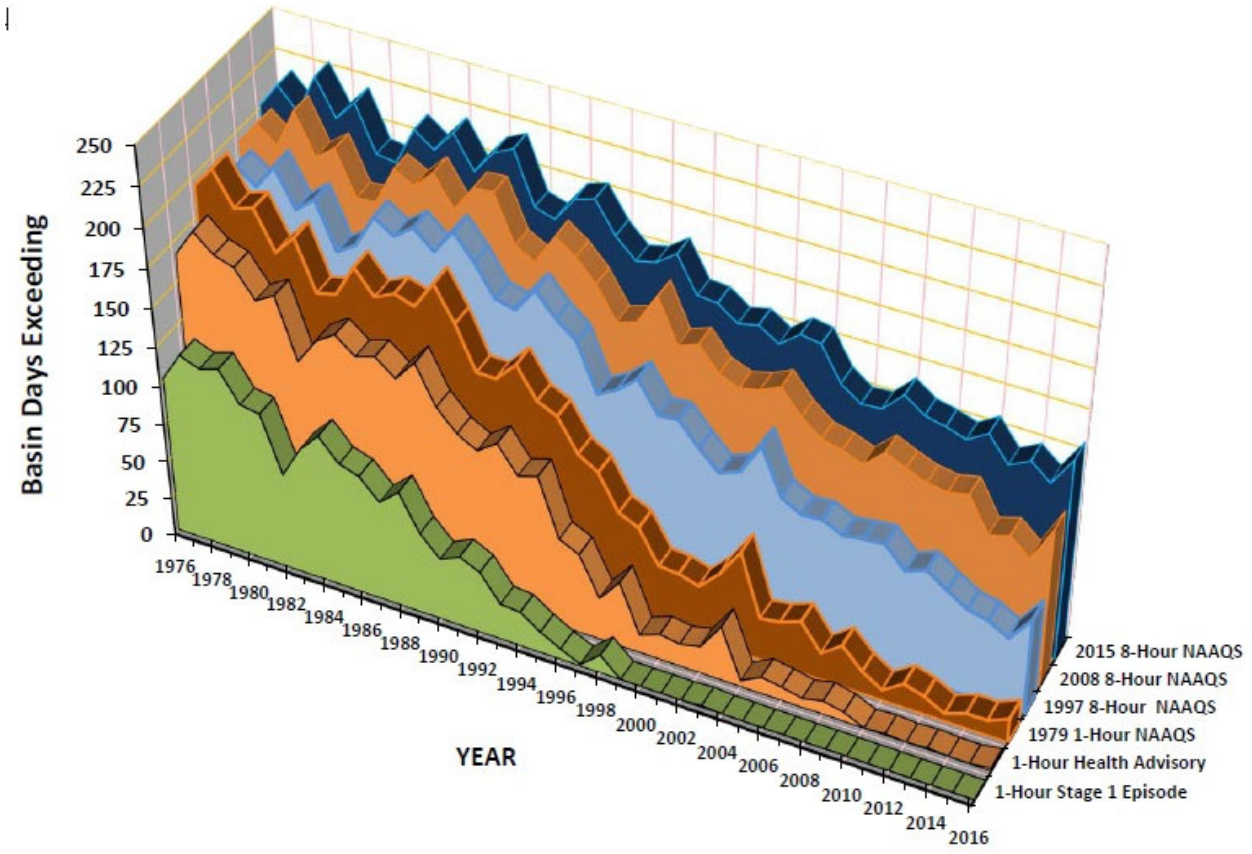
SCAQMD rule development through the 1970s and 1980s resulted in dramatic improvement in SoCAB air quality. Nearly all control programs developed through the early 1990s relied on (i) the development and application of cleaner technology; (ii) add-on emission controls, and (iii) uniform CEQA review throughout the SoCAB. Industrial emission sources have been significantly reduced by this approach and vehicular emissions have been reduced by technologies implemented at the state level by CARB.

As discussed above, the SCAQMD is the lead agency charged with regulating air quality emission reductions for the entire SoCAB. SCAQMD created AQMPs which represent a regional blueprint for achieving healthful air on behalf of the 16 million residents of the SoCAB. The historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs and by utilizing uniform CEQA review throughout the SoCAB.

The 2012 AQMP states, "the remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs," (SCAQMD 2012). Ozone, NO_X, VOC, and CO have been decreasing in the SoCAB since 1975 and are projected to continue to decrease through 2020 (CARB 2009; CARB 2013). These decreases result primarily from motor vehicle controls and reductions in evaporative emissions. Although vehicle miles traveled in the SoCAB continue to increase, NO_X and VOC levels are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NO_X emissions from electric utilities have also decreased due to use of cleaner fuels and renewable energy. Ozone contour maps show that the number of days exceeding the national 8-hour standard has decreased between 1997 and 2007. In the 2007 period, there was an overall decrease in exceedance days compared with the 1997 period. The overall trends of PM_{10} and $PM_{2.5}$ in the air (not emissions) show an overall improvement since 1975. Direct emissions of PM_{10} have remained somewhat constant in the SoCAB and direct emissions of $PM_{2.5}$ have decreased slightly since 1975. Area wide sources (fugitive dust from roads, dust from construction and demolition, and other sources) contribute the greatest amount of direct particulate matter emissions.

Ozone levels in the SoCAB have decreased substantially over the last 30 years as shown in Exhibit 1, *South Coast Air Basin Ozone Trend* (SCAQMD 2018). Today, the maximum measured concentrations are approximately one-third of concentrations within the late 70's.

Exhibit 1: South Coast Air Basin Ozone Trend



As with other pollutants, the most recent PM_{10} statistics also show overall improvement as illustrated in Exhibit 2, *South Coast Air Basin PM_{10} Trend*. During the period for which data are available, the 24-hour national annual average decreased by almost 45 percent, from 103.7 μg/m³ in 1989 to 57.6 μg/m³ in 2014. Although the values in the late 1990's show some variability, this is probably due to meteorology rather than a change in emissions. Despite the overall decrease, ambient concentrations still exceed the State annual and 24-hour PM_{10} standards. Similar to the ambient concentrations, the calculated number of days above the 24-hour PM_{10} standards has also shown an overall drop. During 1995, there were 25 calculated days above the national standard. By 2014, there was one calculated national standard exceedance days (CARB 2018b).

Exhibit 5.2-2: South Coast Air Basin PM_{10} Trend

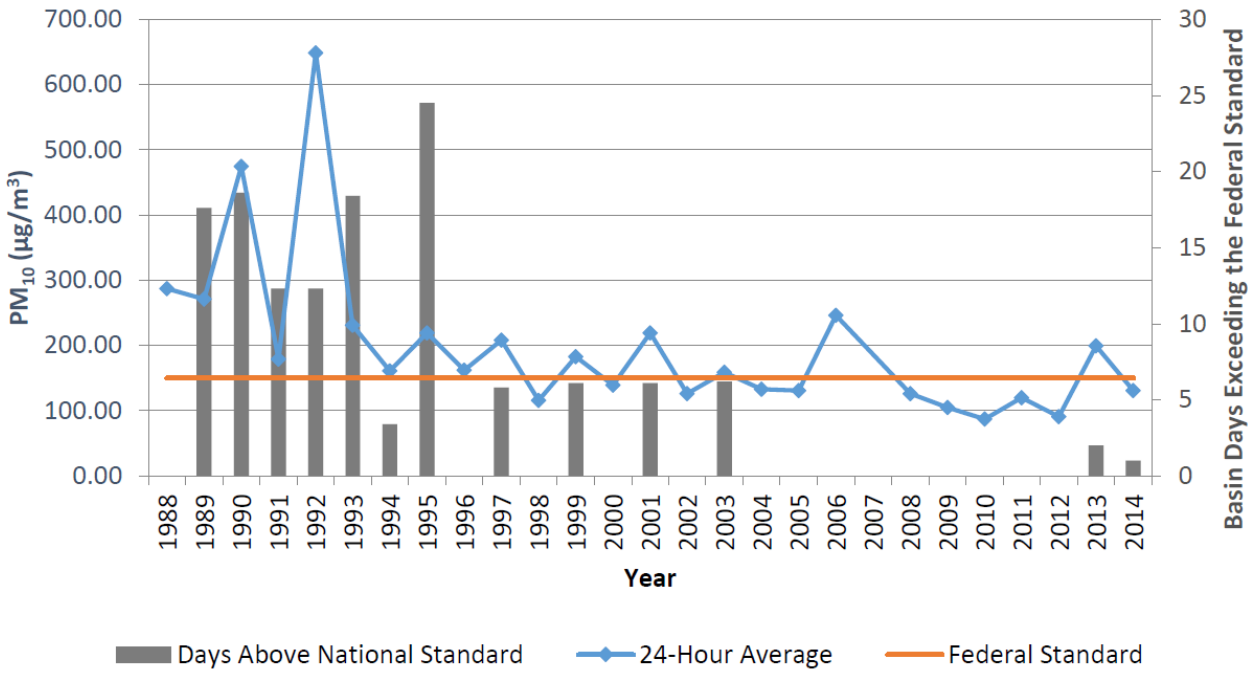
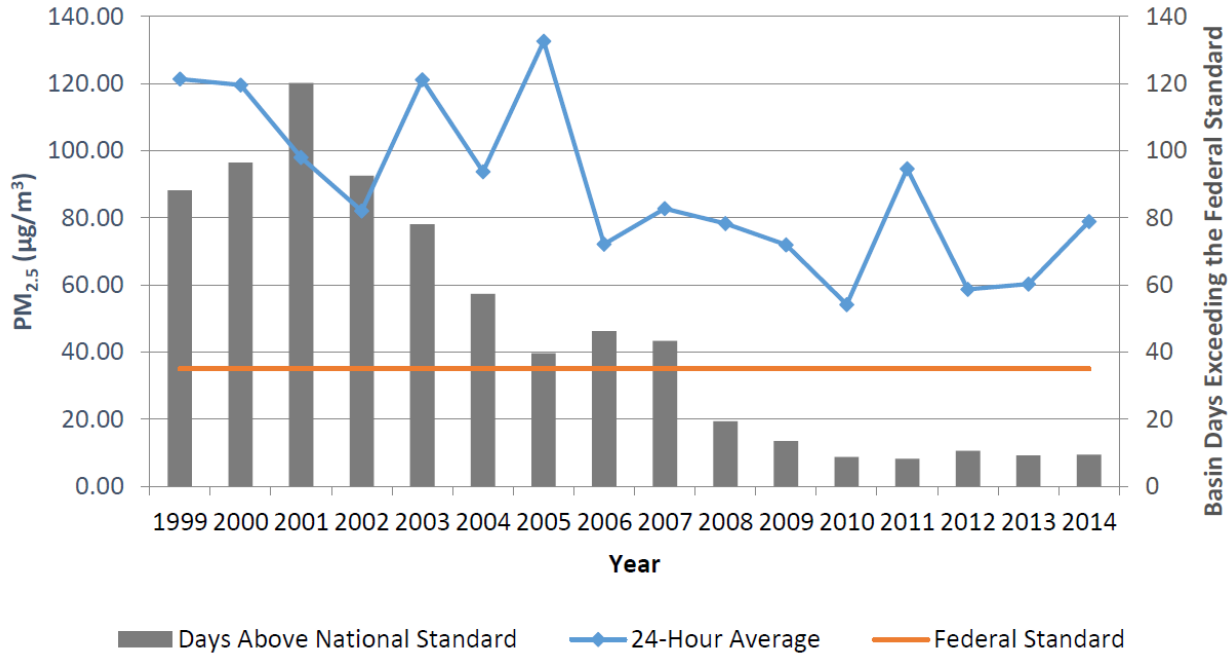


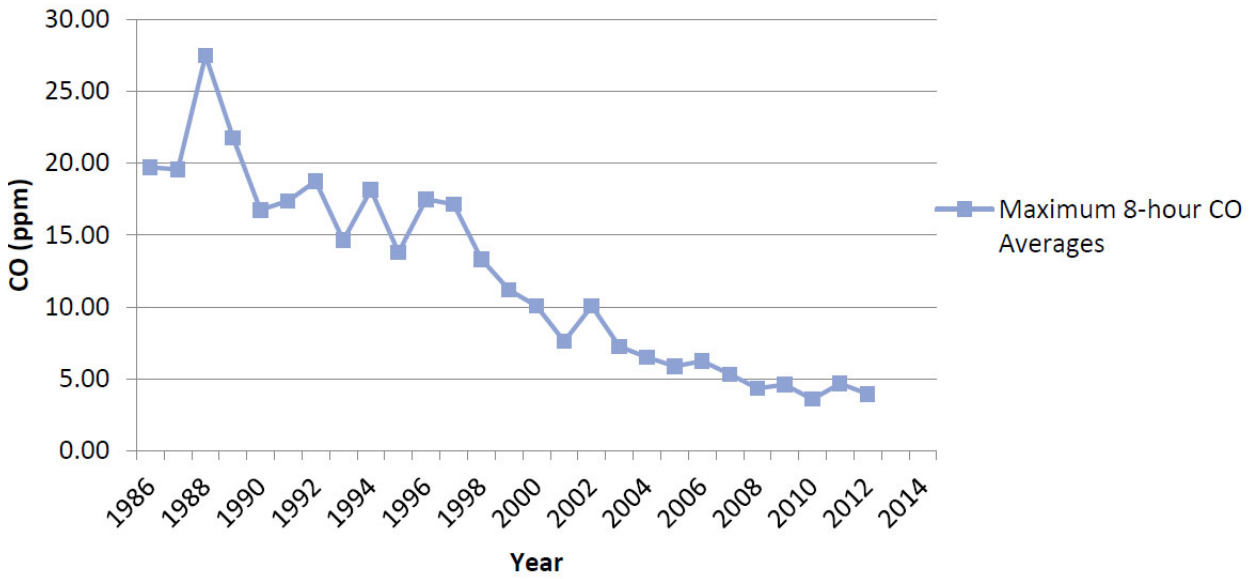
Exhibit 3, *South Coast Air Basin $PM_{2.5}$ Trend*, shows the most recent 24-hour average $PM_{2.5}$ concentrations (national) in the SoCAB from 1999 through 2014. Overall, the annual average concentrations have decreased by almost 52 percent. The calculated number of days above the national standard also decreased, from about 88 days in 1999 to about 9 days in 2014. The SoCAB is currently designated as nonattainment for the State and national $PM_{2.5}$ standards. Measures adopted as part of the upcoming $PM_{2.5}$ SIP, as well as programs to reduce ozone and diesel PM will help in reducing public exposure to $PM_{2.5}$ in this region.

Exhibit 3: South Coast Air Basin $PM_{2.5}$ Trend



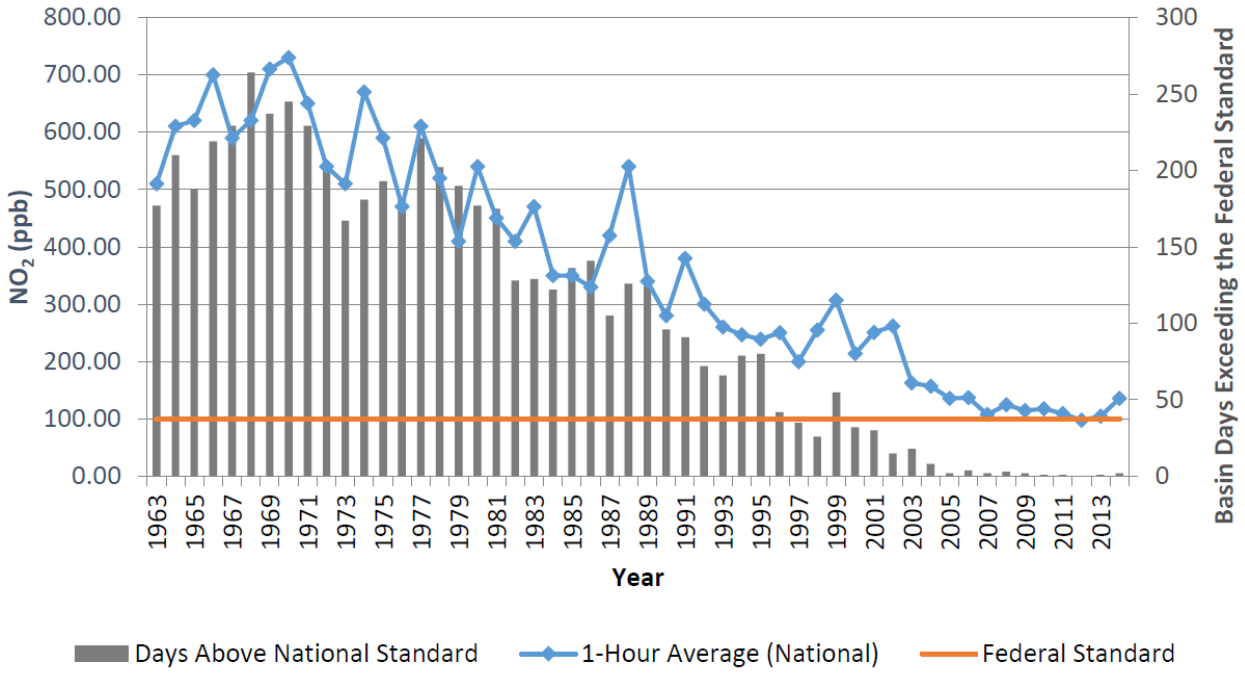
Recent carbon dioxide concentrations in the SoCAB are shown in Exhibit 4, *South Coast Air Basin Carbon Monoxide Trend* (CARB 2018a). Carbon monoxide concentrations in the SoCAB have decreased markedly — a total decrease of more about 80 percent in the peak 8-hour concentration since 1986. The number of exceedance days has also declined. The entire SoCAB is now designated as attainment for both the state and national CO standards. Ongoing reductions from motor vehicle control programs should continue the downward trend in ambient CO concentrations.

Exhibit 4: South Coast Air Basin Carbon Monoxide Trend



Recent NO_2 data for the SoCAB is shown in Exhibit 5, *South Coast Air Basin Nitrogen Dioxide Trend* (CARB 2018a). Over the last 50 years, NO_2 values have decreased significantly; the peak 1-hour average for 2013 was almost 74 percent lower than what it was during 1963. The SoCAB attained the State 1-hour NO_2 standard in 1994, bringing the entire State into attainment. A new state annual average standard of 0.030 parts per million was adopted by the ARB in February 2007 (CARB 2011). The new standard is just barely exceeded in the South Coast. NO_2 is formed from NO_X emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_X emissions. These measures are expected to bring the South Coast into attainment of the State annual average standard.

Exhibit 5: South Coast Air Basin Nitrogen Dioxide Trend



Toxic Air Contaminants Trends

In 1984, as a result of public concern for exposure to airborne carcinogens, the CARB adopted regulations to reduce the amount of air toxic contaminant emissions resulting from mobile and area sources, such as cars, trucks, stationary products, and consumer products. According to the *Ambient and Emission Trends of Toxic Air Contaminants in California* journal article which was prepared for CARB, results show that between 1990-2012, ambient concentration and emission trends for the seven TACs responsible for most of the known cancer risk associated with airborne exposure in California have declined significantly (Propper 2015). The decline in ambient concentration and emission trends of these TACs are a result of various regulations CARB has implemented to address cancer risk.

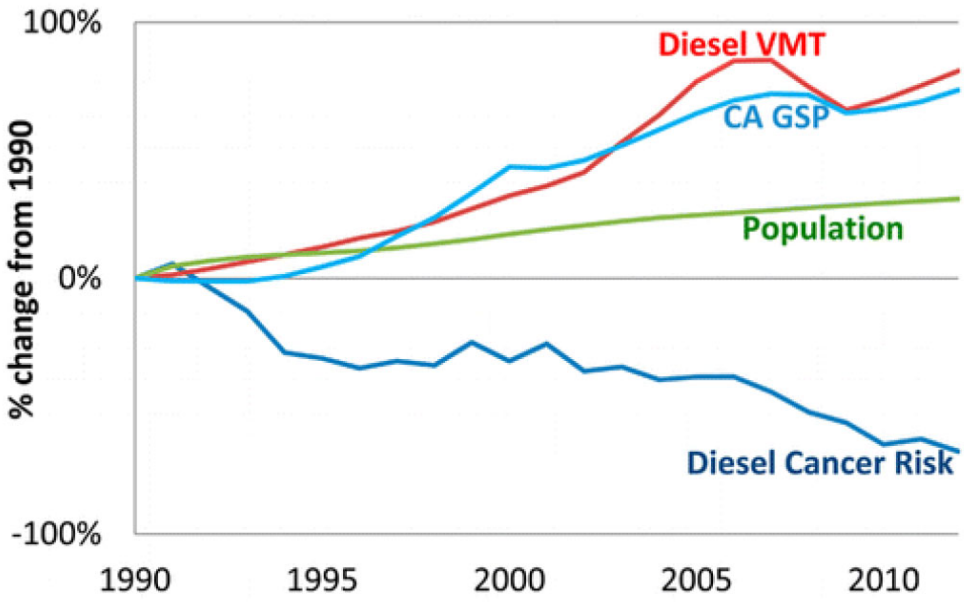
Mobile Source TACs

The CARB introduced two programs that aimed at reducing mobile emissions for light and medium duty vehicles through vehicle emissions controls and cleaner fuel. Since 1996, light-duty vehicles sold in California are equipped with California's second-generation On-Board Diagnostic (OBD-II) system as a result of about half of total car emissions stemming from emissions control device malfunctions. CARB's phase II Reformulated Gasoline (RFG-2) regulation, adopted in 1996, also led to a reduction of mobile source emissions. Through such regulations, benzene levels declined 88% from 1990-2012. 1,3-Butadiene concentrations also declined 85% from 1990-2012 as a result of the motor vehicle regulations (Propper 2015).

In 2000, CARB's Diesel Risk Reduction Plan (DRRP) recommended the replacement and retrofit of diesel-fueled engines and the use of ultra-low-sulfur (<15ppm) diesel fuel. As a result of these measures, DPM concentrations have declined 68%, even though the state's population increased 31% and the amount of diesel vehicles miles traveled increased 81%, as shown in Exhibit 6, *California Population, Gross State Product, Diesel Cancer*

Risk, Diesel Vehicle Miles Traveled. With the implementation of these diesel-related control regulations, ARB expects a DPM decline of 71% for 2000-2020.

Exhibit 6: California Population, Gross State Product, Diesel Cancer Risk, Diesel Vehicle Miles Traveled



Stationary Source TACs

Various regulations led to a decrease in perchloroethylene and hexavalent chromium, with a 92% and 86% decline, respectively. By 1993, several local air districts required dry cleaning businesses to use a carbon absorber and refrigerated condenser, as well as, dry-to-dry machines and closed- looped machines instead of vented transfer machines. Starting in 2003, California provided financial incentives for dry cleaners to use other solvents and soon after, the CARB banned the use of perchloroethylene in automotive products, aerosol coatings, and most consumer products. In 2007, CARB's dry-cleaning regulation was amended to require phase-out of perchloroethylene machines by 2023, which would further reduce emissions to minimal levels (Propper 2015).

Hexavalent chromium emissions began to decline in 1988 with the ARB-regulated regulations contributing to more than 97% emission reduction within four years. The various regulations include prohibiting the use of hexavalent chromium in cooling towers (1989), in motor vehicle and mobile equipment coatings (2001), and in thermal spraying operations (2005). By 2005, hexavalent chromium emissions were 99.97% less than in 1987, far exceeding expectations. In 2006, hexavalent chromium emissions were further reduced with the 2006 ARB regulation requiring add-on air pollution control devices and chemical fume suppressants.

Secondary TACs

Between 1996-2012, ambient concentrations of formaldehyde and acetaldehyde declined 22% and 21%, respectively. The decline in these TACs are attributed from increasingly stringent motor vehicle exhaust emission standards, vehicle fleet turnover, fuel reformulation, and the switch from MTBE (formaldehyde precursor) to ethanol in gasoline (Propper 2015).

As previously discussed, ambient and emissions levels of TACs have reduced significantly from 1990-2012. The overall declining trend in TACs is expected to continue in California from implementation of toxic air controls.

Diesel Regulations

The CARB and the Ports of Los Angeles and Long Beach have adopted several iterations of regulations for diesel trucks that are aimed at reducing diesel particulate matter (DPM). More specifically, the CARB Drayage Truck Regulation (CARB 2017b), the CARB statewide On-road Truck and Bus Regulation (CARB 2017c), and the Ports of Los Angeles and Long Beach "Clean Truck Program" (CTP) require accelerated implementation of "clean trucks" into the statewide truck fleet (Los Angeles 2018). Older more polluting trucks will be replaced with newer, cleaner trucks as a function of these regulatory requirements. Moreover, the average statewide DPM emissions for Heavy Duty Trucks (HHDT), in terms of grams of DPM generated per mile traveled, will dramatically be reduced due to the aforementioned regulatory requirements.

Cancer Risk Trends

Based on information available from CARB, overall cancer risk throughout the SoCAB has had a declining trend since 1990. As previously stated, based on the MATES IV study, the estimated basinwide population-weighted risk decreased by approximately 57 percent since MATES III (SCAQMD 2015). MATES IV modeling predicted an excess cancer risk of 482.86 in one million for the project area.

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5. South Coast Air Quality Management District Friant Ranch Amicus Curiae

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S219783

IN THE SUPREME COURT OF C ALIFORNIA

SIERRA CLUB, REVIVE THE SAN JOAQUIN, and
LEAGUE OF WOMEN VOTERS OF FRESNO,

Plaintiffs and Appellants,

v.

COUNTY OF FRESNO,

Defendant and Respondent,

and,

FRIANT RANCH, L.P.,

Real Party in Interest and Respondent.

SUPREME COURT
FILED
APR 13 2015
Frank A. McGuire Clerk
Deputy

After a Published Decision by the Court of Appeal, filed May 27, 2014
Fifth Appellate District Case No. F066798

Appeal from the Superior Court of California, County of Fresno
Case No. 11CECG00726
Honorable Rosendo A. Pena, Jr.

APPLICATION OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT FOR LEAVE TO FILE BRIEF OF *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY AND *[PROPOSED]* BRIEF OF *AMICUS CURIAE*

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TO THE HONORABLE CHIEF JUSTICE AND JUSTICES OF THE SUPREME COURT:

APPLICATION FOR LEAVE TO FILE *AMICUS CURIAE* BRIEF

Pursuant to Rule 8.520(f) of the California Rules of Court, the South Coast Air Quality Management District (SCAQMD) respectfully requests leave to file the attached *amicus curiae* brief. Because SCAQMD's position differs from that of either party, we request leave to submit this amicus brief in support of neither party.

HOW THIS BRIEF WILL ASSIST THE COURT

SCAQMD's proposed amicus brief takes a position on two of the issues in this case. In both instances, its position differs from that of either party. The issues are:

1) Does the California Environmental Quality Act (CEQA) require an environmental impact report (EIR) to correlate a project's air pollution emissions with specific levels of health impacts?
2) What is the proper standard of review for determining whether an EIR provides sufficient information on the health impacts caused by a project's emission of air pollutants?

This brief will assist the Court by discussing the practical realities of correlating identified air quality impacts with specific health outcomes. In short, CEQA requires agencies to provide detailed information about a project's air quality impacts that is sufficient for the public and decisionmakers to adequately evaluate the project and meaningfully understand its impacts. However, the level of analysis is governed by a rule of reason; CEQA only requires agencies to conduct analysis if it is reasonably feasible to do so.

With regard to health-related air quality impacts, an analysis that correlates a project's air pollution emissions with specific levels of health impacts will be feasible in some cases but not others. Whether it is feasible depends on a variety of factors, including the nature of the project and the nature of the analysis under consideration. The feasibility of analysis may also change over time as air districts and others develop new tools for measuring projects' air quality related health impacts. Because SCAQMD has among the most sophisticated air quality modeling and health impact evaluation capability of any of the air districts in the State, it is uniquely situated to express an opinion on the extent to which the Court should hold that CEQA requires lead agencies to correlate air quality impacts with specific health outcomes.

SCAQMD can also offer a unique perspective on the question of the appropriate standard of review. SCAQMD submits that the proper standard of review for determining whether an EIR is sufficient as an informational document is more nuanced than argued by either party. In our view, this is a mixed question of fact and law. It includes determining whether additional analysis is feasible, which is primarily a factual question that should be reviewed under the substantial evidence standard. However, it also involves determining whether the omission of a particular analysis renders an EIR insufficient to serve CEQA's purpose as a meaningful, informational document. If a lead agency has not determined that a requested analysis is infeasible, it is the court's role to determine whether the EIR nevertheless meets CEQA's purposes, and courts should not defer to the lead agency's conclusions regarding the legal sufficiency of an EIR's analysis. The ultimate question of whether an EIR's analysis is "sufficient" to serve CEQA's informational purposes is predominately a question of law that courts should review de novo.

This brief will explain the rationale for these arguments and may assist the Court in reaching a conclusion that accords proper respect to a lead agency's factual conclusions while maintaining judicial authority over the ultimate question of what level of analysis CEQA requires.

STATEMENT OF INTEREST OF *AMICUS CURIAE*

The SCAQMD is the regional agency primarily responsible for air pollution control in the South Coast Air Basin, which consists of all of Orange County and the non-desert portions of the Los Angeles, Riverside, and San Bernardino Counties. (Health & Saf. Code § 40410; Cal. Code Regs., tit. 17, § 60104.) The SCAQMD participates in the CEQA process in several ways. Sometimes it acts as a lead agency that prepares CEQA documents for projects. Other times it acts as a responsible agency when it has permit authority over some part of a project that is undergoing CEQA review by a different lead agency. Finally, SCAQMD also acts as a commenting agency for CEQA documents that it receives because it is a public agency with jurisdiction by law over natural resources affected by the project.

In all of these capacities, SCAQMD will be affected by the decision in this case. SCAQMD sometimes submits comments requesting that a lead agency perform an additional type of air quality or health impacts analysis. On the other hand, SCAQMD sometimes determines that a particular type of health impact analysis is not feasible or would not produce reliable and informative results. Thus, SCAQMD will be affected by the Court's resolution of the extent to which CEQA requires EIRs to correlate emissions and health impacts, and its resolution of the proper standard of review.

CERTIFICATION REGARDING AUTHORSHIP AND FUNDING

No party or counsel in the pending case authored the proposed amicus curiae brief in whole or in part, or made any monetary contribution intended to fund the preparation or submission of the brief. No person or entity other than the proposed *Amicus Curiae* made any monetary contribution intended to fund the preparation or submission of the brief.

Respectfully submitted,

DATED: April 3, 2015

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BRIEF OF AMICUS CURIAE

SUMMARY OF ARGUMENT

The South Coast Air Quality Management District (SCAQMD) submits that this Court should not try to establish a hard-and-fast rule concerning whether lead agencies are required to correlate emissions of air pollutants with specific health consequences in their environmental impact reports (EIR). The level of detail required in EIRs is governed by a few, core CEQA (California Environmental Quality Act) principles. As this Court has stated, "[a]n EIR must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." (*Laurel Heights Improvement Assn. v. Regents of the Univ of Cal.* (1988) 47 Cal.3d 376, 405 ["*Laurel Heights I*"]) Accordingly, "an agency must use its best efforts to find out and disclose all that it reasonably can." (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 428 (quoting CEQA Guidelines § 15144)[1].). However, "[a]nalysis of environmental effects need not be exhaustive, but will be judged in light of what is reasonably feasible." (*Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1390; CEQA Guidelines §§ 15151, 15204(a).)

With regard to analysis of air quality related health impacts, EIRs must generally quantify a project's pollutant emissions, but in some cases it is not feasible to correlate these emissions to specific, quantifiable health impacts (e.g., premature mortality; hospital admissions). In such cases, a general description of the adverse health impacts resulting from the pollutants at issue may be sufficient. In other cases, due to the magnitude

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[1] The CEQA Guidelines are found at Cal. Code Regs., tit. 14 §§ 15000, *et seq.*

or nature of the pollution emissions, as well as the specificity of the project involved, it may be feasible to quantify health impacts. Or there may be a less exacting, but still meaningful analysis of health impacts that can feasibly be performed. In these instances, agencies should disclose those impacts.

SCAQMD also submits that whether or not an EIR complies with CEQA's informational mandates by providing sufficient, feasible analysis is a mixed question of fact and law. Pertinent here, the question of whether an EIR's discussion of health impacts from air pollution is sufficient to allow the public to understand and consider meaningfully the issues involves two inquiries: (1) Is it feasible to provide the information or analysis that a commenter is requesting or a petitioner is arguing should be required?; and (2) Even if it is feasible, is the agency relying on other policy or legal considerations to justify not preparing the requested analysis? The first question of whether an analysis is feasible is primarily a question of fact that should be judged by the substantial evidence standard. The second inquiry involves evaluating CEQA's information disclosure purposes against the asserted reasons to not perform the requested analysis. For example, an agency might believe that its EIR meets CEQA's informational disclosure standards even without a particular analysis, and therefore choose not to conduct that analysis. SCAQMD submits that this is more of a legal question, which should be reviewed de novo as a question of law.

ARGUMENT

I. RELEVANT FACTUAL AND LEGAL FRAMEWORK.

A. Air Quality Regulatory Background

The South Coast Air Quality Management District (SCAQMD) is one of the local and regional air pollution control districts and air quality

management districts in California. The SCAQMD is the regional air pollution agency for the South Coast Air Basin, which consists of all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. (Health & Saf. Code § 40410, 17 Cal. Code Reg. § 60104.) The SCAQMD also includes the Coachella Valley in Riverside County (Palm Springs area to the Salton Sea). (SCAQMD, *Final 2012 AQMP (Feb. 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "chapter 7" hyperlink; pp 7-1, 7-3 (last visited Apr. 1, 2015).) The SCAQMD's jurisdiction includes over 16 million residents and has the worst or nearly the worst air pollution levels in the country for ozone and fine particulate matter. (SCAQMD, *Final 2012 AQMP (Feb. 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "Executive Summary" hyperlink p. ES-1 (last visited Apr. 1, 2015).)

Under California law, the local and regional districts are primarily responsible for controlling air pollution from all sources except motor vehicles. (Health & Saf. Code § 40000.) The California Air Resources Board (CARB), part of the California Environmental Protection Agency, is primarily responsible for controlling pollution from motor vehicles. (*Id.*) The air districts must adopt rules to achieve and maintain the state and federal ambient air quality standards within their jurisdictions. (Health & Saf. Code § 40001.)

The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (EPA) to identify pollutants that are widely distributed and pose a threat to human health, developing a so-called "criteria" document. (42 U.S.C. § 7408; CAA § 108.) These pollutants are frequently called "criteria pollutants." EPA must then establish "national ambient air quality standards" at levels "requisite to protect public health",

allowing "an adequate margin of safety." (42 U.S.C. § 7409; CAA § 109.) EPA has set standards for six identified pollutants: ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter (PM), and lead. (U.S. EPA, National Ambient Air Quality Standards (NAAQS), http://www.epa.gov/air/criteria.html (last updated Oct. 21, 2014).)[2]

Under the Clean Air Act, EPA sets emission standards for motor vehicles and "nonroad engines" (mobile farm and construction equipment, marine vessels, locomotives, aircraft, etc.). (42 U.S.C. §§ 7521, 7547; CAA §§ 202, 213.) California is the only state allowed to establish emission standards for motor vehicles and most nonroad sources; however, it may only do so with EPA's approval. (42 U.S.C. §§ 7543(b), 7543(e); CAA §§ 209(b), 209(c).) Sources such as manufacturing facilities, power plants and refineries that are not mobile are often referred to as "stationary sources." The Clean Air Act charges state and local agencies with the primary responsibility to attain the national ambient air quality standards. (42 U.S.C. § 7401(a)(3); CAA § 101(a)(3).) Each state must adopt and implement a plan including enforceable measures to achieve and maintain the national ambient air quality standards. (42 U.S.C. § 7410; CAA § 110.) The SCAQMD and CARB jointly prepare portion of the plan for the South Coast Air Basin and submit it for approval by EPA. (Health & Saf. Code §§ 40460, et seq.)

The Clean Air Act also requires state and local agencies to adopt a permit program requiring, among other things, that new or modified "major" stationary sources use technology to achieve the "lowest achievable emission rate," and to control minor stationary sources as

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[2] Particulate matter (PM) is further divided into two categories: fine particulate or $PM_{2.5}$ (particles with a diameter of less than or equal to 2.5 microns) and coarse particulate (PM_{10}) (particles with a diameter of 10 microns or less). (U.S. EPA, Particulate Matter (PM), http://www.epa.gov/airquality/particlepollution/ (last visited Apr. 1, 2015).)

needed to help attain the standards. (42 U.S.C. §§ 7502(c)(5), 7503(a)(2), 7410(a)(2)(C); CAA §§ 172(c)(5), 173(a)(2), 110(a)(2)(C).) The air districts implement these permit programs in California. (Health & Saf. Code §§ 42300, et seq.)

The Clean Air Act also sets out a regulatory structure for over 100 so-called "hazardous air pollutants" calling for EPA to establish "maximum achievable control technology" (MACT) for sources of these pollutants. (42 U.S.C. § 7412(d)(2); CAA § 112(d)(2).) California refers to these pollutants as "toxic air contaminants" (TACs) which are subject to two state-required programs. The first program requires "air toxics control measures" for specific categories of sources. (Health & Saf. Code § 39666.) The other program requires larger stationary sources and sources identified by air districts to prepare "health risk assessments" for impacts of toxic air contaminants. (Health & Saf. Code §§ 44320(b), 44322, 44360.) If the health risk exceeds levels identified by the district as "significant," the facility must implement a "risk reduction plan" to bring its risk levels below "significant" levels. Air districts may adopt additional more stringent requirements than those required by state law, including requirements for toxic air contaminants. (Health & Saf. Code § 41508; *Western Oil & Gas Assn. v. Monterey Bay Unified APCD* (1989) 49 Cal.3d 408, 414.) For example, SCAQMD has adopted a rule requiring new or modified sources to keep their risks below specified levels and use best available control technology (BACT) for toxics. (SCAQMD, *Rule 1401-New Source Review of Toxic Air Contaminants*, http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiv; then follow "Rule 1401" hyperlink (last visited Apr. 1, 2015).)

B. The SCAQMD's Role Under CEQA

The California Environmental Quality Act (CEQA) requires public agencies to perform an environmental review and appropriate analysis for projects that they implement or approve. (Pub. Resources Code § 21080(a).) The agency with primary approval authority for a particular project is generally the "lead agency" that prepares the appropriate CEQA document. (CEQA Guidelines §§ 15050, 15051.) Other agencies having a subsequent approval authority over all or part of a project are called "responsible" agencies that must determine whether the CEQA document is adequate for their use. (CEQA Guidelines §§ 15096(c), 15381.) Lead agencies must also consult with and circulate their environmental impact reports to "trustee agencies" and agencies "with jurisdiction by law" including "authority over resources which may be affected by the project." (Pub. Resources Code §§ 21104(a), 21153; CEQA Guidelines §§ 15086(a)(3), 15073(c).) The SCAQMD has a role in all these aspects of CEQA.

Fulfilling its responsibilities to implement its air quality plan and adopt rules to attain the national ambient air quality standards, SCAQMD adopts a dozen or more rules each year to require pollution reductions from a wide variety of sources. The SCAQMD staff evaluates each rule for any adverse environmental impact and prepares the appropriate CEQA document. Although most rules reduce air emissions, they may have secondary environmental impacts such as use of water or energy or disposal of waste—e.g., spent catalyst from control equipment.[3]

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[3] The SCAQMD's CEQA program for its rules is a "Certified Regulatory Program" under which it prepares a "functionally equivalent" document in lieu of a negative declaration or EIR. (Pub. Resources Code § 21080.5, CEQA Guidelines § 15251(l).)

The SCAQMD also approves a large number of permits every year to construct new, modified, or replacement facilities that emit regulated air pollutants. The majority of these air pollutant sources have already been included in an earlier CEQA evaluation for a larger project, are currently being evaluated by a local government as lead agency, or qualify for an exemption. However, the SCAQMD sometimes acts as lead agency for major projects where the local government does not have a discretionary approval. In such cases, SCAQMD prepares and certifies a negative declaration or environmental impact report (EIR) as appropriate.[4] SCAQMD evaluates perhaps a dozen such permit projects under CEQA each year. SCAQMD is often also a "responsible agency" for many projects since it must issue a permit for part of the projects (e.g., a boiler used to provide heat in a commercial building). For permit projects evaluated by another lead agency under CEQA, SCAQMD has the right to determine that the CEQA document is inadequate for its purposes as a responsible agency, but it may not do so because its permit program already requires all permitted sources to use the best available air pollution control technology. (SCAQMD, *Rule 1303(a)(1) – Requirements*, http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiii; then follow "Rule 1303" hyperlink (last visited Apr. 1, 2015).)

Finally, SCAQMD receives as many as 60 or more CEQA documents each month (around 500 per year) in its role as commenting agency or an agency with "jurisdiction by law" over air quality—a natural resource affected by the project. (Pub. Resources Code §§ 21104(a), 21153; CEQA Guidelines § 15366(a)(3).) The SCAQMD staff provides comments on as many as 25 or 30 such documents each month.

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[4] The SCAQMD's permit projects are not included in its Certified Regulatory Program, and are evaluated under the traditional local government CEQA analysis. (Pub. Resources Code §§ 21150-21154.)

(SCAQMD Governing Board Agenda, Apr. 3, 2015, Agenda Item 16, Attachment A, http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=governing-board-meeting-agenda-april-3-2015; then follow "16. Lead Agency Projects and Environmental Documents Received by SCAQMD" hyperlink (last visited Apr. 1, 2015).) Of course, SCAQMD focuses its commenting efforts on the more significant projects.

Typically, SCAQMD comments on the adequacy of air quality analysis, appropriateness of assumptions and methodology, and completeness of the recommended air quality mitigation measures. Staff may comment on the need to prepare a health risk assessment detailing the projected cancer and noncancer risks from toxic air contaminants resulting from the project, particularly the impacts of diesel particulate matter, which CARB has identified as a toxic air contaminant based on its carcinogenic effects. (California Air Resources Board, Resolution 98-35, Aug. 27, 1998, http://www.arb.ca.gov/regact/diesltac/diesltac.htm; then follow Resolution 98-35 hyperlink (last visited Apr. 1, 2015).) Because SCAQMD already requires new or modified stationary sources of toxic air contaminants to use the best available control technology for toxics and to keep their risks below specified levels, (SCAQMD Rule 1401, supra, note 15), the greatest opportunity to further mitigate toxic impacts through the CEQA process is by reducing emissions—particularly diesel emissions—from vehicles.

II. THIS COURT SHOULD NOT SET A HARD-AND-FAST RULE CONCERNING THE EXTENT TO WHICH AN EIR MUST CORRELATE A PROJECT'S EMISSION OF POLLUTANTS WITH RESULTING HEALTH IMPACTS.

Numerous cases hold that courts do not review the correctness of an EIR's conclusions but rather its sufficiency as an informative document. (*Laurel Heights 1*, *supra*, 47 Cal.3d at p. 392; *Citizens of Goleta Valley v.*

Bd. of Supervisors (1990) 52 Cal.3d 553, 569; *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1197.)

As stated by the Court of Appeal in this case, where an EIR has addressed a topic, but the petitioner claims that the information provided about that topic is insufficient, courts must "draw[] a line that divides *sufficient* discussions from those that are *insufficient*." (*Sierra Club v. County of Fresno* (2014) 226 Cal.App.4th 704 (superseded by grant of review) 172 Cal.Rptr.3d 271, 290.) The Court of Appeal readily admitted that "[t]he terms themselves – sufficient and insufficient – provide little, if any, guidance as to where the line should be drawn. They are simply labels applied once the court has completed its analysis." (*Id.*)

The CEQA Guidelines, however, provide guidance regarding what constitutes a sufficient discussion of impacts. Section 15151 states that "the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." Case law reflects this: "Analysis of environmental effects need not be exhaustive, but will be judged in light of what was reasonably feasible." (*Association of Irritated Residents v. County of Madera, supra,* 107 Cal.App.4th at p. 1390; see also CEQA Guidelines § 15204(a).)

Applying this test, this Court cannot realistically establish a hard-and-fast rule that an analysis correlating air pollution impacts of a project to quantified resulting health impacts is always required, or indeed that it is never required. Simply put, in some cases such an analysis will be "feasible"; in some cases it will not.

For example, air pollution control districts often require a proposed new source of toxic air contaminants to prepare a "health risk assessment" before issuing a permit to construct. District rules often limit the allowable cancer risk the new source may cause to the "maximally exposed individual" (worker and residence exposures). (*See, e.g.*, SCAQMD Rule 1401(c)(8); 1401(d)(1), *supra* note 15.) In order to perform this analysis, it

is necessary to have data regarding the sources and types of air toxic contaminants, location of emission points, velocity of emissions, the meteorology and topography of the area, and the location of receptors (worker and residence). (SCAQMD, *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588), pp. 11-16*; (last visited Apr. 1, 2015) http://www.aqmd.gov/home/library/documents-support-material; "Guidelines" hyperlink; AB2588; then follow AB2588 Risk Assessment Guidelines hyperlink.)

Thus, it is feasible to determine the health risk posed by a new gas station locating at an intersection in a mixed use area, where receptor locations are known. On the other hand, it may not be feasible to perform a health risk assessment for airborne toxics that will be emitted by a generic industrial building that was built on "speculation" (i.e., without knowing the future tenant(s)). Even where a health risk assessment can be prepared, however, the resulting maximum health risk value is only a calculation of risk—it does not necessarily mean anyone will contract cancer as a result of the project.

In order to find the "cancer burden" or expected additional cases of cancer resulting from the project, it is also necessary to know the numbers and location of individuals living within the "zone of impact" of the project: i.e., those living in areas where the projected cancer risk from the project exceeds one in a million. (SCAQMD, Health Risk Assessment Summary form, http://www.aqmd.gov/home/forms ; filter by "AB2588" category; then "Health Risk Assessment" hyperlink (last visited Apr. 1, 2015).) The affected population is divided into bands of those exposed to at least 1 in a million risk, those exposed to at least 10 in a million risk, etc. up to those exposed at the highest levels. (*Id.*) This data allows agencies to calculate an approximate number of additional cancer cases expected from

the project. However, it is not possible to predict which particular individuals will be affected.

For the so-called criteria pollutants[5], such as ozone, it may be more difficult to quantify health impacts. Ozone is formed in the atmosphere from the chemical reaction of the nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. (U.S. EPA, Ground Level Ozone, http://www.epa.gov/airquality/ozonepollution/ (last updated Mar. 25, 2015).) It takes time and the influence of meteorological conditions for these reactions to occur, so ozone may be formed at a distance downwind from the sources. (U.S. EPA, *Guideline on Ozone Monitoring Site Selection* (Aug. 1998) EPA-454/R-98-002 § 5.1.2, http://www.epa.gov/ttnamti1/archive/cpreldoc.html (last visited Apr. 1, 2015).) NO_x and VOC are known as "precursors" of ozone.

Scientifically, health effects from ozone are correlated with increases in the ambient level of ozone in the air a person breathes. (U.S. EPA, *Health Effects of Ozone in the General Population,* Figure 9, http://www.epa.gov/apti/ozonehealth/population.html#levels (last visited Apr. 1, 2015).) However, it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels over an entire region. For example, the SCAQMD's 2012 AQMP showed that reducing NO_x by 432 tons per day (157,680 tons/year) and reducing VOC by 187 tons per day (68,255 tons/year) would reduce ozone levels at the SCAQMD's monitor site with the highest levels by only 9 parts per billion. (South Coast Air Quality Management District, *Final 2012 AQMP (February 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "Appendix V: Modeling & Attainment Demonstrations" hyperlink,

[5] See discussion of types of pollutants, supra, Part I.A.

pp. v-4-2, v-7-4, v-7-24.) SCAQMD staff does not currently know of a way to accurately quantify ozone-related health impacts caused by NO_x or VOC emissions from relatively small projects.

On the other hand, this type of analysis may be feasible for projects on a regional scale with very high emissions of NO_x and VOCs, where impacts are regional. For example, in 2011 the SCAQMD performed a health impact analysis in its CEQA document for proposed Rule 1315, which authorized various newly-permitted sources to use offsets from the districts "internal bank" of emission reductions. This CEQA analysis accounted for essentially *all* the increases in emissions due to new or modified sources in the District between 2010 and 2030.[6] The SCAQMD was able to correlate this very large emissions increase (e.g., 6,620 pounds per day NO_x (1,208 tons per year), 89,180 pounds per day VOC (16,275 tons per year)) to expected health outcomes from ozone and particulate matter (e.g., 20 premature deaths per year and 89,947 school absences in the year 2030 due to ozone).[7] (SCAQMD Governing Board Agenda, February 4, 2011, Agenda Item 26, *Assessment for: Re-adoption of Proposed Rule 1315 – Federal New Source Review Tracking System* (see hyperlink in fn 6*)* at p. 4.1-35, Table 4.1-29.)

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[6] (SCAQMD Governing Board Agenda, February 4, 2011, Agenda Item 26, Attachment G, *Assessment for: Re-adoption of Proposed Rule 1315 – Federal New Source Review Tracking System, Vol. 1, p.4.0-6,* http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=governing-board-meeting-agenda-february-4-2011; the follow "26. Adopt Proposed Rule 1315 – Federal New Source Review Tracking System" (last visited April 1, 2015).)

[7] The SCAQMD was able to establish the location of future NO_x and VOC emissions by assuming that new projects would be built in the same locations and proportions as existing stationary sources. This CEQA document was upheld by the Los Angeles County Superior Court in *Natural Res. Def. Council v SCAQMD*, Los Angeles Superior Court No. BS110792).

However, a project emitting only 10 tons per year of NO_x or VOC is small enough that its regional impact on ambient ozone levels may not be detected in the regional air quality models that are currently used to determine ozone levels. Thus, in this case it would not be feasible to directly correlate project emissions of VOC or NO_x with specific health impacts from ozone. This is in part because ozone formation is not linearly related to emissions. Ozone impacts vary depending on the location of the emissions, the location of other precursor emissions, meteorology and seasonal impacts, and because ozone is formed some time later and downwind from the actual emission. (EPA Guideline on Ozone Monitoring Site Selection (Aug. 1998) EPA-454/R-98-002, § 5.1.2; https://www.epa.gov/ttnamti1/archive/cpreldoc.html; then search "Guideline on Ozone Monitoring Site Selection" click on pdf) (last viewed Apr. 1, 2015).)

SCAQMD has set its CEQA "significance" threshold for NO_x and VOC at 10 tons per year (expressed as 55 lb/day). (SCAQMD, *Air Quality Analysis Handbook*, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook; then follow "SCAQMD Air Quality Significance Thresholds" hyperlink (last visited Apr. 1, 2015).) This is because the federal Clean Air Act defines a "major" stationary source for "extreme" ozone nonattainment areas such as SCAQMD as one emitting 10 tons/year. (42 U.S.C. §§ 7511a(e), 7511a(f); CAA §§ 182(e), 182(f).) Under the Clean Air Act, such sources are subject to enhanced control requirements (42 U.S.C. §§ 7502(c)(5), 7503; CAA §§ 172(c)(5), 173), so SCAQMD decided this was an appropriate threshold for making a CEQA "significance" finding and requiring feasible mitigation. Essentially, SCAQMD takes the position that a source that emits 10 tons/year of NO_x or VOC would contribute cumulatively to ozone formation. Therefore, lead agencies that use SCAQMD's thresholds of significance may determine

that many projects have "significant" air quality impacts and must apply all feasible mitigation measures, yet will not be able to precisely correlate the project to quantifiable health impacts, unless the emissions are sufficiently high to use a regional modeling program.

In the case of particulate matter ($PM_{2.5}$)[8], another "criteria" pollutant, SCAQMD staff is aware of two possible methods of analysis. SCAQMD used regional modeling to predict expected health impacts from its proposed Rule 1315, as mentioned above. Also, the California Air Resources Board (CARB) has developed a methodology that can predict expected mortality (premature deaths) from large amounts of $PM_{2.5}$. (California Air Resources Board, *Health Impacts Analysis: PM Premature Death Relationship*, http://www.arb.ca.gov/research/health/pm-mort/pm-mort_arch.htm (last reviewed Jan. 19, 2012).) SCAQMD used the CARB methodology to predict impacts from three very large power plants (e.g., 731-1837 lbs/day). (Final Environmental Assessment for Rule 1315, *supra*, pp 4.0-12, 4.1-13, 4.1-37 (e.g., 125 premature deaths in the entire SCAQMD in 2030), 4.1-39 (0.05 to 1.77 annual premature deaths from power plants.) Again, this project involved large amounts of additional $PM_{2.5}$ in the District, up to 2.82 tons/day (5,650 lbs/day of $PM_{2.5}$, or, or 1029 tons/year. (*Id.* at table 4.1-4, p. 4.1-10.)

However, the primary author of the CARB methodology has reported that this $PM_{2.5}$ health impact methodology is not suited for small projects and may yield unreliable results due to various uncertainties. [9] (SCAQMD, *Final Subsequent Mitigated Negative Declaration for: Warren*

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[8] SCAQMD has not attained the latest annual or 24-hour national ambient air quality standards for "$PM_{2.5}$" or particulate matter less than 2.5 microns in diameter.

[9] Among these uncertainties are the representativeness of the population used in the methodology, and the specific source of PM and the corresponding health impacts. (*Id.* at p. 2-24.)

E&P, Inc. WTU Central Facility, New Equipment Project (certified July 19, 2011), http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents---year-2011; then follow "Final Subsequent Mitigated Negative Declaration for Warren E&P Inc. WTU Central Facility, New Equipment Project" hyperlink, pp. 2-22, 2-23 (last visited Apr. 1, 2015).) Therefore, when SCAQMD prepared a CEQA document for the expansion of an existing oil production facility, with very small $PM_{2.5}$ increases (3.8 lb/day) and a very small affected population, staff elected not to use the CARB methodology for using estimated $PM_{2.5}$ emissions to derive a projected premature mortality number and explained why it would be inappropriate to do so. (*Id.* at pp 2-22 to 2-24.) SCAQMD staff concluded that use of this methodology for such a small source could result in unreliable findings and would not provide meaningful information. (*Id.* at pp. 2-23, 2-25.) This CEQA document was not challenged in court.

In the above case, while it may have been technically possible to plug the data into the methodology, the results would not have been reliable or meaningful. SCAQMD believes that an agency should not be required to perform analyses that do not produce reliable or meaningful results. This Court has already held that an agency may decline to use even the "normal" "existing conditions" CEQA baseline where to do so would be misleading or without informational value. (*Neighbors for Smart Rail v. Exposition Metro Line* (2013) 57 Cal.4th 439, 448, 457.) The same should be true for a decision that a particular study or analysis would not provide reliable or meaningful results.[10]

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[10] Whether a particular study would result in "informational value" is a part of deciding whether it is "feasible." CEQA defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and

Therefore, it is not possible to set a hard-and-fast rule on whether a correlation of air quality impacts with specific quantifiable health impacts is required in all cases. Instead, the result turns on whether such an analysis is reasonably feasible in the particular case.[11] Moreover, what is reasonably feasible may change over time as scientists and regulatory agencies continually seek to improve their ability to predict health impacts. For example, CARB staff has been directed by its Governing Board to reassess and improve the methodology for estimating premature deaths. (California Air Resources Board, *Health Impacts Analysis: PM Mortality Relationship*, http://www.arb.ca.gov/research/health/pm-mort/pm-mort.htm (last reviewed Dec. 29, 2010).) This factor also counsels against setting any hard-and-fast rule in this case.

III. THE QUESTION OF WHETHER AN EIR CONTAINS SUFFICIENT ANALYSIS TO MEET CEQA'S REQUIREMENTS IS A MIXED QUESTION OF FACT AND LAW GOVERNED BY TWO DIFFERENT STANDARDS OF REVIEW.

A. Standard of Review for Feasibility Determination and Sufficiency as an Informative Document

A second issue in this case is whether courts should review an EIR's informational sufficiency under the "substantial evidence" test as argued by Friant Ranch or the "independent judgment" test as argued by Sierra Club.

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technological factors." (Pub. Resources Code § 21061.1.) A study cannot be "accomplished in a *successful* manner" if it produces unreliable or misleading results.

[11] In this case, the lead agency did not have an opportunity to determine whether the requested analysis was feasible because the comment was non-specific. Therefore, SCAQMD suggests that this Court, after resolving the legal issues in the case, direct the Court of Appeal to remand the case to the lead agency for a determination of whether the requested analysis is feasible. Because Fresno County, the lead agency, did not seek review in this Court, it seems likely that the County has concluded that at least some level of correlation of air pollution with health impacts is feasible.

As this Court has explained, "a reviewing court must adjust its scrutiny to the nature of the alleged defect, depending on whether the claim is predominantly one of improper procedure or a dispute over the facts." (*Vineyard Area Citizens v. City of Rancho Cordova, supra,* 40 Cal.4th at 435.) For questions regarding compliance with proper procedure or other legal questions, courts review an agency's action de novo under the "independent judgment" test. (*Id.*) On the other hand, courts review factual disputes only for substantial evidence, thereby "accord[ing] greater deference to the agency's substantive factual conclusions." (*Id.*)

Here, Friant Ranch and Sierra Club agree that the case involves the question of whether an EIR includes sufficient information regarding a project's impacts. However, they disagree on the proper standard of review for answering this question: Sierra Club contends that courts use the independent judgment standard to determine whether an EIR's analysis is sufficient to meet CEQA's informational purposes,[12] while Friant Ranch contends that the substantial evidence standard applies to this question.

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[12] Sierra Club acknowledges that courts use the substantial evidence standard when reviewing predicate factual issues, but argues that courts ultimately decide as a matter of law what CEQA requires. (Answering Brief, pp. 14, 23.)

SCAQMD submits that the issue is more nuanced than either party contends. We submit that, whether a CEQA document includes sufficient analysis to satisfy CEQA's informational mandates is a mixed question of fact and law,[13] containing two levels of inquiry that should be judged by different standards.[14]

The state CEQA Guidelines set forth standards for the adequacy of environmental analysis. Guidelines Section 15151 states:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection, but for adequacy, completeness, and a good-faith effort at full disclosure.

In this case, the basic question is whether the underlying analysis of air quality impacts made the EIR "sufficient" as an informative document. However, whether the EIR's analysis was sufficient is judged in light of what was reasonably feasible. This represents a mixed question of fact and law that is governed by two different standards of review.

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[13] Friant Ranch actually states that the claim that an EIR lacks sufficient relevant information is, "most properly thought of as raising mixed questions of fact and law." (Opening Brief, p. 27.) However, the remainder of its argument claims that the court should apply the substantial evidence standard of review to all aspects of the issue.

[14] Mixed questions of fact and law issues may implicate predominantly factual subordinate questions that are reviewed under the substantial evidence test even though the ultimate question may be reviewed by the independent judgment test. *Crocker National Bank v. City and County of San Francisco* (1989) 49 Cal.3d 881, 888-889.

SCAQMD submits that an EIR's sufficiency as an informational document is ultimately a legal question that courts should determine using their independent judgment. This Court's language in *Laurel Heights I* supports this position. As this Court explained: "The court does not pass upon the correctness of the EIR's environmental conclusions, but only upon its *sufficiency as an informative document.*" (*Laurel Heights I, supra,* 47 Cal.3d at 392-393) (emphasis added.) As described above, the Court in *Vineyard Area Citizens v. City of Rancho Cordova, supra,* 40 Cal.4th at 431, also used its independent judgment to determine what level of analysis CEQA requires for water supply impacts. The Court did not defer to the lead agency's opinion regarding the law's requirements; rather, it determined for itself what level of analysis was necessary to meet "[t]he law's informational demands." (*Id.* at p. 432.) Further, existing case law also holds that where an agency fails to comply with CEQA's information disclosure requirements, the agency has "failed to proceed in the manner required by law." (*Save Our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 118.)

However, whether an EIR satisfies CEQA's requirements depends in part on whether it was reasonably feasible for an agency to conduct additional or more thorough analysis. EIRs must contain "a detailed statement" of a project's impacts (Pub. Res. Code § 21061), and an agency must "use its best efforts to find out and disclose all that it reasonably can." (CEQA Guidelines § 15144.) Nevertheless, "the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." (CEQA Guidelines § 15151.)

SCAQMD submits that the question of whether additional analysis or a particular study suggested by a commenter is "feasible" is generally a question of fact. Courts have already held that whether a particular alternative is "feasible" is reviewed by the substantial evidence test.

(*Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587, 598-99; *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 883.) Thus, if a lead agency determines that a particular study or analysis is infeasible, that decision should generally be judged by the substantial evidence standard. However, SCAQMD urges this Court to hold that lead agencies must explain the basis of any determination that a particular analysis is infeasible in the EIR itself. An EIR must discuss information, including issues related to the feasibility of particular analyses "in sufficient detail to enable meaningful participation and criticism by the public. '[W]hatever is required to be considered in an EIR must be in that formal report; what any official might have known from other writings or oral presentations cannot supply what is lacking in the report.'" (*Laurel Heights I, supra*, 47 Cal.3d at p. 405 (quoting *Santiago County Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 831) (discussing analysis of alternatives).) The evidence on which the determination is based should also be summarized in the EIR itself, with appropriate citations to reference materials if necessary. Otherwise commenting agencies such as SCAQMD would be forced to guess where the lead agency's evidence might be located, thus thwarting effective public participation.

Moreover, if a lead agency determines that a particular study or analysis would not result in reliable or useful information and for that reason is not feasible, that determination should be judged by the substantial evidence test. (See *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority, supra*, 57 Cal.4th 439, 448, 457:

whether "existing conditions" baseline would be misleading or uninformative judged by substantial evidence standard.[15])

If the lead agency's determination that a particular analysis or study is not feasible is supported by substantial evidence, then the agency has not violated CEQA's information disclosure provisions, since it would be infeasible to provide additional information. This Court's decisions provide precedent for such a result. For example, this Court determined that the issue of whether the EIR should have included a more detailed discussion of future herbicide use was resolved because substantial evidence supported the agency's finding that "the precise parameters of future herbicide use could not be predicted." *Ebbetts Pass Forest Watch v. California Dept. of Forestry & Fire Protection* (2008) 43 Cal.4th 936, 955.

Of course, SCAQMD expects that courts will continue to hold lead agencies to their obligations to consult with, and not to ignore or misrepresent, the views of sister agencies having special expertise in the area of air quality. (*Berkeley Keep Jets Over the Bay v. Board of Port Commissioners* (2007) 91 Cal.App.4th 1344, 1364 n.11.) In some cases, information provided by such expert agencies may establish that the purported evidence relied on by the lead agency is not in fact "substantial". (*Id.* at pp. 1369-1371.)

In sum, courts retain ultimate responsibility to determine what CEQA requires. However, the law does not require exhaustive analysis, but only what is reasonably feasible. Agencies deserve deference for their factual determinations regarding what type of analysis is reasonably feasible. On the other hand, if a commenter requests more information, and the lead agency declines to provide it but does *not* determine that the

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[15] The substantial evidence standard recognizes that the courts "have neither the resources nor the scientific expertise" to weigh conflicting evidence on technical issues. (*Laurel Heights I, supra,* 47 Cal.3d 376, 393.)

requested study or analysis would be infeasible, misleading or uninformative, the question becomes whether the omission of that analysis renders the EIR inadequate to satisfy CEQA's informational purposes. (*Id.* at pp. 1370-71.) Again, this is predominantly a question of law and should be judged by the de novo or independent judgment standard of review. Of course, this Court has recognized that a "project opponent or reviewing court can always imagine some additional study or analysis that might provide helpful information. It is not for them to design the EIR. That further study...might be helpful does not make it necessary." (*Laurel Heights I, supra,* 47 Cal.3d 376, 415 – see also CEQA Guidelines § 15204(a) [CEQA "does not require a lead agency to conduct every test. . . recommended or demanded by commenters."].) Courts, then, must adjudicate whether an omission of particular information renders an EIR inadequate to serve CEQA's informational purposes.[16]

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[16] We recognize that there is case law stating that the substantial evidence standard applies to "challenges to the scope of an EIR's analysis of a topic" as well as the methodology used and the accuracy of the data relied on in the document "because these types of challenges involve factual questions." (*Bakersfield Citizens for Local Control v. City of Bakersfield, supra,* 124 Cal.App.4th 1184, 1198, and cases relied on therein.) However, we interpret this language to refer to situations where the question of the scope of the analysis really is factual—that is, where it involves whether further analysis is feasible, as discussed above. This interpretation is supported by the fact that the *Bakersfield* court expressly rejected an argument that a claimed "omission of information from the EIR should be treated as inquiries whether there is substantial evidence supporting the decision approving the project." *Bakersfield, supra,* 124 Cal.App.4th at p. 1208. And the *Bakersfield* court ultimately decided that the lead agency must analyze the connection between the identified air pollution impacts and resulting health impacts, even though the EIR already included some discussion of air-pollution-related respiratory illnesses. *Bakersfield, supra,* 124 Cal.App.4th at p. 1220. Therefore, the court must not have interpreted this question as one of the "scope of the analysis" to be judged by the substantial evidence standard.

B. Friant Ranch's Rationale for Rejecting the Independent Judgment Standard of Review is Unsupported by Case Law.

In its brief, Friant Ranch makes a distinction between cases where a required CEQA topic is not discussed at all (to be reviewed by independent judgment as a failure to proceed in the manner required by law) and cases where a topic is discussed, but the commenter claims the information provided is insufficient (to be judged by the substantial evidence test). (Opening Brief, pp. 13-17.) The Court of Appeal recognized these two types of cases, but concluded that both raised questions of law. (*Sierra Club v. County of Fresno* (2014) 226 Cal.App.4th 704 (superseded by grant of review) 172 Cal.Rptr.3d 271, 290.) We believe the distinction drawn by Friant Ranch is unduly narrow, and inconsistent with cases which have concluded that CEQA documents are insufficient. In many instances, CEQA's requirements are stated broadly, and the courts must interpret the law to determine what level of analysis satisfies CEQA's mandate for providing meaningful information, even though the EIR discusses the issue to some extent.

For example, the CEQA Guidelines require discussion of the existing environmental baseline. In *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 954-955, the lead agency had discussed the environmental baseline by describing historic month-end water levels in the affected lakes. However, the court held that this was not an adequate baseline discussion because it failed to discuss the timing and amounts of past actual water releases, to allow comparison with the proposed project. The court evidently applied the independent judgment test to its decision, even though the agency discussed the issue to some extent.

Likewise, in *Vineyard Area Citizens* (2007) 40 Cal.4th 412, this Court addressed the question of whether an EIR's analysis of water supply impacts complied with CEQA. The parties agreed that the EIR was required to analyze the effects of providing water to the development project, "and that in order to do so the EIR had, in some manner, to identify the planned sources of that water." (*Vineyard Area Citizens, supra,* at p. 428.) However, the parties disagreed as to the level of detail required for this analysis and "what level of uncertainty regarding the availability of water supplies can be tolerated in an EIR . . . ." (*Id.*) In other words, the EIR had analyzed water supply impacts for the project, but the petitioner claimed that the analysis was insufficient.

This Court noted that neither CEQA's statutory language or the CEQA Guidelines specifically addressed the question of how precisely an EIR must discuss water supply impacts. (*Id.*) However, it explained that CEQA "states that '[w]hile foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can.'" (*Id.*, [Guidelines § 15144].) The Court used this general principle, along with prior precedent, to elucidate four "principles for analytical adequacy" that are necessary in order to satisfy "CEQA's informational purposes." (*Vineyard Area Citizens, supra,* at p. 430.) The Court did not defer to the agency's determination that the EIR's analysis of water supply impacts was sufficient. Rather, this Court used its independent judgment to determine for itself the level of analysis required to satisfy CEQA's fundamental purposes. (*Vineyard Area Citizens, supra*, at p. 441: an EIR does not serve its purposes where it neglects to explain likely sources of water and "... leaves long term water supply considerations to later stages of the project.")

Similarly, the CEQA Guidelines require an analysis of noise impacts of the project. (Appendix G, "Environmental Checklist Form."[17]) In *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1123, the court held that the lead agency's noise impact analysis was inadequate even though it had addressed the issue and concluded that the increase would not be noticeable. If the court had been using the substantial evidence standard, it likely would have upheld this discussion.

Therefore, we do not agree that the issue can be resolved on the basis suggested by Friant Ranch, which would apply the substantial evidence standard to *every* challenge to an analysis that addresses a required CEQA topic. This interpretation would subvert the courts' proper role in interpreting CEQA and determining what the law requires.

Nor do we agree that the Court of Appeal in this case violated CEQA's prohibition on courts interpreting its provisions "in a manner which imposes procedural or substantive requirements beyond those explicitly stated in this division or in the state guidelines." (Pub. Resources Code § 21083.1.) CEQA requires an EIR to describe *all* significant impacts of the project on the environment. (Pub. Resources Code § 21100(b)(2); *Vineyard Area Citizens, supra,* at p. 428.) Human beings are part of the environment, so CEQA requires EIRs to discuss a project's significant impacts on human health. However, except in certain particular circumstances,[18] neither the CEQA statute nor Guidelines specify the precise level of analysis that agencies must undertake to satisfy the law's requirements. (see, e.g., CEQA Guidelines § 15126.2(a) [EIRs must describe "health and safety problems caused by {a project's} physical changes"].) Accordingly, courts must interpret CEQA as a whole to

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[17] Association of Environmental Professionals, 2015 CEQA Statute and Guidelines (2015) p.287.

[18] E.g., Pub. Resources Code § 21151.8(C)(3)(B)(iii) (requiring specific type of health risk analysis for siting schools).

determine whether a particular EIR is sufficient as an informational document. A court determining whether an EIR's discussion of human health impacts is legally sufficient does not constitute imposing a new substantive requirement.[19] Under Friant Ranch's theory, the above-referenced cases holding a CEQA analysis inadequate would have violated the law. This is not a reasonable interpretation.

IV. COURTS MUST SCRUPULOUSLY ENFORCE THE REQUIREMENTS THAT LEAD AGENCIES CONSULT WITH AND OBTAIN COMMENTS FROM AIR DISTRICTS

Courts must "scrupulously enforce" CEQA's legislatively mandated requirements. (*Vineyard Area Citizens, supra*, 40 Cal.4th 412, 435.) Case law has firmly established that lead agencies must consult with the relevant air pollution control district before conducting an initial study, and must provide the districts with notice of the intention to adopt a negative declaration (or EIR). (*Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 958.) As *Schenck* held, neither publishing the notice nor providing it to the State Clearinghouse was a sufficient substitute for sending notice directly to the air district. (*Id.*) Rather, courts "must be satisfied that [administrative] agencies have fully complied with the procedural requirements of CEQA, since only in this way can the important public purposes of CEQA be protected from subversion." *Schenck,* 198 Cal.App.4th at p. 959 (citations omitted).[20]

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[19] We submit that Public Resources Code Section 21083.1 was intended to prevent courts from, for example, holding that an agency must analyze economic impacts of a project where there are no resulting environmental impacts (see CEQA Guidelines § 15131) , or imposing new procedural requirements, such as imposing additional public notice requirements not set forth in CEQA or the Guidelines.

[20] Lead agencies must consult air districts, as public agencies with jurisdiction by law over resources affected by the project, *before* releasing an EIR. (Pub. Resources Code §§ 21104(a); 21153.) Moreover, air

Lead agencies should be aware, therefore, that failure to properly seek and consider input from the relevant air district constitutes legal error which may jeopardize their project approvals. For example, the court in *Fall River Wild Trout Foundation v. County of Shasta,* (1999) 70 Cal.App.4th 482, 492 held that the failure to give notice to a trustee agency (Department of Fish and Game) was prejudicial error requiring reversal. The court explained that the lack of notice prevented the Department from providing any response to the CEQA document. (*Id.* at p. 492.) It therefore prevented relevant information from being presented to the lead agency, which was prejudicial error because it precluded informed decision-making. (*Id.*)[21]

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districts should be considered "state agencies" for purposes of the requirement to consult with "trustee agencies" as set forth in Public Resources Code § 20180.3(a). This Court has long ago held that the districts are not mere "local agencies" whose regulations are superseded by those of a state agency regarding matters of statewide concern, but rather have concurrent jurisdiction over such issues. (*Orange County Air Pollution Control District v. Public Util. Com.* (1971) 4 Cal.3d 945, 951, 954.) Since air pollution is a matter of statewide concern, *Id* at 952, air districts should be entitled to trustee agency status in order to ensure that this vital concern is adequately protected during the CEQA process.

[21] In *Schenck,* the court concluded that failure to give notice to the air district was not prejudicial, but this was partly because the trial court had already corrected the error before the case arrived at the Court of Appeal. The trial court issued a writ of mandate requiring the lead agency to give notice to the air district. The air district responded by concurring with the lead agency that air impacts were not significant. (*Schenck,* 198 Cal.App.4th 949, 960.) We disagree with the *Schenck* court that the failure to give notice to the air district would not have been prejudicial (even in the absence of the trial court writ) merely because the lead agency purported to follow the air district's published CEQA guidelines for significance. (*Id.*, 198 Cal.App.4th at p. 960.) In the first place, absent notice to the air district, it is uncertain whether the lead agency properly followed those guidelines. Moreover, it is not realistic to expect that an air district's published guidelines would necessarily fully address all possible air-quality related issues that can arise with a CEQA project, or that those

Similarly, lead agencies must obtain additional information requested by expert agencies, including those with jurisdiction by law, if that information is necessary to determine a project's impacts. (*Sierra Club v. State Bd. Of Forestry* (1994) 7 Cal.4th 1215, 1236-37.) Approving a project without obtaining that information constitutes a failure to proceed in the manner prescribed by CEQA. (*Id.* at p. 1236.)

Moreover, a lead agency can save significant time and money by consulting with the air district early in the process. For example, the lead agency can learn what the air district recommends as an appropriate analysis on the facts of its case, including what kinds of health impacts analysis may be available, and what models are appropriate for use. This saves the lead agency from the need to do its analysis all over again and possibly needing to recirculate the document after errors are corrected, if new significant impacts are identified. (CEQA Guidelines § 15088.5(a).) At the same time, the air district's expert input can help the lead agency properly determine whether another commenter's request for additional analysis or studies is reasonable or feasible. Finally, the air district can provide input on what mitigation measures would be feasible and effective.

Therefore, we suggest that this Court provide guidance to lead agencies reminding them of the importance of consulting with the relevant air districts regarding these issues. Otherwise, their feasibility decisions may be vulnerable to air district evidence that establishes that there is no substantial evidence to support the lead agency decision not to provide specific analysis. (*See Berkeley Keep Jets Over the Bay, supra,* 91 Cal.App.4th 1344, 1369-1371.)

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guidelines would necessarily be continually modified to reflect new developments. Therefore we believe that, had the trial court not already ordered the lead agency to obtain the air district's views, the failure to give notice would have been prejudicial, as in *Fall River, supra,* 70 Cal.App.4th 482, 492.

CONCLUSION

The SCAQMD respectfully requests this Court *not* to establish a hard-and-fast rule concerning whether CEQA requires a lead agency to correlate identified air quality impacts of a project with resulting health outcomes. Moreover, the question of whether an EIR is "sufficient as an informational document" is a mixed question of fact and law containing two levels of inquiry. Whether a particular proposed analysis is feasible is predominantly a question of fact to be judged by the substantial evidence standard of review. Where the requested analysis is feasible, but the lead agency relies on legal or policy reasons not to provide it, the question of whether the EIR is nevertheless sufficient as an informational document is predominantly a question of law to be judged by the independent judgment standard of review.

Respectfully submitted,

DATED: April 3, 2015

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CERTIFICATE OF WORD COUNT

Pursuant to Rule 8.520(c)(1) of the California Rules of Court, I hereby certify that this brief contains 8,476 words, including footnotes, but excluding the Application, Table of Contents, Table of Authorities, Certificate of Service, this Certificate of Word Count, and signature blocks. I have relied on the word count of the Microsoft Word Vista program used to prepare this Certificate.

DATED: April 3, 2015 Respectfully submitted,

Barbara Baird

Barbara Baird

PROOF OF SERVICE

I am employed in the County of Los Angeles, California. I am over the age of 18 years and not a party to the within action. My business address is 21865 Copley Drive, Diamond Bar, California 91765.

On April 3, 2015 I served true copies of the following document(s) described as **APPLICATION OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT FOR LEAVE TO FILE BRIEF OF *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY AND *[PROPOSED]* BRIEF OF *AMICUS CURIAE*** by placing a true copy of the foregoing document(s) in a sealed envelope addressed as set forth on the attached service list as follows:

BY MAIL: I enclosed the document(s) in a sealed envelope or package addressed to the persons at the addresses listed in the Service List and placed the envelope for collection and mailing following our ordinary business practices. I am readily familiar with this District's practice for collection and processing of correspondence for mailing. Under that practice, the correspondence would be deposited with the United States Postal Service, with postage thereon fully prepaid at Diamond Bar, California, in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on April 3, 2015 at Diamond Bar, California.

Patricia Anderson

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7. Construction HRA and LSTs

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1. Construction Health Risk Assessment and Localized Significance Thresholds

1.1 INTRODUCTION

The Brea 265 Specific Plan (project project) is in the City of Brea and the City's sphere of influence (SOI) in northern Orange County. The project site encompasses 262.1 acres north of State Route 90 (SR-90) and east of SR-57. The 43-acre portion of the project site that is east of Rose Drive is in the incorporated City of Brea, and the remaining 219.1-acre portion of the project site is in the City's SOI, to be annexed into the City. The project site is bordered by Lambert Road/Carbon Canyon Road to the north, Rose Drive to the south, Carbon Canyon Regional Park to the east, and residential uses and Valencia Avenue to the west. The project site is bisected by Valencia Avenue, which runs in a north-south direction, and by Lambert Road, which runs in an east-west direction.

At buildout, the proposed project would provide up to 450 low-density units and 650 medium-density units—a total of 1,100 units. The proposed project also provides up to 15.1 acres of parks/recreations uses, 47.5 acres of open space, and 2.0 acres of rights-of-way. Overall, the proposed project would involve site preparation, grading, trenching, landscaping, building construction, architectural coating, and paving. Project construction would occur continuously over 3 development phases and is anticipated to take place from year 2023 to year 2030 (approximately 1,784 total workdays or 6.84 accumulated years). Activities related to required remediation actions would also occur during this period. The following provides the background methodology used for the construction health risk assessment (HRA) and localized significance thresholds (LST) for the proposed project.

The project site is generally bordered by residential uses to the west, north, and south with single family residences further to the east. Other nearby sensitive uses include Olinda Elementary School along East Birch Street adjacent to the southwest corner of the site's Phase 2 development area, and North Hills Preschool also along East Birch Street further to the southwest. Guidance from the California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment (OEHHA), and California Air Pollution Control Officers Association (CAPCOA) recommend the completion of health risk assessments to determine the impacts of hazardous air emissions upon sensitive receptors in the vicinity of the project. As a result, a site-specific construction HRA has been prepared for the proposed project. This HRA considers the health impact to nearby sensitive receptors (adults and children in the nearby residences, schools and preschools) of construction emissions at the project site from diesel equipment exhaust (diesel particulate matter or DPM). Furthermore, in accordance with South Coast Air Quality Management District (South Coast AQMD) methodology, because the proposed project would result in construction activities that generate onsite fugitive dust and exhaust emissions exceeding the PM_{10} and $PM_{2.5}$ screening-level

construction LSTs, dispersion modeling has been prepared to determine the concentration levels resulting from these construction activities (South Coast AQMD 2008).

1.2 METHODOLOGY AND SIGNIFICANCE THRESHOLDS

1.2.1 Construction HRA

For this HRA, the South Coast AQMD significance thresholds were deemed to be appropriate and the thresholds that were used for this project are shown below:

- Excess cancer risk of more than 10 in a million
- Non-cancer hazard index (chronic or acute) greater than 1.0

The methodology used in this HRA is consistent with the following OEHHA guidance documents:

- OEHHA. 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments.* February, 2015.

Potential exposures to DPM from project construction was evaluated for off-site sensitive receptors in close proximity to the site. Pollutant concentrations were estimated using an air dispersion model, and excess lifetime cancer risks and chronic non-cancer hazard indexes were calculated. These risks were then compared to the significance thresholds adopted for this HRA.

It should be noted that these health impacts are based on conservative (i.e., health protective) assumptions. The United States Environmental Protection Agency (USEPA 2005) and the Office of Environmental Health Hazard Assessment (OEHHA 2015) note that conservative assumptions used in a risk assessment are intended to ensure that the estimated risks do not underestimate the actual risks. Therefore, the estimated risks may not necessarily represent actual risks experienced by populations at or near a site. The use of conservative assumptions tends to produce upper-bound estimates of exposure and thus risk.

For residential-based receptors, the following conservative assumptions were used:

- It was assumed that maximum-exposed off-site residential receptors (both children and adults) stood outdoors and are subject to DPM at their residence for 8 hours per day, and approximately 260 construction days per year. In reality, California residents typically will spend on average 2 hours per day outdoors at their residences (USEPA 2011). This would result in lower exposures to construction related DPM emissions and lower estimated risk values.

- The calculated risk for infants from third trimester to age 2 is multiplied by a factor of 10 and children ages 2 to 16 is multiplied by a factor of 3 to account for early life exposure and uncertainty in child versus adult exposure impacts (OEHHA 2015).

For school-based receptors, the following conservative assumptions were used:

- It was assumed that maximum-exposed student receptors (Olinda Elementary School at 3145 E Birch Street, offering preschool through 6th grade) stood outdoors and are subject to DPM for 8 hours per day,

and approximately 180 school days per year. Additionally, it was assumed that the maximum-exposed North Hills Preschool (at 3100 E Birch Street, offering programs for children from 6 weeks to 5 years of age) stood outdoors and are subject to DPM for 8 hours per day, and approximately 250 school days per year. In reality, students and preschool children are exposed to outdoor pollutant concentration levels for a portion of the day and are exposed to reduced indoor pollutant concentrations for the remaining hours. This would result in lower estimated risk values.

- The calculated risk for students in the 0- to 2-year-old age bin is multiplied by a factor of 10 and those in the 2- to 16-year-old age bin is multiplied by a factor of 3 to account for early life exposure and uncertainty in child versus adult exposure impacts (OEHHA 2015).

1.2.2 Localized Significance Thresholds

The South Coast AQMD identifies localized significance thresholds, shown in Table 1 for PM_{10} and $PM_{2.5}$. Emissions of PM_{10} and $PM_{2.5}$ generated at a project site (offsite mobile-source emissions are not included in the LST analysis) could expose sensitive receptors to substantial concentrations of criteria air pollutants. A project that generates emissions that trigger a violation of the ambient air quality standards when added to the local background concentrations would generate a significant impact.

TABLE 1. SOUTH COAST AQMD LOCALIZED SIGNIFICANCE THRESHOLDS

Air Pollutant (Relevant AAQS)	Concentration
24-Hour PM_{10} Standard – Construction (South Coast AQMD)[1]	10.4 µg/m^3
24-Hour $PM_{2.5}$ Standard – Construction (South Coast AQMD)[1]	10.4 µg/m^3
24-Hour PM_{10} Standard – Operation (South Coast AQMD)[1]	2.5 µg/m^3
24-Hour $PM_{2.5}$ Standard – Operation (South Coast AQMD)[1]	2.5 µg/m^3
Annual Average PM_{10} Standard (South Coast AQMD)[1]	1.0 µg/m^3

Source: South Coast AQMD 2019
Note: ppm – parts per million; µg/m^3 – micrograms per cubic meter
1 Threshold is based on South Coast AQMD Rule 403. Since the South Coast Air Basin is in nonattainment for PM_{10} and $PM_{2.5}$, the threshold is established as an allowable change in concentration. Therefore, background concentration is irrelevant.

1.3 CONSTRUCTION EMISSIONS

Construction emissions were calculated as average daily emissions in pounds per day, using the proposed construction schedule and CalEEMod Version 2020.4.0 (CAPCOA 2021). Construction modeling considered year 2023 for remediation area west of Valencia Avenue, years 2023-2025 for Phase 1 construction activities, year 2024 for the remediation area east of Valencia Avenue, years 2024-2027 for Phase 2, and years 2026-2030 for Phase 3. DPM emissions were based on the CalEEMod construction runs, using annual exhaust PM_{10} construction emissions presented in pounds (lbs) per day.

The project was assumed to have a cumulative duration of 1,784 workdays from August 2023 through May 2030. The average daily emission rates from construction equipment used during the proposed project were determined by dividing the annual average emissions for each construction year by the number of construction days per year for each calendar year of construction (i.e., years 2023 to 2030). The off-site

hauling emission rates were adjusted to evaluate localized emissions from the 3.6-mile haul route within 1,000 feet of the project site. The CalEEMod construction emissions output and emission rate calculations are provided in Appendix A of the HRA.

1.4 DISPERSION MODELING

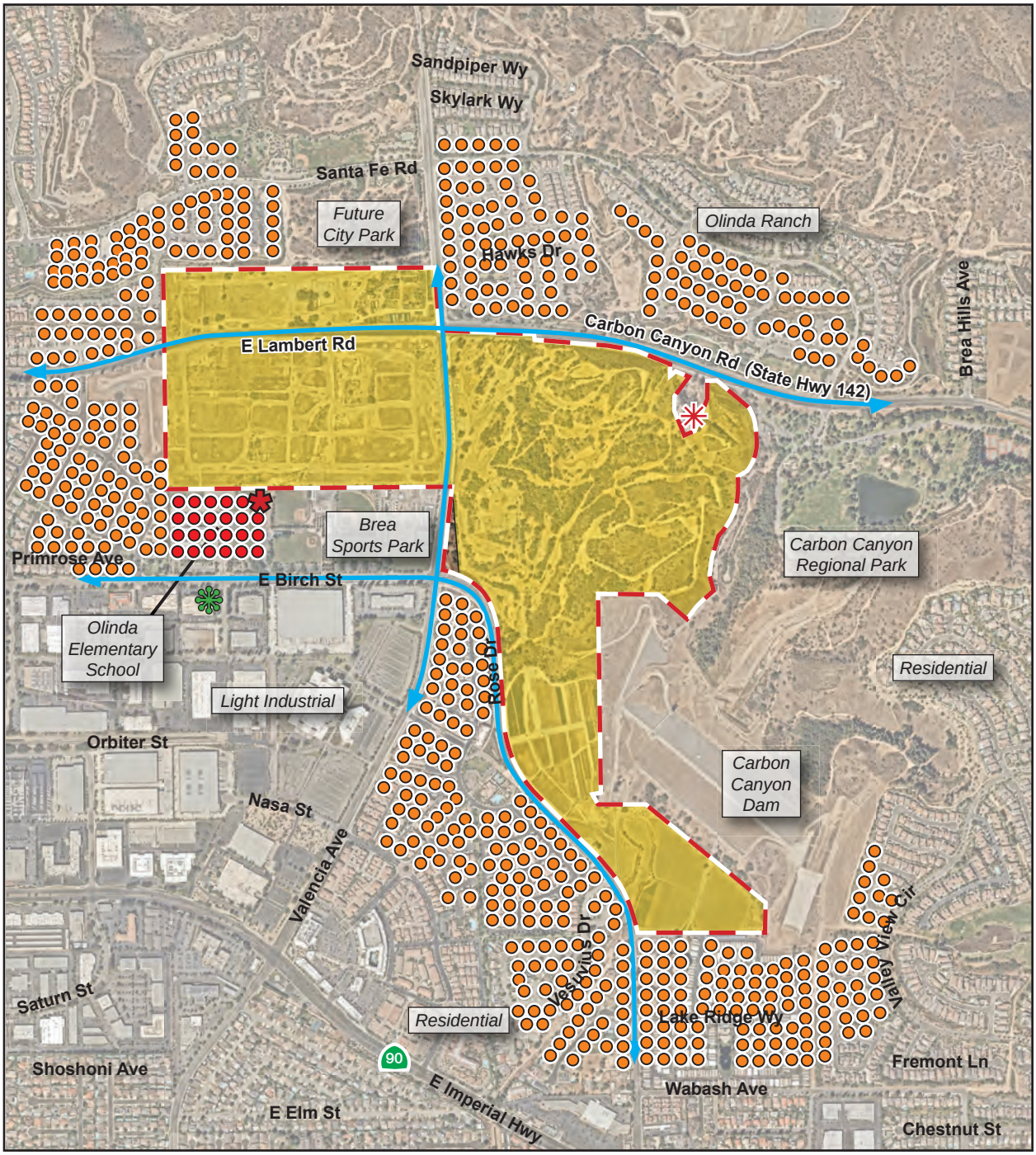
Air quality modeling was performed using the AERMOD atmospheric dispersion model to assess the impact of emitted compounds on sensitive receptors near the project. The model is a steady state Gaussian plume model and is an approved model by South Coast AQMD for estimating ground level impacts from point and fugitive sources in simple and complex terrain. The on-site construction emissions for the project were modeled as poly-area sources. The off-site mobile sources were modeled as adjacent line volume sources. The model requires additional input parameters, including chemical emission data and local meteorology. Inputs for the construction emission rates are those described in Section 1.3. Meteorological data obtained from the South Coast AQMD for the nearest representative meteorological station (Fullerton Airport) with the five latest available years (2012 to 2016) of record were used to represent local weather conditions and prevailing winds (South Coast AQMD 2022). The prevailing wind direction at the Fullerton Airport meteorological station is to the north-northeast, and the wind rose is provided in Appendix B.

The modeling analysis also considered the spatial distribution and elevation of each emitting source in relation to the sensitive receptors. To accommodate the model's Cartesian grid format, direction-dependent calculations were obtained by identifying the Universal Transverse Mercator (UTM) coordinates for each source location. In addition, national elevation dataset (NED) data for the area were obtained and included in the model runs to account for complex terrain. An emission release height of 4.15 meters was used as representative of the stack exhaust height for off-road construction equipment and diesel truck traffic, and an initial vertical dispersion parameter of 1.93 m was used, per California Air Resources Board (CARB) guidance (CARB 2000).

To determine contaminant impacts during construction hours, the model's Hour-By-Day-of-Week (HRDOW) scalar option was invoked to predict ground level concentrations for construction emissions generated from Monday through Friday between the hours of 7:00 AM and 4:00 PM with a 1-hour lunch break.

A unit emission rate of 1 gram per second was used for all modeling runs. The unit emission rates were proportioned over the poly-area sources for on-site construction emissions and divided between the volume sources for off-site hauling emissions. The maximum modeled concentrations from the output files were then multiplied by the emission rates calculated in Appendix A to obtain the maximum flagpole-level concentrations at the off-site maximum exposed individual resident (MEIR). As shown in Figure 1, the MEIR is the single-family residence south of State Route 142 in the pocket of land near the northeast portion of the Phase 3 development area. The maximum exposed receptor (MER) for the Olinda Elementary School,

Figure 1 - Project Sources and Off-Site Receptor Locations



Chaffey College - Rancho Cucamonga Campus
Maximum Exposed School Receptor - Olinda ES
Maximum Exposed School Receptor - North Hills Preschool
Maximum Exposed Individual Receptor - Residential
Development Area
Receptors - Olinda Elementary School
Receptors - Residential
Construction Truck Route

0 750
Scale (Feet)

Source: Nearmap, 2022

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which is situated along East Birch Street next to the southwest corner of the Phase 2 development area of the Specific Plan, lies within the northeastern portion of the school campus.[1] Furthermore, the overall MEIR and maximum exposed Olinda Elementary School receptor are based on the MEIR and maximum exposed school receptor determined for the all-phase source group, which assumes concurrent active construction activities for the entire project plan area.

The air dispersion model output for the emission sources is presented in Appendix B. The DPM concentrations at the MEIR, the MER at Olinda Elementary School, and at North Hills Preschool are provided in Appendix C.

1.5 RISK CHARACTERIZATION

1.5.1 Carcinogenic Chemical Risk

Carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Therefore, any exposure will have some associated risk. The South Coast AQMD has established a maximum incremental cancer risk of 10 in a million (1×10^{-5} or 10×10^{-6}) for CEQA projects and the OEHHA also sets a typical risk management level as 10 in a million (OEHHA 2015).

Health risks associated with exposure to carcinogenic compounds can be defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. The cancer risk probability is determined by multiplying the chemical's annual concentration by its cancer potency factor (CPF), a measure of the carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It is an upper-limit estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu g/m^3$), averaged over a lifetime of 70 years.

Recent guidance from OEHHA recommends a refinement to the standard point estimate approach with the use of age-specific breathing rates and age sensitivity factors (ASFs) to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor in units of inverse dose expressed in milligrams per kilogram per day $(mg/kg/day)^{-1}$ to derive the cancer risk estimate. Therefore, the following dose algorithm was used to accommodate the unique exposures associated with each receptor type.

$$\text{Dose}_{\text{AIR,per age group}} = \left(C_{\text{air}} \times \text{EF} \times \left[\frac{\text{BR}}{\text{BW}}\right] \times \text{A} \times \text{CF}\right)$$

[1] The maximum exposed receptor location (MEIR or MER school receptors) is the receptor location associated with the maximum AERMOD predicted DPM concentrations from the on-site emission source because the calculated on-site emission rates are approximately two to three orders of magnitude higher than the calculated off-site emission rates (see Appendix A). Therefore, the maximum concentrations associated with the on-site emission sources produce the highest overall ground-level maximum exposed receptor concentrations and, consequently, highest calculated health risks.

Where:

$Dose_{AIR}$	=	dose by inhalation (mg/kg-day), per age group
C_{air}	=	concentration of contaminant in air (µg/m^3)
EF	=	exposure frequency (number of days/365 days)
BR/BW	=	daily breathing rate normalized to body weight (L/kg-day)
A	=	inhalation absorption factor (default = 1)
CF	=	conversion factor (1x10^{-6}, µg to mg, L to m^3)

The inhalation absorption factor (A) is a unitless factor that is only used if the cancer potency factor included a correction for absorption across the lung. The default value of 1 was used for this assessment. For residential receptors, the exposure frequency (EF) of 0.96 is used to represent 350 days per year to allow for a two-week period away from home each year (OEHHA 2015). For Olinda Elementary School, an EF of 0.49 is used to represent the traditional school calendar of 180 days per year (OEHHA, 2004). An EF of 0.68 is used for North Hills Preschool to represent worker/daycare calendar of 250 days per year (OEHHA 2015).

For construction analysis, the residential exposure duration spans the length of construction (e.g., 1,784 workdays over a 6.84-year span). The 95th percentile daily breathing rates (BR/BW), exposure duration (ED), age sensitivity factors (ASFs), and fraction of time at home (FAH) for the various age groups are provided herein:

Age Groups	BR/BW (L/kg-day)	ED	ASF	FAH
Third trimester	361	0.25	10	0.85
0-2 age group	1,090	2.00	10	0.85
2-9 age group	861	4.59	3	0.72

For Olinda Elementary School students, the 95th percentile 8-hour breathing rates (moderate intensity activity), ED of 6.84 years (preschool through 6th grade, assuming 6th graders complete the academic year by June), and ASF, for the 2- to 16-year-old age group is provided below:

Age Groups	BR/BW (L/kg-day)	ED, 6.84 years	ASF
2-16 age group	520	6.84	3

For the North Hills Preschool students, the 95th percentile 8-hour breathing rates (moderate intensity activity), ED of 6.84 years (6 weeks to 5 years old), and ASF, for the 0- to 2-year-old age group and 2- to 16-year-old age group is provided below:

Age Groups	BR/BW (L/kg-day)	ED, 6.84 years	ASF
0-2 age group	1,200	2.00	10
2-16 age group	520	4.84	3

To calculate the overall cancer risk, the risk for each appropriate age group is calculated per the following equation:

$$\text{Cancer Risk}_{\text{AIR}} = \text{Dose}_{\text{AIR}} \times \text{CPF} \times \text{ASF} \times \text{FAH} \times \frac{\text{ED}}{AT}$$

Where:

Dose_{AIR}	=	dose by inhalation (mg/kg-day), per age group
CPF	=	cancer potency factor, chemical-specific $(\text{mg/kg-day})^{-1}$
ASF	=	age sensitivity factor, per age group
FAH	=	fraction of time at home, per age group (for residential receptors only)
ED	=	exposure duration (years)
AT	=	averaging time period over which exposure duration is averaged (70 years)

The CPFs used in the assessment were obtained from OEHHA guidance. The excess lifetime cancer risks during the construction period to the maximally exposed resident were calculated based on the factors provided above. The cancer risks for each age group are summed to estimate the total cancer risk for each toxic chemical species. The final step converts the cancer risk in scientific notation to a whole number that expresses the cancer risk in "chances per million" by multiplying the cancer risk by a factor of $1x10^6$ (i.e., 1 million).

The calculated results are provided in Appendix C.

1.5.2 Non-Carcinogenic Hazards

An evaluation was also conducted of the potential non-cancer effects of chronic chemical exposures. Adverse health effects are evaluated by comparing the annual receptor level concentration of each chemical compound with the appropriate reference exposure limit (REL). Available RELs promulgated by OEHHA were considered in the assessment.

The hazard index approach was used to quantify non-carcinogenic impacts. The hazard index assumes that chronic sub-threshold exposures adversely affect a specific organ or organ system (toxicological endpoint). Target organs presented in regulatory guidance were used for each discrete chemical exposure. To calculate the hazard index, each chemical concentration or dose is divided by the appropriate toxicity value. This ratio is summed for compounds affecting the same toxicological endpoint. A health hazard is presumed to exist where the total equals or exceeds one.

The chronic hazard analysis for DPM is provided in Appendix C. The calculations contain the relevant exposure concentrations and corresponding reference dose values used in the evaluation of non-carcinogenic exposures.

1.6 LOCALIZED SIGNIFICANCE THRESHOLDS

To calculate the concentration level generated by construction activity, the maximum modeled concentrations from the dispersion modeling output files were multiplied by the emission rates determined for the on-site construction activities determined to exceed the screening-level localized significance thresholds, to obtain the

maximum flagpole-level concentrations at the annual and 24-hour off-site MEIRs, Olinda Elementary School MER, and North Hills Preschool MER. The LST calculations are provided in Appendix D.

1.7 RESULTS

1.7.1 Construction HRA

The calculated results are provided in Appendix C and the results are summarized in Table 2.

TABLE 2. CONSTRUCTION RISK SUMMARY - UNMITIGATED

Receptor	Cancer Risk (per million)	Chronic Hazards
Maximum Exposed Individual Resident (MEIR)	**15.1**	0.053
Maximum Exposed School Receptor – Olinda Elementary School	1.0	0.020
Maximum Exposed Preschool Receptor – North Hills Preschool	1.1	0.004
South Coast AQMD Threshold	10	1.0
Exceeds Threshold?	**Yes**	**No**

Note: Cancer risk calculated using 2015 OEHHA HRA guidance.

Cancer risk for the MEIR from project-related construction activities was calculated to be 15.1 in a million and would exceed the 10 in a million-significance threshold. Cancer risk for students at Olinda Elementary School and North Hills Preschool is 1.0 per million and 1.1 per million, respectively, and would not exceed 10 per million. For non-carcinogenic effects, the hazard index identified for each toxicological endpoint totaled less than one for the MEIR, the maximum exposed school receptor, and the maximum exposed preschool receptor. Therefore, chronic non-carcinogenic hazards are less than significant. However, because the cancer risk for the MEIR would exceed the 10 per million threshold, project-related construction activities would result in potentially significant health risk impacts.

Because cancer risk for the MEIR would exceed South Coast AQMD significance threshold due to construction activities associated with the proposed project, the following mitigation measure is proposed:

> **Mitigation Measure AQ-1:** Construction and remediation contractors shall, at minimum, use equipment that meets the United States Environmental Protection Agency's (EPA) Tier 4 Interim emissions standards for off-road diesel-powered construction equipment with more than 50 horsepower for the following activities, unless it can be demonstrated to the City of Brea Building and Safety Division that such equipment is not available:
>
> - Remediation phase ground disturbing activities (e.g., site preparation, grading, and trenching)
> - Phase 1 ground disturbing activities (e.g., site preparation, grading, and trenching)
> - Phase 1 building/structure construction

- Phase 2 ground disturbing activities (e.g., site preparation, grading, and trenching)

Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by Tier 4 Interim emissions standards for a similarly sized engine, as defined by the California Air Resources Board's regulations.

Prior to construction, the project engineer shall ensure that all construction (e.g., grading) plans clearly show the requirement for EPA Tier 4 Interim emissions standards for construction equipment over 50 horsepower for the specific activities stated above. During construction, the construction contractor shall maintain a list of all operating equipment in use on the construction site for verification by the City of Brea. The construction equipment list shall state the makes, models, Equipment Identification Numbers, Engine Family Numbers, and number of construction equipment onsite. Equipment shall be properly serviced and maintained in accordance with the manufacturer's recommendations. Construction contractors shall also ensure that all nonessential idling of construction equipment is restricted to 5 minutes or less in compliance with Section 2449 of the California Code of Regulations, Title 13, Article 4.8, Chapter 9.

Mitigation Measure AQ-1 would reduce the project's localized construction emissions, as shown in Table 3. The results indicate that, with mitigation, cancer risk at the MEIR would be reduced to 6.6 in a million and be less than the South Coast AQMD's significance threshold. Therefore, the project would not expose off-site sensitive receptors to substantial concentrations of toxic air contaminant emissions during construction and impacts would be *less than significant* with mitigation.

TABLE 3. CONSTRUCTION RISK SUMMARY - MITIGATED

Receptor	Cancer Risk (per million)	Chronic Hazards
Maximum Exposed Individual Resident (MEIR)	6.6	0.039
South Coast AQMD Threshold	10	1.0
Exceeds Threshold?	**No**	**No**

Note: Cancer risk calculated using 2015 OEHHA HRA guidance.

1.7.2 Construction LSTs

Table 4 shows the concentration levels determined with dispersion modeling for the project-related construction activities that would generate mass emissions exceeding the screening-level LSTs. As shown in the table, the mass emissions generated by these construction activities would not result in concentration levels exceeding the LSTs. Therefore, project-related construction activities would generate *less than significant* localized impacts as it pertains to criteria air pollutants and no mitigation is required.

TABLE 4. CONSTRUCTION LST SUMMARY

Construction Scenario	24-Hour Concentration		Annual Average Concentration
	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
Maximum Exposed Individual Resident (MEIR)[1]			
Western Remediation Site Preparation – Year 2023	1.5	0.8	0.04
Phase 1 Site Preparation – Year 2023	1.5	0.8	0.04
Phase 2 Site Preparation – Year 2024	1.6	0.9	0.4
Phase 2 Site Preparation – Year 2025	1.4	0.8	0.04
Phase 1 Building Construction, Phase 2 Site Preparation, & Eastern Remediation Site Preparation – Year 2024	3.2	1.9	0.8
Phase 1 Building Construction, Phase 2 Site Preparation, & Eastern Remediation Grading – Year 2024	2.5	1.4	0.7
Phase 2 Building Construction, Phase 2 Architectural Coating, Phase 3 Rough Grading, Phase 3 Utility Trenching, & Phase 3 Fine Grading – Year 2027	0.2	0.1	0.4
Maximum Exposed School Receptor – Olinda Elementary School			
Western Remediation Site Preparation – Year 2023	0.9	0.5	0.1
Phase 1 Site Preparation – Year 2023	0.9	0.5	0.1
Phase 2 Site Preparation – Year 2024	0.9	0.5	0.1
Phase 2 Site Preparation – Year 2025	0.9	0.5	0.1
Phase 1 Building Construction, Phase 2 Site Preparation, & Eastern Remediation Site Preparation – Year 2024	1.9	1.1	0.3
Phase 1 Building Construction, Phase 2 Site Preparation, & Eastern Remediation Grading – Year 2024	1.5	0.9	0.2
Phase 2 Building Construction, Phase 2 Architectural Coating, Phase 3 Rough Grading, Phase 3 Utility Trenching, & Phase 3 Fine Grading – Year 2027	1.1	0.6	0.1
Maximum Exposed Daycare Receptor – North Hills Preschool			
Western Remediation Site Preparation – Year 2023	0.3	0.2	0.02
Phase 1 Site Preparation – Year 2023	0.3	0.2	0.02
Phase 2 Site Preparation – Year 2024	0.4	0.2	0.03
Phase 2 Site Preparation – Year 2025	0.3	0.2	0.02
Phase 1 Building Construction, Phase 2 Site Preparation, & Eastern Remediation Site Preparation – Year 2024	0.7	0.4	0.1
Phase 1 Building Construction, Phase 2 Site Preparation, & Eastern Remediation Grading – Year 2024	0.6	0.3	0.05
Phase 2 Building Construction, Phase 2 Architectural Coating, Phase 3 Rough Grading, Phase 3 Utility Trenching, & Phase 3 Fine Grading – Year 2027	0.4	0.2	0.1
South Coast AQMD LSTs	10.4	10.4	1.0
Exceeds Threshold?	**No**	**No**	**No**

Notes:
1 The MEIR under the 24-hour standard, is the mobile home in the southeast corner of Lake Glen Drive and Lake Tree Drive and different from the MEIR under the annual standard shown in Figure 1.

2. References

California Air Pollution Control Officers Association (CAPCOA). 2021. California Emissions Estimator Model (CalEEMod). Version 2020.4. Prepared by: ENVIRON International Corporation and the California Air Districts.

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Appendix A. Emission Rate Calculations

Average Daily Emissions and Emission Rates: Unmitigated

Onsite Construction PM10 Exhaust Emissions[1]

Phases	Year	Annual PM10 Exhaust Emissions (Tons/Year)	Annual PM10 Exhaust Emissions (lbs/Year)	# of Construction Days/Year	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/hr)	Emission Rate (g/s)	# of Total Workdays/ Year	Construction Duration (Yr)[2]
WM & P1	2023	0.0947	189.42	109	1.74	2.17E-01	2.74E-02	260	0.42
P1, EM, & P2	2024	0.2180	435.92	262	1.66	2.08E-01	2.62E-02	262	1.00
P1&P2	2025	0.2318	463.66	261	1.78	2.22E-01	2.80E-02	261	1.00
P2&P3	2026	0.1449	289.72	261	1.11	1.39E-01	1.75E-02	261	1.00
P2&P3	2027	0.2628	525.68	261	2.01	2.52E-01	3.17E-02	261	1.00
P3	2028	0.0992	198.40	260	0.76	9.54E-02	1.20E-02	260	1.00
P3	2029	0.0698	139.50	261	0.53	6.68E-02	8.42E-03	261	1.00
P3	2030	0.0092	18.36	109	0.17	2.11E-02	2.65E-03	261	0.42
				1,784					**6.84**

Offsite Construction PM10 Exhaust Emissions[1]

Year	Annual PM10 Exhaust Emissions (Tons/Year)	Annual PM10 Exhaust Emissions (lbs/Year)	# of Construction Days/Year	Average Daily Emissions (lbs/day)	Hauling Emissions w/in 1,000 ft (lbs/day)[3]	Emission Rate (lbs/hr)	Emission Rate (g/s)
2023	0.0035	7.00	109	6.42E-02	5.38E-03	6.72E-04	8.47E-05
2024	0.0057	11.42	262	4.36E-02	9.37E-03	1.17E-03	1.48E-04
2025	0.0024	4.76	261	1.82E-02	9.52E-03	1.19E-03	1.50E-04
2026	0.0090	18.00	261	6.90E-02	3.60E-02	4.50E-03	5.67E-04
2027	0.0061	12.10	261	4.64E-02	2.42E-02	3.03E-03	3.81E-04
2028	0.0006	1.24	260	4.77E-03	2.49E-03	3.11E-04	3.92E-05
2029	0.0006	1.22	261	4.67E-03	2.44E-03	3.05E-04	3.84E-05
2030	0.0003	0.52	109	4.77E-03	2.49E-03	3.11E-04	3.92E-05

Note: Emissions evenly distributed over 246 modeled volume sources.

	2023	2024	2025	2026	2027	2028	2029	2030
Total Haul Trips	2,270	2,187	0	0	0	0	0	0
Total Vendor Trips	2,009	12,907	12,928	47,304	31,504	3,736	3,654	1,526
Total Trips	4,279	15,094	12,928	47,304	31,504	3,736	3,654	1,526
Average Distance Per Haul Trip (mile/trip)	75	75						
Average Distance Per Vendor Trip (mile/trip)	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Total Haul Trip Miles	170,250.0	164,025.0						
Total Vendor Trip Miles	13,864	89,056	89,203	326,398	217,378	25,778	25,213	10,529
Total Haul and Vendor Trip Miles	184,114	253,081	89,203	326,398	217,378	25,778	25,213	10,529
Haul Length within 1,000 ft of Site (mile)[4]	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Total Miles Traveled within 1,000 ft of Site	15,420	54,389	46,585	170,455	113,521	13,462	13,167	5,499
Hours per work day (7:00 AM to 4:00 PM, 1-hour of breaks)[5]	8	8	8	8	8	8	8	8

[1] DPM emissions taken as PM_{10} exhaust emissions from CalEEMod annual emissions.

[2] Construction durations determined for each year to adjust receptor exposures to the exposure durations for each construction year (see App C - Risk Calculations).

[3] Offsite trip length is based on the CalEEMod default vendor trip length of 6.9 miles per trip for Phases 1 through 3. The Western Remediation and Eastern Remediation haul length of 75 miles per trip is based on the haul truck distance between the project site and and the assumed receiving facility at 12328 Hibiscus Road, Adelanto, CA 92301.

[4] Emissions from CalEEMod offsite average daily emissions, which is based on proportioned haul truck trip distances, are adjusted to evaluate emissions from the **3.60-**mile route within 1,000 of the project site.

[5] Work hours applied in By Hour/Day (HRDOW) variable emissions module in air dispersion model (see App B - Air Dispersion Model Output Files).

Annual Construction Emissions

Western Remediation Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
Fugitive Dust		0	0.0252	1.30E-02	0	1.30E-02
Off-Road		3.80E-03	3.80E-03		3.49E-03	3.49E-03
Total		**3.80E-03**	**2.90E-02**	**1.30E-02**	**3.49E-03**	**1.65E-02**
Offsite						
Hauling		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vendor		1.00E-05	2.90E-04	8.00E-05	1.00E-05	9.00E-05
Worker		0.00E+00	5.50E-04	1.50E-04	0.00E+00	1.50E-04
Total		**1.00E-05**	**8.40E-04**	**2.30E-04**	**1.00E-05**	**2.40E-04**
TOTAL		***0.0038***	***0.0298***	***0.0132***	***0.0035***	***0.0167***

Western Remediation Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
Fugitive Dust		0	0.0339	1.33E-02	0	1.33E-02
Off-Road		1.21E-02	1.21E-02		1.11E-02	1.11E-02
Total		**1.21E-02**	**4.60E-02**	**1.33E-02**	**1.11E-02**	**2.45E-02**
Offsite						
Hauling		3.24E-03	7.13E-02	1.88E-02	3.10E-03	2.19E-02
Vendor		5.00E-05	1.65E-03	4.70E-04	5.00E-05	5.10E-04
Worker		1.00E-05	1.73E-03	4.60E-04	1.00E-05	4.70E-04
Total		**3.30E-03**	**7.47E-02**	**1.97E-02**	**3.16E-03**	**2.29E-02**
TOTAL		***0.0154***	***0.1207***	***0.0330***	***0.0143***	***0.0474***

Phase 1 Site Preparation

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2023**					
	Fugitive Dust		0	0.1933	9.93E-02	0	9.93E-02
	Off-Road		2.91E-02	2.91E-02		2.68E-02	2.68E-02
	Total		**2.91E-02**	**2.22E-01**	**9.93E-02**	**2.68E-02**	**1.26E-01**
Offsite							
	Hauling		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Vendor		3.00E-05	1.12E-03	3.20E-04	3.00E-05	3.50E-04
	Worker		2.00E-05	4.21E-03	1.12E-03	2.00E-05	1.14E-03
	Total		**5.00E-05**	**5.33E-03**	**1.44E-03**	**5.00E-05**	**1.49E-03**
TOTAL			***0.0292***	***0.2277***	***0.1007***	***0.0269***	***0.1276***

Phase 1 Rough Grading

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2023**					
	Fugitive Dust		0	0.143	5.13E-02	0	5.13E-02
	Off-Road		4.49E-02	4.49E-02		4.13E-02	4.13E-02
	Total		**4.49E-02**	**1.88E-01**	**5.13E-02**	**4.13E-02**	**9.25E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		9.00E-05	3.06E-03	8.70E-04	9.00E-05	9.50E-04
	Worker		4.00E-05	6.41E-03	1.70E-03	3.00E-05	1.74E-03
	Total		**1.30E-04**	**9.47E-03**	**2.57E-03**	**1.20E-04**	**2.69E-03**
TOTAL			***0.0450***	***0.1974***	***0.0539***	***0.0414***	***0.0952***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Fugitive Dust		0	0.0979	2.65E-02	0	2.65E-02
	Off-Road		1.87E-02	1.87E-02		1.72E-02	1.72E-02
	Total		**1.87E-02**	**1.17E-01**	**0.0265**	**1.72E-02**	**4.37E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		4.00E-05	1.36E-03	3.80E-04	4.00E-05	4.30E-04
	Worker		2.00E-05	2.85E-03	7.60E-04	1.00E-05	7.70E-04
	Total		**6.00E-05**	**4.21E-03**	**1.14E-03**	**5.00E-05**	**1.20E-03**
TOTAL			***0.0188***	***0.1208***	***0.0276***	***0.0173***	***0.0449***

Phase 1 Utility Trenching							
			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2023**					
	Off-Road		4.81E-03	4.81E-03		4.42E-03	4.42E-03
	Total		**4.81E-03**	**4.81E-03**		**4.42E-03**	**4.42E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	1.22E-03	3.20E-04	1.00E-05	3.30E-04
	Total		**1.00E-05**	**1.22E-03**	**3.20E-04**	**1.00E-05**	**3.30E-04**
TOTAL			***0.0048***	***0.0060***	***0.0003***	***0.0044***	***0.0048***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Off-Road		7.66E-03	7.66E-03		7.05E-03	7.05E-03
	Total		**7.66E-03**	**7.66E-03**		**7.05E-03**	**7.05E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	2.04E-03	5.40E-04	1.00E-05	5.50E-04
	Total		**1.00E-05**	**2.04E-03**	**5.40E-04**	**1.00E-05**	**5.50E-04**
TOTAL			***0.0077***	***0.0097***	***0.0005***	***0.0071***	***0.0076***

Phase 1 Fine Grading							
			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Fugitive Dust		0	0.1771	7.03E-02	0	7.03E-02
	Off-Road		6.01E-02	6.01E-02		5.53E-02	5.53E-02
	Total		**6.01E-02**	**2.37E-01**	**7.03E-02**	**5.53E-02**	**1.26E-01**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		1.40E-04	4.38E-03	1.24E-03	1.30E-04	1.37E-03
	Worker		5.00E-05	9.16E-03	2.43E-03	5.00E-05	2.48E-03
	Total		**1.90E-04**	**1.35E-02**	**3.67E-03**	**1.80E-04**	**3.85E-03**
TOTAL			***0.0603***	***0.2506***	***0.0740***	***0.0555***	***0.1295***

Phase 1 - Paving

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Off-Road		2.16E-02	2.16E-02		1.98E-02	1.98E-02
Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Total		**2.16E-02**	**2.16E-02**		**1.98E-02**	**1.98E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0	0	0.00E+00	0
Worker		4.00E-05	7.02E-03	1.87E-03	3.00E-05	1.90E-03
Total		**4.00E-05**	**7.02E-03**	**1.87E-03**	**3.00E-05**	**1.90E-03**
TOTAL		***0.0216***	***0.0286***	***0.0019***	***0.0198***	***0.0217***

Phase 1 Finishing/Landscaping

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Off-Road		3.01E-03	3.01E-03		2.77E-03	2.77E-03
Total		**3.01E-03**	**3.01E-03**		**2.77E-03**	**2.77E-03**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Worker		1.00E-05	1.39E-03	3.70E-04	1.00E-05	3.80E-04
Total		**1.00E-05**	**1.39E-03**	**3.70E-04**	**1.00E-05**	**3.80E-04**
TOTAL		***0.0030***	***0.0044***	***0.0004***	***0.0028***	***0.0032***

Phase 1 - Building Construction

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Off-Road		5.12E-02	5.12E-02		4.82E-02	4.82E-02
Total		**5.12E-02**	**5.12E-02**		**4.82E-02**	**4.82E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		9.40E-04	3.05E-02	8.61E-03	9.00E-04	9.51E-03
Worker		1.07E-03	0.2005	5.33E-02	9.90E-04	5.43E-02
Total		**2.01E-03**	**0.231**	**6.19E-02**	**1.89E-03**	**6.38E-02**
TOTAL		***0.0532***	***0.2822***	***0.0619***	***0.0501***	***0.1120***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Off-Road		2.85E-02	2.85E-02		2.68E-02	2.68E-02
Total		**2.85E-02**	**2.85E-02**		**2.68E-02**	**2.68E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		6.10E-04	1.97E-02	5.57E-03	5.90E-04	6.16E-03
Worker		6.60E-04	0.1297	3.45E-02	6.10E-04	3.51E-02
Total		**1.27E-03**	**0.1494**	**4.00E-02**	**1.20E-03**	**4.12E-02**
TOTAL		***0.0298***	***0.1779***	***0.0400***	***0.0280***	***0.0680***

Phase 1 - Architectural Coating						
		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Archit. Coating		0	0		0	0
Off-Road		2.32E-03	2.32E-03		2.32E-03	2.32E-03
Total		**2.32E-03**	**2.32E-03**		**2.32E-03**	**2.32E-03**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0	0	0.00E+00	0
Worker		1.10E-04	2.15E-02	5.72E-03	1.00E-04	5.82E-03
Total		**1.10E-04**	**2.15E-02**	**5.72E-03**	**1.00E-04**	**5.82E-03**
TOTAL		***0.0024***	***0.0238***	***0.0057***	***0.0024***	***0.0081***

Eastern Remediation Site Preparation						
		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Fugitive Dust		0	0.0252	1.30E-02	0	1.30E-02
Off-Road		3.69E-03	3.69E-03		3.39E-03	3.39E-03
Total		**3.69E-03**	**2.89E-02**	**1.30E-02**	**3.39E-03**	**1.64E-02**
Offsite						
Hauling		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vendor		2.00E-05	5.80E-04	1.60E-04	2.00E-05	1.80E-04
Worker		0.00E+00	5.50E-04	1.50E-04	0.00E+00	1.50E-04
Total		**2.00E-05**	**1.13E-03**	**3.10E-04**	**2.00E-05**	**3.30E-04**
TOTAL		***0.0037***	***0.0300***	***0.0133***	***0.0034***	***0.0167***

Eastern Remediation Rough Grading						
		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Fugitive Dust		0	0.0339	1.33E-02	0	1.33E-02
Off-Road		1.14E-02	1.14E-02		1.04E-02	1.04E-02
Total		**1.14E-02**	**4.52E-02**	**1.33E-02**	**1.04E-02**	**2.38E-02**
Offsite						
Hauling		3.25E-03	6.88E-02	1.81E-02	3.11E-03	2.12E-02
Vendor		3.00E-05	8.30E-04	2.30E-04	2.00E-05	2.60E-04
Worker		1.00E-05	1.73E-03	4.60E-04	1.00E-05	4.70E-04
Total		**3.29E-03**	**7.14E-02**	**1.88E-02**	**3.14E-03**	**2.20E-02**
TOTAL		***0.0147***	***0.1166***	***0.0321***	***0.0135***	***0.0458***

Phase 2 - Site Preparation						
		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Fugitive Dust		0	2.79E-01	1.43E-01	0	1.43E-01
Off-Road		4.06E-02	4.06E-02		3.73E-02	3.73E-02
Total		**4.06E-02**	**3.19E-01**	**1.43E-01**	**3.73E-02**	**1.80E-01**

Offsite						
	Hauling	0	0	0	0	0
	Vendor	5.00E-05	1.61E-03	4.50E-04	5.00E-05	5.00E-04
	Worker	3.00E-05	6.04E-03	1.61E-03	3.00E-05	1.64E-03
	Total	**8.00E-05**	**7.65E-03**	**2.06E-03**	**8.00E-05**	**2.14E-03**
TOTAL		***0.0407***	***0.3269***	***0.1448***	***0.0374***	***0.1821***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Fugitive Dust		0	3.93E-02	1.11E-02	0	1.11E-02
	Off-Road		2.17E-03	2.17E-03		2.00E-03	2.00E-03
	Total		**2.17E-03**	**4.14E-02**	**1.11E-02**	**2.00E-03**	**1.31E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	1.00E-04	3.00E-05	0.00E+00	3.00E-05
	Worker		0.00E+00	3.70E-04	1.00E-04	0.00E+00	1.00E-04
	Total		**0.00E+00**	**4.70E-04**	**1.30E-04**	**0.00E+00**	**1.30E-04**
TOTAL			***0.0022***	***0.0419***	***0.0112***	***0.0020***	***0.0132***

Phase 2 - Rough Grading

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Fugitive Dust		0	2.74E-01	1.09E-01	0	1.09E-01
	Off-Road		7.86E-02	7.86E-02		7.23E-02	7.23E-02
	Total		**7.86E-02**	**3.52E-01**	**1.09E-01**	**7.23E-02**	**1.81E-01**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		2.10E-04	6.77E-03	1.91E-03	2.00E-04	2.11E-03
	Worker		7.00E-05	1.41E-02	3.76E-03	7.00E-05	3.83E-03
	Total		**2.80E-04**	**2.09E-02**	**5.67E-03**	**2.70E-04**	**5.94E-03**
TOTAL			***0.0789***	***0.3730***	***0.1143***	***0.0726***	***0.1868***

Phase 2 Utility Trenching

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Off-Road		1.92E-02	1.92E-02		1.77E-02	1.77E-02
	Total		**1.92E-02**	**1.92E-02**		**1.77E-02**	**1.77E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		3.00E-05	4.92E-03	1.31E-03	2.00E-05	1.33E-03
	Total		**3.00E-05**	**4.92E-03**	**1.31E-03**	**2.00E-05**	**1.33E-03**
TOTAL			***0.0192***	***0.0241***	***0.0013***	***0.0177***	***0.0190***

Phase 2 - Fine Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Fugitive Dust		0	2.77E-01	1.10E-01	0	1.10E-01
Off-Road		7.97E-02	7.97E-02		7.34E-02	7.34E-02
Total		**7.97E-02**	**3.57E-01**	**1.10E-01**	**7.34E-02**	**1.84E-01**
Offsite						
Hauling		0	0	0	0	0
Vendor		2.10E-04	6.87E-03	1.94E-03	2.00E-04	2.14E-03
Worker		7.00E-05	1.43E-02	3.81E-03	7.00E-05	3.88E-03
Total		**2.80E-04**	**2.12E-02**	**5.75E-03**	**2.70E-04**	**6.02E-03**
TOTAL		***0.0800***	***0.3783***	***0.1159***	***0.0737***	***0.1895***

Phase 2 - Paving

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Off-Road		1.72E-02	1.72E-02		1.58E-02	1.58E-02
Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Total		**1.72E-02**	**1.72E-02**		**1.58E-02**	**1.58E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0	0	0.00E+00	0
Worker		3.00E-05	6.26E-03	1.66E-03	3.00E-05	1.69E-03
Total		**3.00E-05**	**6.26E-03**	**1.66E-03**	**3.00E-05**	**1.69E-03**
TOTAL		***0.0172***	***0.0235***	***0.0017***	***0.0158***	***0.0175***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2026**					
Off-Road		1.28E-02	1.28E-02		1.17E-02	1.17E-02
Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Total		**1.28E-02**	**1.28E-02**		**1.17E-02**	**1.17E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0	0	0.00E+00	0
Worker		2.00E-05	4.65E-03	1.24E-03	2.00E-05	1.26E-03
Total		**2.00E-05**	**4.65E-03**	**1.24E-03**	**2.00E-05**	**1.26E-03**
TOTAL		***0.0128***	***0.0175***	***0.0012***	***0.0117***	***0.0130***

Phase 2 Finishing/Landscaping

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Off-Road		1.24E-03	1.24E-03		1.14E-03	1.14E-03
	Total		**1.24E-03**	**1.24E-03**		**1.14E-03**	**1.14E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		0.00E+00	7.00E-04	1.90E-04	0.00E+00	1.90E-04
	Total		**0.00E+00**	**7.00E-04**	**1.90E-04**	**0.00E+00**	**1.90E-04**
TOTAL			***0.0012***	***0.0019***	***0.0002***	***0.0011***	***0.0013***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2026**					
	Off-Road		2.56E-03	2.56E-03		2.35E-03	2.35E-03
	Total		**2.56E-03**	**2.56E-03**		**2.35E-03**	**2.35E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	1.45E-03	3.90E-04	1.00E-05	3.90E-04
	Total		**1.00E-05**	**1.45E-03**	**3.90E-04**	**1.00E-05**	**3.90E-04**
TOTAL			***0.0026***	***0.0040***	***0.0004***	***0.0024***	***0.0027***

Phase 2 - Building Construction

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Off-Road		2.90E-03	2.90E-03		2.73E-03	2.73E-03
	Total		**2.90E-03**	**2.90E-03**		**2.73E-03**	**2.73E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		1.80E-04	5.89E-03	1.66E-03	1.80E-04	1.84E-03
	Worker		2.00E-04	0.0383	1.02E-02	1.80E-04	1.04E-02
	Total		**3.80E-04**	**0.0442**	**1.19E-02**	**3.60E-04**	**1.22E-02**
TOTAL			***0.0033***	***0.0471***	***0.0119***	***0.0031***	***0.0149***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2026**					
	Off-Road		6.89E-02	6.89E-02		6.48E-02	6.48E-02
	Total		**6.89E-02**	**6.89E-02**		**6.48E-02**	**6.48E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		4.35E-03	1.40E-01	3.95E-02	4.16E-03	4.36E-02
	Worker		4.44E-03	0.9092	2.42E-01	4.08E-03	2.46E-01
	Total		**8.79E-03**	**1.049**	**2.81E-01**	**8.24E-03**	**2.90E-01**
TOTAL			***0.0777***	***1.1179***	***0.2813***	***0.0730***	***0.3543***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2027**					
Off-Road		3.98E-02	3.98E-02		3.75E-02	3.75E-02
Total		**3.98E-02**	**3.98E-02**		**3.75E-02**	**3.75E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		2.51E-03	8.09E-02	2.28E-02	2.40E-03	2.52E-02
Worker		2.42E-03	0.5259	1.40E-01	2.23E-03	1.42E-01
Total		**4.93E-03**	**0.6068**	**1.63E-01**	**4.63E-03**	**1.67E-01**
TOTAL		***0.0447***	***0.6466***	***0.1627***	***0.0421***	***0.2049***

Phase 2 - Architectural Coating

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2027**					
Archit. Coating		0	0		0	0
Off-Road		3.66E-03	3.66E-03		3.66E-03	3.66E-03
Total		**3.66E-03**	**3.66E-03**		**3.66E-03**	**3.66E-03**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0	0	0.00E+00	0
Worker		4.60E-04	9.89E-02	2.63E-02	4.20E-04	2.67E-02
Total		**4.60E-04**	**9.89E-02**	**2.63E-02**	**4.20E-04**	**2.67E-02**
TOTAL		***0.0041***	***0.1026***	***0.0263***	***0.0041***	***0.0304***

Phase 3 - Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2026**					
Fugitive Dust		0	1.98E-01	1.02E-01	0	1.02E-01
Off-Road		2.55E-02	2.55E-02		2.35E-02	2.35E-02
Total		**2.55E-02**	**2.23E-01**	**1.02E-01**	**2.35E-02**	**1.25E-01**
Offsite						
Hauling		0	0	0	0	0
Vendor		4.00E-05	1.14E-03	3.20E-04	3.00E-05	3.60E-04
Worker		2.00E-05	4.30E-03	1.14E-03	2.00E-05	1.16E-03
Total		**6.00E-05**	**5.44E-03**	**1.46E-03**	**5.00E-05**	**1.52E-03**
TOTAL		***0.0256***	***0.2284***	***0.1030***	***0.0236***	***0.1265***

Phase 3 - Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2026**					
Fugitive Dust		0	2.40E-01	6.11E-02	0	6.11E-02
Off-Road		3.51E-02	3.51E-02		3.23E-02	3.23E-02
Total		**3.51E-02**	**2.75E-01**	**6.11E-02**	**3.23E-02**	**9.34E-02**

Offsite						
	Hauling	0	0	0	0	0
	Vendor	9.00E-05	3.02E-03	8.50E-04	9.00E-05	9.40E-04
	Worker	3.00E-05	6.31E-03	1.68E-03	3.00E-05	1.71E-03
	Total	**1.20E-04**	**9.33E-03**	**2.53E-03**	**1.20E-04**	**2.65E-03**
TOTAL		***0.0352***	***0.2840***	***0.0636***	***0.0324***	***0.0961***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Fugitive Dust		0	3.83E-01	1.40E-01	0	1.40E-01
	Off-Road		9.78E-02	9.78E-02		9.00E-02	9.00E-02
	Total		**9.78E-02**	**4.80E-01**	**1.40E-01**	**9.00E-02**	**2.30E-01**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		2.60E-04	8.42E-03	2.38E-03	2.50E-04	2.63E-03
	Worker		8.00E-05	1.76E-02	4.68E-03	7.00E-05	4.75E-03
	Total		**3.40E-04**	**2.60E-02**	**7.06E-03**	**3.20E-04**	**7.38E-03**
TOTAL			***0.0981***	***0.5063***	***0.1468***	***0.0903***	***0.2371***

Phase 3 Utility Trenching

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Off-Road		2.62E-02	2.62E-02		2.41E-02	2.41E-02
	Total		**2.62E-02**	**2.62E-02**		**2.41E-02**	**2.41E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		3.00E-05	6.71E-03	1.79E-03	3.00E-05	1.81E-03
	Total		**3.00E-05**	**6.71E-03**	**1.79E-03**	**3.00E-05**	**1.81E-03**
TOTAL			***0.0262***	***0.0329***	***0.0018***	***0.0241***	***0.0259***

Phase 3 - Fine Grading

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Fugitive Dust		0	3.03E-01	1.10E-01	0	1.10E-01
	Off-Road		7.63E-02	7.63E-02		7.02E-02	7.02E-02
	Total		**7.63E-02**	**3.79E-01**	**1.10E-01**	**7.02E-02**	**1.80E-01**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		2.00E-04	6.57E-03	1.86E-03	2.00E-04	2.05E-03
	Worker		6.00E-05	1.37E-02	3.65E-03	6.00E-05	3.71E-03
	Total		**2.60E-04**	**2.03E-02**	**5.51E-03**	**2.60E-04**	**5.76E-03**
TOTAL			***0.0766***	***0.3996***	***0.1150***	***0.0705***	***0.1855***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2028**					
	Fugitive Dust		0	2.00E-01	5.29E-02	0	5.29E-02
	Off-Road		3.11E-02	3.11E-02		2.86E-02	2.86E-02
	Total		**3.11E-02**	**2.31E-01**	**5.29E-02**	**2.86E-02**	**8.15E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		8.00E-05	2.68E-03	7.60E-04	8.00E-05	8.40E-04
	Worker		2.00E-05	5.59E-03	1.49E-03	2.00E-05	1.51E-03
	Total		**1.00E-04**	**8.27E-03**	**2.25E-03**	**1.00E-04**	**2.35E-03**
TOTAL			***0.0312***	***0.2394***	***0.0552***	***0.0287***	***0.0839***

Phase 3 - Paving

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Off-Road		1.80E-02	1.80E-02		1.66E-02	1.66E-02
	Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Total		**1.80E-02**	**1.80E-02**		**1.66E-02**	**1.66E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		3.00E-05	6.56E-03	1.74E-03	3.00E-05	1.77E-03
	Total		**3.00E-05**	**6.56E-03**	**1.74E-03**	**3.00E-05**	**1.77E-03**
TOTAL			***0.0180***	***0.0246***	***0.0017***	***0.0166***	***0.0184***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2028**					
	Off-Road		1.15E-02	1.15E-02		1.06E-02	1.06E-02
	Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Total		**1.15E-02**	**1.15E-02**		**1.06E-02**	**1.06E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		2.00E-05	4.19E-03	1.12E-03	2.00E-05	1.13E-03
	Total		**2.00E-05**	**4.19E-03**	**1.12E-03**	**2.00E-05**	**1.13E-03**
TOTAL			***0.0115***	***0.0157***	***0.0011***	***0.0106***	***0.0117***

Phase 3 Finishing/Landscaping

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Off-Road		1.08E-03	1.08E-03		9.90E-04	9.90E-04
	Total		**1.08E-03**	**1.08E-03**		**9.90E-04**	**9.90E-04**

Offsite						
	Hauling	0	0	0	0	0
	Vendor	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker	0.00E+00	6.10E-04	1.60E-04	0.00E+00	1.60E-04
	Total	**0.00E+00**	**6.10E-04**	**1.60E-04**	**0.00E+00**	**1.60E-04**
TOTAL		***0.0011***	***0.0017***	***0.0002***	***0.0010***	***0.0012***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2028**					
	Off-Road	2.80E-03	2.80E-03		2.58E-03	2.58E-03
	Total	**2.80E-03**	**2.80E-03**		**2.58E-03**	**2.58E-03**
Offsite						
	Hauling	0	0	0	0	0
	Vendor	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker	1.00E-05	1.59E-03	4.20E-04	1.00E-05	4.30E-04
	Total	**1.00E-05**	**1.59E-03**	**4.20E-04**	**1.00E-05**	**4.30E-04**
TOTAL		***0.0028***	***0.0044***	***0.0004***	***0.0026***	***0.0030***

Phase 3 - Building Construction

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2028**					
	Off-Road	5.38E-02	5.38E-02		5.06E-02	5.06E-02
	Total	**5.38E-02**	**5.38E-02**		**5.06E-02**	**5.06E-02**
Offsite						
	Hauling	0	0	0	0	0
	Vendor	2.70E-04	8.69E-03	2.45E-03	2.60E-04	2.71E-03
	Worker	2.20E-04	0.0508	1.35E-02	2.00E-04	1.37E-02
	Total	**4.90E-04**	**0.0595**	**1.60E-02**	**4.60E-04**	**1.64E-02**
TOTAL		***0.0543***	***0.1133***	***0.0160***	***0.0511***	***0.0670***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2029**					
	Off-Road	6.89E-02	6.89E-02		6.48E-02	6.48E-02
	Total	**6.89E-02**	**6.89E-02**		**6.48E-02**	**6.48E-02**
Offsite						
	Hauling	0	0	0	0	0
	Vendor	3.40E-04	1.11E-02	3.14E-03	3.30E-04	3.47E-03
	Worker	2.60E-04	0.065	1.73E-02	2.40E-04	1.75E-02
	Total	**6.00E-04**	**0.0761**	**2.04E-02**	**5.70E-04**	**2.10E-02**
TOTAL		***0.0695***	***0.1450***	***0.0204***	***0.0654***	***0.0858***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2030**					
	Off-Road		8.07E-03	8.07E-03		8.07E-03	8.07E-03
	Total		**8.07E-03**	**8.07E-03**		**8.07E-03**	**8.07E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		1.40E-04	4.64E-03	1.31E-03	1.40E-04	1.45E-03
	Worker		1.00E-04	0.0271	7.22E-03	9.00E-05	7.32E-03
	Total		**2.40E-04**	**0.0318**	**8.53E-03**	**2.30E-04**	**8.77E-03**
TOTAL			***0.0083***	***0.0399***	***0.0085***	***0.0083***	***0.0168***

Phase 3 - Architectural Coating

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2029**					
	Archit. Coating		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Off-Road		8.50E-04	8.50E-04		8.50E-04	8.50E-04
	Total		**8.50E-04**	**8.50E-04**		**8.50E-04**	**8.50E-04**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0	0	0	0	0
	Worker		1.00E-05	1.68E-03	4.50E-04	1.00E-05	4.50E-04
	Total		**1.00E-05**	**1.68E-03**	**4.50E-04**	**1.00E-05**	**4.50E-04**
TOTAL			***0.0009***	***0.0025***	***0.0005***	***0.0009***	***0.0013***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2030**					
	Archit. Coating		0	0		0	0
	Off-Road		1.11E-03	1.11E-03		1.11E-03	1.11E-03
	Total		**1.11E-03**	**1.11E-03**		**1.11E-03**	**1.11E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		2.00E-05	5.54E-03	1.47E-03	2.00E-05	1.49E-03
	Total		**2.00E-05**	**5.54E-03**	**1.47E-03**	**2.00E-05**	**1.49E-03**
TOTAL			***0.0011***	***0.0067***	***0.0015***	***0.0011***	***0.0026***

Average Daily Emissions and Emission Rates: Mitigated

Onsite Construction PM10 Exhaust Emissions[1]

Phases	Year	Annual PM10 Exhaust Emissions (Tons/Year)	Annual PM10 Exhaust Emissions (lbs/Year)	# of Construction Days/Year	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/hr)	Emission Rate (g/s)	# of Total Workdays/ Year	Construction Duration (Yr)[2]
WM & P1	2023	0.0059	11.84	109	0.11	1.36E-02	1.71E-03	260	0.42
P1, EM, & P2	2024	0.0412	82.32	262	0.31	3.93E-02	4.95E-03	262	1.00
P1&P2	2025	0.0439	87.86	261	0.34	4.21E-02	5.30E-03	261	1.00
P2&P3	2026	0.1449	289.72	261	1.11	1.39E-01	1.75E-02	261	1.00
P2&P3	2027	0.2628	525.68	261	2.01	2.52E-01	3.17E-02	261	1.00
P3	2028	0.0992	198.40	260	0.76	9.54E-02	1.20E-02	260	1.00
P3	2029	0.0698	139.50	261	0.53	6.68E-02	8.42E-03	261	1.00
P3	2030	0.0092	18.36	109	0.17	2.11E-02	2.65E-03	261	0.42
				1,784					**6.84**

Offsite Construction PM10 Exhaust Emissions[1]

	Year	Annual PM10 Exhaust Emissions (Tons/Year)	Annual PM10 Exhaust Emissions (lbs/Year)	# of Construction Days/Year	Average Daily Emissions (lbs/day)	Hauling Emissions w/in 1,000 ft (lbs/day) [3]	Emission Rate (lbs/hr)	Emission Rate (g/s)
WM & P1	2023	0.0035	7.00	109	6.42E-02	5.38E-03	6.72E-04	8.47E-05
P1, EM, & P2	2024	0.0057	11.42	262	4.36E-02	9.37E-03	1.17E-03	1.48E-04
P1&P2	2025	0.0024	4.76	261	1.82E-02	9.52E-03	1.19E-03	1.50E-04
P2&P3	2026	0.0090	18.00	261	6.90E-02	3.60E-02	4.50E-03	5.67E-04
P2&P3	2027	0.0061	12.10	261	4.64E-02	2.42E-02	3.03E-03	3.81E-04
P3	2028	0.0006	1.24	260	4.77E-03	2.49E-03	3.11E-04	3.92E-05
P3	2029	0.0006	1.22	261	4.67E-03	2.44E-03	3.05E-04	3.84E-05
P3	2030	0.0003	0.52	109	4.77E-03	2.49E-03	3.11E-04	3.92E-05

Note: Emissions evenly distributed over 246 modeled volume sources.

	2023	2024	2025	2026	2027	2028	2029	2030
Total Haul Trips	2,270	2,187	0	0	0	0	0	0
Total Vendor Trips	2,009	12,907	12,928	47,304	31,504	3,736	3,654	1,526
Total Trips	4,279	15,094	12,928	47,304	31,504	3,736	3,654	1,526
Average Distance Per Haul Trip (mile/trip)	75	75						
Average Distance Per Vendor Trip (mile/trip)	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Total Haul Trip Miles	170,250.0	164,025.0						
Total Vendor Trip Miles	13,864	89,056	89,203	326,398	217,378	25,778	25,213	10,529
Total Haul and Vendor Trip Miles	184,114	253,081	89,203	326,398	217,378	25,778	25,213	10,529
Haul Length within 1,000 ft of Site (mile) [4]	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Total Miles Traveled within 1,000 ft of Site	15,420	54,389	46,585	170,455	113,521	13,462	13,167	5,499
Hours per work day (7:00 AM to 4:00 PM, 1-hour of breaks) [5]	8	8	8	8	8	8	8	8

[1] DPM emissions taken as PM_{10} exhaust emissions from CalEEMod annual emissions.

[2] Construction durations determined for each year to adjust receptor exposures to the exposure durations for each construction year (see App C - Risk Calculations).

[3] Offsite trip length is based on the CalEEMod default vendor trip length of 6.9 miles per trip for Phases 1 through 3. The Western Remediation and Eastern Remediation haul length of 75 miles per trip is based on the haul truck distance between the project site and and the assumed receiving facility at 12328 Hibiscus Road, Adelanto, CA 92301.

[4] Emissions from CalEEMod offsite average daily emissions, which is based on proportioned haul truck trip distances, are adjusted to evaluate emissions from the **3.60-**mile route within 1,000 of the project site.

[5] Work hours applied in By Hour/Day (HRDOW) variable emissions module in air dispersion model (see App B - Air Dispersion Model Output Files).

Annual Construction Emissions

Mitigated emissions are hightlighted.

Western Remediation Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
Fugitive Dust		0	0.0252	1.30E-02	0	1.30E-02
Off-Road		1.90E-04	1.90E-04		1.90E-04	1.90E-04
Total		**1.90E-04**	**2.54E-02**	**1.30E-02**	**1.90E-04**	**1.32E-02**
Offsite						
Hauling		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vendor		1.00E-05	2.90E-04	8.00E-05	1.00E-05	9.00E-05
Worker		0.00E+00	5.50E-04	1.50E-04	0.00E+00	1.50E-04
Total		**1.00E-05**	**8.40E-04**	**2.30E-04**	**1.00E-05**	**2.40E-04**
TOTAL		***0.0002***	***0.0262***	***0.0132***	***0.0002***	***0.0134***

Western Remediation Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
Fugitive Dust		0	0.0339	1.33E-02	0	1.33E-02
Off-Road		8.60E-04	8.60E-04		8.60E-04	8.60E-04
Total		**8.60E-04**	**3.47E-02**	**1.33E-02**	**8.60E-04**	**1.42E-02**
Offsite						
Hauling		3.24E-03	7.13E-02	1.88E-02	3.10E-03	2.19E-02
Vendor		5.00E-05	1.65E-03	4.70E-04	5.00E-05	5.10E-04
Worker		1.00E-05	1.73E-03	4.60E-04	1.00E-05	4.70E-04
Total		**3.30E-03**	**7.47E-02**	**1.97E-02**	**3.16E-03**	**2.29E-02**
TOTAL		***0.0042***	***0.1094***	***0.0330***	***0.0040***	***0.0371***

Phase 1 Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
Fugitive Dust		0	0.1933	9.93E-02	0	9.93E-02
Off-Road		1.43E-03	1.43E-03		1.43E-03	1.43E-03
Total		**1.43E-03**	**1.95E-01**	**9.93E-02**	**1.43E-03**	**1.01E-01**

Offsite						
	Hauling	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Vendor	3.00E-05	1.12E-03	3.20E-04	3.00E-05	3.50E-04
	Worker	2.00E-05	4.21E-03	1.12E-03	2.00E-05	1.14E-03
	Total	**5.00E-05**	**5.33E-03**	**1.44E-03**	**5.00E-05**	**1.49E-03**
TOTAL		***0.0015***	***0.2000***	***0.1007***	***0.0015***	***0.1023***

Phase 1 Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
	Fugitive Dust	0	0.143	5.13E-02	0	5.13E-02
	Off-Road	3.20E-03	3.20E-03		3.20E-03	3.20E-03
	Total	**3.20E-03**	**1.46E-01**	**5.13E-02**	**3.20E-03**	**5.45E-02**
Offsite						
	Hauling	0	0	0	0	0
	Vendor	9.00E-05	3.06E-03	8.70E-04	9.00E-05	9.50E-04
	Worker	4.00E-05	6.41E-03	1.70E-03	3.00E-05	1.74E-03
	Total	**1.30E-04**	**9.47E-03**	**2.57E-03**	**1.20E-04**	**2.69E-03**
TOTAL		***0.0033***	***0.1557***	***0.0539***	***0.0033***	***0.0572***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
	Fugitive Dust	0	0.0979	2.65E-02	0	2.65E-02
	Off-Road	1.42E-03	1.42E-03		1.42E-03	1.42E-03
	Total	**1.42E-03**	**9.94E-02**	**0.0265**	**1.42E-03**	**2.79E-02**
Offsite						
	Hauling	0	0	0	0	0
	Vendor	4.00E-05	1.36E-03	3.80E-04	4.00E-05	4.30E-04
	Worker	2.00E-05	2.85E-03	7.60E-04	1.00E-05	7.70E-04
	Total	**6.00E-05**	**4.21E-03**	**1.14E-03**	**5.00E-05**	**1.20E-03**
TOTAL		***0.0015***	***0.1036***	***0.0276***	***0.0015***	***0.0291***

Phase 1 Utility Trenching

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2023**					
	Off-Road	2.40E-04	2.40E-04		2.40E-04	2.40E-04
	Total	**2.40E-04**	**2.40E-04**		**2.40E-04**	**2.40E-04**
Offsite						
	Hauling	0	0	0	0	0
	Vendor	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker	1.00E-05	1.22E-03	3.20E-04	1.00E-05	3.30E-04
	Total	**1.00E-05**	**1.22E-03**	**3.20E-04**	**1.00E-05**	**3.30E-04**
TOTAL		***0.0003***	***0.0015***	***0.0003***	***0.0003***	***0.0006***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Off-Road		4.00E-04	4.00E-04		4.00E-04	4.00E-04
	Total		**4.00E-04**	**4.00E-04**		**4.00E-04**	**4.00E-04**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	2.04E-03	5.40E-04	1.00E-05	5.50E-04
	Total		**1.00E-05**	**2.04E-03**	**5.40E-04**	**1.00E-05**	**5.50E-04**
TOTAL			***0.0004***	***0.0024***	***0.0005***	***0.0004***	***0.0010***

Phase 1 Fine Grading

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Fugitive Dust		0	0.1771	7.03E-02	0	7.03E-02
	Off-Road		4.57E-03	4.57E-03		4.57E-03	4.57E-03
	Total		**4.57E-03**	**1.82E-01**	**7.03E-02**	**4.57E-03**	**7.49E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		1.40E-04	4.38E-03	1.24E-03	1.30E-04	1.37E-03
	Worker		5.00E-05	9.16E-03	2.43E-03	5.00E-05	2.48E-03
	Total		**1.90E-04**	**1.35E-02**	**3.67E-03**	**1.80E-04**	**3.85E-03**
TOTAL			***0.0048***	***0.1951***	***0.0740***	***0.0048***	***0.0788***

Phase 1 - Paving

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Off-Road		2.16E-02	2.16E-02		1.98E-02	1.98E-02
	Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Total		**2.16E-02**	**2.16E-02**		**1.98E-02**	**1.98E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		4.00E-05	7.02E-03	1.87E-03	3.00E-05	1.90E-03
	Total		**4.00E-05**	**7.02E-03**	**1.87E-03**	**3.00E-05**	**1.90E-03**
TOTAL			***0.0216***	***0.0286***	***0.0019***	***0.0198***	***0.0217***

Phase 1 Finishing/Landscaping

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Off-Road		3.01E-03	3.01E-03		2.77E-03	2.77E-03
	Total		**3.01E-03**	**3.01E-03**		**2.77E-03**	**2.77E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	1.39E-03	3.70E-04	1.00E-05	3.80E-04
	Total		**1.00E-05**	**1.39E-03**	**3.70E-04**	**1.00E-05**	**3.80E-04**
TOTAL			***0.0030***	***0.0044***	***0.0004***	***0.0028***	***0.0032***

Phase 1 - Building Construction

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2024**					
	Off-Road		7.06E-03	7.06E-03		7.06E-03	7.06E-03
	Total		**7.06E-03**	**7.06E-03**		**7.06E-03**	**7.06E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		9.40E-04	3.05E-02	8.61E-03	9.00E-04	9.51E-03
	Worker		1.07E-03	0.2005	5.33E-02	9.90E-04	5.43E-02
	Total		**2.01E-03**	**0.231**	**6.19E-02**	**1.89E-03**	**6.38E-02**
TOTAL			***0.0091***	***0.2381***	***0.0619***	***0.0090***	***0.0709***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Off-Road		4.57E-03	4.57E-03		4.57E-03	4.57E-03
	Total		**4.57E-03**	**4.57E-03**		**4.57E-03**	**4.57E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		6.10E-04	1.97E-02	5.57E-03	5.90E-04	6.16E-03
	Worker		6.60E-04	0.1297	3.45E-02	6.10E-04	3.51E-02
	Total		**1.27E-03**	**0.1494**	**4.00E-02**	**1.20E-03**	**4.12E-02**
TOTAL			***0.0058***	***0.1540***	***0.0400***	***0.0058***	***0.0458***

Phase 1 - Architectural Coating

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Archit. Coating		0	0		0	0
	Off-Road		2.32E-03	2.32E-03		2.32E-03	2.32E-03
	Total		**2.32E-03**	**2.32E-03**		**2.32E-03**	**2.32E-03**

Offsite						
	Hauling	0	0	0	0	0
	Vendor	0.00E+00	0	0	0.00E+00	0
	Worker	1.10E-04	2.15E-02	5.72E-03	1.00E-04	5.82E-03
	Total	**1.10E-04**	**2.15E-02**	**5.72E-03**	**1.00E-04**	**5.82E-03**
TOTAL		***0.0024***	***0.0238***	***0.0057***	***0.0024***	***0.0081***

Eastern Remediation Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Fugitive Dust		0	0.0252	1.30E-02	0	1.30E-02
Off-Road		1.90E-04	1.90E-04		1.90E-04	1.90E-04
Total		**1.90E-04**	**2.54E-02**	**1.30E-02**	**1.90E-04**	**1.32E-02**
Offsite						
Hauling		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vendor		2.00E-05	5.80E-04	1.60E-04	2.00E-05	1.80E-04
Worker		0.00E+00	5.50E-04	1.50E-04	0.00E+00	1.50E-04
Total		**2.00E-05**	**1.13E-03**	**3.10E-04**	**2.00E-05**	**3.30E-04**
TOTAL		***0.0002***	***0.0265***	***0.0133***	***0.0002***	***0.0135***

Eastern Remediation Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Fugitive Dust		0	0.0339	1.33E-02	0	1.33E-02
Off-Road		8.60E-04	8.60E-04		8.60E-04	8.60E-04
Total		**8.60E-04**	**3.47E-02**	**1.33E-02**	**8.60E-04**	**1.42E-02**
Offsite						
Hauling		3.25E-03	6.88E-02	1.81E-02	3.11E-03	2.12E-02
Vendor		3.00E-05	8.30E-04	2.30E-04	2.00E-05	2.60E-04
Worker		1.00E-05	1.73E-03	4.60E-04	1.00E-05	4.70E-04
Total		**3.29E-03**	**7.14E-02**	**1.88E-02**	**3.14E-03**	**2.20E-02**
TOTAL		***0.0042***	***0.1061***	***0.0321***	***0.0040***	***0.0362***

Phase 2 - Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2024**					
Fugitive Dust		0	2.79E-01	1.43E-01	0	1.43E-01
Off-Road		2.05E-03	2.05E-03		2.05E-03	2.05E-03
Total		**2.05E-03**	**2.81E-01**	**1.43E-01**	**2.05E-03**	**1.45E-01**
Offsite						
Hauling		0	0	0	0	0
Vendor		5.00E-05	1.61E-03	4.50E-04	5.00E-05	5.00E-04
Worker		3.00E-05	6.04E-03	1.61E-03	3.00E-05	1.64E-03
Total		**8.00E-05**	**7.65E-03**	**2.06E-03**	**8.00E-05**	**2.14E-03**
TOTAL		***0.0021***	***0.2884***	***0.1448***	***0.0021***	***0.1468***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Fugitive Dust		0	3.93E-02	1.11E-02	0	1.11E-02
Off-Road		1.20E-04	1.20E-04		1.20E-04	1.20E-04
Total		**1.20E-04**	**3.94E-02**	**1.11E-02**	**1.20E-04**	**1.12E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	1.00E-04	3.00E-05	0.00E+00	3.00E-05
Worker		0.00E+00	3.70E-04	1.00E-04	0.00E+00	1.00E-04
Total		**0.00E+00**	**4.70E-04**	**1.30E-04**	**0.00E+00**	**1.30E-04**
TOTAL		***0.0001***	***0.0399***	***0.0112***	***0.0001***	***0.0113***

Phase 2 - Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Fugitive Dust		0	2.74E-01	1.09E-01	0	1.09E-01
Off-Road		7.06E-03	7.06E-03		7.06E-03	7.06E-03
Total		**7.06E-03**	**2.81E-01**	**1.09E-01**	**7.06E-03**	**1.16E-01**
Offsite						
Hauling		0	0	0	0	0
Vendor		2.10E-04	6.77E-03	1.91E-03	2.00E-04	2.11E-03
Worker		7.00E-05	1.41E-02	3.76E-03	7.00E-05	3.83E-03
Total		**2.80E-04**	**2.09E-02**	**5.67E-03**	**2.70E-04**	**5.94E-03**
TOTAL		***0.0073***	***0.3014***	***0.1143***	***0.0073***	***0.1215***

Phase 2 Utility Trenching

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Off-Road		1.36E-03	1.36E-03		1.36E-03	1.36E-03
Total		**1.36E-03**	**1.36E-03**		**1.36E-03**	**1.36E-03**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Worker		3.00E-05	4.92E-03	1.31E-03	2.00E-05	1.33E-03
Total		**3.00E-05**	**4.92E-03**	**1.31E-03**	**2.00E-05**	**1.33E-03**
TOTAL		***0.0014***	***0.0063***	***0.0013***	***0.0014***	***0.0027***

Phase 2 - Fine Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Fugitive Dust		0	2.77E-01	1.10E-01	0	1.10E-01
Off-Road		7.16E-03	7.16E-03		7.16E-03	7.16E-03
Total		**7.16E-03**	**2.85E-01**	**1.10E-01**	**7.16E-03**	**1.17E-01**
Offsite						
Hauling		0	0	0	0	0
Vendor		2.10E-04	6.87E-03	1.94E-03	2.00E-04	2.14E-03
Worker		7.00E-05	1.43E-02	3.81E-03	7.00E-05	3.88E-03
Total		**2.80E-04**	**2.12E-02**	**5.75E-03**	**2.70E-04**	**6.02E-03**
TOTAL		***0.0074***	***0.3057***	***0.1159***	***0.0074***	***0.1233***

Phase 2 - Paving

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Off-Road		1.72E-02	1.72E-02		1.58E-02	1.58E-02
Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Total		**1.72E-02**	**1.72E-02**		**1.58E-02**	**1.58E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		0.00E+00	0	0	0.00E+00	0
Worker		3.00E-05	6.26E-03	1.66E-03	3.00E-05	1.69E-03
Total		**3.00E-05**	**6.26E-03**	**1.66E-03**	**3.00E-05**	**1.69E-03**
TOTAL		***0.0172***	***0.0235***	***0.0017***	***0.0158***	***0.0175***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2026**					
	Off-Road		1.28E-02	1.28E-02		1.17E-02	1.17E-02
	Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Total		**1.28E-02**	**1.28E-02**		**1.17E-02**	**1.17E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		2.00E-05	4.65E-03	1.24E-03	2.00E-05	1.26E-03
	Total		**2.00E-05**	**4.65E-03**	**1.24E-03**	**2.00E-05**	**1.26E-03**
TOTAL			***0.0128***	***0.0175***	***0.0012***	***0.0117***	***0.0130***

Phase 2 Finishing/Landscaping

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2025**					
	Off-Road		1.24E-03	1.24E-03		1.14E-03	1.14E-03
	Total		**1.24E-03**	**1.24E-03**		**1.14E-03**	**1.14E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		0.00E+00	7.00E-04	1.90E-04	0.00E+00	1.90E-04
	Total		**0.00E+00**	**7.00E-04**	**1.90E-04**	**0.00E+00**	**1.90E-04**
TOTAL			***0.0012***	***0.0019***	***0.0002***	***0.0011***	***0.0013***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2026**					
	Off-Road		2.56E-03	2.56E-03		2.35E-03	2.35E-03
	Total		**2.56E-03**	**2.56E-03**		**2.35E-03**	**2.35E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	1.45E-03	3.90E-04	1.00E-05	3.90E-04
	Total		**1.00E-05**	**1.45E-03**	**3.90E-04**	**1.00E-05**	**3.90E-04**
TOTAL			***0.0026***	***0.0040***	***0.0004***	***0.0024***	***0.0027***

Phase 2 - Building Construction

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2025**					
Off-Road		2.90E-03	2.90E-03		2.73E-03	2.73E-03
Total		**2.90E-03**	**2.90E-03**		**2.73E-03**	**2.73E-03**
Offsite						
Hauling		0	0	0	0	0
Vendor		1.80E-04	5.89E-03	1.66E-03	1.80E-04	1.84E-03
Worker		2.00E-04	0.0383	1.02E-02	1.80E-04	1.04E-02
Total		**3.80E-04**	**0.0442**	**1.19E-02**	**3.60E-04**	**1.22E-02**
TOTAL		***0.0033***	***0.0471***	***0.0119***	***0.0031***	***0.0149***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2026**					
Off-Road		6.89E-02	6.89E-02		6.48E-02	6.48E-02
Total		**6.89E-02**	**6.89E-02**		**6.48E-02**	**6.48E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		4.35E-03	1.40E-01	3.95E-02	4.16E-03	4.36E-02
Worker		4.44E-03	0.9092	2.42E-01	4.08E-03	2.46E-01
Total		**8.79E-03**	**1.049**	**2.81E-01**	**8.24E-03**	**2.90E-01**
TOTAL		***0.0777***	***1.1179***	***0.2813***	***0.0730***	***0.3543***

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2027**					
Off-Road		3.98E-02	3.98E-02		3.75E-02	3.75E-02
Total		**3.98E-02**	**3.98E-02**		**3.75E-02**	**3.75E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		2.51E-03	8.09E-02	2.28E-02	2.40E-03	2.52E-02
Worker		2.42E-03	0.5259	1.40E-01	2.23E-03	1.42E-01
Total		**4.93E-03**	**0.6068**	**1.63E-01**	**4.63E-03**	**1.67E-01**
TOTAL		***0.0447***	***0.6466***	***0.1627***	***0.0421***	***0.2049***

Phase 2 - Architectural Coating

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2027**					
Archit. Coating		0	0		0	0
Off-Road		3.66E-03	3.66E-03		3.66E-03	3.66E-03
Total		**3.66E-03**	**3.66E-03**		**3.66E-03**	**3.66E-03**

Offsite						
	Hauling	0	0	0	0	0
	Vendor	0.00E+00	0	0	0.00E+00	0
	Worker	4.60E-04	9.89E-02	2.63E-02	4.20E-04	2.67E-02
	Total	**4.60E-04**	**9.89E-02**	**2.63E-02**	**4.20E-04**	**2.67E-02**
TOTAL		***0.0041***	***0.1026***	***0.0263***	***0.0041***	***0.0304***

Phase 3 - Site Preparation

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2026**					
Fugitive Dust		0	1.98E-01	1.02E-01	0	1.02E-01
Off-Road		2.55E-02	2.55E-02		2.35E-02	2.35E-02
Total		**2.55E-02**	**2.23E-01**	**1.02E-01**	**2.35E-02**	**1.25E-01**
Offsite						
Hauling		0	0	0	0	0
Vendor		4.00E-05	1.14E-03	3.20E-04	3.00E-05	3.60E-04
Worker		2.00E-05	4.30E-03	1.14E-03	2.00E-05	1.16E-03
Total		**6.00E-05**	**5.44E-03**	**1.46E-03**	**5.00E-05**	**1.52E-03**
TOTAL		***0.0256***	***0.2284***	***0.1030***	***0.0236***	***0.1265***

Phase 3 - Rough Grading

		Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite	**2026**					
Fugitive Dust		0	2.40E-01	6.11E-02	0	6.11E-02
Off-Road		3.51E-02	3.51E-02		3.23E-02	3.23E-02
Total		**3.51E-02**	**2.75E-01**	**6.11E-02**	**3.23E-02**	**9.34E-02**
Offsite						
Hauling		0	0	0	0	0
Vendor		9.00E-05	3.02E-03	8.50E-04	9.00E-05	9.40E-04
Worker		3.00E-05	6.31E-03	1.68E-03	3.00E-05	1.71E-03
Total		**1.20E-04**	**9.33E-03**	**2.53E-03**	**1.20E-04**	**2.65E-03**
TOTAL		***0.0352***	***0.2840***	***0.0636***	***0.0324***	***0.0961***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Fugitive Dust		0	3.83E-01	1.40E-01	0	1.40E-01
	Off-Road		9.78E-02	9.78E-02		9.00E-02	9.00E-02
	Total		**9.78E-02**	**4.80E-01**	**1.40E-01**	**9.00E-02**	**2.30E-01**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		2.60E-04	8.42E-03	2.38E-03	2.50E-04	2.63E-03
	Worker		8.00E-05	1.76E-02	4.68E-03	7.00E-05	4.75E-03
	Total		**3.40E-04**	**2.60E-02**	**7.06E-03**	**3.20E-04**	**7.38E-03**
TOTAL			***0.0981***	***0.5063***	***0.1468***	***0.0903***	***0.2371***

Phase 3 Utility Trenching

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Off-Road		2.62E-02	2.62E-02		2.41E-02	2.41E-02
	Total		**2.62E-02**	**2.62E-02**		**2.41E-02**	**2.41E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		3.00E-05	6.71E-03	1.79E-03	3.00E-05	1.81E-03
	Total		**3.00E-05**	**6.71E-03**	**1.79E-03**	**3.00E-05**	**1.81E-03**
TOTAL			***0.0262***	***0.0329***	***0.0018***	***0.0241***	***0.0259***

Phase 3 - Fine Grading

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Fugitive Dust		0	3.03E-01	1.10E-01	0	1.10E-01
	Off-Road		7.63E-02	7.63E-02		7.02E-02	7.02E-02
	Total		**7.63E-02**	**3.79E-01**	**1.10E-01**	**7.02E-02**	**1.80E-01**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		2.00E-04	6.57E-03	1.86E-03	2.00E-04	2.05E-03
	Worker		6.00E-05	1.37E-02	3.65E-03	6.00E-05	3.71E-03
	Total		**2.60E-04**	**2.03E-02**	**5.51E-03**	**2.60E-04**	**5.76E-03**
TOTAL			***0.0766***	***0.3996***	***0.1150***	***0.0705***	***0.1855***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2028**					
	Fugitive Dust		0	2.00E-01	5.29E-02	0	5.29E-02
	Off-Road		3.11E-02	3.11E-02		2.86E-02	2.86E-02
	Total		**3.11E-02**	**2.31E-01**	**5.29E-02**	**2.86E-02**	**8.15E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		8.00E-05	2.68E-03	7.60E-04	8.00E-05	8.40E-04
	Worker		2.00E-05	5.59E-03	1.49E-03	2.00E-05	1.51E-03
	Total		**1.00E-04**	**8.27E-03**	**2.25E-03**	**1.00E-04**	**2.35E-03**
TOTAL			***0.0312***	***0.2394***	***0.0552***	***0.0287***	***0.0839***

Phase 3 - Paving

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Off-Road		1.80E-02	1.80E-02		1.66E-02	1.66E-02
	Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Total		**1.80E-02**	**1.80E-02**		**1.66E-02**	**1.66E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		3.00E-05	6.56E-03	1.74E-03	3.00E-05	1.77E-03
	Total		**3.00E-05**	**6.56E-03**	**1.74E-03**	**3.00E-05**	**1.77E-03**
TOTAL			***0.0180***	***0.0246***	***0.0017***	***0.0166***	***0.0184***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2028**					
	Off-Road		1.15E-02	1.15E-02		1.06E-02	1.06E-02
	Paving		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Total		**1.15E-02**	**1.15E-02**		**1.06E-02**	**1.06E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		2.00E-05	4.19E-03	1.12E-03	2.00E-05	1.13E-03
	Total		**2.00E-05**	**4.19E-03**	**1.12E-03**	**2.00E-05**	**1.13E-03**
TOTAL			***0.0115***	***0.0157***	***0.0011***	***0.0106***	***0.0117***

Phase 3 Finishing/Landscaping

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2027**					
	Off-Road		1.08E-03	1.08E-03		9.90E-04	9.90E-04
	Total		**1.08E-03**	**1.08E-03**		**9.90E-04**	**9.90E-04**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		0.00E+00	6.10E-04	1.60E-04	0.00E+00	1.60E-04
	Total		**0.00E+00**	**6.10E-04**	**1.60E-04**	**0.00E+00**	**1.60E-04**
TOTAL			***0.0011***	***0.0017***	***0.0002***	***0.0010***	***0.0012***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2028**					
	Off-Road		2.80E-03	2.80E-03		2.58E-03	2.58E-03
	Total		**2.80E-03**	**2.80E-03**		**2.58E-03**	**2.58E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Worker		1.00E-05	1.59E-03	4.20E-04	1.00E-05	4.30E-04
	Total		**1.00E-05**	**1.59E-03**	**4.20E-04**	**1.00E-05**	**4.30E-04**
TOTAL			***0.0028***	***0.0044***	***0.0004***	***0.0026***	***0.0030***

Phase 3 - Building Construction

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2028**					
	Off-Road		5.38E-02	5.38E-02		5.06E-02	5.06E-02
	Total		**5.38E-02**	**5.38E-02**		**5.06E-02**	**5.06E-02**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		2.70E-04	8.69E-03	2.45E-03	2.60E-04	2.71E-03
	Worker		2.20E-04	0.0508	1.35E-02	2.00E-04	1.37E-02
	Total		**4.90E-04**	**0.0595**	**1.60E-02**	**4.60E-04**	**1.64E-02**
TOTAL			***0.0543***	***0.1133***	***0.0160***	***0.0511***	***0.0670***

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2029**					
	Off-Road		6.89E-02	6.89E-02		6.48E-02	6.48E-02
	Total		**6.89E-02**	**6.89E-02**		**6.48E-02**	**6.48E-02**

Offsite							
	Hauling		0	0	0	0	0
	Vendor		3.40E-04	1.11E-02	3.14E-03	3.30E-04	3.47E-03
	Worker		2.60E-04	0.065	1.73E-02	2.40E-04	1.75E-02
	Total		**6.00E-04**	**0.0761**	**2.04E-02**	**5.70E-04**	**2.10E-02**
TOTAL			***0.0695***	***0.1450***	***0.0204***	***0.0654***	***0.0858***
			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2030**					
	Off-Road		8.07E-03	8.07E-03		8.07E-03	8.07E-03
	Total		**8.07E-03**	**8.07E-03**		**8.07E-03**	**8.07E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		1.40E-04	4.64E-03	1.31E-03	1.40E-04	1.45E-03
	Worker		1.00E-04	0.0271	7.22E-03	9.00E-05	7.32E-03
	Total		**2.40E-04**	**0.0318**	**8.53E-03**	**2.30E-04**	**8.77E-03**
TOTAL			***0.0083***	***0.0399***	***0.0085***	***0.0083***	***0.0168***

Phase 3 - Architectural Coating

			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2029**					
	Archit. Coating		0.00E+00	0.00E+00		0.00E+00	0.00E+00
	Off-Road		8.50E-04	8.50E-04		8.50E-04	8.50E-04
	Total		**8.50E-04**	**8.50E-04**		**8.50E-04**	**8.50E-04**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0	0	0	0	0
	Worker		1.00E-05	1.68E-03	4.50E-04	1.00E-05	4.50E-04
	Total		**1.00E-05**	**1.68E-03**	**4.50E-04**	**1.00E-05**	**4.50E-04**
TOTAL			***0.0009***	***0.0025***	***0.0005***	***0.0009***	***0.0013***
			Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Onsite		**2030**					
	Archit. Coating		0	0		0	0
	Off-Road		1.11E-03	1.11E-03		1.11E-03	1.11E-03
	Total		**1.11E-03**	**1.11E-03**		**1.11E-03**	**1.11E-03**
Offsite							
	Hauling		0	0	0	0	0
	Vendor		0.00E+00	0	0	0.00E+00	0
	Worker		2.00E-05	5.54E-03	1.47E-03	2.00E-05	1.49E-03
	Total		**2.00E-05**	**5.54E-03**	**1.47E-03**	**2.00E-05**	**1.49E-03**
TOTAL			***0.0011***	***0.0067***	***0.0015***	***0.0011***	***0.0026***

Appendix B. Air Dispersion Model Output

```
*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
*** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                  PAGE   1
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                       ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses URBAN Dispersion Algorithm for the SBL for   249 Source(s),
  for Total of    1 Urban Area(s):
  Urban Population =   3186989.0 ;  Urban Roughness Length =  1.000 m

**Model Allows User-Specified Options:
        1. Stack-tip Downwash.
        2. Allow FLAT/ELEV Terrain Option by Source,
           with      0 FLAT and    249 ELEV Source(s).
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Used.

**Other Options Specified:
        ADJ_U*   - Use ADJ_U* option for SBL in AERMET
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of:  OTHER

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates PERIOD Averages

**This Run Includes:    249 Source(s);      10 Source Group(s); and    1884 Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
                and:    246 VOLUME source(s)
                and:      3 AREA type source(s)
                and:      0 LINE source(s)
                and:      0 RLINE/RLINEXT source(s)
                and:      0 OPENPIT source(s)
                and:      0 BUOYANT LINE source(s) with a total of     0 line(s)
```

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

```
**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date:  16216

**Output Options Selected:
         Model Outputs Tables of PERIOD Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    29.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.9 MB of RAM.

**Input Runstream File:          aermod.inp
**Output Print File:             aermod.out

**Detailed Error/Message File:   BREA265a.err
**File for Summary of Results:   BREA265a.sum
```

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000702	0	0.42766E-02	421635.9	3754227.1	161.6	4.15	11.63	1.93	YES	HRDOW
L0000703	0	0.42766E-02	421637.5	3754202.2	161.0	4.15	11.63	1.93	YES	HRDOW
L0000704	0	0.42766E-02	421639.1	3754177.2	160.4	4.15	11.63	1.93	YES	HRDOW
L0000705	0	0.42766E-02	421640.7	3754152.3	159.7	4.15	11.63	1.93	YES	HRDOW
L0000706	0	0.42766E-02	421642.3	3754127.3	159.1	4.15	11.63	1.93	YES	HRDOW
L0000707	0	0.42766E-02	421644.0	3754102.4	158.5	4.15	11.63	1.93	YES	HRDOW
L0000708	0	0.42766E-02	421645.6	3754077.4	157.9	4.15	11.63	1.93	YES	HRDOW
L0000709	0	0.42766E-02	421647.2	3754052.5	157.3	4.15	11.63	1.93	YES	HRDOW
L0000710	0	0.42766E-02	421648.8	3754027.5	156.7	4.15	11.63	1.93	YES	HRDOW
L0000711	0	0.42766E-02	421650.4	3754002.6	156.1	4.15	11.63	1.93	YES	HRDOW
L0000712	0	0.42766E-02	421652.0	3753977.6	155.5	4.15	11.63	1.93	YES	HRDOW
L0000713	0	0.42766E-02	421653.7	3753952.7	154.9	4.15	11.63	1.93	YES	HRDOW
L0000714	0	0.42766E-02	421655.3	3753927.7	154.3	4.15	11.63	1.93	YES	HRDOW
L0000715	0	0.42766E-02	421656.9	3753902.8	153.7	4.15	11.63	1.93	YES	HRDOW
L0000716	0	0.42766E-02	421658.5	3753877.8	153.1	4.15	11.63	1.93	YES	HRDOW
L0000717	0	0.42766E-02	421660.1	3753852.9	152.5	4.15	11.63	1.93	YES	HRDOW
L0000718	0	0.42766E-02	421661.7	3753827.9	151.8	4.15	11.63	1.93	YES	HRDOW
L0000719	0	0.42766E-02	421663.4	3753803.0	151.2	4.15	11.63	1.93	YES	HRDOW
L0000720	0	0.42766E-02	421665.0	3753778.1	150.6	4.15	11.63	1.93	YES	HRDOW
L0000721	0	0.42766E-02	421664.7	3753753.1	149.8	4.15	11.63	1.93	YES	HRDOW
L0000722	0	0.42766E-02	421662.2	3753728.3	148.8	4.15	11.63	1.93	YES	HRDOW
L0000723	0	0.42766E-02	421659.6	3753703.4	147.8	4.15	11.63	1.93	YES	HRDOW
L0000724	0	0.42766E-02	421657.1	3753678.5	146.8	4.15	11.63	1.93	YES	HRDOW
L0000725	0	0.42766E-02	421654.0	3753653.7	145.9	4.15	11.63	1.93	YES	HRDOW
L0000726	0	0.42766E-02	421650.5	3753629.0	145.0	4.15	11.63	1.93	YES	HRDOW
L0000727	0	0.42766E-02	421647.0	3753604.2	144.2	4.15	11.63	1.93	YES	HRDOW
L0000728	0	0.42766E-02	421643.5	3753579.5	143.4	4.15	11.63	1.93	YES	HRDOW
L0000729	0	0.42766E-02	421640.0	3753554.7	142.6	4.15	11.63	1.93	YES	HRDOW
L0000730	0	0.42766E-02	421636.5	3753530.0	141.8	4.15	11.63	1.93	YES	HRDOW
L0000731	0	0.42766E-02	421633.0	3753505.2	141.0	4.15	11.63	1.93	YES	HRDOW
L0000732	0	0.42766E-02	421629.5	3753480.4	140.1	4.15	11.63	1.93	YES	HRDOW
L0000733	0	0.42766E-02	421626.0	3753455.7	139.3	4.15	11.63	1.93	YES	HRDOW
L0000734	0	0.42766E-02	421622.5	3753430.9	138.5	4.15	11.63	1.93	YES	HRDOW
L0000735	0	0.42766E-02	421619.0	3753406.2	137.7	4.15	11.63	1.93	YES	HRDOW
L0000736	0	0.42766E-02	421615.5	3753381.4	136.9	4.15	11.63	1.93	YES	HRDOW
L0000737	0	0.42766E-02	421612.0	3753356.7	136.0	4.15	11.63	1.93	YES	HRDOW
L0000738	0	0.42766E-02	421608.5	3753331.9	135.2	4.15	11.63	1.93	YES	HRDOW
L0000739	0	0.42766E-02	421605.0	3753307.2	134.4	4.15	11.63	1.93	YES	HRDOW

L0000740	0	0.42766E-02	421601.5	3753282.4	133.6	4.15	11.63	1.93	YES	HRDOW
L0000741	0	0.42766E-02	421598.0	3753257.7	132.8	4.15	11.63	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000742	0	0.42766E-02	421594.5	3753232.9	131.9	4.15	11.63	1.93	YES	HRDOW
L0000743	0	0.42766E-02	421591.1	3753208.2	131.1	4.15	11.63	1.93	YES	HRDOW
L0000744	0	0.42766E-02	421584.4	3753184.2	130.7	4.15	11.63	1.93	YES	HRDOW
L0000745	0	0.42766E-02	421575.3	3753160.9	130.5	4.15	11.63	1.93	YES	HRDOW
L0000746	0	0.42766E-02	421566.3	3753137.6	130.3	4.15	11.63	1.93	YES	HRDOW
L0000747	0	0.42766E-02	421557.2	3753114.3	130.1	4.15	11.63	1.93	YES	HRDOW
L0000748	0	0.42766E-02	421548.2	3753091.0	129.9	4.15	11.63	1.93	YES	HRDOW
L0000621	0	0.48272E-02	422828.4	3753870.0	141.6	4.15	13.02	1.93	YES	HRDOW
L0000622	0	0.48272E-02	422800.5	3753868.1	141.6	4.15	13.02	1.93	YES	HRDOW
L0000623	0	0.48272E-02	422772.6	3753866.3	141.6	4.15	13.02	1.93	YES	HRDOW
L0000624	0	0.48272E-02	422744.6	3753864.5	141.6	4.15	13.02	1.93	YES	HRDOW
L0000625	0	0.48272E-02	422716.7	3753863.0	141.7	4.15	13.02	1.93	YES	HRDOW
L0000626	0	0.48272E-02	422688.7	3753864.2	142.0	4.15	13.02	1.93	YES	HRDOW
L0000627	0	0.48272E-02	422660.7	3753865.4	142.3	4.15	13.02	1.93	YES	HRDOW
L0000628	0	0.48272E-02	422632.8	3753866.6	142.6	4.15	13.02	1.93	YES	HRDOW
L0000629	0	0.48272E-02	422605.4	3753872.3	142.7	4.15	13.02	1.93	YES	HRDOW
L0000630	0	0.48272E-02	422578.0	3753878.1	142.9	4.15	13.02	1.93	YES	HRDOW
L0000631	0	0.48272E-02	422550.6	3753883.9	143.0	4.15	13.02	1.93	YES	HRDOW
L0000632	0	0.48272E-02	422523.3	3753890.1	143.1	4.15	13.02	1.93	YES	HRDOW
L0000633	0	0.48272E-02	422496.4	3753897.9	142.9	4.15	13.02	1.93	YES	HRDOW
L0000634	0	0.48272E-02	422469.5	3753905.7	142.8	4.15	13.02	1.93	YES	HRDOW
L0000635	0	0.48272E-02	422442.7	3753913.7	142.7	4.15	13.02	1.93	YES	HRDOW
L0000636	0	0.48272E-02	422416.3	3753923.1	142.7	4.15	13.02	1.93	YES	HRDOW
L0000637	0	0.48272E-02	422389.9	3753932.6	142.7	4.15	13.02	1.93	YES	HRDOW
L0000638	0	0.48272E-02	422363.6	3753942.0	142.8	4.15	13.02	1.93	YES	HRDOW
L0000639	0	0.48272E-02	422337.2	3753951.4	142.8	4.15	13.02	1.93	YES	HRDOW
L0000640	0	0.48272E-02	422310.8	3753960.9	142.9	4.15	13.02	1.93	YES	HRDOW
L0000641	0	0.48272E-02	422284.5	3753970.3	142.9	4.15	13.02	1.93	YES	HRDOW
L0000642	0	0.48272E-02	422258.1	3753979.7	143.0	4.15	13.02	1.93	YES	HRDOW
L0000643	0	0.48272E-02	422231.8	3753989.2	143.0	4.15	13.02	1.93	YES	HRDOW
L0000644	0	0.48272E-02	422205.4	3753998.6	143.1	4.15	13.02	1.93	YES	HRDOW
L0000645	0	0.48272E-02	422179.0	3754008.1	143.1	4.15	13.02	1.93	YES	HRDOW
L0000646	0	0.48272E-02	422151.8	3754014.4	144.5	4.15	13.02	1.93	YES	HRDOW
L0000647	0	0.48272E-02	422124.5	3754020.7	145.9	4.15	13.02	1.93	YES	HRDOW
L0000648	0	0.48272E-02	422097.2	3754026.9	147.3	4.15	13.02	1.93	YES	HRDOW
L0000649	0	0.48272E-02	422069.6	3754031.4	148.6	4.15	13.02	1.93	YES	HRDOW
L0000650	0	0.48272E-02	422041.8	3754034.7	149.6	4.15	13.02	1.93	YES	HRDOW
L0000651	0	0.48272E-02	422014.0	3754037.9	150.7	4.15	13.02	1.93	YES	HRDOW

L0000652	0	0.48272E-02	421986.2	3754041.2	151.8	4.15	13.02	1.93	YES	HRDOW
L0000653	0	0.48272E-02	421958.4	3754044.5	152.8	4.15	13.02	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000654	0	0.48272E-02	421930.5	3754047.8	153.9	4.15	13.02	1.93	YES	HRDOW
L0000655	0	0.48272E-02	421902.7	3754051.0	155.0	4.15	13.02	1.93	YES	HRDOW
L0000656	0	0.48272E-02	421874.9	3754054.3	156.0	4.15	13.02	1.93	YES	HRDOW
L0000657	0	0.48272E-02	421847.1	3754057.6	157.1	4.15	13.02	1.93	YES	HRDOW
L0000658	0	0.48272E-02	421819.3	3754060.9	158.2	4.15	13.02	1.93	YES	HRDOW
L0000659	0	0.48272E-02	421791.5	3754064.1	159.2	4.15	13.02	1.93	YES	HRDOW
L0000660	0	0.48272E-02	421763.5	3754064.8	159.2	4.15	13.02	1.93	YES	HRDOW
L0000661	0	0.48272E-02	421735.5	3754065.1	158.9	4.15	13.02	1.93	YES	HRDOW
L0000662	0	0.48272E-02	421707.5	3754065.3	158.7	4.15	13.02	1.93	YES	HRDOW
L0000663	0	0.48272E-02	421679.5	3754065.5	158.4	4.15	13.02	1.93	YES	HRDOW
L0000664	0	0.48272E-02	421651.5	3754065.8	158.1	4.15	13.02	1.93	YES	HRDOW
L0000665	0	0.48272E-02	421623.5	3754066.0	157.8	4.15	13.02	1.93	YES	HRDOW
L0000666	0	0.48272E-02	421595.5	3754066.2	157.6	4.15	13.02	1.93	YES	HRDOW
L0000667	0	0.48272E-02	421567.5	3754066.4	157.3	4.15	13.02	1.93	YES	HRDOW
L0000668	0	0.48272E-02	421539.5	3754066.7	157.0	4.15	13.02	1.93	YES	HRDOW
L0000669	0	0.48272E-02	421511.5	3754066.9	156.8	4.15	13.02	1.93	YES	HRDOW
L0000670	0	0.48272E-02	421483.5	3754067.1	156.5	4.15	13.02	1.93	YES	HRDOW
L0000671	0	0.48272E-02	421455.6	3754066.6	156.0	4.15	13.02	1.93	YES	HRDOW
L0000672	0	0.48272E-02	421427.6	3754066.2	155.6	4.15	13.02	1.93	YES	HRDOW
L0000673	0	0.48272E-02	421399.6	3754065.7	155.1	4.15	13.02	1.93	YES	HRDOW
L0000674	0	0.48272E-02	421371.6	3754065.3	154.7	4.15	13.02	1.93	YES	HRDOW
L0000675	0	0.48272E-02	421343.6	3754064.8	154.2	4.15	13.02	1.93	YES	HRDOW
L0000676	0	0.48272E-02	421315.6	3754064.4	153.7	4.15	13.02	1.93	YES	HRDOW
L0000677	0	0.48272E-02	421287.6	3754063.9	153.3	4.15	13.02	1.93	YES	HRDOW
L0000678	0	0.48272E-02	421259.6	3754063.5	152.8	4.15	13.02	1.93	YES	HRDOW
L0000679	0	0.48272E-02	421231.6	3754063.0	152.4	4.15	13.02	1.93	YES	HRDOW
L0000680	0	0.48272E-02	421203.6	3754062.4	151.9	4.15	13.02	1.93	YES	HRDOW
L0000681	0	0.48272E-02	421175.6	3754061.5	151.4	4.15	13.02	1.93	YES	HRDOW
L0000682	0	0.48272E-02	421147.6	3754060.5	150.9	4.15	13.02	1.93	YES	HRDOW
L0000683	0	0.48272E-02	421119.6	3754059.6	150.4	4.15	13.02	1.93	YES	HRDOW
L0000684	0	0.48272E-02	421091.7	3754058.6	149.9	4.15	13.02	1.93	YES	HRDOW
L0000685	0	0.48272E-02	421063.7	3754057.6	149.4	4.15	13.02	1.93	YES	HRDOW
L0000686	0	0.48272E-02	421036.5	3754050.8	148.8	4.15	13.02	1.93	YES	HRDOW
L0000687	0	0.48272E-02	421009.4	3754044.0	148.2	4.15	13.02	1.93	YES	HRDOW
L0000688	0	0.48272E-02	420982.2	3754037.1	147.6	4.15	13.02	1.93	YES	HRDOW
L0000689	0	0.48272E-02	420955.1	3754030.3	146.9	4.15	13.02	1.93	YES	HRDOW
L0000690	0	0.48272E-02	420927.9	3754023.5	146.3	4.15	13.02	1.93	YES	HRDOW
L0000691	0	0.48272E-02	420900.9	3754016.0	145.9	4.15	13.02	1.93	YES	HRDOW

L0000692	0	0.48272E-02	420874.0	3754008.4	145.6	4.15	13.02	1.93	YES	HRDOW
L0000693	0	0.48272E-02	420847.1	3754000.7	145.3	4.15	13.02	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000694	0	0.48272E-02	420820.1	3753993.0	145.0	4.15	13.02	1.93	YES	HRDOW
L0000695	0	0.48272E-02	420793.2	3753985.3	144.7	4.15	13.02	1.93	YES	HRDOW
L0000696	0	0.48272E-02	420766.3	3753977.6	144.4	4.15	13.02	1.93	YES	HRDOW
L0000697	0	0.48272E-02	420738.8	3753973.2	144.4	4.15	13.02	1.93	YES	HRDOW
L0000698	0	0.48272E-02	420710.9	3753970.9	144.5	4.15	13.02	1.93	YES	HRDOW
L0000699	0	0.48272E-02	420683.0	3753968.6	144.7	4.15	13.02	1.93	YES	HRDOW
L0000700	0	0.48272E-02	420655.1	3753966.2	144.9	4.15	13.02	1.93	YES	HRDOW
L0000701	0	0.48272E-02	420627.2	3753963.9	145.1	4.15	13.02	1.93	YES	HRDOW
L0000749	0	0.34576E-02	422130.7	3752207.5	126.4	4.15	9.30	1.93	YES	HRDOW
L0000750	0	0.34576E-02	422130.3	3752227.5	126.1	4.15	9.30	1.93	YES	HRDOW
L0000751	0	0.34576E-02	422129.9	3752247.5	125.8	4.15	9.30	1.93	YES	HRDOW
L0000752	0	0.34576E-02	422129.5	3752267.5	125.4	4.15	9.30	1.93	YES	HRDOW
L0000753	0	0.34576E-02	422129.2	3752287.5	125.1	4.15	9.30	1.93	YES	HRDOW
L0000754	0	0.34576E-02	422128.8	3752307.5	124.8	4.15	9.30	1.93	YES	HRDOW
L0000755	0	0.34576E-02	422128.4	3752327.5	124.5	4.15	9.30	1.93	YES	HRDOW
L0000756	0	0.34576E-02	422128.0	3752347.5	124.2	4.15	9.30	1.93	YES	HRDOW
L0000757	0	0.34576E-02	422127.6	3752367.5	123.9	4.15	9.30	1.93	YES	HRDOW
L0000758	0	0.34576E-02	422127.2	3752387.5	123.5	4.15	9.30	1.93	YES	HRDOW
L0000759	0	0.34576E-02	422126.8	3752407.5	123.2	4.15	9.30	1.93	YES	HRDOW
L0000760	0	0.34576E-02	422126.4	3752427.5	122.9	4.15	9.30	1.93	YES	HRDOW
L0000761	0	0.34576E-02	422126.0	3752447.5	122.6	4.15	9.30	1.93	YES	HRDOW
L0000762	0	0.34576E-02	422125.6	3752467.5	122.3	4.15	9.30	1.93	YES	HRDOW
L0000763	0	0.34576E-02	422125.2	3752487.5	122.0	4.15	9.30	1.93	YES	HRDOW
L0000764	0	0.34576E-02	422123.5	3752507.4	121.8	4.15	9.30	1.93	YES	HRDOW
L0000765	0	0.34576E-02	422120.5	3752527.1	121.8	4.15	9.30	1.93	YES	HRDOW
L0000766	0	0.34576E-02	422117.6	3752546.9	121.9	4.15	9.30	1.93	YES	HRDOW
L0000767	0	0.34576E-02	422111.5	3752566.0	122.0	4.15	9.30	1.93	YES	HRDOW
L0000768	0	0.34576E-02	422105.2	3752584.9	122.2	4.15	9.30	1.93	YES	HRDOW
L0000769	0	0.34576E-02	422098.8	3752603.9	122.3	4.15	9.30	1.93	YES	HRDOW
L0000770	0	0.34576E-02	422092.0	3752622.6	122.5	4.15	9.30	1.93	YES	HRDOW
L0000771	0	0.34576E-02	422081.7	3752639.8	123.0	4.15	9.30	1.93	YES	HRDOW
L0000772	0	0.34576E-02	422071.3	3752656.9	123.4	4.15	9.30	1.93	YES	HRDOW
L0000773	0	0.34576E-02	422058.6	3752672.2	123.6	4.15	9.30	1.93	YES	HRDOW
L0000774	0	0.34576E-02	422045.1	3752686.9	123.7	4.15	9.30	1.93	YES	HRDOW
L0000775	0	0.34576E-02	422031.5	3752701.6	123.7	4.15	9.30	1.93	YES	HRDOW
L0000776	0	0.34576E-02	422017.9	3752716.2	123.8	4.15	9.30	1.93	YES	HRDOW
L0000777	0	0.34576E-02	422004.3	3752730.9	123.8	4.15	9.30	1.93	YES	HRDOW
L0000778	0	0.34576E-02	421990.7	3752745.6	123.9	4.15	9.30	1.93	YES	HRDOW

L0000779	0	0.34576E-02	421977.1	3752760.3	123.9	4.15	9.30	1.93	YES	HRDOW
L0000780	0	0.34576E-02	421963.5	3752774.9	124.0	4.15	9.30	1.93	YES	HRDOW

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*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000781	0	0.34576E-02	421949.9	3752789.6	124.0	4.15	9.30	1.93	YES	HRDOW
L0000782	0	0.34576E-02	421936.3	3752804.3	124.1	4.15	9.30	1.93	YES	HRDOW
L0000783	0	0.34576E-02	421922.8	3752819.0	124.1	4.15	9.30	1.93	YES	HRDOW
L0000784	0	0.34576E-02	421909.2	3752833.6	124.2	4.15	9.30	1.93	YES	HRDOW
L0000785	0	0.34576E-02	421895.6	3752848.3	124.2	4.15	9.30	1.93	YES	HRDOW
L0000786	0	0.34576E-02	421882.0	3752863.0	124.3	4.15	9.30	1.93	YES	HRDOW
L0000787	0	0.34576E-02	421868.4	3752877.7	124.3	4.15	9.30	1.93	YES	HRDOW
L0000788	0	0.34576E-02	421854.8	3752892.3	124.4	4.15	9.30	1.93	YES	HRDOW
L0000789	0	0.34576E-02	421844.1	3752909.1	124.3	4.15	9.30	1.93	YES	HRDOW
L0000790	0	0.34576E-02	421834.4	3752926.6	124.1	4.15	9.30	1.93	YES	HRDOW
L0000791	0	0.34576E-02	421824.6	3752944.0	124.0	4.15	9.30	1.93	YES	HRDOW
L0000792	0	0.34576E-02	421816.4	3752962.2	123.9	4.15	9.30	1.93	YES	HRDOW
L0000793	0	0.34576E-02	421810.0	3752981.1	123.9	4.15	9.30	1.93	YES	HRDOW
L0000794	0	0.34576E-02	421803.6	3753000.1	123.9	4.15	9.30	1.93	YES	HRDOW
L0000795	0	0.34576E-02	421797.2	3753019.0	123.8	4.15	9.30	1.93	YES	HRDOW
L0000796	0	0.34576E-02	421792.8	3753038.5	123.9	4.15	9.30	1.93	YES	HRDOW
L0000797	0	0.34576E-02	421789.8	3753058.2	124.0	4.15	9.30	1.93	YES	HRDOW
L0000798	0	0.34576E-02	421786.9	3753078.0	124.2	4.15	9.30	1.93	YES	HRDOW
L0000799	0	0.34576E-02	421785.5	3753098.0	124.5	4.15	9.30	1.93	YES	HRDOW
L0000800	0	0.34576E-02	421784.4	3753117.9	124.9	4.15	9.30	1.93	YES	HRDOW
L0000801	0	0.34576E-02	421783.3	3753137.9	125.3	4.15	9.30	1.93	YES	HRDOW
L0000802	0	0.34576E-02	421782.1	3753157.9	125.7	4.15	9.30	1.93	YES	HRDOW
L0000803	0	0.34576E-02	421781.0	3753177.8	126.1	4.15	9.30	1.93	YES	HRDOW
L0000804	0	0.34576E-02	421779.9	3753197.8	126.4	4.15	9.30	1.93	YES	HRDOW
L0000805	0	0.34576E-02	421778.8	3753217.8	126.8	4.15	9.30	1.93	YES	HRDOW
L0000806	0	0.34576E-02	421777.7	3753237.7	127.2	4.15	9.30	1.93	YES	HRDOW
L0000807	0	0.34576E-02	421776.6	3753257.7	127.6	4.15	9.30	1.93	YES	HRDOW
L0000808	0	0.34576E-02	421775.5	3753277.7	128.0	4.15	9.30	1.93	YES	HRDOW
L0000809	0	0.34576E-02	421774.4	3753297.6	128.4	4.15	9.30	1.93	YES	HRDOW
L0000810	0	0.34576E-02	421770.6	3753317.1	129.1	4.15	9.30	1.93	YES	HRDOW
L0000811	0	0.34576E-02	421764.3	3753336.1	130.3	4.15	9.30	1.93	YES	HRDOW
L0000812	0	0.34576E-02	421755.2	3753353.8	131.7	4.15	9.30	1.93	YES	HRDOW
L0000813	0	0.34576E-02	421745.6	3753371.4	133.0	4.15	9.30	1.93	YES	HRDOW
L0000814	0	0.34576E-02	421732.3	3753386.1	134.2	4.15	9.30	1.93	YES	HRDOW
L0000815	0	0.34576E-02	421717.6	3753399.6	135.2	4.15	9.30	1.93	YES	HRDOW
L0000816	0	0.34576E-02	421701.5	3753411.2	136.1	4.15	9.30	1.93	YES	HRDOW
L0000817	0	0.34576E-02	421683.6	3753420.0	137.0	4.15	9.30	1.93	YES	HRDOW
L0000818	0	0.34576E-02	421664.8	3753426.1	137.8	4.15	9.30	1.93	YES	HRDOW

L0000819	0	0.34576E-02	421645.0	3753429.4	138.5	4.15	9.30	1.93	YES	HRDOW
L0000820	0	0.34576E-02	421625.3	3753432.6	139.1	4.15	9.30	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000821	0	0.34576E-02	421605.6	3753435.9	139.7	4.15	9.30	1.93	YES	HRDOW
L0000822	0	0.34576E-02	421585.7	3753437.4	140.0	4.15	9.30	1.93	YES	HRDOW
L0000823	0	0.34576E-02	421565.7	3753437.2	139.8	4.15	9.30	1.93	YES	HRDOW
L0000824	0	0.34576E-02	421545.7	3753437.1	139.7	4.15	9.30	1.93	YES	HRDOW
L0000825	0	0.34576E-02	421525.7	3753436.9	139.5	4.15	9.30	1.93	YES	HRDOW
L0000826	0	0.34576E-02	421505.7	3753436.7	139.4	4.15	9.30	1.93	YES	HRDOW
L0000827	0	0.34576E-02	421485.7	3753436.5	139.2	4.15	9.30	1.93	YES	HRDOW
L0000828	0	0.34576E-02	421465.7	3753436.3	139.1	4.15	9.30	1.93	YES	HRDOW
L0000829	0	0.34576E-02	421445.7	3753436.2	139.0	4.15	9.30	1.93	YES	HRDOW
L0000830	0	0.34576E-02	421425.7	3753436.0	138.8	4.15	9.30	1.93	YES	HRDOW
L0000831	0	0.34576E-02	421405.7	3753435.8	138.7	4.15	9.30	1.93	YES	HRDOW
L0000832	0	0.34576E-02	421385.7	3753435.6	138.5	4.15	9.30	1.93	YES	HRDOW
L0000833	0	0.34576E-02	421365.7	3753435.5	138.4	4.15	9.30	1.93	YES	HRDOW
L0000834	0	0.34576E-02	421345.7	3753435.3	138.2	4.15	9.30	1.93	YES	HRDOW
L0000835	0	0.34576E-02	421325.7	3753435.1	138.1	4.15	9.30	1.93	YES	HRDOW
L0000836	0	0.34576E-02	421305.7	3753434.9	138.0	4.15	9.30	1.93	YES	HRDOW
L0000837	0	0.34576E-02	421285.7	3753434.8	137.8	4.15	9.30	1.93	YES	HRDOW
L0000838	0	0.34576E-02	421265.7	3753434.6	137.7	4.15	9.30	1.93	YES	HRDOW
L0000839	0	0.34576E-02	421245.7	3753434.4	137.5	4.15	9.30	1.93	YES	HRDOW
L0000840	0	0.34576E-02	421225.7	3753434.2	137.4	4.15	9.30	1.93	YES	HRDOW
L0000841	0	0.34576E-02	421205.7	3753434.0	137.2	4.15	9.30	1.93	YES	HRDOW
L0000842	0	0.34576E-02	421185.7	3753433.9	137.1	4.15	9.30	1.93	YES	HRDOW
L0000843	0	0.34576E-02	421165.7	3753433.7	136.9	4.15	9.30	1.93	YES	HRDOW
L0000844	0	0.34576E-02	421145.7	3753433.5	136.8	4.15	9.30	1.93	YES	HRDOW
L0000845	0	0.34576E-02	421125.7	3753433.3	136.7	4.15	9.30	1.93	YES	HRDOW
L0000846	0	0.34576E-02	421105.7	3753433.2	136.5	4.15	9.30	1.93	YES	HRDOW
L0000847	0	0.34576E-02	421085.7	3753433.0	136.4	4.15	9.30	1.93	YES	HRDOW
L0000848	0	0.34576E-02	421065.7	3753432.8	136.2	4.15	9.30	1.93	YES	HRDOW
L0000849	0	0.34576E-02	421045.7	3753432.6	136.1	4.15	9.30	1.93	YES	HRDOW
L0000850	0	0.34576E-02	421025.7	3753432.5	135.9	4.15	9.30	1.93	YES	HRDOW
L0000851	0	0.34576E-02	421005.7	3753432.3	135.8	4.15	9.30	1.93	YES	HRDOW
L0000852	0	0.34576E-02	420985.7	3753432.1	135.6	4.15	9.30	1.93	YES	HRDOW
L0000853	0	0.34576E-02	420965.7	3753431.9	135.5	4.15	9.30	1.93	YES	HRDOW
L0000854	0	0.34576E-02	420945.7	3753431.8	135.4	4.15	9.30	1.93	YES	HRDOW
L0000855	0	0.34576E-02	420925.7	3753431.6	135.2	4.15	9.30	1.93	YES	HRDOW
L0000856	0	0.34576E-02	420905.7	3753431.4	135.1	4.15	9.30	1.93	YES	HRDOW
L0000857	0	0.34576E-02	420885.7	3753431.2	134.9	4.15	9.30	1.93	YES	HRDOW
L0000858	0	0.34576E-02	420865.7	3753431.0	134.8	4.15	9.30	1.93	YES	HRDOW

L0000859	0	0.34576E-02	420845.7	3753430.9	134.6	4.15	9.30	1.93	YES	HRDOW
L0000860	0	0.34576E-02	420825.7	3753430.7	134.5	4.15	9.30	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000861	0	0.34576E-02	420805.7	3753430.5	134.3	4.15	9.30	1.93	YES	HRDOW
L0000862	0	0.34576E-02	420785.7	3753430.3	134.2	4.15	9.30	1.93	YES	HRDOW
L0000863	0	0.34576E-02	420765.7	3753430.2	134.1	4.15	9.30	1.93	YES	HRDOW
L0000864	0	0.34576E-02	420745.7	3753430.0	133.9	4.15	9.30	1.93	YES	HRDOW
L0000865	0	0.34576E-02	420725.7	3753429.8	133.8	4.15	9.30	1.93	YES	HRDOW
L0000866	0	0.34576E-02	420705.7	3753429.6	133.6	4.15	9.30	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PHASE1	0	0.36292E-05	421688.1	3753497.1	135.7	4.15	32	1.93	YES	HRDOW
PHASE2	0	0.25300E-05	420938.2	3754232.9	159.8	4.15	5	1.93	YES	HRDOW
PHASE3	0	0.24952E-05	421670.9	3754038.8	159.2	4.15	43	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
YR2023	PHASE1 , PHASE2 ,
YR2024	PHASE1 , PHASE2 , PHASE3 ,
YR2025	PHASE1 , PHASE2 ,
HAULROUT	L0000702 , L0000703 , L0000704 , L0000705 , L0000706 , L0000707 , L0000708 , L0000709 ,
	L0000710 , L0000711 , L0000712 , L0000713 , L0000714 , L0000715 , L0000716 , L0000717 ,
	L0000718 , L0000719 , L0000720 , L0000721 , L0000722 , L0000723 , L0000724 , L0000725 ,
	L0000726 , L0000727 , L0000728 , L0000729 , L0000730 , L0000731 , L0000732 , L0000733 ,
	L0000734 , L0000735 , L0000736 , L0000737 , L0000738 , L0000739 , L0000740 , L0000741 ,
	L0000742 , L0000743 , L0000744 , L0000745 , L0000746 , L0000747 , L0000748 , L0000621 ,
	L0000622 , L0000623 , L0000624 , L0000625 , L0000626 , L0000627 , L0000628 , L0000629 ,
	L0000630 , L0000631 , L0000632 , L0000633 , L0000634 , L0000635 , L0000636 , L0000637 ,
	L0000638 , L0000639 , L0000640 , L0000641 , L0000642 , L0000643 , L0000644 , L0000645 ,
	L0000646 , L0000647 , L0000648 , L0000649 , L0000650 , L0000651 , L0000652 , L0000653 ,
	L0000654 , L0000655 , L0000656 , L0000657 , L0000658 , L0000659 , L0000660 , L0000661 ,
	L0000662 , L0000663 , L0000664 , L0000665 , L0000666 , L0000667 , L0000668 , L0000669 ,
	L0000670 , L0000671 , L0000672 , L0000673 , L0000674 , L0000675 , L0000676 , L0000677 ,
	L0000678 , L0000679 , L0000680 , L0000681 , L0000682 , L0000683 , L0000684 , L0000685 ,
	L0000686 , L0000687 , L0000688 , L0000689 , L0000690 , L0000691 , L0000692 , L0000693 ,
	L0000694 , L0000695 , L0000696 , L0000697 , L0000698 , L0000699 , L0000700 , L0000701 ,
	L0000749 , L0000750 , L0000751 , L0000752 , L0000753 , L0000754 , L0000755 , L0000756 ,

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*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
*** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                  PAGE  11
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                        *** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID                                          SOURCE IDs
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            L0000757    , L0000758    , L0000759    , L0000760    , L0000761    , L0000762    , L0000763    , L0000764    ,
            L0000765    , L0000766    , L0000767    , L0000768    , L0000769    , L0000770    , L0000771    , L0000772    ,
            L0000773    , L0000774    , L0000775    , L0000776    , L0000777    , L0000778    , L0000779    , L0000780    ,
            L0000781    , L0000782    , L0000783    , L0000784    , L0000785    , L0000786    , L0000787    , L0000788    ,
            L0000789    , L0000790    , L0000791    , L0000792    , L0000793    , L0000794    , L0000795    , L0000796    ,
            L0000797    , L0000798    , L0000799    , L0000800    , L0000801    , L0000802    , L0000803    , L0000804    ,
            L0000805    , L0000806    , L0000807    , L0000808    , L0000809    , L0000810    , L0000811    , L0000812    ,
            L0000813    , L0000814    , L0000815    , L0000816    , L0000817    , L0000818    , L0000819    , L0000820    ,
            L0000821    , L0000822    , L0000823    , L0000824    , L0000825    , L0000826    , L0000827    , L0000828    ,
            L0000829    , L0000830    , L0000831    , L0000832    , L0000833    , L0000834    , L0000835    , L0000836    ,
            L0000837    , L0000838    , L0000839    , L0000840    , L0000841    , L0000842    , L0000843    , L0000844    ,
            L0000845    , L0000846    , L0000847    , L0000848    , L0000849    , L0000850    , L0000851    , L0000852    ,
            L0000853    , L0000854    , L0000855    , L0000856    , L0000857    , L0000858    , L0000859    , L0000860    ,
            L0000861    , L0000862    , L0000863    , L0000864    , L0000865    , L0000866    ,
 ALLPHASE   PHASE1      , PHASE2      , PHASE3      ,
 YR2026     PHASE2      , PHASE3      ,
 YR2027     PHASE2      , PHASE3      ,
 YR2028     PHASE3      ,
 YR2030     PHASE3      ,
 YR2029     PHASE3      ,
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*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
*** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                  PAGE  12
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                        *** SOURCE IDs DEFINED AS URBAN SOURCES ***

 URBAN ID   URBAN POP                                  SOURCE IDs
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             3186989.   PHASE1      , PHASE2      , PHASE3      , L0000702    , L0000703    , L0000704    , L0000705    ,
L0000706    ,
            L0000707    , L0000708    , L0000709    , L0000710    , L0000711    , L0000712    , L0000713    , L0000714    ,
            L0000715    , L0000716    , L0000717    , L0000718    , L0000719    , L0000720    , L0000721    , L0000722    ,
            L0000723    , L0000724    , L0000725    , L0000726    , L0000727    , L0000728    , L0000729    , L0000730    ,
            L0000731    , L0000732    , L0000733    , L0000734    , L0000735    , L0000736    , L0000737    , L0000738    ,
            L0000739    , L0000740    , L0000741    , L0000742    , L0000743    , L0000744    , L0000745    , L0000746    ,
            L0000747    , L0000748    , L0000621    , L0000622    , L0000623    , L0000624    , L0000625    , L0000626    ,
            L0000627    , L0000628    , L0000629    , L0000630    , L0000631    , L0000632    , L0000633    , L0000634    ,
            L0000635    , L0000636    , L0000637    , L0000638    , L0000639    , L0000640    , L0000641    , L0000642    ,
            L0000643    , L0000644    , L0000645    , L0000646    , L0000647    , L0000648    , L0000649    , L0000650    ,
            L0000651    , L0000652    , L0000653    , L0000654    , L0000655    , L0000656    , L0000657    , L0000658    ,
            L0000659    , L0000660    , L0000661    , L0000662    , L0000663    , L0000664    , L0000665    , L0000666    ,
            L0000667    , L0000668    , L0000669    , L0000670    , L0000671    , L0000672    , L0000673    , L0000674    ,
            L0000675    , L0000676    , L0000677    , L0000678    , L0000679    , L0000680    , L0000681    , L0000682    ,
            L0000683    , L0000684    , L0000685    , L0000686    , L0000687    , L0000688    , L0000689    , L0000690    ,
            L0000691    , L0000692    , L0000693    , L0000694    , L0000695    , L0000696    , L0000697    , L0000698    ,
            L0000699    , L0000700    , L0000701    , L0000749    , L0000750    , L0000751    , L0000752    , L0000753    ,
            L0000754    , L0000755    , L0000756    , L0000757    , L0000758    , L0000759    , L0000760    , L0000761    ,
            L0000762    , L0000763    , L0000764    , L0000765    , L0000766    , L0000767    , L0000768    , L0000769    ,
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L0000770 , L0000771 , L0000772 , L0000773 , L0000774 , L0000775 , L0000776 , L0000777 ,

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs
		L0000778 , L0000779 , L0000780 , L0000781 , L0000782 , L0000783 , L0000784 , L0000785 ,
		L0000786 , L0000787 , L0000788 , L0000789 , L0000790 , L0000791 , L0000792 , L0000793 ,
		L0000794 , L0000795 , L0000796 , L0000797 , L0000798 , L0000799 , L0000800 , L0000801 ,
		L0000802 , L0000803 , L0000804 , L0000805 , L0000806 , L0000807 , L0000808 , L0000809 ,
		L0000810 , L0000811 , L0000812 , L0000813 , L0000814 , L0000815 , L0000816 , L0000817 ,
		L0000818 , L0000819 , L0000820 , L0000821 , L0000822 , L0000823 , L0000824 , L0000825 ,
		L0000826 , L0000827 , L0000828 , L0000829 , L0000830 , L0000831 , L0000832 , L0000833 ,
		L0000834 , L0000835 , L0000836 , L0000837 , L0000838 , L0000839 , L0000840 , L0000841 ,
		L0000842 , L0000843 , L0000844 , L0000845 , L0000846 , L0000847 , L0000848 , L0000849 ,
		L0000850 , L0000851 , L0000852 , L0000853 , L0000854 , L0000855 , L0000856 , L0000857 ,
		L0000858 , L0000859 , L0000860 , L0000861 , L0000862 , L0000863 , L0000864 , L0000865 ,
		L0000866 ,

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 *** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
 *** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                   PAGE  14
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                   * SOURCE EMISSION RATE SCALARS WHICH VARY DIURNALLY AND BY DAY OF WEEK (HRDOW) *

 SOURCE ID = PHASE1 - PHASE3     ; SOURCE TYPE = AREAPOLY :
  HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                                          DAY OF WEEK = WEEKDAY
    1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .1000E+01
    9  .1000E+01   10  .1000E+01   11  .1000E+01   12  .0000E+00   13  .1000E+01   14  .1000E+01   15  .1000E+01   16  .1000E+01
   17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                          DAY OF WEEK = SATURDAY
    1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
    9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
   17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                          DAY OF WEEK = SUNDAY
    1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
    9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
   17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00

*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
 *** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                   PAGE  17
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                   * SOURCE EMISSION RATE SCALARS WHICH VARY DIURNALLY AND BY DAY OF WEEK (HRDOW) *

 SOURCE ID = L0000702 - L0000866    ; SOURCE TYPE = VOLUME   :
  HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                                          DAY OF WEEK = WEEKDAY
    1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .1000E+01
    9  .1000E+01   10  .1000E+01   11  .1000E+01   12  .0000E+00   13  .1000E+01   14  .1000E+01   15  .1000E+01   16  .1000E+01
   17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                          DAY OF WEEK = SATURDAY
    1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
    9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
   17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                          DAY OF WEEK = SUNDAY
    1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
    9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
   17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
```

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

```
*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
*** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                  PAGE 287

*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                  *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

  Surface file:   ..\KFUL_V9_ADJU\KFUL_v9.SFC                                              Met Version:  16216
  Profile file:   ..\KFUL_V9_ADJU\KFUL_v9.PFL
  Surface format: FREE
  Profile format: FREE
  Surface station no.:     3166                  Upper air station no.:     3190
                Name: UNKNOWN                                 Name: UNKNOWN
                Year:   2012                                  Year:   2012

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 12 01 01   1 01   -4.8  0.098 -9.000 -9.000 -999.   74.     18.0  0.26   2.61   1.00    0.96  322.   10.1  283.8    2.0
 12 01 01   1 02   -1.9  0.072 -9.000 -9.000 -999.   47.     18.0  0.26   2.61   1.00    0.52   13.   10.1  283.1    2.0
 12 01 01   1 03   -3.1  0.083 -9.000 -9.000 -999.   57.     16.3  0.26   2.61   1.00    0.75   73.   10.1  282.0    2.0
 12 01 01   1 04   -4.3  0.094 -9.000 -9.000 -999.   69.     17.3  0.26   2.61   1.00    0.91   98.   10.1  281.4    2.0
 12 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.26   2.61   1.00    0.00    0.   10.1  280.9    2.0
 12 01 01   1 06   -2.1  0.074 -9.000 -9.000 -999.   48.     17.6  0.26   2.61   1.00    0.55   80.   10.1  280.4    2.0
 12 01 01   1 07   -2.8  0.080 -9.000 -9.000 -999.   54.     16.3  0.26   2.61   1.00    0.69  201.   10.1  280.4    2.0
 12 01 01   1 08   -1.5  0.066 -9.000 -9.000 -999.   41.     17.0  0.26   2.61   0.54    0.52   72.   10.1  280.9    2.0
 12 01 01   1 09   37.4 -9.000 -9.000 -9.000   38. -999. -99999.0  0.26   2.61   0.31    0.00    0.   10.1  285.9    2.0
 12 01 01   1 10  109.1  0.151  0.713  0.008  121.  141.     -2.9  0.26   2.61   0.24    0.79  268.   10.1  289.9    2.0
 12 01 01   1 11  160.5  0.148  1.143  0.005  338.  136.     -1.8  0.26   2.61   0.21    0.70  273.   10.1  294.2    2.0
 12 01 01   1 12  186.9  0.156  1.483  0.005  634.  148.     -1.8  0.26   2.61   0.20    0.74  230.   10.1  297.5    2.0
 12 01 01   1 13  187.4  0.210  1.777  0.005 1088.  231.     -4.5  0.26   2.61   0.20    1.20  227.   10.1  300.4    2.0
 12 01 01   1 14  160.3  0.235  1.833  0.005 1395.  274.     -7.4  0.26   2.61   0.21    1.47  233.   10.1  300.9    2.0
 12 01 01   1 15  109.1  0.197  1.662  0.005 1527.  210.     -6.3  0.26   2.61   0.25    1.20  233.   10.1  302.0    2.0
 12 01 01   1 16   33.3  0.243  1.125  0.005 1548.  288.    -39.2  0.26   2.61   0.33    1.91  229.   10.1  298.1    2.0
 12 01 01   1 17   -9.1  0.141 -9.000 -9.000 -999.  132.     28.3  0.26   2.61   0.60    1.37  212.   10.1  294.2    2.0
 12 01 01   1 18   -4.3  0.094 -9.000 -9.000 -999.   69.     17.5  0.26   2.61   1.00    0.91  190.   10.1  292.0    2.0
 12 01 01   1 19   -2.8  0.079 -9.000 -9.000 -999.   54.     16.3  0.26   2.61   1.00    0.70  302.   10.1  289.2    2.0
 12 01 01   1 20   -4.0  0.091 -9.000 -9.000 -999.   65.     17.0  0.26   2.61   1.00    0.87  338.   10.1  288.1    2.0
 12 01 01   1 21   -6.3  0.113 -9.000 -9.000 -999.   91.     20.5  0.26   2.61   1.00    1.11  304.   10.1  287.0    2.0
 12 01 01   1 22   -3.1  0.082 -9.000 -9.000 -999.   57.     16.3  0.26   2.61   1.00    0.75   76.   10.1  285.4    2.0
 12 01 01   1 23   -2.4  0.076 -9.000 -9.000 -999.   50.     16.7  0.26   2.61   1.00    0.62  306.   10.1  284.9    2.0
 12 01 01   1 24   -3.6  0.087 -9.000 -9.000 -999.   62.     16.6  0.26   2.61   1.00    0.82  318.   10.1  283.8    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.1 1  322.    0.96   283.8   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
```

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2023 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.81235	422261.06	3752501.02	0.83228	
422281.06	3752501.02	0.84794	422301.06	3752501.02	0.85437	
422321.06	3752501.02	0.85654	422341.06	3752501.02	0.85388	
422361.06	3752501.02	0.84622	422381.06	3752501.02	0.83221	
422401.06	3752501.02	0.81194	422421.06	3752501.02	0.78654	
422441.06	3752501.02	0.74811	422661.06	3752501.02	0.15952	
422681.06	3752501.02	0.14870	422701.06	3752501.02	0.13892	
422721.06	3752501.02	0.12992	422741.06	3752501.02	0.12202	
422761.06	3752501.02	0.11492	422701.06	3752561.02	0.14801	
422721.06	3752561.02	0.13716	422741.06	3752561.02	0.12829	
422761.06	3752561.02	0.12060	422781.06	3752561.02	0.11388	
422701.06	3752581.02	0.15041	422721.06	3752581.02	0.13907	
422781.06	3752581.02	0.11519	422701.06	3752601.02	0.15341	
422721.06	3752601.02	0.14130	422741.06	3752601.02	0.13197	
422761.06	3752601.02	0.12365	422781.06	3752601.02	0.11628	
422721.06	3752621.02	0.14323	422761.06	3752621.02	0.12489	
422781.06	3752621.02	0.11730	422721.06	3752641.02	0.14515	
422761.06	3752641.02	0.12615	422781.06	3752641.02	0.11842	
422721.06	3752661.02	0.14709	422761.06	3752661.02	0.12744	
422781.06	3752661.02	0.11962	422721.06	3752681.02	0.14942	
422741.06	3752681.02	0.13781	422741.06	3752701.02	0.13913	
422741.06	3752721.02	0.14046	422290.39	3753829.08	0.24218	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2024 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.83452	422261.06	3752501.02	0.85459	
422281.06	3752501.02	0.87041	422301.06	3752501.02	0.87696	
422321.06	3752501.02	0.87926	422341.06	3752501.02	0.87673	
422361.06	3752501.02	0.86920	422381.06	3752501.02	0.85530	
422401.06	3752501.02	0.83516	422421.06	3752501.02	0.80993	
422441.06	3752501.02	0.77166	422661.06	3752501.02	0.18432	
422681.06	3752501.02	0.17348	422701.06	3752501.02	0.16368	
422721.06	3752501.02	0.15467	422741.06	3752501.02	0.14675	
422761.06	3752501.02	0.13963	422701.06	3752561.02	0.17490	
422721.06	3752561.02	0.16402	422741.06	3752561.02	0.15509	
422761.06	3752561.02	0.14733	422781.06	3752561.02	0.14052	
422701.06	3752581.02	0.17806	422721.06	3752581.02	0.16667	
422781.06	3752581.02	0.14254	422701.06	3752601.02	0.18182	
422721.06	3752601.02	0.16966	422741.06	3752601.02	0.16025	
422761.06	3752601.02	0.15184	422781.06	3752601.02	0.14437	
422721.06	3752621.02	0.17239	422761.06	3752621.02	0.15385	
422781.06	3752621.02	0.14615	422721.06	3752641.02	0.17513	
422761.06	3752641.02	0.15591	422781.06	3752641.02	0.14805	
422721.06	3752661.02	0.17792	422761.06	3752661.02	0.15802	
422781.06	3752661.02	0.15006	422721.06	3752681.02	0.18113	
422741.06	3752681.02	0.16941	422741.06	3752701.02	0.17166	
422741.06	3752721.02	0.17395	422290.39	3753829.08	2.68189	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2025 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.81235	422261.06	3752501.02	0.83228	
422281.06	3752501.02	0.84794	422301.06	3752501.02	0.85437	
422321.06	3752501.02	0.85654	422341.06	3752501.02	0.85388	
422361.06	3752501.02	0.84622	422381.06	3752501.02	0.83221	
422401.06	3752501.02	0.81194	422421.06	3752501.02	0.78654	
422441.06	3752501.02	0.74811	422661.06	3752501.02	0.15952	
422681.06	3752501.02	0.14870	422701.06	3752501.02	0.13892	
422721.06	3752501.02	0.12992	422741.06	3752501.02	0.12202	
422761.06	3752501.02	0.11492	422701.06	3752561.02	0.14801	
422721.06	3752561.02	0.13716	422741.06	3752561.02	0.12829	
422761.06	3752561.02	0.12060	422781.06	3752561.02	0.11388	
422701.06	3752581.02	0.15041	422721.06	3752581.02	0.13907	
422781.06	3752581.02	0.11519	422701.06	3752601.02	0.15341	
422721.06	3752601.02	0.14130	422741.06	3752601.02	0.13197	
422761.06	3752601.02	0.12365	422781.06	3752601.02	0.11628	
422721.06	3752621.02	0.14323	422761.06	3752621.02	0.12489	
422781.06	3752621.02	0.11730	422721.06	3752641.02	0.14515	
422761.06	3752641.02	0.12615	422781.06	3752641.02	0.11842	
422721.06	3752661.02	0.14709	422761.06	3752661.02	0.12744	
422781.06	3752661.02	0.11962	422721.06	3752681.02	0.14942	
422741.06	3752681.02	0.13781	422741.06	3752701.02	0.13913	
422741.06	3752721.02	0.14046	422290.39	3753829.08	0.24218	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HAULROUT ***
INCLUDING SOURCE(S): L0000702 , L0000703 , L0000704 , L0000705 , L0000706 ,
L0000707 , L0000708 , L0000709 , L0000710 , L0000711 , L0000712 , L0000713 , L0000714 ,
L0000715 , L0000716 , L0000717 , L0000718 , L0000719 , L0000720 , L0000721 , L0000722 ,
L0000723 , L0000724 , L0000725 , L0000726 , L0000727 , L0000728 , L0000729 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.30692	422261.06	3752501.02	0.25066	
422281.06	3752501.02	0.20893	422301.06	3752501.02	0.17771	
422321.06	3752501.02	0.15317	422341.06	3752501.02	0.13356	
422361.06	3752501.02	0.11768	422381.06	3752501.02	0.10469	
422401.06	3752501.02	0.09383	422421.06	3752501.02	0.08445	
422441.06	3752501.02	0.07599	422661.06	3752501.02	0.03572	
422681.06	3752501.02	0.03456	422701.06	3752501.02	0.03342	
422721.06	3752501.02	0.03227	422741.06	3752501.02	0.03121	
422761.06	3752501.02	0.03020	422701.06	3752561.02	0.03400	
422721.06	3752561.02	0.03276	422741.06	3752561.02	0.03171	
422761.06	3752561.02	0.03075	422781.06	3752561.02	0.02986	
422701.06	3752581.02	0.03427	422721.06	3752581.02	0.03300	
422781.06	3752581.02	0.03009	422701.06	3752601.02	0.03471	
422721.06	3752601.02	0.03335	422741.06	3752601.02	0.03230	
422761.06	3752601.02	0.03127	422781.06	3752601.02	0.03031	
422721.06	3752621.02	0.03370	422761.06	3752621.02	0.03154	
422781.06	3752621.02	0.03055	422721.06	3752641.02	0.03407	
422761.06	3752641.02	0.03184	422781.06	3752641.02	0.03084	
422721.06	3752661.02	0.03448	422761.06	3752661.02	0.03217	
422781.06	3752661.02	0.03116	422721.06	3752681.02	0.03496	
422741.06	3752681.02	0.03360	422741.06	3752701.02	0.03394	
422741.06	3752721.02	0.03428	422290.39	3753829.08	0.20937	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALLPHASE **
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.83452	422261.06	3752501.02	0.85459	
422281.06	3752501.02	0.87041	422301.06	3752501.02	0.87696	
422321.06	3752501.02	0.87926	422341.06	3752501.02	0.87673	
422361.06	3752501.02	0.86920	422381.06	3752501.02	0.85530	
422401.06	3752501.02	0.83516	422421.06	3752501.02	0.80993	
422441.06	3752501.02	0.77166	422661.06	3752501.02	0.18432	
422681.06	3752501.02	0.17348	422701.06	3752501.02	0.16368	
422721.06	3752501.02	0.15467	422741.06	3752501.02	0.14675	
422761.06	3752501.02	0.13963	422701.06	3752561.02	0.17490	
422721.06	3752561.02	0.16402	422741.06	3752561.02	0.15509	
422761.06	3752561.02	0.14733	422781.06	3752561.02	0.14052	
422701.06	3752581.02	0.17806	422721.06	3752581.02	0.16667	
422781.06	3752581.02	0.14254	422701.06	3752601.02	0.18182	
422721.06	3752601.02	0.16966	422741.06	3752601.02	0.16025	
422761.06	3752601.02	0.15184	422781.06	3752601.02	0.14437	
422721.06	3752621.02	0.17239	422761.06	3752621.02	0.15385	
422781.06	3752621.02	0.14615	422721.06	3752641.02	0.17513	
422761.06	3752641.02	0.15591	422781.06	3752641.02	0.14805	
422721.06	3752661.02	0.17792	422761.06	3752661.02	0.15802	
422781.06	3752661.02	0.15006	422721.06	3752681.02	0.18113	
422741.06	3752681.02	0.16941	422741.06	3752701.02	0.17166	
422741.06	3752721.02	0.17395	422290.39	3753829.08	2.68189	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2026 ***
INCLUDING SOURCE(S): PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.04039	422261.06	3752501.02	0.04050	
422281.06	3752501.02	0.04062	422301.06	3752501.02	0.04069	
422321.06	3752501.02	0.04077	422341.06	3752501.02	0.04084	
422361.06	3752501.02	0.04090	422381.06	3752501.02	0.04096	
422401.06	3752501.02	0.04103	422421.06	3752501.02	0.04114	
422441.06	3752501.02	0.04127	422661.06	3752501.02	0.04184	
422681.06	3752501.02	0.04171	422701.06	3752501.02	0.04158	
422721.06	3752501.02	0.04148	422741.06	3752501.02	0.04136	
422761.06	3752501.02	0.04124	422701.06	3752561.02	0.04448	
422721.06	3752561.02	0.04434	422741.06	3752561.02	0.04417	
422761.06	3752561.02	0.04398	422781.06	3752561.02	0.04379	
422701.06	3752581.02	0.04549	422721.06	3752581.02	0.04534	
422781.06	3752581.02	0.04473	422701.06	3752601.02	0.04650	
422721.06	3752601.02	0.04635	422741.06	3752601.02	0.04614	
422761.06	3752601.02	0.04593	422781.06	3752601.02	0.04571	
422721.06	3752621.02	0.04740	422761.06	3752621.02	0.04695	
422781.06	3752621.02	0.04671	422721.06	3752641.02	0.04848	
422761.06	3752641.02	0.04799	422781.06	3752641.02	0.04774	
422721.06	3752661.02	0.04959	422761.06	3752661.02	0.04907	
422781.06	3752661.02	0.04879	422721.06	3752681.02	0.05072	
422741.06	3752681.02	0.05048	422741.06	3752701.02	0.05166	
422741.06	3752721.02	0.05289	422290.39	3753829.08	2.50122	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2027 ***
INCLUDING SOURCE(S): PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.04039	422261.06	3752501.02	0.04050	
422281.06	3752501.02	0.04062	422301.06	3752501.02	0.04069	
422321.06	3752501.02	0.04077	422341.06	3752501.02	0.04084	
422361.06	3752501.02	0.04090	422381.06	3752501.02	0.04096	
422401.06	3752501.02	0.04103	422421.06	3752501.02	0.04114	
422441.06	3752501.02	0.04127	422661.06	3752501.02	0.04184	
422681.06	3752501.02	0.04171	422701.06	3752501.02	0.04158	
422721.06	3752501.02	0.04148	422741.06	3752501.02	0.04136	
422761.06	3752501.02	0.04124	422701.06	3752561.02	0.04448	
422721.06	3752561.02	0.04434	422741.06	3752561.02	0.04417	
422761.06	3752561.02	0.04398	422781.06	3752561.02	0.04379	
422701.06	3752581.02	0.04549	422721.06	3752581.02	0.04534	
422781.06	3752581.02	0.04473	422701.06	3752601.02	0.04650	
422721.06	3752601.02	0.04635	422741.06	3752601.02	0.04614	
422761.06	3752601.02	0.04593	422781.06	3752601.02	0.04571	
422721.06	3752621.02	0.04740	422761.06	3752621.02	0.04695	
422781.06	3752621.02	0.04671	422721.06	3752641.02	0.04848	
422761.06	3752641.02	0.04799	422781.06	3752641.02	0.04774	
422721.06	3752661.02	0.04959	422761.06	3752661.02	0.04907	
422781.06	3752661.02	0.04879	422721.06	3752681.02	0.05072	
422741.06	3752681.02	0.05048	422741.06	3752701.02	0.05166	
422741.06	3752721.02	0.05289	422290.39	3753829.08	2.50122	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2028 ***
INCLUDING SOURCE(S): PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.02217	422261.06	3752501.02	0.02231	
422281.06	3752501.02	0.02247	422301.06	3752501.02	0.02259	
422321.06	3752501.02	0.02272	422341.06	3752501.02	0.02285	
422361.06	3752501.02	0.02298	422381.06	3752501.02	0.02310	
422401.06	3752501.02	0.02323	422421.06	3752501.02	0.02338	
422441.06	3752501.02	0.02356	422661.06	3752501.02	0.02481	
422681.06	3752501.02	0.02478	422701.06	3752501.02	0.02476	
422721.06	3752501.02	0.02475	422741.06	3752501.02	0.02473	
422761.06	3752501.02	0.02471	422701.06	3752561.02	0.02689	
422721.06	3752561.02	0.02686	422741.06	3752561.02	0.02680	
422761.06	3752561.02	0.02673	422781.06	3752561.02	0.02664	
422701.06	3752581.02	0.02765	422721.06	3752581.02	0.02761	
422781.06	3752581.02	0.02735	422701.06	3752601.02	0.02841	
422721.06	3752601.02	0.02837	422741.06	3752601.02	0.02828	
422761.06	3752601.02	0.02819	422781.06	3752601.02	0.02809	
422721.06	3752621.02	0.02916	422761.06	3752621.02	0.02896	
422781.06	3752621.02	0.02885	422721.06	3752641.02	0.02998	
422761.06	3752641.02	0.02976	422781.06	3752641.02	0.02963	
422721.06	3752661.02	0.03084	422761.06	3752661.02	0.03059	
422781.06	3752661.02	0.03044	422721.06	3752681.02	0.03172	
422741.06	3752681.02	0.03161	422741.06	3752701.02	0.03253	
422741.06	3752721.02	0.03349	422290.39	3753829.08	2.43970	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2030 ***
INCLUDING SOURCE(S): PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.02217	422261.06	3752501.02	0.02231	
422281.06	3752501.02	0.02247	422301.06	3752501.02	0.02259	
422321.06	3752501.02	0.02272	422341.06	3752501.02	0.02285	
422361.06	3752501.02	0.02298	422381.06	3752501.02	0.02310	
422401.06	3752501.02	0.02323	422421.06	3752501.02	0.02338	
422441.06	3752501.02	0.02356	422661.06	3752501.02	0.02481	
422681.06	3752501.02	0.02478	422701.06	3752501.02	0.02476	
422721.06	3752501.02	0.02475	422741.06	3752501.02	0.02473	
422761.06	3752501.02	0.02471	422701.06	3752561.02	0.02689	
422721.06	3752561.02	0.02686	422741.06	3752561.02	0.02680	
422761.06	3752561.02	0.02673	422781.06	3752561.02	0.02664	
422701.06	3752581.02	0.02765	422721.06	3752581.02	0.02761	
422781.06	3752581.02	0.02735	422701.06	3752601.02	0.02841	
422721.06	3752601.02	0.02837	422741.06	3752601.02	0.02828	
422761.06	3752601.02	0.02819	422781.06	3752601.02	0.02809	
422721.06	3752621.02	0.02916	422761.06	3752621.02	0.02896	
422781.06	3752621.02	0.02885	422721.06	3752641.02	0.02998	
422761.06	3752641.02	0.02976	422781.06	3752641.02	0.02963	
422721.06	3752661.02	0.03084	422761.06	3752661.02	0.03059	
422781.06	3752661.02	0.03044	422721.06	3752681.02	0.03172	
422741.06	3752681.02	0.03161	422741.06	3752701.02	0.03253	
422741.06	3752721.02	0.03349	422290.39	3753829.08	2.43970	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2029 ***
INCLUDING SOURCE(S): PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
422241.06	3752501.02	0.02217	422261.06	3752501.02	0.02231	
422281.06	3752501.02	0.02247	422301.06	3752501.02	0.02259	
422321.06	3752501.02	0.02272	422341.06	3752501.02	0.02285	
422361.06	3752501.02	0.02298	422381.06	3752501.02	0.02310	
422401.06	3752501.02	0.02323	422421.06	3752501.02	0.02338	
422441.06	3752501.02	0.02356	422661.06	3752501.02	0.02481	
422681.06	3752501.02	0.02478	422701.06	3752501.02	0.02476	
422721.06	3752501.02	0.02475	422741.06	3752501.02	0.02473	
422761.06	3752501.02	0.02471	422701.06	3752561.02	0.02689	
422721.06	3752561.02	0.02686	422741.06	3752561.02	0.02680	
422761.06	3752561.02	0.02673	422781.06	3752561.02	0.02664	
422701.06	3752581.02	0.02765	422721.06	3752581.02	0.02761	
422781.06	3752581.02	0.02735	422701.06	3752601.02	0.02841	
422721.06	3752601.02	0.02837	422741.06	3752601.02	0.02828	
422761.06	3752601.02	0.02819	422781.06	3752601.02	0.02809	
422721.06	3752621.02	0.02916	422761.06	3752621.02	0.02896	
422781.06	3752621.02	0.02885	422721.06	3752641.02	0.02998	
422761.06	3752641.02	0.02976	422781.06	3752641.02	0.02963	
422721.06	3752661.02	0.03084	422761.06	3752661.02	0.03059	
422781.06	3752661.02	0.03044	422721.06	3752681.02	0.03172	
422741.06	3752681.02	0.03161	422741.06	3752701.02	0.03253	
422741.06	3752721.02	0.03349	422290.39	3753829.08	2.43970	Resident MEIR

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2023 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
422241.06	3752501.02	9.17176c	(12011724)		422261.06	3752501.02	9.37714c	(12011724)
422281.06	3752501.02	9.52372c	(12011724)		422301.06	3752501.02	9.58811c	(12011724)
422321.06	3752501.02	9.59924c	(12011724)	Resident MEIR	422341.06	3752501.02	9.54834c	(12011724)
422361.06	3752501.02	9.48123c	(12011724)		422381.06	3752501.02	9.41557c	(14011524)
422401.06	3752501.02	9.31174c	(14011524)		422421.06	3752501.02	9.20856c	(12120424)
422441.06	3752501.02	9.20224c	(12120424)		422661.06	3752501.02	3.19030c	(12112024)
422681.06	3752501.02	3.00625c	(12112024)		422701.06	3752501.02	2.84105c	(12112024)
422721.06	3752501.02	2.69232c	(12112024)		422741.06	3752501.02	2.55987c	(12112024)
422761.06	3752501.02	2.44028c	(12112024)		422701.06	3752561.02	2.64199c	(12112024)
422721.06	3752561.02	2.50500c	(12112024)		422741.06	3752561.02	2.39118c	(12112024)
422761.06	3752561.02	2.29150c	(12112024)		422781.06	3752561.02	2.20300c	(12112024)
422701.06	3752581.02	2.56111c	(12112024)		422721.06	3752581.02	2.43435c	(12112024)
422781.06	3752581.02	2.15928c	(12112024)		422701.06	3752601.02	2.49237c	(12112024)
422721.06	3752601.02	2.37383c	(12112024)		422741.06	3752601.02	2.28119c	(12112024)
422761.06	3752601.02	2.19555c	(12112024)		422781.06	3752601.02	2.11739c	(12112024)
422721.06	3752621.02	2.31547c	(12112024)		422761.06	3752621.02	2.15149c	(12112024)
422781.06	3752621.02	2.07908c	(12112024)		422721.06	3752641.02	2.26287c	(12112024)
422761.06	3752641.02	2.11200c	(12112024)		422781.06	3752641.02	2.04551c	(12112024)
422721.06	3752661.02	2.21551c	(12112024)		422761.06	3752661.02	2.07630c	(12112024)
422781.06	3752661.02	2.01489c	(12112024)		422721.06	3752681.02	2.17479c	(12112024)
422741.06	3752681.02	2.10390c	(12112024)		422741.06	3752701.02	2.06814c	(12112024)
422741.06	3752721.02	2.03522c	(12112024)		422290.39	3753829.08	1.51489	(12021724)

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2024 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
422241.06	3752501.02	9.72792c	(12011724)		422261.06	3752501.02	9.95698c	(12011724)
422281.06	3752501.02	10.12719c	(12011724)		422301.06	3752501.02	10.21418c	(12011724)
422321.06	3752501.02	10.24743c	(12011724)	Resident MEIR	422341.06	3752501.02	10.21799c	(12011724)
422361.06	3752501.02	10.17155c	(12011724)		422381.06	3752501.02	10.06799c	(12011724)
422401.06	3752501.02	9.90571c	(12011724)		422421.06	3752501.02	9.78699c	(14011524)
422441.06	3752501.02	9.64175c	(14011524)		422661.06	3752501.02	3.35694c	(12112024)
422681.06	3752501.02	3.18245c	(12112024)		422701.06	3752501.02	3.02721c	(12112024)
422721.06	3752501.02	2.88895c	(12112024)		422741.06	3752501.02	2.76730c	(12112024)
422761.06	3752501.02	2.65885c	(12112024)		422701.06	3752561.02	2.86891c	(12112024)
422721.06	3752561.02	2.74464c	(12112024)		422741.06	3752561.02	2.64368c	(12112024)
422761.06	3752561.02	2.55712c	(12112024)		422781.06	3752561.02	2.48910b	(12020824)
422701.06	3752581.02	2.80387c	(12112024)		422721.06	3752581.02	2.69064c	(12112024)
422781.06	3752581.02	2.47850b	(12020824)		422701.06	3752601.02	2.75201c	(12112024)
422721.06	3752601.02	2.64849b	(12020824)		422741.06	3752601.02	2.58554b	(12020824)
422761.06	3752601.02	2.52663b	(12020824)		422781.06	3752601.02	2.47141b	(12020824)
422721.06	3752621.02	2.63749b	(12020824)		422761.06	3752621.02	2.52028b	(12020824)
422781.06	3752621.02	2.46615b	(12020824)		422721.06	3752641.02	2.62914b	(12020824)
422761.06	3752641.02	2.51463b	(12020824)		422781.06	3752641.02	2.46097b	(12020824)
422721.06	3752661.02	2.62155b	(12020824)		422761.06	3752661.02	2.50906b	(12020824)
422781.06	3752661.02	2.45514b	(12020824)		422721.06	3752681.02	2.61380b	(12020824)
422741.06	3752681.02	2.55816b	(12020824)		422741.06	3752701.02	2.55118b	(12020824)
422741.06	3752721.02	2.54357b	(12020824)		422290.39	3753829.08	8.20134c	(13020524)

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2025 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
422241.06	3752501.02	9.17176c	(12011724)		422261.06	3752501.02	9.37714c	(12011724)
422281.06	3752501.02	9.52372c	(12011724)		422301.06	3752501.02	9.58811c	(12011724)
422321.06	3752501.02	9.59924c	(12011724)	Resident MEIR	22341.06	3752501.02	9.54834c	(12011724)
422361.06	3752501.02	9.48123c	(12011724)		422381.06	3752501.02	9.41557c	(14011524)
422401.06	3752501.02	9.31174c	(14011524)		422421.06	3752501.02	9.20856c	(12120424)
422441.06	3752501.02	9.20224c	(12120424)		422661.06	3752501.02	3.19030c	(12112024)
422681.06	3752501.02	3.00625c	(12112024)		422701.06	3752501.02	2.84105c	(12112024)
422721.06	3752501.02	2.69232c	(12112024)		422741.06	3752501.02	2.55987c	(12112024)
422761.06	3752501.02	2.44028c	(12112024)		422701.06	3752561.02	2.64199c	(12112024)
422721.06	3752561.02	2.50500c	(12112024)		422741.06	3752561.02	2.39118c	(12112024)
422761.06	3752561.02	2.29150c	(12112024)		422781.06	3752561.02	2.20300c	(12112024)
422701.06	3752581.02	2.56111c	(12112024)		422721.06	3752581.02	2.43435c	(12112024)
422781.06	3752581.02	2.15928c	(12112024)		422701.06	3752601.02	2.49237c	(12112024)
422721.06	3752601.02	2.37383c	(12112024)		422741.06	3752601.02	2.28119c	(12112024)
422761.06	3752601.02	2.19555c	(12112024)		422781.06	3752601.02	2.11739c	(12112024)
422721.06	3752621.02	2.31547c	(12112024)		422761.06	3752621.02	2.15149c	(12112024)
422781.06	3752621.02	2.07908c	(12112024)		422721.06	3752641.02	2.26287c	(12112024)
422761.06	3752641.02	2.11200c	(12112024)		422781.06	3752641.02	2.04551c	(12112024)
422721.06	3752661.02	2.21551c	(12112024)		422761.06	3752661.02	2.07630c	(12112024)
422781.06	3752661.02	2.01489c	(12112024)		422721.06	3752681.02	2.17479c	(12112024)
422741.06	3752681.02	2.10390c	(12112024)		422741.06	3752701.02	2.06814c	(12112024)
422741.06	3752721.02	2.03522c	(12112024)		422290.39	3753829.08	1.51489	(12021724)

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALLPHASE ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
422241.06	3752501.02	9.72792c	(12011724)		422261.06	3752501.02	9.95698c	(12011724)
422281.06	3752501.02	10.12719c	(12011724)		422301.06	3752501.02	10.21418c	(12011724)
422321.06	3752501.02	10.24743c	(12011724)	Resident MEIR	422341.06	3752501.02	10.21799c	(12011724)
422361.06	3752501.02	10.17155c	(12011724)		422381.06	3752501.02	10.06799c	(12011724)
422401.06	3752501.02	9.90571c	(12011724)		422421.06	3752501.02	9.78699c	(14011524)
422441.06	3752501.02	9.64175c	(14011524)		422661.06	3752501.02	3.35694c	(12112024)
422681.06	3752501.02	3.18245c	(12112024)		422701.06	3752501.02	3.02721c	(12112024)
422721.06	3752501.02	2.88895c	(12112024)		422741.06	3752501.02	2.76730c	(12112024)
422761.06	3752501.02	2.65885c	(12112024)		422701.06	3752561.02	2.86891c	(12112024)
422721.06	3752561.02	2.74464c	(12112024)		422741.06	3752561.02	2.64368c	(12112024)
422761.06	3752561.02	2.55712c	(12112024)		422781.06	3752561.02	2.48910b	(12020824)
422701.06	3752581.02	2.80387c	(12112024)		422721.06	3752581.02	2.69064c	(12112024)
422781.06	3752581.02	2.47850b	(12020824)		422701.06	3752601.02	2.75201c	(12112024)
422721.06	3752601.02	2.64849b	(12020824)		422741.06	3752601.02	2.58554b	(12020824)
422761.06	3752601.02	2.52663b	(12020824)		422781.06	3752601.02	2.47141b	(12020824)
422721.06	3752621.02	2.63749b	(12020824)		422761.06	3752621.02	2.52028b	(12020824)
422781.06	3752621.02	2.46615b	(12020824)		422721.06	3752641.02	2.62914b	(12020824)
422761.06	3752641.02	2.51463b	(12020824)		422781.06	3752641.02	2.46097b	(12020824)
422721.06	3752661.02	2.62155b	(12020824)		422761.06	3752661.02	2.50906b	(12020824)
422781.06	3752661.02	2.45514b	(12020824)		422721.06	3752681.02	2.61380b	(12020824)
422741.06	3752681.02	2.55816b	(12020824)		422741.06	3752701.02	2.55118b	(12020824)
422741.06	3752721.02	2.54357b	(12020824)		422290.39	3753829.08	8.20134c	(13020524)

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2027 ***
INCLUDING SOURCE(S): PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
422241.06	3752501.02	1.17122c	(16121324)		422261.06	3752501.02	1.17580c	(16121324)
422281.06	3752501.02	1.17918c	(16121324)		422301.06	3752501.02	1.18044c	(16121324)
422321.06	3752501.02	1.18480c	(12011724)	Resident MEIR	422341.06	3752501.02	1.19441c	(12011724)
422361.06	3752501.02	1.20298c	(12011724)		422381.06	3752501.02	1.21034c	(12011724)
422401.06	3752501.02	1.21693c	(12011724)		422421.06	3752501.02	1.22352c	(12011724)
422441.06	3752501.02	1.22956c	(12011724)		422661.06	3752501.02	1.27710c	(14011524)
422681.06	3752501.02	1.26976c	(14011524)		422701.06	3752501.02	1.26149c	(14011524)
422721.06	3752501.02	1.25264c	(14011524)		422741.06	3752501.02	1.24235c	(14011524)
422761.06	3752501.02	1.23087c	(14011524)		422701.06	3752561.02	1.32021c	(14011524)
422721.06	3752561.02	1.30824c	(14011524)		422741.06	3752561.02	1.29368c	(14011524)
422761.06	3752561.02	1.27759c	(14011524)		422781.06	3752561.02	1.25986c	(14011524)
422701.06	3752581.02	1.33928c	(14011524)		422721.06	3752581.02	1.32607c	(14011524)
422781.06	3752581.02	1.27343c	(14011524)		422701.06	3752601.02	1.35704c	(14011524)
422721.06	3752601.02	1.34291c	(14011524)		422741.06	3752601.02	1.32544c	(14011524)
422761.06	3752601.02	1.30676c	(14011524)		422781.06	3752601.02	1.30446b	(12020824)
422721.06	3752621.02	1.35982c	(14011524)		422761.06	3752621.02	1.32818b	(12020824)
422781.06	3752621.02	1.34342b	(12020824)		422721.06	3752641.02	1.37642c	(14011524)
422761.06	3752641.02	1.36846b	(12020824)		422781.06	3752641.02	1.38289b	(12020824)
422721.06	3752661.02	1.39265c	(14011524)		422761.06	3752661.02	1.40937b	(12020824)
422781.06	3752661.02	1.42271b	(12020824)		422721.06	3752681.02	1.42045b	(12020824)
422741.06	3752681.02	1.43693b	(12020824)		422741.06	3752701.02	1.48021b	(12020824)
422741.06	3752721.02	1.52429b	(12020824)		422290.39	3753829.08	7.20500c	(13020524)

Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE SUMMARY OF MAXIMUM PERIOD (43848 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)				OF TYPE	NETWORK GRID-ID
			MEIR Location					
ALLPHASE	1ST HIGHEST VALUE IS	2.68189 AT	422290.39,	3753829.08,	155.42,	425.72, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.45653 AT	421760.24,	3753323.17,	129.50,	391.99, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.44184 AT	421688.50,	3754120.28,	162.48,	410.79, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.43533 AT	421728.50,	3754100.28,	161.99,	410.79, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.43475 AT	421668.50,	3754180.28,	162.51,	410.79, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.40945 AT	421748.50,	3754100.28,	161.87,	410.79, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.36446 AT	421760.24,	3753303.17,	128.45,	391.99, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.35437 AT	421668.50,	3754200.28,	162.73,	410.79, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.35155 AT	421688.50,	3754140.28,	162.63,	410.79, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.33102 AT	421868.50,	3754100.28,	160.65,	413.40, 0.00)	DC	
YR2026	1ST HIGHEST VALUE IS	2.50122 AT	422290.39,	3753829.08,	155.42,	425.72, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.40565 AT	421688.50,	3754120.28,	162.48,	410.79, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.40326 AT	421668.50,	3754180.28,	162.51,	410.79, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.39413 AT	421728.50,	3754100.28,	161.99,	410.79, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.36619 AT	421748.50,	3754100.28,	161.87,	410.79, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.32384 AT	421668.50,	3754200.28,	162.73,	410.79, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.31661 AT	421688.50,	3754140.28,	162.63,	410.79, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.28733 AT	421167.01,	3754273.15,	167.37,	391.99, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.27182 AT	421868.50,	3754100.28,	160.65,	413.40, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.26149 AT	421147.01,	3754273.15,	167.30,	391.99, 0.00)	DC	
YR2027	1ST HIGHEST VALUE IS	2.50122 AT	422290.39,	3753829.08,	155.42,	425.72, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.40565 AT	421688.50,	3754120.28,	162.48,	410.79, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.40326 AT	421668.50,	3754180.28,	162.51,	410.79, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.39413 AT	421728.50,	3754100.28,	161.99,	410.79, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.36619 AT	421748.50,	3754100.28,	161.87,	410.79, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.32384 AT	421668.50,	3754200.28,	162.73,	410.79, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.31661 AT	421688.50,	3754140.28,	162.63,	410.79, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.28733 AT	421167.01,	3754273.15,	167.37,	391.99, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.27182 AT	421868.50,	3754100.28,	160.65,	413.40, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.26149 AT	421147.01,	3754273.15,	167.30,	391.99, 0.00)	DC	
YR2028	1ST HIGHEST VALUE IS	2.43970 AT	422290.39,	3753829.08,	155.42,	425.72, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.01152 AT	421948.50,	3754100.28,	159.95,	420.67, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.01132 AT	421928.50,	3754100.28,	160.23,	420.67, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.00710 AT	421968.50,	3754100.28,	159.51,	425.30, 0.00)	DC	

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          5TH HIGHEST VALUE IS      1.00648 AT (  421908.50,  3754100.28,   160.46,   420.67,    0.00)  DC
          6TH HIGHEST VALUE IS      0.99723 AT (  421888.50,  3754100.28,   160.61,   420.18,    0.00)  DC
          7TH HIGHEST VALUE IS      0.98447 AT (  421868.50,  3754100.28,   160.65,   413.40,    0.00)  DC
          8TH HIGHEST VALUE IS      0.84062 AT (  421968.50,  3754120.28,   160.00,   425.30,    0.00)  DC
          9TH HIGHEST VALUE IS      0.83731 AT (  421948.50,  3754120.28,   160.40,   420.67,    0.00)  DC
         10TH HIGHEST VALUE IS      0.83119 AT (  421928.50,  3754120.28,   160.73,   420.67,    0.00)  DC
 *** AERMOD - VERSION 21112  ***   *** Construction HRA                                          ***        02/08/22
 *** AERMET - VERSION  16216 ***   *** Brea 265                                                  ***        10:20:16
                                                                                                           PAGE 770
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                  *** THE SUMMARY OF MAXIMUM PERIOD ( 43848 HRS) RESULTS ***


                                 ** CONC OF OTHER    IN MICROGRAMS/M**3                      **

                                                                                                 NETWORK
GROUP ID                       AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

YR2030    1ST HIGHEST VALUE IS      2.43970 AT (  422290.39,  3753829.08,   155.42,   425.72,    0.00)  DC
          2ND HIGHEST VALUE IS      1.01152 AT (  421948.50,  3754100.28,   159.95,   420.67,    0.00)  DC
          3RD HIGHEST VALUE IS      1.01132 AT (  421928.50,  3754100.28,   160.23,   420.67,    0.00)  DC
          4TH HIGHEST VALUE IS      1.00710 AT (  421968.50,  3754100.28,   159.51,   425.30,    0.00)  DC
          5TH HIGHEST VALUE IS      1.00648 AT (  421908.50,  3754100.28,   160.46,   420.67,    0.00)  DC
          6TH HIGHEST VALUE IS      0.99723 AT (  421888.50,  3754100.28,   160.61,   420.18,    0.00)  DC
          7TH HIGHEST VALUE IS      0.98447 AT (  421868.50,  3754100.28,   160.65,   413.40,    0.00)  DC
          8TH HIGHEST VALUE IS      0.84062 AT (  421968.50,  3754120.28,   160.00,   425.30,    0.00)  DC
          9TH HIGHEST VALUE IS      0.83731 AT (  421948.50,  3754120.28,   160.40,   420.67,    0.00)  DC
         10TH HIGHEST VALUE IS      0.83119 AT (  421928.50,  3754120.28,   160.73,   420.67,    0.00)  DC

YR2029    1ST HIGHEST VALUE IS      2.43970 AT (  422290.39,  3753829.08,   155.42,   425.72,    0.00)  DC
          2ND HIGHEST VALUE IS      1.01152 AT (  421948.50,  3754100.28,   159.95,   420.67,    0.00)  DC
          3RD HIGHEST VALUE IS      1.01132 AT (  421928.50,  3754100.28,   160.23,   420.67,    0.00)  DC
          4TH HIGHEST VALUE IS      1.00710 AT (  421968.50,  3754100.28,   159.51,   425.30,    0.00)  DC
          5TH HIGHEST VALUE IS      1.00648 AT (  421908.50,  3754100.28,   160.46,   420.67,    0.00)  DC
          6TH HIGHEST VALUE IS      0.99723 AT (  421888.50,  3754100.28,   160.61,   420.18,    0.00)  DC
          7TH HIGHEST VALUE IS      0.98447 AT (  421868.50,  3754100.28,   160.65,   413.40,    0.00)  DC
          8TH HIGHEST VALUE IS      0.84062 AT (  421968.50,  3754120.28,   160.00,   425.30,    0.00)  DC
          9TH HIGHEST VALUE IS      0.83731 AT (  421948.50,  3754120.28,   160.40,   420.67,    0.00)  DC
         10TH HIGHEST VALUE IS      0.83119 AT (  421928.50,  3754120.28,   160.73,   420.67,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
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Model Output - Residential Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
YR2023 HIGH 1ST HIGH VALUE IS	9.59924c	ON 12011724:	AT (422321.06, 3752501.02, 124.19, 266.65, 0.00)	DC	
YR2024 HIGH 1ST HIGH VALUE IS	10.24743c	ON 12011724:	AT (422321.06, 3752501.02, 124.19, 266.65, 0.00)	DC	
YR2025 HIGH 1ST HIGH VALUE IS	9.59924c	ON 12011724:	AT (422321.06, 3752501.02, 124.19, 266.65, 0.00)	DC	
HAULROUT HIGH 1ST HIGH VALUE IS	5.60349c	ON 14120524:	AT (421720.24, 3753363.17, 132.29, 391.99, 0.00)	DC	
			MEIR Location		
ALLPHASE HIGH 1ST HIGH VALUE IS	10.24743c	ON 12011724:	AT (422321.06, 3752501.02, 124.19, 266.65, 0.00)	DC	
YR2026 HIGH 1ST HIGH VALUE IS	7.83384c	ON 14120524:	AT (420931.39, 3753715.80, 141.63, 391.99, 0.00)	DC	
YR2027 HIGH 1ST HIGH VALUE IS	7.83384c	ON 14120524:	AT (420931.39, 3753715.80, 141.63, 391.99, 0.00)	DC	
YR2028 HIGH 1ST HIGH VALUE IS	7.16186c	ON 13020524:	AT (422290.39, 3753829.08, 155.42, 425.72, 0.00)	DC	
YR2030 HIGH 1ST HIGH VALUE IS	7.16186c	ON 13020524:	AT (422290.39, 3753829.08, 155.42, 425.72, 0.00)	DC	
YR2029 HIGH 1ST HIGH VALUE IS	7.16186c	ON 13020524:	AT (422290.39, 3753829.08, 155.42, 425.72, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

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*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
*** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:20:16
                                                                                                                  PAGE 772
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            2 Warning Message(s)
A Total of         2285 Informational Message(s)

A Total of        43848 Hours Were Processed

A Total of         1588 Calm Hours Identified

A Total of          697 Missing Hours Identified (  1.59 Percent)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W186    5627       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
ME W187    5627       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET

   ***********************************
   *** AERMOD Finishes Successfully ***
   ***********************************
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Model Output - School Receptors Unit Emission Rates (1 g/s)

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*** AERMOD - VERSION 21112  ***   *** Construction HRA                                                    ***        02/08/22
*** AERMET - VERSION  16216 ***   *** Brea 265                                                           ***        10:02:13
                                                                                                                  PAGE   1
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                       ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses URBAN Dispersion Algorithm for the SBL for   249 Source(s),
  for Total of    1 Urban Area(s):
  Urban Population =   3186989.0 ;  Urban Roughness Length =  1.000 m

**Model Allows User-Specified Options:
        1. Stack-tip Downwash.
        2. Allow FLAT/ELEV Terrain Option by Source,
           with      0 FLAT and    249 ELEV Source(s).
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Used.

**Other Options Specified:
        ADJ_U*   - Use ADJ_U* option for SBL in AERMET
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of:  OTHER

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates PERIOD Averages

**This Run Includes:    249 Source(s);      10 Source Group(s); and      93 Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
                and:    246 VOLUME source(s)
                and:      3 AREA type source(s)
                and:      0 LINE source(s)
                and:      0 RLINE/RLINEXT source(s)
                and:      0 OPENPIT source(s)
                and:      0 BUOYANT LINE source(s) with a total of     0 line(s)
```

Model Output - School Receptors Unit Emission Rates (1 g/s)

```
**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date:  16216

**Output Options Selected:
         Model Outputs Tables of PERIOD Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    29.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.0 MB of RAM.

**Input Runstream File:          aermod.inp
**Output Print File:             aermod.out

**Detailed Error/Message File:   Brea265_School.err
**File for Summary of Results:   Brea265_School.sum
```

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000375	0	0.42766E-02	421635.9	3754227.1	161.6	4.15	11.63	1.93	YES	HRDOW
L0000376	0	0.42766E-02	421637.5	3754202.2	161.0	4.15	11.63	1.93	YES	HRDOW
L0000377	0	0.42766E-02	421639.1	3754177.2	160.4	4.15	11.63	1.93	YES	HRDOW
L0000378	0	0.42766E-02	421640.7	3754152.3	159.7	4.15	11.63	1.93	YES	HRDOW
L0000379	0	0.42766E-02	421642.3	3754127.3	159.1	4.15	11.63	1.93	YES	HRDOW
L0000380	0	0.42766E-02	421644.0	3754102.4	158.5	4.15	11.63	1.93	YES	HRDOW
L0000381	0	0.42766E-02	421645.6	3754077.4	157.9	4.15	11.63	1.93	YES	HRDOW
L0000382	0	0.42766E-02	421647.2	3754052.5	157.3	4.15	11.63	1.93	YES	HRDOW
L0000383	0	0.42766E-02	421648.8	3754027.5	156.7	4.15	11.63	1.93	YES	HRDOW
L0000384	0	0.42766E-02	421650.4	3754002.6	156.1	4.15	11.63	1.93	YES	HRDOW
L0000385	0	0.42766E-02	421652.0	3753977.6	155.5	4.15	11.63	1.93	YES	HRDOW
L0000386	0	0.42766E-02	421653.7	3753952.7	154.9	4.15	11.63	1.93	YES	HRDOW
L0000387	0	0.42766E-02	421655.3	3753927.7	154.3	4.15	11.63	1.93	YES	HRDOW
L0000388	0	0.42766E-02	421656.9	3753902.8	153.7	4.15	11.63	1.93	YES	HRDOW
L0000389	0	0.42766E-02	421658.5	3753877.8	153.1	4.15	11.63	1.93	YES	HRDOW
L0000390	0	0.42766E-02	421660.1	3753852.9	152.5	4.15	11.63	1.93	YES	HRDOW
L0000391	0	0.42766E-02	421661.7	3753827.9	151.8	4.15	11.63	1.93	YES	HRDOW
L0000392	0	0.42766E-02	421663.4	3753803.0	151.2	4.15	11.63	1.93	YES	HRDOW
L0000393	0	0.42766E-02	421665.0	3753778.1	150.6	4.15	11.63	1.93	YES	HRDOW
L0000394	0	0.42766E-02	421664.7	3753753.1	149.8	4.15	11.63	1.93	YES	HRDOW
L0000395	0	0.42766E-02	421662.2	3753728.3	148.8	4.15	11.63	1.93	YES	HRDOW
L0000396	0	0.42766E-02	421659.6	3753703.4	147.8	4.15	11.63	1.93	YES	HRDOW
L0000397	0	0.42766E-02	421657.1	3753678.5	146.8	4.15	11.63	1.93	YES	HRDOW
L0000398	0	0.42766E-02	421654.0	3753653.7	145.9	4.15	11.63	1.93	YES	HRDOW
L0000399	0	0.42766E-02	421650.5	3753629.0	145.0	4.15	11.63	1.93	YES	HRDOW
L0000400	0	0.42766E-02	421647.0	3753604.2	144.2	4.15	11.63	1.93	YES	HRDOW
L0000401	0	0.42766E-02	421643.5	3753579.5	143.4	4.15	11.63	1.93	YES	HRDOW
L0000402	0	0.42766E-02	421640.0	3753554.7	142.6	4.15	11.63	1.93	YES	HRDOW
L0000403	0	0.42766E-02	421636.5	3753530.0	141.8	4.15	11.63	1.93	YES	HRDOW
L0000404	0	0.42766E-02	421633.0	3753505.2	141.0	4.15	11.63	1.93	YES	HRDOW
L0000405	0	0.42766E-02	421629.5	3753480.4	140.1	4.15	11.63	1.93	YES	HRDOW
L0000406	0	0.42766E-02	421626.0	3753455.7	139.3	4.15	11.63	1.93	YES	HRDOW
L0000407	0	0.42766E-02	421622.5	3753430.9	138.5	4.15	11.63	1.93	YES	HRDOW
L0000408	0	0.42766E-02	421619.0	3753406.2	137.7	4.15	11.63	1.93	YES	HRDOW
L0000409	0	0.42766E-02	421615.5	3753381.4	136.9	4.15	11.63	1.93	YES	HRDOW
L0000410	0	0.42766E-02	421612.0	3753356.7	136.0	4.15	11.63	1.93	YES	HRDOW
L0000411	0	0.42766E-02	421608.5	3753331.9	135.2	4.15	11.63	1.93	YES	HRDOW
L0000412	0	0.42766E-02	421605.0	3753307.2	134.4	4.15	11.63	1.93	YES	HRDOW

L0000413	0	0.42766E-02	421601.5	3753282.4	133.6	4.15	11.63	1.93	YES	HRDOW
L0000414	0	0.42766E-02	421598.0	3753257.7	132.8	4.15	11.63	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000415	0	0.42766E-02	421594.5	3753232.9	131.9	4.15	11.63	1.93	YES	HRDOW
L0000416	0	0.42766E-02	421591.1	3753208.2	131.1	4.15	11.63	1.93	YES	HRDOW
L0000417	0	0.42766E-02	421584.4	3753184.2	130.7	4.15	11.63	1.93	YES	HRDOW
L0000418	0	0.42766E-02	421575.3	3753160.9	130.5	4.15	11.63	1.93	YES	HRDOW
L0000419	0	0.42766E-02	421566.3	3753137.6	130.3	4.15	11.63	1.93	YES	HRDOW
L0000420	0	0.42766E-02	421557.2	3753114.3	130.1	4.15	11.63	1.93	YES	HRDOW
L0000421	0	0.42766E-02	421548.2	3753091.0	129.9	4.15	11.63	1.93	YES	HRDOW
L0000422	0	0.48272E-02	422828.4	3753870.0	141.6	4.15	13.02	1.93	YES	HRDOW
L0000423	0	0.48272E-02	422800.5	3753868.1	141.6	4.15	13.02	1.93	YES	HRDOW
L0000424	0	0.48272E-02	422772.6	3753866.3	141.6	4.15	13.02	1.93	YES	HRDOW
L0000425	0	0.48272E-02	422744.6	3753864.5	141.6	4.15	13.02	1.93	YES	HRDOW
L0000426	0	0.48272E-02	422716.7	3753863.0	141.7	4.15	13.02	1.93	YES	HRDOW
L0000427	0	0.48272E-02	422688.7	3753864.2	142.0	4.15	13.02	1.93	YES	HRDOW
L0000428	0	0.48272E-02	422660.7	3753865.4	142.3	4.15	13.02	1.93	YES	HRDOW
L0000429	0	0.48272E-02	422632.8	3753866.6	142.6	4.15	13.02	1.93	YES	HRDOW
L0000430	0	0.48272E-02	422605.4	3753872.3	142.7	4.15	13.02	1.93	YES	HRDOW
L0000431	0	0.48272E-02	422578.0	3753878.1	142.9	4.15	13.02	1.93	YES	HRDOW
L0000432	0	0.48272E-02	422550.6	3753883.9	143.0	4.15	13.02	1.93	YES	HRDOW
L0000433	0	0.48272E-02	422523.3	3753890.1	143.1	4.15	13.02	1.93	YES	HRDOW
L0000434	0	0.48272E-02	422496.4	3753897.9	142.9	4.15	13.02	1.93	YES	HRDOW
L0000435	0	0.48272E-02	422469.5	3753905.7	142.8	4.15	13.02	1.93	YES	HRDOW
L0000436	0	0.48272E-02	422442.7	3753913.7	142.7	4.15	13.02	1.93	YES	HRDOW
L0000437	0	0.48272E-02	422416.3	3753923.1	142.7	4.15	13.02	1.93	YES	HRDOW
L0000438	0	0.48272E-02	422389.9	3753932.6	142.7	4.15	13.02	1.93	YES	HRDOW
L0000439	0	0.48272E-02	422363.6	3753942.0	142.8	4.15	13.02	1.93	YES	HRDOW
L0000440	0	0.48272E-02	422337.2	3753951.4	142.8	4.15	13.02	1.93	YES	HRDOW
L0000441	0	0.48272E-02	422310.8	3753960.9	142.9	4.15	13.02	1.93	YES	HRDOW
L0000442	0	0.48272E-02	422284.5	3753970.3	142.9	4.15	13.02	1.93	YES	HRDOW
L0000443	0	0.48272E-02	422258.1	3753979.7	143.0	4.15	13.02	1.93	YES	HRDOW
L0000444	0	0.48272E-02	422231.8	3753989.2	143.0	4.15	13.02	1.93	YES	HRDOW
L0000445	0	0.48272E-02	422205.4	3753998.6	143.1	4.15	13.02	1.93	YES	HRDOW
L0000446	0	0.48272E-02	422179.0	3754008.1	143.1	4.15	13.02	1.93	YES	HRDOW
L0000447	0	0.48272E-02	422151.8	3754014.4	144.5	4.15	13.02	1.93	YES	HRDOW
L0000448	0	0.48272E-02	422124.5	3754020.7	145.9	4.15	13.02	1.93	YES	HRDOW
L0000449	0	0.48272E-02	422097.2	3754026.9	147.3	4.15	13.02	1.93	YES	HRDOW
L0000450	0	0.48272E-02	422069.6	3754031.4	148.6	4.15	13.02	1.93	YES	HRDOW
L0000451	0	0.48272E-02	422041.8	3754034.7	149.6	4.15	13.02	1.93	YES	HRDOW
L0000452	0	0.48272E-02	422014.0	3754037.9	150.7	4.15	13.02	1.93	YES	HRDOW

L0000453	0	0.48272E-02	421986.2	3754041.2	151.8	4.15	13.02	1.93	YES	HRDOW
L0000454	0	0.48272E-02	421958.4	3754044.5	152.8	4.15	13.02	1.93	YES	HRDOW

*** AERMOD - VERSION 21112 *** *** Construction HRA *** 02/08/22
*** AERMET - VERSION 16216 *** *** Brea 265 *** 10:02:13
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*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000455	0	0.48272E-02	421930.5	3754047.8	153.9	4.15	13.02	1.93	YES	HRDOW
L0000456	0	0.48272E-02	421902.7	3754051.0	155.0	4.15	13.02	1.93	YES	HRDOW
L0000457	0	0.48272E-02	421874.9	3754054.3	156.0	4.15	13.02	1.93	YES	HRDOW
L0000458	0	0.48272E-02	421847.1	3754057.6	157.1	4.15	13.02	1.93	YES	HRDOW
L0000459	0	0.48272E-02	421819.3	3754060.9	158.2	4.15	13.02	1.93	YES	HRDOW
L0000460	0	0.48272E-02	421791.5	3754064.1	159.2	4.15	13.02	1.93	YES	HRDOW
L0000461	0	0.48272E-02	421763.5	3754064.8	159.2	4.15	13.02	1.93	YES	HRDOW
L0000462	0	0.48272E-02	421735.5	3754065.1	158.9	4.15	13.02	1.93	YES	HRDOW
L0000463	0	0.48272E-02	421707.5	3754065.3	158.7	4.15	13.02	1.93	YES	HRDOW
L0000464	0	0.48272E-02	421679.5	3754065.5	158.4	4.15	13.02	1.93	YES	HRDOW
L0000465	0	0.48272E-02	421651.5	3754065.8	158.1	4.15	13.02	1.93	YES	HRDOW
L0000466	0	0.48272E-02	421623.5	3754066.0	157.8	4.15	13.02	1.93	YES	HRDOW
L0000467	0	0.48272E-02	421595.5	3754066.2	157.6	4.15	13.02	1.93	YES	HRDOW
L0000468	0	0.48272E-02	421567.5	3754066.4	157.3	4.15	13.02	1.93	YES	HRDOW
L0000469	0	0.48272E-02	421539.5	3754066.7	157.0	4.15	13.02	1.93	YES	HRDOW
L0000470	0	0.48272E-02	421511.5	3754066.9	156.8	4.15	13.02	1.93	YES	HRDOW
L0000471	0	0.48272E-02	421483.5	3754067.1	156.5	4.15	13.02	1.93	YES	HRDOW
L0000472	0	0.48272E-02	421455.6	3754066.6	156.0	4.15	13.02	1.93	YES	HRDOW
L0000473	0	0.48272E-02	421427.6	3754066.2	155.6	4.15	13.02	1.93	YES	HRDOW
L0000474	0	0.48272E-02	421399.6	3754065.7	155.1	4.15	13.02	1.93	YES	HRDOW
L0000475	0	0.48272E-02	421371.6	3754065.3	154.7	4.15	13.02	1.93	YES	HRDOW
L0000476	0	0.48272E-02	421343.6	3754064.8	154.2	4.15	13.02	1.93	YES	HRDOW
L0000477	0	0.48272E-02	421315.6	3754064.4	153.7	4.15	13.02	1.93	YES	HRDOW
L0000478	0	0.48272E-02	421287.6	3754063.9	153.3	4.15	13.02	1.93	YES	HRDOW
L0000479	0	0.48272E-02	421259.6	3754063.5	152.8	4.15	13.02	1.93	YES	HRDOW
L0000480	0	0.48272E-02	421231.6	3754063.0	152.4	4.15	13.02	1.93	YES	HRDOW
L0000481	0	0.48272E-02	421203.6	3754062.4	151.9	4.15	13.02	1.93	YES	HRDOW
L0000482	0	0.48272E-02	421175.6	3754061.5	151.4	4.15	13.02	1.93	YES	HRDOW
L0000483	0	0.48272E-02	421147.6	3754060.5	150.9	4.15	13.02	1.93	YES	HRDOW
L0000484	0	0.48272E-02	421119.6	3754059.6	150.4	4.15	13.02	1.93	YES	HRDOW
L0000485	0	0.48272E-02	421091.7	3754058.6	149.9	4.15	13.02	1.93	YES	HRDOW
L0000486	0	0.48272E-02	421063.7	3754057.6	149.4	4.15	13.02	1.93	YES	HRDOW
L0000487	0	0.48272E-02	421036.5	3754050.8	148.8	4.15	13.02	1.93	YES	HRDOW
L0000488	0	0.48272E-02	421009.4	3754044.0	148.2	4.15	13.02	1.93	YES	HRDOW
L0000489	0	0.48272E-02	420982.2	3754037.1	147.6	4.15	13.02	1.93	YES	HRDOW
L0000490	0	0.48272E-02	420955.1	3754030.3	146.9	4.15	13.02	1.93	YES	HRDOW
L0000491	0	0.48272E-02	420927.9	3754023.5	146.3	4.15	13.02	1.93	YES	HRDOW
L0000492	0	0.48272E-02	420900.9	3754016.0	145.9	4.15	13.02	1.93	YES	HRDOW

L0000493	0	0.48272E-02	420874.0	3754008.4	145.6	4.15	13.02	1.93	YES	HRDOW
L0000494	0	0.48272E-02	420847.1	3754000.7	145.3	4.15	13.02	1.93	YES	HRDOW

*** AERMOD - VERSION 21112 *** *** Construction HRA *** 02/08/22
*** AERMET - VERSION 16216 *** *** Brea 265 *** 10:02:13
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*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000495	0	0.48272E-02	420820.1	3753993.0	145.0	4.15	13.02	1.93	YES	HRDOW
L0000496	0	0.48272E-02	420793.2	3753985.3	144.7	4.15	13.02	1.93	YES	HRDOW
L0000497	0	0.48272E-02	420766.3	3753977.6	144.4	4.15	13.02	1.93	YES	HRDOW
L0000498	0	0.48272E-02	420738.8	3753973.2	144.4	4.15	13.02	1.93	YES	HRDOW
L0000499	0	0.48272E-02	420710.9	3753970.9	144.5	4.15	13.02	1.93	YES	HRDOW
L0000500	0	0.48272E-02	420683.0	3753968.6	144.7	4.15	13.02	1.93	YES	HRDOW
L0000501	0	0.48272E-02	420655.1	3753966.2	144.9	4.15	13.02	1.93	YES	HRDOW
L0000502	0	0.48272E-02	420627.2	3753963.9	145.1	4.15	13.02	1.93	YES	HRDOW
L0000503	0	0.34576E-02	422130.7	3752207.5	126.4	4.15	9.30	1.93	YES	HRDOW
L0000504	0	0.34576E-02	422130.3	3752227.5	126.1	4.15	9.30	1.93	YES	HRDOW
L0000505	0	0.34576E-02	422129.9	3752247.5	125.8	4.15	9.30	1.93	YES	HRDOW
L0000506	0	0.34576E-02	422129.5	3752267.5	125.4	4.15	9.30	1.93	YES	HRDOW
L0000507	0	0.34576E-02	422129.2	3752287.5	125.1	4.15	9.30	1.93	YES	HRDOW
L0000508	0	0.34576E-02	422128.8	3752307.5	124.8	4.15	9.30	1.93	YES	HRDOW
L0000509	0	0.34576E-02	422128.4	3752327.5	124.5	4.15	9.30	1.93	YES	HRDOW
L0000510	0	0.34576E-02	422128.0	3752347.5	124.2	4.15	9.30	1.93	YES	HRDOW
L0000511	0	0.34576E-02	422127.6	3752367.5	123.9	4.15	9.30	1.93	YES	HRDOW
L0000512	0	0.34576E-02	422127.2	3752387.5	123.5	4.15	9.30	1.93	YES	HRDOW
L0000513	0	0.34576E-02	422126.8	3752407.5	123.2	4.15	9.30	1.93	YES	HRDOW
L0000514	0	0.34576E-02	422126.4	3752427.5	122.9	4.15	9.30	1.93	YES	HRDOW
L0000515	0	0.34576E-02	422126.0	3752447.5	122.6	4.15	9.30	1.93	YES	HRDOW
L0000516	0	0.34576E-02	422125.6	3752467.5	122.3	4.15	9.30	1.93	YES	HRDOW
L0000517	0	0.34576E-02	422125.2	3752487.5	122.0	4.15	9.30	1.93	YES	HRDOW
L0000518	0	0.34576E-02	422123.5	3752507.4	121.8	4.15	9.30	1.93	YES	HRDOW
L0000519	0	0.34576E-02	422120.5	3752527.1	121.8	4.15	9.30	1.93	YES	HRDOW
L0000520	0	0.34576E-02	422117.6	3752546.9	121.9	4.15	9.30	1.93	YES	HRDOW
L0000521	0	0.34576E-02	422111.5	3752566.0	122.0	4.15	9.30	1.93	YES	HRDOW
L0000522	0	0.34576E-02	422105.2	3752584.9	122.2	4.15	9.30	1.93	YES	HRDOW
L0000523	0	0.34576E-02	422098.8	3752603.9	122.3	4.15	9.30	1.93	YES	HRDOW
L0000524	0	0.34576E-02	422092.0	3752622.6	122.5	4.15	9.30	1.93	YES	HRDOW
L0000525	0	0.34576E-02	422081.7	3752639.8	123.0	4.15	9.30	1.93	YES	HRDOW
L0000526	0	0.34576E-02	422071.3	3752656.9	123.4	4.15	9.30	1.93	YES	HRDOW
L0000527	0	0.34576E-02	422058.6	3752672.2	123.6	4.15	9.30	1.93	YES	HRDOW
L0000528	0	0.34576E-02	422045.1	3752686.9	123.7	4.15	9.30	1.93	YES	HRDOW
L0000529	0	0.34576E-02	422031.5	3752701.6	123.7	4.15	9.30	1.93	YES	HRDOW
L0000530	0	0.34576E-02	422017.9	3752716.2	123.8	4.15	9.30	1.93	YES	HRDOW
L0000531	0	0.34576E-02	422004.3	3752730.9	123.8	4.15	9.30	1.93	YES	HRDOW
L0000532	0	0.34576E-02	421990.7	3752745.6	123.9	4.15	9.30	1.93	YES	HRDOW

L0000533	0	0.34576E-02	421977.1	3752760.3	123.9	4.15	9.30	1.93	YES	HRDOW
L0000534	0	0.34576E-02	421963.5	3752774.9	124.0	4.15	9.30	1.93	YES	HRDOW

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*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000535	0	0.34576E-02	421949.9	3752789.6	124.0	4.15	9.30	1.93	YES	HRDOW
L0000536	0	0.34576E-02	421936.3	3752804.3	124.1	4.15	9.30	1.93	YES	HRDOW
L0000537	0	0.34576E-02	421922.8	3752819.0	124.1	4.15	9.30	1.93	YES	HRDOW
L0000538	0	0.34576E-02	421909.2	3752833.6	124.2	4.15	9.30	1.93	YES	HRDOW
L0000539	0	0.34576E-02	421895.6	3752848.3	124.2	4.15	9.30	1.93	YES	HRDOW
L0000540	0	0.34576E-02	421882.0	3752863.0	124.3	4.15	9.30	1.93	YES	HRDOW
L0000541	0	0.34576E-02	421868.4	3752877.7	124.3	4.15	9.30	1.93	YES	HRDOW
L0000542	0	0.34576E-02	421854.8	3752892.3	124.4	4.15	9.30	1.93	YES	HRDOW
L0000543	0	0.34576E-02	421844.1	3752909.1	124.3	4.15	9.30	1.93	YES	HRDOW
L0000544	0	0.34576E-02	421834.4	3752926.6	124.1	4.15	9.30	1.93	YES	HRDOW
L0000545	0	0.34576E-02	421824.6	3752944.0	124.0	4.15	9.30	1.93	YES	HRDOW
L0000546	0	0.34576E-02	421816.4	3752962.2	123.9	4.15	9.30	1.93	YES	HRDOW
L0000547	0	0.34576E-02	421810.0	3752981.1	123.9	4.15	9.30	1.93	YES	HRDOW
L0000548	0	0.34576E-02	421803.6	3753000.1	123.9	4.15	9.30	1.93	YES	HRDOW
L0000549	0	0.34576E-02	421797.2	3753019.0	123.8	4.15	9.30	1.93	YES	HRDOW
L0000550	0	0.34576E-02	421792.8	3753038.5	123.9	4.15	9.30	1.93	YES	HRDOW
L0000551	0	0.34576E-02	421789.8	3753058.2	124.0	4.15	9.30	1.93	YES	HRDOW
L0000552	0	0.34576E-02	421786.9	3753078.0	124.2	4.15	9.30	1.93	YES	HRDOW
L0000553	0	0.34576E-02	421785.5	3753098.0	124.5	4.15	9.30	1.93	YES	HRDOW
L0000554	0	0.34576E-02	421784.4	3753117.9	124.9	4.15	9.30	1.93	YES	HRDOW
L0000555	0	0.34576E-02	421783.3	3753137.9	125.3	4.15	9.30	1.93	YES	HRDOW
L0000556	0	0.34576E-02	421782.1	3753157.9	125.7	4.15	9.30	1.93	YES	HRDOW
L0000557	0	0.34576E-02	421781.0	3753177.8	126.1	4.15	9.30	1.93	YES	HRDOW
L0000558	0	0.34576E-02	421779.9	3753197.8	126.4	4.15	9.30	1.93	YES	HRDOW
L0000559	0	0.34576E-02	421778.8	3753217.8	126.8	4.15	9.30	1.93	YES	HRDOW
L0000560	0	0.34576E-02	421777.7	3753237.7	127.2	4.15	9.30	1.93	YES	HRDOW
L0000561	0	0.34576E-02	421776.6	3753257.7	127.6	4.15	9.30	1.93	YES	HRDOW
L0000562	0	0.34576E-02	421775.5	3753277.7	128.0	4.15	9.30	1.93	YES	HRDOW
L0000563	0	0.34576E-02	421774.4	3753297.6	128.4	4.15	9.30	1.93	YES	HRDOW
L0000564	0	0.34576E-02	421770.6	3753317.1	129.1	4.15	9.30	1.93	YES	HRDOW
L0000565	0	0.34576E-02	421764.3	3753336.1	130.3	4.15	9.30	1.93	YES	HRDOW
L0000566	0	0.34576E-02	421755.2	3753353.8	131.7	4.15	9.30	1.93	YES	HRDOW
L0000567	0	0.34576E-02	421745.6	3753371.4	133.0	4.15	9.30	1.93	YES	HRDOW
L0000568	0	0.34576E-02	421732.3	3753386.1	134.2	4.15	9.30	1.93	YES	HRDOW
L0000569	0	0.34576E-02	421717.6	3753399.6	135.2	4.15	9.30	1.93	YES	HRDOW
L0000570	0	0.34576E-02	421701.5	3753411.2	136.1	4.15	9.30	1.93	YES	HRDOW
L0000571	0	0.34576E-02	421683.6	3753420.0	137.0	4.15	9.30	1.93	YES	HRDOW
L0000572	0	0.34576E-02	421664.8	3753426.1	137.8	4.15	9.30	1.93	YES	HRDOW

L0000573	0	0.34576E-02	421645.0	3753429.4	138.5	4.15	9.30	1.93	YES	HRDOW
L0000574	0	0.34576E-02	421625.3	3753432.6	139.1	4.15	9.30	1.93	YES	HRDOW

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*** AERMET - VERSION 16216 *** *** Brea 265 *** 10:02:13
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*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000575	0	0.34576E-02	421605.6	3753435.9	139.7	4.15	9.30	1.93	YES	HRDOW
L0000576	0	0.34576E-02	421585.7	3753437.4	140.0	4.15	9.30	1.93	YES	HRDOW
L0000577	0	0.34576E-02	421565.7	3753437.2	139.8	4.15	9.30	1.93	YES	HRDOW
L0000578	0	0.34576E-02	421545.7	3753437.1	139.7	4.15	9.30	1.93	YES	HRDOW
L0000579	0	0.34576E-02	421525.7	3753436.9	139.5	4.15	9.30	1.93	YES	HRDOW
L0000580	0	0.34576E-02	421505.7	3753436.7	139.4	4.15	9.30	1.93	YES	HRDOW
L0000581	0	0.34576E-02	421485.7	3753436.5	139.2	4.15	9.30	1.93	YES	HRDOW
L0000582	0	0.34576E-02	421465.7	3753436.3	139.1	4.15	9.30	1.93	YES	HRDOW
L0000583	0	0.34576E-02	421445.7	3753436.2	139.0	4.15	9.30	1.93	YES	HRDOW
L0000584	0	0.34576E-02	421425.7	3753436.0	138.8	4.15	9.30	1.93	YES	HRDOW
L0000585	0	0.34576E-02	421405.7	3753435.8	138.7	4.15	9.30	1.93	YES	HRDOW
L0000586	0	0.34576E-02	421385.7	3753435.6	138.5	4.15	9.30	1.93	YES	HRDOW
L0000587	0	0.34576E-02	421365.7	3753435.5	138.4	4.15	9.30	1.93	YES	HRDOW
L0000588	0	0.34576E-02	421345.7	3753435.3	138.2	4.15	9.30	1.93	YES	HRDOW
L0000589	0	0.34576E-02	421325.7	3753435.1	138.1	4.15	9.30	1.93	YES	HRDOW
L0000590	0	0.34576E-02	421305.7	3753434.9	138.0	4.15	9.30	1.93	YES	HRDOW
L0000591	0	0.34576E-02	421285.7	3753434.8	137.8	4.15	9.30	1.93	YES	HRDOW
L0000592	0	0.34576E-02	421265.7	3753434.6	137.7	4.15	9.30	1.93	YES	HRDOW
L0000593	0	0.34576E-02	421245.7	3753434.4	137.5	4.15	9.30	1.93	YES	HRDOW
L0000594	0	0.34576E-02	421225.7	3753434.2	137.4	4.15	9.30	1.93	YES	HRDOW
L0000595	0	0.34576E-02	421205.7	3753434.0	137.2	4.15	9.30	1.93	YES	HRDOW
L0000596	0	0.34576E-02	421185.7	3753433.9	137.1	4.15	9.30	1.93	YES	HRDOW
L0000597	0	0.34576E-02	421165.7	3753433.7	136.9	4.15	9.30	1.93	YES	HRDOW
L0000598	0	0.34576E-02	421145.7	3753433.5	136.8	4.15	9.30	1.93	YES	HRDOW
L0000599	0	0.34576E-02	421125.7	3753433.3	136.7	4.15	9.30	1.93	YES	HRDOW
L0000600	0	0.34576E-02	421105.7	3753433.2	136.5	4.15	9.30	1.93	YES	HRDOW
L0000601	0	0.34576E-02	421085.7	3753433.0	136.4	4.15	9.30	1.93	YES	HRDOW
L0000602	0	0.34576E-02	421065.7	3753432.8	136.2	4.15	9.30	1.93	YES	HRDOW
L0000603	0	0.34576E-02	421045.7	3753432.6	136.1	4.15	9.30	1.93	YES	HRDOW
L0000604	0	0.34576E-02	421025.7	3753432.5	135.9	4.15	9.30	1.93	YES	HRDOW
L0000605	0	0.34576E-02	421005.7	3753432.3	135.8	4.15	9.30	1.93	YES	HRDOW
L0000606	0	0.34576E-02	420985.7	3753432.1	135.6	4.15	9.30	1.93	YES	HRDOW
L0000607	0	0.34576E-02	420965.7	3753431.9	135.5	4.15	9.30	1.93	YES	HRDOW
L0000608	0	0.34576E-02	420945.7	3753431.8	135.4	4.15	9.30	1.93	YES	HRDOW
L0000609	0	0.34576E-02	420925.7	3753431.6	135.2	4.15	9.30	1.93	YES	HRDOW
L0000610	0	0.34576E-02	420905.7	3753431.4	135.1	4.15	9.30	1.93	YES	HRDOW
L0000611	0	0.34576E-02	420885.7	3753431.2	134.9	4.15	9.30	1.93	YES	HRDOW
L0000612	0	0.34576E-02	420865.7	3753431.0	134.8	4.15	9.30	1.93	YES	HRDOW

L0000613	0	0.34576E-02	420845.7	3753430.9	134.6	4.15	9.30	1.93	YES	HRDOW
L0000614	0	0.34576E-02	420825.7	3753430.7	134.5	4.15	9.30	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000615	0	0.34576E-02	420805.7	3753430.5	134.3	4.15	9.30	1.93	YES	HRDOW
L0000616	0	0.34576E-02	420785.7	3753430.3	134.2	4.15	9.30	1.93	YES	HRDOW
L0000617	0	0.34576E-02	420765.7	3753430.2	134.1	4.15	9.30	1.93	YES	HRDOW
L0000618	0	0.34576E-02	420745.7	3753430.0	133.9	4.15	9.30	1.93	YES	HRDOW
L0000619	0	0.34576E-02	420725.7	3753429.8	133.8	4.15	9.30	1.93	YES	HRDOW
L0000620	0	0.34576E-02	420705.7	3753429.6	133.6	4.15	9.30	1.93	YES	HRDOW

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PHASE1	0	0.36292E-05	421688.1	3753497.1	135.7	4.15	32	1.93	YES	HRDOW
PHASE2	0	0.25300E-05	420938.2	3754232.9	159.8	4.15	5	1.93	YES	HRDOW
PHASE3	0	0.24952E-05	421670.9	3754038.8	159.2	4.15	43	1.93	YES	HRDOW

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
YR2023	PHASE1 , PHASE2 ,
YR2024	PHASE1 , PHASE2 , PHASE3 ,
YR2025	PHASE1 , PHASE2 ,
HAULROUT	L0000375 , L0000376 , L0000377 , L0000378 , L0000379 , L0000380 , L0000381 , L0000382 ,
	L0000383 , L0000384 , L0000385 , L0000386 , L0000387 , L0000388 , L0000389 , L0000390 ,
	L0000391 , L0000392 , L0000393 , L0000394 , L0000395 , L0000396 , L0000397 , L0000398 ,
	L0000399 , L0000400 , L0000401 , L0000402 , L0000403 , L0000404 , L0000405 , L0000406 ,
	L0000407 , L0000408 , L0000409 , L0000410 , L0000411 , L0000412 , L0000413 , L0000414 ,
	L0000415 , L0000416 , L0000417 , L0000418 , L0000419 , L0000420 , L0000421 , L0000422 ,
	L0000423 , L0000424 , L0000425 , L0000426 , L0000427 , L0000428 , L0000429 , L0000430 ,
	L0000431 , L0000432 , L0000433 , L0000434 , L0000435 , L0000436 , L0000437 , L0000438 ,
	L0000439 , L0000440 , L0000441 , L0000442 , L0000443 , L0000444 , L0000445 , L0000446 ,
	L0000447 , L0000448 , L0000449 , L0000450 , L0000451 , L0000452 , L0000453 , L0000454 ,
	L0000455 , L0000456 , L0000457 , L0000458 , L0000459 , L0000460 , L0000461 , L0000462 ,
	L0000463 , L0000464 , L0000465 , L0000466 , L0000467 , L0000468 , L0000469 , L0000470 ,
	L0000471 , L0000472 , L0000473 , L0000474 , L0000475 , L0000476 , L0000477 , L0000478 ,
	L0000479 , L0000480 , L0000481 , L0000482 , L0000483 , L0000484 , L0000485 , L0000486 ,
	L0000487 , L0000488 , L0000489 , L0000490 , L0000491 , L0000492 , L0000493 , L0000494 ,
	L0000495 , L0000496 , L0000497 , L0000498 , L0000499 , L0000500 , L0000501 , L0000502 ,
	L0000503 , L0000504 , L0000505 , L0000506 , L0000507 , L0000508 , L0000509 , L0000510 ,

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
	L0000511 , L0000512 , L0000513 , L0000514 , L0000515 , L0000516 , L0000517 , L0000518 ,
	L0000519 , L0000520 , L0000521 , L0000522 , L0000523 , L0000524 , L0000525 , L0000526 ,
	L0000527 , L0000528 , L0000529 , L0000530 , L0000531 , L0000532 , L0000533 , L0000534 ,
	L0000535 , L0000536 , L0000537 , L0000538 , L0000539 , L0000540 , L0000541 , L0000542 ,
	L0000543 , L0000544 , L0000545 , L0000546 , L0000547 , L0000548 , L0000549 , L0000550 ,
	L0000551 , L0000552 , L0000553 , L0000554 , L0000555 , L0000556 , L0000557 , L0000558 ,
	L0000559 , L0000560 , L0000561 , L0000562 , L0000563 , L0000564 , L0000565 , L0000566 ,
	L0000567 , L0000568 , L0000569 , L0000570 , L0000571 , L0000572 , L0000573 , L0000574 ,
	L0000575 , L0000576 , L0000577 , L0000578 , L0000579 , L0000580 , L0000581 , L0000582 ,
	L0000583 , L0000584 , L0000585 , L0000586 , L0000587 , L0000588 , L0000589 , L0000590 ,
	L0000591 , L0000592 , L0000593 , L0000594 , L0000595 , L0000596 , L0000597 , L0000598 ,
	L0000599 , L0000600 , L0000601 , L0000602 , L0000603 , L0000604 , L0000605 , L0000606 ,
	L0000607 , L0000608 , L0000609 , L0000610 , L0000611 , L0000612 , L0000613 , L0000614 ,
	L0000615 , L0000616 , L0000617 , L0000618 , L0000619 , L0000620 ,
ALLPHASE	PHASE1 , PHASE2 , PHASE3 ,
YR2026	PHASE2 , PHASE3 ,
YR2027	PHASE2 , PHASE3 ,
YR2028	PHASE3 ,
YR2030	PHASE3 ,
YR2029	PHASE3 ,

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs
	3186989.	PHASE1 , PHASE2 , PHASE3 , L0000375 , L0000376 , L0000377 , L0000378 , L0000379 ,
		L0000380 , L0000381 , L0000382 , L0000383 , L0000384 , L0000385 , L0000386 , L0000387 ,
		L0000388 , L0000389 , L0000390 , L0000391 , L0000392 , L0000393 , L0000394 , L0000395 ,
		L0000396 , L0000397 , L0000398 , L0000399 , L0000400 , L0000401 , L0000402 , L0000403 ,
		L0000404 , L0000405 , L0000406 , L0000407 , L0000408 , L0000409 , L0000410 , L0000411 ,
		L0000412 , L0000413 , L0000414 , L0000415 , L0000416 , L0000417 , L0000418 , L0000419 ,
		L0000420 , L0000421 , L0000422 , L0000423 , L0000424 , L0000425 , L0000426 , L0000427 ,
		L0000428 , L0000429 , L0000430 , L0000431 , L0000432 , L0000433 , L0000434 , L0000435 ,
		L0000436 , L0000437 , L0000438 , L0000439 , L0000440 , L0000441 , L0000442 , L0000443 ,
		L0000444 , L0000445 , L0000446 , L0000447 , L0000448 , L0000449 , L0000450 , L0000451 ,
		L0000452 , L0000453 , L0000454 , L0000455 , L0000456 , L0000457 , L0000458 , L0000459 ,
		L0000460 , L0000461 , L0000462 , L0000463 , L0000464 , L0000465 , L0000466 , L0000467 ,
		L0000468 , L0000469 , L0000470 , L0000471 , L0000472 , L0000473 , L0000474 , L0000475 ,
		L0000476 , L0000477 , L0000478 , L0000479 , L0000480 , L0000481 , L0000482 , L0000483 ,
		L0000484 , L0000485 , L0000486 , L0000487 , L0000488 , L0000489 , L0000490 , L0000491 ,
		L0000492 , L0000493 , L0000494 , L0000495 , L0000496 , L0000497 , L0000498 , L0000499 ,
		L0000500 , L0000501 , L0000502 , L0000503 , L0000504 , L0000505 , L0000506 , L0000507 ,
		L0000508 , L0000509 , L0000510 , L0000511 , L0000512 , L0000513 , L0000514 , L0000515 ,
		L0000516 , L0000517 , L0000518 , L0000519 , L0000520 , L0000521 , L0000522 , L0000523 ,

L0000524 , L0000525 , L0000526 , L0000527 , L0000528 , L0000529 , L0000530 , L0000531 ,

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs
		L0000532 , L0000533 , L0000534 , L0000535 , L0000536 , L0000537 , L0000538 , L0000539 ,
		L0000540 , L0000541 , L0000542 , L0000543 , L0000544 , L0000545 , L0000546 , L0000547 ,
		L0000548 , L0000549 , L0000550 , L0000551 , L0000552 , L0000553 , L0000554 , L0000555 ,
		L0000556 , L0000557 , L0000558 , L0000559 , L0000560 , L0000561 , L0000562 , L0000563 ,
		L0000564 , L0000565 , L0000566 , L0000567 , L0000568 , L0000569 , L0000570 , L0000571 ,
		L0000572 , L0000573 , L0000574 , L0000575 , L0000576 , L0000577 , L0000578 , L0000579 ,
		L0000580 , L0000581 , L0000582 , L0000583 , L0000584 , L0000585 , L0000586 , L0000587 ,
		L0000588 , L0000589 , L0000590 , L0000591 , L0000592 , L0000593 , L0000594 , L0000595 ,
		L0000596 , L0000597 , L0000598 , L0000599 , L0000600 , L0000601 , L0000602 , L0000603 ,
		L0000604 , L0000605 , L0000606 , L0000607 , L0000608 , L0000609 , L0000610 , L0000611 ,
		L0000612 , L0000613 , L0000614 , L0000615 , L0000616 , L0000617 , L0000618 , L0000619 ,
		L0000620 ,

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

* SOURCE EMISSION RATE SCALARS WHICH VARY DIURNALLY AND BY DAY OF WEEK (HRDOW) *

SOURCE ID = PHASE1 - PHASE3 ; SOURCE TYPE = AREAPOLY :

HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR
DAY OF WEEK = WEEKDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.1000E+01
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.0000E+00	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
DAY OF WEEK = SATURDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
DAY OF WEEK = SUNDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

* SOURCE EMISSION RATE SCALARS WHICH VARY DIURNALLY AND BY DAY OF WEEK (HRDOW) *

SOURCE ID = L0000375-L0000620 ; SOURCE TYPE = VOLUME :

HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR
DAY OF WEEK = WEEKDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.1000E+01
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.0000E+00	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
DAY OF WEEK = SATURDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
DAY OF WEEK = SUNDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\KFUL_V9_ADJU\KFUL_v9.SFC Met Version: 16216
Profile file: ..\KFUL_V9_ADJU\KFUL_v9.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 3166 Upper air station no.: 3190
Name: UNKNOWN Name: UNKNOWN
Year: 2012 Year: 2012

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
12	01	01	1	01	-4.8	0.098	-9.000	-9.000	-999.	74.	18.0	0.26	2.61	1.00	0.96	322.	10.1	283.8	2.0
12	01	01	1	02	-1.9	0.072	-9.000	-9.000	-999.	47.	18.0	0.26	2.61	1.00	0.52	13.	10.1	283.1	2.0
12	01	01	1	03	-3.1	0.083	-9.000	-9.000	-999.	57.	16.3	0.26	2.61	1.00	0.75	73.	10.1	282.0	2.0
12	01	01	1	04	-4.3	0.094	-9.000	-9.000	-999.	69.	17.3	0.26	2.61	1.00	0.91	98.	10.1	281.4	2.0
12	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.26	2.61	1.00	0.00	0.	10.1	280.9	2.0
12	01	01	1	06	-2.1	0.074	-9.000	-9.000	-999.	48.	17.6	0.26	2.61	1.00	0.55	80.	10.1	280.4	2.0
12	01	01	1	07	-2.8	0.080	-9.000	-9.000	-999.	54.	16.3	0.26	2.61	1.00	0.69	201.	10.1	280.4	2.0
12	01	01	1	08	-1.5	0.066	-9.000	-9.000	-999.	41.	17.0	0.26	2.61	0.54	0.52	72.	10.1	280.9	2.0
12	01	01	1	09	37.4	-9.000	-9.000	-9.000	38.	-999.	-99999.0	0.26	2.61	0.31	0.00	0.	10.1	285.9	2.0
12	01	01	1	10	109.1	0.151	0.713	0.008	121.	141.	-2.9	0.26	2.61	0.24	0.79	268.	10.1	289.9	2.0
12	01	01	1	11	160.5	0.148	1.143	0.005	338.	136.	-1.8	0.26	2.61	0.21	0.70	273.	10.1	294.2	2.0
12	01	01	1	12	186.9	0.156	1.483	0.005	634.	148.	-1.8	0.26	2.61	0.20	0.74	230.	10.1	297.5	2.0
12	01	01	1	13	187.4	0.210	1.777	0.005	1088.	231.	-4.5	0.26	2.61	0.20	1.20	227.	10.1	300.4	2.0
12	01	01	1	14	160.3	0.235	1.833	0.005	1395.	274.	-7.4	0.26	2.61	0.21	1.47	233.	10.1	300.9	2.0
12	01	01	1	15	109.1	0.197	1.662	0.005	1527.	210.	-6.3	0.26	2.61	0.25	1.20	233.	10.1	302.0	2.0
12	01	01	1	16	33.3	0.243	1.125	0.005	1548.	288.	-39.2	0.26	2.61	0.33	1.91	229.	10.1	298.1	2.0
12	01	01	1	17	-9.1	0.141	-9.000	-9.000	-999.	132.	28.3	0.26	2.61	0.60	1.37	212.	10.1	294.2	2.0
12	01	01	1	18	-4.3	0.094	-9.000	-9.000	-999.	69.	17.5	0.26	2.61	1.00	0.91	190.	10.1	292.0	2.0
12	01	01	1	19	-2.8	0.079	-9.000	-9.000	-999.	54.	16.3	0.26	2.61	1.00	0.70	302.	10.1	289.2	2.0
12	01	01	1	20	-4.0	0.091	-9.000	-9.000	-999.	65.	17.0	0.26	2.61	1.00	0.87	338.	10.1	288.1	2.0
12	01	01	1	21	-6.3	0.113	-9.000	-9.000	-999.	91.	20.5	0.26	2.61	1.00	1.11	304.	10.1	287.0	2.0
12	01	01	1	22	-3.1	0.082	-9.000	-9.000	-999.	57.	16.3	0.26	2.61	1.00	0.75	76.	10.1	285.4	2.0
12	01	01	1	23	-2.4	0.076	-9.000	-9.000	-999.	50.	16.7	0.26	2.61	1.00	0.62	306.	10.1	284.9	2.0
12	01	01	1	24	-3.6	0.087	-9.000	-9.000	-999.	62.	16.6	0.26	2.61	1.00	0.82	318.	10.1	283.8	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
12	01	01	01	10.1	1	322.	0.96	283.8	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2023 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.48997		420995.66	3753651.65	0.53446	
421015.66	3753651.65	0.56894		421035.66	3753651.65	0.59608	
421055.66	3753651.65	0.61887		421075.66	3753651.65	0.63692	
421095.66	3753651.65	0.65201		421115.66	3753651.65	0.66493	
421135.66	3753651.65	0.67641		421155.66	3753651.65	0.68703	
421175.66	3753651.65	0.69620		421195.66	3753651.65	0.70377	Olinda ES MER
420945.89	3753399.73	0.12901	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2024 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.57274		420995.66	3753651.65	0.61960	
421015.66	3753651.65	0.65655		421035.66	3753651.65	0.68627	
421055.66	3753651.65	0.71173		421075.66	3753651.65	0.73264	
421095.66	3753651.65	0.75077		421115.66	3753651.65	0.76695	
421135.66	3753651.65	0.78193		421155.66	3753651.65	0.79629	
421175.66	3753651.65	0.80946		421195.66	3753651.65	0.82128	Olinda ES MER
420945.89	3753399.73	0.18679	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2025 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.48997		420995.66	3753651.65	0.53446	
421015.66	3753651.65	0.56894		421035.66	3753651.65	0.59608	
421055.66	3753651.65	0.61887		421075.66	3753651.65	0.63692	
421095.66	3753651.65	0.65201		421115.66	3753651.65	0.66493	
421135.66	3753651.65	0.67641		421155.66	3753651.65	0.68703	
421175.66	3753651.65	0.69620		421195.66	3753651.65	0.70377	Olinda ES MER
420945.89	3753399.73	0.12901	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HAULROUT ***
INCLUDING SOURCE(S): L0000375 , L0000376 , L0000377 , L0000378 , L0000379 ,
L0000380 , L0000381 , L0000382 , L0000383 , L0000384 , L0000385 , L0000386 , L0000387 ,
L0000388 , L0000389 , L0000390 , L0000391 , L0000392 , L0000393 , L0000394 , L0000395 ,
L0000396 , L0000397 , L0000398 , L0000399 , L0000400 , L0000401 , L0000402 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.20110		420995.66	3753651.65	0.20479	
421015.66	3753651.65	0.20843		421035.66	3753651.65	0.21208	
421055.66	3753651.65	0.21587		421075.66	3753651.65	0.21927	
421095.66	3753651.65	0.22244		421115.66	3753651.65	0.22539	
421135.66	3753651.65	0.22806		421155.66	3753651.65	0.23073	
421175.66	3753651.65	0.23352		421195.66	3753651.65	0.23639	Olinda ES MER
420945.89	3753399.73	1.01737	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALLPHASE ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.57274		420995.66	3753651.65	0.61960	
421015.66	3753651.65	0.65655		421035.66	3753651.65	0.68627	
421055.66	3753651.65	0.71173		421075.66	3753651.65	0.73264	
421095.66	3753651.65	0.75077		421115.66	3753651.65	0.76695	
421135.66	3753651.65	0.78193		421155.66	3753651.65	0.79629	
421175.66	3753651.65	0.80946		421195.66	3753651.65	0.82128	Olinda ES MER
420945.89	3753399.73	0.18679	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2026 ***
INCLUDING SOURCE(S): PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.53324		420995.66	3753651.65	0.57938	
421015.66	3753651.65	0.61555		421035.66	3753651.65	0.64441	
421055.66	3753651.65	0.66747		421075.66	3753651.65	0.68742	
421095.66	3753651.65	0.70455		421115.66	3753651.65	0.71969	
421135.66	3753651.65	0.73360		421155.66	3753651.65	0.74683	
421175.66	3753651.65	0.75881		421195.66	3753651.65	0.76937	Olinda ES MER
420945.89	3753399.73	0.12516	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2027 ***
INCLUDING SOURCE(S): PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.53324		420995.66	3753651.65	0.57938	
421015.66	3753651.65	0.61555		421035.66	3753651.65	0.64441	
421055.66	3753651.65	0.66747		421075.66	3753651.65	0.68742	
421095.66	3753651.65	0.70455		421115.66	3753651.65	0.71969	
421135.66	3753651.65	0.73360		421155.66	3753651.65	0.74683	
421175.66	3753651.65	0.75881		421195.66	3753651.65	0.76937	Olinda ES MER
420945.89	3753399.73	0.12516	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2028 ***
INCLUDING SOURCE(S): PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.08277		420995.66	3753651.65	0.08515	
421015.66	3753651.65	0.08762		421035.66	3753651.65	0.09019	
421055.66	3753651.65	0.09286		421075.66	3753651.65	0.09571	
421095.66	3753651.65	0.09876		421115.66	3753651.65	0.10201	
421135.66	3753651.65	0.10552		421155.66	3753651.65	0.10926	
421175.66	3753651.65	0.11326		421195.66	3753651.65	0.11751	Olinda ES MER
420945.89	3753399.73	0.05777	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2030 ***
INCLUDING SOURCE(S): PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.08277		420995.66	3753651.65	0.08515	
421015.66	3753651.65	0.08762		421035.66	3753651.65	0.09019	
421055.66	3753651.65	0.09286		421075.66	3753651.65	0.09571	
421095.66	3753651.65	0.09876		421115.66	3753651.65	0.10201	
421135.66	3753651.65	0.10552		421155.66	3753651.65	0.10926	
421175.66	3753651.65	0.11326		421195.66	3753651.65	0.11751	Olinda ES MER
420945.89	3753399.73	0.05777	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2029 ***
INCLUDING SOURCE(S): PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC		X-COORD (M)	Y-COORD (M)	CONC	
420975.66	3753651.65	0.08277		420995.66	3753651.65	0.08515	
421015.66	3753651.65	0.08762		421035.66	3753651.65	0.09019	
421055.66	3753651.65	0.09286		421075.66	3753651.65	0.09571	
421095.66	3753651.65	0.09876		421115.66	3753651.65	0.10201	
421135.66	3753651.65	0.10552		421155.66	3753651.65	0.10926	
421175.66	3753651.65	0.11326		421195.66	3753651.65	0.11751	Olinda ES MER
420945.89	3753399.73	0.05777	North Hills MER				

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2023 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	
420975.66	3753651.65	4.84964c	(12011124)		420995.66	3753651.65	4.97040c	(12011124)	
421015.66	3753651.65	5.03345c	(12011124)		421035.66	3753651.65	5.06394c	(12011124)	
421055.66	3753651.65	5.07456c	(12011124)		421075.66	3753651.65	5.14320c	(12011124)	
421095.66	3753651.65	5.29993c	(16020424)		421115.66	3753651.65	5.47490c	(16020424)	
421135.66	3753651.65	5.63413c	(16020424)		421155.66	3753651.65	5.77242c	(16020424)	
421175.66	3753651.65	5.89537c	(16020424)		421195.66	3753651.65	6.00126c	(16020424)	Olinda ES MER
420945.89	3753399.73	2.22884c	(12011124)	North Hills MER					

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2024 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	
420975.66	3753651.65	5.16298c	(14120524)		420995.66	3753651.65	5.29054	(16120124)	
421015.66	3753651.65	5.43087	(16120124)		421035.66	3753651.65	5.44444	(16120124)	
421055.66	3753651.65	5.59111	(16120124)		421075.66	3753651.65	5.62058	(16120124)	
421095.66	3753651.65	5.64276	(16120124)		421115.66	3753651.65	5.59724c	(16020424)	
421135.66	3753651.65	5.76294c	(16020424)		421155.66	3753651.65	5.90820c	(16020424)	
421175.66	3753651.65	6.03866c	(16020424)		421195.66	3753651.65	6.15266c	(16020424)	Olinda ES MER
420945.89	3753399.73	2.37211c	(12011124)	North Hills MER					

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2025 ***
INCLUDING SOURCE(S): PHASE1 , PHASE2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	
420975.66	3753651.65	4.84964c	(12011124)		420995.66	3753651.65	4.97040c	(12011124)	
421015.66	3753651.65	5.03345c	(12011124)		421035.66	3753651.65	5.06394c	(12011124)	
421055.66	3753651.65	5.07456c	(12011124)		421075.66	3753651.65	5.14320c	(12011124)	
421095.66	3753651.65	5.29993c	(16020424)		421115.66	3753651.65	5.47490c	(16020424)	
421135.66	3753651.65	5.63413c	(16020424)		421155.66	3753651.65	5.77242c	(16020424)	
421175.66	3753651.65	5.89537c	(16020424)		421195.66	3753651.65	6.00126c	(16020424)	Olinda ES MER
420945.89	3753399.73	2.22884c	(12011124)	North Hills MER					

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: YR2027 ***
INCLUDING SOURCE(S): PHASE2 , PHASE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)		X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	
420975.66	3753651.65	5.10049	(16120124)		420995.66	3753651.65	5.24033	(16120124)	
421015.66	3753651.65	5.37955	(16120124)		421035.66	3753651.65	5.39193	(16120124)	
421055.66	3753651.65	5.53346	(16120124)		421075.66	3753651.65	5.56156	(16120124)	
421095.66	3753651.65	5.58232	(16120124)		421115.66	3753651.65	5.59491c	(16020424)	
421135.66	3753651.65	5.76060c	(16020424)		421155.66	3753651.65	5.90585c	(16020424)	
421175.66	3753651.65	6.03631c	(16020424)		421195.66	3753651.65	6.15031c	(16020424)	Olinda ES MER
420945.89	3753399.73	2.18648c	(12011124)	North Hills MER					

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE SUMMARY OF MAXIMUM PERIOD (43848 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
YR2023	1ST HIGHEST VALUE IS	0.70377 AT	(421195.66,	3753651.65,	140.25,	391.99,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.69620 AT	(421175.66,	3753651.65,	140.18,	391.99,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.68703 AT	(421155.66,	3753651.65,	140.07,	391.99,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.67641 AT	(421135.66,	3753651.65,	139.98,	391.99,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.66493 AT	(421115.66,	3753651.65,	139.92,	391.99,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.65201 AT	(421095.66,	3753651.65,	140.02,	391.99,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.63692 AT	(421075.66,	3753651.65,	140.23,	391.99,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.61887 AT	(421055.66,	3753651.65,	140.53,	391.99,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.59608 AT	(421035.66,	3753651.65,	140.97,	391.99,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.56894 AT	(421015.66,	3753651.65,	141.24,	391.99,	0.00)	DC	
YR2024	1ST HIGHEST VALUE IS	0.82128 AT	(421195.66,	3753651.65,	140.25,	391.99,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.80946 AT	(421175.66,	3753651.65,	140.18,	391.99,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.79629 AT	(421155.66,	3753651.65,	140.07,	391.99,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.78193 AT	(421135.66,	3753651.65,	139.98,	391.99,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.76695 AT	(421115.66,	3753651.65,	139.92,	391.99,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.75077 AT	(421095.66,	3753651.65,	140.02,	391.99,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.73264 AT	(421075.66,	3753651.65,	140.23,	391.99,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.71173 AT	(421055.66,	3753651.65,	140.53,	391.99,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.68627 AT	(421035.66,	3753651.65,	140.97,	391.99,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.65655 AT	(421015.66,	3753651.65,	141.24,	391.99,	0.00)	DC	
YR2025	1ST HIGHEST VALUE IS	0.70377 AT	(421195.66,	3753651.65,	140.25,	391.99,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.69620 AT	(421175.66,	3753651.65,	140.18,	391.99,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.68703 AT	(421155.66,	3753651.65,	140.07,	391.99,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.67641 AT	(421135.66,	3753651.65,	139.98,	391.99,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.66493 AT	(421115.66,	3753651.65,	139.92,	391.99,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.65201 AT	(421095.66,	3753651.65,	140.02,	391.99,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.63692 AT	(421075.66,	3753651.65,	140.23,	391.99,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.61887 AT	(421055.66,	3753651.65,	140.53,	391.99,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.59608 AT	(421035.66,	3753651.65,	140.97,	391.99,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.56894 AT	(421015.66,	3753651.65,	141.24,	391.99,	0.00)	DC	
HAULROUT	1ST HIGHEST VALUE IS	1.01737 AT	(420945.89,	3753399.73,	134.00,	134.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.60784 AT	(421175.66,	3753511.65,	137.70,	391.99,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.60447 AT	(421155.66,	3753511.65,	137.88,	391.99,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.60045 AT	(421135.66,	3753511.65,	137.78,	391.99,	0.00)	DC	

Model Output - School Receptors Unit Emission Rates (1 g/s)

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 5TH HIGHEST VALUE IS       0.59647 AT (  421115.66,  3753511.65,   137.62,   391.99,    0.00)  DC
 6TH HIGHEST VALUE IS       0.58014 AT (  421035.66,  3753511.65,   137.29,   137.29,    0.00)  DC
 7TH HIGHEST VALUE IS       0.57539 AT (  421015.66,  3753511.65,   137.34,   137.34,    0.00)  DC
 8TH HIGHEST VALUE IS       0.57037 AT (  420995.66,  3753511.65,   137.36,   137.36,    0.00)  DC
 9TH HIGHEST VALUE IS       0.56508 AT (  420975.66,  3753511.65,   137.35,   137.35,    0.00)  DC
10TH HIGHEST VALUE IS       0.55945 AT (  420955.66,  3753511.65,   137.32,   137.32,    0.00)  DC
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Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE SUMMARY OF MAXIMUM PERIOD (43848 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)				OF TYPE	NETWORK GRID-ID
			Olinda ES MER Location					
ALLPHASE	1ST HIGHEST VALUE IS	0.82128 AT	421195.66,	3753651.65,	140.25,	391.99, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.80946 AT	421175.66,	3753651.65,	140.18,	391.99, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.79629 AT	421155.66,	3753651.65,	140.07,	391.99, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.78193 AT	421135.66,	3753651.65,	139.98,	391.99, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.76695 AT	421115.66,	3753651.65,	139.92,	391.99, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.75077 AT	421095.66,	3753651.65,	140.02,	391.99, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.73264 AT	421075.66,	3753651.65,	140.23,	391.99, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.71173 AT	421055.66,	3753651.65,	140.53,	391.99, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.68627 AT	421035.66,	3753651.65,	140.97,	391.99, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.65655 AT	421015.66,	3753651.65,	141.24,	391.99, 0.00)	DC	
YR2026	1ST HIGHEST VALUE IS	0.76937 AT	421195.66,	3753651.65,	140.25,	391.99, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.75881 AT	421175.66,	3753651.65,	140.18,	391.99, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.74683 AT	421155.66,	3753651.65,	140.07,	391.99, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.73360 AT	421135.66,	3753651.65,	139.98,	391.99, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.71969 AT	421115.66,	3753651.65,	139.92,	391.99, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.70455 AT	421095.66,	3753651.65,	140.02,	391.99, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.68742 AT	421075.66,	3753651.65,	140.23,	391.99, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.66747 AT	421055.66,	3753651.65,	140.53,	391.99, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.64441 AT	421035.66,	3753651.65,	140.97,	391.99, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.61555 AT	421015.66,	3753651.65,	141.24,	391.99, 0.00)	DC	
YR2027	1ST HIGHEST VALUE IS	0.76937 AT	421195.66,	3753651.65,	140.25,	391.99, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.75881 AT	421175.66,	3753651.65,	140.18,	391.99, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.74683 AT	421155.66,	3753651.65,	140.07,	391.99, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.73360 AT	421135.66,	3753651.65,	139.98,	391.99, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.71969 AT	421115.66,	3753651.65,	139.92,	391.99, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.70455 AT	421095.66,	3753651.65,	140.02,	391.99, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.68742 AT	421075.66,	3753651.65,	140.23,	391.99, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.66747 AT	421055.66,	3753651.65,	140.53,	391.99, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.64441 AT	421035.66,	3753651.65,	140.97,	391.99, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.61555 AT	421015.66,	3753651.65,	141.24,	391.99, 0.00)	DC	
YR2028	1ST HIGHEST VALUE IS	0.11751 AT	421195.66,	3753651.65,	140.25,	391.99, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.11542 AT	421195.66,	3753631.65,	139.93,	391.99, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.11326 AT	421175.66,	3753651.65,	140.18,	391.99, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.11301 AT	421195.66,	3753611.65,	139.64,	391.99, 0.00)	DC	

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          5TH HIGHEST VALUE IS       0.11128 AT (  421175.66,  3753631.65,   139.81,   391.99,    0.00)  DC
          6TH HIGHEST VALUE IS       0.11030 AT (  421195.66,  3753591.65,   139.34,   391.99,    0.00)  DC
          7TH HIGHEST VALUE IS       0.10926 AT (  421155.66,  3753651.65,   140.07,   391.99,    0.00)  DC
          8TH HIGHEST VALUE IS       0.10902 AT (  421175.66,  3753611.65,   139.49,   391.99,    0.00)  DC
          9TH HIGHEST VALUE IS       0.10742 AT (  421155.66,  3753631.65,   139.72,   391.99,    0.00)  DC
         10TH HIGHEST VALUE IS       0.10731 AT (  421195.66,  3753571.65,   139.00,   391.99,    0.00)  DC
 *** AERMOD - VERSION 21112  ***   *** Construction HRA                                                ***        02/08/22
 *** AERMET - VERSION  16216 ***   *** Brea 265                                                       ***        10:02:13
                                                                                                               PAGE 309
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  URBAN  ADJ_U*

                                    *** THE SUMMARY OF MAXIMUM PERIOD ( 43848 HRS) RESULTS ***


                                   ** CONC OF OTHER    IN MICROGRAMS/M**3                        **

                                                                                                    NETWORK
GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

YR2030    1ST HIGHEST VALUE IS       0.11751 AT (  421195.66,  3753651.65,   140.25,   391.99,    0.00)  DC
          2ND HIGHEST VALUE IS       0.11542 AT (  421195.66,  3753631.65,   139.93,   391.99,    0.00)  DC
          3RD HIGHEST VALUE IS       0.11326 AT (  421175.66,  3753651.65,   140.18,   391.99,    0.00)  DC
          4TH HIGHEST VALUE IS       0.11301 AT (  421195.66,  3753611.65,   139.64,   391.99,    0.00)  DC
          5TH HIGHEST VALUE IS       0.11128 AT (  421175.66,  3753631.65,   139.81,   391.99,    0.00)  DC
          6TH HIGHEST VALUE IS       0.11030 AT (  421195.66,  3753591.65,   139.34,   391.99,    0.00)  DC
          7TH HIGHEST VALUE IS       0.10926 AT (  421155.66,  3753651.65,   140.07,   391.99,    0.00)  DC
          8TH HIGHEST VALUE IS       0.10902 AT (  421175.66,  3753611.65,   139.49,   391.99,    0.00)  DC
          9TH HIGHEST VALUE IS       0.10742 AT (  421155.66,  3753631.65,   139.72,   391.99,    0.00)  DC
         10TH HIGHEST VALUE IS       0.10731 AT (  421195.66,  3753571.65,   139.00,   391.99,    0.00)  DC

YR2029    1ST HIGHEST VALUE IS       0.11751 AT (  421195.66,  3753651.65,   140.25,   391.99,    0.00)  DC
          2ND HIGHEST VALUE IS       0.11542 AT (  421195.66,  3753631.65,   139.93,   391.99,    0.00)  DC
          3RD HIGHEST VALUE IS       0.11326 AT (  421175.66,  3753651.65,   140.18,   391.99,    0.00)  DC
          4TH HIGHEST VALUE IS       0.11301 AT (  421195.66,  3753611.65,   139.64,   391.99,    0.00)  DC
          5TH HIGHEST VALUE IS       0.11128 AT (  421175.66,  3753631.65,   139.81,   391.99,    0.00)  DC
          6TH HIGHEST VALUE IS       0.11030 AT (  421195.66,  3753591.65,   139.34,   391.99,    0.00)  DC
          7TH HIGHEST VALUE IS       0.10926 AT (  421155.66,  3753651.65,   140.07,   391.99,    0.00)  DC
          8TH HIGHEST VALUE IS       0.10902 AT (  421175.66,  3753611.65,   139.49,   391.99,    0.00)  DC
          9TH HIGHEST VALUE IS       0.10742 AT (  421155.66,  3753631.65,   139.72,   391.99,    0.00)  DC
         10TH HIGHEST VALUE IS       0.10731 AT (  421195.66,  3753571.65,   139.00,   391.99,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Model Output - School Receptors Unit Emission Rates (1 g/s)

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
YR2023 HIGH 1ST HIGH VALUE IS	6.00126c	ON 16020424:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2024 HIGH 1ST HIGH VALUE IS	6.15266c	ON 16020424:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2025 HIGH 1ST HIGH VALUE IS	6.00126c	ON 16020424:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
HAULROUT HIGH 1ST HIGH VALUE IS	3.47118c	ON 12121024:	AT (420945.89, 3753399.73, 134.00, 134.00, 0.00)	DC	
			Olinda ES MER Location		
ALLPHASE HIGH 1ST HIGH VALUE IS	6.15266c	ON 16020424:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2026 HIGH 1ST HIGH VALUE IS	6.15031c	ON 16020424:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2027 HIGH 1ST HIGH VALUE IS	6.15031c	ON 16020424:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2028 HIGH 1ST HIGH VALUE IS	1.87216c	ON 14120524:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2030 HIGH 1ST HIGH VALUE IS	1.87216c	ON 14120524:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	
YR2029 HIGH 1ST HIGH VALUE IS	1.87216c	ON 14120524:	AT (421195.66, 3753651.65, 140.25, 391.99, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV URBAN ADJ_U*

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   2 Warning Message(s)
A Total of   2285 Informational Message(s)

A Total of   43848 Hours Were Processed

A Total of   1588 Calm Hours Identified

A Total of   697 Missing Hours Identified (1.59 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
ME W186   3836   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used   0.50
ME W187   3836   MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET

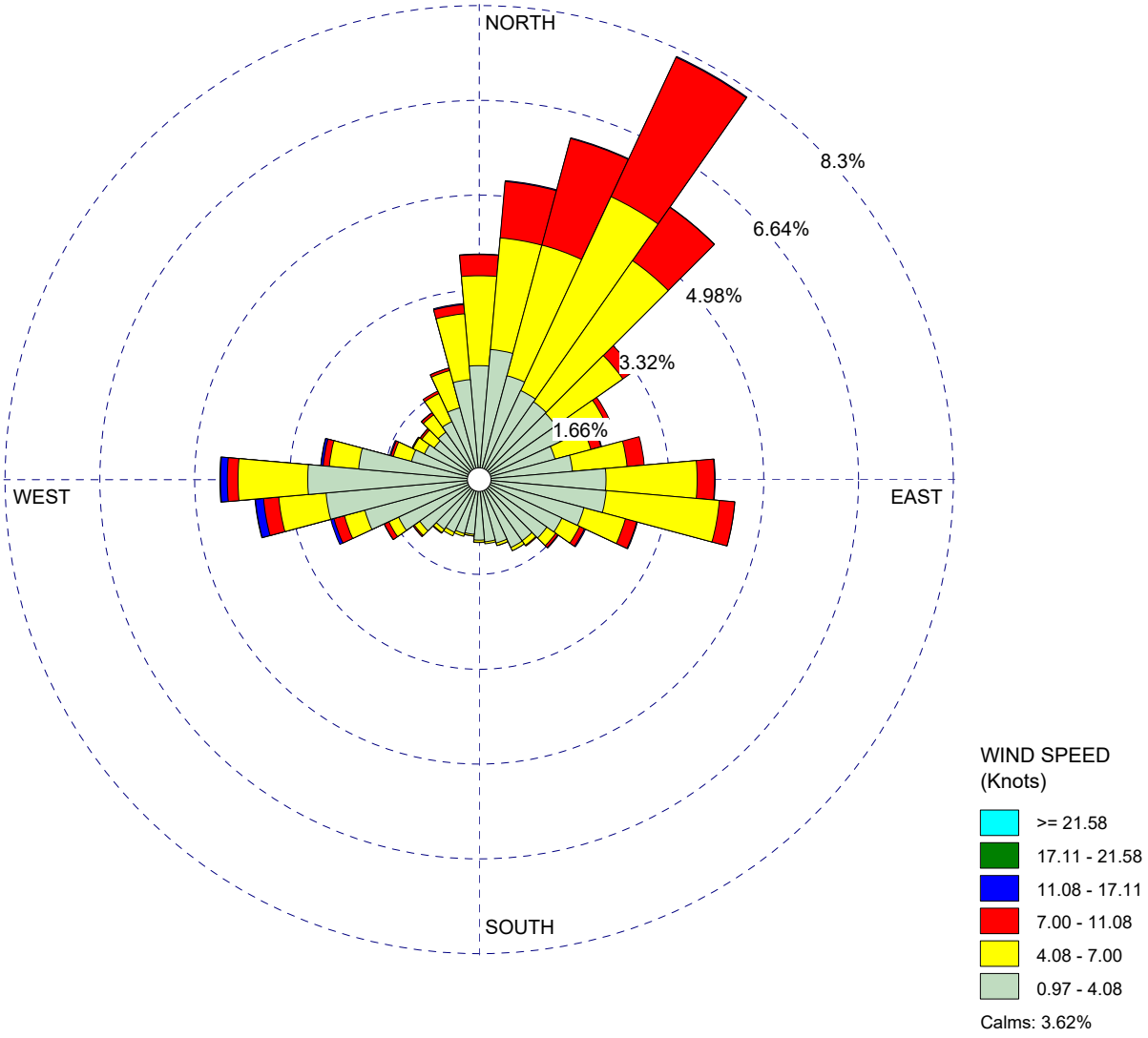
   ****
   *** AERMOD Finishes Successfully ***
   ****

WIND ROSE PLOT:

Station #

DISPLAY:

Wind Speed
Flow Vector (blowing to)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2012 - 00:00** **End Date: 12/31/2016 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **3.62%**	TOTAL COUNT: **43471 hrs.**	
	AVG. WIND SPEED: **3.93 Knots**	DATE: **2/17/2022**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Appendix C. Construction Risk Calculations

Table C1
Residential Concentrations for Construction Risk Calculations

Contaminant		Source	Model Output [1] ($\mu g/m^3$)	Emission Rates [2] (g/s)	MEIR Conc. ($\mu g/m^3$)	Total MEIR Conc. Annual Average ($\mu g/m^3$)
(a)		(b)	(c)	(d)	(e)	(f)
Residential Receptors						
DPM	2023	On-Site	0.24	2.74E-02	6.63E-03	6.65E-03
		Truck Route	0.21	8.47E-05	1.77E-05	
	2024	On-Site	2.68	2.62E-02	7.03E-02	7.03E-02
		Truck Route	0.21	1.48E-04	3.09E-05	
	2025	On-Site	0.24	2.80E-02	6.78E-03	6.81E-03
		Truck Route	0.21	1.50E-04	3.14E-05	
	2026	On-Site	2.50	1.75E-02	4.37E-02	4.38E-02
		Truck Route	0.21	5.67E-04	1.19E-04	
	2027	On-Site	2.50	3.17E-02	7.93E-02	7.94E-02
		Truck Route	0.21	3.81E-04	7.98E-05	
	2028	On-Site	2.44	1.20E-02	2.93E-02	2.93E-02
		Truck Route	0.21	3.92E-05	8.21E-06	
	2029	On-Site	2.44	8.42E-03	2.05E-02	2.05E-02
		Truck Route	0.21	3.84E-05	8.05E-06	
	2030	On-Site	2.44	2.65E-03	6.47E-03	6.48E-03
		Truck Route	0.21	3.92E-05	8.22E-06	
					Total DPM concentrations used for Cancer Risk and Chronic Hazard calculations	
Residential Receptors - Mitigated Run: Tier 4 Engines for eq. > 50 HP (Phases 1 & 2) - MM AQ-1 and MM AQ-13 [3]						
DPM	2023	On-Site	0.24	1.71E-03	4.14E-04	4.32E-04
		Truck Route	0.21	8.47E-05	1.77E-05	
	2024	On-Site	2.68	4.95E-03	1.33E-02	1.33E-02
		Truck Route	0.21	1.48E-04	3.09E-05	
	2025	On-Site	0.24	5.30E-03	1.28E-03	1.32E-03
		Truck Route	0.21	1.50E-04	3.14E-05	
	2026	On-Site	2.50	1.75E-02	4.37E-02	4.38E-02
		Truck Route	0.21	5.67E-04	1.19E-04	
	2027	On-Site	2.50	3.17E-02	7.93E-02	7.94E-02
		Truck Route	0.21	3.81E-04	7.98E-05	
	2028	On-Site	2.44	1.20E-02	2.93E-02	2.93E-02
		Truck Route	0.21	3.92E-05	8.21E-06	
	2029	On-Site	2.44	8.42E-03	2.05E-02	2.05E-02
		Truck Route	0.21	3.84E-05	8.05E-06	
	2030	On-Site	2.44	2.65E-03	6.47E-03	6.48E-03
		Truck Route	0.21	3.92E-05	8.22E-06	
					0.00E+00	0.00E+00
					0.00E+00	
					Total DPM concentrations used for Cancer Risk and Chronic Hazard calculations	

Maximum Exposed Individual Resident (MEIR) UTM coordinates: 422290.39E, 3753829.08N

[1] Model Output (Appendix B) at the MEIR based on unit emission rates for sources (1 g/s).

[2] Emission Rates from Emission Rate Calculations (Appendix A - Construction Emissions).

Table C2
Quantification of Health Risks for Off-site Residents
Construction Emissions

Source		MEIR Conc. ($\mu g/m^3$)	Weight Fraction	Contaminant	URF $(\mu g/m^3)^{-1}$	CPF $(mg/kg/day)^{-1}$	Dose (by age bin) 3rd Trimester (mg/kg-day)	Dose 0 < 2 years (mg/kg-day)	Dose 2 < 9 years (mg/kg-day)	Dose 2<16 years (mg/kg-day)	Dose 16<30 years (mg/kg-day)	Carcinogenic Risks 3rd Trimester per million	Carcinogenic Risks 0 < 2 years per million	Carcinogenic Risks 2 < 9 years per million	Carcinogenic Risks 2<16 years per million	Carcinogenic Risks 16<30 years per million	**Total Cancer Risk** per million	**Chronic Hazards** [1] Chronic REL ($\mu g/m^3$)	RESP
(a)		(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)
Residential Receptors																			
2023		6.65E-03	1.00E+00	DPM	3.0E-04	1.1E+00	2.30E-06	6.95E-06				7.33E-02	1.50E-01				2.23E-01	5.0E+00	1.33E-03
2024		7.03E-02	1.00E+00					7.35E-05					9.37E+00				9.37E+00		1.41E-02
2025		6.81E-03	1.00E+00					7.12E-06	5.62E-06				7.54E-01	3.08E-02			7.84E-01		1.36E-03
2026		4.38E-02	1.00E+00						3.62E-05					1.17E+00			1.17E+00		8.77E-03
2027		7.94E-02	1.00E+00						6.56E-05					2.12E+00			2.12E+00		1.59E-02
2028		2.93E-02	1.00E+00						2.42E-05					7.85E-01			7.85E-01		5.87E-03
2029		2.05E-02	1.00E+00						1.70E-05					5.50E-01			5.50E-01		4.11E-03
2030		6.48E-03	1.00E+00						5.35E-06					7.24E-02			7.24E-02		1.30E-03
																Total	**15.1**		**0.053**
Residential Receptors - Mitigated Run: Tier 4 Interim Engines for eq. > 50 HP (Remediation and Phases 1 & 2) - MM AQ-1																			
2023		4.32E-04	1.00E+00	DPM	3.0E-04	1.1E+00	1.50E-07	4.52E-07				4.77E-03	9.74E-03				0.01	5.0E+00	8.64E-05
2024		1.33E-02	1.00E+00					1.39E-05					1.77E+00				1.77		2.66E-03
2025		1.32E-03	1.00E+00					1.37E-06	1.09E-06				1.46E-01	5.95E-03			0.15		2.63E-04
2026		4.38E-02	1.00E+00						3.62E-05				0.00E+00	1.17E+00			1.17		8.77E-03
2027		7.94E-02	1.00E+00						6.56E-05					2.12E+00			2.12		1.59E-02
2028		2.93E-02	1.00E+00						2.42E-05					7.85E-01			0.78		5.87E-03
2029		2.05E-02	1.00E+00						1.70E-05					5.50E-01			0.55		4.11E-03
2030		6.48E-03	1.00E+00						5.35E-06					7.24E-02			0.07		1.30E-03
		0.00E+00	1.00E+00														0.00		0.00E+00
																Total	**6.6**		**0.039**

Maximum Exposed Individual Resident (MEIR) UTM coordinates: 422290.39E, 3753829.08N

OEHHA age bin	3rd Trimester	0 < 2 years	2 < 9 years	2<16 years	16<30 years
exposure year(s)	2023	2023-2025	2025-2030		
Dose Exposure Factors: frequency (days/year)	350	350	350	350	350
inhalation rate (L/kg-day) [2]	361	1090	861	745	335
inhalation absorption factor	1	1	1	1	1
conversion factor ($mg/\mu g$; m^3/L)	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06
Risk Calculation Factors: age sensitivity factor	10	10	3	3	1
averaging time (years)	70	70	70	70	70
per million	1.0E+06	1.0E+06	1.0E+06	1.0E+06	1.0E+06
fraction of time at home	0.85	0.85	0.72	0.72	0.73

		exposure durations (year) [3]					
Construction Year		3rd Trimester	0 < 2 years	2 < 9 years	9<16 years	16<30 years	
2023		0.25	0.17				0.42
2024			1.00				1.00
2025			0.83	0.17			1.00
2026				1.00			1.00
2027				1.00			1.00
2028				1.00			1.00
2029				1.00			1.00
2030				0.42			0.42
	6.84	0.25	2.00	4.59	0.00	0.00	6.84

[1] Chronic Hazards for DPM using the chronic reference exposure level (REL) for the Respiratory Toxicological Endpoint.

[2] Inhalation rate taken as the 95th percentile breathing rates (OEHHA, 2015).

[3] Construction durations determined for each year to adjust receptor exposures to the exposure durations for each construction year (see App A - Construction Emissions).

Table C3
Olinda ES Student MER Concentrations for Construction Risk Calculations

Contaminant	Source		Model Output [1] ($\mu g/m^3$)	Emission Rates [2] (g/s)	MER Conc. ($\mu g/m^3$)	Total MER Conc. Annual Average ($\mu g/m^3$)
(a)	(b)		(c)	(d)	(e)	(f)
Olinda Elementary School Student						
DPM	2023	On-Site	0.70	2.74E-02	1.93E-02	1.93E-02
		Truck Route	0.24	8.47E-05	2.00E-05	
	2024	On-Site	0.82	2.62E-02	2.15E-02	2.16E-02
		Truck Route	0.24	1.48E-04	3.49E-05	
	2025	On-Site	0.70	2.80E-02	1.97E-02	1.97E-02
		Truck Route	0.24	1.50E-04	3.55E-05	
	2026	On-Site	0.77	1.75E-02	1.35E-02	1.36E-02
		Truck Route	0.24	5.67E-04	1.34E-04	
	2027	On-Site	0.77	3.17E-02	2.44E-02	2.45E-02
		Truck Route	0.24	3.81E-04	9.01E-05	
	2028	On-Site	0.12	1.20E-02	1.41E-03	1.42E-03
		Truck Route	0.24	3.92E-05	9.27E-06	
	2029	On-Site	0.12	8.42E-03	9.89E-04	9.98E-04
		Truck Route	0.24	3.84E-05	9.09E-06	
	2030	On-Site	0.12	2.65E-03	3.12E-04	3.21E-04
		Truck Route	0.24	3.92E-05	9.28E-06	
					Total DPM concentrations used for Cancer Risk and Chronic Hazard calculations	

Maximum Exposed Receptor (MER) UTM coordinates: 421195.66E, 3753651.65N

[1] Model Output (Appendix C) at the MER based on unit emission rates for sources (1 g/s).

[2] Emission Rates from Emission Rate Calculations (Appendix A - Construction Emissions).

Table C4
Quantification of Health Risks for Off-site Olinda ES Student
Construction Emissions

Source		MER Conc. ($\mu g/m^3$)	Weight Fraction	Contaminant	URF $(\mu g/m^3)^{-1}$	CPF $(mg/kg/day)^{-1}$	Dose (by age bin) 2<16 years (mg/kg-day)	Carcinogenic Risks (by age bin) 2<16 years per million	**Total Cancer Risk** per million	**Chronic Hazards** [1] Chronic REL ($\mu g/m^3$)	RESP
(a)		(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Olinda Elementary School Student											
2023		1.93E-02	1.00E+00	DPM	3.0E-04	1.1E+00	4.94E-06	9.33E-02	9.33E-02	5.0E+00	3.86E-03
2024		2.16E-02	1.00E+00				5.53E-06	2.49E-01	2.49E-01		4.31E-03
2025		1.97E-02	1.00E+00				5.06E-06	2.28E-01	2.28E-01		3.95E-03
2026		1.36E-02	1.00E+00				3.48E-06	1.57E-01	1.57E-01		2.72E-03
2027		2.45E-02	1.00E+00				6.28E-06	2.83E-01	2.83E-01		4.90E-03
2028		1.42E-03	1.00E+00				3.65E-07	1.64E-02	1.64E-02		2.84E-04
2029		9.98E-04	1.00E+00				2.56E-07	1.15E-02	1.15E-02		2.00E-04
2030		3.21E-04	1.00E+00				8.23E-08	1.55E-03	1.55E-03		6.42E-05
									1.039		**0.020**

Maximum Exposed Receptor (MER) UTM coordinates: 421195.66E, 3753651.65N

	OEHHA age bin [2]	2 < 16 years
	exposure year(s)	2023-2030
Dose Exposure Factors:	exposure frequency (days/year) [3]	180
	8-hour inhalation rate (L/kg-day) [4]	520
	inhalation absorption factor	1
	conversion factor ($mg/\mu g$; m^3/L)	1.0E-06
Risk Calculation Factors:	age sensitivity factor	3
	averaging time (years)	70
	per million	1.0E+06

	exposure durations (year) [5]
Construction Year	2 < 16 years
2023	0.42
2024	1.00
2025	1.00
2026	1.00
2027	1.00
2028	1.00
2029	1.00
2030	0.42
	6.84

[1] Chronic Hazards for DPM using the chronic reference exposure level (REL) for the Respiratory Toxicological Endpoint.

[2] Olinda Elementary School includes grade levels from preschool to the 6th grade.

3 Office of Environmental Heaht Hazard Assessment. 2004, February. Guidance for School Site Risk Assessment Pursuant to Health and Safety Code Section 901(f): Guidance for Assessing Exposures and Health Risks at Existing and Proposed School Sites.

[4] Inhalation rate taken as the 8-hour 95th percentile breathing rates, Moderate Activity (OEHHA, 2015).

[5] Construction durations determined for each year to adjust receptor exposures to the exposure durations for each construction year (see App A - Construction Emissio

Table C5
North Hills Preschool Student MER Concentrations for Construction Risk Calculations

Contaminant	Source		Model Output [1] ($\mu g/m^3$)	Emission Rates [2] (g/s)	MER Conc. ($\mu g/m^3$)	Total MER Conc. Annual Average ($\mu g/m^3$)
(a)	(b)		(c)	(d)	(e)	(f)
Daycare Student						
DPM	2023	On-Site	0.13	2.74E-02	3.53E-03	3.62E-03
		Truck Route	1.02	8.47E-05	8.62E-05	
	2024	On-Site	0.19	2.62E-02	4.89E-03	5.04E-03
		Truck Route	1.02	1.48E-04	1.50E-04	
	2025	On-Site	0.13	2.80E-02	3.61E-03	3.76E-03
		Truck Route	1.02	1.50E-04	1.53E-04	
	2026	On-Site	0.13	1.75E-02	2.19E-03	2.77E-03
		Truck Route	1.02	5.67E-04	5.77E-04	
	2027	On-Site	0.13	3.17E-02	3.97E-03	4.36E-03
		Truck Route	1.02	3.81E-04	3.88E-04	
	2028	On-Site	0.06	1.20E-02	6.94E-04	7.34E-04
		Truck Route	1.02	3.92E-05	3.99E-05	
	2029	On-Site	0.06	8.42E-03	4.86E-04	5.25E-04
		Truck Route	1.02	3.84E-05	3.91E-05	
	2030	On-Site	0.06	2.65E-03	1.53E-04	1.93E-04
		Truck Route	1.02	3.92E-05	3.99E-05	
					Total DPM concentrations used for Cancer Risk and Chronic Hazard calculations	

Maximum Exposed Receptor (MER) UTM coordinates: 420945.89E, 3753399.73N

[1] Model Output (Appendix C) at the MER based on unit emission rates for sources (1 g/s).

[2] Emission Rates from Emission Rate Calculations (Appendix A - Construction Emissions).

Table C6
Quantification of Health Risks for Off-site North Hills Preschool Student
Construction Emissions

Source		MER	Weight	Contaminant			Dose (by age bin)		Carcinogenic Risks (by age bin)		**Total Cancer Risk**	**Chronic Hazards [1]**	
		Conc. ($\mu g/m^3$)	Fraction		URF $(\mu g/m^3)^{-1}$	CPF $(mg/kg/day)^{-1}$	0 < 2 years (mg/kg-day)	2<16 years (mg/kg-day)	0 < 2 years per million	2<16 years per million	per million	Chronic REL ($\mu g/m^3$)	RESP
		(a)	(b)	(c)	(d)	(e)	(f)	(j)	(k)	(p)	(q)	(r)	(s)	(t)
Daycare Student														
2023		3.62E-03	1.00E+00	DPM	3.0E-04	1.1E+00	2.97E-06		1.87E-01		1.87E-01	5.0E+00	7.23E-04
2024		5.04E-03	1.00E+00				4.15E-06		6.22E-01		6.22E-01		1.01E-03
2025		3.76E-03	1.00E+00				1.34E-06	1.34E-06	1.17E-01	2.53E-02	1.42E-01		7.52E-04
2026		2.77E-03	1.00E+00					9.85E-07		4.43E-02	4.43E-02		5.53E-04
2027		4.36E-03	1.00E+00					1.55E-06		6.99E-02	6.99E-02		8.72E-04
2028		7.34E-04	1.00E+00					2.62E-07		1.18E-02	1.18E-02		1.47E-04
2029		5.25E-04	1.00E+00					1.87E-07		8.42E-03	8.42E-03		1.05E-04
2030		1.93E-04	1.00E+00					6.88E-08		1.29E-03	1.29E-03		3.86E-05
										Total	**1.087**		**0.004**

Maximum Exposed Receptor (MER) UTM coordinates: 420945.89E, 3753399.73N

		OEHHA age bin [2]	0 < 2 years	2 < 16 years
		exposure year(s)	2023-2025	2025-2030
Dose Exposure Factors:		exposure frequency (days/year) [3]	250	250
		8-hour inhalation rate (L/kg-day) [4]	1200	520
		inhalation absorption factor	1	1
		conversion factor (mg/µg; m^3/L)	1.0E-06	1.0E-06
Risk Calculation Factors:		age sensitivity factor	10	3
		averaging time (years)	70	70
		per million	1.0E+06	1.0E+06

		exposure durations (year) [5]	
Construction Year		0 < 2 years	2 < 16 years
2023		0.42	
2024		1.00	
2025		0.58	0.42
2026			1.00
2027			1.00
2028			1.00
2029			1.00
2030			0.42
6.84		2.00	4.84

[1] Chronic Hazards for DPM using the chronic reference exposure level (REL) for the Respiratory Toxicological Endpoint.

[2] North Hills Preschool accommodates children 6 weeks to 5 years old.

[3] Based on worker exposure duration (Office of Environmental Health Hazard Assessment. 2015, February. Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk As:

[4] Inhalation rate taken as the 8-hour 95th percentile breathing rates, Moderate Activity (Office of Environmental Health Hazard Assessment. 2015, February. Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments).

[5] Construction durations determined for each year to adjust receptor exposures to the exposure durations for each construction year (see App A - Construction Emissions).

8. Energy Demand Calculations

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Building Energy Demand Worksheet

Land Use	Electricity (kWh/yr)	Natural Gas: Building Envelope (kBTU/yr)	Natural Gas: Fireplace (kBTU/yr)[1]	Total (kiloBTU/yr)
LDR-Single Family	3,518,140	*10,754,000*	*2,025,000*	12,779,000
MDR-Condo/Townhouse	3,141,010	*10,728,500*	*2,925,000*	13,653,500
Surface Parking Lot	22,680	*0*	*0*	0
Total	**6,681,830**	***21,482,500***	***4,950,000***	**26,432,500**

Land Use	Number of DU	Hours Per Day	Days Per Year
LDR - Single Family	450	3	25
MDR - Condo/Townhouse	650	3	25
Total	**1,100**	**n/a**	**n/a**

Source: CalEEMod Version 2020.4.0.

Notes: kWh/yr=kilowatt hour per year; kBTU/yr=kilo-British Thermal Unit per year.

[1] *Assumes all units would have a natural gas fireplace. Total natural gas usage based on the number of fireplaces, a rate of 60,000 BTU/hour/fireplace, 25 days of use per year, and 3 hours per day.*

Natural Gas Amount from Natural Gas Fireplaces = (# of Natural Gas Fireplaces x # of Hours of Fireplace Operation/Day x # of Days of Fireplace Operation/Year x 60,000 BTU/hr/fireplace) ÷ 1,000 BTU/KBTU

Number of Natural Gas Fireplaces: 1,100 DUs
Number of Hours of Fireplace Operation/Day: 3 hrs/day (CalEEMod default)
Number of Days of Operation/Yr: 25 days/yr (CalEEMod default)
Average Heating Rate:* 60,000 BTU/hr/fireplace

**Based on CalEEMod methodology*

Construction-Related Fuel/Energy Usage

CONSTRUCTION WORKER COMMUTE

Year	Gas		Diesel		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	kWh
2023	39,124	1,484	90	2	1,593	587
2024	624,260	23,294	1,364	38	29,687	10,939
2025	953,274	33,850	1,989	52	67,350	24,900
2026	2,522,104	91,020	5,001	137	149,338	55,070
2027	2,682,760	92,341	4,892	127	218,075	80,614
2028	247,935	8,406	423	11	21,380	7,904
2029	264,748	8,853	423	11	24,102	8,912
2030	129,231	4,267	194	5	12,378	4,578
Total	**7,463,437**	**263,515**	**14,377**	**382**	**523,904**	**193,504**

CONSTRUCTION VENDOR TRIPS

Year	Gas		Diesel	
	VMT	Gallons	VMT	Gallons
2023	2,479	482	15,671	2,243
2024	5,307	1,028	34,896	4,954
2025	30,718	5,913	204,521	28,571
2026	38,113	7,258	264,963	36,304
2027	24,401	4,646	177,198	24,252
2028	2,701	511	21,311	2,900
2029	2,485	467	20,630	2,776
2030	1,046	195	8,697	1,150
Total	**107,249**	**20,501**	**747,888**	**103,149**

CONSTRUCTION TRUCK HAUL TRIPS

Year	Gas		Diesel	
	VMT	Gallons	VMT	Gallons
2023	0	0	170,250	28,505
2024	0	0	164,025	27,183
Total	**0**	**0**	**334,275**	**55,688**

CONSTRUCTION OFF-ROAD EQUIPMENT

Year	Gasoline gallons	Diesel gallons
2023	0	34,630
2024	6,932	76,534
2025	6,964	126,954
2026	10,816	58,992
2027	9,454	131,750
2028	8,449	43,575
2029	11,546	23,120
2030	6,964	9,639
Total	**61,124**	**505,194**

CONSTRUCTION TOTAL

Year	Gas		Diesel		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	kWh
2023	41,603	1,966	186,011	65,381	1,593	587
2024	629,567	31,253	200,286	108,708	29,687	10,939
2025	983,992	46,728	206,510	155,577	67,350	24,900
2026	2,560,217	109,094	269,964	95,433	149,338	55,070
2027	2,707,161	106,441	182,090	156,129	218,075	80,614
2028	250,636	17,366	21,734	46,485	21,380	7,904
2029	267,233	20,865	21,054	25,907	24,102	8,912
2030	130,277	11,427	8,892	10,794	12,378	4,578
Total	**7,570,686**	**345,140**	**1,096,540**	**664,413**	**523,904**	**193,504**

Operation-Related Vehicle Fuel/Energy Usage

PROJECT LAND USE COMMUTE

Vehicle Type	Gas		Diesel		CNG		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	Gallons	VMT	kWh
All Vehicles	28,563,135	955,438	541,078	30,213	4,356	380	3,213,615	1,084,548
Total	**28,563,135**	**955,438**	**541,078**	**30,213**	**4,356**	**380**	**3,213,615**	**1,084,548**

Off-Road Construction Equipment Fuel Usage Worksheet

Year	Total Gasoline	Total Diesel Gallons	Total Natural Gas
2023	0	34,630	0
2024	6,932	76,534	0
2025	6,964	126,954	0
2026	10,816	58,992	0
2027	9,454	131,750	0
2028	8,449	43,575	0
2029	11,546	23,120	0
2030	6,964	9,639	0
Total	**61,124**	**505,194**	**0**

Equipment Type[1]	Number of Equipment[1]	Horsepower	OFFROAD2017 Horsepower Category	Fuel Type	Working days[1]	Hours Per Day	Total Hours of Operation	Gasoline Gal/Hr[2]	Total Gasoline gallons	Diesel Gal/Hr[2]	Total Diesel gallons	Natural Gas Gal/Hr[2]	Total Natural Gas gallons
2023													
West Rem Area - Site Preparation													
Rubber Tired Dozers	3	247	*300*	*Diesel*	6	8	144	0.00	0	4.47	644	0.00	0
Tractors/Loaders/Backhoes	4	97	*100*	*Diesel*	6	8	192	0.00	0	1.59	306	0.00	0
West Rem Area - Rough Grading													
Excavators	2	158	*175*	*Diesel*	17	8	272	0.00	0	2.89	785	0.00	0
Graders	1	187	*300*	*Diesel*	17	8	136	0.00	0	4.55	618	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	17	8	136	0.00	0	4.47	608	0.00	0
Scrapers	2	367	*600*	*Diesel*	17	8	272	0.00	0	10.55	2,871	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	17	8	272	0.00	0	1.59	433	0.00	0
Phase 1 - Site Preparation													
Rubber Tired Dozers	3	247	*300*	*Diesel*	46	8	1,104	0.00	0	4.47	4,935	0.00	0
Tractors/Loaders/Backhoes	4	97	*100*	*Diesel*	46	8	1,472	0.00	0	1.59	2,344	0.00	0
Phase 1 - Rough Grading													
Excavators	2	158	*175*	*Diesel*	63	8	1,008	0.00	0	2.89	2,909	0.00	0
Graders	1	187	*300*	*Diesel*	63	8	504	0.00	0	4.55	2,292	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	63	8	504	0.00	0	4.47	2,253	0.00	0
Scrapers	2	367	*600*	*Diesel*	63	8	1,008	0.00	0	10.55	10,639	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	63	8	1,008	0.00	0	1.59	1,605	0.00	0
Phase 1 - Utility Trenching													
Excavators	2	158	*175*	*Diesel*	30	5	300	0.00	0	2.89	866	0.00	0
Trenchers	1	78	*100*	*Diesel*	30	8	240	0.00	0	2.18	523	0.00	0
							TOTAL		**0**		**34,630**		**0**
2024													
Phase 1 - Rough Grading													
Excavators	2	158	*175*	*Diesel*	28	8	448	0.00	0	2.89	1,293	0.00	0
Graders	1	187	*300*	*Diesel*	28	8	224	0.00	0	4.53	1,016	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	28	8	224	0.00	0	4.63	1,037	0.00	0
Scrapers	2	367	*600*	*Diesel*	28	8	448	0.00	0	10.56	4,730	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	28	8	448	0.00	0	1.59	714	0.00	0
Phase 1 - Utility Trenching													
Excavators	2	306	*600*	*Diesel*	50	5	500	0.00	0	6.67	3,333	0.00	0
Trenchers	1	215	*300*	*Diesel*	50	8	400	0.00	0	5.87	2,349	0.00	0
Phase 1 - Fine Grading													
Excavators	2	158	*175*	*Diesel*	90	8	1,440	0.00	0	2.89	4,157	0.00	0
Graders	1	187	*300*	*Diesel*	90	8	720	0.00	0	4.53	3,265	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	90	8	720	0.00	0	4.63	3,334	0.00	0
Scrapers	2	367	*600*	*Diesel*	90	8	1,440	0.00	0	10.56	15,202	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	90	8	1,440	0.00	0	1.59	2,294	0.00	0
Phase 1 - Asphalt Paving													
Pavers	2	130	*175*	*Diesel*	92	8	1,472	0.00	0	3.40	4,999	0.00	0
Paving Equipment	2	132	*175*	*Diesel*	92	8	1,472	0.00	0	2.67	3,932	0.00	0
Rollers	2	80	*100*	*Diesel*	92	8	1,472	0.00	0	1.69	2,494	0.00	0
Phase 1 - Finishing/Landscaping													
Tractors/Loaders/Backhoes	1	97	*100*	*Diesel*	91	8	728	0.00	0	1.59	1,160	0.00	0
Phase 1 - Building Construction													
Cranes	1	231	*300*	*Diesel*	167	7	1,169	0.00	0	3.27	3,823	0.00	0
Forklifts	3	89	*100*	*Diesel*	167	8	4,008	0.00	0	0.98	3,919	0.00	0
Generator Sets	1	84	*100*	*Gasoline*	167	8	1,336	5.19	6,932	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*Diesel*	167	7	3,507	0.00	0	1.59	5,588	0.00	0
Welders	1	46	*50*	*Diesel*	167	8	1,336	0.00	0	1.19	1,587	0.00	0
East Rem Area - Site Preparation													
Rubber Tired Dozers	3	247	*300*	*Diesel*	6	8	144	0.00	0	4.63	667	0.00	0
Tractors/Loaders/Backhoes	4	97	*100*	*Diesel*	6	8	192	0.00	0	1.59	306	0.00	0
East Rem Area - Rough Grading													
Excavators	2	158	*175*	*Diesel*	17	8	272	0.00	0	2.89	785	0.00	0
Graders	1	187	*300*	*Diesel*	17	8	136	0.00	0	4.53	617	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	17	8	136	0.00	0	4.63	630	0.00	0
Scrapers	2	367	*600*	*Diesel*	17	8	272	0.00	0	10.56	2,872	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	17	8	272	0.00	0	1.59	433	0.00	0
Phase 2 - Site Preparation													
Rubber Tired Dozers	3	247	*300*	*Diesel*	17		0	0.00	0	4.63	0	0.00	0
Tractors/Loaders/Backhoes	4	97	*100*	*Diesel*	17		0	0.00	0	1.59	0	0.00	0
							TOTAL		**6,932**		**76,534**		**0**
2025													
Phase 1 - Building Construction													
Cranes	1	231	*300*	*Diesel*	108	7	756	0.00	0	3.26	2,465	0.00	0
Forklifts	3	89	*100*	*Diesel*	108	8	2,592	0.00	0	0.97	2,518	0.00	0
Generator Sets	1	84	*100*	*Gasoline*	108	8	864	5.19	4,481	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*Diesel*	108	7	2,268	0.00	0	1.59	3,617	0.00	0
Welders	1	46	*50*	*Diesel*	108	8	864	0.00	0	1.19	1,026	0.00	0
Phase 1 - Architectural Coating													
Air Compressors	1	78	*100*	*Gasoline*	90	6	540	3.75	2,027	0.00	0	0.00	0
Phase 2 - Site Preparation													
Rubber Tired Dozers	3	247	*300*	*Diesel*	66	8	1,584	0.00	0	4.47	7,077	0.00	0
Tractors/Loaders/Backhoes	4	97	*100*	*Diesel*	66	8	2,112	0.00	0	1.59	3,369	0.00	0
Phase 2 - Rough Grading													
Excavators	2	158	*175*	*Diesel*	139	8	2,224	0.00	0	2.89	6,421	0.00	0
Graders	1	187	*300*	*Diesel*	139	8	1,112	0.00	0	4.55	5,055	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	139	8	1,112	0.00	0	4.47	4,968	0.00	0
Scrapers	2	367	*600*	*Diesel*	139	8	2,224	0.00	0	10.52	23,405	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	139	8	2,224	0.00	0	1.59	3,547	0.00	0
Phase 2 - Utility Trenching													
Excavators	2	158	*175*	*Diesel*	121	8	1,936	0.00	0	2.89	5,590	0.00	0
Trenchers	1	78	*100*	*Diesel*	121	8	968	0.00	0	2.18	2,113	0.00	0
Phase 2 - Fine Grading													
Excavators	2	158	*175*	*Diesel*	141	8	2,256	0.00	0	2.89	6,514	0.00	0
Graders	1	187	*300*	*Diesel*	141	8	1,128	0.00	0	4.55	5,128	0.00	0
Rubber Tired Dozers	1	247	*300*	*Diesel*	141	8	1,128	0.00	0	4.47	5,040	0.00	0
Scrapers	2	367	*600*	*Diesel*	141	8	2,256	0.00	0	10.52	23,742	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*Diesel*	141	8	2,256	0.00	0	1.59	3,598	0.00	0
Phase 2 - Asphalt Paving													
Pavers	2	130	*175*	*Diesel*	82	8	1,312	0.00	0	3.40	4,457	0.00	0
Paving Equipment	2	132	*175*	*Diesel*	82	8	1,312	0.00	0	2.68	3,516	0.00	0
Rollers	2	80	*100*	*Diesel*	82	8	1,312	0.00	0	1.69	2,222	0.00	0
Phase 2 - Finishing/Landscaping													
Tractors/Loaders/Backhoes	1	97	*100*	*Diesel*	46	8	368	0.00	0	1.59	587	0.00	0
Phase 2 - Building Construction													
Cranes	1	231	*300*	*Diesel*	11	7	77	0.00	0	3.26	251	0.00	0
Forklifts	3	89	*100*	*Diesel*	11	8	264	0.00	0	0.97	256	0.00	0
Generator Sets	1	84	*100*	*Gasoline*	11	8	88	5.19	456	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*Diesel*	11	7	231	0.00	0	1.59	368	0.00	0
Welders	1	46	*50*	*Diesel*	11	8	88	0.00	0	1.19	104	0.00	0
							TOTAL		**6,964**		**126,954**		**0**
2026													
Phase 2 - Asphalt Paving													
Pavers	2	130	*175*	*diesel*	61	8	976	0.00	0	3.40	3,314	0.00	0
Paving Equipment	2	132	*175*	*diesel*	61	8	976	0.00	0	2.65	2,587	0.00	0
Rollers	2	80	*100*	*diesel*	61	8	976	0.00	0	1.69	1,654	0.00	0
Phase 2 - Finishing/Landscaping													
Tractors/Loaders/Backhoes	1	97	*100*	*diesel*	95	8	760	0.00	0	1.60	1,213	0.00	0
Phase 2 - Building Construction													
Cranes	1	231	*300*	*diesel*	261	7	1,827	0.00	0	3.26	5,963	0.00	0
Forklifts	3	89	*100*	*diesel*	261	8	6,264	0.00	0	0.97	6,047	0.00	0
Generator Sets	1	84	*100*	*gasoline*	261	8	2,088	5.18	10,816	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*diesel*	261	7	5,481	0.00	0	1.60	8,750	0.00	0
Welders	1	46	*50*	*diesel*	261	8	2,088	0.00	0	1.19	2,478	0.00	0

Phase 3 - Site Preparation													
Rubber Tired Dozers	3	247	*300*	*diesel*	47	8	1,128	0.00	0	4.58	5,164	0.00	0
Tractors/Loaders/Backhoes	4	97	*100*	*diesel*	47	8	1,504	0.00	0	1.60	2,401	0.00	0
Phase 3 - Rough Grading													
Excavators	2	158	*175*	*diesel*	62	8	992	0.00	0	2.89	2,864	0.00	0
Graders	1	187	*300*	*diesel*	62	8	496	0.00	0	4.55	2,255	0.00	0
Rubber Tired Dozers	1	247	*300*	*diesel*	62	8	496	0.00	0	4.58	2,271	0.00	0
Scrapers	2	367	*600*	*diesel*	62	8	992	0.00	0	10.53	10,447	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*diesel*	62	8	992	0.00	0	1.60	1,584	0.00	0
							TOTAL		**10,816**		**58,992**		**0**
2027													
Phase 2 - Building Construction													
Cranes	1	231	*300*	*diesel*	151	7	1,057	0.00	0	3.26	3,443	0.00	0
Forklifts	3	89	*100*	*diesel*	151	8	3,624	0.00	0	0.96	3,489	0.00	0
Generator Sets	1	84	*100*	*gasoline*	151	8	1,208	5.18	6,256	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*diesel*	151	7	3,171	0.00	0	1.60	5,061	0.00	0
Welders	1	46	*50*	*diesel*	151	8	1,208	0.00	0	1.19	1,433	0.00	0
Phase 2 - Architectural Coating													
Air Compressors	1	78	*100*	*gasoline*	142	6	852	3.75	3,198	0.00	0	0.00	0
Phase 3 - Rough Grading													
Excavators	2	158	*175*	*diesel*	173	8	2,768	0.00	0	2.89	7,991	0.00	0
Graders	1	187	*300*	*diesel*	173	8	1,384	0.00	0	4.56	6,308	0.00	0
Rubber Tired Dozers	1	247	*300*	*diesel*	173	8	1,384	0.00	0	4.58	6,336	0.00	0
Scrapers	2	367	*600*	*diesel*	173	8	2,768	0.00	0	10.56	29,241	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*diesel*	173	8	2,768	0.00	0	1.60	4,418	0.00	0
Phase 3 - Utility Trenching													
Excavators	2	158	*175*	*diesel*	165	8	2,640	0.00	0	2.89	7,621	0.00	0
Trenchers	1	78	*100*	*diesel*	165	8	1,320	0.00	0	2.18	2,879	0.00	0
Phase 3 - Fine Grading													
Excavators	2	158	*175*	*diesel*	135	8	2,160	0.00	0	2.89	6,235	0.00	0
Graders	1	187	*300*	*diesel*	135	8	1,080	0.00	0	4.56	4,922	0.00	0
Rubber Tired Dozers	1	247	*300*	*diesel*	135	8	1,080	0.00	0	4.58	4,944	0.00	0
Scrapers	2	367	*600*	*diesel*	135	8	2,160	0.00	0	10.56	22,818	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*diesel*	135	8	2,160	0.00	0	1.60	3,448	0.00	0
Phase 3 - Asphalt Paving													
Pavers	2	130	*175*	*diesel*	86	8	1,376	0.00	0	3.40	4,672	0.00	0
Paving Equipment	2	132	*175*	*diesel*	86	8	1,376	0.00	0	2.65	3,648	0.00	0
Rollers	2	80	*100*	*diesel*	86	8	1,376	0.00	0	1.69	2,331	0.00	0
Phase 3 - Finishing/Landscaping													
Tractors/Loaders/Backhoes	1	97	*100*	*diesel*	40	8	320	0.00	0	1.60	511	0.00	0
							TOTAL		**9,454**		**131,750**		**0**

2028													
Phase 3 - Fine Grading													
Excavators	2	158	*175*	*diesel*	55	8	880	0.00	0	2.89	2,540	0.00	0
Graders	1	187	*300*	*diesel*	55	8	440	0.00	0	4.56	2,007	0.00	0
Rubber Tired Dozers	1	247	*300*	*diesel*	55	8	440	0.00	0	4.58	2,014	0.00	0
Scrapers	2	367	*600*	*diesel*	55	8	880	0.00	0	10.57	9,306	0.00	0
Tractors/Loaders/Backhoes	2	97	*100*	*diesel*	55	8	880	0.00	0	1.60	1,405	0.00	0
Phase 3 - Asphalt Paving													
Pavers	2	130	*175*	*diesel*	55	8	880	0.00	0	3.40	2,989	0.00	0
Paving Equipment	2	132	*175*	*diesel*	55	8	880	0.00	0	2.70	2,374	0.00	0
Rollers	2	80	*100*	*diesel*	55	8	880	0.00	0	1.70	1,492	0.00	0
Phase 3 - Finishing/Landscaping													
Tractors/Loaders/Backhoes	1	97	*100*	*diesel*	104	8	832	0.00	0	1.60	1,329	0.00	0
Phase 3 - Building Construction													
Cranes	1	231	*300*	*diesel*	204	7	1,428	0.00	0	3.26	4,662	0.00	0
Forklifts	3	89	*100*	*diesel*	204	8	4,896	0.00	0	0.96	4,679	0.00	0
Generator Sets	1	84	*100*	*gasoline*	204	8	1,632	5.18	8,449	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*diesel*	204	7	4,284	0.00	0	1.60	6,841	0.00	0
Welders	1	46	*50*	*diesel*	204	8	1,632	0.00	0	1.19	1,936	0.00	0
							TOTAL		**8,449**		**43,575**		**0**
2029													
Phase 3 - Building Construction													
Cranes	1	231	*300*	*diesel*	261	7	1,827	0.00	0	3.27	5,971	0.00	0
Forklifts	3	89	*100*	*diesel*	261	8	6,264	0.00	0	0.95	5,920	0.00	0
Generator Sets	1	84	*100*	*gasoline*	261	8	2,088	5.17	10,803	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*diesel*	261	7	5,481	0.00	0	1.60	8,752	0.00	0
Welders	1	46	*50*	*diesel*	261	8	2,088	0.00	0	1.19	2,476	0.00	0
Phase 3 - Architectural Coating													
Air Compressors	1	78	*100*	*gasoline*	33	6	198	3.75	743	0.00	0	0.00	0
							TOTAL		**11,546**		**23,120**		**0**
2030													
Phase 3 - Building Construction													
Cranes	1	231	*300*	*diesel*	109	7	763	0.00	0	3.27	2,494	0.00	0
Forklifts	3	89	*100*	*diesel*	109	8	2,616	0.00	0	0.94	2,456	0.00	0
Generator Sets	1	84	*100*	*gasoline*	109	8	872	5.17	4,511	0.00	0	0.00	0
Tractors/Loaders/Backhoes	3	97	*100*	*diesel*	109	7	2,289	0.00	0	1.60	3,655	0.00	0
Welders	1	46	*50*	*diesel*	109	8	872	0.00	0	1.19	1,034	0.00	0
Phase 3 - Architectural Coating													
Air Compressors	1	78	*100*	*gasoline*	109	6	654	3.75	2,453	0.00	0	0.00	0
							TOTAL		**6,964**		**9,639**		**0**

[1] Based on information provided.

[2] OFFROAD2021 v.1.0.1

OFFROAD 2023

	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	8860.077231	30.32028789	0	0	829.63524	1.571869236	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	51490.55	47.8	23093.55	2.229650703	91104	109.62	89235.2	1.020942408	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	281093.8	154.96	74905.3	3.752655687	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	34488.85	10.41	5044.3	6.837192475	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2528.57121	14.05363045	0	0	19.08146745	8.873802377	0	0	53282.7	120.13	45088.45	1.18173723
Aerial Lifts50	Aerial Lifts	50	72518.2	126.64	45749.1	1.585128451	118626.9208	473.9772312	145093.3401	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	89153.05167	262.8236181	80016.54353	1.114182739	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	130337.85	126.64	45749.1	2.848970799	117836.894	311.3621075	95363.1061	1.235665435	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	12650.3932	19.90749107	6084.658638	2.079063749	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	755.9594671	0.671039025	206.2508535	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	536.840781	0.223679675	68.7502845	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	214.232259	2.259412064	0	0	8.688533472	1.366994864	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	689.85	2.49	266.45	2.589041096	3070.220791	7.426357912	2674.137144	1.14811643	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	4507.624225	5.081192256	2463.313428	1.829902835	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7880.35	11.5	1233.7	6.387573964	14606.3506	17.58874242	6701.014631	2.179722236	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2748.45	2.85	306.6	8.964285714	22425.0372	17.90143118	5732.345598	3.912017657	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	32709.95966	18.4486365	6040.632376	5.414989296	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	51873.93158	14.77454364	4991.933432	10.39155115	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	30619.62973	3.126887542	1820.906289	16.81559887	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	16703.67538	0.469033131	346.0435534	48.27044231	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	113.1709054	1.52648489	0	0	2.543208933	0.976422301	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	3691.963332	16.59232647	0	0	1.733701151	0.36258398	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	4650.1	5.78	3368.95	1.38028169	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	59.07929684	0.294533434	142.7119459	0.413975834	0	0	0	0
Cranes50	Cranes	50	2292.2	2.85	1186.25	1.932307692	957.1813664	3.141689966	1388.208332	0.689508443	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	366.6490116	0.981778114	364.3805805	1.006225445	0	0	0	0
Cranes100	Cranes	100	7821.95	5.67	2361.55	3.312210201	21613.63282	36.81667929	16530.64914	1.30748845	0	0	0	0
Cranes175	Cranes	175	496.4	0.22	102.2	4.857142857	66266.15434	65.77913366	30397.53103	2.179984758	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	113655.0304	72.74975827	34674.692	3.277751692	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	200224.0988	72.94611389	36597.33275	5.471002495	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	3472.165572	0.883600303	365.7419027	9.493485833	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	11000.5233	1.570844983	787.5249034	13.96847675	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	3100.168015	8.713546911	3007.940406	1.030661382	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	479.794341	1.481302975	309.1004869	1.55222771	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	136473.0827	148.217433	70213.43416	1.943689043	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	149451.1397	98.37594462	45115.38078	3.312642765	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	156487.2998	76.1564	34402.8842	4.54866804	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	548151.8293	133.4915387	64095.15752	8.552156677	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	5596.31971	0.95849016	407.0662113	13.74793475	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	31733.58146	2.614064073	1464.048919	21.67521936	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	39.7904963	0.187745476	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14022.47183	274.9994607	40372.65	0.34732602	1.250360548	0.505388251	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	646.05	2.04	259.15	2.492957746	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	47.38967228	1.056767522	70.11544232	0.675880672	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	123952.6534	213.0356864	157678.835	0.786108379	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	1615.310551	1.746194151	1137.887876	1.419569173	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	159133.4499	151.8315814	99448.01063	1.600167252	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	339633.1043	196.7087711	117693.7638	2.885735773	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	432365.9438	169.2935229	100079.9576	4.320205107	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	770641.8679	178.1118034	115489.5159	6.672829669	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	8020.126425	1.222335905	644.4567562	12.44478601	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	21406.7394	1.309645613	899.0918302	23.80929142	0	0	0	0
Forklifts25	Forklifts	25	48.86001662	0.10984734	0	0	36.49337905	0.202283846	63.10900107	0.578259494	1412.55	1.15	1441.75	0.979746835
Forklifts50	Forklifts	50	1213325.7	424.6	761747.7	1.592818331	83904.84818	232.0178128	166457.2847	0.504062339	1877315.45	780.55	1406213.6	1.335014432
Forklifts75	Forklifts	75	0	0	0	0	9942.47067	22.5527533	10234.68651	0.971448482	0	0	0	0
Forklifts100	Forklifts	100	5665577.45	1514.33	2683304.8	2.111417775	1234496.867	1934.142823	1255174.843	0.98352582	11748682.05	2739.48	4935373.05	2.38050537
Forklifts175	Forklifts	175	396375.4	55.35	98039	4.043037975	363960.6576	355.3954717	230009.8569	1.582369828	881785.25	100.25	180612.95	4.882181759
Forklifts300	Forklifts	300	0	0	0	0	70688.02943	43.99572007	31334.18129	2.255939888	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	18391.92441	6.983232962	4720.937855	3.895820062	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	286.7822898	0.101141923	22.08815037	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1323.948282	0.181591105	144.7804769	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	13111.3891	125.4496417	0	0	15237.42234	57.04342144	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	400492.6	1572.39	180602	2.217542441	250955.75	532.05	179616.5	1.397175371	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	181025.4	303.7	34868.45	5.191667539	0	0	0	0	16235.2	22.61	2587.85	6.273624824
Generator Sets175	Generator Sets	175	29597.85	28.71	3292.3	8.990022173	0	0	0	0	23480.45	18.73	2157.15	10.88494078
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	23.831373	0.175475547	40.55206177	0.587673523	0	0	0	0
Graders50	Graders	50	0	0	0	0	797.7667136	2.544395426	907.251002	0.879323045	0	0	0	0
Graders75	Graders	75	0	0	0	0	296.4408131	0.52642664	193.027814	1.53574144	0	0	0	0
Graders100	Graders	100	0	0	0	0	19196.33323	26.49680754	10200.76976	1.881851437	0	0	0	0
Graders175	Graders	175	0	0	0	0	206427.6545	137.397353	65421.62746	3.155342698	0	0	0	0
Graders300	Graders	300	0	0	0	0	428112.239	122.8328827	94153.87841	4.546942157	0	0	0	0
Graders600	Graders	600	0	0	0	0	27657.72969	4.825577533	3927.061662	7.042855974	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	14845.61051	0.52642664	388.2859915	38.23370103	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	12.45659339	0.086147617	19.90854883	0.625690677	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	51323.53516	81.66794098	54483.5265	0.942000976	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	28291.0932	29.37633742	17802.52299	1.589162009	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	37280.04623	30.06551836	20946.38148	1.779784554	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	55852.32978	22.57067567	15663.64805	3.565729363	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	48728.11148	15.24812822	10045.95328	4.85052141	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	156292.6482	27.82568031	19389.43342	8.060712494	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	6635.450221	0.689180937	466.1586709	14.23431684	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	8702.583198	0.430738085	236.0158464	36.87287668	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	0	0	0	0	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	4959.937307	4.865290479	7917.659178	0.62643986	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	1662.4117	0.76820376	1162.528323	1.429996729	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3007.879912	1.2803396	1745.814359	1.722909367	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	117935.1143	26.80177562	37948.60527	3.107758862	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	239578.2313	44.98259794	57800.05609	4.144948076	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	1027236.984	100.2079127	138194.9996	7.433242782	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	348496.2763	21.59506125	26639.91794	13.08173235	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	617258.0583	17.15655064	24549.89183	25.14300521	0	0	0	0
Pavers25	Pavers	25	711.8439506	2.290313898	0	0	2.356648427	0.313834118	0	0	0	0	0	0
Pavers50	Pavers	50	7387.6	8.06	3182.8	2.321100917	3399.963445	10.22448669	3669.421939	0.926566501	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	4457.771193	8.435201518	2919.706394	1.526787489	0	0	0	0
Pavers100	Pavers	100	6624.75	4.46	1741.05	3.805031447	28338.85495	40.98315081	16358.36984	1.732376467	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	44886.38725	33.82601013	13207.30014	3.398604315	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	34838.47391	16.18877059	7364.146162	4.730823255	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	6608.190105	1.874489226	829.3635913	7.967784183	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	1315.079034	0.170408111	81.61709606	16.11278884	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	802.3043636	5.693648106	0	0	3.996347126	0.778808443	0	0	0	0	0	0
Paving Equipment50	Paving Equipment	50	8610.35	22.09	3861.7	2.229678639	4237.119948	12.58992108	5999.874378	0.706201444	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	727.4034083	1.361072549	562.9305466	1.292172565	0	0	0	0
Paving Equipment100	Paving Equipment	100	3562.4	5.69	1007.4	3.536231884	17617.28773	23.05316631	10750.23363	1.638781847	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	18993.96818	15.31206618	7124.261059	2.666096598	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	12805.83123	6.380027575	3020.185782	4.24008063	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	13816.07773	3.998150614	1891.474159	7.304396764	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	2616.302633	0.425335172	223.3242888	11.71526235	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	1242.394866	0.170134069	80.20801921	15.489659	0	0	0	0
Rollers25	Rollers	25	2424.766614	12.2706905	0	0	38.89243255	6.242205991	20.25410928	1.920224287	0	0	0	0
Rollers50	Rollers	50	9581.25	5.67	3533.2	2.71177686	69777.12182	258.4589559	90516.12071	0.770880604	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	729.9040188	2.278715786	530.657663	1.375470609	0	0	0	0
Rollers100	Rollers	100	30061.4	10.69	6643	4.525274725	108329.9767	190.5356969	63950.32463	1.693970709	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	112754.8218	111.4817877	40445.93717	2.787791054	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	19064.30199	14.46108095	4520.61592	4.21719127	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	10540.2651	4.995646147	1535.160213	6.865905598	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	36.49337905	0.202283846	63.10900107	0.578259494	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3109.8	2.28	941.7	3.302325581	3513.584564	11.53017921	3182.329813	1.104091898	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	96.90018199	0.303425769	70.23798082	1.379598059	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68043.3	32.32	13388.2	5.082333697	278910.7974	487.4029263	139113.7422	2.004911902	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3825.2	1.18	459.9	8.317460317	59901.65337	82.22838329	22911.83971	2.614441011	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	4485.006248	4.045676914	1024.703188	4.376883278	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1666.62567	0.809135383	209.6621258	7.949102224	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	286.7822898	0.101141923	22.08815037	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	3078.683033	3.418742052	3284.645905	0.937295259	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	3307.818223	3.085206242	2324.52457	1.423008501	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	9682.282574	6.33718039	5563.693579	1.740261651	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	13439.18951	5.836876675	4640.377697	2.896141303	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	15133.94742	4.752885292	3385.427332	4.470321154	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	155624.8497	28.01700804	20564.90295	7.567497405	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	5771.279793	0.416919762	423.9371676	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	24.79312367	0.085933017	35.74611916	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	197.3342492	0.5155981	186.7734726	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1712.519571	2.234258433	1015.586963	1.686236268	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	8259.68344	6.273110217	3630.713465	2.274947754	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	103941.4419	54.39559955	24772.06058	4.195914248	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	126408.5663	55.6845948	22801.35717	5.543905364	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1546334.297	301.6248885	146508.7461	10.5545528	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	23789.01645	4.1247848	1525.366341	15.59560862	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	35736.61225	2.234258433	896.6318224	39.85650671	0	0	0	0
Skid Steer

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2660.85	0.58	295.65	9	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.061447492	0	0	42.70588603	5.830392071	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	104083.4242	250.4521763	130970.3334	0.794709927	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	15659.96362	49.30504517	11417.49317	1.371576351	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25502.55	10.02	8712.55	2.927105153	1666070.178	1651.239053	1046181.582	1.592524861	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	291073.1289	190.2389353	106817.5407	2.724956286	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	182661.9023	81.76783597	46102.35113	3.962095159	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	240046.0642	67.10722077	37291.32958	6.437047618	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	3890.322598	0.698124533	312.587025	12.44556647	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	81614.40535	3.6651538	2312.740647	35.28904353	0	0	0	0
Trenchers25	Trenchers	25	4645.850836	14.26751876	0	0	41.5527333	4.167093636	0	0	0	0	0	0
Trenchers50	Trenchers	50	45807.5	51.82	20841.5	2.197898424	36956.14998	82.12563531	32004.33056	1.154723418	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	2212.175128	4.479580108	1213.69038	1.8226849	0	0	0	0
Trenchers100	Trenchers	100	28605.05	17.18	6916.75	4.135620053	24112.33007	33.22355247	11072.35014	2.177706609	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	5955.302953	5.412825964	1660.6692	3.586086231	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	12294.73265	6.719370162	2095.570426	5.867010001	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	18687.26015	5.039527621	1877.634553	9.952554466	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	6006.853735	0.746596685	356.8282067	16.83402159	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	482.1967759	0.093324586	21.56713247	22.35794566	0	0	0	0
Welders25	Welders	25	0	0	0	0	7581.430125	23.30332732	0	0	0	0	0	0
Welders50	Welders	50	124749.7	249.71	51873.8	2.404869125	418133.05	547.87	351845.4	1.188399934	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	175634.35	254.85	52939.6	3.317636514	0	0	0	0	0	0	0	0
Welders175	Welders	175	21936.5	17.57	3646.35	6.016016016	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2023
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower B	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity_	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	8.15292E-08	9.86503E-08	1.17402E-07	1.17715E-06	3.14771E-07	3.72812E-05	2.80451E-09	2.58015E-09	3.37327E-10	3.03956E-10	1.208245086	6.066181326	0.003649695	32.24483304
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.00172717	0.002089876	0.002487125	0.013834946	0.015515819	2.233797243	0.001095175	0.001007561	2.03065E-05	1.82123E-05	72395.08474	2406.526065	37.89917331	2587651.159
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	1.03765E-07	1.25556E-07	1.49422E-07	1.58121E-06	7.67802E-07	8.51104E-05	6.4025E-09	5.8903E-09	7.72565E-10	6.93912E-10	2.758340927	7.471273325	0.006518851	73.61274962
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000638787	0.000772932	0.000919853	0.006155127	0.006843502	1.039544118	0.000309752	0.000284972	9.45502E-06	8.47548E-06	33690.56212	2383.168572	14.08458213	1338748.445
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	2.69312E-06	3.25868E-06	3.8781E-06	2.93415E-05	4.76498E-07	7.6792E-05	5.44001E-08	5.0048E-08	6.19073E-10	6.26091E-10	2.48875108	76.68541444	0.034813271	66.41811647
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000154403	0.000186828	0.000222341	0.000548563	0.000397521	0.048165622	2.55159E-05	2.34747E-05	4.34339E-07	3.92698E-07	1560.99858	780.3923679	4.558464935	55795.4978
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.00024793	0.000299995	0.000357019	0.001586415	0.002281046	0.712908633	0.000101098	9.30102E-05	6.48986E-06	5.8124E-06	23104.64001	1458.28305	3.29303399	918099.8743
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	5.89961E-07	7.13853E-07	8.49543E-07	1.68541E-05	1.63365E-06	0.000334501	2.51631E-08	2.31501E-08	3.03088E-09	2.72722E-09	10.84084426	45.99711822	0.040572419	289.3131677
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.00337753	0.004086811	0.004863643	0.013017922	0.010190056	1.200375795	0.000884986	0.000814187	1.08386E-05	9.78676E-06	38902.95243	2906.524307	51.06333423	1390526.308
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	0.000127361	0.000154106	0.000183399	0.000962836	0.001170201	0.388290086	5.03468E-05	4.63191E-05	3.53497E-06	3.16576E-06	12584.08481	1015.794666	1.07499107	500048.7666
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	5.33799E-08	6.45897E-08	7.68671E-08	8.02115E-07	2.064E-07	2.45154E-05	1.84419E-09	1.69665E-09	2.21826E-10	1.99876E-10	0.79451786	12.13236172	0.003519491	21.20355857
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001793595	0.00217025	0.002582777	0.008869176	0.01466283	1.229005947	0.000955005	0.000878605	1.11471E-05	1.00202E-05	39830.82631	2598.625225	36.24183666	1423691.738
Orange (SC)	2023	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - ATVs	Aggregate	100	Gasoline	2.26242E-05	2.73752E-05	3.25788E-05	0.000734997	8.5101E-05	0.045662568	3.435E-06	3.1602E-06	4.1548E-07	3.7229E-07	1479.877152	51.38772373	1.884204997	47392.76022
Orange (SC)	2023	Agricultural - ATVs	Aggregate	175	Gasoline	2.23092E-05	2.69941E-05	3.21253E-05	0.000848704	0.000122778	0.065188164	4.90383E-06	4.51153E-06	5.93442E-07	5.31484E-07	2112.681767	28.91925265	1.636079413	67658.19767
Orange (SC)	2023	Agricultural - ATVs	Aggregate	175	Diesel	5.36374E-08	6.49013E-08	7.72379E-08	9.48696E-07	5.81191E-07	0.000173203	2.25514E-08	2.07473E-08	1.57692E-09	1.41213E-09	5.613321302	69.45376204	0.002576586	267.6651753
Orange (SC)	2023	Agricultural - ATVs	Aggregate	25	Gasoline	0.001478478	0.001788959	0.002129009	0.017757605	0.000636321	0.064071296	5.4875E-05	5.0485E-05	5.39578E-07	5.22378E-07	2076.485187	264.1146466	11.50652877	66499.00981
Orange (SC)	2023	Agricultural - ATVs	Aggregate	25	Diesel	3.21354E-05	3.88838E-05	4.6275E-05	0.000257313	0.000248086	0.037563775	1.07947E-05	9.93108E-06	3.41384E-07	3.0626E-07	1217.403558	284.2642628	3.622962281	52217.06482
Orange (SC)	2023	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	97.4417622	2.693094473	15982.70772
Orange (SC)	2023	Agricultural - ATVs	Aggregate	50	Gasoline	5.14185E-05	6.22164E-05	7.40427E-05	0.002415983	0.000134278	0.068905752	5.18349E-06	4.76881E-06	6.2645E-07	5.61794E-07	2233.16496	194.466559	7.62991714	71516.6467
Orange (SC)	2023	Agricultural - ATVs	Aggregate	50	Diesel	8.35812E-05	0.000101133	0.000120357	0.000731917	0.000657426	0.110404517	2.54979E-05	2.34581E-05	1.0037E-06	9.00137E-07	3578.097547	503.1361371	6.724384892	153472.3247
Orange (SC)	2023	Agricultural - ATVs	Aggregate	75	Gasoline	1.43857E-05	1.74067E-05	2.07155E-05	0.000635448	3.94629E-05	0.021497678	1.61718E-06	1.48781E-06	1.95494E-07	1.75272E-07	696.7177515	97.52339453	1.311684334	22312.24235
Orange (SC)	2023	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	9.13114E-08	1.10487E-07	1.31488E-07	8.41972E-07	9.39263E-07	0.000141694	4.2828E-08	3.94018E-08	1.28863E-09	1.15524E-09	4.592166246	133.6372732	0.001288293	175.1779951
Orange (SC)	2023	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Combine Harvesters	Aggregate	300	Diesel	3.87387E-07	4.68738E-07	5.57838E-07	2.07754E-06	4.11615E-06	0.000728558	1.85878E-07	1.71008E-07	6.62831E-09	5.93999E-09	23.61183502	40.51133449	0.004891792	1014.945341
Orange (SC)	2023	Agricultural - Combine Harvesters	Aggregate	600	Diesel	3.16627E-05	3.83119E-05	4.55943E-05	0.000260281	0.00034762	0.065143777	1.43949E-05	1.32433E-05	5.92757E-07	5.31122E-07	2111.243224	675.9893529	0.272526107	90750.95086
Orange (SC)	2023	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	3.5602E-07	4.30784E-07	5.12669E-07	2.82163E-06	5.09495E-06	0.000663773	1.62582E-07	1.49575E-07	6.03881E-09	5.4118E-09	21.5122197	108.504659	0.0012715	924.694212
Orange (SC)	2023	Agricultural - Construction Equipment	Aggregate	100	Diesel	7.79061E-06	9.42664E-06	1.12185E-05	6.28191E-05	7.16571E-05	0.010348604	4.6281E-06	4.25785E-06	9.40813E-08	8.4373E-08	335.3876859	87.22633004	0.276293958	14385.50144
Orange (SC)	2023	Agricultural - Construction Equipment	Aggregate	175	Diesel	6.3654E-05	7.70213E-05	9.16617E-05	0.000614669	0.000738004	0.106845463	3.11587E-05	2.8666E-05	9.71858E-07	8.71119E-07	3462.752242	183.6029961	2.256373936	165117.6086
Orange (SC)	2023	Agricultural - Construction Equipment	Aggregate	300	Diesel	8.5763E-06	1.03773E-05	1.23499E-05	4.20449E-05	9.48222E-05	0.014032774	4.27994E-06	3.93754E-06	1.27634E-07	1.1441E-07	454.7878464	111.870936	0.119697359	21686.06821
Orange (SC)	2023	Agricultural - Construction Equipment	Aggregate	50	Diesel	2.19434E-06	2.65515E-06	3.15984E-06	9.92531E-06	7.91638E-06	0.001129065	5.35022E-07	4.9222E-07	1.02242E-08	9.20536E-09	36.59184339	40.51133461	0.036688442	1569.503108
Orange (SC)	2023	Agricultural - Construction Equipment	Aggregate	600	Diesel	4.63846E-06	5.61254E-06	6.67938E-06	3.84542E-05	4.90439E-05	0.007214321	2.25986E-06	2.07907E-06	6.56107E-08	5.88189E-08	233.8087643	44.38247521	0.037044128	11148.91894
Orange (SC)	2023	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.79651E-07	2.17377E-07	2.58697E-07	1.25683E-06	1.62434E-06	0.000201269	8.54534E-08	7.86171E-08	1.82893E-09	1.64096E-09	6.52292162	133.6372802	0.005190588	279.7821797
Orange (SC)	2023	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	1.293E-06	1.56453E-06	1.86191E-06	1.15557E-05	1.32261E-05	0.002601283	5.78967E-07	5.32649E-07	2.36688E-08	2.12085E-08	84.30493706	3.018603316	0.006852053	3623.814163
Orange (SC)	2023	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	8.49646E-06	1.02807E-05	1.22349E-05	7.02465E-05	9.37154E-05	0.013178836	4.38762E-06	4.03661E-06	1.19854E-07	1.07448E-07	427.1125864	91.20646908	0.032241023	18359.26476
Orange (SC)	2023	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	6.00714E-06	7.26865E-06	8.65029E-06	4.8744E-05	8.20218E-05	0.008903743	2.89472E-06	2.66314E-06	8.09666E-08	7.25929E-08	288.5612109	45.60323729	0.016686362	12403.68899
Orange (SC)	2023	Agricultural - Forklifts	Aggregate	100	Diesel	2.1453E-05	2.59581E-05	3.08923E-05	0.000161759	0.000177625	0.025981045	1.25212E-05	1.15195E-05	2.36142E-07	2.11825E-07	842.0191207	393.2370987	0.548334629	36116.01726
Orange (SC)	2023	Agricultural - Forklifts	Aggregate	175	Diesel	2.16097E-06	2.61477E-06	3.11179E-06	1.99269E-05	2.22272E-05	0.003353308	1.01359E-06	9.32504E-07	3.04965E-08	2.73398E-08	108.6772749	40.9524899	0.054066071	5182.158651
Orange (SC)	2023	Agricultural - Forklifts	Aggregate	50	Diesel	3.19628E-05	3.8675E-05	4.60264E-05	0.00014808	0.000122029	0.016988527	8.13136E-06	7.48085E-06	1.53871E-07	1.38509E-07	550.5808005	531.2074948	0.762396227	23615.5985
Orange (SC)	2023	Agricultural - Forklifts	Aggregate	75	Diesel	8.05495E-05	9.74648E-05	0.000115991	0.00056697	0.000730394	0.090963551	3.847E-05	3.53924E-05	8.26606E-07	7.41633E-07	2948.035701	1024.39407	2.274305947	126447.6124
Orange (SC)	2023	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	3.03377E-07	3.67086E-07	4.36863E-07	2.89896E-06	2.96161E-06	0.000468985	1.45672E-07	1.34018E-07	4.26513E-09	3.82367E-09	15.19931368	3.018603516	0.006852053	690.2503724
Orange (SC)	2023	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	8.04544E-06	9.73499E-06	1.15854E-05	4.31474E-05	8.54862E-05	0.015131055	3.8604E-06	3.55157E-06	1.3766E-07	1.23365E-07	490.3820244	149.01598	0.130815283	22269.8458
Orange (SC)	2023	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	2.60102E-08	3.14723E-08	3.74547E-08	1.81966E-07	2.35175E-07	2.91401E-05	1.23721E-08	1.13824E-08	2.64797E-10	2.37582E-10	0.944402271	133.6372732	0.000644147	38.57852505
Orange (SC)	2023	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000130602	0.000158029	0.000188067	0.000875018	0.001112131	0.132111536	8.50376E-05	7.82346E-05	1.20012E-06	1.07712E-06	4281.599797	1192.895532	2.186442985	165548.3715
Orange (SC)	2023	Agricultural - Nut Harvester	Aggregate	175	Diesel	2.42066E-05	2.929E-05	3.48575E-05	0.000213761	0.00025211	0.035245183	1.18879E-05	1.09369E-05	3.20491E-07	2.87357E-07	1142.260346	547.090337	0.471763694	49099.60717
Orange (SC)	2023	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.96357E-05	4.79592E-05	5.70754E-05	0.000179278	0.000151212	0.020393975	7.98929E-06	7.35015E-06	1.84677E-07	1.66274E-07	660.9478863	133.6372882	1.629227306	25555.59874
Orange (SC)	2023	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.58324E-05	1.91573E-05	2.27987E-05	8.32144E-05	0.000167017	0.028432175	7.66724E-06	7.05386E-06	2.5865E-07	2.3181E-07	921.4577143	152.8871282	0.191339083	39608.49336
Orange (SC)	2023	Agricultural - Nut Harvester	Aggregate	50	Diesel	1.15874E-05	1.40207E-05	1.66858E-05	5.09219E-05	4.01337E-05	0.005330748	2.99602E-06	2.75633E-06	4.82357E-08	4.3462E-08	172.7640923	223.8102767	0.19781175	6679.936321
Orange (SC)	2023	Agricultural - Nut Harvester	Aggregate	75	Diesel	2.35613E-05	2.85091E-05	3.39282E-05	0.000165179	0.00021324	0.026467904	1.1223E-05	1.03251E-05	2.40516E-07	2.15795E-07	857.7977096	289.2980899	0.548017986	33166.81207
Orange (SC)	2023	Agricultural - Other Harvesters	Aggregate	100	Diesel	2.60205E-05	3.14848E-05	3.74695E-05	0.000192967	0.000213629	0.030763048	1.53126E-05	1.40876E-05	2.79587E-07	2.50814E-07	996.9989293	590.7808864	0.498462152	38549.03716
Orange (SC)	2023	Agricultural - Other Harvesters	Aggregate	175	Diesel	2.38838E-05	2.88994E-05	3.43926E-05	0.000214316	0.00024806	0.035616923	1.15502E-05	1.06262E-05	3.23889E-07	2.90388E-07	1154.308068	335.5656484	0.47095224	49617.47348
Orange (SC)	2023	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.69215E-07	2.0475E-07	2.4367E-07	9.07495E-07	1.79798E-06	0.000318243	8.11936E-08	7.46981E-08	2.89532E-09	2.59466E-09	10.31391546	133.6372807	0.00193244	443.3395541
Orange (SC)	2023	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.85542E-07	3.45506E-07	4.11181E-07	2.34728E-06	3.13492E-06	0.000587484	1.29817E-07	1.19432E-07	5.34564E-09	4.7898E-09	19.03974579	133.6372807	0.00193244	818.4158977
Orange (SC)	2023	Agricultural - Other Harvesters	Aggregate	75	Diesel	8.0555E-08	9.74716E-08	1.15999E-07	5.63558E-07	7.2835E-07	9.02487E-05	3.83172E-08	3.52518E-08	8.20091E-10	7.35804E-10	2.924866936	133.6372807	0.00193244	113.090196
Orange (SC)	2023	Agricultural - Other Harvesters	Aggregate	750	Diesel	1.1873E-07	1.43663E-07	1.70971E-07	9.72108E-07	1.35134E-06	0.000243301	5.68099E-08	5.22651E-08	2.21384E-09	1.98365E-09	7.885146672	133.6372732	0.000644147	338.9398957
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	4.33907E-06	5.25027E-06	6.24826E-06	3.76516E-05	4.53037E-05	0.006152992	2.16525E-06	1.99203E-06	5.59469E-08	5.01658E-08	199.4121837	262.6125612	0.077655579	9055.957127
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.9883E-05	2.40584E-05	2.86315E-05	9.49368E-05	0.000202918	0.028118711	1.00265E-05	9.22441E-06	2.55672E-07	2.29254E-07	911.2986752	44.38247521	0.191550507	41385.04251
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.78081E-06	4.57478E-06	5.44436E-06	1.73592E-05	1.41091E-05	0.001993281	9.40325E-07	8.65099E-07	1.80529E-08	1.62514E-08	64.60020663	63.44864401	0.087318636	2638.897362
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.99577E-05	2.41488E-05	2.87391E-05	0.000164314	0.000217646	0.039246157	9.1912E-06	8.45591E-06	3.57083E-07	3.19977E-07	1271.927812	154.1078848	0.191339084	57762.38715
Orange (SC)	2023	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000537327	0.000650166	0.000773751	0.003391881	0.004638446	0.509145396	0.000298162	0.000274309	4.62412E-06	4.1511E-06	16500.88164	709.9688327	14.88136302	674055.6385
Orange (SC)	2023	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	3.58696E-05	4.34022E-05	5.16522E-05	0.000268455	0.000293469	0.042990675	2.08957E-05	1.9224E-05	3.90732E-07	3.50506E-07	1393.283815	391.1579253	0.641588294	49800.79064
Orange (SC)	2023	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	7.91223E-07	9.5738E-07	1.13936E-06	4.17292E-06	8.02208E-06	0.001461398	3.74557E-07	3.44592E-07	1.32951E-08	1.19149E-08	47.36241723	136.6558765	0.009428639	1882.021508
Orange (SC)	2023	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	2.09646E-09	2.53671E-09	3.0189E-09	1.53554E-08	1.90379E-08	2.3904E-06	1.0465E-09	9.62784E-10	2.17227E-11	1.94891E-11	0.077470432	0.441155416	4.99786E-05	2.769061709
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	4.49576E-05	5.43987E-05	6.47389E-05	0.000596211	0.000556586	0.090953641	3.03755E-05	2.79454E-05	8.39563E-07	7.42351E-07	2950.89072	1201.525774	3.608310711	106557.231
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	9.97808E-05	0.000120735	0.000143684	0.001674781	0.00141741	0.283197422	7.53386E-05	6.93115E-05	2.61531E-06	2.31142E-06	9188.028464	2523.570494	7.661481646	331770.942
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.8207E-05	4.62305E-05	5.50181E-05	0.000283204	0.000652946	0.147852351	1.88041E-05	1.72998E-05	1.36582E-06	1.20675E-06	4796.906694	773.5850872	2.323158951	173217.2225
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.76279E-05	3.34298E-05	3.97842E-05	0.00011631	9.7838E-05	0.009655669	1.05481E-05	9.70423E-06	8.84426E-08	7.88083E-08	313.2675315	235.8431103	0.741433708	10174.06289
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.59842E-06	1.93409E-06	2.30173E-06	1.53289E-05	2.02741E-05	0.002241936	1.54599E-06	1.42231E-06	2.06799E-08	1.82984E-08	72.73712924	43.85489786	0.148286742	2625.55227
Orange (SC)	2023	Airport Ground Support - A/C Tug Narrow Body	Aggregate	750	Diesel	1.19847E-05	1.45015E-05	1.72579E-05	5.92726E-05	0.000162756	0.009834345	7.53847E-06	6.93539E-06	9.05639E-08	8.02666E-08	319.0644893	16.45925718	0.049428914	11521

Orange (SC)	2023 Airport Ground Support - Misc - Maint. Truck	Aggregate	175	Gasoline	0.000167393	0.000153968	0.000184205	0.014234956	0.001345209	0.409692192	2.93706E-05	2.21911E-05	4.06986E-06	5.73233E-06	16362.95	2774	6.18	360620
Orange (SC)	2023 Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000138916	0.000127775	0.000152869	0.009838669	0.000287214	0.098627636	6.7993E-06	5.13725E-06	1.19913E-06	1.51652E-06	4328.9	1664.4	9.09	83220
Orange (SC)	2023 Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.18951E-05	0.001511749	0.000470762	0.089181432	0	0	0	0	4766.9	1755.65	1.71	87782.5
Orange (SC)	2023 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.99652E-05	4.5958E-05	5.49836E-05	0.004317288	0.000469616	0.132292344	9.48395E-06	7.16565E-06	1.17082E-06	1.84386E-06	5263.3	792.05	4.2	99085.455
Orange (SC)	2023 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	9.49335E-09	8.87616E-06	1.03801E-06	0.000361518	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2023 Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000856331	0.000787654	0.00094234	0.048952175	0.005201336	1.188603973	8.76839E-05	6.62501E-05	1.21503E-05	1.68147E-05	47997.5	14935.8	17.72	2688444
Orange (SC)	2023 Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.04152E-05	0.005822229	0.000515589	0.165953702	0	0	0	0	9081.2	2266.65	1.76	407997
Orange (SC)	2023 Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	7.19601E-06	6.61889E-06	7.91877E-06	0.000374508	3.44448E-05	0.0093146	6.49436E-07	4.90685E-07	7.69023E-08	1.31704E-07	375.95	142.35	0.39	7587.255
Orange (SC)	2023 Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	9.1817E-08	2.36442E-05	7.11417E-06	0.001974425	0	0	0	0	98.55	51.1	0.15	2299.5
Orange (SC)	2023 Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.44571E-05	1.32977E-05	1.59092E-05	0.001122388	0.000121546	0.033041885	2.36875E-06	1.78972E-06	3.28237E-07	4.62883E-07	1321.3	481.8	1.57	72270
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	100	Diesel	4.13111E-05	4.99864E-05	5.94888E-05	0.000854429	0.000586145	0.132397657	2.59527E-05	2.38765E-05	1.22284E-06	1.08061E-06	4295.496181	2828.802263	5.828218398	247601.0759
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	175	Diesel	7.90099E-05	9.5602E-05	0.000113774	0.001786947	0.000911392	0.310819498	3.86193E-05	3.55298E-05	2.87131E-06	2.53687E-06	10084.19631	3625.703732	7.566458973	581279.7269
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	25	Diesel	5.39127E-07	6.52343E-07	7.76342E-07	1.03174E-05	7.67957E-06	0.001489438	3.42716E-08	3.15298E-08	1.37544E-08	1.21566E-08	48.32316266	100.2206816	0.204498891	2505.51704
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	300	Diesel	8.04161E-05	9.73034E-05	0.000115799	0.000807645	0.000894694	0.360401453	3.47042E-05	3.19278E-05	3.32968E-06	2.94155E-06	11692.82823	3024.379643	6.339465626	674007.0462
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	50	Diesel	0.00015974	0.000193286	0.000230026	0.001374187	0.001230164	0.17823937	6.49436E-05	5.97481E-05	1.64312E-06	1.45477E-06	5782.78006	8699.743364	18.20040131	299639.5053
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	600	Diesel	4.94936E-05	5.98872E-05	7.12707E-05	0.000508691	0.000546871	0.216032879	2.22209E-05	2.04432E-05	1.99585E-06	1.76323E-06	7008.948826	1125.050676	2.351737249	404014.5661
Orange (SC)	2023 Airport Ground Support - Other	Aggregate	75	Diesel	3.56177E-05	4.30975E-05	5.12896E-05	0.000605333	0.000496489	0.092116201	2.51716E-05	2.31579E-05	8.50591E-07	7.5184E-07	2988.608705	2646.120095	5.623719507	172274.1483
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	100	Diesel	2.71331E-07	3.2831E-07	3.90717E-07	1.22539E-06	3.0735E-06	0.000130273	1.63466E-07	1.50389E-07	1.1963E-09	1.06327E-09	4.226563382	2.087130284	0.055489138	208.7130284
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	5.60004E-07	6.77604E-07	8.06405E-07	5.30037E-06	8.72623E-06	0.000851304	5.27772E-07	4.8555E-07	7.85392E-09	6.94823E-09	27.61960841	12.27723697	0.055489138	1350.496066
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.8281E-07	2.212E-07	2.63246E-07	1.24808E-06	4.17598E-06	0.000709988	8.93022E-08	8.2158E-08	6.5587E-09	5.79482E-09	23.03477043	4.174260569	0.110978275	1137.486005
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.08451E-06	1.31225E-06	1.56169E-06	9.94988E-06	1.23167E-05	0.001809243	6.27833E-07	5.77606E-07	1.66948E-08	1.47668E-08	58.69890934	60.03568877	1.054293613	2595.530667
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	5.82864E-08	7.05265E-08	8.39324E-08	1.40385E-06	3.89918E-07	0.000801179	1.30665E-08	1.20212E-08	7.40555E-09	6.53911E-09	25.9933648	4.174260569	0.110978275	1283.585125
Orange (SC)	2023 Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.0906E-07	2.52963E-07	3.01047E-07	1.12295E-05	5.88457E-06	0.001933251	3.8955E-08	3.58386E-08	1.78676E-08	1.57789E-08	62.72220058	56.35251768	1.498206713	3097.301342
Orange (SC)	2023 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000343	0.0000415	0.0000494	0.000164277	0.000893827	0.127294585	0.000039	0.0000373	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2023 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	0.0000503	0.0000608	0.0000724	0.000381661	0.001129088	0.161520299	0.0000507	0.0000484	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2023 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000264	0.0000319	0.000038	0.000137027	0.000644972	0.087797776	0.0000226	0.0000216	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2023 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000285981	0.00034611	0.000411784	0.001172246	0.001753076	0.163841665	0.0001358	0.00013	0	0	5315.080954	11062.28165	6.703055	92409.87884
Orange (SC)	2023 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.001877303	0.002271601	0.002703314	0.007274827	0.011243118	1.199324645	0.00077139	0.000737507	0	0	38906.512	42036.67879	25.471615	669971.6984
Orange (SC)	2023 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.001001202	0.001211555	0.001441848	0.004014237	0.012197827	1.405139561	0.000721475	0.000689607	0	0	45583.21827	28761.9362	17.42794592	805229.3133
Orange (SC)	2023 Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000135484	0.000163936	0.000195097	0.000816205	0.0029652	0.43995744	0.000123397	0.000117968	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2023 Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000315707	0.000381988	0.000454652	0.002200955	0.008044435	1.104411255	0.000310971	0.00029718	0	0	35827.48786	14573.56994	20.409706	692498.7373
Orange (SC)	2023 Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.313E-05	0.00004009	0.00004774	0.0001207	0.000211729	0.022707277	0.00001517	0.00001448	0	0	736.6320038	3135.15036	5.102426052	11761.97356
Orange (SC)	2023 Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000822074	0.000994771	0.001183855	0.00368674	0.012690281	1.198657912	0.000521531	0.000498565	0	0	38884.88221	8115.264157	15.30727914	751594.161
Orange (SC)	2023 Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.00032472	0.000392806	0.000467693	0.00138536	0.002985508	0.380109444	0.00016655	0.000159378	0	0	12330.88614	15538.90142	25.51213197	205775.4362
Orange (SC)	2023 Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000295221	0.000357196	0.000425074	0.00177535	0.008238015	0.994453512	0.000247942	0.000237012	0	0	32260.41943	4151.633637	5.102426052	624624.6275
Orange (SC)	2023 Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000662056	0.000801097	0.000953436	0.002603943	0.006224128	0.688378471	0.00045058	0.000430843	0	0	22331.23827	18054.53379	28.06334526	403681.7764
Orange (SC)	2023 Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	0.0000668	0.0000808	0.0000962	0.0000645	0.00153879	0.248144597	0.0000664	0.0000635	0	0	8049.897461	3548.810303	2	155594.0469
Orange (SC)	2023 Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000455	0.0000055	0.00000655	0.0000429	0.0000951	0.012758453	0.0000048	0.00000459	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2023 Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.0000328	0.0000396	0.0000472	0.000119152	0.00016699	0.017992692	0.0000206	0.0000197	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2023 Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.19E-05	3.86E-05	4.59E-05	0.000321107	0.000643059	0.082925439	3.56E-05	3.4E-05	0	0	2690.130137	4401.614761	6.136045	46771.55469
Orange (SC)	2023 Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000204416	0.000247343	0.000294359	0.001577123	0.004789288	0.796780953	0.000188794	0.000180487	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000855038	0.001034538	0.00123107	0.003373453	0.011072501	0.921483896	0.000411425	0.000393234	0	0	29893.25944	9472.179834	9.500724149	578418.6974
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.003003834	0.003634514	0.004325453	0.012840646	0.052129939	4.705672488	0.001551886	0.001483564	0	0	152653.6631	28416.54265	28.50217595	2953901.624
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000101254	0.000122517	0.000145806	0.000463699	0.002893007	0.413541555	0.0000409	0.0000391	0	0	13415.43262	1578.696655	1.583454013	260011.3422
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000137759	0.000166696	0.000198376	0.000577662	0.001612704	0.089400842	7.09896E-05	6.78523E-05	0	0	2900.194667	1599.41738	1.340611019	55275.85836
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000754638	0.000913192	0.001086766	0.003459842	0.020020953	2.027567316	0.000412287	0.000394112	0	0	65774.99183	15994.17666	13.406113	1271345.017
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.00494376	0.005981928	0.007119004	0.021257775	0.094780166	8.659818552	0.002620445	0.002505146	0	0	280927.541	46383.11268	38.87772797	5436395.814
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.009014852	0.010907929	0.012981385	0.035571725	0.1055865	6.057699402	0.004765217	0.004555496	0	0	196513.8897	20792.43213	17.42794894	3800216.561
Orange (SC)	2023 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008458685	0.010235008	0.012180506	0.034165665	0.104158972	8.269492877	0.004347479	0.004156192	0	0	268265.2347	15994.17897	13.406115	5288980.046
Orange (SC)	2023 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2023 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001465677	0.001773464	0.002110558	0.006468578	0.038820591	4.864925641	0.000668594	0.000639151	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2023 Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.000106	0.0001284	0.000152758	0.000428079	0.001093232	0.134737155	7.547E-05	7.216E-05	0	0	4370.920506	3610.067691	12.75606513	77399.85566
Orange (SC)	2023 Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.00060681	0.000734199	0.000873732	0.002721997	0.015667323	1.679813856	0.000325412	0.000311232	0	0	54493.74965	15571.51684	22.96091813	1054245.273
Orange (SC)	2023 Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005073563	0.006138986	0.007306136	0.020780531	0.101723979	9.816577511	0.002704531	0.002585411	0	0	318453.2112	51782.3099	81.6388127	6160637.834
Orange (SC)	2023 Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002918511	0.003531437	0.004202653	0.011169302	0.036826128	2.91603472	0.001455503	0.001391421	0	0	94597.18491	10624.3025	20.40970596	1831067.754
Orange (SC)	2023 Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.00163934	0.001983602	0.002360649	0.005068721	0.025983265	2.936270505	0.000659711	0.000630684	0	0	95253.64356	6490.26294	10.2048521	1895210.05
Orange (SC)	2023 Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.00235529	0.002849901	0.003391618	0.009740784	0.060589094	5.606853962	0.001383785	0.001322898	0	0	181888.2969	4744.229492	2	3515664
Orange (SC)	2023 Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000204475	0.000247415	0.000294444	0.000834011	0.005209181	0.542378247	0.000113074	0.000108099	0	0	17594.93945	8022.818359	3	340087.2813
Orange (SC)	2023 Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	0.0000326	0.0000394	0.0000469	0.000178493	0.001005661	0.090107121	0.0000211	0.0000202	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2023 Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000926	0.000112059	0.00013336	0.000537179	0.002467255	0.228271365	0.0000448	0.0000428	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2023 Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000300853	0.000364008	0.000432218	0.001273716	0.004113555	0.320565717	0.000151317	0.000144679	0	0	10399.26377	3920.689657	6.136045984	195838.4522
Orange (SC)	2023 Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.000887787	0.001074222	0.001278412	0.00437556	0.024405754	2.485922833	0.000490874	0.000469266	0	0	80644.20772	11762.06797	18.408137	1560179.501
Orange (SC)	2023 Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000285017	0.000344871	0.000410424	0.001148862	0.007126625	0.733968862	0.000150982	0.000144339	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	0.000126426	0.000152975	0.000182053	0.002835359	0.001779446	0.45020331	7.17679E-05	6.60264E-05	4.15856E-06	3.67455E-06	14606.3506	6701.014631	17.58874242	566883.0416
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	0.000135792	0.000164308	0.00019554	0.003828692	0.001413052	0.69119428	6.35496E-05	5.84656E-05	6.38636E-06	5.64143E-06	22425.0372	5732.345598	17.90143118	857093.6322
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.000187346	0.000226689	0.000269778	0.002030174	0.002289692	1.008200647	7.33005E-05	6.74364E-05	9.31569E-06	8.2288E-06	32709.95966	6040.632376	18.4486365	1268853.851
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	7.96364E-05	9.63601E-05	0.000114676	0.000685536	0.000669243	0.094631685	3.59178E-05	3.30444E-05	8.72528E-07	7.72371E-07	3070.220791	2674.137144	7.426357912	103865.7423
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.000248215	0.00030034	0.00035743	0.002991529	0.00247371	1.59888095	8.54213E-05	7.85876E-05	1.4775E-05	1.30499E-05	51873.93158	4991.933432	14.77454364	2022585.888
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	4.80365E-05	5.81241E-05	6.91725E-05	0.000882559	0.000891139	0.13893596	4.23326E-05	3.8946E-05	1.28309E-06	1.13398E-06	4507.624225	2463.313428	5.081192256	176722.039
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000117002	0.000141573	0.000168483	0.001713225	0.001048716	0.943771586	4.0689E-05	3.74339E-05	8.72213E-06	7.70294E-06	30619.62973	1820.906289	3.126887542	1166259.581
Orange (SC)	2023 Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.000134714	0.000163004	0.000193988	0.000964914	0.00375902	0.51484797	8.65618E-05	7.96369E-05	4.75598E-06	4.20212E-06	16703.67538	346.0435534	0.469033131	643830.0641
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	100	Diesel	0.000570881	0.000690766	0.000822069	0.005004663	0.006142991	0.66618482	0.000401391	0.00036928	6.14208E-06	5.43731E-06	21613.63282	16530.64914	36.81667929	1455441.154
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	175	Diesel	0.001353906	0.001638226	0.001949624	0.013300107	0.016264801	2.042484319	0.000868694	0.000799198	1.88432E-05	1.66705E-05	66266.15434	30397.53103	65.77913366	4441257.064
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	25	Diesel	3.0841E-06	3.73176E-06	4.4411E-06	1.73356E-05	1.49901E-05	0.001820968	1.16447E-06	1.07131E-06	1.67432E-08	1.48625E-08	59.07929684	142.7119459	0.294533434	3567.798647
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	300	Diesel	0.001725579	0.002087951	0.002484834	0.011980258	0.022992818	3.50312493	0.000963768	0.000886667	3.23364E-05	2.8592E-05	113655.0304	34674.692	72.74975827	7633429.824
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	50	Diesel	8.83749E-05	0.000106934	0.0001272	0.000385653	0.000305263	0.029502662	3.1692E-05	2.91566E-05	2.70115E-07	2.40797E-07	957.1813664	1388.208332	3.141689966	57239.35083
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	600	Diesel	0.002057792	0.002489928	0.00296322	0.01991788	0.026111741	6.171394525	0.001042702	0.000959286	5.69959E-05	5.03701E-05	200224.0988	36597.33275	72.94611389	13446012.2
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	75	Diesel	2.33158E-05	2.82121E-05	3.35748E-05	9.7255E-05	0.00021167	0.011301016	1.98702E-05	1.82805E-05	1.03784E-07	9.22374E-08	366.6490116	364.3805805	0.981778114	24458.64941
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	750	Diesel	6.38206E-05	7.7223E-05	9.19017E-05	0.000583372	0.000792753	0.107020602	3.9115E-05	3.59858E-05	9.87544E-07	8.73488E-07	3472.165572	365.7419027	0.883600303	233305.1034
Orange (SC)	2023 Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000311996	0.000377516	0.000449275	0.003126536	0.004560033	0.339062928	0.000199998	0.000183999	3.12545E-06	2.76739E-06	11000.5233	787.5249034	1.570844983	738900.4023
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.003601436	0.004357737	0.005186068	0.030631591	0.037237808	4.206432893	0.002917906	0.002684474	3.87825E-05	3.43323E-05	136473.0827	70213.43416	148.217433	6141409.729
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.002512893	0.0030406	0.003618566	0.02826115	0.029148567	4.606448231	0.001622949	0.001493113	4.25135E-05	3.75972E-05	149451.1397	45115.38078	98.37594462	6738888.79
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.002458072	0.002974267	0.003539623	0.017498148	0.033618568	4.823319826	0.001392822	0.001281397	4.45202E-05	3.93673E-05	156487.2998	34402.8842	76.1564	7063768.211
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.00025615	0.000309941	0.000368856	0.001162975	0.000881331	0.095554731	8.70891E-05	8.01219E-05	8.75766E-07	7.79905E-07	3100.168015	3007.940406	8.713546911	126707.7335
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.005468239	0.006616569	0.007874264	0.047820973	0.067598592	16.89537483	0.002642582	0.002431175	0.000156042	0.000137898	548151.8293	64095.15752	133.4915387	24722303.28
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	4.51538E-05	5.46361E-05	6.50215E-05	0.000177117	0.000432687	0.01478843	3.17238E-05	2.91859E-05	1.35372E-07	1.20701E-07	479.794341	309.1004869	1.481302975	21595.79384
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	0.000118318	0.000143165	0.000170378	0.000879277	0.001787277	0.172492208	6.42578E-05	5.91172E-05	1.59123E-06	1.40786E-06	5596.31971	407.0662113	0.95849016	253840.9719
Orange (SC)	2023 Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000440209	0.000532653	0.000633901	0.002783195	0.009522746	0.978106292	0.000238923	0.000219809	9.02987E-06	7.98317E-06	31733.58146	1464.048919	2.614064073	1424410.02
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	100	Diesel	0.001745004	0.002111455	0.002512806	0.032327814	0.021805884	4.904880617	0.00105169	0.000967555	4.52957E-05	4.0033E-05	159133.4499	99448.01063	151.8315814	8093653.408
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	175	Diesel	0.002946916	0.003565768	0.004243559	0.061028182	0.029256093	10.46831971	0.001439492	0.001324333	9.66964E-05	8.5441E-05	339633.1043	117693.7638	196.7087711	17186645.97
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	25	Diesel	6.62814E-06	8.02005E-06	9.54452E-06	2.25218E-05	1.52978E-05	0.001185063	2.13205E-06	1.96149E-06	1.07577E-08	9.67233E-09	38.44806683	70.11544232	0.261929123	1752.886058
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	300	Diesel	0.003006787	0.003638213	0.004329774	0.027994185	0.031160385	13.32657175	0.001009914	0.000929121	0.000123121	0.00010877	432365.9438	100079.9576	169.2935229	21865899.96
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	50	Diesel	0.002412517	0.002919146	0.003474025	0.02750875	0.02335197	3.82052276	0.000904447	0.000832092	3.52503E-05	3.11826E-05	123952.6534	157678.835	213.0356864	5644316.12
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	600	Diesel	0.00454263	0.005496582	0.006541387	0.047021512	0.04002106	23.75305986	0.001351882	0.001243731	0.000219473	0.000193869	770641.8679	115489.5159	178.1118034	39095494.25
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	75	Diesel	2.99888E-05	3.62865E-05	4.31839E-05	0.000363267	0.000509692	0.049787807	3.0436E-05	2.80011E-05	4.59413E-07	4.06361E-07	1615.310551	1137.887876	1.746194151	82439.97663
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	750	Diesel	8.34164E-05	0.000100934	0.00012012	0.000781663	0.00111574	0.247199836	4.43238E-05	4.07779E-05	2.28298E-06	2.01761E-06	8020.126425	644.4567562	1.222335905	402478.4611
Orange (SC)	2023 Construction and Mining - Excavators	Aggregate	9999	Diesel	9.06239E-05	0.000109655	0.000130498	0.001229075	0.00291983	0.659807861	2.93527E-05	2.70044E-05	6.09753E-06	5.38526E-06	21406.7394	899.0918302	1.309645613	1082471.657
Orange (SC)	2023 Construction and Mining - Graders	Aggregate	100	Diesel	0.000711481	0.000860892	0.001024533	0.004839096	0.006794

Orange (SC)	2023 Construction and Mining - Misc - Trenchers	Aggregate	2	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.022837024	0
Orange (SC)	2023 Construction and Mining - Misc - Trenchers	Aggregate	25	Gasoline	0.002249484	0.00227198	0.00247542	0.074269836	0.001449906	2.58954E-06	0.000839012	0.00063392	1.18087E-06	1.63004E-06	4645.850836	0	14.26751876	0
Orange (SC)	2023 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000116265	0.000139841	0.000167132	0.000477296	0.000883684	2.03973E-06	2.97172E-05	0.000022453	1.21243E-08	1.0444E-08	41.5527333	0	4.167093636	0
Orange (SC)	2023 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.022837024	0
Orange (SC)	2023 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.002103156	0.001934483	0.002314395	0.143939479	0.002962637	0.976133614	6.72938E-05	5.08442E-05	1.1868E-05	1.60474E-05	45807.5	20841.5	51.82	625245
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000546996	0.000661865	0.000787675	0.00786515	0.006688355	1.149061849	0.000433025	0.000398383	1.06072E-05	9.37849E-06	37280.04623	20946.38148	30.06551836	1652518.567
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.00054049	0.000653993	0.000778305	0.010227609	0.005807231	1.721504875	0.000277792	0.000255569	1.59E-05	1.40507E-05	55852.32978	15663.64805	22.57067567	2481085.022
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	2.19451E-06	2.65536E-06	3.16009E-06	7.29672E-06	5.02438E-06	0.000383943	6.90753E-07	6.35493E-07	3.4839E-09	3.13369E-09	12.45659339	19.90854883	0.086147617	497.7137208
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000419556	0.000507663	0.000604161	0.003257572	0.004422736	1.501919111	0.000162225	0.000149247	1.38734E-05	1.22585E-05	48728.11148	10045.95328	15.24812822	2166166.303
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.001464839	0.001772456	0.002109369	0.013079021	0.010778781	1.581916392	0.000548386	0.000504516	1.45817E-05	1.29114E-05	51323.53516	54483.5265	81.66794098	2053575.292
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000992066	0.001200399	0.001428574	0.009664323	0.008619655	4.81732019	0.000294682	0.000271107	4.45088E-05	3.93183E-05	156292.6482	19389.43342	27.82568031	6954053.638
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000445075	0.000538541	0.000640908	0.006125924	0.005058753	0.872000417	0.000277124	0.000254954	8.04872E-06	7.11715E-06	28291.0932	17802.52299	29.37633742	1256029.118
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	7.70546E-05	9.32361E-05	0.000110959	0.000419933	0.000665124	0.204520742	3.38765E-05	3.11664E-05	1.88858E-06	1.66927E-06	6635.450221	466.1586709	0.689180937	296616.0688
Orange (SC)	2023 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	0.000111233	0.000134592	0.000160176	0.000655415	0.001838779	0.268234816	4.9498E-05	4.55382E-05	2.47663E-06	2.1893E-06	8702.583198	236.0158464	0.430738085	386576.7355
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	4.85938E-05	5.87985E-05	6.99751E-05	0.000686399	0.000513603	0.092710187	3.21275E-05	2.95573E-05	8.55694E-07	7.56688E-07	3007.879912	1745.814359	1.2803396	151868.8195
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.001379867	0.001669639	0.001987008	0.022922631	0.011978235	3.635047545	0.000584275	0.000537533	3.35664E-05	2.96688E-05	117935.1143	37948.60527	26.80177562	5981569.617
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.002419908	0.002928089	0.003484668	0.01816167	0.020704636	7.384384765	0.000841729	0.00077439	6.81997E-05	6.02704E-05	239578.2313	57800.05609	44.98259794	12176377.28
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	0.000166175	0.000201072	0.000239292	0.001435947	0.001103323	0.152877352	6.29387E-05	5.79036E-05	1.40844E-06	1.24776E-06	4959.937307	7917.659178	4.865290479	227270.8549
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.009214494	0.011149537	0.013268871	0.07252876	0.079376375	31.66194646	0.002858503	0.002629823	0.000292454	0.000258421	1027236.984	138194.9996	100.2079127	51936760.64
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	1.82781E-05	2.21165E-05	2.63205E-05	0.0003791	0.00015743	0.051239579	2.43979E-06	2.24461E-06	4.73187E-07	4.18211E-07	1662.4117	1162.528323	0.76820376	83821.24766
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.004431453	0.005362058	0.006381293	0.035189455	0.044198951	10.74150427	0.001722049	0.001584285	9.91776E-05	8.76707E-05	348496.2763	26639.91794	21.59506125	17671469.02
Orange (SC)	2023 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.005673313	0.006864708	0.00816957	0.043252566	0.118319106	19.02539717	0.002277976	0.002095738	0.000175729	0.000155283	617258.0583	24549.89183	17.15655064	31165135.99
Orange (SC)	2023 Construction and Mining - Other	Aggregate	100	Diesel	0.001488729	0.001801362	0.00214377	0.016974137	0.016745351	2.499644995	0.001134658	0.001043886	2.30658E-05	2.04018E-05	81098.22899	45892.79541	100.74719	3771897.371
Orange (SC)	2023 Construction and Mining - Other	Aggregate	175	Diesel	0.000631743	0.000764409	0.00090971	0.008735644	0.007531278	1.459012739	0.000392997	0.000361558	1.34703E-05	1.19083E-05	47336.06151	14530.74235	34.74333957	2211827.51
Orange (SC)	2023 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Other	Aggregate	300	Diesel	0.000656175	0.000793972	0.000944892	0.004920535	0.00879816	1.916538667	0.000338948	0.000311832	1.76997E-05	1.56425E-05	62179.98637	13180.12281	32.02503427	2889011.128
Orange (SC)	2023 Construction and Mining - Other	Aggregate	50	Diesel	0.001035721	0.001253223	0.001491439	0.007342428	0.006648909	0.856861952	0.000465271	0.00042805	7.89104E-06	6.99359E-06	27799.94236	30369.60291	63.1156511	1158373.187
Orange (SC)	2023 Construction and Mining - Other	Aggregate	600	Diesel	0.002025867	0.002451299	0.002917249	0.018649047	0.024729934	7.479080251	0.000919197	0.000845661	6.9087E-05	6.10432E-05	242650.522	29523.6989	65.66406231	11295726.1
Orange (SC)	2023 Construction and Mining - Other	Aggregate	75	Diesel	0.000210591	0.000254815	0.000303251	0.001463504	0.002470616	0.18166709	0.000177479	0.000163281	1.67328E-06	1.48274E-06	5893.988658	3771.820994	10.53343302	278764.1243
Orange (SC)	2023 Construction and Mining - Other	Aggregate	750	Diesel	0.000345303	0.000417817	0.000497237	0.002820661	0.00468583	1.368848217	0.000146161	0.000134468	1.26453E-05	1.11724E-05	44410.77289	3355.936185	6.286080997	2069097.763
Orange (SC)	2023 Construction and Mining - Other	Aggregate	9999	Diesel	9.80372E-05	0.000118625	0.000141174	0.000891101	0.002588538	0.472676509	4.73307E-05	4.35443E-05	4.36719E-06	3.85792E-06	15335.46878	777.4896321	1.61399377	714131.147
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	100	Diesel	0.000319336	0.000386397	0.000459844	0.005641448	0.004503388	0.873472551	0.000228299	0.000210035	8.06611E-06	7.12917E-06	28338.85495	16358.36984	40.98315081	1324233.979
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000439752	0.0005321	0.000633243	0.007850688	0.005197053	1.383507811	0.000247637	0.000227826	1.2778E-05	1.1292E-05	44886.38725	13207.30014	33.82601013	2085008.198
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000236175	0.000285772	0.000340093	0.002057405	0.003535845	1.073806642	0.000109874	0.000101084	9.92079E-06	8.76427E-06	34838.47391	7364.146162	16.18877059	1620824.116
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	50	Diesel	0.000147977	0.000179053	0.00021308	0.000890297	0.000761939	0.104795157	5.3083E-05	4.88364E-05	9.64444E-07	8.55324E-07	3399.963445	3669.421939	10.22448669	142338.5845
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	600	Diesel	3.6011E-05	4.35733E-05	5.18559E-05	0.000377349	0.000478956	0.203680518	1.40009E-05	1.28808E-05	1.88205E-06	1.66241E-06	6608.190105	829.3635913	1.874489226	307655.7913
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	75	Diesel	0.000227788	0.000275623	0.000328014	0.001088669	0.002015024	0.137399369	0.000200612	0.000184563	1.26349E-06	1.12144E-06	4457.771193	2919.706394	8.435201518	209076.6758
Orange (SC)	2023 Construction and Mining - Pavers	Aggregate	750	Diesel	3.44677E-06	4.1706E-06	4.96335E-06	7.21003E-05	1.99372E-05	0.04053394	6.79954E-07	6.25558E-07	3.74653E-07	3.30833E-07	1315.079034	81.61709606	0.170408111	61212.82204
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000209903	0.000253982	0.00030226	0.003544842	0.002653604	0.543007728	0.000132383	0.000121792	5.01408E-06	4.43196E-06	17617.28773	10750.23363	23.05316631	957658.6727
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.000210033	0.000254139	0.000302447	0.003450186	0.002345052	0.585440374	0.000122254	0.000112474	5.40639E-06	4.77829E-06	18993.96818	7124.261059	15.31206618	1036542.048
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	0.000113618	0.000137478	0.00016361	0.000846207	0.00149058	0.394706917	5.72815E-05	5.2699E-05	3.64585E-06	3.22154E-06	12805.83123	3020.185782	6.380027575	697086.1699
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	0.000100211	0.000121256	0.000144305	0.000950214	0.000845666	0.13059836	3.87759E-05	3.56738E-05	1.20444E-06	1.06593E-06	4237.119948	5999.874378	12.58992108	208522.8824
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	9.08656E-05	0.000109947	0.000130846	0.00082131	0.001091536	0.425845175	3.61276E-05	3.32374E-05	3.93442E-06	3.47569E-06	13816.07773	1891.474159	3.998150614	753281.4006
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.60315E-05	1.93981E-05	2.30854E-05	0.000160171	0.000204259	0.022420345	1.46123E-05	1.34433E-05	2.06806E-07	1.82992E-07	727.4034083	562.9305466	1.361072549	39235.9249
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.56743E-05	1.8966E-05	2.25711E-05	0.000150069	0.000168991	0.080640821	4.62523E-06	4.25522E-06	7.45094E-07	6.5818E-07	2616.302633	223.3242888	0.425335172	142292.237
Orange (SC)	2023 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.3763E-06	7.71532E-06	9.18187E-06	7.21006E-05	0.00017066	0.038293637	2.84065E-06	2.61339E-06	3.53852E-07	3.12548E-07	1242.394866	80.20801921	0.170134069	67616.53972
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	100	Diesel	0.001436951	0.00173871	0.002069209	0.021644507	0.018402572	3.338993804	0.00100238	0.00092219	3.08275E-05	2.72524E-05	108329.9767	63950.32463	190.5356969	5580644.026
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000815625	0.000986907	0.001174501	0.019154719	0.009765371	3.47537831	0.000445428	0.000409794	3.21071E-05	2.83656E-05	112754.8218	40445.93717	111.4817877	5815806.37
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	25	Diesel	1.90366E-06	2.30343E-06	2.74127E-06	6.33541E-06	4.39215E-06	0.000336498	6.00465E-07	5.52428E-07	3.05398E-09	2.74645E-09	10.9172961	20.25410928	0.087642915	506.3527319
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000204425	0.000247354	0.000294372	0.001714379	0.002824998	0.587608233	0.000107642	9.90305E-05	5.4266E-06	4.79598E-06	19064.30199	4520.61592	14.46108095	982352.9267
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001994702	0.00241359	0.002872372	0.015544211	0.014334754	2.150700891	0.000772936	0.000711101	1.98245E-05	1.75537E-05	69777.12182	90516.12071	258.4589559	3234394.128
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	600	Diesel	7.24202E-05	8.76284E-05	0.000104285	0.000863944	0.000933354	0.324876649	3.17453E-05	2.92057E-05	3.00147E-06	2.6516E-06	10540.2651	1535.160213	4.995646147	540641.4114
Orange (SC)	2023 Construction and Mining - Rollers	Aggregate	75	Diesel	6.5445E-05	7.91884E-05	9.42408E-05	0.000260847	0.000639286	0.02249742	4.52823E-05	4.16597E-05	2.06036E-07	1.83621E-07	729.9040188	530.657663	2.278715786	37617.95716
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001679989	0.002032787	0.002419185	0.052332133	0.029863668	8.596710278	0.000731642	0.000673111	7.94305E-05	7.01652E-05	278910.7974	139113.7422	487.4029263	13399965.45
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.0006602	0.000798842	0.000950688	0.010430661	0.006871138	1.846314894	0.000458607	0.000421918	1.70503E-05	1.50694E-05	59901.65337	22911.83971	82.22838329	2881579.817
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	6.3018E-07	7.62518E-07	9.07459E-07	7.76503E-06	9.58547E-06	0.001124815	5.40388E-07	4.97157E-07	1.03806E-08	9.18059E-09	36.49337905	63.10900107	0.202283846	1577.725027
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	2.44222E-05	2.95509E-05	3.5168E-05	0.000258157	0.000373789	0.138238819	8.75269E-06	8.05248E-06	1.27735E-06	1.12829E-06	4485.006248	1024.703188	4.045676914	215559.0066
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	0.000105719	0.00012792	0.000152236	0.000761175	0.000708689	0.108297236	3.74095E-05	3.44168E-05	9.9809E-07	8.83907E-07	3513.584564	3182.329813	11.53017921	151960.2158
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	5.79833E-06	7.01598E-06	8.3496E-06	9.2544E-05	5.78909E-05	0.051369464	8.82256E-07	8.11675E-07	4.74762E-07	4.19271E-07	1666.62567	209.6621258	0.809135383	80764.32846
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	8.30989E-06	1.0055E-05	1.19662E-05	3.36271E-05	8.26609E-05	0.0029867	5.66439E-06	5.21124E-06	2.73642E-08	2.4377E-08	96.90018199	70.23798082	0.303425769	4659.606346
Orange (SC)	2023 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.55776E-06	1.88489E-06	2.24318E-06	1.63875E-05	2.24821E-05	0.008839329	1.59943E-07	1.47148E-07	8.16772E-08	7.21454E-08	286.7822898	22.08815037	0.101141923	13805.09398
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000300706	0.000363854	0.000433016	0.002342039	0.003068888	0.298431538	0.000229699	0.000211323	2.75013E-06	2.43576E-06	9682.282574	5563.693579	6.33718039	470078.3444
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.000411022	0.000497336	0.000591871	0.003007525	0.004500836	0.414228562	0.000286182	0.000263288	3.81742E-06	3.38088E-06	13439.18951	4640.377697	5.836876675	656955.9228
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000329923	0.000399206	0.000475089	0.002315564	0.004350034	0.46646513	0.000194432	0.000178878	4.3028E-06	3.80723E-06	15133.94742	3385.427332	4.752885292	738872.4538
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	7.12437E-05	8.62049E-05	0.000102591	0.000784531	0.000592633	0.094892512	2.31376E-05	2.12866E-05	8.75191E-07	7.745E-07	3078.683033	3284.645905	3.418742052	135429.3296
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.00331262	0.00400827	0.004770173	0.032285844	0.040219063	4.796737013	0.001812944	0.001667909	4.42488E-05	3.91503E-05	155624.8497	20564.90295	28.01700804	7549563.826
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	0.000135847	0.000164374	0.000195619	0.000862797	0.00131893	0.101955016	9.80243E-05	9.01824E-05	9.38549E-07	8.32143E-07	3307.818223	2324.52457	3.085206242	161321.6877
Orange (SC)	2023 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	6.12088E-05	7.40627E-05	8.81407E-05	0.000363556	0.000965905	0.177884904	2.73063E-05	2.51218E-05	1.6428E-06	1.45187E-06	5771.279793	423.9371676	0.416919762	282272.7821
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.004650866	0.005627547	0.006697247	0.052987413	0.048052059	7.242527706	0.003252776	0.002992554	6.68212E-05	5.91125E-05	234975.8352	147451.1401	158.1786443	12674078.16
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.007353321	0.008897519	0.010588783	0.108092065	0.07254942	17.26712831	0.003896318	0.003584613	0.000159423	0.000140932	560212.9617	200237.4488	210.4992729	30025264.69
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.008147971	0.009859045	0.011733078	0.056780554	0.096010886	24.95110191	0.003217374	0.002959984	0.000230441	0.000203648	809511.0228	208094.1157	193.0300929	43371925.63
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.00042817	0.000518086	0.000616565	0.00299536	0.002270022	0.29573183	0.000149874	0.000137884	2.72134E-06	2.41372E-06	9594.693518	11087.34623	12.77596743	460423.5911
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.011446813	0.013850644	0.016483411	0.083672535	0.121091861	32.39081231	0.004552196	0.00418802	0.000299126	0.000264369	1050884.233	170834.9523	173.301218	56374946.78
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	4.75856E-05	5.75786E-05	6.85233E-05	0.000188015	0.000351876	0.019215859	3.33085E-05	3.06439E-05	1.76233E-07	1.56837E-07	623.4373756	479.1287351	0.86911343	32857.23578
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.000899198	0.00108803	0.001294845	0.008776545	0.007403694	3.074757891	0.000266102	0.000244814	2.84007E-05	2.50958E-05	99757.13353	8304.462898	8.256577589	5364944.479
Orange (SC)	2023 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000719406	0.000870481	0.001035945	0.004877636	0.015718738	2.235940935	0.000325382	0.000299351	2.06508E-05	1.82494E-05	72542.64117	4043.01902	3.389542379	3871206.643
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	100	Diesel	0.000219731	0.000265875	0.000316413	0.001926749	0.002718145	0.254583566	0.000201026	0.000184943	2.34716E-06	2.07788E-06	8259.68344	3630.713465	6.273110217	328805.2799
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.001729492	0.002092685	0.002490468	0.020300175	0.020055439	3.20372847	0.001053636	0.000969345	2.95682E-05	2.61484E-05	103941.4419	24772.06058	54.39559955	4138439.762
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	25	Diesel	1.65495E-07	2.00249E-07	2.38313E-07	4.22869E-06	3.7207E-06	0.000764184	1.36391E-08	1.2548E-08	7.0603E-09	6.23717E-09	24.79312367	35.74611916	0.085933017	893.6529791
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.002014075	0.002437031	0.002900268	0.012790669	0.025194804	3.89621998	0.001125873	0.001035803	3.59621E-05	3.18004E-05	126408.5663	22801.35717	55.6845948	5071771.021
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.95117E-05	3.57092E-05	4.24969E-05	0.000100555	7.09586E-05	0.006082322	9.93281E-06	9.13819E-06	5.53487E-08	4.96431E-08	197.3342492	186.7734726	0.5155981	7233.723687
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.01761438	0.0213134	0.025364707	0.158641102	0.222902675	47.66179033	0.008537908	0.007854876	0.000440128	0.000389009	1546334.297	146508.7461	301.6248885	61836800.45
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	75	Diesel	7.2967E-05	8.829E-05	0.000105072	0.000422986	0.000681675	0.052784025	5.79644E-05	5.33273E-05	4.85825E-07	4.30816E-07	1712.519571	1015.586963	2.234258433	68625.64781
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000791588	0.000957821	0.001139886	0.008905074	0.013124059	0.733235444	0.000533063	0.000490418	6.75538E-06	5.98457E-06	23789.01645	1525.366341	4.1247848	949302.8684
Orange (SC)	2023 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.000786826	0.000952059	0.001133029	0.009427039	0.01334197	1.101489454	0.000477952	0.000439715	1.01602E-05	8.99021E-06	35736.61225	896.6318224	2.234258433	1431910.098
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	8.22716E-06	9.95487E-06	1.18471E-05	3.36944E-05	8.30199E-05	0.003060331	5.54019E-06	5.09698E-06	2.80475E-08	2.4978E-08	99.28905342	61.511177	0.26616914	5207.946319
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	1.1706E-05	1.41643E-05	1.68566E-05	0.000317379	0.000137735	0.058443997	5.78763E-06	5.32462E-06	5.39993E-07	4.77012E-07	1896.151115	654.5814419	2.39552226	99785.6013
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	8.63959E-06	1.04539E-05	1.2441E-05	0.000101001	0.000120585	0.054259648	3.69483E-06	3.39925E-06	5.01398E-07	4.4286E-07	1760.394526	450.3643342	1.508291793	92396.6566
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000805362	0.000974488	0.001159722	0.01007584	0.009295346	1.626980932	0.000257251	0.000236671	1.50181E-05	1.32792E-05	52785.60455	56990.31053	178.9543851	2482699.756
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.99108E-06	4.82921E-06	5.74715E-06	2.95297E-05	6.17563E-05	0.01568076	2.68563E-06	2.47078E-06	1.44857E-07	1.27984E-07	508.7449752	56.38524558	0.177446093	26658.94411
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.002066042	0.002499911	0.002975101	0.053389552	0.033260859	8.644688259	0.001122487	0.001032688	7.98624E-05	7.05568E-05	280467.3902	208257.9819	577.2321417	14716755.78
Orange (SC)	2023 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.34402E-06	2.83626E-06	3.37539E-06	3.80363E-05	9.15823E-05	0.02122607	1.24219E-06	1.14282E-06	1.96175E-07	1.73244E-07	688.656481	36.08655717	0.177446093	36086.55717
Orange (SC)	2023 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	2.12778E-05	2.57461E-05	3.064E-05	0.000559305	0.000359337	0.091239265	1.28409E-05	1.18136E-05	8.42914E-07	7.44683E-07	2960.157472	2118.20227	7.485583374	188986.5144
Orange (SC)	2023 Construction and Mining - Surfacing Equipment	Aggregate	175	Diesel	4.08341E-05	4.94092E-05	5.88016E-05	0.000466028	0.000484413	0.078415414	2.81349E-05

Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Gasoline	0.000069952	7.69779E-05	7.06515E-05	0.003995789	2.88145E-05	0.008281922	1.75996E-07	1.32974E-07	1.41606E-07	1.95469E-07	552.196495	0	55.59085115	0
Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	20.57190433	0
Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	2.21686E-05	2.43952E-05	2.23903E-05	0.000291971	2.43667E-06	0.000643295	1.19934E-08	9.06168E-09	1.1937E-08	1.64774E-08	43.99108711	0	19.23071591	0
Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.116502803	0
Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	1.97215E-06	0.000002835	2.37207E-06	8.09621E-06	1.49896E-05	0.001966272	5.04083E-07	3.80862E-07	1.88009E-08	1.61953E-08	64.43503781	0	0.153548711	0
Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	8.24346E-05	9.07142E-05	8.32589E-05	0.00398662	3.00309E-05	0.008750374	1.70969E-07	1.29177E-07	1.48319E-07	2.04735E-07	570.7557591	0	88.39748435	0
Orange (SC)	2023 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	32.71229984	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000158054	0.000173929	0.000159634	0.010169562	7.03068E-05	0.020417808	2.37665E-06	1.79568E-06	3.61852E-07	4.9949E-07	1378.152312	0	190.4597346	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	76.40382609	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.43188E-06	1.03792E-05	9.5262E-06	0.000217862	4.50128E-06	0.000555067	4.37324E-07	3.30422E-07	9.63268E-09	1.32967E-08	34.69927916	0	12.67832812	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.085971474	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000130541	0.000143652	0.000131846	0.008566554	4.47638E-05	0.017199389	2.00202E-06	1.51264E-06	2.97656E-07	4.10875E-07	1160.578582	0	51.85292983	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	20.8010488	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.033573764	0.03694588	0.033909502	1.599985706	0.01999412	4.170269119	0.000434571	0.000328342	6.77518E-05	9.35226E-05	253687.163	0	52071.44072	0
Orange (SC)	2023 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	20888.70548	0
Orange (SC)	2023 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000764108	0.000840855	0.00077175	0.055653107	0.000567231	0.134607586	2.08494E-06	1.57529E-06	2.16003E-06	2.98164E-06	8381.867141	0	434.9642537	0
Orange (SC)	2023 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.082219491	0.090477534	0.083041687	0.524881994	0.003635783	2.142845821	0.001157582	0.000874618	3.09419E-05	4.27113E-05	121386.9574	0	14429.50994	0
Orange (SC)	2023 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	33490.24784	0
Orange (SC)	2023 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.63478E-05	1.79898E-05	1.65113E-05	0.00121076	1.79031E-05	0.004343161	5.17269E-08	3.90826E-08	5.99575E-08	8.27637E-08	235.0811392	0	4.385982619	0
Orange (SC)	2023 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.112044931	0.123298613	0.113165381	0.417799253	0.002789353	2.723272985	0.001722415	0.00130138	3.57374E-05	4.93311E-05	140640.8264	0	7005.543542	0
Orange (SC)	2023 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	18022.3661	0
Orange (SC)	2023 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000394424	0.00043404	0.000398368	0.022264687	0.000145675	0.054132757	1.23241E-06	9.31154E-07	8.68988E-07	1.19953E-06	3375.308512	0	405.6932306	0
Orange (SC)	2023 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.35227E-07	1.0569E-06	8.84316E-07	5.2066E-06	6.21606E-06	0.000852713	2.18605E-07	1.65169E-07	8.17341E-09	7.04065E-09	28.01215033	0	0.117790774	0
Orange (SC)	2023 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.10233E-05	7.81568E-05	7.17335E-05	0.006500937	4.80382E-05	0.012842433	2.92376E-07	2.20907E-07	2.21545E-07	3.05813E-07	869.2612237	0	34.98515412	0
Orange (SC)	2023 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.29818E-07	1.86615E-07	1.56142E-07	5.32935E-07	9.86695E-07	0.00012943	3.31814E-08	2.50704E-08	1.23758E-09	1.06606E-09	4.241452463	0	0.013409295	0
Orange (SC)	2023 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000201911	0.000222191	0.000203931	0.010031357	7.75789E-05	0.021369845	4.50047E-07	3.40035E-07	3.70174E-07	5.10977E-07	1411.268339	0	330.3405907	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001782862	0.00196193	0.00180069	0.089609477	0.001318092	0.242206572	9.2998E-06	7.02652E-06	3.74685E-06	5.17204E-06	14517.85233	0	379.2234924	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.000189429	0.000272308	0.000227842	0.001341468	0.00160155	0.219699176	5.63196E-05	4.25527E-05	2.10586E-06	1.814E-06	7217.256889	0	255.4672225	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21.92857228	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.057561038	0.063342411	0.058136648	3.214214942	0.029084225	6.282586965	0.000258384	0.000195223	0.000109933	0.000151749	430204.6551	0	4419.976318	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000571789	0.000821955	0.000687736	0.002347343	0.004345956	0.570083398	0.0001461 4	0.000110417	5.45097E-06	4.69551E-06	18681.72046	0	520.6604555	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	250.4777889	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.000180932	0.000199104	0.00018274	0.006512609	7.57424E-05	0.014317556	5.49234E-07	4.14976E-07	2.48853E-07	3.4351E-07	939.2673384	0	61.72656113	0
Orange (SC)	2023 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.569334139	0
Orange (SC)	2023 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.00019456	0.000214102	0.000196506	0.01438649	9.58068E-05	0.023713911	5.9663E-07	4.50787E-07	4.7274E-07	6.52556E-07	1752.997594	0	417.7729179	0
Orange (SC)	2023 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	39.16982828	0
Orange (SC)	2023 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.25538E-07	6.88366E-07	6.31793E-07	6.15946E-05	4.42834E-07	0.000101529	2.55442E-09	1.93001E-09	1.95439E-09	2.69779E-09	7.478310769	0	0.860500257	0
Orange (SC)	2023 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.08067935	0
Orange (SC)	2023 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	8.58782E-05	9.45037E-05	8.67371E-05	0.004547105	3.73085E-05	0.009756322	2.13502E-07	1.61313E-07	1.66554E-07	2.29906E-07	641.57384	0	314.082626	0
Orange (SC)	2023 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	29.44796562	0
Orange (SC)	2023 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000290734	0.000319935	0.000293641	0.018561842	0.000177371	0.044141159	9.6907E-07	7.32186E-07	7.21539E-07	9.95991E-07	2772.124058	0	447.7580716	0
Orange (SC)	2023 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001125925	0.001239011	0.001137183	0.00340618	2.09913E-05	0.019457261	1.96879E-06	1.48753E-06	3.04326E-07	4.20082E-07	1071.876871	0	605.8998391	0
Orange (SC)	2023 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	186.1292702	0
Orange (SC)	2023 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000179802	0.000197861	0.0001816	0.009052341	5.92487E-05	0.020127802	3.74945E-07	2.83291E-07	3.42268E-07	4.72457E-07	1304.684927	0	300.979494	0
Orange (SC)	2023 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.70741E-05	1.8789E-05	1.72448E-05	0.000958772	6.5188E-06	0.00231898	3.59894E-08	2.7192E-08	3.78868E-08	5.22977E-08	144.9090281	0	17.14845545	0
Orange (SC)	2023 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.119755434	0.131783548	0.120952988	0.683265306	0.007296658	3.496318412	0.001038356	0.000784536	4.75411E-05	6.56243E-05	186036.263	0	38346.39611	0
Orange (SC)	2023 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	56623.70852	0
Orange (SC)	2023 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.90282E-05	2.09394E-05	1.92185E-05	0.000969827	7.89209E-06	0.003575568	4.08543E-08	3.08677E-08	4.93824E-08	8.6166E-08	192.6792063	0	7.893733336	0
Orange (SC)	2023 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.004464552	0.004912966	0.004509196	0.084107972	0.000512023	0.270109063	5.32491E-05	4.02327E-05	3.96516E-06	5.47339E-06	15585.09679	0	1236.458079	0
Orange (SC)	2023 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	912.9677562	0
Orange (SC)	2023 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.006238227	0.006864788	0.006300609	0.293089143	0.002984152	0.688878891	2.97397E-05	2.247E-05	1.12963E-05	1.5593E-05	43683.62461	0	1451.129191	0
Orange (SC)	2023 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.000109391	0.000120378	0.000110485	0.002891809	5.64747E-05	0.006329759	2.63169E-07	1.9884E-07	1.11146E-07	1.53423E-07	419.8126502	0	38.86530036	0
Orange (SC)	2023 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.7097E-06	4.0823E-06	3.7468E-06	0.000200308	1.55235E-06	0.00044713	1.86802E-08	1.4114E-08	7.37575E-09	1.01813E-08	28.89989802	0	0.315978025	0
Orange (SC)	2023 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000416851	0.000458719	0.00042102	0.016164135	0.000133522	0.036434708	1.51483E-06	1.14454E-06	6.15451E-07	8.49552E-07	2360.572199	0	139.8202875	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.007679552	0.007063652	0.008450879	0.338904529	0.019148747	6.86755518	0.000478822	0.000361777	6.63502E-05	9.84738E-05	281093.8	74905.3	154.96	5243371
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.038384055	0.038767895	0.042239311	2.493777827	0.023402285	4.619244633	7.33951E-05	9.71406E-05	8.26171E-05	0.000114042	323444.7426	0	2929.517585	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.38448E-06	7.67913E-06	9.1778E-06	3.88437E-05	0.00004801	0.00630491	1.43873E-06	1.90421E-06	6.04797E-08	5.20978E-08	207.2780166	0	0.783249029	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	35617.64914	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000702694	0.000646338	0.000773272	0.031017256	0.002664231	0.8601155	6.16611E-05	4.65884E-05	8.54435E-06	1.20823E-05	34488.85	5044.3	10.41	675936.2
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000559622	0.000565218	0.00061583	0.078395471	0.000779819	0.112404502	1.73637E-06	2.29814E-06	2.25283E-06	3.10974E-06	8860.077231	0	30.32028789	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	0.000026822	0.000032261	3.85571E-05	0.000106894	0.000197705	0.025306113	5.59474E-06	7.4048E-06	2.42072E-07	2.08523E-07	829.63524	0	1.571869236	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	188.7085731	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008140009	0.008221409	0.008957584	0.32934169	0.002441964	0.736785327	1.03876E-05	1.37483E-05	1.22475E-05	1.69061E-05	47842.71008	0	1104.163909	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	13424.64128	0
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.002415565	0.002221837	0.002658182	0.178374746	0.003211439	1.070974592	7.3832E-05	5.57842E-05	1.30211E-05	1.80384E-05	51490.55	23093.55	47.8	808274.25
Orange (SC)	2023 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.002479019	0.002950238	0.003569787	0.023422766	0.018929333	2.719841127	0.000738788	0.000679685	3.51608E-05	2.29189E-05	91104	89235.2	109.62	3301702.4
Orange (SC)	2023 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000868112	0.45103971	0.034205395	10.796087	0	0	0	0	597377.25	61706.9	7.27	5430207.2
Orange (SC)	2023 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000242106	0.09175828	0.009153202	2.8097168	0	0	0	0	153416.8	9953.55	1.17	1453218.3
Orange (SC)	2023 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000186269	0.10558487	0.008858215	2.8957754	0	0	0	0	158888.15	7964.3	0.93	1672503
Orange (SC)	2023 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000159193	0.028204836	0.005780865	1.9211879	0	0	0	0	102079.55	29860.65	3.51	955540.8
Orange (SC)	2023 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000262329	0.14869872	0.012475324	4.0782164	0	0	0	0	223766.9	6967.85	0.82	2355133.3
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.00270804	0.002490855	0.002980033	0.10833435	0.015459696	4.604667209	0.000321048	0.00024257	4.44875E-05	6.34175E-05	181025.4	34868.45	303.7	2894081.35
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.29968E-05	0.009363984	0.000980551	0.298549658	0	0	0	0	16235.2	2587.85	22.61	214791.55
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.034750541	0.035098048	0.038240852	1.947362996	0.018033926	4.636690033	7.09284E-05	9.38759E-05	7.44289E-05	0.000102739	291596.7858	0	6542.161715	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.000333202	0.000400769	0.000478983	0.002271807	0.002813538	0.367956772	8.43308E-05	0.000111614	3.52799E-06	3.03905E-06	12091.24565	0	77.99320597	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000269823	0.000248183	0.000296924	0.023716576	0.002696231	0.744310786	5.33592E-05	4.03158E-05	7.39395E-06	1.03688E-05	29597.85	3292.3	28.71	480675.8
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.44869E-05	0.011226312	0.001349537	0.435365485	0	0	0	0	23480.45	2157.15	18.73	314943.9
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.104265283	0.105307934	0.114737581	1.824122827	0.030287278	3.73839281	0.000155784	0.000206185	6.76835E-05	9.34283E-05	259915.7059	0	15794.43655	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	4940.078533	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001230093	0.001242393	0.001353641	0.114792769	0.000695866	0.166852463	2.51929E-06	3.33435E-06	3.33398E-06	4.60212E-06	13111.3891	0	125.4496417	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.0004773	0.000574087	0.000686126	0.001969055	0.003637642	0.464843229	0.000104325	0.000138078	4.44599E-06	3.82982E-06	15237.42234	0	57.04342144	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.010052652	0.010153179	0.01106233	0.463227029	0.00230836	0.925408212	2.18303E-05	2.88931E-05	1.62881E-05	2.24837E-05	62973.94228	0	3616.523194	0
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.012281619	0.011296633	0.013515172	0.789637291	0.025471385	9.296531705	0.000640895	0.000484231	0.000113029	0.000140302	400492.6	180602	1572.39	5779264
Orange (SC)	2023 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.004683446	0.005573688	0.006744163	0.050434631	0.048597239	7.527871572	0.001615497	0.001486257	9.73166E-05	6.31326E-05	250955.75	179616.5	532.05	5927344.5
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.012939096	0.013068486	0.014238686	0.961155701	0.006522538	1.759914819	2.31711E-05	3.06676E-05	3.14755E-05	4.34477E-05	123658.7471	0	3981.763824	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.16378E-06	3.80533E-06	4.54798E-06	2.15987E-05	2.67239E-05	0.003500031	7.99989E-07	1.05881E-06	3.35581E-08	2.89073E-08	115.0113989	0	3.609444261	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7502.246812	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	7.5622E-06	7.63782E-06	8.32173E-06	0.000160551	2.54221E-06	0.000339698	4.61728E-09	6.11111E-09	5.93396E-09	8.19106E-09	23.06409886	0	2.909210074	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.481392913	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000203454	0.000205489	0.000223888	0.016863534	9.89332E-05	0.030873864	4.06486E-07	5.37996E-07	5.50112E-07	7.59357E-07	2166.386453	0	26.41876906	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.20348E-06	1.44752E-06	1.73002E-06	4.96124E-06	9.18617E-06	0.001177256	2.61557E-07	3.46178E-07	1.12592E-08	9.69882E-09	38.58801784	0	0.830671251	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	49.77696687	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.024017354	0.024257528	0.026429633	1.224932677	0.009647851	2.593144885	3.52468E-05	4.66502E-05	4.38277E-05	6.04985E-05	171638.2122	0	10405.14041	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	19604.8623	0
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000110329	0.00010148	0.00012141	0.00740322	0.000183576	0.094126869	6.48902E-06	4.90282E-06	1.14441E-06	1.40527E-06	4011.35	1613.3	14.08	46785.7
Orange (SC)	2023 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.5899E-05	1.89212E-05	2.28946E-05	0.00020708	0.00022442	0.036171496	6.32951E-06	5.82315E-06	4.67607E-07	3.03014E-07	1204.5	1835.95	12.77	69766.1
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.003032117	0.002788941	0.00333666	0.142840699	0.008198116	5.276841916	0.000367914	0.00027798	5.09817E-05	7.30638E-05	208561	35156.8	159.27	3269582.4
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004137355	0.004178729	0.004552907	0.259050897	0.002353203	0.554578855	9.65991E-06	1.27852E-05	9.29147E-06	1.28256E-05	36406.12639	0	914.5513229	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.00024484	0.000294489	0.000351962	0.001479545	0.001838422	0.239639797	5.58053E-05	0.00007386	2.29888E-06	1.98028E-06	7878.796257	0	58.57782796	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000106718	9.81588E-05	0.000117436	0.007837736	0.000409778	0.239561105	1.7174E-05	1.29759E-05	2.37979E-06	3.34247E-06	9541.1	1054.85	4.79	151898.4
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.001787377	0.001805251	0.0019669	0.016953059	0.000106987	0.04813543	5.42182E-07	7.17594E-07	7.97139E-07	1.10035E-06	3021.580751	0	331.4982083	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	26425.55143	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.10623E-05	3.13729E-05	3.41821E-05	0.002137428	2.17741E-05	0.004566994	8.74527E-08	1.15746E-07	7.61823E-08	1.0516E-07	299.6571734	0	3.045458944	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.000200215	0.000240814	0.000287812	0.000795805	0.00147024	0.187882538	4.18408E-05	5.53775E-05	1.79731E-06	1.54822E-06	6159.808692	0	17.49570439	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.00316595	0.00319761	0.003483935	0.134441518	0.001067353	0.300235648	4.76077E-06	6.30103E-06	5.02913E-06	6.94207E-06	19489.83733	0	1004.087816	0
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.001893279	0.001741438	0.002083438	0.140243775	0.002944142	1.403525735	9.67578E-05	7.31059E-05	1.70643E-05	2.16238E-05	61725.15	27747.3	125.67	860166.3
Orange (SC)	2023 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.003011466	0.003583893	0.004336511	0.030963398	0.028815885	4.405958411	0.00100417	0.000923837	5.6958E-05	3.69843E-05	147014.7	93768.5	232.96	3469434.5
Orange (SC)	2023 Light Commercial - Misc -

Orange (SC)	2023 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Gasoline	0.000352113	0.000355634	0.000387479	0.003898636	0.00040374	0.039476914	4.12001E-06	3.1129E-06	4.4612E-07	6.15811E-07	1746.724859	0	1.984787632	0	0
Orange (SC)	2023 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001469284	0.001483977	0.001616858	0.006704567	0.000694766	0.074019214	7.72502E-06	5.83669E-06	8.51361E-07	1.17519E-06	3344.919485	0	1.984787632	0	0
Orange (SC)	2023 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.000207102	0.000209173	0.000227903	0.002586491	9.73212E-05	0.019370541	1.55767E-06	1.17691E-06	3.04441E-07	4.20242E-07	901.0254543	0	72.26061721	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002859424	0.002888017	0.003146621	0.024371533	0.002502417	0.27190356	2.71408E-05	2.05064E-05	3.11496E-06	4.29979E-06	11941.942	0	56.65789859	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.024704791	0.024951839	0.027186116	0.263501906	0.009781854	2.787352307	0.000290902	0.000219793	3.15329E-05	4.35271E-05	122621.0164	0	404.8494517	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	6.10744E-05	6.16852E-05	6.72087E-05	0.001013651	0.000020943	0.01574891	1.64364E-06	1.24186E-06	1.66826E-07	2.30282E-07	654.7576374	0	1.372471866	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.007052557	0.007123081	0.007760908	0.018731029	0.000207833	0.056061651	0.000348533	0.000263335	1.06489E-06	1.46994E-06	4106.623169	0	37.63593653	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001100492	0.001111497	0.001211025	0.010080286	0.000423273	0.051716847	2.55789E-05	1.93263E-05	6.84341E-07	9.44644E-07	2662.950912	0	20.95425731	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.002973588	0.003003324	0.003272252	0.028511303	0.001324449	0.182356369	0.000380459	0.000287458	2.26177E-06	3.12208E-06	8859.526787	0	58.59144315	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.008144944	0.008226394	0.008963015	0.018066154	0.000119649	0.047102238	0.000401731	0.000303531	1.0448E-06	1.44221E-06	3875.650775	0	72.27105105	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.101350607	0.102364113	0.111530161	0.323045896	0.011808166	1.58889167	0.00774207	0.005849563	2.37137E-05	3.27337E-05	91385.66362	0	538.9754499	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.015289026	0.015441916	0.01682464	0.051337615	0.001312465	0.176300499	0.00083738	0.000632688	0.00000356	4.91412E-06	11574.23999	0	602.2584765	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.045909908	0.046369007	0.050521053	0.189005441	0.006625852	0.878933395	0.004565441	0.003449444	1.27892E-05	1.76539E-05	49834.63219	0	159.6504178	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.018958168	0.01914775	0.020862307	0.045638061	0.001515692	0.179528701	0.001155427	0.000872989	3.27162E-06	4.51605E-06	11838.08752	0	258.5682566	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.042731114	0.043158425	0.047022985	0.199300752	0.01263538	1.188840397	0.008617259	0.006510818	1.57644E-05	2.17607E-05	61583.19232	0	150.6164684	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.044431019	0.04487533	0.048893626	0.115978535	0.004456083	0.507475831	0.003063472	0.002314622	8.42932E-06	1.16356E-05	31507.48597	0	370.8100508	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.01325325	0.013385783	0.014584393	0.175621618	0.006564262	0.732272964	0.001868114	0.001411464	1.00225E-05	1.38348E-05	39330.19539	0	78.38058168	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	7.06278E-07	7.13341E-07	7.77216E-07	5.99622E-06	3.4946E-07	0.000115886	1.059E-08	8.00132E-09	1.26117E-09	1.74088E-09	4.765655481	0	0.066016146	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000508028	0.000513107	0.000559054	0.00836906	0.000536443	0.064576509	9.06525E-06	6.8493E-06	1.02397E-06	1.41346E-06	2965.188326	0	307.9589751	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.003878432	0.003917216	0.004267978	0.043275033	0.011491141	0.754003228	7.58542E-05	5.73121E-05	8.14471E-06	1.12428E-05	31163.72776	0	273.173895	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.016646936	0.016813407	0.018318938	0.175395342	0.014691685	1.680915232	0.000167785	0.000126771	1.95957E-05	2.70493E-05	75140.79094	0	483.3959876	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.01965752	0.019854096	0.021631902	0.130189329	0.007913171	2.580769055	0.000269342	0.000203503	2.74151E-05	3.78429E-05	106445.5363	0	523.9319915	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.001398648	0.001412634	0.001539127	0.002607111	0.000429486	0.073241557	7.64386E-06	5.77536E-06	7.81468E-07	1.07872E-06	3066.56719	0	8.14824171	0	0
Orange (SC)	2023 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000211626	0.000256068	0.000304742	0.006293097	0.003259925	0.942296459	0.000236391	0.00021748	8.70565E-06	7.6909E-06	30571.77087	23486.80427	57.74234678	1953812.741	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.00028999	0.000350888	0.000417586	0.010935946	0.003605474	1.976713395	0.000138973	0.000127855	1.8267E-05	1.61337E-05	64132.28916	30394.68788	74.72538995	4098633.481	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000193369	0.000233977	0.000278451	0.002255507	0.002098317	1.185553976	8.02155E-05	7.37982E-05	1.09552E-05	9.67633E-06	38463.99311	8858.344863	21.77825536	2458197.143	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	7.93966E-06	9.60699E-06	1.14331E-05	0.00017015	0.000167207	0.027199662	5.12908E-06	4.71875E-06	2.51236E-07	2.22E-07	882.4630912	1219.038284	2.997007618	50729.99187	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000285775	0.000345788	0.000411516	0.003104462	0.003031619	1.622453315	0.000116707	0.000107371	1.49918E-05	1.32422E-05	52638.711	7070.422047	17.38264419	3364089.855	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	9.09538E-05	0.000110054	0.000130974	0.001917367	0.001477778	0.293395483	2.33842E-05	2.15135E-05	2.70986E-06	2.39465E-06	9518.893313	9345.960177	22.97705841	608343.4	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	0.000122437	0.000148148	0.000176309	0.001011146	0.002177593	0.531229422	6.91114E-05	6.35825E-05	4.90781E-06	4.33582E-06	17235.15354	1625.384379	3.996010158	1101482.237	
Orange (SC)	2023 Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	5.34311E-06	6.46516E-06	7.69408E-06	6.6653E-05	0.000107731	0.034550201	1.25219E-06	1.15201E-06	3.19273E-07	2.81994E-07	1120.943208	81.26921893	0.199800508	71638.41216	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.00112709	0.001363779	0.00162301	0.028685728	0.011813556	3.899021107	0.000977004	0.000898843	3.60146E-05	3.18233E-05	126499.4458	84594.16789	62.33775846	8084459.027	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.002462582	0.002979725	0.003546118	0.053457311	0.019421295	8.45319571	0.000971888	0.000894137	7.80801E-05	6.89938E-05	274254.6253	126348.9815	93.10703667	17527351.73	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002991945	0.003620254	0.004308401	0.020955218	0.021461827	9.245465004	0.0009464 8	0.000870762	8.53892E-05	7.54602E-05	299958.93	78086.92421	57.54254627	19170089.35	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.12982E-05	4.99709E-05	5.94694E-05	0.000616836	0.000417617	0.063923899	1.20791E-05	1.11127E-05	5.89769E-07	5.21738E-07	2073.940501	2440.216381	1.798204571	119224.2325	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.005046135	0.006105823	0.007266434	0.038887945	0.03045523	19.01499919	0.001382928	0.001272294	0.000175652	0.000155198	616920.7075	99235.46618	73.12698589	39426814.48	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001227308	0.001485042	0.001767323	0.018038365	0.013304366	2.445968931	0.00026668	0.000245345	2.25774E-05	1.99637E-05	79356.7682	77544.6539	57.14294525	5071615.427	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.001562589	0.001890732	0.002250128	0.010129018	0.011911021	4.7529456	0.000558373	0.000513703	4.38965E-05	3.87929E-05	154204.0855	14370.16314	10.58942692	9855036.148	
Orange (SC)	2023 Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.010198125	0.012339731	0.014685299	0.067314893	0.159229749	31.07609625	0.004371505	0.004021784	0.000287008	0.000253639	1008229.719	51515.67916	37.9620965	64435000.46	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000243975	0.00029521	0.000351324	0.008928998	0.004564163	1.410600989	0.000307975	0.000283337	1.30344E-05	1.15131E-05	45765.39559	32918.93346	103.8962641	2924822.817	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000700986	0.000848193	0.00100942	0.025141569	0.009593426	4.562523571	0.000364697	0.000335521	4.21618E-05	3.72387E-05	148026.0526	68686.62077	216.7835511	9460203.948	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000279546	0.000338251	0.000402547	0.003027677	0.003160034	1.531178817	0.000119756	0.000110176	1.41481E-05	1.24973E-05	49677.41043	13484.10159	42.55750818	3174835.958	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.21485E-06	7.51997E-06	8.94938E-06	0.000137307	0.000132477	0.023240154	3.42184E-06	3.14809E-06	2.1468E-07	1.89683E-07	754.0012166	949.584619	2.997007618	43345.12794	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000356339	0.00043117	0.000513128	0.003801065	0.0039877 3	2.013677898	0.000142751	0.000131331	1.86068E-05	1.64354E-05	65331.56172	9495.84619	29.97007618	4175277.848	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.000143255	0.000173338	0.000206287	0.003871875	0.003099853	0.626766869	5.80546E-05	5.34103E-05	5.79047E-06	5.11559E-06	20334.76079	18358.63597	57.94214729	1299575.183	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000165189	0.000199878	0.000237872	0.001654894	0.002445197	0.882098948	9.1799E-05	8.44551E-05	8.15049E-06	7.19957E-06	28618.72891	2658.836933	8.391621331	1828995.69	
Orange (SC)	2023 Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.001775995	0.002148954	0.002557433	0.014911684	0.042870874	7.78279341	0.000915158	0.000841945	7.19025E-05	6.35221E-05	252504.161	6710.397974	21.17885384	16137300.29	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000119723	0.000144865	0.000172401	0.004291228	0.002264639	0.679727685	0.000145959	0.000134282	6.28083E-06	5.54785E-06	22053.01614	15416.15709	48.55152342	1409387.245	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.00018369	0.000222265	0.000264513	0.006546595	0.00253777	1.186779323	0.000101953	9.37972E-05	1.09669E-05	9.68633E-06	38503.74813	17826.91416	56.14394272	2460737.848	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000126533	0.000153104	0.000182207	0.001659724	0.001237939	0.875328938	4.55724E-05	4.19267E-05	8.08905E-06	7.14432E-06	28399.0834	7612.917081	23.97606095	1814958.355	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.33444E-06	1.61467E-06	1.92159E-06	2.90653E-05	2.21586E-05	0.004706778	2.56795E-07	2.36251E-07	4.34765E-08	3.84161E-08	152.7062434	190.322927	0.599401524	8778.595463	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000265373	0.000321101	0.000382137	0.00304266	0.003901538	1.655695459	0.000147379	0.000135589	1.52998E-05	1.35136E-05	53717.21576	8501.09074	26.77326806	3433016.066	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	9.38571E-05	0.000113567	0.000135154	0.002226382	0.001837661	0.354509631	4.66519E-05	4.29197E-05	3.2748E-06	2.89346E-06	11501.67456	10467.76099	32.9670838	735061.0601	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000135012	0.000163364	0.000194417	0.001540072	0.002476476	0.839608267	0.000100175	9.21606E-05	7.75854E-06	6.85277E-06	27240.16555	2537.639027	7.992020315	1740893.02	
Orange (SC)	2023 Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	7.91514E-05	9.57732E-05	0.000113978	0.000907352	0.001809023	0.478983156	3.045E-05	2.8014E-05	4.42606E-06	3.9094E-06	15540.081	761.2917081	2.397606095	993151.7667	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.39552E-05	1.68858E-05	2.00955E-05	0.000470493	0.000198835	0.069542837	1.45743E-05	1.34084E-05	6.42539E-07	5.67599E-07	2256.240764	1703.897766	3.196808126	144194.197	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000234983	0.00028433	0.000338376	0.008952379	0.003241013	1.626702247	0.00010025	9.22303E-05	1.50326E-05	1.32769E-05	52776.5629	24387.03678	45.75431631	3372899.838	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000142062	0.000171895	0.000204569	0.001987015	0.000828215	1.039299539	3.5147E-05	3.23353E-05	9.60458E-06	8.48262E-06	33718.92896	7561.046337	14.18583606	2154944.615	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	50	Diesel	6.62465E-06	8.01583E-06	9.5395E-06	0.000152741	0.000120212	0.02580966	1.80661E-06	1.66208E-06	2.38424E-07	2.10655E-07	837.3659789	958.4424935	1.798204571	48137.50255	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002169826	0.002625489	0.003124549	0.027870601	0.017159295	14.62931761	0.000707154	0.000650582	0.00013519	0.00011943	474632.0984	55163.69018	103.4966631	30333285.08	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.39854E-05	2.90224E-05	3.4539E-05	0.000494138	0.000370328	0.074807246	4.96331E-06	4.56624E-06	6.90911E-07	6.10567E-07	2427.038702	2449.353039	4.595411681	155109.7304	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000259605	0.000314122	0.000373831	0.002928924	0.002267716	1.500356441	0.000118862	0.000109353	1.38638E-05	1.22457E-05	48677.41239	4898.706078	9.190823363	3110927.035	
Orange (SC)	2023 Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.00015085	0.000182529	0.000217224	0.002084323	0.003391059	1.102419798	5.62469E-05	5.17471E-05	1.01879E-05	8.9978E-06	35766.79624	2129.872208	3.996010158	2285821.861	
Orange (SC)	2023 Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001762646	0.002132802	0.0025382 1	0.046408507	0.020520822	6.368093451	0.001625618	0.001495568	5.88233E-05	5.19755E-05	206605.7788	137938.4889	94.90

OFFROAD 2024

	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9058.377327	30.97042859	0	0	831.6202895	1.575798551	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	51892.05	48.03	23210.35	2.235728888	91498.2	110.17	89662.25	1.020476287	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	282542.85	155.71	75266.65	3.753891664	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	34660.4	10.48	5058.9	6.851370851	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2573.16634	14.29916225	0	0	19.27392888	8.978987915	0	0	53782.75	121.29	45519.15	1.181541176
Aerial Lifts50	Aerial Lifts	50	72901.45	127.24	45979.05	1.585536239	122330.565	483.3519432	149623.2908	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	93636.84125	273.0402435	84074.46352	1.113737006	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	130994.85	127.24	45979.05	2.849011669	119815.5255	312.5022002	96780.70397	1.238010477	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	13045.35039	20.30123782	6274.627412	2.079063749	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	779.5612338	0.684311387	212.6901994	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	553.6014559	0.228103796	70.89673314	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	215.5695038	2.272978544	0	0	8.807321926	1.38568425	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	689.85	2.5	266.45	2.589041096	2989.470367	7.179406083	2614.484433	1.14342634	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	3676.28468	4.005352868	1982.58594	1.854287679	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7876.7	11.48	1226.4	6.422619048	15009.15616	17.91072886	6976.491392	2.151390336	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2748.45	2.85	306.6	8.964285714	21890.54793	17.3061473	5603.021692	3.906918289	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	31894.22374	17.83515617	5885.415681	5.419196446	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	49131.88103	14.13209408	4775.354758	10.28863478	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	31793.94048	3.174053216	1902.84805	16.70860712	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	16328.66618	0.453436174	338.2899846	48.26825186	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	114.1774456	1.545515756	0	0	2.571731727	0.99129987	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	3740.351094	16.81408876	0	0	1.760124798	0.368110185	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	4701.2	5.88	3420.05	1.374599787	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	57.75554616	0.284739189	139.5142938	0.413975834	0	0	0	0
Cranes50	Cranes	50	2295.85	2.85	1193.55	1.923547401	935.7344373	3.037218017	1357.103667	0.689508443	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	359.084513	0.94913063	356.8815561	1.006172796	0	0	0	0
Cranes100	Cranes	100	7825.6	5.7	2361.55	3.313755796	22527.27171	37.39574684	17098.48591	1.317500966	0	0	0	0
Cranes175	Cranes	175	503.7	0.21	91.25	5.52	63388.87898	61.78840404	28778.0947	2.202678101	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	110052.0183	69.76110133	33651.22474	3.270371856	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	196729.5823	71.08988421	36026.07298	5.460755671	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	3385.94245	0.854217567	356.5488511	9.496433491	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	10746.58739	1.518609009	769.657551	13.96281682	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	3026.636462	8.423791641	2940.641906	1.029243464	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	742.9364151	2.10594791	470.2900999	1.579740707	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	133164.0775	142.6147925	68473.56924	1.944751515	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	146116.367	95.10460762	44105.19931	3.312905718	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	152211.9696	72.86579769	33499.95086	4.543647548	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	536307.4415	129.8106292	62804.00455	8.539382883	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	5307.37696	0.92661708	385.8386755	13.75543018	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	31064.46562	2.527137492	1431.244944	21.7045068	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	39.9878892	0.18875644	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14084.03028	276.39951	40558.8	0.347249679	1.266598888	0.51195169	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	649.7	2.06	266.45	2.438356164	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	32.18841576	0.973473058	42.11289775	0.764336284	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	121316.7654	206.0359267	154175.8118	0.786872882	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	2276.082337	2.701003546	1577.704977	1.442653963	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	154945.2507	145.7697851	96755.81265	1.601405088	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	332131.2985	190.1675309	115057.7624	2.886648337	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	423171.8421	163.8327463	97885.46401	4.323132616	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	751269.2175	171.8513506	112714.727	6.665226784	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	9386.701883	1.350501773	769.867166	12.1926253	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	20927.35561	1.266095412	879.143725	23.80424841	0	0	0	0
Forklifts25	Forklifts	25	49.34141092	0.11092841	0	0	35.67569607	0.195557215	61.69495947	0.578259494	1427.15	1.16	1452.7	0.98241206
Forklifts50	Forklifts	50	1220260.7	426.7	765510.85	1.594047557	86166.15861	235.3844489	171345.6187	0.502879264	1895134.75	787.97	1419561.65	1.335014052
Forklifts75	Forklifts	75	0	0	0	0	8515.830852	19.05544468	8343.04058	1.020710707	0	0	0	0
Forklifts100	Forklifts	100	5694927.1	1521.67	2696477.65	2.111987503	1261188.929	1954.007273	1289901.398	0.977740571	11860164	2765.52	4982217.15	2.380499212
Forklifts175	Forklifts	175	398339.1	55.63	98535.4	4.042598904	370651.1711	355.0313159	235262.5939	1.575478554	890147.4	101.2	182328.45	4.882109183
Forklifts300	Forklifts	300	0	0	0	0	72794.08012	44.74913093	32283.33238	2.254850251	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	18737.77902	6.980664219	4831.49439	3.878257431	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	280.356549	0.097778608	21.59323581	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1365.283195	0.185182764	149.3006598	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	13493.32047	128.9291331	0	0	15293.04746	57.25577559	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	402394.25	1580.17	181496.25	2.217094017	252101.85	534.72	180496.15	1.396715941	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	181799.2	305.17	35040	5.188333333	0	0	0	0	16341.05	22.67	2602.45	6.279102384
Generator Sets175	Generator Sets	175	29751.15	28.83	3306.9	8.996688742	0	0	0	0	23597.25	18.84	2164.45	10.90219224
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	23.2973992	0.169640384	39.64343858	0.587673523	0	0	0	0
Graders50	Graders	50	0	0	0	0	779.5195047	2.459785566	886.823721	0.87900164	0	0	0	0
Graders75	Graders	75	0	0	0	0	289.7986601	0.508921152	188.7027676	1.53574144	0	0	0	0
Graders100	Graders	100	0	0	0	0	19585.88532	25.95497873	10318.98884	1.898043075	0	0	0	0
Graders175	Graders	175	0	0	0	0	201021.2911	132.4891398	63607.69898	3.160329556	0	0	0	0
Graders300	Graders	300	0	0	0	0	414874.7519	118.3241678	91500.72326	4.534114454	0	0	0	0
Graders600	Graders	600	0	0	0	0	30334.29251	5.089211517	4381.293723	6.923592534	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	14512.97475	0.508921152	379.4868158	38.24368633	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	24.3549735	0.166565828	38.92494232	0.625690677	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	50148.6825	78.8689194	53246.49904	0.941821217	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	25670.96868	26.90038117	16190.82976	1.585525206	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	38469.19892	30.56482938	21689.65905	1.773619347	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	54459.16777	21.6535576	15272.00649	3.565947132	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	47491.99309	14.90764158	9824.655442	4.83396017	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	153128.0435	26.90038117	18988.94924	8.064060922	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	6476.399949	0.666263311	455.0325757	14.23282704	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	8513.900762	0.416414569	230.7275956	36.90022747	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	184.2327547	0.247552785	335.7278762	0.548756203	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	4677.251624	4.455950127	7404.429137	0.631682948	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	1624.127617	0.742658354	1135.419722	1.430420475	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3209.553505	1.402799114	1842.646595	1.741817185	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	115019.2632	25.74548962	36963.52347	3.111696406	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	234043.8793	43.48677253	56505.16134	4.141991169	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	1004536.97	96.87565646	135096.9167	7.435676509	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	340783.3183	20.87695152	26043.68986	13.08506283	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	603677.3437	16.58603658	24001.74703	25.15139182	0	0	0	0
Pavers25	Pavers	25	720.2548616	2.317112338	0	0	2.385703557	0.317703379	0	0	0	0	0	0
Pavers50	Pavers	50	7394.9	8.07	3168.2	2.334101382	3323.763757	9.884487498	3587.011138	0.926610938	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	3848.827632	7.083882707	2524.545927	1.524562334	0	0	0	0
Pavers100	Pavers	100	6628.4	4.43	1748.35	3.791231733	28181.32962	40.60876947	16302.04117	1.72869945	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	43916.71608	32.7835502	12931.10345	3.39620793	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	34276.52815	15.73280927	7231.673935	4.73977788	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	6308.542219	1.729785312	778.0567775	8.108074373	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	1285.612929	0.164741458	79.78835583	16.11278884	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	813.2173626	5.769973544	0	0	4.050943077	0.789448105	0	0	0	0	0	0
Paving Equipment50	Paving Equipment	50	8621.3	22.1	3854.4	2.236742424	4141.73443	12.1712631	5865.246982	0.706148342	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	509.9895727	1.151335698	419.0560321	1.216996138	0	0	0	0
Paving Equipment100	Paving Equipment	100	3569.7	5.71	992.8	3.595588235	17443.08642	22.45104612	10665.22105	1.635511007	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	18538.88985	14.80288755	6940.609527	2.671075181	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	12577.45205	6.167869813	2962.988478	4.244853512	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	13942.61072	3.94743668	1885.80019	7.3934719	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	2056.608941	0.328953057	170.851095	12.03743495	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	1214.557347	0.164476528	78.41085123	15.489659	0	0	0	0
Rollers25	Rollers	25	2454.162226	12.42287199	0	0	39.04016524	6.32560892	19.80028886	1.971696752	0	0	0	0
Rollers50	Rollers	50	9628.7	5.7	3544.15	2.716786818	68225.98301	249.8643106	88485.9069	0.771037845	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	713.5495428	2.202940684	518.7675682	1.375470609	0	0	0	0
Rollers100	Rollers	100	30090.6	10.69	6657.6	4.519736842	105918.6611	184.1997326	62519.11508	1.694180428	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	110246.3414	107.7746365	39538.10781	2.788356537	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	18634.36504	13.98020049	4419.424474	4.216468717	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	10297.45347	4.829523807	1501.059899	6.860121625	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	35.67569607	0.195557215	61.69495947	0.578259494	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3109.8	2.3	941.7	3.302325581	3288.97235	10.56008962	2985.464789	1.101661745	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	241.4152306	0.880007469	195.5958715	1.234255247	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68057.9	32.36	13380.9	5.08619749	274051.4748	474.2262469	136696.4934	2.004817153	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3832.5	1.2	474.5	8.076923077	57103.55302	76.46287115	21699.71674	2.63153449	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	4524.136194	4.008922912	1027.563825	4.402778771	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1490.300698	0.684450253	179.3723822	8.308417831	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	280.356549	0.097778608	21.59323581	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2913.991032	3.143834872	3127.125266	0.931843397	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	3867.001854	3.385668324	2629.422558	1.470665809	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	8926.879498	5.884613991	5166.067454	1.727983534	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	13591.36841	5.804002841	4666.104173	2.91278718	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	15941.64533	4.917280184	3442.757699	4.630487165	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	150506.4864	26.60167969	19841.51562	7.585432954	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	5641.966549	0.403055753	414.4382882	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	24.23760056	0.08307545	34.94517954	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	192.9127113	0.498452698	182.5885631	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1606.572637	2.15996169	964.6810952	1.665392475	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	8135.456928	6.064507823	3577.609826	2.273992225	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	100422.3124	51.83908057	23940.06887	4.194737823	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	124741.0231	54.58057041	22570.80026	5.526654865	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1514105.563	291.8440545	143421.3264	10.55704616	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	20234.23118	3.738395233	1299.572399	15.56991453	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	34935.88564	2.15996169	876.9298666	39.83885938	0

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2668.15	0.58	295.65	9.024691358	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.061369722	0	0	43.29503308	5.910824909	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	101762.2788	242.1237839	128033.4021	0.794810394	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	12687.89136	39.48220588	9333.394882	1.359407966	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25513.5	10.03	8723.5	2.924686192	1632397.957	1604.512978	1024554.859	1.593275306	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	284904.4533	183.9128394	104424.1508	2.728338715	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	176570.4101	78.20513857	44715.48134	3.948753425	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	236993.7903	65.71931278	36808.56806	6.438549577	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	3821.144152	0.674909502	308.0474743	12.4044002	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	79783.53611	3.543274887	2261.610625	35.27730867	0	0	0	0
Trenchers25	Trenchers	25	4694.147334	14.4143417	0	0	42.11098225	4.223077398	0	0	0	0	0	0
Trenchers50	Trenchers	50	45927.95	51.81	20841.5	2.203677758	36123.04411	79.39467674	31288.07407	1.154530766	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	3941.322383	6.947034215	2103.750745	1.873474028	0	0	0	0
Trenchers100	Trenchers	100	28623.3	17.21	6913.1	4.140443506	22266.30129	29.863225	10086.8502	2.20745831	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	5345.716079	4.871946073	1442.349053	3.706256866	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	12131.62741	6.495928097	2065.483481	5.873504933	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	18094.10586	4.871946073	1819.329042	9.945482889	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	5873.692591	0.721769789	348.8329934	16.83812226	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	471.392512	0.090221224	21.08389201	22.35794566	0	0	0	0
Welders25	Welders	25	0	0	0	0	7609.314978	23.39162228	0	0	0	0	0	0
Welders50	Welders	50	125457.8	250.93	52136.6	2.406328759	420009.15	550.57	353575.5	1.187890988	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	176411.8	256.12	53195.1	3.316316728	0	0	0	0	0	0	0	0
Welders175	Welders	175	22042.35	17.65	3668.25	6.008955224	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2024
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower B	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.78475E-08	9.41955E-08	1.121E-07	1.1489E-06	2.95874E-07	3.73396E-05	2.8089E-09	2.58419E-09	3.37969E-10	3.04432E-10	1.210136699	6.227602241	0.003655408	32.29531501
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.001624946	0.001966184	0.002339922	0.013679748	0.0145363	2.219855045	0.001035516	0.000952675	2.01825E-05	1.80987E-05	71943.23271	2432.21405	37.65310553	2571500.403
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	9.58856E-08	1.16022E-07	1.38075E-07	1.4958E-06	7.11214E-07	8.40042E-05	6.31929E-09	5.81374E-09	7.6272E-10	6.84893E-10	2.722490057	7.670082808	0.006434124	72.65598441
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000604295	0.000731197	0.000870185	0.006084126	0.006349621	1.030966015	0.000289043	0.00026592	9.37788E-06	8.40555E-06	33412.55451	2404.944067	13.96895556	1327701.364
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	2.56299E-06	3.10122E-06	3.69071E-06	2.89055E-05	4.66897E-07	7.63594E-05	5.24993E-08	4.82993E-08	6.19034E-10	6.22564E-10	2.47473045	78.72600798	0.034617986	66.04394288
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000149857	0.000181327	0.000215794	0.00054101	0.000391793	0.047957015	2.47915E-05	2.28082E-05	4.32574E-07	3.90997E-07	1554.237844	787.4064859	4.53763964	55553.8455
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.000235773	0.000285285	0.000339513	0.00155622	0.002046267	0.709546483	9.16771E-05	8.43429E-05	6.45958E-06	5.78499E-06	22995.67631	1489.210944	3.276739992	913770.0286
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	5.33983E-07	6.46119E-07	7.68935E-07	1.58122E-05	1.48115E-06	0.000330304	2.48474E-08	2.28596E-08	2.9943E-09	2.693E-09	10.70482106	47.40803422	0.040080726	285.68307
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.003247962	0.003930034	0.004677065	0.012776488	0.009923551	1.189138506	0.000846974	0.000779216	1.07401E-05	9.69514E-06	38538.76335	2934.853504	50.60316365	1377508.929
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	0.000121057	0.000146479	0.000174322	0.000928304	0.001045339	0.384833544	4.5616E-05	4.19667E-05	3.50366E-06	3.13758E-06	12472.06176	1037.335064	1.065419256	495597.3505
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.85267E-08	5.87173E-08	6.98784E-08	7.39065E-07	1.90974E-07	2.4259E-05	1.8249E-09	1.67891E-09	2.19635E-10	1.97785E-10	0.786208742	12.45520323	0.003483233	20.9818104
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001734964	0.002099307	0.002498348	0.008763643	0.014238237	1.222168926	0.000919353	0.000845804	1.10865E-05	9.96444E-06	39609.24547	2617.004432	36.04020504	1415771.668
Orange (SC)	2024	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - ATVs	Aggregate	100	Gasoline	2.02389E-05	2.44891E-05	2.9144E-05	0.000715081	7.70867E-05	0.04557342	3.4283E-06	3.15403E-06	4.14739E-07	3.71564E-07	1476.987954	52.06582796	1.879944066	47300.23426
Orange (SC)	2024	Agricultural - ATVs	Aggregate	175	Gasoline	2.0472E-05	2.47711E-05	2.94797E-05	0.000848156	0.000111436	0.065286325	4.91122E-06	4.51832E-06	5.94392E-07	5.32285E-07	2115.863079	29.30086341	1.638562888	67760.07911
Orange (SC)	2024	Agricultural - ATVs	Aggregate	175	Diesel	4.97477E-08	6.01948E-08	7.16367E-08	9.36647E-07	5.16085E-07	0.000170952	2.02542E-08	1.86338E-08	1.55652E-09	1.39378E-09	5.540363836	70.37026479	0.002543098	264.186276
Orange (SC)	2024	Agricultural - ATVs	Aggregate	25	Gasoline	0.001430493	0.001730896	0.002059909	0.017810548	0.000650554	0.063650196	5.47842E-05	5.04015E-05	5.3718E-07	5.18945E-07	2062.837783	267.5577197	11.42962212	66061.95423
Orange (SC)	2024	Agricultural - ATVs	Aggregate	25	Diesel	3.00711E-05	3.63861E-05	4.33024E-05	0.000253901	0.000244845	0.037379068	1.0384E-05	9.5533E-06	3.39763E-07	3.04754E-07	1211.417396	290.5433955	3.605031044	51960.30575
Orange (SC)	2024	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	98.72758689	2.677503059	15889.77767
Orange (SC)	2024	Agricultural - ATVs	Aggregate	50	Gasoline	4.70704E-05	5.69552E-05	6.77814E-05	0.002313763	0.000120434	0.068599097	5.16042E-06	4.74759E-06	6.23786E-07	5.59294E-07	2223.226608	197.0327073	7.59671482	71198.3783
Orange (SC)	2024	Agricultural - ATVs	Aggregate	50	Diesel	7.78397E-05	9.4186E-05	0.000112089	0.000722706	0.000639581	0.109938785	2.3208E-05	2.13513E-05	9.99624E-07	8.9634E-07	3563.003634	509.7120921	6.696452979	152824.9125
Orange (SC)	2024	Agricultural - ATVs	Aggregate	75	Gasoline	1.29718E-05	1.56958E-05	1.86793E-05	0.000608299	3.53995E-05	0.021327905	1.60441E-06	1.47606E-06	1.93989E-07	1.73888E-07	691.2156015	98.81029094	1.301205112	22136.03689
Orange (SC)	2024	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	8.69597E-08	1.05221E-07	1.25222E-07	8.26152E-07	8.752E-07	0.000139853	4.00603E-08	3.68555E-08	1.27198E-09	1.14023E-09	4.532480932	134.7498013	0.001271549	172.9011743
Orange (SC)	2024	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Combine Harvesters	Aggregate	300	Diesel	3.71053E-07	4.48974E-07	5.34316E-07	2.01532E-06	3.90286E-06	0.000729699	1.75034E-07	1.61031E-07	6.63919E-09	5.94929E-09	23.64879951	40.84858819	0.004899451	1016.534263
Orange (SC)	2024	Agricultural - Combine Harvesters	Aggregate	600	Diesel	3.01085E-05	3.64312E-05	4.33562E-05	0.000241915	0.000326249	0.064618147	1.34031E-05	1.23308E-05	5.88013E-07	5.26837E-07	2094.208087	681.6169147	0.270335795	90018.70304
Orange (SC)	2024	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	3.37254E-07	4.08078E-07	4.85646E-07	2.62056E-06	4.85762E-06	0.000655146	1.50811E-07	1.38746E-07	5.96075E-09	5.34146E-09	21.2326213	109.4079585	0.001254974	912.6757724
Orange (SC)	2024	Agricultural - Construction Equipment	Aggregate	100	Diesel	7.14283E-06	8.64283E-06	1.02857E-05	6.16665E-05	6.6416E-05	0.010225984	4.31638E-06	3.97107E-06	9.29832E-08	8.33732E-08	331.4136765	87.9537318	0.273048465	14215.04762
Orange (SC)	2024	Agricultural - Construction Equipment	Aggregate	175	Diesel	5.85337E-05	7.08257E-05	8.42885E-05	0.000603017	0.00067219	0.105178138	2.84544E-05	2.61781E-05	9.56816E-07	8.57526E-07	3408.715924	185.0967885	2.222029746	162540.9447
Orange (SC)	2024	Agricultural - Construction Equipment	Aggregate	300	Diesel	8.22269E-06	9.94945E-06	1.18407E-05	4.10465E-05	8.88875E-05	0.014022715	4.03977E-06	3.71659E-06	1.27553E-07	1.14328E-07	454.4618531	113.0773687	0.119515166	21670.52348
Orange (SC)	2024	Agricultural - Construction Equipment	Aggregate	50	Diesel	2.13076E-06	2.57822E-06	3.0683E-06	9.85225E-06	7.80763E-06	0.001130833	5.10727E-07	4.69869E-07	1.02422E-08	9.21977E-09	36.6491299	40.84859055	0.036745879	1571.960285
Orange (SC)	2024	Agricultural - Construction Equipment	Aggregate	600	Diesel	4.50177E-06	5.44714E-06	6.48254E-06	3.73187E-05	4.65872E-05	0.007225616	2.16177E-06	1.98883E-06	6.57177E-08	5.8911E-08	234.1748283	46.23215369	0.037102121	11166.37413
Orange (SC)	2024	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.7151E-07	2.07527E-07	2.46975E-07	1.23328E-06	1.55883E-06	0.000198653	8.01867E-08	7.37718E-08	1.80534E-09	1.61963E-09	6.438141159	134.7497931	0.005123125	276.1457673
Orange (SC)	2024	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	1.23246E-06	1.49128E-06	1.77475E-06	1.09702E-05	1.22618E-05	0.002575795	5.39311E-07	4.96166E-07	2.34383E-08	2.10007E-08	83.47889513	3.060439095	0.006784914	3588.307188
Orange (SC)	2024	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	8.15901E-06	9.8724E-06	1.1749E-05	6.74681E-05	8.824E-05	0.013063128	4.164E-06	3.83088E-06	1.1881E-07	1.06505E-07	423.3626337	92.464307	0.031945898	18198.07461
Orange (SC)	2024	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	5.70097E-06	6.89817E-06	8.2094E-06	4.62863E-05	7.77452E-05	0.008733272	2.72594E-06	2.50786E-06	7.94222E-08	7.12031E-08	283.036426	46.23215369	0.016366885	12166.20825
Orange (SC)	2024	Agricultural - Forklifts	Aggregate	100	Diesel	2.02643E-05	2.45197E-05	2.91805E-05	0.000158642	0.000164925	0.025631557	1.17332E-05	1.07946E-05	2.32993E-07	2.08976E-07	830.6925489	393.9244085	0.541109673	35630.19576
Orange (SC)	2024	Agricultural - Forklifts	Aggregate	175	Diesel	2.06585E-06	2.49967E-06	2.97482E-06	1.96274E-05	2.07903E-05	0.003322399	9.51714E-07	8.75577E-07	3.02177E-08	2.70878E-08	107.6755692	41.29586018	0.053568121	5134.393409
Orange (SC)	2024	Agricultural - Forklifts	Aggregate	50	Diesel	3.03717E-05	3.67498E-05	4.37353E-05	0.000144689	0.000118325	0.016779366	7.62255E-06	7.01275E-06	1.52012E-07	1.36803E-07	543.8021136	535.3934146	0.753215203	23324.84576
Orange (SC)	2024	Agricultural - Forklifts	Aggregate	75	Diesel	7.69391E-05	9.30963E-05	0.000110792	0.000557568	0.000701979	0.08998234	3.61165E-05	3.32271E-05	8.17772E-07	7.33633E-07	2916.235633	1032.943704	2.249719532	125083.6387
Orange (SC)	2024	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.8805E-07	3.4854E-07	4.14792E-07	2.85884E-06	2.74541E-06	0.000464389	1.35955E-07	1.25078E-07	4.22371E-09	3.7862E-09	15.05038627	3.060439061	0.006784914	683.4870898
Orange (SC)	2024	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	7.58844E-06	9.18201E-06	1.09273E-05	4.12154E-05	7.98178E-05	0.014923142	3.57964E-06	3.29327E-06	1.35779E-07	1.2167E-07	483.6437886	150.2565276	0.129092312	21963.84051
Orange (SC)	2024	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	2.48316E-08	3.00462E-08	3.57575E-08	1.78557E-07	2.2569E-07	2.87614E-05	1.16096E-08	1.06808E-08	2.6138E-10	2.34494E-10	0.932127706	134.7498013	0.000635774	38.07711279
Orange (SC)	2024	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000125459	0.000151805	0.000180661	0.000871889	0.00106557	0.132141461	8.20344E-05	7.54716E-05	1.20055E-06	1.07736E-06	4282.569681	1201.747172	2.186739218	165585.8735
Orange (SC)	2024	Agricultural - Nut Harvester	Aggregate	175	Diesel	2.33386E-05	2.82397E-05	3.36076E-05	0.000212566	0.000238424	0.035211577	1.12934E-05	1.039E-05	3.20211E-07	2.87083E-07	1141.171213	551.2038199	0.47131734	49052.79127
Orange (SC)	2024	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.84873E-05	4.65696E-05	5.54217E-05	0.000177958	0.000150185	0.020425902	7.80482E-06	7.18044E-06	1.85003E-07	1.66534E-07	661.9826028	134.7498017	1.631777918	25595.60616
Orange (SC)	2024	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.50194E-05	1.81735E-05	2.1628E-05	7.99029E-05	0.000156557	0.028127741	7.15688E-06	6.58433E-06	2.559E-07	2.29328E-07	911.5913212	155.6400998	0.18927128	39184.39041
Orange (SC)	2024	Agricultural - Nut Harvester	Aggregate	50	Diesel	1.12149E-05	1.357E-05	1.61494E-05	5.05274E-05	3.94899E-05	0.005337408	2.86945E-06	2.63989E-06	4.83076E-08	4.35163E-08	172.9799522	225.6363002	0.198057337	6688.282617
Orange (SC)	2024	Agricultural - Nut Harvester	Aggregate	75	Diesel	2.2807E-05	2.75965E-05	3.28421E-05	0.000164433	0.000207558	0.026502776	1.06778E-05	9.82353E-06	2.40857E-07	2.16079E-07	858.9278815	289.9846662	0.548711691	33210.50958
Orange (SC)	2024	Agricultural - Other Harvesters	Aggregate	100	Diesel	2.48345E-05	3.00497E-05	3.57616E-05	0.000190616	0.000200151	0.030560086	1.44819E-05	1.33233E-05	2.77773E-07	2.49159E-07	990.4211349	595.4596971	0.495189851	38294.70601
Orange (SC)	2024	Agricultural - Other Harvesters	Aggregate	175	Diesel	2.27087E-05	2.74775E-05	3.27005E-05	0.000210135	0.000231195	0.035095511	1.08133E-05	9.94828E-06	3.19172E-07	2.86136E-07	1137.409641	336.560595	0.464125057	48891.10153
Orange (SC)	2024	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.59723E-07	1.93265E-07	2.30002E-07	8.67513E-07	1.68003E-06	0.000314106	7.53451E-08	6.93175E-08	2.85791E-09	2.56093E-09	10.17986279	134.7498013	0.001907323	437.5773576
Orange (SC)	2024	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.70177E-07	3.26914E-07	3.89055E-07	2.17082E-06	2.92758E-06	0.000579848	1.20272E-07	1.1065E-07	5.27651E-09	4.72755E-09	18.79228094	134.7498009	0.001907323	807.7787267
Orange (SC)	2024	Agricultural - Other Harvesters	Aggregate	75	Diesel	7.69048E-08	9.30549E-08	1.10743E-07	5.53001E-07	6.98976E-07	8.90757E-05	3.59556E-08	3.30792E-08	8.0951E-10	7.26241E-10	2.886851705	134.7498009	0.001907323	111.6203332
Orange (SC)	2024	Agricultural - Other Harvesters	Aggregate	750	Diesel	1.12342E-07	1.35933E-07	1.61772E-07	8.99025E-07	1.26067E-06	0.000240139	5.26519E-08	4.84398E-08	2.18521E-09	1.95787E-09	7.782662191	134.7498013	0.000635774	334.5346373
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	4.16023E-06	5.03387E-06	5.99073E-06	3.72124E-05	4.26435E-05	0.006105606	2.04825E-06	1.88439E-06	5.55204E-08	4.97795E-08	197.8764428	265.0480646	0.077053898	8986.214175
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.899E-05	2.29778E-05	2.73455E-05	9.17609E-05	0.000190067	0.027759914	9.44697E-06	8.69121E-06	2.52428E-07	2.26329E-07	899.6704422	46.23215369	0.189106292	40856.9671
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.65349E-06	4.42072E-06	5.26103E-06	1.71979E-05	1.38784E-05	0.001994492	8.94375E-07	8.22825E-07	1.80678E-08	1.62612E-08	64.63943429	63.98568673	0.087332247	2640.4998
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.89755E-05	2.29603E-05	2.73247E-05	0.000153359	0.000203905	0.038825932	8.57012E-06	7.88451E-06	3.53282E-07	3.16551E-07	1258.308777	154.4158384	0.189271281	57143.90297
Orange (SC)	2024	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000514075	0.000622031	0.000740268	0.003338921	0.004464114	0.50305328	0.000281508	0.000258987	4.5693E-06	4.10143E-06	16303.44261	716.0991144	14.70337541	665990.3182
Orange (SC)	2024	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	3.40862E-05	4.12443E-05	4.90841E-05	0.000264007	0.000273322	0.042525442	1.9647E-05	1.80752E-05	3.86545E-07	3.46713E-07	1378.206114	394.414278	0.634599759	49261.86191
Orange (SC)	2024	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	7.50823E-07	9.08496E-07	1.08119E-06	4.0272E-06	7.45411E-06	0.001445833	3.48541E-07	3.20658E-07	1.31545E-08	1.1788E-08	46.85797467	137.8102404	0.009328012	1861.976663
Orange (SC)	2024	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.94075E-09	2.34831E-09	2.79468E-09	1.46766E-08	1.77974E-08	2.29634E-06	9.49427E-10	8.73473E-10	2.08702E-11	1.87223E-11	0.074422177	0.447269501	4.80121E-05	2.660106448
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	4.11881E-05	4.98376E-05	5.93109E-05	0.000647975	0.000530516	0.100617923	2.6424E-05	2.43101E-05	9.29027E-07	8.2123E-07	3264.437696	1317.554942	3.938292992	117879.4725
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	9.78518E-05	0.000118401	0.000140907	0.001654313	0.001361008	0.278503561	7.35276E-05	6.76454E-05	2.57197E-06	2.27311E-06	9035.741312	2457.027475	7.427919694	326271.6838
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.89229E-05	4.70967E-05	5.6049E-05	0.000288303	0.00064854	0.1498165	1.85417E-05	1.70583E-05	1.38396E-06	1.22278E-06	4860.63134	783.8618007	2.343035071	175518.3317
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.84353E-05	3.44068E-05	4.09469E-05	0.000119589	9.95532E-05	0.00978394	1.08177E-05	9.95225E-06	8.96043E-08	7.98552E-08	317.4291431	238.9761749	0.74777715	10309.22053
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.49696E-06	1.81133E-06	2.15563E-06	1.51294E-05	1.81234E-05	0.002271719	1.2752E-06	1.17319E-06	2.09583E-08	1.85415E-08	73.70340774	44.43748952	0.14955543	2660.431495
Orange (SC)	2024	Airport Ground Support - A/C Tug Narrow Body	Aggregate	750	Diesel	1.22407E-05	1.48112E-05	1.76266E-05	6.03635E-05	0.000165636	0.00996499	7.72112E-06	7.10343E-06	9.1764E-08	8.13329E-08	323.3031108	16.67791065	0.04985181

Orange (SC)	2024 Airport Ground Support - Misc - Lift	Aggregate	100	Nat Gas	0	0	7.17561E-07	0.000409453	4.20343E-05	0.011564243	0	0	0	0	631.45	98.55	0.32	9855
Orange (SC)	2024 Airport Ground Support - Misc - Maint. Truck	Aggregate	175	Gasoline	0.000164681	0.000151473	0.000181221	0.014388849	0.001330817	0.414279591	2.96994E-05	2.24396E-05	4.11543E-06	5.79626E-06	16545.45	2795.9	6.25	363467
Orange (SC)	2024 Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000136477	0.000125531	0.000150184	0.009942184	0.000283931	0.09973199	6.87543E-06	5.19477E-06	1.21256E-06	1.5357E-06	4383.65	1689.95	9.2	84497.5
Orange (SC)	2024 Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.16586E-05	0.001527848	0.000462637	0.090180013	0	0	0	0	4810.7	1773.9	1.73	88695
Orange (SC)	2024 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.84122E-05	4.45296E-05	5.32747E-05	0.004368763	0.000458504	0.133773645	9.59014E-06	7.24589E-06	1.18393E-06	1.86687E-06	5329	792.05	4.23	99085.455
Orange (SC)	2024 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	9.08525E-09	8.97548E-06	1.01031E-06	0.000365566	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2024 Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000841049	0.000773597	0.000925524	0.049535886	0.005077917	1.201912981	8.86657E-05	6.69919E-05	1.22864E-05	1.70013E-05	48530.4	15096.4	17.93	2717352
Orange (SC)	2024 Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.03824E-05	0.005899246	0.000514553	0.167811926	0	0	0	0	9183.4	2284.9	1.75	411282
Orange (SC)	2024 Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	6.87632E-06	6.32484E-06	7.56697E-06	0.000377018	3.38452E-05	0.009418897	6.56708E-07	4.96179E-07	7.77634E-08	1.32983E-07	379.6	149.65	0.41	7976.345
Orange (SC)	2024 Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.97694E-08	2.39069E-05	7.00501E-06	0.001996533	0	0	0	0	102.2	51.1	0.15	2299.5
Orange (SC)	2024 Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.40668E-05	1.29386E-05	1.54796E-05	0.001135788	0.000118682	0.033411863	2.39527E-06	1.80976E-06	3.31912E-07	4.66719E-07	1332.25	481.8	1.57	72270
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	100	Diesel	3.18226E-05	3.85053E-05	4.58245E-05	0.000741609	0.000472691	0.116698252	1.85776E-05	1.70914E-05	1.07798E-06	9.52475E-07	3786.146278	2612.501403	5.362461282	218241.3503
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	175	Diesel	8.34176E-05	0.000100935	0.000120121	0.00207147	0.000928085	0.356652889	3.65554E-05	3.3631E-05	3.29493E-06	2.91095E-06	11571.2102	4333.957928	8.971810222	666993.7411
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	300	Diesel	8.33225E-05	0.00010082	0.000119984	0.00074968	0.000903484	0.350934817	3.53096E-05	3.24848E-05	3.24207E-06	2.86428E-06	11385.69366	2912.229002	6.08433107	656303.4949
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	50	Diesel	0.000147618	0.000178617	0.000212569	0.001379203	0.001215785	0.18211642	5.7866E-05	5.32367E-05	1.67933E-06	1.48641E-06	5908.566683	8916.867423	18.56236598	306110.1351
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	600	Diesel	4.92901E-05	5.9641E-05	7.09777E-05	0.000516406	0.000515512	0.218902774	2.08036E-05	1.91393E-05	2.02239E-06	1.78666E-06	7102.05941	1139.996444	2.371857875	409381.7093
Orange (SC)	2024 Airport Ground Support - Other	Aggregate	75	Diesel	3.61278E-05	4.37146E-05	5.2024E-05	0.000560466	0.000480199	0.083348266	2.56922E-05	2.36368E-05	7.69512E-07	6.80277E-07	2704.142713	2427.392389	5.156212771	155877.1491
Orange (SC)	2024 Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	8.44101E-07	1.02136E-06	1.2155E-06	6.61822E-06	1.19642E-05	0.000994616	7.02045E-07	6.45881E-07	9.1704E-09	8.11793E-09	32.26923319	14.5551911	0.111927766	1579.922453
Orange (SC)	2024 Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024 Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.85616E-07	2.24596E-07	2.67288E-07	1.2655E-06	4.23378E-06	0.00071942	9.06407E-08	8.33894E-08	6.64582E-09	5.87181E-09	23.3407765	4.229713654	0.111927766	1152.596971
Orange (SC)	2024 Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.1047E-06	1.33669E-06	1.59077E-06	1.01149E-05	1.24886E-05	0.001833278	6.37762E-07	5.86741E-07	1.69164E-08	1.4963E-08	59.4786967	60.83323462	1.063313774	2630.01107
Orange (SC)	2024 Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	5.94967E-08	7.1991E-08	8.56753E-08	1.42344E-06	3.95282E-07	0.000811822	1.32566E-08	1.21961E-08	7.50391E-09	6.62598E-09	26.3386744	4.229713654	0.111927766	1300.636949
Orange (SC)	2024 Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.13479E-07	2.5831E-07	3.0741E-07	1.13885E-05	5.96535E-06	0.001958933	3.95922E-08	3.64248E-08	1.81049E-08	1.59886E-08	63.55543547	57.10113433	1.511024836	3138.447532
Orange (SC)	2024 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000346	0.0000418	0.0000498	0.000165137	0.000897965	0.127294585	0.0000395	0.0000377	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2024 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	0.0000509	0.0000617	0.0000734	0.000386302	0.001131441	0.161520299	5.11E-05	0.0000489	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2024 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000266	0.0000322	0.0000383	0.000137737	0.000647931	0.087797776	0.0000229	0.0000219	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2024 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000286181	0.00034641	0.000412084	0.001173966	0.001753761	0.163841657	0.000136	0.0001301	0	0	5315.08071	11062.28165	6.703055	92409.87846
Orange (SC)	2024 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.001880503	0.002275401	0.002707614	0.007294933	0.011252966	1.199324645	0.00077339	0.000739407	0	0	38906.512	42036.67879	25.471615	669971.6937
Orange (SC)	2024 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000991027	0.001199187	0.001427052	0.003982697	0.012151805	1.404809623	0.000719443	0.000687655	0	0	45572.515	28761.93634	17.42794605	805229.3185
Orange (SC)	2024 Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000138684	0.000167808	0.000199705	0.000832379	0.002975344	0.43995744	0.00012533	0.000119815	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2024 Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000319305	0.000386383	0.000459735	0.002217961	0.008090384	1.104411255	0.000315911	0.000301953	0	0	35827.48786	14573.56994	20.409706	692498.7373
Orange (SC)	2024 Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	0.00003326	0.00004024	0.00004792	0.0001214	0.000212129	0.022707277	0.00001524	0.00001455	0	0	736.6320038	3135.15036	5.102426052	11761.97356
Orange (SC)	2024 Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000823714	0.000996756	0.001186216	0.003694579	0.012711489	1.198657912	0.000523807	0.000500765	0	0	38884.88221	8115.264157	15.30727914	751594.1609
Orange (SC)	2024 Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000326184	0.000394484	0.000469685	0.001394715	0.002991381	0.380124023	0.000167712	0.000160438	0	0	12331.35748	15538.90143	25.512132	205775.4362
Orange (SC)	2024 Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000299182	0.000361989	0.000430778	0.001791874	0.00829259	0.994453512	0.000251742	0.000240612	0	0	32260.41943	4151.633637	5.102426052	624624.6275
Orange (SC)	2024 Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000663636	0.000802937	0.000955636	0.002609031	0.006243876	0.688378471	0.00045242	0.000432558	0	0	22331.23828	18054.5338	28.06334527	403681.7764
Orange (SC)	2024 Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	0.0000668	0.0000808	0.0000962	0.0000645	0.00153879	0.248144597	0.0000664	0.0000635	0	0	8049.897461	3548.810303	2	155594.0469
Orange (SC)	2024 Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000461	0.00000558	0.00000664	0.0000434	0.0000952	0.012758453	0.00000484	0.00000463	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2024 Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.000033	0.00004	0.0000476	0.000119763	0.000167749	0.017992692	0.0000208	0.0000199	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2024 Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.23E-05	3.91E-05	4.65E-05	0.000324624	0.000644372	0.082925439	3.59E-05	3.43E-05	0	0	2690.130137	4401.614761	6.136045	46771.55469
Orange (SC)	2024 Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000207049	0.000250529	0.000298151	0.00158964	0.004821795	0.796780953	0.000192178	0.000183722	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000840467	0.001017012	0.001210276	0.003312112	0.010954441	0.921463123	0.0040379	0.000385867	0	0	29892.58711	9472.179793	9.500724026	578418.6942
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.002967957	0.003591166	0.004273842	0.012671268	0.051878808	4.705600972	0.001534952	0.001467426	0	0	152651.3442	28416.54264	28.50217603	2953901.628
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000102579	0.000124121	0.000147714	0.000467266	0.00291184	0.413541555	0.0000417	0.0000399	0	0	13415.43262	1578.696655	1.583454013	260011.3422
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000127307	0.000154053	0.000183335	0.000534527	0.001523705	0.08961129	6.54396E-05	6.24781E-05	0	0	2907.021648	1599.417288	1.340610982	55275.85908
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.00076232	0.000922456	0.001097823	0.003479373	0.020129343	2.027567316	0.000418232	0.00039993	0	0	65774.99183	15994.17666	13.406113	1271345.01
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.00492012	0.00595333	0.00708496	0.02110873	0.094793133	8.659739079	0.002611323	0.002496415	0	0	280924.9632	46383.11278	38.877728	5436395.828
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.008936039	0.010812648	0.012867848	0.035234332	0.104999472	6.05758037	0.004723799	0.004515945	0	0	196510.0298	20792.43221	17.42794902	3800216.59
Orange (SC)	2024 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008489006	0.010271697	0.012224168	0.03426518	0.104549919	8.269492877	0.004368007	0.004175858	0	0	268265.2347	15994.17897	13.406115	5288980.011
Orange (SC)	2024 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2024 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001502301	0.001817882	0.002163371	0.006566214	0.039336919	4.864925641	0.00069147	0.000661053	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2024 Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001062	0.0001286	0.000152958	0.000428679	0.001095445	0.134737155	7.568E-05	7.236E-05	0	0	4370.920506	3610.067691	12.75606513	77399.85571
Orange (SC)	2024 Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000612239	0.000740836	0.000881602	0.002735592	0.015751269	1.679812433	0.000329409	0.000315197	0	0	54493.70351	15571.51684	22.96091823	1054245.272
Orange (SC)	2024 Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005087886	0.006156429	0.007326557	0.020750242	0.102169534	9.816517579	0.002721525	0.002601813	0	0	318451.2671	51782.3099	81.63881313	6160637.837
Orange (SC)	2024 Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002906284	0.003516647	0.004185037	0.011107886	0.036777194	2.91600722	0.001449041	0.001385242	0	0	94596.29355	10624.30242	20.40970578	1831067.752
Orange (SC)	2024 Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001661535	0.002010457	0.00239261	0.005129978	0.026228481	2.936270505	0.000670215	0.000640725	0	0	95253.64356	6490.26294	10.2048521	1895210.049
Orange (SC)	2024 Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002405306	0.00291042	0.003463641	0.009874219	0.06130673	5.606853962	0.001422888	0.001360281	0	0	181888.2969	4744.229492	2	3515664
Orange (SC)	2024 Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000207546	0.000251131	0.000298866	0.000841824	0.005252539	0.542378247	0.000115475	0.000110394	0	0	17594.93945	8022.818359	3	340087.2813
Orange (SC)	2024 Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	3.29E-05	0.0000398	0.0000474	0.000179626	0.001011338	0.090107121	0.0000214	0.0000205	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2024 Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.000094	0.000113683	0.000135292	0.0005422	0.00248719	0.228271365	0.0000456	0.0000436	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2024 Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000284252	0.000343964	0.000409455	0.001204939	0.003975019	0.320906194	0.000142426	0.000136184	0	0	10410.30905	3920.689629	6.136045982	195838.4537
Orange (SC)	2024 Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.000896409	0.001084655	0.001290828	0.004400878	0.024528042	2.485922833	0.000496474	0.000474666	0	0	80644.20772	11762.06797	18.408137	1560179.5
Orange (SC)	2024 Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.00028947	0.000350259	0.000416837	0.001160126	0.007186632	0.733968862	0.000154206	0.000147421	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	0.000121191	0.000146641	0.000174514	0.002907232	0.001731584	0.462618759	6.41973E-05	5.90615E-05	4.2735E-06	3.77583E-06	15009.15616	6976.491392	17.91072886	584623.9649
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	0.000131968	0.000159681	0.000190034	0.003753895	0.001319638	0.674720018	6.03483E-05	5.55204E-05	6.23416E-06	5.50697E-06	21890.54793	5603.021692	17.3061473	835635.3139
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.00017915	0.000216772	0.000257976	0.001981252	0.002093862	0.983057679	6.7948E-05	6.25122E-05	9.08348E-06	8.02358E-06	31894.22374	5885.415681	17.83515617	1234061.91
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	7.82212E-05	9.46477E-05	0.000112639	0.000673318	0.000646584	0.09214276	3.40637E-05	3.13386E-05	8.49559E-07	7.52057E-07	2989.470367	2614.484433	7.179406083	101423.6812
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.000237387	0.000287238	0.000341837	0.002847345	0.002228921	1.514364272	8.02674E-05	7.3846E-05	1.39939E-05	1.236E-05	49131.88103	4775.354758	14.13209408	1910499.698
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	4.01722E-05	4.86084E-05	5.7848E-05	0.000720299	0.000722148	0.11331205	3.49533E-05	3.2157E-05	1.04642E-06	9.24838E-07	3676.28468	1982.58594	4.005352868	144010.2786
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000119378	0.000144448	0.000171905	0.001778611	0.00103131	0.979966704	3.97147E-05	3.65375E-05	9.0567E-06	7.99836E-06	31793.94048	1902.84805	3.174053216	1212536.392
Orange (SC)	2024 Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.000133599	0.000161655	0.000192383	0.00094607	0.003680969	0.503289273	8.50191E-05	7.82176E-05	4.64915E-06	4.10778E-06	16328.66618	338.2899846	0.453436174	629375.5799
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	100	Diesel	0.000520957	0.000630358	0.000750178	0.005080405	0.005650645	0.694345397	0.000354644	0.000326272	6.40394E-06	5.66715E-06	22527.27171	17098.48591	37.39574684	1516411.775
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	175	Diesel	0.001203128	0.001455785	0.001732505	0.012566663	0.014013938	1.953799683	0.00075751	0.000696909	1.80278E-05	1.59467E-05	63388.87898	28778.0947	61.78840404	4249735.597
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	25	Diesel	3.09787E-06	3.74843E-06	4.46094E-06	1.73653E-05	1.47604E-05	0.001780167	1.15926E-06	1.06652E-06	1.63656E-08	1.45295E-08	57.75554616	139.5142938	0.284739189	3487.857346
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	300	Diesel	0.001561787	0.001889763	0.002248974	0.010830058	0.020255649	3.392071321	0.000844797	0.000777213	3.13145E-05	2.76856E-05	110052.0183	33651.22474	69.76110133	7389809.041
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	50	Diesel	8.15112E-05	9.86285E-05	0.000117376	0.000366866	0.000291205	0.028841615	2.935E-05	2.7002E-05	2.6421E-07	2.35401E-07	935.7344373	1357.103667	3.037218017	55943.58309
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	600	Diesel	0.001997315	0.002416752	0.002876134	0.019313363	0.024489774	6.063685014	0.000985452	0.000906615	5.60019E-05	4.9491E-05	196729.5823	36026.07298	71.08988421	13210933.41
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	75	Diesel	2.29154E-05	2.77277E-05	3.29982E-05	9.54743E-05	0.000207686	0.01106786	1.95562E-05	1.79917E-05	1.0164E-07	9.03344E-08	359.084513	356.8815561	0.94913063	23949.65804
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	750	Diesel	6.32717E-05	7.65587E-05	9.11112E-05	0.000571009	0.000775128	0.104362995	3.83789E-05	3.53086E-05	9.62989E-07	8.51797E-07	3385.94245	356.5488511	0.854217567	227466.2451
Orange (SC)	2024 Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000297703	0.000360221	0.000428692	0.00307305	0.004294442	0.331236005	0.000190416	0.000175182	3.05351E-06	2.7035E-06	10746.58739	769.657551	1.518609009	721615.6154
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.003209061	0.003882964	0.004621048	0.029552745	0.03341896	4.104441293	0.002543971	0.002340453	3.78513E-05	3.34999E-05	133164.0775	68473.56924	142.6147925	5994705.001
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.002305572	0.002789742	0.003320023	0.027557605	0.026030381	4.50366241	0.001458447	0.001341771	4.15694E-05	3.67583E-05	146116.367	44105.19931	95.10460762	6591669.768
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.002260818	0.002735589	0.003255577	0.016189246	0.030157033	4.691543732	0.001249322	0.001149376	4.33078E-05	3.82917E-05	152211.9696	33499.95086	72.86579769	6868274.624
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000234809	0.000284119	0.000338125	0.001081598	0.000804969	0.093288309	7.53882E-05	6.93571E-05	8.55452E-07	7.61407E-07	3026.636462	2940.641906	8.423791641	123454.2386
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.005138478	0.006217559	0.007399409	0.045801272	0.060585274	16.53030194	0.002378958	0.002188641	0.000152677	0.000134918	536307.4415	62804.00455	129.8106292	24178770.52
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	6.99183E-05	8.46012E-05	0.000100682	0.000274257	0.000669993	0.02289911	4.91227E-05	4.51929E-05	2.09616E-07	1.86899E-07	742.9364151	470.2900999	2.10594791	33542.93775
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	0.000115612	0.00013989	0.000166481	0.000853346	0.001736615	0.163586288	6.30701E-05	5.80245E-05	1.50897E-06	1.33517E-06	5307.37696	385.8386755	0.92661708	240805.0179
Orange (SC)	2024 Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000427621	0.000517421	0.000615774	0.002705517	0.009235097	0.957482512	0.000230459	0.000212022	8.83957E-06	7.81484E-06	31064.46562	1431.244944	2.527137492	1391098.709
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	100	Diesel	0.00155892	0.001886293	0.002244845	0.031408304	0.019730194	4.775790116	0.000854357	0.000786009	4.41078E-05	3.89794E-05	154945.2507	96755.81265	145.7697851	7881951.686
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	175	Diesel	0.002753767	0.003332058	0.003965424	0.059794608	0.025938393	10.23709578	0.001284818	0.001182032	9.45644E-05	8.35538E-05	332131.2985	115057.7624	190.1675309	16810594.79
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	25	Diesel	3.98852E-06	4.82611E-06	5.74347E-06	1.35526E-05	9.20552E-06	0.000713118	1.28297E-06	1.18034E-06	6.47347E-09	5.82037E-09	23.13631749	42.11289775	0.168812722	1052.822444
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	300	Diesel	0.002882301	0.003487584	0.004150514	0.0273923	0.028089286	13.04318713	0.000917915	0.000844482	0.000120504	0.000106457	423171.8421	97885.46401	163.8327463	21400219.57
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	50	Diesel	0.002183973	0.002642607	0.003144921	0.026718825	0.022291586	3.73927827	0.000758635	0.000697944	3.4506E-05	3.05195E-05	121316.7654	154175.8118	206.0359267	5520194.689
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	600	Diesel	0.004393502	0.005316138	0.006326643	0.045980322	0.036244374	23.15594758	0.001245896	0.001146224	0.000213956	0.000188996	751269.2175	112714.727	171.8513506	38096818.04
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	75	Diesel	7.75367E-05	9.38195E-05	0.000111653	0.000545295	0.000849424	0.070154403	7.43062E-05	6.83617E-05	6.46286E-07	5.72591E-07	2276.082337	1577.704977	2.701003546	115271.2976
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	750	Diesel	8.80404E-05	0.000106529	0.000126778	0.000854203	0.001115745	0.289321021	4.42857E-05	4.07428E-05	2.67228E-06	2.36114E-06	9386.701883	769.867166	1.350501773	472571.904
Orange (SC)	2024 Construction and Mining - Excavators	Aggregate	9999	Diesel	8.05215E-05	9.7431E-05	0.000115951	0.001199175	0.002850731	0.645032085	2.57446E-05	2.3685E-05	5.96123E-06	5.26467E-06	20927.35561	879.143725	1.266095412	1047979.592
Orange (SC)	2024 Construction and Mining - Graders	Aggregate	100	Diesel	0.000660373	0.000799051	0.000950937	0.004841797	0.006316409	0.603684702	0.000479058	0.000440733	5.56155E-06	4.92719E-06	19585.88532	10318.98884	25.95497873	934093.1966
Orange (SC)	2024 Construction and Mining - Graders	Aggregate	175	Diesel	0.003484

Orange (SC)	2024 Construction and Mining - Misc - Trenchers	Aggregate	2	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0.022941574	0
Orange (SC)	2024 Construction and Mining - Misc - Trenchers	Aggregate	25	Gasoline	0.00227638	0.002299142	0.002505016	0.075034124	0.001467236	2.61618E-06	0.000847646	0.000640444	1.19314E-06	1.64698E-06	4694.147334	0	0	14.4143417	0
Orange (SC)	2024 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000117826	0.000141719	0.000169377	0.000483709	0.000895556	2.06713E-06	3.01165E-05	2.27547E-05	1.22872E-08	1.05843E-08	42.11098225	0	0	4.223077398	0
Orange (SC)	2024 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0.022941574	0
Orange (SC)	2024 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.002046743	0.001882594	0.002252315	0.146218641	0.002862265	0.976133633	6.72938E-05	5.08442E-05	1.1868E-05	1.60896E-05	45927.95	20841.5	51.81	625245	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000513998	0.000621938	0.000740157	0.008074988	0.006360548	1.185714432	0.000387915	0.000356882	1.09471E-05	9.67764E-06	38469.19892	21689.65905	30.56482938	1703519.057	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000470515	0.000569323	0.000677542	0.009914388	0.004635626	1.678564228	0.000220757	0.000203097	1.5505E-05	1.37002E-05	54459.16777	15272.00649	21.6535576	2419716.536	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	4.29068E-06	5.19172E-06	6.17858E-06	1.42665E-05	9.8236E-06	0.00075068	1.35055E-06	1.24251E-06	6.81168E-09	6.12695E-09	24.3549735	38.92494232	0.166565828	973.123558	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000411492	0.000497905	0.000592549	0.003208745	0.004129338	1.46381893	0.000153293	0.00014103	1.35214E-05	1.19475E-05	47491.99309	9824.655442	14.90764158	2108855.021	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.001296103	0.001568285	0.001866389	0.012534594	0.010170952	1.545704571	0.000460111	0.000423302	1.42519E-05	1.26158E-05	50148.6825	53246.49904	78.8689194	2007025.412	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000974403	0.001179027	0.00140314	0.00951705	0.007828511	4.719779362	0.000267405	0.000246012	4.36075E-05	3.85222E-05	153128.0435	18988.94924	26.90038117	6819167.331	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000411522	0.000497942	0.000592592	0.005618988	0.004581871	0.791241796	0.000244705	0.000225129	7.30308E-06	6.45801E-06	25670.96868	16190.82976	26.90038117	1140006.18	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	7.79854E-05	9.43623E-05	0.000112299	0.000413614	0.000652403	0.199618425	3.3566E-05	3.08807E-05	1.84323E-06	1.62926E-06	6476.399949	455.0325757	0.666263311	289524.9017	
Orange (SC)	2024 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	0.000112371	0.000135969	0.000161814	0.000644625	0.001804455	0.262419164	4.89111E-05	4.49982E-05	2.42282E-06	2.14183E-06	8513.900762	230.7275956	0.416414569	378148.5162	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	5.61079E-05	6.78906E-05	8.07954E-05	0.000745031	0.00058109	0.098926258	3.80975E-05	3.50497E-05	9.12939E-07	8.07423E-07	3209.553505	1842.646595	1.402799114	162065.433	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.001276207	0.001544211	0.001837739	0.022481355	0.010375877	3.545173909	0.000492955	0.000453518	3.27386E-05	2.89352E-05	115019.2632	36963.52347	25.74548962	5835264.9	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	1.96793E-05	2.38119E-05	2.83381E-05	8.34803E-05	5.51158E-05	0.005678502	6.18332E-06	5.68865E-06	5.19102E-08	4.63472E-08	184.2327547	335.7278762	0.247552785	8393.196906	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.002310361	0.002795537	0.00332692	0.017561282	0.018863997	7.213802554	0.000757386	0.000696795	6.66259E-05	5.88781E-05	234043.8793	56505.16134	43.48677253	11891188.15	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	0.000120944	0.000146342	0.000174159	0.001299606	0.000979264	0.14416429	4.36023E-05	4.01142E-05	1.32924E-06	1.17665E-06	4677.251624	7404.429137	4.455950127	214783.5528	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.008893247	0.010760829	0.012806275	0.070096619	0.072497579	30.96227674	0.002599028	0.002391106	0.000285995	0.00025271	1004536.97	135096.9167	96.87565646	50866649.65	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	1.82432E-05	2.20743E-05	2.62702E-05	0.000372899	0.000154259	0.05005957	2.40432E-06	2.21198E-06	4.62278E-07	4.08579E-07	1624.127617	1135.419722	0.742658354	81871.06399	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.004259712	0.005154252	0.006133986	0.032962851	0.041196134	10.50377211	0.001575573	0.001449527	9.69848E-05	8.57304E-05	340783.3183	26043.68986	20.87695152	17266317.39	
Orange (SC)	2024 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.005556116	0.006722901	0.008000807	0.042322437	0.113524342	18.60680646	0.002125451	0.001955415	0.000171862	0.000151866	603677.3437	24001.74703	16.58603658	30521290.52	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	100	Diesel	0.00130516	0.001579243	0.00187943	0.016382121	0.014901519	2.429853564	0.000958808	0.000882103	2.2426E-05	1.98321E-05	78833.92288	44564.83477	95.83667806	3665180.388	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	175	Diesel	0.000591579	0.00071581	0.000851873	0.008574191	0.00690811	1.427742065	0.000358426	0.000329752	1.31824E-05	1.1653E-05	46321.51891	14223.68117	33.67012682	2164202.47	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	300	Diesel	0.000612574	0.000741215	0.000882107	0.004715505	0.007908361	1.86526659	0.000306458	0.000281941	1.72269E-05	1.52241E-05	60516.52028	12832.98819	30.7958477	2812133.595	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	50	Diesel	0.000967696	0.001170912	0.001393483	0.007118671	0.006380693	0.837457805	0.000431278	0.000396776	7.71368E-06	6.83522E-06	27170.3962	29686.73242	61.01683959	1131271.006	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	600	Diesel	0.001865055	0.002256716	0.002685679	0.018040913	0.021609604	7.302736767	0.000810261	0.00074544	6.74615E-05	5.9604E-05	236929.2519	28854.02465	62.90565158	11020218.98	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	75	Diesel	0.000254474	0.000307913	0.000366442	0.001568717	0.002820143	0.190671487	0.000212279	0.000195297	1.75522E-06	1.55624E-06	6186.126394	3968.9397	11.661361	292561.9031	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	750	Diesel	0.000366907	0.000443958	0.000528346	0.002833831	0.004610176	1.361335348	0.000160324	0.000147498	1.25752E-05	1.1111E-05	44167.02611	3342.057947	6.816147625	2052804.771	
Orange (SC)	2024 Construction and Mining - Other	Aggregate	9999	Diesel	9.95146E-05	0.000120413	0.000143301	0.000877784	0.002541678	0.462151573	4.67542E-05	4.30139E-05	4.26984E-06	3.77202E-06	14993.99882	760.1648929	1.56032295	698305.4912	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	100	Diesel	0.000337768	0.0004087	0.000486387	0.005648496	0.004468717	0.868617236	0.000238249	0.000219189	8.02066E-06	7.08954E-06	28181.32962	16302.04117	40.60876947	1315500.835	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000415647	0.000502933	0.000598532	0.007716292	0.004745093	1.353620183	0.000225754	0.000207694	1.25024E-05	1.10481E-05	43916.71608	12931.10345	32.7835502	2040366.015	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000215181	0.000260369	0.00030986	0.00201808	0.002959445	1.056486105	9.58147E-05	8.81495E-05	9.76128E-06	8.6229E-06	34276.52815	7231.673935	15.73280927	1593518.498	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	50	Diesel	0.000136532	0.000165204	0.000196607	0.000861584	0.000730654	0.102446497	4.85178E-05	4.46364E-05	9.43073E-07	8.36155E-07	3323.763757	3587.011138	9.884487498	138960.2314	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	600	Diesel	3.12355E-05	3.7795E-05	4.49791E-05	0.000359424	0.000360396	0.194444641	1.01286E-05	9.31831E-06	1.7968E-06	1.58703E-06	6308.542219	778.0567775	1.729785312	293741.1414	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	75	Diesel	0.0001744	0.000211024	0.000251136	0.00091635	0.001583766	0.118630244	0.000152719	0.00014052	1.09156E-06	9.68244E-07	3848.827632	2524.545927	7.083882707	180419.923	
Orange (SC)	2024 Construction and Mining - Pavers	Aggregate	750	Diesel	3.63436E-06	4.39758E-06	5.23348E-06	7.10569E-05	1.96022E-05	0.039625723	6.74763E-07	6.20782E-07	3.6625E-07	3.2342E-07	1285.612929	79.78835583	0.164741458	59841.26687	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000190411	0.000230398	0.000274192	0.003509413	0.002453194	0.53763842	0.000111145	0.000102254	4.96502E-06	4.38813E-06	17443.08642	10665.22105	22.45104612	949292.6178	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.00020131	0.000243585	0.000289887	0.003386708	0.00217412	0.571413751	0.000114328	0.000105182	5.27696E-06	4.6638E-06	18538.88985	6940.609527	14.80288755	1010990.387	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	9.37981E-05	0.000113496	0.000135069	0.000802362	0.001096012	0.387667714	4.29097E-05	3.94769E-05	3.58137E-06	3.16409E-06	12577.45205	2962.988478	6.167869813	683844.5456	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	9.4664E-05	0.000114543	0.000136316	0.000936282	0.000819891	0.127658346	3.59309E-05	3.30565E-05	1.17742E-06	1.04193E-06	4141.73443	5865.246982	12.1712631	203871.2369	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	9.2994E-05	0.000112523	0.000133911	0.000832229	0.001072072	0.42974523	3.5739E-05	3.28799E-05	3.97042E-06	3.50752E-06	13942.61072	1885.80019	3.94743668	760084.2827	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.37149E-05	1.65951E-05	1.97495E-05	0.000114493	0.000147425	0.015719121	1.20488E-05	1.10849E-05	1.4492E-07	1.28297E-07	509.9895727	419.0560321	1.151335698	27889.48739	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.45219E-05	1.75715E-05	2.09115E-05	0.000119939	0.000158017	0.063389698	4.31462E-06	3.96945E-06	5.85634E-07	5.17378E-07	2056.608941	170.851095	0.328953057	111779.9054	
Orange (SC)	2024 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.55044E-06	7.92603E-06	9.43263E-06	7.1033E-05	0.000167692	0.037435616	2.81969E-06	2.59412E-06	3.45914E-07	3.05544E-07	1214.557347	78.41085123	0.164476528	66101.50069	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	100	Diesel	0.001327837	0.001606682	0.001912085	0.021133272	0.016995906	3.264671183	0.000888021	0.000816979	3.01437E-05	2.66458E-05	105918.6611	62519.11508	184.1997326	5455606.931	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000751921	0.000909824	0.001082766	0.018756258	0.008523077	3.398060831	0.000389421	0.000358267	3.13942E-05	2.77345E-05	110246.3414	39538.10781	107.7746365	5685584.069	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	25	Diesel	1.88023E-06	2.27508E-06	2.70754E-06	6.25175E-06	4.30483E-06	0.000328958	5.9183E-07	5.44483E-07	2.98497E-09	2.68491E-09	10.67267947	19.80028886	0.084728488	495.0072215	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000192743	0.000233219	0.00027755	0.00165547	0.002563225	0.574356529	9.84709E-05	9.05932E-05	5.30443E-06	4.68782E-06	18634.36504	4419.424474	13.98020049	959800.213	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001831374	0.002215963	0.002637179	0.015032537	0.01366818	2.102891013	0.000687522	0.00063252	1.93873E-05	1.71635E-05	68225.98301	88485.9069	249.8643106	3162671.677	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	600	Diesel	6.99429E-05	8.46309E-05	0.000100718	0.000847802	0.000865606	0.317392603	2.94304E-05	2.7076E-05	2.93235E-06	2.59052E-06	10297.45347	1501.059899	4.829523807	527963.1523	
Orange (SC)	2024 Construction and Mining - Rollers	Aggregate	75	Diesel	6.43894E-05	7.79111E-05	9.27207E-05	0.00025609	0.00062736	0.021993335	4.46445E-05	4.10729E-05	2.01408E-07	1.79507E-07	713.5495428	518.7675682	2.202940684	36775.0765	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001651113	0.001997846	0.002377602	0.051531484	0.028670856	8.446934117	0.000689276	0.000634134	7.80466E-05	6.89427E-05	274051.4748	136696.4934	474.2262469	13164613.91	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.00055141	0.000667206	0.00079403	0.009839507	0.00558262	1.760070624	0.000371171	0.000341477	1.62562E-05	1.43655E-05	57103.55302	21699.71674	76.46287115	2745955.94	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	6.29813E-07	7.62074E-07	9.06931E-07	7.6936E-06	9.40368E-06	0.001099612	5.3404E-07	4.91317E-07	1.01476E-08	8.97488E-09	35.67569607	61.69495947	0.195557215	1542.373987	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	2.48739E-05	3.00974E-05	3.58184E-05	0.000261199	0.000369009	0.1394449	8.73099E-06	8.03251E-06	1.28849E-06	1.13813E-06	4524.136194	1027.563825	4.008922912	217472.2472	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	7.12745E-05	8.62421E-05	0.000102635	0.000656195	0.000611509	0.101374141	2.42917E-05	2.23483E-05	9.35116E-07	8.27402E-07	3288.97235	2985.464789	10.56008962	142263.0777	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	5.1149E-06	6.18903E-06	7.36546E-06	8.29209E-05	4.57832E-05	0.045934698	7.91863E-07	7.28514E-07	4.24536E-07	3.74913E-07	1490.300698	179.3723822	0.684450253	71724.96038	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	2.20907E-05	2.67298E-05	3.18106E-05	8.31126E-05	0.000125932	0.007441006	1.09214E-05	1.00477E-05	6.81331E-08	6.07325E-08	241.4152306	195.5958715	0.880007469	10901.78496	
Orange (SC)	2024 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.56746E-06	1.89663E-06	2.25714E-06	1.60819E-05	2.20346E-05	0.008641272	1.57441E-07	1.44846E-07	7.98458E-08	7.05289E-08	280.356549	21.59323581	0.097778608	13495.77238	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000272341	0.000329532	0.000392171	0.00216225	0.002749672	0.275148174	0.00020341	0.000187137	2.53571E-06	2.24572E-06	8926.879498	5166.067454	5.884613991	433338.5941	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.00038376	0.00046435	0.000552615	0.002985335	0.004097883	0.418919087	0.00026418	0.000243046	3.8616E-06	3.41916E-06	13591.36841	4666.104173	5.804002841	664543.1265	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000403496	0.00048823	0.000581034	0.003516562	0.005367807	0.491360347	0.000239181	0.000220047	4.53077E-06	4.01042E-06	15941.64533	3442.757699	4.917280184	778402.8202	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	5.63039E-05	6.81278E-05	8.10777E-05	0.000744957	0.000547477	0.089816303	1.73655E-05	1.59763E-05	8.28707E-07	7.33069E-07	2913.991032	3127.125266	3.143834872	128190.3779	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.002943753	0.003561941	0.004239005	0.02835066	0.0349553	4.638976587	0.001556076	0.00143159	4.28013E-05	3.78627E-05	150506.4864	19841.51562	26.60167969	7301410.531	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	0.000139486	0.000168778	0.00020086	0.000983905	0.001298668	0.119190418	9.38976E-05	8.63858E-05	1.09779E-06	9.72816E-07	3867.001854	2629.422558	3.385668324	188806.052	
Orange (SC)	2024 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	6.14856E-05	7.43976E-05	8.85393E-05	0.000358972	0.000944958	0.173899154	2.6757E-05	2.46164E-05	1.60594E-06	1.41934E-06	5641.966549	414.4382882	0.403055753	275948.0828	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.00437859	0.005298093	0.006305169	0.051860138	0.044586405	7.083201969	0.00293231	0.002697725	6.53564E-05	5.78121E-05	229806.6871	144147.5946	152.8346416	12387598.53	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.006577786	0.007959121	0.009472012	0.105568232	0.060970122	16.87088968	0.003264998	0.003003798	0.000155782	0.000137698	547357.4356	195772.1649	203.6674938	29335831.91	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.007682946	0.009296364	0.011063442	0.056309934	0.085964696	25.38270073	0.002850561	0.002622516	0.000234445	0.00020717	823513.7712	209374.7122	191.316371	44107333.56	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.000415167	0.000502353	0.000597841	0.002981445	0.002224766	0.292012638	0.000142529	0.000131127	2.68735E-06	2.38337E-06	9474.028454	10931.20396	12.43514401	453122.0167	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.010601014	0.012827227	0.015265461	0.078816309	0.105030893	30.76717462	0.003974966	0.003656969	0.00028414	0.000251118	998207.0966	161354.3448	163.001212	53534702.51	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	3.18535E-05	3.85427E-05	4.5869E-05	0.000132114	0.000298612	0.015172916	2.6739E-05	2.45999E-05	1.39326E-07	1.23839E-07	492.2685569	358.1426216	0.672169946	26636.85748	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.000903205	0.001092878	0.001300616	0.008532298	0.007236085	2.917979909	0.000262034	0.000241071	2.69511E-05	2.38162E-05	94670.64458	7829.951969	7.813975627	5075711.747	
Orange (SC)	2024 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000728462	0.000881439	0.001048985	0.004833151	0.01544373	2.185979247	0.000320144	0.000294533	2.01886E-05	1.78417E-05	70921.68924	3952.527945	3.276828489	3784820.199	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	100	Diesel	0.000202291	0.000244772	0.000291298	0.001888936	0.002559043	0.250754603	0.000182574	0.000167969	2.31228E-06	2.04663E-06	8135.456928	3577.609826	6.064507823	324520.705	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.001507914	0.001824576	0.002171396	0.019453028	0.016963255	3.095260324	0.000888506	0.000817425	2.8572E-05	2.52631E-05	100422.3124	23940.06887	51.83908057	3994975.001	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	25	Diesel	1.84041E-07	2.22689E-07	2.65019E-07	4.34721E-06	3.68128E-06	0.000747062	1.41235E-08	1.29937E-08	6.90144E-09	6.09742E-09	24.23760056	34.94517954	0.08307545	873.6294886	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.001933026	0.002338961	0.002783557	0.012398536	0.023420911	3.844822234	0.001060222	0.000975404	3.54893E-05	3.13809E-05	124741.0231	22570.80026	54.58057041	5004698.694	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.90954E-05	3.52054E-05	4.18974E-05	9.90741E-05	6.95483E-05	0.00594604	9.77866E-06	8.99637E-06	5.41012E-08	4.85308E-08	192.9127113	182.5885631	0.498452698	7071.64243	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.016664331	0.020163841	0.023996637	0.150939901	0.202188553	46.66842223	0.007811444	0.007186528	0.000430973	0.000380901	1514105.563	143421.3264	291.8440545	60558509.75	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	75	Diesel	5.80758E-05	7.02717E-05	8.36291E-05	0.000380016	0.000542292	0.049518483	4.60883E-05	4.24012E-05	4.56081E-07	4.04163E-07	1606.572637	964.6810952	2.15996169	63897.51965	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000691188	0.000836337	0.000995311	0.008022956	0.011334043	0.623668301	0.000468402	0.00043093	5.74539E-06	5.0903E-06	20234.23118	1299.572399	0.738395233	808059.3346	
Orange (SC)	2024 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.000701104	0.000848336	0.00100959	0.008261199	0.012169104	1.076809109	0.000417738	0.000384319	9.9346E-06	8.78877E-06	34935.88564	876.9298666	2.15996169	1400602.796	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	6.84303E-05	8.28007E-05	9.85397E-05	0.000302544	0.000578498	0.038520761	5.76791E-05	5.30648E-05	3.54091E-07	3.14401E-07	1249.763682	864.2105232	3.516680765	66116.51213	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	1.17483E-05	1.42154E-05	1.69175E-05	0.000312536	0.000135001	0.057137072	5.71421E-06	5.25707E-06	5.27908E-07	4.66345E-07	1853.749365	639.8144474	2.315862943	97543.39064	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	8.73415E-06	1.05683E-05	1.25772E-05	9.93915E-05	0.00011899	0.053065987	3.66069E-06	3.36783E-06	4.90359E-07	4.33117E-07	1721.667521	439.8724326	1.458135927	90266.75407	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000778623	0.000942134	0.001121217	0.009896382	0.009019551	1.591664419	0.000239109	0.00021998	1.46924E-05	1.2991E-05	51639.79918	55712.5646	173.0035391	2428343.529	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.97334E-06	4.80774E-06	5.72161E-06	2.89516E-05	6.04806E-05	0.015329411	2.64112E-06	2.42983E-06	1.41609E-07	1.25117E-07	497.3458635	55.12185872	0.171545403	26061.6148	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.001873062	0.002266405	0.002697209	0.051890118	0.030577044	8.418879539	0.000943824	0.000868318	7.77805E-05	6.87138E-05	273141.2749	202792.1156	554.7778338	14322925.72	
Orange (SC)	2024 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.38578E-06	2.88679E-06	3.43552E-06	3.73977E-05	8.98641E-05	0.020750472	1.20796E-06	1.11133E-06	1.91777E-07	1.69363E-07	673.2262113	35.27798958	0.171545403	35277.98958	
Orange (SC)	2024 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	2.25843E-05	2.7327E-05	3.25214E-05

Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Gasoline	7.22058E-05	0.000079458	7.29278E-05	0.004101174	2.93476E-05	0.008490602	1.61377E-07	1.21929E-07	1.45189E-07	2.00415E-07	566.4497793	0	56.99157403	0
Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21.12074839	0
Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	2.27607E-05	2.50468E-05	2.29883E-05	0.000300198	2.46374E-06	0.000659504	1.12506E-08	8.50043E-09	1.22318E-08	1.68845E-08	45.15489681	0	19.71527233	0
Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.306366135	0
Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	1.98566E-06	2.85442E-06	2.38831E-06	8.15166E-06	1.50923E-05	0.00197974	5.07535E-07	3.83471E-07	1.89297E-08	1.63062E-08	64.87637373	0	0.154600415	0
Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	8.48133E-05	9.33318E-05	8.56614E-05	0.004090469	0.000030651	0.008970857	1.58516E-07	1.19768E-07	1.52025E-07	2.0985E-07	585.3755155	0	90.62483608	0
Orange (SC)	2024 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	33.58504119	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000156259	0.000171954	0.000157822	0.010349942	7.00227E-05	0.02065953	1.90012E-06	1.43564E-06	3.66544E-07	5.05965E-07	1397.506726	0	192.8854447	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	79.9879323	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.54949E-06	1.05086E-05	9.64499E-06	0.000221004	4.56665E-06	0.000561639	4.37542E-07	3.30588E-07	9.73177E-09	1.34334E-08	35.14380234	0	12.8398003	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.324554577	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000129165	0.000142138	0.000130457	0.008718502	4.42492E-05	0.017403009	1.6006E-06	1.20934E-06	3.01735E-07	4.16507E-07	1176.899887	0	52.51333282	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21.77682675	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.033403022	0.036757987	0.033737052	1.62652442	0.020130877	4.219640152	0.000344203	0.000260065	6.85515E-05	9.46265E-05	257061.8237	0	52734.62668	0
Orange (SC)	2024 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21868.5954	0
Orange (SC)	2024 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000769379	0.000846655	0.000777072	0.056074274	0.000571159	0.135625696	2.08418E-06	1.57471E-06	2.17642E-06	3.00426E-06	8445.211172	0	439.5665847	0
Orange (SC)	2024 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.082891952	0.091217537	0.083720871	0.528945522	0.003664099	2.15905332	0.00116606	0.000881028	3.11792E-05	4.30389E-05	122317.1399	0	14582.18776	0
Orange (SC)	2024 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	34156.7737	0
Orange (SC)	2024 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.64544E-05	1.81071E-05	1.6619E-05	0.001219673	1.80335E-05	0.004376012	5.16684E-08	3.90384E-08	6.04075E-08	8.33848E-08	236.8425937	0	4.432390339	0
Orange (SC)	2024 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.11294987	0.124294441	0.114079368	0.420960761	0.002811811	2.743870572	0.001735467	0.001311241	3.60098E-05	4.97069E-05	141712.1355	0	7079.668803	0
Orange (SC)	2024 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	18381.04882	0
Orange (SC)	2024 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.00040362	0.00044416	0.000407656	0.022825165	0.000148012	0.055527424	1.17468E-06	8.87535E-07	8.90613E-07	1.22938E-06	3461.373217	0	418.1549525	0
Orange (SC)	2024 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.45894E-07	1.07223E-06	8.97147E-07	5.28215E-06	6.30625E-06	0.000865085	2.21777E-07	1.67565E-07	8.292E-09	7.14281E-09	28.41858913	0	0.119499844	0
Orange (SC)	2024 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.22153E-05	7.94685E-05	7.29374E-05	0.006677253	4.89418E-05	0.013173304	2.7868E-07	2.10559E-07	2.27316E-07	3.13781E-07	892.0910734	0	36.0597968	0
Orange (SC)	2024 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.29811E-07	1.86605E-07	1.56134E-07	5.32908E-07	9.86645E-07	0.000129424	3.31797E-08	2.50691E-08	1.23751E-09	1.066E-09	4.241237364	0	0.013408615	0
Orange (SC)	2024 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000205469	0.000226106	0.000207523	0.010307617	0.00007922	0.021920414	4.29181E-07	3.24271E-07	3.79611E-07	5.24005E-07	1448.458161	0	340.4876976	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.00171014	0.001881906	0.001727242	0.08939077	0.001303023	0.243070058	8.12407E-06	6.13818E-06	3.74192E-06	5.16525E-06	14527.77598	0	380.1092133	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.000191789	0.000275699	0.00023068	0.001358178	0.001621499	0.222435774	5.70246E-05	4.30853E-05	2.13209E-06	1.8366E-06	7307.155838	0	258.6327305	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	22.42230975	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.05594356	0.061562476	0.056502997	3.230610486	0.028483977	6.304984915	0.000224129	0.000169342	0.000110253	0.000152189	431790.506	0	4430.299691	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000578911	0.000832193	0.000696303	0.002376582	0.004400089	0.577184421	0.0014797	0.000111799	5.51887E-06	0.000004754	18914.42204	0	527.1119871	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	256.1174752	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.000181653	0.000199897	0.000183468	0.006535098	7.54204E-05	0.0143686	4.81337E-07	3.63677E-07	2.48483E-07	3.42998E-07	942.5830886	0	61.87073075	0
Orange (SC)	2024 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.649700247	0
Orange (SC)	2024 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000199232	0.000219243	0.000201225	0.014960852	9.74611E-05	0.024577766	5.48775E-07	4.1463E-07	4.91178E-07	6.78007E-07	1819.489227	0	432.3313691	0
Orange (SC)	2024 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	41.18244613	0
Orange (SC)	2024 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.35838E-07	6.99701E-07	6.42196E-07	6.40537E-05	4.5247E-07	0.000105228	2.34954E-09	1.7752E-09	2.02951E-09	2.80147E-09	7.76172635	0	0.890486765	0
Orange (SC)	2024 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.084824803	0
Orange (SC)	2024 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	8.86482E-05	9.75519E-05	8.95346E-05	0.004716468	3.81929E-05	0.010111727	1.99236E-07	1.50534E-07	1.72611E-07	2.38268E-07	665.1166823	0	325.0277025	0
Orange (SC)	2024 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	30.96105628	0
Orange (SC)	2024 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000295811	0.000325522	0.000298769	0.019013088	0.000180291	0.04521718	8.92368E-07	6.74234E-07	7.36837E-07	1.01711E-06	2839.365751	0	458.7783113	0
Orange (SC)	2024 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001161963	0.00127867	0.001173583	0.003490124	2.15085E-05	0.019931566	1.97746E-06	1.49408E-06	3.12254E-07	4.31027E-07	1099.177489	0	620.8122703	0
Orange (SC)	2024 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	190.7382817	0
Orange (SC)	2024 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000182811	0.000201173	0.00018464	0.009334604	5.99949E-05	0.020618452	3.48717E-07	2.63475E-07	3.51178E-07	4.84755E-07	1339.920324	0	308.3872134	0
Orange (SC)	2024 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.72165E-05	1.89457E-05	1.73886E-05	0.00096683	6.56599E-06	0.002338453	3.58982E-08	2.7123E-08	3.82164E-08	5.27527E-08	146.1261252	0	17.37863329	0
Orange (SC)	2024 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.120959369	0.133108407	0.122168962	0.688977955	0.007366363	3.52567705	0.00104707 2	0.00079112	4.7948E-05	6.6186E-05	187622.7749	0	38861.10666	0
Orange (SC)	2024 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	57614.84039	0
Orange (SC)	2024 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.91873E-05	2.11144E-05	1.93791E-05	0.000977666	7.9518E-06	0.003605593	4.0691E-08	3.07443E-08	4.97977E-08	6.87393E-08	194.2791068	0	7.999688213	0
Orange (SC)	2024 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.00450262	0.004954862	0.004547649	0.084809225	0.000516887	0.272377173	5.36934E-05	4.05684E-05	3.98849E-06	5.51939E-06	15715.7476	0	1253.054632	0
Orange (SC)	2024 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	928.9481902	0
Orange (SC)	2024 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.006120482	0.006735217	0.006181687	0.298962597	0.002995561	0.706616212	2.72195E-05	2.05659E-05	1.15359E-05	1.59238E-05	44674.11071	0	1488.529628	0
Orange (SC)	2024 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.000110945	0.000122088	0.000112055	0.002970899	5.85237E-05	0.006492738	2.41097E-07	1.82162E-07	1.13834E-07	1.57134E-07	430.7292301	0	39.86698869	0
Orange (SC)	2024 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.64034E-06	4.00598E-06	3.67675E-06	0.000204811	1.54722E-06	0.000458642	1.70089E-08	1.28511E-08	7.54676E-09	1.04174E-08	29.58419648	0	0.324121832	0
Orange (SC)	2024 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000400313	0.00044052	0.000404316	0.016659941	0.00013273	0.037372832	1.38777E-06	1.04854E-06	6.30859E-07	8.70819E-07	2422.469506	0	143.4239224	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.007316	0.006729256	0.008050811	0.342298375	0.018180843	6.90145907	0.000481186	0.000363563	6.66777E-05	9.89814E-05	282542.85	75266.65	155.71	5268665.5
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.038905528	0.039294584	0.042813161	2.550202806	0.023681799	4.717733332	6.88746E-05	9.11576E-05	8.4401E-05	0.000116505	330493.1208	0	2992.333525	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.34418E-06	7.63065E-06	9.11986E-06	0.000038931	4.77853E-05	0.006335489	1.3968E-06	1.84871E-06	6.07685E-08	5.23466E-08	208.2676322	0	0.787047759	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36560.86744	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000698076	0.00064209	0.00076819	0.031237463	0.002512497	0.86436176	6.19655E-05	4.68184E-05	8.58653E-06	1.21424E-05	34660.4	5058.9	10.48	677892.6
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000558183	0.000563763	0.000614244	0.080256888	0.000792732	0.114801123	1.61421E-06	2.13645E-06	2.30307E-06	3.17909E-06	9058.377327	0	30.97042859	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	2.65316E-05	3.19117E-05	3.81396E-05	0.000106454	0.000197287	0.025369373	5.46395E-06	7.2317E-06	2.42651E-07	2.09022E-07	831.6202895	0	1.575798551	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	193.7059097	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008248438	0.008330922	0.009076902	0.338173346	0.00245582	0.752494611	9.82802E-06	1.30077E-05	1.25263E-05	1.72909E-05	48960.3713	0	1127.839853	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	13780.14949	0
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.002355307	0.002166411	0.002591871	0.181888181	0.003121343	1.076261808	7.41965E-05	5.60596E-05	1.30854E-05	1.8179E-05	51892.05	23210.35	48.03	812362.25
Orange (SC)	2024 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.002326149	0.002768309	0.003349654	0.023388931	0.018497961	2.733268462	0.000641837	0.00059049	3.53343E-05	2.30181E-05	91498.2	89662.25	110.17	3317503.25
Orange (SC)	2024 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000872415	0.45327112	0.03437499	10.849385	0	0	0	0	600326.45	62013.5	7.3	5457188
Orange (SC)	2024 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000243307	0.0922121	0.009198586	2.8235883	0	0	0	0	154172.35	10001	1.18	1460146
Orange (SC)	2024 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000187192	0.10610708	0.008902004	2.910071	0	0	0	0	159672.9	8000.8	0.94	1680168
Orange (SC)	2024 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000159982	0.028344376	0.005809517	1.9306733	0	0	0	0	102583.25	30003	3.53	960096
Orange (SC)	2024 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000263629	0.14943409	0.012536983	4.0983498	0	0	0	0	224872.85	7000.7	0.82	2366236.6
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002570381	0.002364236	0.002828547	0.107364736	0.014981281	4.627399576	0.000322633	0.000243767	4.47071E-05	6.36885E-05	181799.2	35040	305.17	2908320
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.24401E-05	0.009415452	0.000949919	0.300023516	0	0	0	0	16341.05	2602.45	22.67	216003.35
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.035529271	0.035884563	0.039097795	2.001343399	0.01836545	4.767808655	6.81488E-05	9.01968E-05	7.64956E-05	0.000105592	299752.3867	0	6723.616164	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.000331112	0.000398255	0.000475979	0.002274142	0.002798024	0.369333135	8.16603E-05	0.00010808	3.54096E-06	3.05021E-06	12135.66692	0	78.28494399	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000258195	0.000237488	0.000284128	0.023859981	0.002606124	0.747985313	5.36226E-05	4.05148E-05	7.43045E-06	1.04225E-05	29751.15	3306.9	28.83	482807.4
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.38551E-05	0.01128665	0.001301613	0.437514817	0	0	0	0	23597.25	2164.45	18.84	316009.7
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.107463131	0.108537762	0.11825662	1.880278763	0.031214751	3.844110212	0.000144945	0.000191839	6.96542E-05	9.61487E-05	267566.2303	0	16232.5136	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5024.881436	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001254409	0.001266953	0.001380401	0.118252569	0.000709269	0.171570857	2.40272E-06	3.18008E-06	3.4308E-06	4.73576E-06	13493.32047	0	128.9291331	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.000476286	0.000572868	0.000684669	0.001962904	0.003633915	0.466573689	0.000101299	0.000134072	4.46222E-06	3.8438E-06	15293.04746	0	57.25577559	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.010269377	0.010372071	0.011300824	0.478190276	0.002337034	0.951577681	1.85253E-05	2.45188E-05	1.67693E-05	2.31478E-05	64855.21531	0	3716.831665	0
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.011977748	0.011017133	0.013180782	0.793192358	0.024906499	9.342426759	0.000644059	0.000486622	0.000113587	0.000140968	402394.25	181496.25	1580.17	5807880
Orange (SC)	2024 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.004353115	0.005180566	0.006268485	0.050280612	0.04748335	7.565035434	0.000141058	0.001297437	9.7797E-05	6.34209E-05	252101.85	180496.15	534.72	5956372.95
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.01317743	0.013309204	0.014500957	0.979911733	0.006634905	1.793832136	2.3225E-05	3.07389E-05	3.20838E-05	4.42876E-05	126054.1073	0	4058.30163	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.14455E-06	3.7822E-06	4.52034E-06	2.16242E-05	2.65786E-05	0.003513623	7.74425E-07	1.02497E-06	3.36862E-08	2.90176E-08	115.4504089	0	3.623461226	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7668.305571	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	7.72564E-06	7.8029E-06	8.5016E-06	0.000163736	2.59646E-06	0.000346245	4.42154E-09	5.85204E-09	6.05006E-09	8.35132E-09	23.51621925	0	2.965131159	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.602721007	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000207117	0.000209189	0.00022792	0.017191489	0.000100609	0.031468869	4.07431E-07	5.39247E-07	5.6074E-07	7.74027E-07	2208.277182	0	26.92659291	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.20194E-06	1.44567E-06	1.72781E-06	4.94917E-06	9.1782E-06	0.001181712	2.54209E-07	3.36452E-07	1.13011E-08	9.7349E-09	38.73159602	0	0.833831521	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	50.87875698	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.024468783	0.024713471	0.026926404	1.249574551	0.009827109	2.643120325	3.37527E-05	4.46726E-05	4.46867E-05	6.16842E-05	175005.2094	0	10605.14891	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	20038.80685	0
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000107918	9.92631E-05	0.000118757	0.007422289	0.000178302	0.094591556	6.52106E-06	4.92702E-06	1.15006E-06	1.4155E-06	4040.55	1620.6	14.12	46997.4
Orange (SC)	2024 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.46712E-05	1.746E-05	2.11265E-05	0.000206475	0.000219224	0.036350069	5.50062E-06	5.06057E-06	4.69916E-07	3.03933E-07	1208.15	1854.2	12.82	70459.6
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.002892172	0.00266022	0.003182659	0.142397192	0.007669274	5.302893102	0.00036973	0.00027352	5.12333E-05	7.33835E-05	209473.5	35339.3	160.05	3286554.9
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004138294	0.004179678	0.004553941	0.266591396	0.002325366	0.570064543	8.591E-06	1.13704E-05	9.54619E-06	1.31773E-05	37425.78387	0	935.3579894	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.000242917	0.000292176	0.000349197	0.001481049	0.001827007	0.240531033	0.000054148	7.16664E-05	2.30725E-06	1.98749E-06	7907.475753	0	58.79568277	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000104569	9.61824E-05	0.000115072	0.00787633	0.000381499	0.240743796	1.72588E-05	1.304E-05	2.39154E-06	3.35782E-06	9584.9	1062.15	4.82	152949.6
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.001819876	0.001838074	0.002002663	0.017375181	0.000109996	0.04947953	5.1282E-07	6.78734E-07	8.16663E-07	1.1273E-06	3100.682704	0	339.0400157	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	26932.22462	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.09033E-05	3.12124E-05	3.40073E-05	0.002197796	2.17712E-05	0.004694519	7.50917E-08	9.93861E-08	7.82675E-08	1.08038E-07	307.9311135	0	3.114745213	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.00019816	0.000238343	0.000284858	0.000793202	0.00146861	0.188576079	4.08901E-05	5.41192E-05	1.80375E-06	1.55376E-06	6181.851759	0	17.56028722	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.003173351	0.003205084	0.003492079	0.140106602	0.001056448	0.308619226	4.25857E-06	5.63635E-06	5.19101E-06	7.16551E-06	20135.52365	0	1026.931499	0
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.001851451	0.001702964	0.002037409	0.141067808	0.002864285	1.410454697	9.72355E-05	7.34668E-05	1.71486E-05	2.17286E-05	62024.45	27878.7	126.28	864239.7
Orange (SC)	2024 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.002803204	0.003336045	0.004036614	0.030867227	0.028157424	4.427709927	0.000877554	0.00080735	5.72392E-05	3.71496E-05	147671.7	94232.05	234.09	3486585.85
Orange (SC)	2024 Light Commercial - Misc - Welders

Orange (SC)	2024	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Gasoline	0.000342306	0.000345728	0.000376686	0.003831178	0.000389265	0.038245342	3.99148E-06	3.01579E-06	4.33047E-07	5.97765E-07	1695.559929	0	1.922867701	0
Orange (SC)	2024	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001421817	0.001436035	0.001564623	0.006526104	0.000672446	0.071710016	7.48402E-06	5.6546E-06	8.25203E-07	1.13909E-06	3242.154467	0	1.922867701	0
Orange (SC)	2024	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.000198578	0.000200564	0.000218522	0.002479675	9.33197E-05	0.018573545	1.49358E-06	1.12849E-06	2.92645E-07	4.03959E-07	863.9293856	0	69.28747328	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002739148	0.002766539	0.003014265	0.023345632	0.002397052	0.260459167	2.59985E-05	1.96433E-05	2.98443E-06	4.11963E-06	11439.31075	0	54.27317342	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.024390475	0.02463438	0.026840231	0.264286876	0.009619401	2.854627633	0.000297924	0.000225097	3.21698E-05	4.44062E-05	125135.3365	0	414.6208675	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	6.69584E-05	6.76279E-05	7.36836E-05	0.00111074	0.000022945	0.017272897	1.80269E-06	1.36203E-06	1.82951E-07	2.5254E-07	718.055079	0	1.50528288	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.006527483	0.006592757	0.007183097	0.01789147	0.000213218	0.054986145	0.000321261	0.000242731	1.02359E-06	1.41294E-06	3948.969698	0	36.80016172	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001093305	0.001104239	0.001203116	0.010025198	0.000420863	0.051686099	2.52083E-05	1.90463E-05	6.83064E-07	9.42882E-07	2657.640042	0	20.94203024	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.003129227	0.003160519	0.003443524	0.030178605	0.001361974	0.194598903	0.000376313	0.000284326	2.40828E-06	3.32432E-06	9434.122083	0	62.53265517	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.007115359	0.007186512	0.007830018	0.015877906	0.000112216	0.042247018	0.000350268	0.000264647	9.24957E-07	1.27678E-06	3432.318088	0	64.6565496	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.095832527	0.096790852	0.10545785	0.319238483	0.011700737	1.592802023	0.007448198	0.005627527	2.34988E-05	3.2437E-05	90590.23915	0	540.7528981	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.014419696	0.014563892	0.015867995	0.050686459	0.001282212	0.173514976	0.000779682	0.000589093	3.47189E-06	4.79251E-06	11319.04796	0	584.6749829	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.043830488	0.044268793	0.048232779	0.188167874	0.006636236	0.884034809	0.004496143	0.003397087	1.27537E-05	1.76049E-05	49705.1997	0	160.524816	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.01771354	0.017890676	0.01949267	0.044030212	0.001479492	0.174182905	0.001075335	0.000812475	3.14555E-06	4.34203E-06	11382.48975	0	250.7338832	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.041048884	0.041459372	0.045171792	0.197329998	0.012377319	1.179038791	0.00850963	0.006429498	1.55841E-05	2.15119E-05	60883.18365	0	149.3185328	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.041685869	0.042102728	0.045872756	0.112713181	0.004360497	0.4994154	0.002915776	0.002203032	8.19637E-06	1.1314E-05	30658.21458	0	363.471123	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.013871542	0.014010257	0.015264786	0.185342927	0.006773606	0.770198373	0.001897786	0.001433883	1.05476E-05	1.45596E-05	41394.96402	0	82.54018172	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	6.93554E-07	7.0049E-07	7.63214E-07	5.88753E-06	3.43163E-07	0.000113786	1.0398E-08	7.85629E-09	1.239E-09	1.71029E-09	4.679280621	0	0.064819498	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000486092	0.000490953	0.000534915	0.007985097	0.000510606	0.061638871	8.76033E-06	6.61891E-06	9.80559E-07	1.35354E-06	2830.261998	0	293.9615653	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.003695391	0.003732344	0.004066552	0.041334238	0.010909196	0.719407326	7.23738E-05	5.46825E-05	7.77345E-06	1.07303E-05	29735.80687	0	260.6398672	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.016434217	0.01659856	0.018084854	0.177771714	0.014553647	1.671470525	0.000166842	0.000126059	1.95219E-05	2.69475E-05	74900.12263	0	480.6798877	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.019832148	0.020030469	0.021824068	0.133581789	0.007861756	2.714014209	0.000283249	0.00021401	2.87419E-05	3.96746E-05	111636.839	0	550.9826102	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.001553683	0.00156922	0.001709734	0.002896607	0.000477093	0.08137438	8.49265E-06	6.41667E-06	8.68233E-07	1.19848E-06	3407.046774	0	9.053031382	0
Orange (SC)	2024	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000218337	0.000264188	0.000314406	0.006418959	0.003433987	0.961142389	0.000245951	0.000226275	8.87969E-06	7.84471E-06	31183.20629	23956.54036	58.2620279	1971397.056
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.000290626	0.000351658	0.000418502	0.011154665	0.003297831	2.016247663	0.000129061	0.000118736	1.86325E-05	1.64563E-05	65414.93494	31002.58164	75.39791846	4135521.182
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000188377	0.000227936	0.000271263	0.002300617	0.001831979	1.209265056	7.11825E-05	6.54879E-05	1.11746E-05	9.86986E-06	39233.27297	9035.511761	21.97425966	2480320.917
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	8.09846E-06	9.79913E-06	1.16618E-05	0.000173553	0.000170551	0.027743656	5.23166E-06	4.81313E-06	2.56261E-07	2.2644E-07	900.112353	1243.41905	3.023980687	51186.56179
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000294295	0.000356097	0.000423785	0.003166551	0.003183956	1.654902382	0.000121012	0.000111331	1.52916E-05	1.35071E-05	53691.48522	7211.830488	17.53908798	3394366.664
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	9.20874E-05	0.000111426	0.000132606	0.001955232	0.001511877	0.299263392	2.55134E-05	2.34724E-05	2.76408E-06	2.44255E-06	9709.27118	9532.87938	23.18385193	613818.4906
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	0.000124885	0.000151111	0.000179835	0.001031369	0.002241531	0.54185401	7.10908E-05	6.54035E-05	5.00596E-06	4.42254E-06	17579.85661	1657.892066	4.031974249	1111395.577
Orange (SC)	2024	Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	5.44997E-06	6.59446E-06	7.84796E-06	6.7986E-05	0.000109886	0.035241205	1.27723E-06	1.17505E-06	3.25659E-07	2.87634E-07	1143.362072	82.89460331	0.201598712	72283.15787
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.001158674	0.001401995	0.00166849	0.0292606	0.012829817	3.97700153	0.001036129	0.000953239	3.67346E-05	3.24598E-05	129029.4347	86286.05125	62.89879829	8157219.158
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.002503995	0.003029834	0.003605752	0.054526457	0.01952037	8.622259624	0.000973585	0.000895698	7.96419E-05	7.03737E-05	279739.7178	128875.9612	93.945	17685097.9
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002983525	0.003610065	0.004296275	0.021374322	0.020869743	9.430374304	0.000927433	0.000853238	8.7099E-05	7.69694E-05	305958.1086	79648.66269	58.06042919	19342620.16
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.21242E-05	5.09703E-05	6.06588E-05	0.000629172	0.000432623	0.065202377	1.45305E-05	1.33681E-05	6.01565E-07	5.32173E-07	2115.419311	2489.020709	1.814388412	120297.2506
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.005069018	0.006133512	0.007299386	0.039665704	0.030205495	19.39529917	0.001343903	0.00123639	0.000179167	0.000158302	629259.1216	101220.1755	73.78512876	39781655.81
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001251854	0.001514743	0.00180267	0.018399132	0.013585281	2.494888309	0.000266557	0.000245233	2.30289E-05	2.03629E-05	80943.90356	79095.54698	57.65723176	5117259.966
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.001568616	0.001898026	0.002258807	0.010331599	0.012112657	4.848004512	0.000565678	0.000520424	4.47751E-05	3.95688E-05	157288.1673	14657.5664	10.68473176	9943731.474
Orange (SC)	2024	Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.010023453	0.012128378	0.014433772	0.066608243	0.157211142	31.69761817	0.004098639	0.003770748	0.000292759	0.000258712	1028394.313	52545.99275	38.30375537	65014915.46
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000242997	0.000294026	0.000349915	0.009107578	0.004748673	1.438813009	0.00031573	0.000290472	1.32952E-05	1.17434E-05	46680.7035	33577.31213	104.8313305	2951146.222
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000705008	0.000853059	0.001015211	0.0256444	0.009454847	4.653774043	0.000352901	0.000324669	4.30053E-05	3.79835E-05	150986.5736	70060.35319	218.734603	9545345.783
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000278006	0.000336387	0.000400329	0.003088231	0.003001658	1.561802394	0.000114852	0.000105664	1.44313E-05	1.27472E-05	50670.95864	13753.78362	42.94052575	3203409.481
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.33915E-06	7.67037E-06	9.12837E-06	0.000140053	0.000135127	0.023704958	3.49028E-06	3.21106E-06	2.18974E-07	1.93477E-07	769.0812409	968.5763114	3.023980687	43735.23409
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000347919	0.000420982	0.000501003	0.003877087	0.003608705	2.053951456	0.000130183	0.000119768	1.89794E-05	1.67641E-05	66638.19295	9685.763114	30.23980687	4212855.348
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.000145788	0.000176404	0.000209935	0.003949103	0.003151883	0.639302206	5.76617E-05	5.30488E-05	5.90629E-06	5.2179E-06	20741.45601	18725.80869	58.46362661	1311271.36
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000163855	0.000198265	0.000235952	0.001687992	0.002344555	0.899740927	8.81846E-05	8.11299E-05	8.31364E-06	7.34356E-06	29191.10348	2712.013672	8.467145923	1845456.652
Orange (SC)	2024	Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.00178242	0.002156728	0.002566685	0.015209918	0.042818218	7.938449278	0.000898237	0.000826378	7.33414E-05	6.47926E-05	257554.2442	6844.605934	21.36946352	16282535.99
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000117403	0.000142058	0.000169061	0.004374514	0.002409616	0.693322238	0.000152113	0.000139944	6.40659E-06	5.6588E-06	22494.07647	15724.48023	48.98848713	1422071.73
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.000183946	0.000222574	0.000264882	0.006677527	0.002448344	1.210514909	9.69783E-05	8.922E-05	1.11863E-05	9.88006E-06	39273.82309	18183.45245	56.6492382	2482884.489
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000124146	0.000150217	0.000178771	0.001692918	0.001069422	0.892835517	4.01079E-05	3.68992E-05	8.25098E-06	7.2872E-06	28967.06507	7765.175423	24.19184549	1831292.98
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.36113E-06	1.64696E-06	1.96002E-06	2.96466E-05	2.26018E-05	0.004800914	2.61931E-07	2.40976E-07	4.4346E-08	3.91844E-08	155.7603683	194.1293856	0.604796137	8857.602822
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000261399	0.000316293	0.000376415	0.003103513	0.003644705	1.688809369	0.000137965	0.000126928	1.5606E-05	1.37838E-05	54791.56007	8671.112555	27.01422747	3463913.21
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	9.57342E-05	0.000115838	0.000137857	0.00227091	0.001867737	0.361599824	4.40421E-05	4.05187E-05	3.3403E-06	2.95133E-06	11731.70805	10677.11621	33.26378756	741676.6096
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000134732	0.000163025	0.000194013	0.001570874	0.002424724	0.856400432	0.000100563	9.2518E-05	7.9138E-06	6.98983E-06	27784.96886	2588.391808	8.063948498	1756561.057
Orange (SC)	2024	Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	8.52601E-05	0.000103165	0.000122775	0.000925499	0.001936922	0.488562819	3.54494E-05	3.26135E-05	4.51445E-06	3.98758E-06	15850.88262	776.5175423	2.419184549	1002090.133
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.56779E-05	1.89703E-05	2.25762E-05	0.000479903	0.000240961	0.070933694	1.63955E-05	1.50838E-05	6.55347E-07	5.78951E-07	2301.365579	1737.975721	3.225579399	145491.9447
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000228327	0.000276276	0.000328791	0.009131426	0.002766227	1.659236292	8.82144E-05	8.11573E-05	1.53336E-05	1.35425E-05	53832.09416	24874.77751	46.16610515	3403255.937
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000141618	0.000171358	0.00020393	0.002026756	0.000667459	1.06008553	3.21359E-05	2.9565E-05	9.79677E-06	8.65228E-06	34393.30754	7712.267264	14.31350858	2174339.117
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	50	Diesel	6.75714E-06	8.17614E-06	9.73029E-06	0.000155796	0.000122616	0.026325853	1.84274E-06	1.69532E-06	2.43193E-07	2.14868E-07	854.1132984	977.6113433	1.814388412	48570.74007
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002148004	0.002599084	0.003093125	0.028428013	0.014822018	14.92190396	0.000621528	0.000571806	0.000137896	0.000121791	484124.7404	56266.96398	104.4281331	30606284.65
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.44651E-05	2.96028E-05	3.52298E-05	0.000504021	0.000378791	0.076303391	5.25579E-06	4.83533E-06	7.04729E-07	6.22778E-07	2475.579476	2498.3401	4.636770386	156505.718
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000264797	0.000320405	0.000381308	0.002987502	0.00231307	1.53036357	0.000121239	0.00011154	1.4141E-05	1.24906E-05	49650.96063	4996.680199	9.273540773	3138925.379
Orange (SC)	2024	Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000153867	0.000186179	0.000221569	0.002126009	0.00345888	1.124468194	5.73718E-05	5.27821E-05	1.03917E-05	9.17776E-06	36482.13216	2172.469652	4.031974249	2306394.258
Orange (SC)	2024	Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001785886	0.002160922	0.002571676	0.047336677	0.020526708	6.49545532	0.001626618	0.001496489	6.00001E-05	5.3015E-05	210737.8944	140697.2586	95.75938842	13322814.23
Orange (SC)	2024	Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002928605	0.003543612	0.004217191	0.078377183	0.01962935	12.55924693	0.000711647	0.000654716	0.000116029	0.000102507	407470.935	176834.2388	120.3544313	25760243.96
Orange (SC)	2024	Portable Equipment - Rental Generator	Aggregate	300

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	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9237.761358	31.56321156	0	0	834.4506656	1.581300958	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	52293.55	48.28	23334.45	2.241044893	91947.15	110.75	90122.15	1.020250294	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	284032.05	156.52	75668.15	3.753653948	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	34839.25	10.53	5095.4	6.83739255	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2621.433784	14.56969034	0	0	19.36803168	9.029769581	0	0	54297.4	122.42	45949.85	1.181666534
Aerial Lifts50	Aerial Lifts	50	73288.35	127.9	46212.65	1.585893689	123769.914	486.9597282	151383.7677	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	138031.052	390.4410468	121019.7505	1.140566324	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	131681.05	127.9	46212.65	2.849458968	77932.8084	199.4719415	61963.36999	1.257723852	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	13198.84279	20.4527682	6348.455064	2.079063749	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	788.7335992	0.689419153	215.1927254	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	560.1151647	0.229806384	71.73090847	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	216.6631722	2.284093808	0	0	8.94711904	1.40767896	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	682.55	2.49	273.75	2.493333333	2874.666832	6.83621777	2499.715676	1.149997522	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	1301.783226	2.302725986	761.7449282	1.708948991	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7862.1	11.5	1226.4	6.410714286	16512.88405	18.56572826	7806.091137	2.115384481	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2741.15	2.82	295.65	9.271604938	20903.56215	16.47888284	5358.982388	3.900658863	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	30088.85892	16.6947634	5575.658753	5.396467082	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	43324.60012	13.38459479	4351.682172	9.955828207	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	34764.92364	3.382128792	2088.233242	16.64800797	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	15614.44894	0.431761122	323.4946037	48.26803527	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	115.7121184	1.570526644	0	0	2.602035635	1.005879473	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	3790.918752	17.0398068	0	0	1.784854234	0.373282069	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	4770.55	5.95	3460.2	1.378691983	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	55.22956152	0.271128152	133.4125255	0.413975834	0	0	0	0
Cranes50	Cranes	50	2299.5	2.82	1186.25	1.938461538	894.8093492	2.892033622	1297.749662	0.689508443	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	488.3404199	1.35564076	477.5489684	1.022597581	0	0	0	0
Cranes100	Cranes	100	7825.6	5.68	2354.25	3.324031008	21121.36207	34.52365137	16054.2567	1.315623791	0	0	0	0
Cranes175	Cranes	175	507.35	0.18	87.6	5.791666667	60888.47355	59.46744136	27679.81145	2.199743075	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	103826.6314	65.6130128	31847.83933	3.260083998	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	189065.2751	68.41467038	34731.16186	5.443678384	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	3676.29279	0.903760507	389.9506011	9.427585902	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	10277.02662	1.446016811	735.889916	13.9654402	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	2897.981424	8.021119496	2812.030599	1.030565395	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	502.4550725	1.443801509	319.9254252	1.570538109	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	127521.8526	136.3590314	65608.71364	1.943672502	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	139654.8743	90.55843911	42173.11735	3.311466713	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	146340.3846	69.70352842	32158.10558	4.550653156	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	511936.2858	123.2846067	59921.87214	8.543396051	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	5159.124784	0.882323145	378.1878078	13.64170044	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	29740.43406	2.406335849	1368.460064	21.73277456	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	40.35302258	0.19046285	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14167.89132	277.8709054	40785.1	0.3473791	1.284415022	0.519152865	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	646.05	2.04	270.1	2.391891892	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	31.84742764	0.976264914	41.30848445	0.770965773	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	115965.8225	196.1870449	147433.6591	0.786562738	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	8876.390445	8.117530329	6034.528259	1.470933612	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	141333.513	133.4168351	88030.3609	1.605508731	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	317578.0078	180.9164433	109993.9312	2.88723209	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	404497.5637	155.9208796	93562.39691	4.323292018	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	717984.1058	163.5561804	107697.9151	6.666648146	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	10485.16191	1.446688573	862.6682813	12.15433804	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	20012.35862	1.205573811	840.5050534	23.80992064	0	0	0	0
Forklifts25	Forklifts	25	49.88851508	0.112159526	0	0	34.11539119	0.186209234	58.99668146	0.578259494	1438.1	1.17	1470.95	0.977667494
Forklifts50	Forklifts	50	1227662.9	428.85	769463.8	1.595478436	87125.30531	237.1017306	173312.4183	0.502706651	1913147.5	795.47	1433059.35	1.335009258
Forklifts75	Forklifts	75	0	0	0	0	7648.771243	17.52303967	7414.237048	1.031632951	0	0	0	0
Forklifts100	Forklifts	100	5726120	1529.36	2710365.9	2.11267416	1260747.777	1941.722893	1297985.405	0.971311212	11972879.65	2791.82	5029597.8	2.380484509
Forklifts175	Forklifts	175	400401.35	55.92	99031.8	4.043159369	372616.3387	355.1305067	237211.4486	1.570819372	898619.05	102.18	184051.25	4.882439266
Forklifts300	Forklifts	300	0	0	0	0	73400.11378	44.86158611	32605.8206	2.251135301	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	18875.51079	6.994941827	4878.277297	3.869298451	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	268.0949328	0.093104617	20.64883851	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1381.347201	0.186564985	151.0573405	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	13837.80523	132.0521344	0	0	15352.17317	57.48057492	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	404398.1	1588.34	182434.3	2.216678004	253335.55	537.45	181426.9	1.396350541	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	182656.95	306.77	35218.85	5.186340553	0	0	0	0	16403.1	22.8	2617.05	6.267782427
Generator Sets175	Generator Sets	175	29900.8	29	3332.45	8.972617744	0	0	0	0	23721.35	18.91	2171.75	10.92268908
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	22.27846896	0.161531273	37.90960134	0.587673523	0	0	0	0
Graders50	Graders	50	0	0	0	0	745.0238917	2.342203464	848.0377819	0.878526768	0	0	0	0
Graders75	Graders	75	0	0	0	0	256.6041883	0.48459382	168.7924999	1.520234539	0	0	0	0
Graders100	Graders	100	0	0	0	0	17354.99754	21.72595627	9253.449364	1.875516563	0	0	0	0
Graders175	Graders	175	0	0	0	0	193562.8543	129.1442531	61449.18919	3.149965961	0	0	0	0
Graders300	Graders	300	0	0	0	0	400515.5398	113.152657	88100.77622	4.546106822	0	0	0	0
Graders600	Graders	600	0	0	0	0	25181.45277	4.361344382	3591.366083	7.011664139	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	13878.23828	0.48459382	362.7001108	38.26367258	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	23.28978941	0.158603686	37.22252908	0.625690677	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	47946.49638	75.09884551	50913.3475	0.941727439	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	24732.86371	26.40751378	15662.49579	1.57911383	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	36672.89387	28.31075802	20560.42228	1.783664429	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	52246.64463	20.77708292	14642.22626	3.56821727	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	44036.61673	13.71921887	9158.789393	4.808126362	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	147797.0682	25.93170272	18358.43051	8.050637451	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	6182.703317	0.634414746	434.4799707	14.23012275	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	7791.405882	0.396509216	220.6365411	35.31330686	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	0	0	0	0	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	4646.028264	4.47866715	7401.174099	0.627742058	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	1284.649904	0.628584863	924.501354	1.389559786	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3363.512995	1.335742834	1922.487058	1.7495634	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	109904.0871	24.59338277	35347.90866	3.109210453	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	223814.0275	41.40802787	54034.50868	4.142057232	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	959418.3085	92.32340179	129144.5503	7.429026672	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	328332.0539	19.80042319	24950.28801	13.15944945	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	577642.1065	15.79319469	22951.82717	25.16758697	0	0	0	0
Pavers25	Pavers	25	728.0696624	2.342437226	0	0	2.411408841	0.321126545	0	0	0	0	0	0
Pavers50	Pavers	50	7383.95	8.09	3182.8	2.319954128	3178.377285	9.411991507	3430.498508	0.926505952	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	5240.007146	8.706092144	3407.673309	1.537708187	0	0	0	0
Pavers100	Pavers	100	6632.05	4.42	1744.7	3.80125523	25407.39814	36.78520014	14613.28123	1.738651145	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	41940.90009	31.13800523	12346.40766	3.397012413	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	31882.01347	14.6670201	6770.70863	4.708814869	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	6913.412319	1.960831564	888.8021917	7.778347514	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	1229.385628	0.156866525	76.29874878	16.11278884	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	824.6353578	5.849979012	0	0	4.098372161	0.798691079	0	0	0	0	0	0
Paving Equipment50	Paving Equipment	50	8606.7	22.09	3869	2.224528302	3960.136259	11.58945519	5608.633862	0.706078585	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	457.0862575	1.174606945	370.9562217	1.232183829	0	0	0	0
Paving Equipment100	Paving Equipment	100	3555.1	5.71	1003.75	3.541818182	16911.32874	21.53446065	10326.03552	1.637736836	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	17530.63459	13.86036195	6540.940483	2.68013975	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	11586.39663	5.794727593	2751.89421	4.210335043	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	13282.97644	3.758742223	1838.241074	7.225916463	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	2458.523601	0.391535648	209.7827729	11.71937794	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	1161.437718	0.156614259	74.98149044	15.489659	0	0	0	0
Rollers25	Rollers	25	2485.304188	12.57940244	0	0	38.97128404	6.409096496	18.93430752	2.058236564	0	0	0	0
Rollers50	Rollers	50	9661.55	5.68	3540.5	2.728865979	65264.9014	237.9203545	84625.27803	0.771222298	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	651.4346796	2.016957905	473.3576879	1.37619964	0	0	0	0
Rollers100	Rollers	100	30112.5	10.7	6653.95	4.525507405	101283.5181	175.4753378	59807.70248	1.693486188	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	105415.1784	102.6228182	37811.33875	2.787925049	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	17822.74619	13.31192217	4225.474737	4.217927524	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	9842.485439	4.598664024	1436.545911	6.851493824	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	34.11539119	0.186209234	58.99668146	0.578259494	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3109.8	2.26	934.4	3.328125	3286.05193	10.61392636	2976.273327	1.104082713	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	110.3295823	0.372418469	85.32668189	1.29302558	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68109	32.32	13359	5.098360656	261248.9412	449.7884055	130309.2479	2.00483807	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3825.2	1.2	467.2	8.1875	55381.75934	74.48369374	21136.21665	2.620230491	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	4326.901493	3.817289304	982.2947463	4.404891209	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1425.097576	0.65173232	171.4181356	8.313575287	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	268.0949328	0.093104617	20.64883851	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2877.79851	3.147069593	3070.250958	0.93731703	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	3563.384678	2.993554003	2394.087789	1.488410197	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	8578.818226	5.680076826	4979.126147	1.722956594	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	13012.41329	5.526561236	4462.47876	2.915960834	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	13320.01103	4.144920927	2981.44093	4.467642105	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	145761.5241	25.8673769	19283.93579	7.558702003	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	5395.210665	0.383788975	396.3125009	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	23.17754987	0.079104296	33.41682439	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	184.4755208	0.474625777	174.6029074	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1680.931993	2.135815996	1001.483662	1.678441753	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	7628.402738	5.695509323	3342.239386	2.282422609	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	87532.76033	47.06705621	20937.49697	4.180669755	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	127834.8452	54.26554716	23537.04743	5.431218406	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1432477.589	277.0232451	136114.9871	10.52402545	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	34773.45204	4.429840584	2268.816727	15.32669062	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	33407.93696	2.0567117	838.5766431	39.83885938	0	0	0	0
Sk

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2686.4	0.59	295.65	9.086419753	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.061350702	0	0	43.90093775	5.993545671	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	97302.32074	230.5498387	122438.3786	0.794704421	0	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	12414.99948	38.47852708	9163.773452	1.354791184	0	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25517.15	9.99	8719.85	2.926329008	1562228.895	1526.930778	979484.1225	1.594950708	0	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	272400.9412	175.1214802	99864.14748	2.727715081	0	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	169002.657	74.22580172	42737.75652	3.954411058	0	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	222527.153	62.41715144	34808.93479	6.392817085	0	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	8189.735729	1.044302405	705.3769698	11.61043822	0	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	76291.38632	3.373900078	2162.320234	35.28218676	0	0	0	0	0
Trenchers25	Trenchers	25	4742.017404	14.56290638	0	0	42.64374616	4.276505322	0	0	0	0	0	0	0
Trenchers50	Trenchers	50	46070.3	51.79	20845.15	2.210120819	34552.26236	75.59947072	29921.27827	1.154772268	0	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	2408.370271	4.810875409	1327.350211	1.814419624	0	0	0	0	0
Trenchers100	Trenchers	100	28630.6	17.17	6916.75	4.139313984	22002.70921	29.2947949	10081.28887	2.182529387	0	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	5776.419821	5.584051814	1630.079207	3.543643644	0	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	11604.02354	6.18541124	1975.248731	5.874715097	0	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	17895.78699	4.72496692	1780.687638	10.04993049	0	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	5038.388027	0.601359426	292.3456834	17.23435068	0	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	450.7757865	0.085908489	20.16177127	22.35794566	0	0	0	0	0
Welders25	Welders	25	0	0	0	0	7640.209119	23.48882312	0	0	0	0	0	0	0
Welders50	Welders	50	126184.15	252.26	52395.75	2.408289794	422016.65	553.45	355422.4	1.187366497	0	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	177254.95	257.43	53483.45	3.31420187	0	0	0	0	0	0	0	0	0
Welders175	Welders	175	22162.8	17.75	3686.5	6.011881188	0	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2025
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower B	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.68178E-08	9.29495E-08	1.10618E-07	1.14722E-06	2.88123E-07	3.7398E-05	2.8133E-09	2.58823E-09	3.38533E-10	3.04909E-10	1.212031166	6.479206656	0.003661131	32.34587391
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.001528851	0.001849909	0.002201545	0.013531211	0.013579089	2.206119983	0.000977364	0.000899175	2.00602E-05	1.79867E-05	71498.09354	2456.779896	37.41072428	2555589.589
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	9.17462E-08	1.11013E-07	1.32114E-07	1.45237E-06	6.80275E-07	8.29124E-05	6.23715E-09	5.73818E-09	7.52894E-10	6.75991E-10	2.687105299	7.979965989	0.006350498	71.71166105
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000571898	0.000691996	0.000823533	0.006015757	0.005887338	1.022506751	0.000269497	0.000247937	9.30176E-06	8.33658E-06	33138.39846	2433.046216	13.85492455	1316807.336
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	2.43977E-06	2.95213E-06	3.51327E-06	2.85157E-05	4.62429E-07	7.59329E-05	5.12074E-08	4.71108E-08	6.18844E-10	6.19087E-10	2.460908895	81.90665414	0.034425483	65.6750827
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000145198	0.00017569	0.000209085	0.000533158	0.000386122	0.047751634	2.40733E-05	2.21474E-05	4.30842E-07	3.89323E-07	1547.581617	793.8011911	4.517132483	55315.92898
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.00022135	0.000267833	0.000318743	0.001517247	0.001804201	0.706245417	8.10862E-05	7.45993E-05	6.42993E-06	5.75807E-06	22888.69192	1491.943661	3.260730413	909518.837
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	4.90245E-07	5.93197E-07	7.05953E-07	1.49903E-05	1.349E-06	0.000326161	2.45357E-08	2.25729E-08	2.95786E-09	2.65922E-09	10.57054427	49.00877974	0.039595265	282.0995811
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.003119962	0.003775153	0.004492745	0.012534233	0.009662386	1.178044561	0.000809299	0.000744555	1.06429E-05	9.60469E-06	38179.21989	2954.328073	50.14886835	1364657.595
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	0.000113772	0.000137664	0.000163831	0.000874269	0.000918119	0.381416439	4.04278E-05	3.71936E-05	3.47274E-06	3.10972E-06	12361.31691	1038.985899	1.055955417	491196.7283
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.77242E-08	5.77463E-08	6.87229E-08	7.47931E-07	1.82289E-07	2.40078E-05	1.80601E-09	1.66153E-09	2.17371E-10	1.95738E-10	0.778069405	12.95841091	0.003447717	20.76459341
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001676212	0.002028217	0.002413746	0.008657487	0.013815099	1.215437279	0.000883398	0.000812726	1.1027E-05	9.90956E-06	39391.07968	2638.108545	35.84168534	1407973.666
Orange (SC)	2025	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - ATVs	Aggregate	100	Gasoline	1.79005E-05	2.16596E-05	2.57767E-05	0.00069419	6.94026E-05	0.04548528	3.42167E-06	3.14793E-06	4.14006E-07	3.70845E-07	1474.131437	52.25525773	1.875728019	47208.75499
Orange (SC)	2025	Agricultural - ATVs	Aggregate	175	Gasoline	1.86493E-05	2.25656E-05	2.6855E-05	0.000845889	0.000100497	0.065384688	4.91862E-06	4.52513E-06	5.95343E-07	5.33086E-07	2119.050887	29.40746817	1.641051032	67862.1683
Orange (SC)	2025	Agricultural - ATVs	Aggregate	175	Diesel	4.5981E-08	5.5637E-08	6.62126E-08	9.24347E-07	4.54303E-07	0.00016873	1.80388E-08	1.65957E-08	1.53639E-09	1.37567E-09	5.46835416	70.62629016	0.002510044	260.7525718
Orange (SC)	2025	Agricultural - ATVs	Aggregate	25	Gasoline	0.001365887	0.001652723	0.001966877	0.016906898	0.000662173	0.063234573	5.50243E-05	5.06223E-05	5.3533E-07	5.15556E-07	2049.367888	268.9237084	11.35372266	65630.58328
Orange (SC)	2025	Agricultural - ATVs	Aggregate	25	Diesel	2.80545E-05	3.3946E-05	4.03985E-05	0.000250313	0.000241745	0.037196906	9.99371E-06	9.19422E-06	3.38163E-07	3.03269E-07	1205.513688	292.4702486	3.587344878	51707.08327
Orange (SC)	2025	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	99.08678894	2.662109513	15798.01758
Orange (SC)	2025	Agricultural - ATVs	Aggregate	50	Gasoline	4.20437E-05	5.08728E-05	6.05429E-05	0.002184544	0.000108022	0.068296731	5.13768E-06	4.72666E-06	6.21181E-07	5.56829E-07	2213.427217	197.7495698	7.563978722	70884.54943
Orange (SC)	2025	Agricultural - ATVs	Aggregate	50	Diesel	7.22171E-05	8.73826E-05	0.000103993	0.000712916	0.000622226	0.109478954	2.09568E-05	1.92803E-05	9.95602E-07	8.9259E-07	3548.100958	512.43635	6.66887386	152185.7049
Orange (SC)	2025	Agricultural - ATVs	Aggregate	75	Gasoline	1.16095E-05	1.40475E-05	1.67177E-05	0.000581573	3.15417E-05	0.021160354	1.59181E-06	1.46446E-06	1.92503E-07	1.72522E-07	685.7854322	99.16979633	1.290862325	21962.13696
Orange (SC)	2025	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	8.27928E-08	1.00179E-07	1.19222E-07	8.10956E-07	8.15757E-07	0.000138035	3.74369E-08	3.4442E-08	1.25554E-09	1.12541E-09	4.473570957	134.8842771	0.001255022	170.6539267
Orange (SC)	2025	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Combine Harvesters	Aggregate	300	Diesel	3.55218E-07	4.29814E-07	5.11514E-07	1.95531E-06	3.70009E-06	0.000730841	1.64562E-07	1.51397E-07	6.65008E-09	5.95861E-09	23.68582263	40.88935594	0.004907121	1018.125674
Orange (SC)	2025	Agricultural - Combine Harvesters	Aggregate	600	Diesel	2.86215E-05	3.4632E-05	4.1215E-05	0.000224606	0.00030617	0.064097228	1.24653E-05	1.14681E-05	5.8331E-07	5.2259E-07	2077.325617	682.2971819	0.268164972	89293.01608
Orange (SC)	2025	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	3.19517E-07	3.86616E-07	4.60104E-07	2.43135E-06	4.63653E-06	0.000646631	1.39976E-07	1.28778E-07	5.88368E-09	5.27203E-09	20.95665473	109.5171507	0.001238663	900.8134771
Orange (SC)	2025	Agricultural - Construction Equipment	Aggregate	100	Diesel	6.54422E-06	7.9185E-06	9.42367E-06	6.05692E-05	6.13773E-05	0.010104873	4.01896E-06	3.69744E-06	9.18974E-08	8.23858E-08	327.4885883	86.62833908	0.269842987	14046.69213
Orange (SC)	2025	Agricultural - Construction Equipment	Aggregate	175	Diesel	5.38074E-05	6.5107E-05	7.74827E-05	0.000591867	0.000610041	0.10353936	2.59097E-05	2.38369E-05	9.42022E-07	8.44164E-07	3355.6048	183.0308813	2.188256647	160008.3967
Orange (SC)	2025	Agricultural - Construction Equipment	Aggregate	300	Diesel	7.88649E-06	9.54266E-06	1.13565E-05	4.01208E-05	8.31891E-05	0.014013026	3.80902E-06	3.5043E-06	1.24775E-07	1.14249E-07	454.1478298	114.2163564	0.119337136	21655.54976
Orange (SC)	2025	Agricultural - Construction Equipment	Aggregate	50	Diesel	2.06597E-06	2.49983E-06	2.975E-06	9.77704E-06	7.70426E-06	0.001132603	4.87234E-07	4.48255E-07	1.02603E-08	9.2342E-09	36.70650574	40.88935866	0.036803406	1574.421237
Orange (SC)	2025	Agricultural - Construction Equipment	Aggregate	600	Diesel	4.3681E-06	5.2854E-06	6.29006E-06	3.61902E-05	4.4199E-05	0.007236927	2.06531E-06	1.90009E-06	6.58248E-08	5.90032E-08	234.5414172	46.83524485	0.037160206	11183.85462
Orange (SC)	2025	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.63667E-07	1.98037E-07	2.3568E-07	1.21049E-06	1.49611E-06	0.000196071	7.51245E-08	6.91146E-08	1.78204E-09	1.59858E-09	6.354463701	134.8842929	0.005056538	272.5566606
Orange (SC)	2025	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	1.17584E-06	1.42277E-06	1.69321E-06	1.04237E-05	1.13725E-05	0.002550557	5.02492E-07	4.62293E-07	2.321E-08	2.07949E-08	82.66094343	3.101300752	0.006718433	3553.147835
Orange (SC)	2025	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	7.8341E-06	9.47926E-06	1.12811E-05	6.47593E-05	8.29792E-05	0.012949849	3.94639E-06	3.63067E-06	1.17787E-07	1.05581E-07	419.6913691	91.21575341	0.031656927	18040.26665
Orange (SC)	2025	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	5.40856E-06	6.54435E-06	7.78832E-06	4.39219E-05	7.36593E-05	0.008566065	2.56232E-06	2.35734E-06	7.79071E-08	6.98398E-08	277.6173997	46.83524485	0.016053525	11933.27366
Orange (SC)	2025	Agricultural - Forklifts	Aggregate	100	Diesel	1.91324E-05	2.31502E-05	2.75506E-05	0.000155633	0.00015259	0.025287395	1.09625E-05	1.00855E-05	2.2989E-07	2.0617E-07	819.5386225	394.7886211	0.533993028	35151.77953
Orange (SC)	2025	Agricultural - Forklifts	Aggregate	175	Diesel	1.97438E-06	2.389E-06	2.84311E-06	1.93402E-05	1.94524E-05	0.003291779	8.92792E-07	8.21368E-07	2.99414E-08	2.68381E-08	106.6832038	41.34259993	0.053074803	5087.073577
Orange (SC)	2025	Agricultural - Forklifts	Aggregate	50	Diesel	2.88334E-05	3.48884E-05	4.15201E-05	0.000141381	0.000114785	0.016573481	7.13871E-06	6.56761E-06	1.50182E-07	1.35125E-07	537.1295692	536.7480437	0.744171846	23038.64619
Orange (SC)	2025	Agricultural - Forklifts	Aggregate	75	Diesel	7.3469E-05	8.88975E-05	0.000105795	0.000548478	0.000674817	0.089012574	3.38531E-05	3.11449E-05	8.09038E-07	7.25726E-07	2884.806521	1037.043748	2.225422362	123735.5765
Orange (SC)	2025	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.7372E-07	3.31201E-07	3.94157E-07	2.82007E-06	2.54595E-06	0.000459839	1.26911E-07	1.16758E-07	4.18267E-09	3.7491E-09	14.90291717	3.101300579	0.006718434	676.7900367
Orange (SC)	2025	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	7.15418E-06	8.65656E-06	1.0302E-05	3.93804E-05	7.45208E-05	0.014719339	3.31433E-06	3.04918E-06	1.33934E-07	1.20008E-07	477.0387268	150.4064959	0.127403551	21663.88326
Orange (SC)	2025	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	2.3696E-08	2.86722E-08	3.41223E-08	1.75257E-07	2.16609E-07	2.83876E-05	1.08767E-08	1.00066E-08	2.58008E-10	2.31446E-10	0.920012604	134.8842852	0.000627511	37.58221502
Orange (SC)	2025	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000120454	0.000145749	0.000173453	0.000868791	0.001018509	0.132173694	7.90043E-05	7.26839E-05	1.20099E-06	1.07762E-06	4283.614298	1205.766005	2.187075725	165626.2617
Orange (SC)	2025	Agricultural - Nut Harvester	Aggregate	175	Diesel	2.24951E-05	2.72191E-05	3.2393E-05	0.000211437	0.000225384	0.035179114	1.07175E-05	9.86009E-06	3.1994E-07	2.86818E-07	1140.11914	552.650151	0.470886201	49007.56788
Orange (SC)	2025	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.73171E-05	4.51536E-05	5.37366E-05	0.0001766	0.000149161	0.020457879	7.62378E-06	7.01387E-06	1.85329E-07	1.66795E-07	663.0189491	134.8842852	1.634332518	25635.67662
Orange (SC)	2025	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.42426E-05	1.72336E-05	2.05094E-05	7.67458E-05	0.000146707	0.027827282	6.67131E-06	6.1376E-06	2.53185E-07	2.26878E-07	901.8537708	156.3523893	0.187230448	38765.8261
Orange (SC)	2025	Agricultural - Nut Harvester	Aggregate	50	Diesel	1.08451E-05	1.31226E-05	1.5617E-05	5.012815E-05	3.88678E-05	0.005344101	2.74519E-06	2.52557E-06	4.83797E-08	4.35709E-08	173.1968586	226.4371979	0.198304141	6696.6694
Orange (SC)	2025	Agricultural - Nut Harvester	Aggregate	75	Diesel	2.20685E-05	2.67029E-05	3.17787E-05	0.000163735	0.000202055	0.02653781	1.01429E-05	9.33149E-06	2.41198E-07	2.16365E-07	860.063302	292.3220027	0.549409	33254.41084
Orange (SC)	2025	Agricultural - Other Harvesters	Aggregate	100	Diesel	2.36906E-05	2.86657E-05	3.41145E-05	0.000188351	0.000186883	0.030360419	1.3657E-05	1.25644E-05	2.75988E-07	2.47531E-07	983.9501472	596.7111463	0.491970681	38044.50508
Orange (SC)	2025	Agricultural - Other Harvesters	Aggregate	175	Diesel	2.1586E-05	2.61191E-05	3.10839E-05	0.000206111	0.000215438	0.034583331	1.01137E-05	9.30465E-06	3.14538E-07	2.81961E-07	1120.810388	340.0903014	0.457418478	48177.58949
Orange (SC)	2025	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.50684E-07	1.82328E-07	2.16985E-07	8.29444E-07	1.56958E-06	0.000310024	6.98076E-08	6.4223E-08	2.82097E-09	2.52765E-09	10.04755301	134.8842929	0.001882533	431.8900743
Orange (SC)	2025	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.55556E-07	3.09223E-07	3.68001E-07	2.00546E-06	2.73373E-06	0.000572312	1.113E-07	1.02396E-07	5.20826E-09	4.6661E-09	18.54803402	134.8842929	0.001882533	797.2798645
Orange (SC)	2025	Agricultural - Other Harvesters	Aggregate	75	Diesel	7.3388E-08	8.87995E-08	1.05679E-07	5.42781E-07	6.70851E-07	8.79179E-05	3.36857E-08	3.09909E-08	7.99064E-10	7.16802E-10	2.849330651	134.8842929	0.001882533	110.1695785
Orange (SC)	2025	Agricultural - Other Harvesters	Aggregate	750	Diesel	1.06263E-07	1.28578E-07	1.53018E-07	8.30545E-07	1.17646E-06	0.000237018	4.87662E-08	4.48649E-08	2.15694E-09	1.93243E-09	7.681508383	134.8842771	0.000627511	330.186585
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	3.98762E-06	4.82502E-06	5.74217E-06	3.67883E-05	4.01159E-05	0.00605896	1.93565E-06	1.7808E-06	5.51005E-08	4.93992E-08	196.3646878	265.86954	0.07646159	8917.560346
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.81313E-05	2.19389E-05	2.61091E-05	8.87193E-05	0.000177803	0.027405692	8.88995E-06	8.17875E-06	2.49226E-07	2.23441E-07	888.1904549	45.6078767	0.186693267	40335.62354
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.52641E-06	4.26695E-06	5.07803E-06	1.70362E-05	1.36582E-05	0.001995719	8.50029E-07	7.82027E-07	1.80828E-08	1.62713E-08	64.67921396	65.07626951	0.087346824	2642.124785
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.80378E-05	2.18258E-05	2.59745E-05	0.000143041	0.000190984	0.038411197	7.98286E-06	7.34423E-06	3.4953E-07	3.13169E-07	1244.867615	156.3523827	0.187230448	56533.49467
Orange (SC)	2025	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000491866	0.000595158	0.000708287	0.003286753	0.004297683	0.497040585	0.000265487	0.000244248	4.51517E-06	4.05241E-06	16108.57724	721.5785724	14.5277081	658030.1257
Orange (SC)	2025	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	3.23766E-05	3.91756E-05	4.66222E-05	0.000259726	0.000253658	0.042069674	1.84174E-05	1.6944E-05	3.82443E-07	3.42997E-07	1363.435128	394.80793	0.627753207	48733.89561
Orange (SC)	2025	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	7.12862E-07	8.62563E-07	1.02652E-06	3.88965E-06	6.92803E-06	0.001430437	3.2424E-07	2.98301E-07	1.30153E-08	1.16625E-08	46.3589941	137.9855776	0.009228478	1842.14889
Orange (SC)	2025	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.79864E-09	2.17635E-09	2.59004E-09	1.40325E-08	1.66556E-08	2.20599E-06	8.61526E-10	7.92604E-10	2.0051E-11	1.79856E-11	0.071493863	0.453241278	4.61229E-05	2.55543839
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	4.69345E-05	5.67908E-05	6.75857E-05	0.000672191	0.000572014	0.102975469	3.10287E-05	2.85464E-05	9.50651E-07	8.40472E-07	3340.925669	1351.725131	4.021774003	120641.4679
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	8.49696E-05	0.000102813	0.000122356	0.001664084	0.00124438	0.281116436	6.09951E-05	5.61155E-05	2.59651E-06	2.29443E-06	9120.513163	2472.343436	7.440281906	329332.6717
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.90407E-05	4.72392E-05	5.62186E-05	0.000293029	0.000625246	0.151780649	1.81611E-05	1.67082E-05	1.40212E-06	1.23881E-06	4924.355986	794.1385142	2.362792227	177819.4409
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.21747E-05	2.68314E-05	3.19316E-05	0.000105387	9.06878E-05	0.009912211	8.80494E-06	8.10055E-06	9.09781E-08	8.09021E-08	321.5907547	242.1092396	0.754082626	10444.37816
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.53679E-06	1.85951E-06	2.21297E-06	1.53981E-05	1.8446E-05	0.002301502	1.30845E-06	1.20378E-06	2.12324E-08	1.87845E-08	74.66968624	45.02008118	0.150816525	2695.31072
Orange (SC)	2025	Airport Ground Support - A/C Tug Narrow Body

Orange (SC)	2025 Airport Ground Support - Misc - Maint. Truck	Aggregate	175	Gasoline	0.000163129	0.000150046	0.000179514	0.014556744	0.001323215	0.418828256	3.00255E-05	2.26859E-05	4.16062E-06	5.85892E-06	16724.3	2832.4	6.29	368212
Orange (SC)	2025 Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000134421	0.000123641	0.000147922	0.010042462	0.000281397	0.100827022	6.95092E-06	5.25181E-06	1.22587E-06	1.55104E-06	4427.45	1708.2	9.3	85410
Orange (SC)	2025 Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.14549E-05	0.001543436	0.000456032	0.091170168	0	0	0	0	4861.8	1788.5	1.75	89425
Orange (SC)	2025 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.70816E-05	4.33056E-05	5.18104E-05	0.004418824	0.00044917	0.135242445	9.69544E-06	7.32545E-06	1.19693E-06	1.88861E-06	5391.05	795.7	4.3	99542.07
Orange (SC)	2025 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	8.74269E-09	9.07392E-06	9.87471E-07	0.00036958	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2025 Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000827603	0.000761229	0.000910726	0.050095568	0.004971849	1.215109553	8.96392E-05	6.77274E-05	1.24213E-05	1.71919E-05	49074.25	15271.6	18.13	2748888
Orange (SC)	2025 Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.03623E-05	0.005975652	0.000514657	0.169654451	0	0	0	0	9292.9	2314.1	1.78	416538
Orange (SC)	2025 Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	6.59369E-06	6.06487E-06	7.25595E-06	0.000379592	3.33583E-05	0.009522314	6.63919E-07	5.01627E-07	7.86172E-08	1.34262E-07	383.25	153.3	0.42	8170.89
Orange (SC)	2025 Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.80679E-08	2.41573E-05	6.92789E-06	0.002018454	0	0	0	0	94.9	47.45	0.15	2135.25
Orange (SC)	2025 Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.37305E-05	1.26293E-05	1.51096E-05	0.001148782	0.000116263	0.033778713	2.42157E-06	1.82963E-06	3.35556E-07	4.74391E-07	1354.15	492.75	1.58	73912.5
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	100	Diesel	3.64772E-05	4.41375E-05	5.25272E-05	0.000847397	0.000526837	0.132229374	2.13442E-05	1.96367E-05	1.22143E-06	1.07924E-06	4290.036401	3006.844325	6.135635926	247286.412
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	175	Diesel	8.65009E-05	0.000104666	0.000124561	0.002041495	0.000937317	0.346887458	3.73688E-05	3.43793E-05	3.20455E-06	2.83125E-06	11254.38155	4236.452518	8.735481657	648731.366
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	25	Diesel	1.29826E-06	1.57089E-06	1.86949E-06	1.83034E-05	1.51164E-05	0.002293516	6.53539E-07	6.01256E-07	2.11657E-08	1.87194E-08	74.41059535	154.325176	0.311981488	3858.1294
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	300	Diesel	8.45955E-05	0.000102361	0.000121817	0.000839558	0.000851585	0.36997698	3.4514E-05	3.17529E-05	3.41808E-06	3.0197E-06	12003.49566	3104.734561	6.447617414	691914.7784
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	50	Diesel	0.000125958	0.000152409	0.00018138	0.001331132	0.001158084	0.182210517	4.68838E-05	4.31331E-05	1.68085E-06	1.48718E-06	5911.619547	8879.445624	18.40690778	306519.1782
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	600	Diesel	5.19034E-05	6.28031E-05	7.47408E-05	0.000526355	0.000524478	0.221772669	2.13291E-05	1.96228E-05	2.04884E-06	1.81008E-06	7195.169993	1154.942213	2.391858073	414748.8525
Orange (SC)	2025 Airport Ground Support - Other	Aggregate	75	Diesel	2.99642E-05	3.62567E-05	4.31485E-05	0.000475619	0.000399317	0.070439828	1.91528E-05	1.76206E-05	6.50352E-07	5.7492E-07	2285.342641	2099.124309	4.471734658	131736.917
Orange (SC)	2025 Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	5.77554E-07	6.98841E-07	8.31678E-07	5.45073E-06	8.96896E-06	0.000873922	5.44335E-07	5.00788E-07	8.06252E-09	7.13283E-09	28.35343539	12.60343159	0.056435787	1386.377475
Orange (SC)	2025 Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.88433E-07	2.28004E-07	2.71344E-07	1.28293E-06	4.29164E-06	0.000728851	9.19831E-08	8.46244E-08	6.73294E-09	5.94879E-09	23.64678258	4.28516674	0.112871573	1167.707937
Orange (SC)	2025 Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.12411E-06	1.36017E-06	1.61872E-06	1.02717E-05	1.26589E-05	0.001857313	6.47699E-07	5.95883E-07	1.71381E-08	1.51591E-08	60.25848407	61.63078046	1.072279946	2664.491472
Orange (SC)	2025 Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	5.82691E-08	7.05056E-08	8.39075E-08	1.43776E-06	3.99617E-07	0.000822465	1.33542E-08	1.22859E-08	7.60235E-09	6.71285E-09	26.68398401	4.28516674	0.112871573	1317.688773
Orange (SC)	2025 Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.31082E-07	2.79609E-07	3.32758E-07	1.23226E-05	6.38287E-06	0.00211835	4.2417E-08	3.90236E-08	1.95783E-08	1.72897E-08	68.72752955	59.99233436	1.580202025	3393.852058
Orange (SC)	2025 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	3.49E-05	0.0000422	0.0000502	0.000165997	0.000902103	0.127294585	0.00004	0.0000382	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2025 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	0.0000518	0.0000625	0.0000744	0.000390956	0.001133796	0.161520299	5.17E-05	0.0000493	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2025 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000268	0.0000324	0.0000386	0.000138447	0.00065089	0.087797776	0.0000232	0.0000222	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2025 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000286381	0.00034671	0.000412384	0.001175687	0.001754445	0.163841657	0.0001361	0.0001303	0	0	5315.08071	11062.28165	6.703055	92409.8786
Orange (SC)	2025 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.001883503	0.002279001	0.002712114	0.007315038	0.011262817	1.199324645	0.00077519	0.000741307	0	0	38906.512	42036.67879	25.471615	669971.6954
Orange (SC)	2025 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000980512	0.001186393	0.001411934	0.003950039	0.012100978	1.404480895	0.000716949	0.000685333	0	0	45561.85089	28761.93632	17.42794605	805229.3166
Orange (SC)	2025 Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000141885	0.000171681	0.000204314	0.000848553	0.002985487	0.43995744	0.000127263	0.000121663	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2025 Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000320105	0.000387383	0.000461035	0.002222037	0.008101412	1.104411255	0.000317011	0.000303053	0	0	35827.48786	14573.56994	20.409706	692498.7375
Orange (SC)	2025 Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.29777E-05	3.99614E-05	4.75456E-05	0.000120711	0.000211584	0.022716592	1.51574E-05	1.44666E-05	0	0	736.9348283	3135.150353	5.102425967	11761.97355
Orange (SC)	2025 Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000822869	0.000995734	0.001185	0.003691964	0.012705811	1.198656221	0.000523388	0.000500343	0	0	38884.8258	8115.264129	15.30727894	751594.1607
Orange (SC)	2025 Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000326986	0.000395707	0.000470932	0.001402683	0.002996382	0.380146832	0.000168811	0.000161532	0	0	12332.0973	15538.90143	25.51213196	205775.436
Orange (SC)	2025 Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000303143	0.000366782	0.000436482	0.001808399	0.008347166	0.994453512	0.000255416	0.000244112	0	0	32260.41943	4151.633637	5.102426052	624624.6276
Orange (SC)	2025 Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000665096	0.000804767	0.000957716	0.002614319	0.006263627	0.688378471	0.00045426	0.000434284	0	0	22331.23828	18054.5338	28.06334527	403681.7766
Orange (SC)	2025 Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	0.0000668	0.0000808	0.0000962	0.00050645	0.00153879	0.248144597	0.0000664	0.0000635	0	0	8049.897461	3548.810303	2	155594.0469
Orange (SC)	2025 Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000467	0.00000565	0.00000673	0.0000439	0.0000954	0.012758453	0.00000489	0.00000467	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2025 Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.0000333	0.0000403	0.000048	0.000120374	0.000168508	0.017992692	0.0000211	0.0000202	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2025 Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.27E-05	3.95E-05	4.71E-05	0.000328142	0.000645685	0.082925439	3.62E-05	3.46E-05	0	0	2690.130137	4401.614761	6.136045	46771.55469
Orange (SC)	2025 Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000209682	0.000253715	0.000301942	0.001602156	0.004854301	0.796780953	0.000195562	0.000186957	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000827036	0.00100062	0.001190754	0.003254967	0.010844931	0.921443784	0.000396604	0.000379122	0	0	29891.95822	9472.179846	9.500724106	578418.6951
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.00293591	0.003552598	0.004227806	0.012517017	0.051661181	4.705534003	0.001520057	0.001453222	0	0	152649.1704	28416.54293	28.50217618	2953901.627
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000103903	0.000125723	0.00014962	0.000470833	0.002930672	0.413541555	0.0000425	0.0000406	0	0	13415.43262	1578.696655	1.583454013	260011.3422
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.00011764	0.000142341	0.000169399	0.000494528	0.001441075	0.089806748	6.02696E-05	5.75858E-05	0	0	2913.362361	1599.417342	1.340610999	55275.85913
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000770001	0.000931719	0.00110888	0.003498904	0.020237735	2.027567316	0.000424277	0.000405649	0	0	65774.99183	15994.17666	13.406113	1271345.013
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.004892315	0.005919707	0.007044933	0.020950176	0.09474626	8.6596604	0.002598922	0.002484633	0	0	280922.4113	46383.11267	38.877728	5436395.831
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.008857903	0.010717929	0.012755365	0.034899042	0.104419243	6.057461707	0.004682791	0.004476729	0	0	196506.1803	20792.43226	17.42794898	3800216.567
Orange (SC)	2025 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008519328	0.010308386	0.012267832	0.034364695	0.104940872	8.269492877	0.004388532	0.004195423	0	0	268265.2347	15994.17897	13.406115	5288980.026
Orange (SC)	2025 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2025 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001539026	0.001862101	0.002216184	0.006663852	0.039853242	4.864925641	0.000714346	0.000682855	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2025 Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001063	0.0001288	0.000153258	0.000429279	0.001097658	0.134737155	7.588E-05	7.255E-05	0	0	4370.920506	3610.067691	12.75606513	77399.85621
Orange (SC)	2025 Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000617578	0.000747286	0.000889286	0.002748996	0.015834903	1.67981091	0.000333511	0.000318967	0	0	54493.65404	15571.51683	22.96091823	1054245.272
Orange (SC)	2025 Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005097513	0.006168159	0.007340526	0.020708013	0.102553181	9.816457551	0.002735256	0.002614898	0	0	318449.3194	51782.30986	81.63881292	6160637.843
Orange (SC)	2025 Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002892911	0.003500472	0.004165799	0.01104184	0.036718923	2.915978244	0.001441945	0.001378459	0	0	94595.35288	10624.30244	20.4097058	1831067.743
Orange (SC)	2025 Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001683731	0.002037315	0.002424572	0.005191235	0.026473696	2.936270505	0.000680718	0.000650766	0	0	95253.64356	6490.26294	10.2048521	1895210.051
Orange (SC)	2025 Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002455322	0.00297094	0.003535664	0.010007655	0.06202437	5.606853962	0.001461991	0.001397663	0	0	181888.2969	4744.229492	2	3515664
Orange (SC)	2025 Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000210618	0.000254848	0.00030329	0.000849636	0.005295897	0.542378247	0.000117876	0.000112689	0	0	17594.93945	8022.818359	3	340087.2813
Orange (SC)	2025 Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	0.0000332	0.0000402	0.0000479	0.00018076	0.001017015	0.090107121	0.0000217	0.0000208	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2025 Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000953	0.000115307	0.000137225	0.00054722	0.002507125	0.228271365	0.0000465	0.0000444	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2025 Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000268638	0.000325024	0.000386793	0.001139567	0.003843575	0.321230337	0.000134085	0.000128226	0	0	10420.82438	3920.689579	6.136045973	195838.4489
Orange (SC)	2025 Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.000905032	0.001095088	0.001303245	0.004426197	0.024650328	2.485922833	0.000502174	0.000480166	0	0	80644.20772	11762.06797	18.408137	1560179.504
Orange (SC)	2025 Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000293924	0.000355648	0.000423251	0.001171389	0.00724664	0.733968862	0.000157429	0.000150502	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	0.000114193	0.000138174	0.000164438	0.003164655	0.001699363	0.508967316	4.95087E-05	4.5548E-05	4.70223E-06	4.15412E-06	16512.88405	7806.091137	18.56572826	641801.0885
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	0.000115566	0.000139835	0.000166415	0.003584415	0.001092939	0.644298712	4.85744E-05	4.46884E-05	5.95339E-06	5.25868E-06	20903.56215	5358.982388	16.47888284	800124.1913
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.000165169	0.000199854	0.000237843	0.00186211	0.001861656	0.927411937	6.11883E-05	5.62932E-05	8.56943E-06	7.56941E-06	30088.85892	5575.658753	16.6947634	1162687.083
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	7.25817E-05	8.78239E-05	0.000104518	0.000635221	0.000591374	0.088604235	2.87144E-05	2.64173E-05	8.17013E-07	7.23176E-07	2874.666832	2499.715676	6.83621777	97314.56722
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.00021664	0.000262134	0.000311961	0.002518052	0.002115563	1.335369726	7.56121E-05	6.95632E-05	1.23397E-05	1.08991E-05	43324.60012	4351.682172	13.38459479	1688756.068
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	1.99557E-05	2.41464E-05	2.87362E-05	0.00026818	0.00037649	0.040124131	2.0585E-05	1.89382E-05	3.70369E-07	3.27488E-07	1301.783226	761.7449282	2.302725986	53114.83916
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000117857	0.000142606	0.000169713	0.001938643	0.000842477	1.071539644	3.15651E-05	2.90399E-05	9.90338E-06	8.74576E-06	34764.92364	2088.233242	3.382128792	1331480.783
Orange (SC)	2025 Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.000129896	0.000157174	0.00018705	0.000908067	0.00352704	0.481275357	8.17129E-05	7.51759E-05	4.44573E-06	3.9281E-06	15614.44894	323.4946037	0.431761122	601846.2997
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	100	Diesel	0.000391201	0.000473353	0.000563329	0.004608647	0.004407108	0.651011836	0.000254893	0.000234502	6.00719E-06	5.31347E-06	21121.36207	16054.2567	34.52365137	1421310.571
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	175	Diesel	0.001044681	0.001264064	0.00150434	0.011935662	0.011790196	1.876731096	0.000640928	0.000589654	1.732E-05	1.53176E-05	60888.47355	27679.81145	59.46744136	4079926.011
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	25	Diesel	3.0412E-06	3.67986E-06	4.37933E-06	1.70014E-05	1.42152E-05	0.00170231	1.12844E-06	1.03816E-06	1.56475E-08	1.3894E-08	55.22956152	133.4125255	0.271128152	3335.313137
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	300	Diesel	0.001354539	0.001638992	0.001950536	0.009320446	0.016817443	3.200189729	0.000713283	0.00065622	2.95467E-05	2.61195E-05	103826.6314	31847.83933	65.6130128	6971819.555
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	50	Diesel	7.26169E-05	8.78665E-05	0.000104568	0.000340475	0.000270668	0.027580204	2.63054E-05	2.4201E-05	2.52814E-07	2.25106E-07	894.8093492	1297.749662	2.892033622	53539.90291
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	600	Diesel	0.001835982	0.002221539	0.002643815	0.018367317	0.021535225	5.827452393	0.000873636	0.000803745	5.38226E-05	4.75629E-05	189065.2751	34731.16186	68.41467038	12694984.19
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	75	Diesel	3.25498E-05	3.93853E-05	4.68717E-05	0.000134525	0.000278521	0.015051841	2.81162E-05	2.58669E-05	1.38185E-07	1.22851E-07	488.3404199	477.5489684	1.35564076	32925.63861
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	750	Diesel	6.74347E-05	8.15959E-05	9.71059E-05	0.000574945	0.000808951	0.1133123	4.01676E-05	3.69542E-05	1.04561E-06	9.2484E-07	3676.29279	389.9506011	0.903760507	247024.9566
Orange (SC)	2025 Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000241471	0.000292179	0.000347718	0.002454447	0.003623897	0.316762998	0.00015098	0.000138902	2.92139E-06	2.58538E-06	10277.02662	735.889916	1.446016811	690241.9402
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.002725146	0.003297426	0.00392421	0.02786771	0.028826256	3.930534175	0.002071423	0.001905709	3.6258E-05	3.20805E-05	127521.8526	65608.71364	136.3590314	5743335.647
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.00201631	0.002439736	0.002903487	0.026205501	0.022009561	4.304503463	0.001229886	0.001131495	3.97368E-05	3.51328E-05	139654.8743	42173.11735	90.55843911	6301614.032
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.001958298	0.002369541	0.002819949	0.014959776	0.025100526	4.51056718	0.001047058	0.000963294	4.16437E-05	3.68146E-05	146340.3846	32158.10558	69.70352842	6605672.491
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000222951	0.00026977	0.000321049	0.001034519	0.000763643	0.089322848	7.05704E-05	6.49247E-05	8.19146E-07	7.29041E-07	2897.981424	2812.030599	8.021119496	118321.1634
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.00445529	0.005390901	0.006415618	0.042352765	0.048697642	15.77912354	0.001933155	0.001778503	0.000145752	0.000128787	511936.2858	59921.87214	123.2846067	23073136.42
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	4.72864E-05	5.72166E-05	6.80925E-05	0.000185483	0.000453123	0.015486889	3.32221E-05	3.05644E-05	1.41765E-07	1.26402E-07	502.4550725	319.9254252	1.443801509	22655.91572
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	0.000102791	0.000124377	0.000148019	0.000584825	0.001614992	0.159016795	5.41044E-05	4.97761E-05	1.46711E-06	1.29787E-06	5159.124784	378.1878078	0.882323145	234167.0807
Orange (SC)	2025 Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000316139	0.000382528	0.00045524	0.002396828	0.007309439	0.916672634	0.000163947	0.000150831	8.46561E-06	7.48176E-06	29740.43406	1368.460064	2.406335849	1325885.84
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	100	Diesel	0.001353688	0.001637962	0.001949311	0.02872065	0.016972332	4.356243197	0.000669165	0.000615631	4.0235E-05	3.55551E-05	141333.513	88030.3609	133.4168351	7196108.607
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	175	Diesel	0.002436733	0.002948447	0.003508896	0.057053326	0.021571057	9.788527908	0.001062906	0.000977874	9.04267E-05	7.98926E-05	317578.0078	109993.9312	180.9164433	16071325.04
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	25	Diesel	3.90867E-06	4.72949E-06	5.62848E-06	1.32813E-05	9.02123E-06	0.000698842	1.25729E-06	1.15671E-06	6.34388E-09	5.70385E-09	22.67314308	41.30848445	0.160743175	1032.712111
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	300	Diesel	0.002587373	0.003130721	0.003725817	0.025944678	0.023287714	12.46760038	0.000773046	0.000711202	0.000115192	0.000101759	404497.5637	93562.39691	155.9208796	20462670.22
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	50	Diesel	0.002022112	0.002446756	0.002911841	0.025635783	0.020981008	3.574349175	0.000651633	0.000599502	3.2986E-05	2.91734E-05	115965.8225	147433.6591	196.1870449	5278324.158
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	600	Diesel	0.003983681	0.004820254	0.0057365	0.043800939	0.029994544	22.13001935	0.001058629	0.000973939	0.000204483	0.000180622	717984.1058	107697.9151	163.5561804	36409939.98
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	75	Diesel	9.61765E-05	0.000116374	0.000138494	0.001734049	0.001304513	0.273591979	7.20578E-05	6.62932E-05	2.52661E-06	2.23302E-06	8876.390445	6034.528259	8.117530329	449933.0842
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	750	Diesel	0.000109842	0.000132909	0.000158173	0.000919843	0.001478551	0.323178235	5.45289E-05	5.01666E-05	2.98465E-06	2.63774E-06	10485.16191	862.6682813	1.446688573	528268.7434
Orange (SC)	2025 Construction and Mining - Excavators	Aggregate	9999	Diesel	7.55888E-05	9.14625E-05	0.000108848	0.00114358	0.002721146	0.616829648	2.44849E-05	2.25261E-05	5.70063E-06	5.03448E-06	20012.35862	840.5050534	1.205573811	999803.2072
Orange (SC)	2025 Construction and Mining - Graders	Aggregate	100	Diesel	0.000451231	0.000545989	0.000649772	0.004060815	0.004314193	0.534923306	0.000317494	0.000292094	4.93209E-06	4.36597E-06	17354.99754	9253.449364	21.72595627	828742.9778
Orange (SC)	2025 Construction and Mining - Graders	Aggregate	175	Diesel	0.0031514	0.003813194	0.004538017	0.038399809	0.032105967	5.96607874	0

Orange (SC)	2025 Construction and Mining - Misc - Trenchers	Aggregate	25	Gasoline	0.002295912	0.002318872	0.002526512	0.07580748	0.001479832	2.64316E-06	0.000856382	0.000647044	1.20531E-06	1.66378E-06	4742.017404	0	14.56290638	0
Orange (SC)	2025 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000119317	0.000143512	0.00017152	0.000489828	0.000906886	2.09328E-06	3.04975E-05	2.30425E-05	1.24426E-08	1.07182E-08	42.64374616	0	4.276505322	0
Orange (SC)	2025 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.022802148	0
Orange (SC)	2025 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.001995395	0.001835365	0.002195811	0.148627843	0.002771743	0.97613362	6.72938E-05	5.08442E-05	1.1868E-05	1.61395E-05	46070.3	20845.15	51.79	625354.5
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.00037588	0.000454814	0.000541267	0.007501385	0.004823563	1.130347934	0.000231883	0.000213332	1.04394E-05	9.22575E-06	36672.89387	20560.42228	28.31075802	1622731.445
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000440502	0.000533007	0.000634322	0.009558621	0.004102064	1.610368874	0.000196688	0.000180953	1.48754E-05	1.31436E-05	52246.64463	14642.22626	20.77708292	2321347.265
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	4.10302E-06	4.96466E-06	5.90835E-06	1.36425E-05	9.39396E-06	0.000717848	1.29148E-06	1.18816E-06	6.51377E-09	5.85898E-09	23.28978941	37.22252908	0.158603686	930.563227
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000334012	0.000404155	0.000480977	0.002926619	0.002968493	1.357315813	0.000106873	9.83231E-05	1.2539E-05	1.10782E-05	44036.61673	9158.789393	13.71921887	1955362.96
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.001074007	0.001299548	0.00154657	0.011618565	0.009283068	1.477827829	0.000351867	0.000323718	1.3631E-05	1.20618E-05	47946.49638	50913.3475	75.09884551	1916962.382
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000900282	0.001089341	0.001296406	0.009088004	0.006484111	4.555465716	0.000222464	0.000204667	4.20905E-05	3.71811E-05	147797.0682	18358.43051	25.93170272	6576784.663
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000433013	0.000523946	0.000623539	0.005516279	0.004782137	0.762327115	0.000278778	0.000256476	7.0351E-06	6.22201E-06	24732.86371	15662.49579	26.40751378	1100652.101
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	7.60672E-05	9.20413E-05	0.000109537	0.000397374	0.000624157	0.190565979	3.22698E-05	2.96882E-05	1.75959E-06	1.55537E-06	6182.703317	434.4799707	0.634414746	276436.6794
Orange (SC)	2025 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	7.51002E-05	9.08712E-05	0.000108144	0.000482494	0.001300045	0.240150111	2.83603E-05	2.60915E-05	2.21805E-06	1.96007E-06	7791.405882	220.6365411	0.396509216	346050.8737
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	4.98836E-05	6.03591E-05	7.18324E-05	0.000758377	0.000526438	0.103671665	3.04435E-05	2.8008E-05	9.56999E-07	8.46154E-07	3363.512995	1922.487058	1.335742834	169561.0965
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.001157274	0.001400302	0.001666475	0.021490556	0.008823827	3.38751172	0.000434401	0.000399649	3.12845E-05	2.76484E-05	109904.0871	35347.90866	24.59338277	5577040.973
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.002023179	0.002448046	0.002913378	0.016183164	0.015064653	6.898493598	0.000579148	0.000532816	6.37193E-05	5.63046E-05	223814.0275	54034.50868	41.40802787	11366452.09
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	0.000137908	0.000166869	0.000198588	0.001361128	0.000986498	0.14320191	4.55122E-05	4.18712E-05	1.31984E-06	1.16879E-06	4646.028264	7401.174099	4.47866715	213328.2157
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.008205633	0.009928816	0.011816111	0.065687269	0.060753048	29.57160967	0.002153665	0.001981372	0.000273158	0.00024136	959418.3085	129144.5503	92.32340179	48506201.31
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	1.4655E-05	1.77325E-05	2.11032E-05	0.000295899	0.000123764	0.03959604	2.01688E-06	1.85553E-06	3.65645E-07	3.23178E-07	1284.649904	924.501354	0.628584863	65706.75548
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.003660405	0.00442909	0.005270983	0.030129454	0.031961286	10.11999381	0.001224006	0.001126085	9.34545E-05	8.2598E-05	328332.0539	24950.28801	19.80042319	16596553.8
Orange (SC)	2025 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.004740179	0.005735616	0.006825857	0.038498459	0.100130966	17.80433702	0.001661883	0.001528932	0.000164468	0.000145317	577642.1065	22951.82717	15.79319469	29442042.53
Orange (SC)	2025 Construction and Mining - Other	Aggregate	100	Diesel	0.001099155	0.001329977	0.001582783	0.015694633	0.012917813	2.358312531	0.000769914	0.000708321	2.17708E-05	1.92482E-05	76512.85285	43259.35724	92.42846535	3562061.611
Orange (SC)	2025 Construction and Mining - Other	Aggregate	175	Diesel	0.000510448	0.000617642	0.000735045	0.008165407	0.005690939	1.366164797	0.000296207	0.00027251	1.26156E-05	1.11505E-05	44323.71228	13601.32191	32.06063519	2068422.403
Orange (SC)	2025 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Other	Aggregate	300	Diesel	0.000601744	0.00072811	0.000866511	0.004787675	0.007587556	1.849531066	0.000296376	0.000272666	1.70818E-05	1.50956E-05	60005.99854	12600.04263	30.02752174	2789055.356
Orange (SC)	2025 Construction and Mining - Other	Aggregate	50	Diesel	0.000846534	0.001024306	0.001219008	0.006593672	0.005825069	0.800443755	0.000362336	0.00033335	7.3751E-06	6.53311E-06	25969.51609	28384.41396	58.1001267	1078724.333
Orange (SC)	2025 Construction and Mining - Other	Aggregate	600	Diesel	0.001734566	0.002098825	0.002497776	0.017077313	0.019009346	7.110888591	0.000721036	0.000663353	6.56917E-05	5.80381E-05	230704.9491	27760.17433	60.36783016	10726728.17
Orange (SC)	2025 Construction and Mining - Other	Aggregate	75	Diesel	0.000233416	0.000282433	0.000336118	0.001301883	0.002463274	0.150911579	0.000188738	0.000173639	1.38825E-06	1.23172E-06	4896.159981	3152.304645	9.930977242	230295.1979
Orange (SC)	2025 Construction and Mining - Other	Aggregate	750	Diesel	0.0002654	0.000321133	0.000382175	0.002316613	0.003162109	1.104625285	0.000106333	9.78261E-05	1.02048E-05	9.0158E-06	35838.35083	2699.930485	5.317373641	1665182.661
Orange (SC)	2025 Construction and Mining - Other	Aggregate	9999	Diesel	8.59767E-05	0.000104032	0.000123806	0.000836611	0.002271408	0.442008669	3.77907E-05	3.47675E-05	4.08401E-06	3.60762E-06	14340.48448	726.9184781	1.485736753	667861.0774
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	100	Diesel	0.00030467	0.000368651	0.000438725	0.00512409	0.003934996	0.78311791	0.000207228	0.00019065	7.23117E-06	6.3917E-06	25407.39814	14613.28123	36.78520014	1185550.743
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000373287	0.000451678	0.000537534	0.007371451	0.004100251	1.29272072	0.0019509	0.000179483	1.19406E-05	1.0551E-05	41940.90009	12346.40766	31.13800523	1949784.159
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000168538	0.000203931	0.000242695	0.001859463	0.001988303	0.982681328	6.70181E-05	6.16566E-05	9.08032E-06	8.02051E-06	31882.01347	6770.70863	14.6670201	1482600.73
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	50	Diesel	0.000126169	0.000152665	0.000181683	0.00082195	0.000686736	0.097965331	4.39847E-05	4.04659E-05	9.01953E-07	7.9958E-07	3178.377285	3430.498508	9.411991507	132935.8607
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	600	Diesel	3.60145E-05	4.35776E-05	5.18609E-05	0.000395683	0.000420581	0.213088211	1.28231E-05	1.17972E-05	1.96903E-06	1.7392E-06	6913.412319	888.8021917	1.960831564	321894.9084
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	75	Diesel	0.000153871	0.000186184	0.000221575	0.001141044	0.001510491	0.161509786	0.00012922	0.000118883	1.48862E-06	1.31822E-06	5240.007146	3407.673309	8.706092144	245457.9776
Orange (SC)	2025 Construction and Mining - Pavers	Aggregate	750	Diesel	3.72316E-06	4.50502E-06	5.36135E-06	6.84845E-05	1.88495E-05	0.03789266	6.54648E-07	6.02276E-07	3.50225E-07	3.09275E-07	1229.385628	76.29874878	0.156866525	57224.06158
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000165212	0.000199906	0.000237905	0.003376011	0.002188794	0.521248352	8.83588E-05	8.12901E-05	4.81424E-06	4.25436E-06	16911.32874	10326.03552	21.53446065	921100.2109
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.00016733	0.000202469	0.000240955	0.00316662	0.0017394	0.540336867	9.11061E-05	8.38176E-05	4.99066E-06	4.41016E-06	17530.63459	6540.940483	13.86036195	956193.5926
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	8.58675E-05	0.0001039	0.000123649	0.00074437	0.000943738	0.357120972	3.76849E-05	3.46701E-05	3.29918E-06	2.91477E-06	11586.39663	2751.89421	5.794727593	629980.8004
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	8.24266E-05	9.97361E-05	0.000118694	0.000880418	0.000759618	0.122061047	2.96314E-05	2.72609E-05	1.12604E-06	9.96246E-07	3960.136259	5608.633862	11.58945519	194298.3421
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	6.40874E-05	7.75458E-05	9.22859E-05	0.000778156	0.000543219	0.409413695	1.72248E-05	1.58468E-05	3.78331E-06	3.34158E-06	13282.97644	1838.241074	3.758742223	724407.1353
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.97473E-05	2.38942E-05	2.84361E-05	0.000112496	0.00017903	0.014088512	1.77921E-05	1.63687E-05	1.29663E-07	1.14989E-07	457.0862575	370.9562217	1.174606945	25073.28357
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.15787E-05	1.40102E-05	1.66733E-05	0.000139424	0.000100115	0.075777687	1.55281E-06	1.42859E-06	7.00255E-07	6.18487E-07	2458.523601	209.7827729	0.391535648	133818.0693
Orange (SC)	2025 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.56155E-06	7.93947E-06	9.44863E-06	6.84408E-05	0.000161162	0.03579834	2.73645E-06	2.51753E-06	3.30777E-07	2.92181E-07	1161.437718	74.98149044	0.156614259	63210.49911
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	100	Diesel	0.001192166	0.001442521	0.001716719	0.020182071	0.015378554	3.121804781	0.000761277	0.000700374	2.88269E-05	2.54798E-05	101283.5181	59807.70248	175.4753378	5217592.473
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000644477	0.000779817	0.000928047	0.017901042	0.006775403	3.24915262	0.000304111	0.000279782	3.00207E-05	2.65191E-05	105415.1784	37811.33875	102.6228182	5436424.432
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	25	Diesel	1.798E-06	2.17558E-06	2.58912E-06	5.97833E-06	4.11656E-06	0.000314571	5.65946E-07	5.2067E-07	2.85442E-09	2.56748E-09	10.20590137	18.93430752	0.080678316	473.3576879
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000179215	0.000216851	0.0002587	0.001583719	0.002262985	0.549340459	9.02589E-05	8.30382E-05	5.07355E-06	4.48364E-06	17822.74619	4225.474737	13.31192217	918043.675
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001605607	0.001942785	0.002312075	0.014097346	0.01260698	2.011623264	0.000570315	0.00052469	1.85503E-05	1.64186E-05	65264.9014	84625.27803	237.9203545	3024869.901
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	600	Diesel	6.76751E-05	8.18868E-05	9.74521E-05	0.000814634	0.00081796	0.30336938	2.83459E-05	2.60782E-05	2.80277E-06	2.47606E-06	9842.485439	1436.545911	4.598664024	505416.3391
Orange (SC)	2025 Construction and Mining - Rollers	Aggregate	75	Diesel	5.91897E-05	7.16195E-05	8.52331E-05	0.000234871	0.000575115	0.020078804	4.11301E-05	3.78397E-05	1.83863E-07	1.6388E-07	651.4346796	473.3576879	2.016957905	33589.46154
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001490886	0.001803972	0.002146876	0.049053446	0.025802647	8.052328841	0.000551628	0.000507498	7.4403E-05	6.5722E-05	261248.9412	130309.2479	449.7884055	12544501.59
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.000478801	0.00057935	0.000689474	0.009517018	0.00475624	1.707000748	0.000325625	0.000299575	1.57677E-05	1.39323E-05	55381.75934	21136.21665	74.48369374	2664162.781
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	6.15419E-07	7.44657E-07	8.86203E-07	7.45518E-06	9.02395E-06	0.001051519	5.16191E-07	4.74896E-07	9.70336E-09	8.58236E-09	34.11539119	58.99668146	0.186209234	1474.917037
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	2.4495E-05	2.9639E-05	3.52728E-05	0.000251114	0.000354941	0.133365646	8.49062E-06	7.81137E-06	1.2323E-06	1.08851E-06	4326.901493	982.2947463	3.817289304	207934.4983
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	6.50148E-05	7.86679E-05	9.36213E-05	0.000644261	0.000596804	0.101284126	2.1773E-05	2.00312E-05	9.34472E-07	8.26667E-07	3286.05193	2976.273327	10.61392636	142084.766
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	5.0787E-06	6.14523E-06	7.31333E-06	7.9659E-05	4.38539E-05	0.043924979	7.63643E-07	7.02552E-07	4.05956E-07	3.5851E-07	1425.097576	171.4181356	0.65173232	68548.6812
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	7.78736E-06	9.4227E-06	1.12138E-05	3.24845E-05	7.74684E-05	0.003400627	5.67121E-06	5.21751E-06	3.12069E-08	2.77555E-08	110.3295823	85.32668189	0.372418469	5285.064754
Orange (SC)	2025 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.54032E-06	1.86378E-06	2.21806E-06	1.54358E-05	2.1123E-05	0.008263339	1.51559E-07	1.39434E-07	7.63525E-08	6.74443E-08	268.0949328	20.64883851	0.093104617	12905.52407
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.00024301	0.000294042	0.000349934	0.002067317	0.002444594	0.264420078	0.000176659	0.000162526	2.4374E-06	2.15816E-06	8578.818226	4979.126147	5.680076826	416624.9341
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.00032788	0.000396735	0.000472147	0.002800187	0.003396384	0.401074279	0.000220067	0.000202461	3.69829E-06	3.27351E-06	13012.41329	4462.47876	5.526561236	636135.8647
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0.0000288	3.46401E-05	4.14005E-05	0.000181702	0.00021693	5.23637E-07	7.62897E-06	5.76411E-06	3.94676E-09	3.39977E-09	13.52644799	0	6.303578	0
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000275814	0.000333735	0.000397173	0.002007543	0.003571882	0.410555191	0.000155815	0.00014335	3.78751E-06	3.3509E-06	13320.01103	2981.44093	4.144920927	650637.1718
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	6.59017E-05	7.9741E-05	9.48984E-05	0.000782949	0.00055591	0.088700761	1.92188E-05	1.76813E-05	8.18105E-07	7.23964E-07	2877.79851	3070.250958	3.147069593	126578.7901
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.002587516	0.003130895	0.003726024	0.024500122	0.029600934	4.492725288	0.001299807	0.001195822	4.14598E-05	3.6669E-05	145761.5241	19283.93579	25.8673769	7071636.957
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	0.000116358	0.000140793	0.000167556	0.000885689	0.001125136	0.109832197	8.01505E-05	7.37384E-05	1.01196E-06	8.96436E-07	3563.384678	2394.087789	2.993554003	174271.1136
Orange (SC)	2025 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	6.03396E-05	7.3011E-05	8.68891E-05	0.000346606	0.000904281	0.166293537	2.56453E-05	2.35936E-05	1.53566E-06	1.35727E-06	5395.210665	396.3125009	0.383788975	263879.2744
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.003746068	0.004532743	0.005394339	0.049252474	0.038289481	6.79522536	0.002300372	0.002116342	6.27128E-05	5.54617E-05	220463.6032	138279.1699	146.2489192	11893850.05
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.005705397	0.006903531	0.008215772	0.1006372	0.049122554	16.12986996	0.002602467	0.002394269	0.000148957	0.00013165	523315.867	187091.5296	193.7718175	28056452.51
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.006580697	0.007962644	0.009476204	0.051588752	0.066403176	23.43266117	0.002207866	0.002031236	0.000216449	0.000191254	760246.8851	195173.0194	178.9709148	40719182.86
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.000377901	0.000457261	0.000544178	0.002829294	0.002070772	0.279069543	0.000123167	0.000113313	2.5688E-06	2.27773E-06	9054.103992	10452.93132	11.84072212	433812.1411
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.009374735	0.01134343	0.013499619	0.072811388	0.084218431	30.42846724	0.003159049	0.002906325	0.000281045	0.000248353	987218.1086	159669.3662	158.6496755	52829706.37
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	2.08379E-06	2.52139E-06	3.00066E-06	8.17375E-06	1.9968E-05	0.000682468	1.46402E-06	1.3469E-06	6.24724E-09	5.57022E-09	22.14193469	18.77625931	0.080004879	1182.904337
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.000846439	0.001024192	0.001218873	0.007981879	0.006356067	2.668443124	0.000233582	0.000214895	2.46457E-05	2.17795E-05	86574.69839	7154.130322	7.200439129	4641270.599
Orange (SC)	2025 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000619298	0.00074935	0.000891789	0.004434758	0.013507145	2.090721736	0.000251963	0.000231806	1.93112E-05	1.70642E-05	67831.1642	3779.660999	3.120190289	3617083.912
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	100	Diesel	0.000197716	0.000239237	0.000284712	0.001789662	0.00244223	0.235125957	0.000177127	0.000162957	2.16792E-06	1.91907E-06	7628.402738	3342.239386	5.695509323	304469.248
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.001268298	0.001534641	0.001826349	0.017028061	0.013886889	2.697972927	0.000722788	0.000664965	2.4906E-05	2.20205E-05	87532.76033	20937.49697	47.06705621	3482203.16
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	25	Diesel	1.96731E-07	2.38044E-07	2.83292E-07	4.35583E-06	3.56124E-06	0.000714389	1.42421E-08	1.31027E-08	6.59897E-09	5.83074E-09	23.17754987	33.41682439	0.079104296	835.4206097
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.00174613	0.002112817	0.002514427	0.012965216	0.020283258	3.94018137	0.000916946	0.00084359	3.63765E-05	3.21592E-05	127834.8452	23537.04743	54.26554716	5130555.503
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.79674E-05	3.38405E-05	4.0273E-05	9.51966E-05	6.66125E-05	0.005685985	9.39134E-06	8.64003E-06	5.17307E-08	4.64082E-08	184.4755208	174.6029074	0.474625777	6762.358537
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.014105399	0.017067533	0.020311775	0.131563037	0.159376635	44.15244919	0.006172363	0.005678574	0.000407788	0.000360366	1432477.589	136114.9871	277.0232451	57296472.41
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	75	Diesel	4.75023E-05	5.74778E-05	6.84033E-05	0.000379565	0.000453452	0.051810419	3.6318E-05	3.34125E-05	4.77588E-07	4.2287E-07	1680.931993	1001.483662	2.135815996	66940.31187
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000464586	0.00056215	0.000669005	0.006076773	0.00704188	1.071802509	0.000289964	0.000266767	9.89541E-06	8.74791E-06	34773.45204	2268.816727	4.429840584	1393608.29
Orange (SC)	2025 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.000676774	0.000818896	0.000974554	0.007912358	0.011649705	1.029714008	0.000400466	0.000368429	9.49991E-06	8.40439E-06	33407.93696	838.5766431	2.0567117	1339346.321
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	7.76544E-06	9.39618E-06	1.11822E-05	3.16958E-05	7.80443E-05	0.002860913	5.24742E-06	4.82763E-06	2.62176E-08	2.33504E-08	92.81916301	57.50297508	0.245017844	4868.585223
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	9.32668E-06	1.12853E-05	1.34304E-05	0.000298379	0.000104213	0.054641014	4.01582E-06	3.69455E-06	5.04903E-07	4.45973E-07	1772.767518	611.8316549	2.205160597	93152.74313
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	8.61595E-06	1.04253E-05	1.2407E-05	9.56398E-05	0.000114912	0.050768786	3.5494E-06	3.26545E-06	4.69124E-07	4.14368E-07	1647.137352	420.8259393	1.38843445	86397.93254
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000727207	0.000879921	0.001047179	0.009436093	0.008531788	1.522225755	0.000216344	0.000199036	1.40519E-05	1.24242E-05	49386.9382	53277.65647	164.7336638	2321478.997
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.86724E-06	4.67936E-06	5.56883E-06	2.77634E-05	5.79383E-05	0.014658967	2.54056E-06	2.33732E-06	1.35413E-07	1.19645E-07	475.5940475	52.71106049	0.163345229	24921.7894
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.001758731	0.002128064	0.002532572	0.049687659	0.02847552	8.080927112	0.000861196	0.0007923	7.46594E-05	6.59554E-05	262176.7806	194704.4028	531.3620312	13742660.6
Orange (SC)	2025 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.36014E-06	2.85577E-06	3.3986E-06	3.59514E-05	8.62298E-05	0.019842934	1.14477E-06	1.05319E-06	1.83387E-07	1.61955E-07	643.7821287	33.83091701	0.163345229	33830.91701
Orange (SC)	2025 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	1.84498E-05	2.23242E-05	2.65677E-05	0.00053837	0.000313962	0.08777702	9.59148E-06	8.82416E-06	8.10989E-07	7.16424E-07	2847.828743	2010.954189	6.964830788	181050.8825
Orange (SC)	2025 Construction and Mining - Surfacing Equipment	Aggregate	175	Diesel	3.01343E-05	3.64625E-05	4.33934E-05	0.000422363	0.000356674

Orange (SC)	2025 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21.58185643	0
Orange (SC)	2025 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	2.32632E-05	2.55997E-05	2.34958E-05	0.000307043	2.49914E-06	0.000673582	1.09683E-08	8.28717E-09	1.24898E-08	1.72405E-08	46.14654577	0	20.13611934	0
Orange (SC)	2025 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.46587867	0
Orange (SC)	2025 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	2.01774E-06	2.90054E-06	2.4269E-06	8.28337E-06	1.53361E-05	0.002011725	5.15735E-07	3.89667E-07	1.92355E-08	1.65697E-08	65.92454495	0	0.157098207	0
Orange (SC)	2025 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	8.69025E-05	9.56309E-05	8.77716E-05	0.004179826	0.000031259	0.009162351	1.51936E-07	1.14796E-07	1.55263E-07	2.1432E-07	598.0269478	0	92.55933593	0
Orange (SC)	2025 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	34.31826958	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000155093	0.00017067	0.000156644	0.010501112	6.98694E-05	0.020867	1.53585E-06	1.16042E-06	3.70598E-07	5.11562E-07	1413.953211	0	195.1082313	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	83.24881353	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.65018E-06	1.06194E-05	9.74668E-06	0.000223647	4.62121E-06	0.000567279	4.38135E-07	3.31036E-07	9.82074E-09	1.35563E-08	35.52217855	0	12.98776448	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.541621571	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000128306	0.000141193	0.000129589	0.008845842	4.3902E-05	0.017577775	1.29375E-06	9.77505E-07	3.05221E-07	4.21317E-07	1190.770001	0	53.1184896	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	22.66460623	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.033320271	0.036666926	0.033653474	1.64908713	0.020256896	4.262015129	0.000274332	0.000207273	6.92562E-05	9.55992E-05	259953.9622	0	53342.33362	0
Orange (SC)	2025 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	22760.11604	0
Orange (SC)	2025 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000773012	0.000850652	0.000780742	0.056346398	0.000573864	0.136283629	2.08697E-06	1.57682E-06	2.18705E-06	3.01894E-06	8486.172768	0	442.5279031	0
Orange (SC)	2025 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.083328591	0.091698031	0.084161875	0.531543886	0.003682677	2.16952709	0.001171636	0.000885236	3.13323E-05	4.32502E-05	122916.9034	0	14680.42653	0
Orange (SC)	2025 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	34734.73565	0
Orange (SC)	2025 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.65306E-05	1.81909E-05	1.66959E-05	0.001225481	1.81218E-05	0.004397241	5.17201E-08	3.90773E-08	6.06995E-08	8.37878E-08	237.9847936	0	4.46225241	0
Orange (SC)	2025 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.113537968	0.124941608	0.114673347	0.423003056	0.00282641	2.757181341	0.001743898	0.001317612	3.61858E-05	4.995E-05	142404.8318	0	7127.363836	0
Orange (SC)	2025 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	18692.07195	0
Orange (SC)	2025 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000410959	0.000452235	0.000415068	0.023265384	0.000149765	0.05662162	1.1207E-06	8.46747E-07	9.0749E-07	1.25267E-06	3528.940856	0	427.8922045	0
Orange (SC)	2025 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.62306E-07	1.09583E-06	9.16886E-07	5.39837E-06	0.000006445	0.000884119	2.26657E-07	1.71252E-07	8.47444E-09	7.29996E-09	29.0438674	0	0.122129132	0
Orange (SC)	2025 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.31613E-05	8.05095E-05	7.38928E-05	0.006816861	4.96518E-05	0.01343289	2.65873E-07	2.00882E-07	2.31855E-07	3.20046E-07	910.0786442	0	36.8994935	0
Orange (SC)	2025 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.33635E-07	1.92102E-07	1.60733E-07	5.48606E-07	1.01571E-06	0.000133236	3.41571E-08	2.58076E-08	1.27397E-09	1.09741E-09	4.366174486	0	0.013803602	0
Orange (SC)	2025 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000208266	0.000229184	0.000210348	0.010528326	8.04669E-05	0.022352367	4.07684E-07	3.08028E-07	3.86985E-07	5.34182E-07	1477.868918	0	348.4163721	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001656756	0.00182316	0.001673324	0.089408852	0.001291693	0.244245405	7.12287E-06	5.38173E-06	3.74485E-06	5.16929E-06	14565.72619	0	381.483234	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.00019417	0.000279123	0.000233544	0.001375039	0.00164163	0.225197203	5.77326E-05	4.36202E-05	2.15856E-06	1.8594E-06	7397.870555	0	261.8724071	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	22.8350168	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.054787523	0.060290327	0.055335398	3.251299507	0.02799568	6.335472199	0.000194937	0.000147285	0.000110736	0.000152856	433989.7657	0	4446.314361	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000586098	0.000842524	0.000704947	0.002406086	0.004454714	0.584349878	0.000149807	0.000113187	5.58738E-06	4.81303E-06	19149.23521	0	533.7146796	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	260.8315965	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.00018281	0.000201171	0.000184638	0.006568293	7.52437E-05	0.014438078	4.23238E-07	3.1978E-07	2.48582E-07	3.43135E-07	947.2706408	0	62.09438138	0
Orange (SC)	2025 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.716876957	0
Orange (SC)	2025 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000203793	0.000224262	0.000205831	0.015434709	9.88783E-05	0.025292254	5.17038E-07	3.90651E-07	5.06424E-07	6.99052E-07	1874.504655	0	444.4696871	0
Orange (SC)	2025 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	42.98019482	0
Orange (SC)	2025 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.47772E-07	7.12833E-07	6.5425E-07	6.60823E-05	4.60639E-07	0.000108287	2.21365E-09	1.67254E-09	2.09165E-09	2.88726E-09	7.996282045	0	0.915488447	0
Orange (SC)	2025 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.088527684	0
Orange (SC)	2025 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	9.11591E-05	0.000100315	9.20707E-05	0.004857618	3.89516E-05	0.01040568	1.89919E-07	1.43494E-07	1.77658E-07	2.45233E-07	684.6801273	0	334.1533175	0
Orange (SC)	2025 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	32.31260782	0
Orange (SC)	2025 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000300736	0.000330941	0.000303743	0.019413946	0.00018308	0.046169998	8.39088E-07	6.33977E-07	7.5071E-07	1.03626E-06	2899.039192	0	468.5628159	0
Orange (SC)	2025 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001194471	0.001314443	0.001206416	0.003564723	2.19915E-05	0.020351564	1.9983E-06	1.50983E-06	3.19314E-07	4.40772E-07	1123.445289	0	634.0525224	0
Orange (SC)	2025 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	195.2112911	0
Orange (SC)	2025 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000185999	0.000204679	0.000187858	0.009576072	6.08311E-05	0.021052925	3.31503E-07	2.50469E-07	3.59042E-07	4.9561E-07	1370.692569	0	314.9642813	0
Orange (SC)	2025 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.73209E-05	1.90605E-05	1.74941E-05	0.000972651	6.60358E-06	0.002352527	3.59952E-08	2.71964E-08	3.84562E-08	5.30838E-08	147.0057781	0	17.56488958	0
Orange (SC)	2025 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.121852429	0.134091163	0.123070952	0.693116946	0.007417067	3.546895557	0.001053371	0.000795882	4.82435E-05	6.6594E-05	188772.988	0	39277.60234	0
Orange (SC)	2025 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	58479.61863	0
Orange (SC)	2025 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.93051E-05	2.12441E-05	1.94982E-05	0.000983458	7.99873E-06	0.003627292	4.07829E-08	3.08137E-08	5.01006E-08	6.91573E-08	195.443225	0	8.085425238	0
Orange (SC)	2025 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.004531072	0.004986169	0.004576383	0.085318179	0.000520549	0.274016414	5.40157E-05	4.08119E-05	4.02265E-06	5.55276E-06	15810.42033	0	1266.484302	0
Orange (SC)	2025 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	942.8913718	0
Orange (SC)	2025 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.006040276	0.006646955	0.006100678	0.304665705	0.003007472	0.723285786	2.50122E-05	1.88982E-05	1.17655E-05	1.62409E-05	45619.67347	0	1523.691415	0
Orange (SC)	2025 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.0001127	0.00012402	0.000113827	0.00304749	6.03998E-05	0.006645906	2.21797E-07	1.6758E-07	1.16417E-07	1.60698E-07	441.1594673	0	40.80871977	0
Orange (SC)	2025 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.59119E-06	3.95188E-06	3.6271E-06	0.000209112	1.54318E-06	0.000469462	1.55436E-08	1.1744E-08	7.70919E-09	1.06415E-08	30.23344867	0	0.331778181	0
Orange (SC)	2025 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000388148	0.000427133	0.00039203	0.017144187	0.00013201	0.038254484	1.27669E-06	9.64608E-07	6.45767E-07	8.91397E-07	2482.151979	0	146.8118574	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.006987928	0.006427496	0.007689788	0.345624315	0.017342232	6.937251455	0.000483682	0.000365448	6.70235E-05	9.95031E-05	284032.05	75668.15	156.52	5296770.5
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.039457441	0.039852016	0.043420507	2.601226499	0.023980509	4.807628941	6.58479E-05	8.71517E-05	8.60275E-05	0.00011875	336908.3844	0	3049.608185	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.31423E-06	7.59463E-06	9.07681E-06	3.90146E-05	4.75932E-05	0.006360799	1.36662E-06	1.80876E-06	6.10078E-08	5.25527E-08	209.087825	0	0.790192005	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	37394.89784	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000694646	0.000638935	0.000764415	0.031454545	0.002379757	0.868844518	6.22869E-05	4.70612E-05	8.63106E-06	1.2205E-05	34839.25	5095.4	10.53	682783.6
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000559526	0.000565121	0.000615723	0.081922462	0.000805298	0.116988618	1.53146E-06	2.02693E-06	2.34856E-06	3.24189E-06	9237.761358	0	31.56321156	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	2.63266E-05	3.16651E-05	3.78449E-05	0.000106246	0.000197145	0.025457958	5.37703E-06	7.11666E-06	2.43477E-07	2.09733E-07	834.4506656	0	1.581300958	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	198.1247496	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008364034	0.008447675	0.009204109	0.345822116	0.002477609	0.766833268	9.48519E-06	1.25539E-05	1.27764E-05	1.76362E-05	49958.51423	0	1149.427233	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	14094.50374	0
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.002301465	0.002116887	0.002532622	0.185206282	0.003042617	1.081843567	7.45813E-05	5.63503E-05	1.31532E-05	1.83197E-05	52293.55	23334.45	48.28	816705.75
Orange (SC)	2025 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.002196147	0.002613596	0.003162451	0.023384391	0.018076813	2.747443956	0.000555267	0.000510846	3.55176E-05	2.3131E-05	91947.15	90122.15	110.75	3334519.55
Orange (SC)	2025 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000876921	0.45561701	0.034552504	10.905652	0	0	0	0	603439.9	62334.7	7.33	5485453.6
Orange (SC)	2025 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000244563	0.09268948	0.009246089	2.8382315	0	0	0	0	154971.7	10055.75	1.18	1468139.5
Orange (SC)	2025 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000188159	0.10665639	0.008948113	2.9251627	0	0	0	0	160501.45	8040.95	0.94	1688599.5
Orange (SC)	2025 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000160809	0.028491064	0.005839529	1.940686	0	0	0	0	103112.5	30163.6	3.55	965235.2
Orange (SC)	2025 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000264991	0.15020772	0.012601922	4.1196046	0	0	0	0	226040.85	7037.2	0.83	2378573.6
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002445196	0.002249091	0.002690789	0.106595488	0.014558888	4.651398337	0.000324307	0.000245032	4.4939E-05	6.3989E-05	182656.95	35218.85	306.77	2923164.55
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.19441E-05	0.009468674	0.00092306	0.301579505	0	0	0	0	16403.1	2617.05	22.8	217215.15
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.036316893	0.036680062	0.039964526	2.050640596	0.018723892	4.886878431	6.67111E-05	8.82943E-05	7.83823E-05	0.000108197	307185.2643	0	6886.479761	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.000329539	0.000396363	0.000473717	0.002277884	0.002785909	0.370789811	8.00162E-05	0.000105904	3.55472E-06	3.06207E-06	12182.83921	0	78.5937054	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000247785	0.000227913	0.000272673	0.024004889	0.002525713	0.751864529	5.39007E-05	4.0725E-05	7.46899E-06	1.0475E-05	29900.8	3332.45	29	486537.7
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.32953E-05	0.011349305	0.001259242	0.439783845	0	0	0	0	23721.35	2171.75	18.91	317075.5
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.11032992	0.111433221	0.121411348	1.930474562	0.032045917	3.940112464	0.000137901	0.000182517	7.14352E-05	9.86071E-05	274461.9896	0	16625.7076	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5090.280326	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001279986	0.001292786	0.001408547	0.1213466	0.000723432	0.175855643	2.33953E-06	3.09643E-06	3.51818E-06	4.8564E-06	13837.80523	0	132.0521344	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.000475916	0.000572422	0.000684137	0.00195908	0.003632388	0.468405565	9.95247E-05	0.000131724	4.47947E-06	3.85866E-06	15352.17317	0	57.48057492	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.010481059	0.01058587	0.011533767	0.49145239	0.002369873	0.975342243	1.62443E-05	2.14997E-05	1.7203E-05	2.37466E-05	66546.4298	0	3806.863065	0
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.011705296	0.010766531	0.012880964	0.797006744	0.024418549	9.390878643	0.000647399	0.000489146	0.000114176	0.00014167	404398.1	182434.3	1588.34	5837897.6
Orange (SC)	2025 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.004061517	0.004833541	0.005848584	0.050179688	0.046407697	7.604269363	0.001225999	0.001127919	9.83042E-05	6.37313E-05	253335.55	181426.9	537.45	5987087.7
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.013377493	0.013511268	0.014721115	0.995148973	0.006731647	1.821514476	2.33885E-05	3.09553E-05	3.258E-05	4.49724E-05	128005.6975	0	4120.412609	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.13062E-06	3.76545E-06	4.50032E-06	2.16612E-05	2.64682E-05	0.003527341	7.59057E-07	1.00463E-06	3.38159E-08	2.91293E-08	115.8948438	0	3.637607477	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7797.508889	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	7.85704E-06	7.93561E-06	8.6462E-06	0.000166307	2.64026E-06	0.000351589	4.34846E-09	5.75531E-09	6.1446E-09	8.48181E-09	23.88334699	0	3.010511523	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.69712128	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000210226	0.000212329	0.000231341	0.017458253	0.000102065	0.031954496	4.103E-07	5.43044E-07	5.69408E-07	7.85994E-07	2242.429811	0	27.33869561	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.20291E-06	1.44684E-06	1.72921E-06	4.94624E-06	9.18238E-06	0.00118691	2.49816E-07	3.30639E-07	1.13503E-08	9.77725E-09	38.90007012	0	0.837482928	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	51.7360134	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.024848548	0.025097034	0.027344311	1.269372732	0.009978595	2.683908844	3.31948E-05	4.39342E-05	4.53843E-05	6.26472E-05	177736.3367	0	10767.45725	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	20376.4408	0
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000106125	9.76137E-05	0.000116784	0.007449115	0.000174206	0.095082126	6.55488E-06	4.95257E-06	1.15603E-06	1.41934E-06	4051.5	1631.55	14.22	47314.95
Orange (SC)	2025 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.36015E-05	1.61869E-05	1.95862E-05	0.000206113	0.000214239	0.036538587	4.7619E-06	4.38095E-06	4.72353E-07	3.07605E-07	1222.75	1868.8	12.89	71014.4
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.002782865	0.002559679	0.003062373	0.142285827	0.007249905	5.330394847	0.000371648	0.000280801	5.1499E-05	7.37428E-05	210499.15	35521.8	160.88	3303527.4
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004172623	0.00421435	0.004591718	0.27382425	0.002323792	0.585058308	7.90038E-06	1.04564E-05	9.7941E-06	1.35194E-05	38413.40758	0	954.7927681	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.000241401	0.000290353	0.000347018	0.001483511	0.001817905	0.241485488	5.28902E-05	7.00017E-05	2.31625E-06	1.99524E-06	7938.313218	0	59.02899084	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000103013	9.47509E-05	0.000113359	0.007917337	0.000358884	0.241992333	1.73483E-05	1.31076E-05	2.40394E-06	3.377E-06	9639.65	1069.45	4.84	154000.8
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.001862033	0.001880653	0.002049055	0.017810447	0.000112948	0.050780934	5.07655E-07	6.71895E-07	8.36723E-07	1.15499E-06	3180.219858	0	346.0845577	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	27391.89699	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.10433E-05	3.13537E-05	3.41612E-05	0.002256093	2.19431E-05	0.004817995	6.71714E-08	8.89033E-08	8.02978E-08	1.10841E-07	315.9715154	0	3.179463091	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.000196586	0.000236449	0.000282595	0.000791726	0.001468086	0.18932589	4.02327E-05	5.32492E-05	1.81075E-06	1.55979E-06	6205.847087	0	17.63010993	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.003206242	0.003238304	0.003528274	0.14500277	0.001058593	0.31673649	3.96497E-06	5.24775E-06	5.34109E-06	7.37269E-06	20729.52756	0	1048.268984	0
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.001820128	0.001674154	0.00200294	0.141965402	0.002800981	1.417769626	9.77398E-05	7.38478E-05	1.72375E-05	2.18399E-05	62342	28024.7	126.95	868765.7
Orange (SC)	2025 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.002618649	0.003116408	0.003770854	0.030802333	0.027520189	4.450672927	0.00076363	0.00070254	5.75361E-05	3.73314E-05	148394.4	94717.5	235.31	3504547.5
Orange (SC)	2025 Light Commercial - Misc - Welders	Aggregate	100	Gasoline	0.003095734	0.002847456	0.003406666	0.132470655	0.008645613	4.465669651	0.000311357	0.000235248	4.31446E-05	6.20966E-05	177254.95	53483.45	257.43	3743841.5
Orange (SC)	2025 Light Commercial - Misc - Welders	A

Orange (SC)	2025	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Gasoline	0.000332676	0.000336002	0.000366089	0.003764808	0.000375066	0.037036771	3.86535E-06	2.92049E-06	4.20214E-07	5.8005E-07	1645.339734	0	1.862104143	0
Orange (SC)	2025	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.00137523	0.001388982	0.001513357	0.006350527	0.000650542	0.069443945	7.24752E-06	5.47591E-06	7.99527E-07	1.10364E-06	3141.281592	0	1.862104143	0
Orange (SC)	2025	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.000190204	0.000192106	0.000209308	0.002374063	8.93311E-05	0.017786878	1.43032E-06	1.08069E-06	2.80931E-07	3.87789E-07	827.3087104	0	66.35286149	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002620158	0.002646359	0.002883324	0.022330114	0.002292754	0.249131181	2.48678E-05	1.8789E-05	2.85518E-06	3.9412E-06	10941.79705	0	51.91270455	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.024089485	0.02433038	0.026509009	0.265177455	0.009462504	2.92158037	0.000304911	0.000230378	3.28056E-05	4.52839E-05	127645.5489	0	424.3454292	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	7.27626E-05	7.34902E-05	8.00708E-05	0.001206497	2.49195E-05	0.018776474	1.95961E-06	1.48059E-06	1.9886E-07	2.74501E-07	780.5028441	0	1.636315266	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.00606284	0.006123468	0.006671785	0.017181745	0.000219159	0.054220226	0.000297025	0.000224419	9.89343E-07	1.36566E-06	3818.337018	0	36.17835506	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001085101	0.001095952	0.001194087	0.009965673	0.000419053	0.051615171	2.48484E-05	1.87744E-05	6.81305E-07	9.40453E-07	2650.438048	0	20.91350301	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.003277125	0.003309896	0.003606276	0.031800232	0.001394208	0.206522898	0.000369062	0.000278847	2.55082E-06	3.52108E-06	9993.152085	0	66.37215016	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.006212292	0.006274415	0.006836248	0.013961576	0.000105938	0.038035921	0.000305097	0.000230518	8.20444E-07	1.13251E-06	3045.412266	0	58.04346989	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.090601415	0.091507429	0.099701331	0.315859137	0.011606638	1.598099832	0.007171888	0.00541876	2.33135E-05	3.21813E-05	89908.99864	0	542.9814723	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.013593937	0.013729876	0.014959298	0.050099788	0.001253978	0.170971822	0.000724764	0.0005476	3.38938E-06	4.67861E-06	11082.34555	0	568.2152349	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.041876715	0.042295483	0.046082771	0.187519704	0.00665193	0.889750735	0.004434283	0.003350348	1.27312E-05	1.75738E-05	49626.13931	0	161.5125965	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.016529568	0.016694864	0.018189782	0.04251994	0.001445997	0.169192945	0.000999099	0.000754875	3.02674E-06	4.17803E-06	10953.77678	0	243.4166374	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.039434483	0.039828829	0.043395243	0.195466263	0.012126185	1.169707409	0.008406468	0.006351554	1.54122E-05	2.12745E-05	60215.81335	0	148.0819289	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.039077277	0.03946805	0.04300216	0.109665028	0.0042715	0.492116672	0.00277638	0.002097709	7.97907E-06	1.10141E-05	29867.85518	0	356.734266	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.014482504	0.014627329	0.015937112	0.19494095	0.00698089	0.807652571	0.001927398	0.001456256	1.10662E-05	1.52755E-05	43433.9777	0	86.64764	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	6.80273E-07	6.87076E-07	7.48599E-07	5.77808E-06	3.36599E-07	0.00011167	1.02047E-08	7.71022E-09	1.21666E-09	1.67945E-09	4.59223596	0	0.063614414	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000464385	0.000469028	0.000511027	0.007607879	0.000485342	0.058749834	8.44497E-06	6.38065E-06	9.37682E-07	1.29435E-06	2697.573478	0	280.1940226	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.003517458	0.003552632	0.003870747	0.039450094	0.010343057	0.685807681	6.89936E-05	5.21285E-05	7.4127E-06	1.02323E-05	28349.02913	0	248.4667814	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.016236037	0.016398398	0.017866768	0.180299099	0.014429498	1.663466084	0.000166043	0.000125455	1.94648E-05	2.68687E-05	74723.91592	0	478.3779785	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.0199852	0.020185052	0.021992493	0.136909382	0.007805543	2.845834136	0.000297006	0.000224404	3.00535E-05	4.14849E-05	116768.3744	0	577.7438875	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.00170854	0.001725626	0.001880145	0.003185774	0.000524646	0.089497932	9.34046E-06	7.05724E-06	9.54907E-07	1.31813E-06	3747.138065	0	9.956789671	0
Orange (SC)	2025	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000213794	0.00025869	0.000307863	0.006545075	0.003259731	0.980365236	0.000236001	0.000217121	9.05755E-06	8.00161E-06	31806.87041	24435.67116	58.78638615	1989139.629
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.00028416	0.000343833	0.00040919	0.011377759	0.00269147	2.056572617	0.000104892	9.65002E-05	1.90055E-05	1.67855E-05	66723.23364	31622.63327	76.07649972	4172740.873
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000171527	0.000207548	0.000246999	0.002346629	0.001115042	1.233450357	4.77325E-05	4.39139E-05	1.13987E-05	1.00673E-05	40017.93843	9216.221996	22.17202799	2502643.805
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	8.26043E-06	9.99512E-06	1.1895E-05	0.000177024	0.000173962	0.028298529	5.3363E-06	4.90939E-06	2.61386E-07	2.30969E-07	918.1146	1268.287431	3.051196513	51647.24085
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000251895	0.000304793	0.000362729	0.003174412	0.001475015	1.688000429	6.64906E-05	6.11713E-05	1.55988E-05	1.37772E-05	54765.31493	7356.067098	17.69693978	3424915.963
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	9.28204E-05	0.000112313	0.000133661	0.001993585	0.001518459	0.30524866	2.27766E-05	2.09545E-05	2.81939E-06	2.4914E-06	9903.456603	9723.536968	23.3925066	619342.857
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	9.86897E-05	0.000119415	0.000142113	0.001051996	0.001006769	0.55269109	3.66598E-05	3.3727E-05	5.10694E-06	4.51099E-06	17931.45374	1691.049907	4.068262017	1121398.138
Orange (SC)	2025	Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	5.55897E-06	6.72635E-06	8.00492E-06	6.93458E-05	0.000112084	0.035946029	1.30277E-06	1.19855E-06	3.32172E-07	2.93387E-07	1166.229314	84.55249537	0.203413101	72933.70629
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.00113784	0.00137695	0.0016385	0.029829332	0.012218008	4.05654156	0.001009118	0.000928388	3.74706E-05	3.31089E-05	131610.0234	88011.77227	63.46488747	8230634.131
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.002338288	0.002829328	0.003367134	0.055616986	0.015156846	8.794704817	0.000712917	0.000655883	8.12413E-05	7.17812E-05	285334.5121	131453.4804	94.790505	17844263.78
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002797092	0.003384481	0.004027812	0.021801809	0.015344364	9.61898179	0.000718344	0.000660877	8.88483E-05	7.85088E-05	312077.2708	81241.63594	58.58297305	19516703.74
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.29667E-05	5.19897E-05	6.1872E-05	0.000641756	0.000441275	0.066506424	1.48211E-05	1.36354E-05	6.13596E-07	5.42816E-07	2157.727697	2538.801123	1.830717908	121379.9258
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.004768827	0.00577028	0.00686711	0.040459018	0.020963217	19.78320516	0.001017432	0.000936038	0.000182762	0.000161468	641844.3041	103244.579	74.44919492	40139690.71
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001275533	0.001543395	0.001836767	0.018766244	0.013802935	2.544786075	0.000258787	0.000238084	2.34895E-05	2.07702E-05	82562.78163	80677.45792	58.17614685	5163315.306
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.001395815	0.001688936	0.002009974	0.010538231	0.005641447	4.944964602	0.000338554	0.00031147	4.56768E-05	4.03601E-05	160433.9306	14950.71773	10.78089435	10033225.06
Orange (SC)	2025	Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.009420305	0.011398569	0.013565239	0.067940407	0.144273667	32.33157054	0.003392489	0.00312109	0.000298639	0.000263886	1048962.199	53596.9126	38.64848916	65600049.7
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000228628	0.00027664	0.000329225	0.009287522	0.004021447	1.467589269	0.00028002	0.000257619	1.35617E-05	1.19783E-05	47614.31757	34248.85837	105.7748125	2977706.538
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000676935	0.000819091	0.000974786	0.026157288	0.007591044	4.746849524	0.000276386	0.000254275	4.38667E-05	3.87431E-05	154006.3051	71461.56025	220.7032144	9631253.895
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000248285	0.000300425	0.000357531	0.003123201	0.001703169	1.593038441	7.15507E-05	6.58267E-05	1.4721E-05	1.30022E-05	51684.37782	14028.85929	43.32699048	3232240.166
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.46593E-06	7.82378E-06	9.31094E-06	0.000142854	0.000137829	0.024179057	3.56008E-06	3.27528E-06	2.23353E-07	1.97346E-07	784.4628657	987.9478376	3.051196513	44128.85119
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000332035	0.000401762	0.00047813	0.003954628	0.002520366	2.095030485	0.000101045	9.29615E-05	1.93596E-05	1.70994E-05	67970.95681	9879.478376	30.51196513	4250771.046
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.000146973	0.000177837	0.00021164	0.004026911	0.003180158	0.65208825	5.46537E-05	5.02814E-05	6.02447E-06	5.32226E-06	21156.28513	19100.32486	58.98979925	1323072.802
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000150777	0.00018244	0.000217119	0.001721752	0.001649197	0.917735745	6.84302E-05	6.29558E-05	8.4804E-06	7.49044E-06	29774.92555	2766.253945	8.543350236	1862065.761
Orange (SC)	2025	Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.001399205	0.001693038	0.002014855	0.015514117	0.030441252	8.097218264	0.000521023	0.000479341	7.48208E-05	6.60884E-05	262705.3291	6981.498052	21.56178869	16429078.81
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000112282	0.000135861	0.000161685	0.004460725	0.002210617	0.707188683	0.00014366	0.000132167	6.53494E-06	5.77198E-06	22943.958	16038.96984	49.42938351	1434870.376
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.00017297	0.000209294	0.000249077	0.006811077	0.001911526	1.234725208	7.20129E-05	6.62519E-05	1.14105E-05	1.00777E-05	40059.29955	18547.1215	57.15908134	2505230.449
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000119556	0.000144663	0.000172161	0.001726776	0.000685666	0.910692227	3.00261E-05	2.7624E-05	8.41621E-06	7.43295E-06	29546.40637	7920.478931	24.4095721	1847774.617
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.38835E-06	1.6799E-06	1.99922E-06	3.02395E-05	2.30538E-05	0.004896932	2.67169E-07	2.45796E-07	4.52329E-08	3.96681E-08	158.8755757	198.0119733	0.610239303	8937.321247
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.00022475	0.000271948	0.000323641	0.003165583	0.001801757	1.722585556	8.02439E-05	7.38244E-05	1.59194E-05	1.40595E-05	55887.39127	8844.534806	27.25735552	3495088.429
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	9.70533E-05	0.000117434	0.000139757	0.002315909	0.001889518	0.36883182	4.1599E-05	3.8271E-05	3.40712E-06	3.01036E-06	11966.34222	10890.65853	33.56316164	748351.6991
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000111529	0.00013495	0.000160601	0.001602291	0.001198766	0.873528441	6.43769E-05	5.92268E-05	8.07286E-06	7.12962E-06	28340.66824	2640.159644	8.136524035	1772370.107
Orange (SC)	2025	Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	8.20668E-05	9.93009E-05	0.000118176	0.000944009	0.001865275	0.498334076	3.04205E-05	2.79868E-05	4.60488E-06	4.06734E-06	16167.90027	792.0478931	2.44095721	1011108.944
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.57809E-05	1.90949E-05	2.27245E-05	0.000489501	0.00024296	0.072352368	1.5764E-05	1.45029E-05	6.6846E-07	5.9053E-07	2347.39289	1772.735236	3.254609614	146801.3722
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000222281	0.000268961	0.000320085	0.009314055	0.002115487	1.692421018	7.15228E-05	6.58009E-05	1.56406E-05	1.38133E-05	54908.73605	25372.27306	46.5816001	3433885.24
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000139605	0.000168922	0.000201031	0.002067291	0.000478792	1.08128724	2.59613E-05	2.38844E-05	9.99285E-06	8.82532E-06	35081.17369	7866.512609	14.44233016	2193908.169
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	50	Diesel	6.89229E-06	8.33967E-06	9.92489E-06	0.000158912	0.000125068	0.02685237	1.8796E-06	1.72923E-06	2.48057E-07	2.19165E-07	871.1955644	997.1635702	1.830717908	49007.87673
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002137412	0.002586268	0.003077873	0.028996574	0.012985057	15.22034204	0.000545722	0.000502064	0.000140655	0.000124226	493807.2352	57392.30326	105.3679862	30881741.21
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.49544E-05	3.01949E-05	3.59344E-05	0.000514101	0.000386367	0.077829458	5.36091E-06	4.93204E-06	7.18823E-07	6.35234E-07	2525.091065	2548.306902	4.67850132	157914.2695
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000270093	0.000326813	0.000388934	0.003047252	0.002359332	1.560970841	0.000123409	0.000113536	1.44238E-05	1.27404E-05	50643.97985	5096.613803	9.35700264	3167175.707
Orange (SC)	2025	Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000156944	0.000189903	0.000226	0.00216853	0.003528058	1.146957558	5.85192E-05	5.38377E-05	1.05995E-05	9.36131E-06	37211.77481	2215.919045	4.068262017	2327151.806
Orange (SC)	2025	Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.00174663	0.002113422	0.002515147	0.04827879	0.018782746	6.625364426	0.001522776	0.001400954	6.12024E-05	5.40753E-05	214952.6523	143511.2038	96.62122291	13442719.56
Orange (SC)	2025	Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002843703	0.00344088	0.004094932	0.079944727	0.015119624	12.81043187	0.000566928	0.000521574	0.000118353	0.000104557	415620.3537	180370.9235	121.4376212	25992086.16
Orange (SC)	2025	Portable Equipment - Rental Generator	Aggregate	300	Diesel	0.006669547	0.008070151	0.009604147	0.057324041	0.02733331	26.17183238	0.001287858	0.00118483	0.000241771	0.000213611	849116.2

OFFROAD 2026

	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9399.740404	32.10549533	0	0	838.8809745	1.589816903	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	52698.7	48.55	23469.5	2.245412131	92432.6	111.35	90647.75	1.019689954	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	285619.8	157.42	76091.55	3.753633616	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	35047.3	10.59	5113.65	6.853675946	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2666.340202	14.81759738	0	0	19.57694425	9.129513641	0	0	54815.7	123.58	46376.9	1.181961278
Aerial Lifts50	Aerial Lifts	50	73722.7	128.62	46479.1	1.586147322	125209.2629	490.5481246	153144.2445	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	133855.8985	376.4187119	117057.8466	1.143502143	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	132432.95	128.62	46479.1	2.849301084	84619.45564	217.8413333	68053.22695	1.243430465	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	13352.33518	20.60348423	6422.282717	2.079063749	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	797.9059646	0.694499469	217.6952514	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	566.6288734	0.231499823	72.56508379	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	217.83852	2.296190944	0	0	9.120892524	1.435019315	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	689.85	2.49	277.4	2.486842105	2755.079057	6.486893802	2381.611672	1.15681288	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	1161.133949	1.980209687	687.3345125	1.689328745	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7862.1	11.47	1230.05	6.391691395	15780.04377	17.75360409	7460.741747	2.115077066	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2737.5	2.84	292	9.375	19997.07955	15.70511131	5122.983658	3.903404906	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	28700.84693	15.84167749	5314.651981	5.400324807	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	39726.57274	12.42752286	4034.851533	9.845857379	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	34711.58996	3.482437725	2099.902689	16.53009453	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	14879.14517	0.409698556	308.2625284	48.26777113	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	116.9960943	1.590394488	0	0	2.635042286	1.01986378	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	3842.750496	17.2718755	0	0	1.805258655	0.377549423	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	4825.3	6.04	3496.7	1.379958246	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	52.62902095	0.257273772	127.1306598	0.413975834	0	0	0	0
Cranes50	Cranes	50	2306.8	2.84	1171.65	1.968847352	852.0852718	2.744253564	1236.54273	0.689086799	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	466.2430113	1.286368858	455.8715473	1.022750847	0	0	0	0
Cranes100	Cranes	100	7821.95	5.67	2361.55	3.312210201	20133.50474	32.75952692	15319.54768	1.31423624	0	0	0	0
Cranes175	Cranes	175	507.35	0.16	87.6	5.791666667	58012.26993	56.4287139	26353.13478	2.201342285	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	99501.10111	62.5175265	30484.27488	3.264014036	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	179590.0326	64.66147459	32960.89736	5.448578375	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	3510.923574	0.857579239	372.397839	9.427883853	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	9793.558612	1.372126782	701.5429576	13.96002698	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	2763.946713	7.611248221	2679.44387	1.031537456	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	1896.758493	3.653399146	1126.076782	1.684395348	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	120147.4374	127.1078453	61696.80961	1.947384932	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	133094.4422	85.93099241	40188.9673	3.311715906	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	139081.6873	65.91340959	30584.17364	4.547505154	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	487048.3376	117.0609976	57071.14988	8.534055098	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	6115.872174	0.989462269	450.3410213	13.58053538	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	28343.00908	2.283374466	1304.114409	21.73352957	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	40.54903156	0.191362846	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14226.34125	279.5012675	41000.45	0.346980125	1.302975367	0.526654843	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	649.7	2.04	270.1	2.405405405	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	31.48272183	0.979506166	40.44188227	0.778468263	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	110506.6112	186.1620809	140489.527	0.786582556	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	1568.780163	1.982881648	1084.112057	1.447064584	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	141673.4611	132.3192177	88554.87063	1.599838158	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	302638.51	171.6717919	104813.4959	2.88740021	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	385613.1129	147.9534768	89160.42042	4.32493601	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	678159.4261	154.3597098	102114.135	6.641190525	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	16179.54402	2.211675684	1334.312502	12.12575315	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	19070.34964	1.143970182	800.9290106	23.81028704	0	0	0	0
Forklifts25	Forklifts	25	50.42547582	0.113366202	0	0	43.86950541	0.26504119	75.89532895	0.578026422	1456.35	1.19	1481.9	0.982758621
Forklifts50	Forklifts	50	1235521.35	431.23	773785.4	1.596723523	87923.4719	238.1256148	175128.3897	0.502051507	1931393.85	803.02	1446735.9	1.335000984
Forklifts75	Forklifts	75	0	0	0	0	6635.218693	15.33470407	6085.355147	1.090358497	0	0	0	0
Forklifts100	Forklifts	100	5759659.85	1537.78	2725546.25	2.11321303	1261800.75	1933.567764	1307182.183	0.965283008	12087018.8	2818.44	5077573.4	2.380471506
Forklifts175	Forklifts	175	402649.75	56.22	99586.6	4.043212139	372966.4761	351.8014173	238372.4247	1.564637674	907174.65	103.15	185810.55	4.882255878
Forklifts300	Forklifts	300	0	0	0	0	74004.78002	44.968981	32928.0543	2.247468962	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	19011.31972	7.008381932	4924.838943	3.860292679	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	255.4714079	0.088347063	19.67656676	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1397.411207	0.187939779	152.8140213	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	14144.56531	134.8414677	0	0	15417.30552	57.72724921	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	406577.15	1597.27	183456.3	2.216207075	254682.4	540.46	182452.55	1.39588293	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	183587.7	308.5	35441.5	5.180020597	0	0	0	0	16501.65	22.95	2628	6.279166667
Generator Sets175	Generator Sets	175	30057.75	29.14	3347.05	8.980370774	0	0	0	0	23845.45	19.01	2197.3	10.85215947
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	0	0	0	0	0	0	0	0
Graders50	Graders	50	0	0	0	0	609.5463062	1.992603405	741.186252	0.822392893	0	0	0	0
Graders75	Graders	75	0	0	0	0	352.1016363	0.766385925	256.123335	1.374734701	0	0	0	0
Graders100	Graders	100	0	0	0	0	16318.06465	20.5391428	8720.927308	1.871138708	0	0	0	0
Graders175	Graders	175	0	0	0	0	184735.6131	122.6983866	58663.8939	3.149051329	0	0	0	0
Graders300	Graders	300	0	0	0	0	380203.7493	107.2173909	83613.52182	4.547156262	0	0	0	0
Graders600	Graders	600	0	0	0	0	25824.49437	4.291761181	3752.983537	6.881057196	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	13224.76719	0.459831555	345.6220039	38.26367258	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	45702.59522	71.41186795	48552.66294	0.941299456	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	23940.24951	24.68186795	15087.37442	1.586773738	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	34546.69547	27.24035427	19431.19182	1.777898947	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	49766.99974	19.71539452	13954.46684	3.566384895	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	41973.32718	13.01818035	8728.779843	4.808613338	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	140909.9116	24.60661836	17494.53702	8.054509325	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	5881.088115	0.601996779	413.0466141	14.23831576	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	7421.330329	0.376247987	210.2476432	35.2980429	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	212.2644073	0.298232399	386.9345788	0.548579576	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	4212.183444	3.951579288	6666.274803	0.631864657	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	429.5532467	0.223674299	293.8910459	1.461607125	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	4716.35448	2.013068694	2771.888971	1.701494732	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	104041.6285	22.96389473	33332.07689	3.121366511	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	213083.8369	39.14300238	51455.2702	4.141146982	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	915783.7682	87.82944154	123152.5607	7.436173171	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	312300.5357	18.71408304	23719.86285	13.16620327	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	550572.7805	14.98617806	21869.18393	25.17573506	0	0	0	0
Pavers25	Pavers	25	736.5321242	2.369534964	0	0	2.45385012	0.326778437	0	0	0	0	0	0
Pavers50	Pavers	50	7391.25	8.1	3164.55	2.335640138	3028.701077	8.931048047	3269.05767	0.926475267	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	4434.294444	7.51696544	2893.77469	1.532356496	0	0	0	0
Pavers100	Pavers	100	6617.45	4.43	1741.05	3.800838574	24729.36451	35.57534139	14261.63025	1.733978801	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	40012.5394	29.62130936	11782.25426	3.396000333	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	31234.1503	14.14082607	6556.006839	4.764203435	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	5749.702447	1.637358809	742.5849463	7.742821175	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	1171.498744	0.148850801	72.61844048	16.13224873	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	835.8019812	5.928504576	0	0	13.09101009	0.882884806	17.51247795	0.747524715	0	0	0	0
Paving Equipment50	Paving Equipment	50	8614	22.11	3854.4	2.234848485	3761.536721	10.92293977	5327.033105	0.706122272	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	539.2988304	1.263197117	429.3183969	1.256174518	0	0	0	0
Paving Equipment100	Paving Equipment	100	3558.75	5.71	996.45	3.571428571	15593.71721	19.76531959	9532.041747	1.635926239	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	17135.24561	13.67225114	6464.731235	2.650573549	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	11042.11174	5.498622743	2621.880636	4.211523435	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	12739.93162	3.566674212	1757.377162	7.249400924	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	2270.229335	0.371528564	194.1258181	11.69462855	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	1106.750231	0.148611425	71.45091003	15.489659	0	0	0	0
Rollers25	Rollers	25	2517.198152	12.74020585	0	0	38.88563858	6.491854556	18.04276622	2.15519273	0	0	0	0
Rollers50	Rollers	50	9719.95	5.67	3544.15	2.742533471	62192.78451	225.7628596	80635.73844	0.771280647	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	620.7612094	1.913893351	451.0691555	1.37619964	0	0	0	0
Rollers100	Rollers	100	30141.7	10.69	6653.95	4.529895776	96559.18839	166.5087215	56988.97925	1.694348445	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	100463.3444	97.37889368	36032.39649	2.788139402	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	17162.24778	12.70825185	4055.562777	4.231779589	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	9212.25851	4.287121105	1339.224323	6.878801671	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	43.86950541	0.26504119	75.89532895	0.578026422	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3117.1	2.22	927.1	3.362204724	3122.04704	9.983218152	2817.288747	1.108174319	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	105.2872746	0.353388253	81.41309635	1.293247393	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68109	32.32	13359	5.098360656	249667.4602	428.3949099	124528.3062	2.004905293	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3817.9	1.2	459.9	8.301587302	52044.92622	69.08740349	19784.83994	2.63054573	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	4128.299367	3.622229595	936.7711521	4.406945451	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1357.971614	0.618429443	163.242628	8.31873164	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	255.4714079	0.088347063	19.67656676	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2742.156647	2.986257448	2925.942532	0.937187459	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	3335.971399	2.694915258	2238.101421	1.490536294	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	8819.171052	5.754008254	5070.231833	1.739401933	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	11820.10964	5.025652779	3970.321198	2.977116725	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	13927.10604	4.297297304	3042.327925	4.57777938	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	137407.1073	24.18140178	18174.4032	7.560474244	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	5141.171635	0.364177738	377.6517201	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	22.08621115	0.075062145	31.84335892	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	175.7893016	0.450372869	166.3815504	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1410.276999	1.726429331	833.5883736	1.691814622	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	7528.244908	5.779785152	3332.319058	2.259160896	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	95452.20213	48.79039414	22696.17717	4.205651085	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	109752.4565	47.28915125	19658.85145	5.582851918	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1367730.349	263.1678798	129878.6235	10.53083496	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	30403.93835	3.903231531	1989.060034	15.28558104	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	31834.88997	1.951615766	799.0914015	39.83885938	0	0	0	0
Skid Steer Loaders25

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2704.65	0.59	302.95	8.927710843	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.061255364	0	0	44.50466073	6.075968441	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	92718.04603	218.7689699	116672.9724	0.794683157	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	14868.49486	46.04057763	10864.11432	1.36858785	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25528.1	10.03	8723.5	2.926359833	1486643.636	1439.37786	931241.7128	1.596410057	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	259755.5572	166.1729458	95165.355	2.729518081	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	162755.8354	70.66161501	40968.92211	3.972665792	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	211972.3478	58.99901836	33049.91363	6.413703533	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	6560.691016	0.990939585	549.7315324	11.93435455	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	72695.52232	3.20149712	2060.864469	35.27428583	0	0	0	0
Trenchers25	Trenchers	25	4792.078812	14.71626775	0	0	43.34452809	4.346782841	0	0	0	0	0	0
Trenchers50	Trenchers	50	46209	51.77	20837.85	2.217551235	32944.83562	71.73641251	28511.82781	1.155479608	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	2016.895867	4.15745118	1122.006121	1.797580092	0	0	0	0
Trenchers100	Trenchers	100	28637.9	17.19	6927.7	4.133825079	21601.2534	28.77608366	9889.79231	2.184196869	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	5134.505416	4.728081734	1413.842987	3.631595207	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	11280.45825	5.950861493	1909.523773	5.907472014	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	16916.53015	4.402007132	1673.595089	10.10789901	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	4731.163247	0.570630554	274.4496137	17.23873167	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	429.5505461	0.081518651	19.21243358	22.35794566	0	0	0	0
Welders25	Welders	25	0	0	0	0	7671.465633	23.58681193	0	0	0	0	0	0
Welders50	Welders	50	126954.3	253.62	52680.45	2.409893993	424235.85	556.51	357400.7	1.187003411	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	178182.05	258.88	53786.4	3.312771444	0	0	0	0	0	0	0	0
Welders175	Welders	175	22297.85	17.84	3708.4	6.012795276	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2026
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower B	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.74148E-08	9.36719E-08	1.11477E-07	1.17232E-06	2.85136E-07	3.74566E-05	2.8177E-09	2.59228E-09	3.39049E-10	3.05386E-10	1.213928696	6.89318765	0.003666863	32.39651362
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.001438547	0.001740641	0.002071507	0.013388826	0.012642331	2.192588952	0.000920473	0.000846835	1.99396E-05	1.78763E-05	71059.56646	2476.523589	37.17197404	2539915.114
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	8.90111E-08	1.07703E-07	1.28176E-07	1.42723E-06	6.5987E-07	8.18347E-05	6.15609E-09	5.6636E-09	7.43154E-10	6.67205E-10	2.652180045	8.489835207	0.006267959	70.77959875
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000541395	0.000655088	0.000779609	0.00594967	0.005453497	1.014164621	0.00025104	0.000230957	9.22664E-06	8.26856E-06	32868.03854	2457.221913	13.7424658	1306064.149
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	2.30536E-06	2.78949E-06	3.31972E-06	2.80574E-05	4.61728E-07	7.55125E-05	5.00566E-08	4.60521E-08	6.19045E-10	6.1566E-10	2.447284346	87.1399825	0.034235726	65.31147958
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000140541	0.000170055	0.000202379	0.000525256	0.000380575	0.047549434	2.33711E-05	2.15014E-05	4.29139E-07	3.87674E-07	1541.028545	794.969006	4.496939511	55081.69934
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.00020617	0.000249466	0.000296885	0.001475086	0.001565868	0.703004496	7.02568E-05	6.46362E-05	6.40085E-06	5.73165E-06	22783.65687	1493.055935	3.245000711	905345.0954
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	4.50613E-07	5.45242E-07	6.48883E-07	1.4214E-05	1.23285E-06	0.000322071	2.42281E-08	2.22898E-08	2.92177E-09	2.62587E-09	10.43799146	51.5888725	0.039115958	278.5621027
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.002994948	0.003623887	0.004312726	0.012294217	0.009408363	1.167092294	0.000772374	0.000710584	1.05468E-05	9.51539E-06	37824.2681	2960.097255	49.7003742	1351970.395
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	0.000106221	0.000128527	0.000152958	0.000812115	0.000794555	0.37803832	3.51964E-05	3.23807E-05	3.44218E-06	3.08218E-06	12251.83545	1040.231586	1.046598278	486846.3052
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.77219E-08	5.77435E-08	6.87195E-08	7.69927E-07	1.76364E-07	2.37618E-05	1.7875E-09	1.6445E-09	2.15129E-10	1.93732E-10	0.77009682	13.78637297	0.003412931	20.55182632
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001618468	0.001958346	0.002330593	0.00855259	0.013400343	1.208809532	0.000847836	0.000780009	1.09683E-05	9.85552E-06	39176.28126	2642.714598	35.64623321	1400296.029
Orange (SC)	2026	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - ATVs	Aggregate	100	Gasoline	1.57948E-05	1.91118E-05	2.27446E-05	0.000675871	6.25269E-05	0.04539814	3.41511E-06	3.1419E-06	4.13275E-07	3.70135E-07	1471.307309	52.43176885	1.871556553	47118.31307
Orange (SC)	2026	Agricultural - ATVs	Aggregate	175	Gasoline	1.69778E-05	2.05431E-05	2.4448E-05	0.000844954	9.04386E-05	0.065483244	4.92603E-06	4.53195E-06	5.96291E-07	5.3389E-07	2122.245002	29.50680552	1.643543825	67964.4572
Orange (SC)	2026	Agricultural - ATVs	Aggregate	175	Diesel	4.25701E-08	5.15099E-08	6.1301E-08	9.12168E-07	3.9881E-07	0.000166537	1.60329E-08	1.47503E-08	1.5165E-09	1.35779E-09	5.397280876	70.86486365	0.002477421	257.3635202
Orange (SC)	2026	Agricultural - ATVs	Aggregate	25	Gasoline	0.001319642	0.001596766	0.001900284	0.017027037	0.000668311	0.06282435	5.45406E-05	5.01774E-05	5.32979E-07	5.12212E-07	2036.072947	269.5138619	11.27881689	65204.81556
Orange (SC)	2026	Agricultural - ATVs	Aggregate	25	Diesel	2.62249E-05	3.17322E-05	3.77639E-05	0.000246948	0.000238881	0.037017258	9.64035E-06	8.86912E-06	3.36581E-07	3.01805E-07	1199.691483	294.2933127	3.569900904	51457.3564
Orange (SC)	2026	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	99.42149106	2.646911517	15707.41309
Orange (SC)	2026	Agricultural - ATVs	Aggregate	50	Gasoline	3.74099E-05	4.52659E-05	5.38702E-05	0.002054394	9.69446E-05	0.06799859	5.11525E-06	4.70603E-06	6.18603E-07	5.54398E-07	2203.764778	198.4175507	7.531703181	70575.11273
Orange (SC)	2026	Agricultural - ATVs	Aggregate	50	Diesel	6.71507E-05	8.12524E-05	9.6697E-05	0.000703797	0.00060626	0.109024952	1.88846E-05	1.73739E-05	9.91616E-07	8.88889E-07	3533.387248	515.0024502	6.641643744	151554.6031
Orange (SC)	2026	Agricultural - ATVs	Aggregate	75	Gasoline	1.02292E-05	1.23774E-05	1.47301E-05	0.00055146	2.82105E-05	0.020994992	1.57937E-06	1.45302E-06	1.91037E-07	1.71174E-07	680.426231	99.50478191	1.280654287	21790.50973
Orange (SC)	2026	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	7.88427E-08	9.53997E-08	1.13534E-07	7.96488E-07	7.60758E-07	0.000136241	3.49734E-08	3.21756E-08	1.23931E-09	1.11078E-09	4.41542736	135.0310558	0.00123871	168.4359165
Orange (SC)	2026	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Combine Harvesters	Aggregate	300	Diesel	3.4015E-07	4.11581E-07	4.89816E-07	1.89865E-06	3.50884E-06	0.000731986	1.54593E-07	1.42226E-07	6.66096E-09	5.96794E-09	23.72290343	40.93384608	0.004914803	1019.719576
Orange (SC)	2026	Agricultural - Combine Harvesters	Aggregate	600	Diesel	2.72204E-05	3.29367E-05	3.91974E-05	0.000208632	0.000287425	0.06358097	1.15887E-05	1.06616E-05	5.78647E-07	5.18381E-07	2060.59422	683.0395938	0.266013439	88573.82395
Orange (SC)	2026	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	3.02936E-07	3.66553E-07	4.36228E-07	2.2566E-06	4.43138E-06	0.000638227	1.30094E-07	1.19686E-07	5.80758E-09	5.20351E-09	20.68427592	109.6363118	0.001222563	889.1053903
Orange (SC)	2026	Agricultural - Construction Equipment	Aggregate	100	Diesel	5.99315E-06	7.25171E-06	8.63013E-06	5.95238E-05	5.65347E-05	0.009985254	3.73504E-06	3.43624E-06	9.08237E-08	8.14106E-08	323.6118738	87.00279701	0.266677031	13880.41148
Orange (SC)	2026	Agricultural - Construction Equipment	Aggregate	175	Diesel	4.94579E-05	5.9844E-05	7.12193E-05	0.000581162	0.000551702	0.101928625	2.35247E-05	2.16427E-05	9.27472E-07	8.31032E-07	3303.402549	183.5613227	2.15504483	157519.1871
Orange (SC)	2026	Agricultural - Construction Equipment	Aggregate	300	Diesel	7.56653E-06	9.1555E-06	1.08958E-05	3.9259E-05	7.77344E-05	0.014003702	3.58754E-06	3.30054E-06	1.274E-07	1.14173E-07	453.8456676	119.1112895	0.119163222	21641.14141
Orange (SC)	2026	Agricultural - Construction Equipment	Aggregate	50	Diesel	2.00105E-06	2.42127E-06	2.88151E-06	9.70246E-06	7.60667E-06	0.001134376	4.64709E-07	4.27532E-07	1.02784E-08	9.24866E-09	36.76397064	40.93384866	0.036861023	1576.886033
Orange (SC)	2026	Agricultural - Construction Equipment	Aggregate	600	Diesel	4.2372E-06	5.12701E-06	6.10157E-06	3.50655E-05	4.18806E-05	0.007248257	1.97058E-06	1.81294E-06	6.5932E-08	5.90956E-08	234.9085952	46.18095805	0.037218381	11201.36329
Orange (SC)	2026	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.56194E-07	1.88995E-07	2.2492E-07	1.18859E-06	1.43665E-06	0.000193523	7.03068E-08	6.46822E-08	1.75904E-09	1.57781E-09	6.271872707	135.0310395	0.004990817	269.0141531
Orange (SC)	2026	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	1.11327E-06	1.34706E-06	1.60311E-06	9.87061E-06	1.04405E-05	0.002525566	4.63801E-07	4.26697E-07	2.29841E-08	2.05911E-08	81.85100958	3.103325841	0.006652604	3518.333107
Orange (SC)	2026	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	7.52091E-06	9.1003E-06	1.08301E-05	6.2112E-05	7.79362E-05	0.012838953	3.73529E-06	3.43646E-06	1.16786E-07	1.04677E-07	416.0973493	92.36191583	0.031373994	17885.77925
Orange (SC)	2026	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	5.12917E-06	6.2063E-06	7.38601E-06	4.16439E-05	6.97613E-05	0.008402059	2.40449E-06	2.21213E-06	7.64207E-08	6.85026E-08	272.3021432	47.41101086	0.015746165	11704.79933
Orange (SC)	2026	Agricultural - Forklifts	Aggregate	100	Diesel	1.80639E-05	2.18573E-05	2.60119E-05	0.000152749	0.000140709	0.024948472	1.02128E-05	9.39577E-06	2.26833E-07	2.03407E-07	808.554479	398.2353412	0.526982922	34680.64603
Orange (SC)	2026	Agricultural - Forklifts	Aggregate	175	Diesel	1.88736E-06	2.2837E-06	2.7178E-06	1.90679E-05	1.82101E-05	0.003261445	8.37226E-07	7.70248E-07	2.96675E-08	2.65908E-08	105.7001008	41.38738826	0.052586072	5040.195335
Orange (SC)	2026	Agricultural - Forklifts	Aggregate	50	Diesel	2.73578E-05	3.31029E-05	3.93952E-05	0.000138182	0.000111412	0.016370816	6.68135E-06	6.14685E-06	1.48379E-07	1.33473E-07	530.5613978	537.0675857	0.735263985	22756.92318
Orange (SC)	2026	Agricultural - Forklifts	Aggregate	75	Diesel	7.01695E-05	8.49052E-05	0.000101044	0.000539763	0.00064911	0.088054115	3.16974E-05	2.91616E-05	8.00402E-07	7.17912E-07	2853.74384	1038.593707	2.201410838	122403.23
Orange (SC)	2026	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.57896E-07	3.12054E-07	3.7137E-07	2.77772E-06	2.33607E-06	0.000455334	1.17283E-07	1.079E-07	4.14208E-09	3.71237E-09	14.75689491	3.103325841	0.006652604	670.1586846
Orange (SC)	2026	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	6.74716E-06	8.16407E-06	9.71592E-06	3.76613E-05	6.96009E-05	0.014519566	3.06649E-06	2.82117E-06	1.32126E-07	1.18379E-07	470.5642757	150.5701472	0.125748349	21369.85719
Orange (SC)	2026	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	2.26141E-08	2.73631E-08	3.25643E-08	1.72087E-07	2.08001E-07	2.80186E-05	1.01792E-08	9.36483E-09	2.54677E-10	2.28438E-10	0.908055038	135.0310549	0.000619355	37.09375193
Orange (SC)	2026	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000115589	0.000139863	0.000166448	0.000865724	0.000970961	0.132208219	7.59487E-05	6.98728E-05	1.20145E-06	1.0779E-06	4284.733251	1205.693942	2.187451985	165669.5262
Orange (SC)	2026	Agricultural - Nut Harvester	Aggregate	175	Diesel	2.16827E-05	2.6236E-05	3.1223E-05	0.000210394	0.000213011	0.035147779	1.01638E-05	9.35067E-06	3.19679E-07	2.86563E-07	1139.10357	551.9458103	0.470470085	48963.91413
Orange (SC)	2026	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.61444E-05	4.37347E-05	5.20479E-05	0.000175253	0.000148152	0.020489907	7.44733E-06	6.85154E-06	1.85656E-07	1.67056E-07	664.0569397	135.0310471	1.63689115	25675.81043
Orange (SC)	2026	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.35093E-05	1.63463E-05	1.94535E-05	7.37734E-05	0.000137481	0.027530749	6.21392E-06	5.71681E-06	2.50504E-07	2.2446E-07	892.2434189	155.8172627	0.185216245	38352.7288
Orange (SC)	2026	Agricultural - Nut Harvester	Aggregate	50	Diesel	1.04807E-05	1.26817E-05	1.50922E-05	4.97303E-05	3.82689E-05	0.005350826	2.62399E-06	2.41407E-06	4.84519E-08	4.36257E-08	173.4148082	226.4544758	0.198552156	6705.096371
Orange (SC)	2026	Agricultural - Nut Harvester	Aggregate	75	Diesel	2.13565E-05	2.58413E-05	3.07533E-05	0.000163105	0.000196808	0.026573007	9.62459E-06	8.85462E-06	2.4154E-07	2.16652E-07	861.2039782	291.1898342	0.550109862	33298.51513
Orange (SC)	2026	Agricultural - Other Harvesters	Aggregate	100	Diesel	2.25985E-05	2.73441E-05	3.25418E-05	0.000186194	0.000173942	0.030164001	1.28431E-05	1.18156E-05	2.7423E-07	2.45929E-07	977.5844225	596.9555251	0.488803862	37798.3741
Orange (SC)	2026	Agricultural - Other Harvesters	Aggregate	175	Diesel	2.05213E-05	2.48308E-05	2.95507E-05	0.000202261	0.000200762	0.034080215	9.45424E-06	8.6979E-06	3.09984E-07	2.77859E-07	1104.504923	340.2833525	0.450830295	47476.70543
Orange (SC)	2026	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.42194E-07	1.72055E-07	2.04759E-07	7.93697E-07	1.46681E-06	0.000305994	6.46251E-08	5.94551E-08	2.7845E-09	2.4948E-09	9.916962014	135.0310471	0.001858065	426.2766753
Orange (SC)	2026	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.41835E-07	2.9262E-07	3.48242E-07	1.85355E-06	2.55357E-06	0.000564873	1.02957E-07	9.47208E-08	5.14088E-09	4.60545E-09	18.30695875	135.0310471	0.001858065	786.9173706
Orange (SC)	2026	Agricultural - Other Harvesters	Aggregate	75	Diesel	7.00372E-08	8.4745E-08	1.00854E-07	5.32963E-07	6.44192E-07	8.67752E-05	3.15254E-08	2.90034E-08	7.8875E-10	7.07485E-10	2.812296973	135.0310471	0.001858065	108.7376704
Orange (SC)	2026	Agricultural - Other Harvesters	Aggregate	750	Diesel	1.00557E-07	1.21674E-07	1.44802E-07	7.67631E-07	1.09863E-06	0.000023937	4.51692E-08	4.15557E-08	2.12904E-09	1.90731E-09	7.581670845	135.0310558	0.000619355	325.8951093
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	3.82204E-06	4.62467E-06	5.50374E-06	3.63816E-05	3.77233E-05	0.006013043	1.82789E-06	1.68166E-06	5.4687E-08	4.90248E-08	194.8765742	265.4535689	0.075878518	8849.980353
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.73051E-05	2.09392E-05	2.49194E-05	8.58001E-05	0.000166112	0.027055991	8.35487E-06	7.68648E-06	2.46063E-07	2.2059E-07	876.8570178	47.41101086	0.184311032	39820.93443
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.40117E-06	4.11542E-06	4.89768E-06	1.68784E-05	1.34495E-05	0.001996963	8.07567E-07	7.42962E-07	1.80979E-08	1.62814E-08	64.71954463	64.42186244	0.08736236	2643.772295
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.71535E-05	2.07557E-05	2.4701E-05	0.000133492	0.000178896	0.038001877	7.43273E-06	6.83811E-06	3.45827E-07	3.09832E-07	1231.601997	157.0473094	0.185216245	55931.06114
Orange (SC)	2026	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000470645	0.000569481	0.000677729	0.003235337	0.00413874	0.491106345	0.000250093	0.000230086	4.46172E-06	4.00403E-06	15916.25459	720.8515301	14.35433082	650173.8075
Orange (SC)	2026	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	3.07538E-05	3.72121E-05	4.42855E-05	0.000255644	0.000234646	0.041623182	1.72145E-05	1.58373E-05	3.78422E-07	3.39357E-07	1348.964785	395.2375125	0.621045925	48216.67532
Orange (SC)	2026	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	6.72996E-07	8.14325E-07	9.69114E-07	3.75098E-06	6.39204E-06	0.001415207	2.99478E-07	2.7552E-07	1.28777E-08	1.15383E-08	45.86542368	138.1343728	0.009130025	1822.536063
Orange (SC)	2026	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.6544E-09	2.00182E-09	2.38233E-09	1.33942E-08	1.55382E-08	2.11919E-06	7.73833E-10	7.11927E-10	1.92642E-11	1.72779E-11	0.068680766	0.453537235	4.43081E-05	2.454888551
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	4.45052E-05	5.38513E-05	6.40875E-05	0.000732152	0.000587434	0.113029599	2.8644E-05	2.63525E-05	1.04368E-06	9.22532E-07	3667.120852	1471.908715	4.359344627	132420.4387
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	8.13293E-05	9.84084E-05	0.000117114	0.001635245	0.001142076	0.276105771	5.55172E-05	5.10758E-05	2.55029E-06	2.25354E-06	8957.947663	2401.646001	7.19798764	323462.2603
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.82727E-05	4.63099E-05	5.51127E-05	0.000296986	0.000585044	0.153744797	1.71011E-05	1.5733E-05	1.4203E-06	1.25484E-06	4988.080631	804.4152277	2.382432529	180120.5501
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.28246E-05	2.76177E-05	3.28674E-05	0.000108386	9.2263E-05	0.010040482	9.02532E-06	8.30329E-06	9.21445E-08	8.19491E-08	325.7523663	245.2423042	0.760350807	10579.53579
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	3.11489E-06	3.76902E-06	4.48544E-06	1.73957E-05	3.2035E-05	0.00225824	2.6787E-06	2.4644E-06	2.07851E-08	1.84315E-08	73.26610507	45.60267284	0.152070161	2644.613858
Orange (SC)	2026	Airport Ground Support - A/C Tug Narrow Body	Aggregate	750	Diesel	9.4242E-07	1.14033E-06	1.35708E-06	1.83475E-05	5.06068E-06	0.010226279	1.74308E-07	1.60363E-07	9.45187E-08	8.34655E-08	331.7803

Orange (SC)	2026 Airport Ground Support - Misc - Maint. Truck	Aggregate	175	Gasoline	0.000162485	0.000149454	0.000178805	0.014728096	0.001322039	0.42337155	3.03512E-05	2.2932E-05	4.20575E-06	5.92797E-06	16921.4	2872.55	6.38	373431.5
Orange (SC)	2026 Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000132738	0.000122092	0.0001460	0.010139939	0.00027948	0.101920748	7.02633E-06	5.30878E-06	1.23917E-06	1.5715E-06	4485.85	1722.8	9.42	86140
Orange (SC)	2026 Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.12747E-05	0.001558971	0.000450509	0.092159154	0	0	0	0	4923.85	1814.05	1.77	90702.5
Orange (SC)	2026 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.59469E-05	4.2262E-05	5.05618E-05	0.004468334	0.000441511	0.1367095	9.80062E-06	7.40491E-06	1.20991E-06	1.90651E-06	5442.15	810.3	4.33	101368.53
Orange (SC)	2026 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	8.45368E-09	9.17225E-06	9.68902E-07	0.000373589	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2026 Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000816047	0.0007506	0.00089801	0.050647158	0.004882895	1.228290728	9.06116E-05	6.84621E-05	1.2556E-05	1.73709E-05	49585.25	15424.9	18.31	2776482
Orange (SC)	2026 Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.03816E-05	0.006051607	0.000516364	0.171494793	0	0	0	0	9391.45	2328.7	1.79	419166
Orange (SC)	2026 Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	6.34417E-06	5.83537E-06	6.98137E-06	0.000382241	3.29634E-05	0.009625608	6.71121E-07	5.07069E-07	7.947E-08	1.36819E-07	390.55	156.95	0.43	8365.435
Orange (SC)	2026 Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.72713E-08	2.44372E-05	6.88938E-06	0.00204035	0	0	0	0	98.55	47.45	0.15	2135.25
Orange (SC)	2026 Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.3443E-05	1.23649E-05	1.47932E-05	0.001161622	0.000114266	0.034145134	2.44784E-06	1.84948E-06	3.39196E-07	4.78227E-07	1365.1	492.75	1.62	73912.5
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	100	Diesel	2.93601E-05	3.55258E-05	4.22786E-05	0.000775693	0.000432692	0.121652861	1.36466E-05	1.25548E-05	1.12386E-06	9.92914E-07	3946.893083	2733.110509	5.557487779	227507.1017
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	175	Diesel	8.69465E-05	0.000105205	0.000125203	0.002152328	0.00087906	0.366004587	3.2748E-05	3.01282E-05	3.38129E-06	2.98728E-06	11874.61575	4447.59746	9.122668618	684482.8025
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	300	Diesel	8.3654E-05	0.000101221	0.00012046 2	0.00077131	0.000833765	0.360136584	3.37707E-05	3.1069E-05	3.32713E-06	2.93939E-06	11684.23483	2988.589767	6.186637339	673512.2503
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	50	Diesel	0.000115282	0.000139491	0.000166006	0.001336035	0.001144109	0.186891645	3.95998E-05	3.64318E-05	1.72445E-06	1.52538E-06	6063.493602	9150.674177	18.8744868	314393.8093
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	600	Diesel	5.46366E-05	6.61102E-05	7.86767E-05	0.000536534	0.000533529	0.224642564	2.18638E-05	2.01147E-05	2.07529E-06	1.8335E-06	7288.280577	1169.887981	2.41173998	420115.9957
Orange (SC)	2026 Airport Ground Support - Other	Aggregate	75	Diesel	3.39163E-05	4.10387E-05	4.88394E-05	0.000563336	0.000452414	0.083639024	2.16757E-05	1.99417E-05	7.72267E-07	6.8265E-07	2713.57601	2438.932967	5.138054739	156421.057
Orange (SC)	2026 Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	5.86381E-07	7.09522E-07	8.44389E-07	5.52609E-06	9.09054E-06	0.000885231	5.52666E-07	5.08453E-07	8.16681E-09	7.22514E-09	28.72034888	12.7665289	0.056904899	1404.318179
Orange (SC)	2026 Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.9126E-07	2.31424E-07	2.75414E-07	1.30039E-06	4.34956E-06	0.000738283	9.33295E-08	8.58631E-08	6.82006E-09	6.02577E-09	23.95278865	4.340619825	0.113809799	1182.818902
Orange (SC)	2026 Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.14085E-06	1.38042E-06	1.64282E-06	1.04024E-05	1.28238E-05	0.001881348	6.57577E-07	6.04971E-07	1.73598E-08	1.53553E-08	61.03827143	62.42832631	1.081193087	2698.971874
Orange (SC)	2026 Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	5.92451E-08	7.16865E-08	8.53129E-08	1.45685E-06	4.04882E-07	0.000833109	1.35355E-08	1.24526E-08	7.70073E-09	6.79972E-09	27.02929362	4.340619825	0.113809799	1334.740596
Orange (SC)	2026 Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.35921E-07	2.85465E-07	3.39727E-07	1.24931E-05	6.46838E-06	0.002145763	4.31003E-08	3.96523E-08	1.98316E-08	1.75134E-08	69.61691235	60.76867755	1.593337181	3437.770902
Orange (SC)	2026 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000352	0.0000426	0.0000506	0.000166857	0.000906241	0.127294585	0.0000404	0.0000387	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2026 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	0.0000524	0.0000634	0.0000755	0.000395579	0.001136149	0.161520299	5.21E-05	0.0000498	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2026 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.000027	0.0000327	0.0000389	0.000139157	0.000653848	0.087797776	0.0000235	0.0000224	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2026 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000286381	0.00034671	0.000412384	0.001175687	0.001754445	0.163841665	0.0001361	0.0001303	0	0	5315.080954	11062.28165	6.703055	92409.87892
Orange (SC)	2026 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.001865799	0.002257518	0.002686553	0.007275797	0.011237189	1.199641086	0.000771964	0.000737988	0	0	38916.7773	42036.67865	25.47161494	669971.6951
Orange (SC)	2026 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000970086	0.001173842	0.001396932	0.00391791	0.012051056	1.404155633	0.000714551	0.000683005	0	0	45551.29942	28761.93623	17.42794602	805229.3166
Orange (SC)	2026 Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000145085	0.000175553	0.000208922	0.000864727	0.00299563	0.43995744	0.000129196	0.000123511	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2026 Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000321005	0.000388383	0.000462235	0.002226114	0.00811244	1.104411255	0.000318211	0.000304153	0	0	35827.48786	14573.56994	20.409706	692498.7376
Orange (SC)	2026 Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.27977E-05	3.96857E-05	4.71743E-05	0.000119935	0.000210992	0.022726793	1.50767E-05	1.43852E-05	0	0	737.2658217	3135.150368	5.102426055	11761.9738
Orange (SC)	2026 Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000821948	0.000994618	0.001183671	0.003689119	0.012699638	1.198654341	0.000522979	0.00050003	0	0	38884.76383	8115.264145	15.30727903	751594.1606
Orange (SC)	2026 Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000327	0.000395546	0.000470897	0.001406186	0.002998588	0.380171685	0.000169421	0.000162037	0	0	12332.90425	15538.90142	25.51213199	205775.4355
Orange (SC)	2026 Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000307103	0.000371574	0.000442184	0.001824923	0.008401741	0.994453512	0.000259133	0.000247678	0	0	32260.41943	4151.633637	5.102426052	624624.6277
Orange (SC)	2026 Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000666586	0.000806487	0.000959816	0.002619606	0.006283477	0.688378471	0.0004560 8	0.000436004	0	0	22331.23828	18054.5338	28.06334527	403681.7767
Orange (SC)	2026 Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	0.0000668	0.0000808	0.0000962	0.00050645	0.00153879	0.248144597	0.0000664	0.0000635	0	0	8049.897461	3548.810303	2	155594.0469
Orange (SC)	2026 Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000473	0.00000573	0.00000682	0.0000444	0.0000956	0.012758453	0.00000493	0.00000471	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2026 Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.0000336	0.0000406	0.0000484	0.000120985	0.000169267	0.017992692	0.0000213	0.0000204	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2026 Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.31E-05	4E-05	4.77E-05	0.000331659	0.000646999	0.082925439	3.65E-05	3.49E-05	0	0	2690.130137	4401.614761	6.136045	46771.55469
Orange (SC)	2026 Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000212315	0.000256901	0.000305734	0.001614673	0.004886807	0.796780953	0.000198945	0.000190191	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000814469	0.000985484	0.001172685	0.003201798	0.010743926	0.921425568	0.000390032	0.000372874	0	0	29891.36947	9472.179819	9.500724127	578418.6938
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.002907493	0.003518256	0.004186941	0.012376931	0.051475137	4.705471243	0.001507272	0.001440853	0	0	152647.1377	28416.54283	28.50217612	2953901.628
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000105228	0.000127326	0.000151528	0.0004744	0.002949504	0.413541555	0.0000433	0.0000414	0	0	13415.43262	1578.696655	1.583454013	260011.3422
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000108763	0.000131552	0.000156564	0.000457615	0.001365414	0.089987559	5.54766E-05	5.30706E-05	0	0	2919.227908	1599.417338	1.34061101	55275.86116
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000777683	0.000941083	0.001119938	0.003518435	0.020346129	2.027567316	0.000430223	0.000411368	0	0	65774.99183	15994.17666	13.406113	1271345.02
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.004860744	0.005881529	0.006999454	0.02078379	0.094643726	8.659583056	0.002583736	0.002470097	0	0	280919.9021	46383.11258	38.87727795	5436395.816
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.008781035	0.010624943	0.012644644	0.034568488	0.103851631	6.05734431	0.004642497	0.004438211	0	0	196502.3718	20792.43207	17.42794898	3800216.542
Orange (SC)	2026 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008549649	0.010345075	0.012311493	0.034464211	0.105331832	8.269492877	0.004409056	0.004215057	0	0	268265.2347	15994.17897	13.406115	5288980.056
Orange (SC)	2026 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2026 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001568922	0.001898258	0.002259163	0.006744219	0.040277559	4.864925641	0.000731949	0.000699811	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2026 Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001065	0.000129	0.000153458	0.000429879	0.001099871	0.134737151	7.609E-05	7.275E-05	0	0	4370.920384	3610.067691	12.75606513	77399.85485
Orange (SC)	2026 Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000622931	0.000753753	0.000896991	0.002762201	0.015918181	1.679809255	0.000337518	0.000322842	0	0	54493.60038	15571.51684	22.96091821	1054245.273
Orange (SC)	2026 Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005088888	0.006157393	0.007327881	0.020618982	0.10268565	9.816397699	0.002734815	0.002614568	0	0	318447.3778	51782.30988	81.63881291	6160637.848
Orange (SC)	2026 Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002878429	0.003482963	0.004144974	0.010971488	0.03665178	2.915947865	0.001434244	0.001371097	0	0	94594.36748	10624.30242	20.40970583	1831067.739
Orange (SC)	2026 Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001705926	0.002064171	0.002456533	0.005252492	0.026718913	2.936270505	0.000691222	0.000660808	0	0	95253.64356	6490.26294	10.2048521	1895210.05
Orange (SC)	2026 Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002455322	0.00297094	0.003535664	0.010007655	0.06202437	5.606853962	0.001461991	0.001397663	0	0	181888.2969	4744.229492	2	3515664
Orange (SC)	2026 Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000210618	0.000254848	0.00030329	0.000849636	0.005295897	0.542378247	0.000117876	0.000112689	0	0	17594.93945	8022.818359	3	340087.2813
Orange (SC)	2026 Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	0.0000332	0.0000402	0.0000479	0.00018076	0.001017015	0.090107121	0.0000217	0.0000208	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2026 Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000966	0.000116931	0.000139158	0.00055224	0.002527061	0.228271365	0.0000474	0.0000453	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2026 Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000253761	0.000307054	0.000365535	0.00107782	0.003720032	0.321537445	0.00012622	0.00012057	0	0	10430.78712	3920.689621	6.136046008	195838.4531
Orange (SC)	2026 Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.000913655	0.001105522	0.001315663	0.004451516	0.024772615	2.485922833	0.000507774	0.000485366	0	0	80644.20772	11762.06797	18.408137	1560179.5
Orange (SC)	2026 Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000298377	0.000361036	0.000429663	0.001182652	0.007306647	0.733968862	0.000160653	0.000153584	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	9.81148E-05	0.000118719	0.000141285	0.003012773	0.001518436	0.486379393	3.70926E-05	3.41252E-05	4.49388E-06	3.96976E-06	15780.04377	7460.741747	17.75360409	610380.7266
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	0.000112698	0.000136365	0.000162285	0.003437226	0.001033563	0.61635871	4.68362E-05	4.30893E-05	5.69516E-06	5.03064E-06	19997.07955	5122.983658	15.70511131	766627.8644
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.00016196	0.000195971	0.000233222	0.001786431	0.001806192	0.884630025	5.93062E-05	5.45617E-05	8.17398E-06	7.22023E-06	28700.84693	5314.651981	15.84167749	1109468.979
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	6.96018E-05	8.42182E-05	0.000100227	0.000613473	0.000562939	0.084918249	2.67539E-05	2.46136E-05	7.83023E-07	6.93091E-07	2755.079057	2381.611672	6.486893802	92561.67704
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.000192438	0.00023285	0.00027711	0.002307575	0.001794272	1.224469757	6.34557E-05	5.83793E-05	1.13151E-05	9.99396E-06	39726.57274	4034.851533	12.42752286	1548310.644
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	1.81092E-05	2.19121E-05	2.60773E-05	0.000239863	0.000337406	0.035788977	1.84745E-05	1.69965E-05	3.30344E-07	2.92105E-07	1161.133949	687.3345125	1.980209687	46776.16321
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000119471	0.00014456	0.000172038	0.001939493	0.000839575	1.06989577	3.15191E-05	2.89975E-05	9.88813E-06	8.73235E-06	34711.58996	2099.902689	3.482437725	1325933.583
Orange (SC)	2026 Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.00012572	0.000152121	0.000181036	0.000868311	0.003367359	0.458611504	7.82482E-05	7.19883E-05	4.23632E-06	3.74313E-06	14879.14517	308.2625284	0.409698556	573504.8524
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	100	Diesel	0.000350523	0.000424133	0.000504753	0.004367754	0.003951352	0.620563667	0.000221015	0.000203334	5.7269E-06	5.06496E-06	20133.50474	15319.54768	32.75952692	1354610.482
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	175	Diesel	0.000902942	0.00109256	0.001300237	0.011256147	0.009931575	1.788079493	0.000535659	0.000492806	1.65046E-05	1.45941E-05	58012.26993	26353.13478	56.4287139	3886189.855
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	25	Diesel	2.9729E-06	3.59721E-06	4.28098E-06	1.65759E-05	1.36411E-05	0.001622155	1.09424E-06	1.0067E-06	1.49084E-08	1.32398E-08	52.62902095	127.1306598	0.257273772	3178.266496
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	300	Diesel	0.001200643	0.001452778	0.001728926	0.008624264	0.014594835	3.066866348	0.000607131	0.00055856	2.83187E-05	2.50314E-05	99501.10111	30484.27488	62.5175265	6681373.521
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	50	Diesel	5.40713E-05	6.54262E-05	7.78626E-05	0.000285555	0.000230384	0.026263344	1.95921E-05	1.80247E-05	2.41196E-07	2.14358E-07	852.0852718	1236.54273	2.744253564	51212.34957
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	600	Diesel	0.001713655	0.002073522	0.002467663	0.017180767	0.019273274	5.535402335	0.000789883	0.000726692	5.11261E-05	4.51792E-05	179590.0326	32960.89736	64.66147459	12061589.89
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	75	Diesel	3.12083E-05	3.77621E-05	4.494E-05	0.000128804	0.000266456	0.014370746	2.70085E-05	2.48479E-05	1.31928E-07	1.17292E-07	466.2430113	455.8715473	1.286368858	31430.5191
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	750	Diesel	6.79237E-05	8.21877E-05	9.78101E-05	0.000551178	0.000879244	0.108215218	4.02122E-05	3.69952E-05	9.98466E-07	8.83238E-07	3510.923574	372.397839	0.857579239	235890.4004
Orange (SC)	2026 Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000190191	0.000230131	0.000273875	0.001890256	0.003006289	0.301861336	0.000115055	0.00010585	2.78515E-06	2.46375E-06	9793.558612	701.5429576	1.372126782	658162.1463
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.002394436	0.002897267	0.003447988	0.02609196	0.025436639	3.703236732	0.001756254	0.001615753	3.41664E-05	3.02253E-05	120147.4374	61696.80961	127.1078453	5409594.691
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.001790175	0.002166112	0.002577852	0.024949229	0.019002857	4.102294964	0.001056627	0.000972097	3.7874E-05	3.34824E-05	133094.4422	40188.9673	85.93099241	6007845.315
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.001783264	0.00215775	0.0025679	0.013879176	0.022150397	4.286836443	0.0009309 5	0.000856474	3.95804E-05	3.49886E-05	139081.6873	30584.17364	65.91340959	6278224.467
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000196124	0.00023731	0.000282419	0.00094992	0.000699886	0.085191571	6.08396E-05	5.59724E-05	7.81755E-07	6.95322E-07	2763.946713	2679.44387	7.611248221	112488.0058
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.004096037	0.004956204	0.005898293	0.040133649	0.042259229	15.01201635	0.00169592	0.001560246	0.000138671	0.000122526	487048.3376	57071.14988	117.0609976	21951285.67
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	6.32178E-05	7.64936E-05	9.10337E-05	0.000488073	0.000672494	0.058462718	4.91335E-05	4.52029E-05	5.3862E-07	4.77165E-07	1896.758493	1126.076782	3.653399146	82927.36167
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	7.62353E-05	9.22447E-05	0.000109779	0.00057384	0.001075756	0.18850608	3.59195E-05	3.3046E-05	1.74055E-06	1.53856E-06	6115.872174	450.3410213	0.989462269	277423.8816
Orange (SC)	2026 Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000306088	0.000370367	0.000440767	0.002297026	0.006968361	0.873600591	0.000156509	0.000143989	8.06769E-06	7.13021E-06	28343.00908	1304.114409	2.283374466	1262961.094
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	100	Diesel	0.001252641	0.001515696	0.001803803	0.028662086	0.016049731	4.366721227	0.000550857	0.000506788	4.03349E-05	3.56406E-05	141673.4611	88554.87063	132.3192177	7209896.507
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	175	Diesel	0.002148854	0.002600113	0.003094349	0.054273567	0.017845829	9.328056189	0.000859588	0.000790821	8.6178E-05	7.61343E-05	302638.51	104813.4959	171.6717919	15321108.81
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	25	Diesel	3.82358E-06	4.62653E-06	5.50596E-06	1.29922E-05	8.82484E-06	0.000683628	1.22992E-06	1.13153E-06	6.20578E-09	5.57968E-09	22.17957247	40.44188227	0.152529358	1011.047057
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	300	Diesel	0.002417629	0.002925331	0.003481386	0.024733267	0.020655342	11.8855356	0.000699663	0.00064369	0.000109815	9.70081E-05	385613.1129	89160.42042	147.9534768	19510896.44
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	50	Diesel	0.001885338	0.002281259	0.002714887	0.024490246	0.019767623	3.40608298	0.000572082	0.000526315	3.14344E-05	2.78E-05	110506.6112	140489.527	186.1620809	5030773.481
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	600	Diesel	0.003750653	0.00453829	0.00540094	0.041416552	0.027016487	20.90252569	0.000957502	0.000880902	0.000193142	0.000170604	678159.4261	102114.135	154.3597098	34379652.94
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	75	Diesel	5.4446E-05	6.58797E-05	7.84022E-05	0.000379926	0.000484499	0.048353627	5.01468E-05	4.6135E-05	4.4542E-07	3.946566E-07	1568.780163	1084.112057	1.982881648	78526.90151
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	750	Diesel	0.000127251	0.000153974	0.000183242	0.001209177	0.001334961	0.498692965	4.72344E-05	4.34556E-05	4.60685E-06	4.07026E-06	16179.54402	1334.312502	2.211675684	814697.3595
Orange (SC)	2026 Construction and Mining - Excavators	Aggregate	9999	Diesel	7.70234E-05	9.31983E-05	0.000110914	0.001100438	0.002609759	0.587794637	2.3845E-05	2.19374E-05	5.43214E-06	4.7975E-06	19070.34964	800.9290106	1.143970182	952751.6112
Orange (SC)	2026 Construction and Mining - Graders	Aggregate	100	Diesel	0.000396198	0.0004794	0.000570526	0.003807987	0.003772934	0.502962508	0.000268541	0.000247058	4.63825E-06	4.10511E-06	16318.06465	8720.927308	20.5391428	777615.1568
Orange (SC)	2026 Construction and Mining - Graders	Aggregate	175	Diesel	0.002774097	0.003356657	0.003994699	0.03644299	0.027112976	5.694001661	0.001506217	0.00138572	5.25606E-05	4.64737E-05	184735.6131	58663.8939

Orange (SC)	2026 Construction and Mining - Misc - Trenchers	Aggregate	25	Gasoline	0.00232104	0.002344252	0.002554164	0.076605802	0.001496026	2.67098E-06	0.0008654	0.000653858	1.21804E-06	1.68134E-06	4792.078812	0	14.71626775	0
Orange (SC)	2026 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000121278	0.000145871	0.000174339	0.000497878	0.000921789	2.12768E-06	3.09986E-05	2.34212E-05	1.26471E-08	1.08943E-08	43.34452809	0	4.346782841	0
Orange (SC)	2026 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.022417482	0
Orange (SC)	2026 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.001946965	0.001790818	0.002142516	0.151107333	0.002687933	0.976133591	6.72938E-05	5.08442E-05	1.1868E-05	1.61881E-05	46209	20837.85	51.77	625135.5
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000358528	0.000433819	0.000516281	0.007145694	0.004597359	1.06481332	0.000213939	0.000196824	9.83397E-06	8.69086E-06	34546.69547	19431.19182	27.24035427	1527026.824
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000395887	0.000479023	0.000570077	0.009127998	0.003462693	1.533940178	0.000160707	0.000147851	1.41702E-05	1.25198E-05	49766.99974	13954.46684	19.71539452	2209015.073
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000303355	0.000367059	0.000436831	0.002788489	0.002505171	1.293720202	9.00812E-05	8.28747E-05	1.1952E-05	1.05592E-05	41973.32718	8728.779843	13.01818035	1864153.877
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.000974174	0.001178751	0.001402811	0.011055877	0.008693186	1.408665329	0.000301998	0.000277839	1.29946E-05	1.14973E-05	45702.59522	48552.66294	71.41186795	1827215.737
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000878545	0.00106304	0.001265105	0.008713135	0.006084738	4.34318677	0.000210866	0.000193996	4.01286E-05	3.54485E-05	140909.9116	17494.53702	24.60661836	6267338.97
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000351505	0.000425321	0.000506167	0.005185206	0.003790776	0.737896815	0.000191522	0.000176201	6.81168E-06	6.02261E-06	23940.24951	15087.37442	24.68186795	1066142.388
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	7.30116E-05	8.8344E-05	0.000105137	0.000379473	0.000593495	0.181269464	3.06944E-05	2.82389E-05	1.67374E-06	1.4795E-06	5881.088115	413.0466141	0.601996779	262790.4358
Orange (SC)	2026 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	7.46695E-05	9.03501E-05	0.000107524	0.000464112	0.001246026	0.228743481	2.74699E-05	2.52723E-05	2.11261E-06	1.86697E-06	7421.330329	210.2476432	0.376247987	329614.8337
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	6.06694E-05	7.34099E-05	8.73639E-05	0.001040661	0.000633677	0.145369535	3.16195E-05	2.90899E-05	1.34219E-06	1.18649E-06	4716.35448	2771.888971	2.013068694	239496.792
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.001004872	0.001215895	0.001447015	0.020321666	0.00694692	3.206816465	0.000341452	0.000314136	2.96185E-05	2.61736E-05	104041.6285	33332.07689	22.96389473	5277282.24
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	1.36147E-05	1.64738E-05	1.96052E-05	8.2691E-05	6.27707E-05	0.006542506	6.02238E-06	5.54059E-06	6.00803E-08	5.33991E-08	212.2644073	386.9345788	0.298232399	9673.36447
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.001893863	0.002291574	0.002727162	0.015222922	0.013271133	6.567762984	0.000509035	0.000468312	6.06654E-05	5.36052E-05	213083.8369	51455.2702	39.14300238	10822825.67
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	9.92755E-05	0.000120123	0.000142957	0.00115219	0.000808624	0.129829756	2.45923E-05	2.2625E-05	1.19736E-06	1.05965E-06	4212.183444	6666.274803	3.951579288	193127.3272
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.007752167	0.009380122	0.011163121	0.062847704	0.053944868	28.22668683	0.001899678	0.001747704	0.000260737	0.000230382	915783.7682	123152.5607	87.82944154	46249331.78
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	4.97843E-06	6.02391E-06	7.16895E-06	9.75474E-05	4.68081E-05	0.013239878	1.04888E-06	9.64974E-07	1.2226E-07	1.08062E-07	429.5532467	293.8910459	0.223674299	21402.20907
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.003546454	0.00429121	0.005106894	0.028923856	0.030213174	9.625863361	0.001159499	0.001066739	8.88895E-05	7.8565E-05	312300.5357	23719.86285	18.71408304	15783903.67
Orange (SC)	2026 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.004539956	0.005493346	0.006537536	0.036501633	0.094028163	16.96999444	0.001511025	0.001390143	0.00015676	0.000138507	550572.7805	21869.18393	14.98617806	28097764.39
Orange (SC)	2026 Construction and Mining - Other	Aggregate	100	Diesel	0.001005667	0.001216857	0.001448161	0.015142112	0.011813064	2.279604489	0.000683202	0.000628546	2.10459E-05	1.86058E-05	73959.2571	41931.13811	89.85728822	3444493.328
Orange (SC)	2026 Construction and Mining - Other	Aggregate	175	Diesel	0.000452357	0.000547352	0.000651394	0.007772096	0.004833408	1.302738618	0.000249796	0.000229812	1.20309E-05	1.06328E-05	42265.91974	12960.88971	30.42236843	1969949.005
Orange (SC)	2026 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Other	Aggregate	300	Diesel	0.000559527	0.000677028	0.000805719	0.004550832	0.006782221	1.75264713	0.000269862	0.000248273	1.61873E-05	1.43049E-05	56862.70592	11958.403	28.41894417	2639666.037
Orange (SC)	2026 Construction and Mining - Other	Aggregate	50	Diesel	0.000727912	0.000880774	0.001048194	0.006063456	0.005281807	0.762320598	0.000298248	0.000274388	7.02619E-06	6.22196E-06	24732.65226	27050.96507	55.13126767	1030857.463
Orange (SC)	2026 Construction and Mining - Other	Aggregate	600	Diesel	0.001593337	0.001927938	0.002294405	0.016051216	0.01656303	6.84901744	0.000625685	0.00057563	6.32748E-05	5.59008E-05	222208.828	26671.91754	57.57989732	10329707.8
Orange (SC)	2026 Construction and Mining - Other	Aggregate	75	Diesel	0.00019861	0.000240318	0.000285998	0.000992056	0.002055375	0.10937234	0.000158105	0.000145457	1.00524E-06	8.92682E-07	3548.465128	2295.620251	7.271688064	166799.2478
Orange (SC)	2026 Construction and Mining - Other	Aggregate	750	Diesel	0.000239569	0.000289879	0.000344979	0.002082996	0.002737488	0.982343954	9.33536E-05	8.58853E-05	9.07507E-06	8.01776E-06	31871.06773	2400.109708	4.82305841	1479829.99
Orange (SC)	2026 Construction and Mining - Other	Aggregate	9999	Diesel	8.11192E-05	9.81542E-05	0.000116812	0.000796738	0.002162407	0.420446595	3.46943E-05	3.19187E-05	3.8848E-06	3.43163E-06	13640.92673	692.6907758	1.409817074	635323.1785
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	100	Diesel	0.000284136	0.000343804	0.000409156	0.004973796	0.003672411	0.762219262	0.000187064	0.000172098	7.03857E-06	6.22113E-06	24729.36451	14261.63025	35.57534139	1155522.025
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	175	Diesel	0.00033369	0.000403764	0.000480513	0.00702988	0.003492412	1.233283946	0.000169392	0.00015584	1.13923E-05	1.00659E-05	40012.5394	11782.25426	29.62130936	1860165.032
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000162836	0.000197032	0.000234484	0.001826588	0.001823263	0.962712607	6.13426E-05	5.64352E-05	8.89587E-06	7.85753E-06	31234.1503	6556.006839	14.14082607	1452644.037
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	50	Diesel	0.000115396	0.000139629	0.00016617	0.000778387	0.000642411	0.093351946	3.95556E-05	3.63912E-05	8.59623E-07	7.61926E-07	3028.701077	3269.05767	8.931048047	126546.9437
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	600	Diesel	2.87618E-05	3.48018E-05	4.1417E-05	0.000329375	0.000299433	0.177219837	1.02958E-05	9.47212E-06	1.63762E-06	1.44644E-06	5749.702447	742.5849463	1.637358809	267918.2626
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	75	Diesel	0.000116465	0.000140922	0.000167709	0.000955874	0.001179766	0.136675758	9.57372E-05	8.80783E-05	1.26014E-06	1.11553E-06	4434.294444	2893.77469	7.51696544	207417.2757
Orange (SC)	2026 Construction and Mining - Pavers	Aggregate	750	Diesel	3.77871E-06	4.57224E-06	5.44134E-06	6.57586E-05	1.80594E-05	0.036108445	6.32579E-07	5.81973E-07	3.33727E-07	2.94712E-07	1171.498744	72.61844048	0.148850801	54463.83036
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000142984	0.00017301	0.000205897	0.00309926	0.001881144	0.480636355	7.3143E-05	6.72915E-05	4.43943E-06	3.92289E-06	15593.71721	9532.041747	19.76531959	849302.3786
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.000149066	0.00018037	0.000214655	0.003083747	0.001530181	0.528150016	7.49164E-05	6.89231E-05	4.87854E-06	4.31069E-06	17135.24561	6464.731235	13.67225114	933574.7549
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	1.15463E-06	1.3971E-06	1.66266E-06	4.02013E-06	2.95739E-06	0.000275611	4.10935E-07	3.7806E-07	2.51352E-09	2.2495E-09	8.941899003	17.51247795	0.074305713	437.8119487
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	8.27367E-05	0.000100111	0.000119141	0.000713479	0.000863362	0.340344785	3.52109E-05	3.2394E-05	3.14417E-06	2.77785E-06	11042.11174	2621.880636	5.498622743	600361.6905
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	7.2137E-05	8.72858E-05	0.000103877	0.000826075	0.000709741	0.115939726	2.52279E-05	2.32097E-05	1.06976E-06	9.46284E-07	3761.536721	5327.033105	10.92293977	184500.211
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	5.88233E-05	7.11762E-05	8.47056E-05	0.000746764	0.0004267	0.392675731	1.6417E-05	1.51036E-05	3.62872E-06	3.20497E-06	12739.93162	1757.377162	3.566674212	694929.14
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	2.08598E-05	2.52404E-05	3.00381E-05	0.00013076	0.000203825	0.016622504	1.90449E-05	1.75213E-05	1.53057E-07	1.35671E-07	539.2988304	429.3183969	1.263197117	29429.21571
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.13923E-05	1.37847E-05	1.64049E-05	0.000129896	9.45777E-05	0.069973999	1.46263E-06	1.34562E-06	6.46603E-07	5.71118E-07	2270.229335	194.1258181	0.371528564	123899.687
Orange (SC)	2026 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.53089E-06	7.90238E-06	9.40449E-06	6.56994E-05	0.000154326	0.034112738	2.64507E-06	2.43347E-06	3.15193E-07	2.78424E-07	1106.750231	71.45091003	0.148611425	60234.1679
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	100	Diesel	0.001074144	0.001299714	0.001546768	0.019225963	0.014002797	2.976189431	0.000652326	0.00060014	2.74841E-05	2.42913E-05	96559.18839	56988.97925	166.5087215	4974426.086
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000585315	0.000708231	0.000842853	0.017091884	0.005873449	3.096525031	0.000261187	0.00024092	2.86114E-05	2.52734E-05	100463.3444	36032.39649	97.37889368	5181868.809
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	25	Diesel	1.71334E-06	2.07314E-06	2.46721E-06	5.69683E-06	3.92273E-06	0.000299759	5.39297E-07	4.96154E-07	2.72002E-09	2.44659E-09	9.72534603	18.04276622	0.076555734	451.0691555
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000169072	0.000204577	0.000243464	0.001521038	0.002060624	0.528982289	8.3588E-05	7.69009E-05	4.88563E-06	4.31748E-06	17162.24778	4055.562777	12.70825185	883926.79
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001463063	0.001770306	0.00210681	0.01336721	0.011803652	1.916933137	0.000502574	0.000462368	1.76791E-05	1.56458E-05	62192.78451	80635.73844	225.7628596	2882428.858
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	600	Diesel	6.52136E-05	7.89085E-05	9.39076E-05	0.00077117	0.000779344	0.283944251	2.71199E-05	2.49504E-05	2.62325E-06	2.31751E-06	9212.25851	1339.224323	4.287121105	473750.9124
Orange (SC)	2026 Construction and Mining - Rollers	Aggregate	75	Diesel	5.67587E-05	6.86781E-05	8.17326E-05	0.000224755	0.000550114	0.019133373	3.95201E-05	3.63585E-05	1.75195E-07	1.56164E-07	620.7612094	451.0691555	1.913893351	32007.86728
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001383445	0.001673968	0.001992161	0.046852658	0.02390328	7.69535938	0.000480973	0.000442495	7.11059E-05	6.28085E-05	249667.4602	124528.3062	428.3949099	11984689.48
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.000420002	0.000508202	0.00060403	0.008914128	0.003973982	1.604151422	0.00028085	0.000258382	1.48186E-05	1.30929E-05	52044.92622	19784.83994	69.08740349	2503877.243
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	7.04539E-07	8.52493E-07	1.01454E-06	9.42019E-06	1.15496E-05	0.001352165	6.0068E-07	5.52626E-07	1.24803E-08	1.10362E-08	43.86950541	75.89532895	0.26504119	1897.383224
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	2.30905E-05	2.79394E-05	3.32503E-05	0.000239757	0.000324195	0.127244244	7.53967E-06	6.9365E-06	1.17574E-06	1.03855E-06	4128.299367	936.7711521	3.622229595	198559.0709
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	5.64713E-05	6.83302E-05	8.13186E-05	0.000604157	0.000549662	0.096229096	1.7576E-05	1.61699E-05	8.87992E-07	7.85409E-07	3122.04704	2817.288747	9.983218152	134926.8049
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	5.0135E-06	6.06633E-06	7.21944E-06	7.6247E-05	4.18525E-05	0.041855994	7.33644E-07	6.74952E-07	3.86829E-07	3.41623E-07	1357.971614	163.242628	0.618429443	65268.94181
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	7.47587E-06	9.0458E-06	1.07653E-05	3.11186E-05	7.41752E-05	0.00324521	5.45726E-06	5.02068E-06	2.97793E-08	2.6487E-08	105.2872746	81.41309635	0.353388253	5042.927077
Orange (SC)	2026 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.50607E-06	1.82234E-06	2.16873E-06	1.47618E-05	2.01766E-05	0.007874251	1.45351E-07	1.33723E-07	7.27562E-08	6.42686E-08	255.4714079	19.67656676	0.088347063	12297.85423
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000232549	0.000281384	0.00033487	0.002114024	0.002298715	0.271828338	0.000164397	0.000151246	2.50621E-06	2.21863E-06	8819.171052	5070.231833	5.754008254	426373.9173
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.000247301	0.000299235	0.000356114	0.002466393	0.002557154	0.364324576	0.00015179	0.000139646	3.36094E-06	2.97357E-06	11820.10964	3970.321198	5.025652779	577948.9329
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000320037	0.000387245	0.000460854	0.002898426	0.004127137	0.429267338	0.000182909	0.000168277	3.95919E-06	3.50362E-06	13927.10604	3042.327925	4.297297304	680383.5145
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	6.59164E-05	7.97588E-05	9.49196E-05	0.000776466	0.000535665	0.084519949	1.8347E-05	1.68792E-05	7.79451E-07	6.8984E-07	2742.156647	2925.942532	2.986257448	120623.676
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.002318767	0.002805708	0.003339025	0.021681028	0.025628406	4.235221808	0.00112969	0.001039314	3.90872E-05	3.45673E-05	137407.1073	18174.4032	24.18140178	6661587.478
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	0.000103525	0.000125265	0.000149076	0.00082051	0.000975704	0.102822766	7.1863E-05	6.61139E-05	9.47542E-07	8.39226E-07	3335.971399	2238.101421	2.694915258	163148.1174
Orange (SC)	2026 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	5.89374E-05	7.13143E-05	8.48699E-05	0.000333394	0.000862309	0.158463435	2.44923E-05	2.25329E-05	1.4633E-06	1.29336E-06	5141.171635	377.6517201	0.364177738	251454.2481
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.003325584	0.004023957	0.004788841	0.046858346	0.033705239	6.480844093	0.001899588	0.001747621	5.98189E-05	5.28958E-05	210263.8492	131765.8273	138.775744	11331300.83
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.005103325	0.006175023	0.007348788	0.096171498	0.040835133	15.37253935	0.002127935	0.001957701	0.000141974	0.000125469	498745.1095	178285.3536	183.8702692	26726240.75
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.005954918	0.007205451	0.008575082	0.047980276	0.055036892	21.67274629	0.001847989	0.00170015	0.000200197	0.00017689	703148.3852	182177.0772	167.3963433	37666813.29
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.000325841	0.000394267	0.000469211	0.002612525	0.001874974	0.26603834	9.72062E-05	8.94297E-05	2.44988E-06	2.17137E-06	8631.32096	9961.102168	11.23567293	413681.7665
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.008701756	0.010529125	0.012530528	0.069563355	0.073424977	29.6980546	0.002737662	0.002518649	0.000274312	0.000242392	963520.6751	156085.03	153.124002	51555462.35
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	1.98568E-06	2.40267E-06	2.85938E-06	7.78888E-06	1.90278E-05	0.000650334	1.39508E-06	1.28348E-06	5.95309E-09	5.30794E-09	21.09935898	17.89215988	0.075916709	1127.206072
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.00076723	0.000928348	0.001104811	0.006987829	0.005366007	2.492532225	0.000188391	0.00017332	2.30217E-05	2.03437E-05	80867.46301	6690.057499	6.680670391	4331825.182
Orange (SC)	2026 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000585449	0.000708394	0.000843047	0.004217336	0.012859554	1.992494747	0.000239449	0.000220293	1.8404E-05	1.62625E-05	64644.29772	3601.512861	2.960751651	3446846.426
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	100	Diesel	0.000174439	0.000211072	0.000251193	0.001732368	0.002172959	0.232038849	0.000153778	0.000141476	2.14008E-06	1.89387E-06	7528.244908	3332.319058	5.779785152	300750.5126
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.00124409	0.001505349	0.0017949	0.018148477	0.013319225	2.942069417	0.000690993	0.000635713	2.71636E-05	2.40128E-05	95452.20213	22696.17717	48.79039414	3803059.178
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	25	Diesel	2.06714E-07	2.50124E-07	2.97669E-07	4.33518E-06	3.43157E-06	0.000680751	1.42547E-08	1.31144E-08	6.28768E-09	5.5562E-09	22.08621115	31.84335892	0.075062145	796.0839731
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.001476789	0.001786915	0.002126577	0.010027703	0.016572272	3.382838097	0.00074236	0.000682972	3.12317E-05	2.76103E-05	109752.4565	19658.85145	47.28915125	4405405.763
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.67721E-05	3.23943E-05	3.85518E-05	9.10976E-05	6.35651E-05	0.005418255	8.9831E-06	8.26445E-06	4.92913E-08	4.42231E-08	175.7893016	166.3815504	0.450372869	6443.945947
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.012916075	0.015628451	0.018599148	0.122688384	0.138750031	42.15678151	0.005410957	0.00497808	0.000389373	0.000344078	1367730.349	129878.6235	263.1678798	54715828.56
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	75	Diesel	4.18872E-05	5.06836E-05	6.03176E-05	0.000325073	0.000405195	0.043468173	3.27622E-05	3.01413E-05	4.00628E-07	3.54781E-07	1410.276999	833.5883736	1.726429331	56427.83253
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000390693	0.000472738	0.000562597	0.005170622	0.005745473	0.937123452	0.00023867	0.000219577	8.65245E-06	7.64868E-06	30403.93835	1989.060034	3.903231531	1220338.763
Orange (SC)	2026 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.00065062	0.000787251	0.000936893	0.007551276	0.011110988	0.981228867	0.000382431	0.000351837	9.05243E-06	8.00866E-06	31834.88997	799.0914015	1.951615766	1276281.826
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	7.43524E-06	8.99664E-06	1.07067E-05	3.02972E-05	7.45764E-05	0.002726204	5.03285E-06	4.63022E-06	2.4982E-08	2.22509E-08	88.44867748	54.7953885	0.232497674	4639.342893
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	9.00195E-06	1.08924E-05	1.29628E-05	0.000285096	9.94518E-05	0.052071409	3.86139E-06	3.55248E-06	4.81156E-07	4.25E-07	1689.399519	583.0229336	2.09247907	88604.96514
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	7.55582E-06	9.14254E-06	1.08804E-05	9.08724E-05	9.35345E-05	0.048395278	2.64716E-06	2.43538E-06	4.47212E-07	3.94996E-07	1570.131487	401.0109182	1.317486822	82348.97563
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.00067411	0.000815673	0.000970719	0.008897556	0.008040749	1.449215	0.000196501	0.000180781	1.33785E-05	1.18283E-05	47018.18465	50767.83612	156.3159365	2212229.404
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.7488E-06	4.53605E-06	5.39827E-06	2.65286E-05	5.53079E-05	0.013968735	2.43515E-06	2.24034E-06	1.29035E-07	1.14011E-07	453.2002138	50.22910612	0.15499845	23748.32138
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.001610526	0.001948737	0.002319158	0.047250023	0.026318999	7.698352497	0.000749009	0.000689088	7.11268E-05	6.28329E-05	249764.5685	185532.5279	504.2099568	13085921.83
Orange (SC)	2026 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.31246E-06	2.79808E-06	3.32994E-06	3.44249E-05	8.24294E-05	0.018908609	1.0762E-06	9.90107E-07	1.7475E-07	1.5433E-07	613.4689867	32.23795357	0.15499845	32237.95357
Orange (SC)	2026 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	1.83812E-05	2.22412E-05	2.64689E-05	0.000534936	0.000308413	0.086954831	9.28367E-06	8.54098E-06	8.03389E-07	7.09714E-07	2821.153722	1984.121514	6.819858274	179432.9696
Orange (SC)	2026 Construction and Mining - Surfacing Equipment	Aggregate	175	Diesel	2.51013E-05	3.03725

Orange (SC)	2026 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	21.9784215	0
Orange (SC)	2026 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	2.36749E-05	2.60528E-05	2.39117E-05	0.000312588	2.53379E-06	0.000685262	1.08949E-08	8.23167E-09	1.27068E-08	1.754E-08	46.96074626	20.48527285	0
Orange (SC)	2026 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	7.603063657	0
Orange (SC)	2026 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	2.05151E-06	2.94908E-06	2.46752E-06	0.000008422	1.55928E-05	0.002045394	5.24367E-07	3.96188E-07	1.95575E-08	1.6847E-08	67.02788452	0.159727466	0
Orange (SC)	2026 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	8.86508E-05	9.75548E-05	8.95373E-05	0.004253331	0.000031814	0.009321223	1.49567E-07	1.13006E-07	1.57964E-07	2.18048E-07	608.488243	94.16428353	0
Orange (SC)	2026 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	34.94886533	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000154332	0.000169833	0.000155876	0.010626967	6.97814E-05	0.021041375	1.25206E-06	9.46002E-07	3.74056E-07	5.16336E-07	1427.734516	197.0882079	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	86.2102694	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.7347E-06	1.07124E-05	9.83204E-06	0.000225843	4.66608E-06	0.000572019	4.38807E-07	3.31544E-07	9.89927E-09	1.36647E-08	35.83869746	13.11956553	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	5.738756726	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000127775	0.000140609	0.000129053	0.008951859	4.36552E-05	0.017724664	1.0547E-06	7.96886E-07	3.08158E-07	4.25373E-07	1202.393274	53.65754099	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	23.47086674	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.03328704	0.036630356	0.03361991	1.668127396	0.020366111	4.297630606	0.000219075	0.000165523	6.98678E-05	9.64435E-05	262393.9778	53883.6566	0
Orange (SC)	2026 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	23569.77417	0
Orange (SC)	2026 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.00077542	0.000853302	0.000783175	0.056517333	0.000575654	0.13669698	2.09052E-06	1.57951E-06	2.19375E-06	3.02819E-06	8511.92177	444.3785197	0
Orange (SC)	2026 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.083604168	0.092001286	0.084440208	0.533167976	0.00369446	2.176107315	0.001175159	0.000887899	3.14284E-05	4.33828E-05	123293.3831	14741.81889	0
Orange (SC)	2026 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	35245.49186	0
Orange (SC)	2026 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.65824E-05	1.82479E-05	1.67482E-05	0.001229158	1.81793E-05	0.004410577	5.18014E-08	3.91389E-08	6.08839E-08	8.40422E-08	238.7043774	4.480912576	0
Orange (SC)	2026 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.113909103	0.12535002	0.115048194	0.42428596	0.002835625	2.765543933	0.001749192	0.001321612	3.62966E-05	5.01028E-05	142840.2287	7157.169895	0
Orange (SC)	2026 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	18966.92913	0
Orange (SC)	2026 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000416774	0.000458635	0.000420943	0.023611363	0.000151094	0.057480945	1.07388E-06	8.11373E-07	9.207E-07	1.27091E-06	3582.026652	435.8124738	0
Orange (SC)	2026 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.71332E-07	1.1088E-06	9.27742E-07	5.46229E-06	6.52131E-06	0.000894587	2.2934E-07	1.7328E-07	8.57478E-09	7.3864E-09	29.38775359	0.12357517	0
Orange (SC)	2026 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.38981E-05	8.13204E-05	7.46372E-05	0.006927151	5.02018E-05	0.013636756	2.54767E-07	1.9249E-07	2.35425E-07	3.24974E-07	924.2424931	37.58250179	0
Orange (SC)	2026 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.36188E-07	1.95773E-07	1.63805E-07	5.59089E-07	1.03512E-06	0.000135782	3.48098E-08	2.63007E-08	1.29831E-09	1.11838E-09	4.449604281	0.014067364	0
Orange (SC)	2026 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000210538	0.000231685	0.000212643	0.010702113	8.14619E-05	0.022691601	3.90741E-07	2.95227E-07	3.92781E-07	5.42184E-07	1501.003067	354.8655467	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001620261	0.001782998	0.001636464	0.089679777	0.001285274	0.245842932	6.30685E-06	4.76517E-06	3.75706E-06	5.18613E-06	14636.44003	383.5748956	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.0019662	0.000282644	0.000236491	0.00139239	0.001662345	0.228038952	5.84611E-05	4.41706E-05	2.1858E-06	1.88287E-06	7491.223787	265.1844338	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	23.16933663	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.054050664	0.059479458	0.054591172	3.277273625	0.02765103	6.376910394	0.000171112	0.000129285	0.000111426	0.000153809	436961.7845	4470.693373	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000593493	0.000853158	0.000713842	0.002436449	0.004510928	0.59172375	0.000151698	0.000114615	5.65789E-06	4.87375E-06	19390.87812	540.4648266	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	264.6503444	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.00018433	0.000202845	0.000186173	0.00661358	7.52896E-05	0.014532513	3.7742E-07	2.85162E-07	2.49267E-07	3.44079E-07	953.6450288	62.43484308	0
Orange (SC)	2026 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	3.771294507	0
Orange (SC)	2026 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000207444	0.00022828	0.000209519	0.015808428	0.000100058	0.025859766	4.95171E-07	3.74129E-07	5.18499E-07	7.15722E-07	1918.05059	454.1889048	0
Orange (SC)	2026 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	44.59172556	0
Orange (SC)	2026 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.57585E-07	7.23633E-07	6.64161E-07	6.76825E-05	4.67375E-07	0.000110716	2.12004E-09	1.6018E-09	2.14086E-09	2.95519E-09	8.181963062	0.935507431	0
Orange (SC)	2026 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0.091847005	0
Orange (SC)	2026 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	9.31862E-05	0.000102546	0.000094118	0.004969487	3.95888E-05	0.010639163	1.83529E-07	1.38666E-07	1.81671E-07	2.50772E-07	700.2090985	341.4602474	0
Orange (SC)	2026 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	33.52416028	0
Orange (SC)	2026 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000305125	0.000335772	0.000308177	0.019750343	0.000185531	0.046967446	8.02963E-07	6.06683E-07	7.62515E-07	1.05255E-06	2949.069909	476.7688602	0
Orange (SC)	2026 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001222159	0.001344911	0.00123438	0.003627331	2.241E-05	0.020703078	2.02234E-06	1.52799E-06	3.25256E-07	4.48974E-07	1143.828642	645.1568247	0
Orange (SC)	2026 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	199.4783214	0
Orange (SC)	2026 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000188992	0.000207974	0.000190882	0.009773863	6.16315E-05	0.021416552	3.19923E-07	2.4172E-07	3.65612E-07	5.04681E-07	1396.237172	320.4803205	0
Orange (SC)	2026 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.73936E-05	1.91406E-05	1.75675E-05	0.000976674	6.63062E-06	0.002362254	3.61078E-08	2.72815E-08	3.86224E-08	5.33132E-08	147.6138301	17.6964291	0
Orange (SC)	2026 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.122479393	0.1347811	0.123704186	0.695980706	0.007452338	3.561561942	0.001057728	0.000799172	4.84483E-05	6.68766E-05	189569.4505	39571.74477	0
Orange (SC)	2026 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	59257.44774	0
Orange (SC)	2026 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.93882E-05	2.13355E-05	1.95821E-05	0.000987495	8.03253E-06	0.00364229	4.09049E-08	3.0906E-08	5.03107E-08	6.94475E-08	196.2501468	8.145975454	0
Orange (SC)	2026 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.004551212	0.005008331	0.004596723	0.085670547	0.000523154	0.275149471	5.42388E-05	4.09805E-05	4.03939E-06	5.57586E-06	15875.95406	1275.968761	0
Orange (SC)	2026 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	955.4326362	0
Orange (SC)	2026 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.005990743	0.006592447	0.006050651	0.310125952	0.003018231	0.738741245	2.30617E-05	1.74243E-05	1.19822E-05	1.654E-05	46509.71012	1556.306988	0
Orange (SC)	2026 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.000114521	0.000126023	0.000115666	0.0031202	6.21066E-05	0.006787919	2.04763E-07	1.5471E-07	1.18851E-07	1.64057E-07	450.9564162	41.68225606	0
Orange (SC)	2026 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.55831E-06	3.9157E-06	3.59389E-06	0.000213167	1.53915E-06	0.000479494	1.42479E-08	1.07651E-08	7.86129E-09	1.08515E-08	30.84098573	0.338880102	0
Orange (SC)	2026 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000379206	0.000417293	0.000382998	0.017608387	0.000131324	0.03907192	1.17863E-06	8.90523E-07	6.59921E-07	9.10936E-07	2538.683888	149.9544574	0
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.006675905	0.006140497	0.007346426	0.348501468	0.016575028	6.976280431	0.000486403	0.000367505	6.74006E-05	0.000100059	285619.8	76091.55	157.42	5326408.5
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.040042791	0.040443218	0.044064649	2.647144127	0.024313541	4.88989621	6.44972E-05	8.53639E-05	8.75115E-05	0.000120798	342744.2094	0	3102.002369	0
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.27898E-06	7.55223E-06	9.02613E-06	3.90194E-05	4.73569E-05	0.006371347	1.34014E-06	1.77371E-06	6.11061E-08	5.26374E-08	209.4247431	0	0.791502358	0
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	38113.19473	0	
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000691237	0.0006358	0.000760664	0.031669825	0.00225775	0.87373266	6.26373E-05	4.7326E-05	8.67962E-06	1.22779E-05	35047.3	5113.65	10.59	685229.1
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000563963	0.000569603	0.000620607	0.083402305	0.0008178	0.118990538	1.49286E-06	1.97584E-06	2.38967E-06	3.29863E-06	9399.740404	0	32.10549533	0
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	0.000026211	3.15261E-05	3.76788E-05	0.000106317	0.00019749	0.025595059	5.31309E-06	7.03203E-06	2.44769E-07	2.10847E-07	838.8809745	0	1.589816903	0
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	201.930413	0	
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008487161	0.008572033	0.009339604	0.352339834	0.002507761	0.77995518	9.38349E-06	1.24193E-05	1.30006E-05	1.79456E-05	50845.96359	0	1169.175115	0
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	14365.23689	0	
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.00224986	0.002069421	0.002475833	0.188200299	0.002970364	1.087929991	7.50009E-05	5.66674E-05	1.32272E-05	1.84616E-05	52698.7	23469.5	48.55	821432.5
Orange (SC)	2026 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.002079683	0.002474994	0.002994743	0.023387419	0.017658302	2.762901047	0.000471549	0.000433825	3.57174E-05	2.32531E-05	92432.6	90647.75	111.35	3353966.75
Orange (SC)	2026 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000881828	0.4581731	0.034745815	10.967007	0	0	0	0	606830.75	62685.1	7.38	5516288.8
Orange (SC)	2026 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000245931	0.09320972	0.009297818	2.8541999	0	0	0	0	155844.05	10110.5	1.19	1476133
Orange (SC)	2026 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000189212	0.10725502	0.00899837	2.9416199	0	0	0	0	161403	8088.4	0.95	1698564
Orange (SC)	2026 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000161708	0.028650914	0.005872214	1.9516045	0	0	0	0	103692.85	30327.85	3.57	970491.2
Orange (SC)	2026 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000266474	0.15105086	0.012672701	4.1427816	0	0	0	0	227311.05	7077.35	0.83	2392144.3
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002332266	0.002145218	0.002566516	0.105900917	0.014189315	4.677566785	0.000326131	0.00024641	4.51918E-05	6.43151E-05	183587.7	35441.5	308.5	2941644.5
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.14931E-05	0.009524368	0.000899512	0.303276184	0	0	0	0	16501.65	2628	22.95	218124
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.037050716	0.037421223	0.040772053	2.094857004	0.019065397	4.993316439	6.59594E-05	8.72993E-05	8.00739E-05	0.000110532	313842.2155	0	7031.942666	0
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.000328501	0.000395115	0.000472226	0.002282908	0.002777579	0.372338643	7.89109E-05	0.000104441	3.5694E-06	3.07471E-06	12233.143	0	78.9220004	0
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000238479	0.000219353	0.000262431	0.024156535	0.002455534	0.756094504	5.42039E-05	4.09541E-05	7.51101E-06	1.05299E-05	30057.75	3347.05	29.14	488669.3
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.27939E-05	0.011415429	0.001222125	0.44225806	0	0	0	0	23845.45	2197.3	19.01	320805.8
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.112871798	0.114000515	0.124208526	1.974847964	0.032781078	4.025929875	0.0001334	0.000176559	7.3022E-05	0.000100797	280594.3388	0	16976.89191	0
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	5139.833489	0	
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001304227	0.001317269	0.001435223	0.124089221	0.000736832	0.179685858	2.30396E-06	3.04936E-06	3.59604E-06	4.96386E-06	14144.56531	0	134.8414677	0
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.00047626	0.000572836	0.000684631	0.001957678	0.003634343	0.470415698	9.83896E-05	0.000130222	4.49848E-06	3.87503E-06	15417.30552	0	57.72724921	0
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.010679204	0.010785995	0.011751811	0.503095955	0.00240353	0.996585634	1.46665E-05	1.94116E-05	1.75886E-05	2.42788E-05	68046.98415	0	3887.275319	0
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.011463373	0.01054401	0.012614742	0.800498902	0.023990193	9.443711559	0.000651041	0.000491898	0.000114818	0.000142434	406577.15	183456.3	1597.27	5870601.6
Orange (SC)	2026 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.003793969	0.004515137	0.005463316	0.050108845	0.045357126	7.647050784	0.001047965	0.000964127	9.88573E-05	6.40701E-05	254682.4	182452.55	540.46	6020934.15
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.013544503	0.013679949	0.0149049	1.007634995	0.006813637	1.844263991	2.35837E-05	3.12137E-05	3.29875E-05	4.55349E-05	129607.7522	0	4171.541335	0
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.12335E-06	3.7567E-06	4.48987E-06	2.17247E-05	2.64089E-05	0.003544744	7.49499E-07	9.91985E-07	3.39811E-08	2.92717E-08	116.4611055	0	3.655555462	0
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	7903.077407	0	
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	7.96339E-06	8.04303E-06	8.76323E-06	0.000168407	2.67584E-06	0.000355978	4.33251E-09	5.73422E-09	6.22212E-09	8.58883E-09	24.18401726	0	3.047867882	0
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	5.774253177	0	
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000212834	0.000214962	0.000234211	0.017677026	0.000103304	0.032353586	4.13724E-07	5.47576E-07	5.76528E-07	7.95823E-07	2270.47673	0	27.6779317	0
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.20329E-06	1.44729E-06	1.72975E-06	4.94155E-06	9.17959E-06	0.001190623	2.46938E-07	3.2683E-07	1.13854E-08	9.80746E-09	39.02024974	0	0.840103179	0
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	52.43645432	0	
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.025165277	0.02541693	0.027692853	1.285482922	0.01010527	2.717429095	3.3073E-05	4.37731E-05	4.59559E-05	6.34361E-05	179972.0148	0	10901.06677	0
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	20652.31233	0	
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000105118	9.66877E-05	0.000115676	0.007484295	0.000171634	0.095617061	6.59175E-06	4.98044E-06	1.16253E-06	1.42701E-06	4073.4	1631.55	14.28	47314.95
Orange (SC)	2026 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.26352E-05	1.50369E-05	1.81947E-05	0.0002059	0.000209415	0.036744154	4.05425E-06	3.72991E-06	4.7501E-07	3.05769E-07	1215.45	1879.75	12.96	71430.5
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.002713058	0.002495471	0.002985555	0.142542144	0.006969381	5.360383549	0.000373739	0.00028238	5.17888E-05	7.41418E-05	211637.95	35707.95	161.78	3320839.35
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004242558	0.004284984	0.004668676	0.280787309	0.002352015	0.599693419	7.62471E-06	1.00915E-05	1.00374E-05	1.38553E-05	39376.47527	0	972.6122211	0
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.000240275	0.000288998	0.000345399	0.001486768	0.001811358	0.242491947	5.18284E-05	6.85964E-05	2.32577E-06	2.00344E-06	7970.934363	0	59.27501094	0
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000102169	9.39755E-05	0.000112431	0.007962081	0.00034354	0.243353774	1.74459E-05	1.31813E-05	2.41746E-06	3.3949E-06	9690.75	1065.8	4.92	153475.2
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.001906991	0.001926061	0.002098526	0.018244906	0.000115845	0.052051208	5.11736E-07	6.77298E-07	8.57049E-07	1.183056E-06	3258.912911	0	352.5435876	0
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	27789.02492	0	
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.15146E-05	3.18297E-05	3.46799E-05	0.002312788	2.23134E-05	0.004938516	6.38273E-08	8.44773E-08	8.22927E-08	1.13594E-07	323.8509195	0	3.238801928	0
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.000195391	0.000235013	0.000280878	0.000791121	0.001468819	0.190131994	0.000039688	5.25282E-05	1.81831E-06	1.56631E-06	6231.767489	0	17.70517474	0
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.00326711	0.003299781	0.003595256	0.149112112	0.001075089	0.324659588	3.89095E-06	5.14979E-06	5.48007E-06	7.56452E-06	21273.81394	0	1067.832998	0
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.0018023	0.001657756	0.001983322	0.142909072	0.002759676	1.425745912	9.82896E-05	7.42633E-05	1.73345E-05	2.19652E-05	62699.7	28178	127.68	873518
Orange (SC)	2026 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.002448735	0.002914197	0.003526178	0.030753403	0.02689598	4.475712249	0.000653316	0.000601051	5.78598E-05	3.75279E-05	149175.5	95254.05	236.64	3524399.85
Orange (SC)	2026 Light Commercial - Misc - Welders	Aggregate	100	Gasoline	0.002950539	0.002713906	0.003246888	0.132421227	0.008096494	4.490793778	0.000313109	0.000236571	4.33873E-05	6.24214E-05	178182.05	53786.4	258.88	3765048
Orange (SC)	2026 Light Commercial - Misc - Welders	Aggregate	15	Gasoline	0.021532763	0.02174809	0.023695492	1.285837114	0.009649119	2.161589319	4.31755E-05	5.71439E-05	4.04918E-05	5.58936E-05	158788.4788	0	3181.247151	0
Orange (SC)	2026 Light Commercial - Misc - Welders	Aggregate	15	Diesel	0.000144893	0.000174275	0.000208286	0.000896629	0.001092327	0.146243788	3.12506E-05	4.13611E-05	1.40264E-06	1.20825E-06

Orange (SC)	2026 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Gasoline	0.000323896	0.000327136	0.000356428	0.003706875	0.000361939	0.035927386	3.74956E-06	2.833E-06	4.08476E-07	5.63848E-07	1599.424241	0	1.806327423	0
Orange (SC)	2026 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001332375	0.001345699	0.001466197	0.006191241	0.0006304	0.067363849	7.03044E-06	5.31189E-06	7.75979E-07	1.07114E-06	3048.785784	0	1.806327423	0
Orange (SC)	2026 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.000182333	0.000184157	0.000200646	0.002274862	8.55605E-05	0.017048083	1.37092E-06	1.0358E-06	2.69897E-07	3.72558E-07	792.9147473	0	63.59682962	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.00250528	0.002530333	0.002756908	0.021350369	0.002192101	0.23820331	2.37769E-05	1.79647E-05	2.73046E-06	3.76904E-06	10461.83865	0	49.6356097	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.023821651	0.024059867	0.026214274	0.266337049	0.009320486	2.989892369	0.00031204	0.000235764	3.34599E-05	4.6187E-05	130226.5408	0	434.2674168	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	0.000078495	0.00007928	0.000086379	0.001301073	2.68696E-05	0.020261376	2.11458E-06	1.59768E-06	2.14573E-07	2.96191E-07	842.1755021	0	1.765720182	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.005578406	0.00563419	0.006138696	0.016425987	0.000224826	0.053340442	0.000271888	0.000205427	9.5261E-07	1.31495E-06	3678.183873	0	35.47903834	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001074079	0.00108482	0.001181958	0.009887681	0.000415081	0.051385741	2.42402E-05	1.83147E-05	6.77647E-07	9.35405E-07	2635.875313	0	20.82086583	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.00343323	0.003467563	0.003778061	0.033473079	0.001432173	0.218773615	0.000365062	0.000275825	2.69756E-06	3.72363E-06	10568.43817	0	70.31595859	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.005287792	0.005340669	0.005818892	0.011998749	9.92768E-05	0.033708625	0.000258865	0.000195587	7.13173E-07	9.84443E-07	2648.657768	0	51.25094477	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.085397718	0.086251696	0.093974979	0.312466	0.011512101	1.603091285	0.006896552	0.005210728	2.31257E-05	3.19221E-05	89219.09135	0	545.1048732	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.012773064	0.012900795	0.014055978	0.049512325	0.0012259	0.168429631	0.000670172	0.000506352	3.30642E-06	4.56409E-06	10846.26856	0	551.8168777	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.040036241	0.040436603	0.044057442	0.187033333	0.006671946	0.895963725	0.004378976	0.00330856	1.27196E-05	1.75578E-05	49589.8461	0	162.5922821	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.015352678	0.015506205	0.016894685	0.041017861	0.00141259	0.164223508	0.000923316	0.000697616	2.9082E-06	4.0144E-06	10527.23101	0	236.1298955	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.037883484	0.038262319	0.041688464	0.193722565	0.011881687	1.160879652	0.008307235	0.006276578	1.52489E-05	2.1049E-05	59582.5134	0	146.9098742	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.036483554	0.036848391	0.040147926	0.106626746	0.00418289	0.484800241	0.00263756	0.001992823	7.76193E-06	1.07143E-05	29079.34876	0	349.9979368	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.015083243	0.015234075	0.016598188	0.204362174	0.007184455	0.844468579	0.001956818	0.001478485	1.15757E-05	1.59788E-05	45437.49558	0	90.68464421	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	6.65817E-07	6.72475E-07	7.32691E-07	5.66481E-06	3.29467E-07	0.000109481	1.00047E-08	7.55908E-09	1.19349E-09	1.64746E-09	4.502067503	0	0.062367366	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000442225	0.000446648	0.000486643	0.007224669	0.000459764	0.055812103	8.11812E-06	6.13369E-06	8.93738E-07	1.23369E-06	2562.658749	0	266.1937462	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.003337778	0.003371156	0.003673022	0.037547717	0.009772002	0.651889734	6.55814E-05	4.95504E-05	7.0482E-06	9.72912E-06	26949.08361	0	236.1783752	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.016032529	0.016192854	0.017642819	0.182802022	0.0143014	1.654992165	0.000165198	0.000124816	1.94023E-05	2.67823E-05	74528.07175	0	475.9410569	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.020119487	0.020320681	0.022140267	0.14015732	0.007742171	2.976333121	0.000310625	0.000234695	3.13505E-05	4.32754E-05	121843.5308	0	604.2369956	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.00186342	0.001882054	0.00205058	0.003474981	0.000572206	0.097622635	1.01884E-05	7.6979E-06	1.0416E-06	1.4378E-06	4087.277542	0	10.86067604	0
Orange (SC)	2026 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000217166	0.000262771	0.000312719	0.006675976	0.003298436	0.999972541	0.000239177	0.000220043	9.23873E-06	8.16164E-06	32443.00782	24924.38459	59.31546363	2007041.886
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.000284586	0.000344349	0.000409803	0.011605314	0.002409572	2.097704069	9.6394E-05	8.86825E-05	1.93858E-05	1.71212E-05	68057.69831	32255.08594	76.76118822	4210295.541
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000174321	0.000210929	0.000251022	0.002393562	0.001058203	1.258119364	4.61549E-05	4.24625E-05	1.16267E-05	1.02686E-05	40818.2972	9400.546436	22.37157625	2525167.6
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	8.42563E-06	1.0195E-05	1.21329E-05	0.000180565	0.00017535	0.028864499	5.2313E-06	4.81279E-06	2.66614E-07	2.35588E-07	936.476892	1293.653179	3.078657282	52112.06602
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000253891	0.000307208	0.000365603	0.0032379	0.001396423	1.721760438	6.41736E-05	5.90397E-05	1.59109E-05	1.40528E-05	55860.62123	7503.18844	17.85621223	3455740.207
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	9.46768E-05	0.000114559	0.000136335	0.002033456	0.001548828	0.311353633	2.32321E-05	2.13735E-05	2.87578E-06	2.54123E-06	10101.52574	9918.007707	23.60303916	624916.9427
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	9.63725E-05	0.000116611	0.000138776	0.001073036	0.000824677	0.563744912	3.26526E-05	3.00404E-05	5.20921E-06	4.60121E-06	18290.08282	1724.870906	4.104876376	1131490.721
Orange (SC)	2026 Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	5.67015E-06	6.86088E-06	8.16502E-06	7.07327E-05	0.000114325	0.036664949	1.32883E-06	1.22252E-06	3.38816E-07	2.99254E-07	1189.5539	86.24354528	0.205243819	73590.10965
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.001157149	0.00140015	0.001666295	0.030425919	0.012169439	4.137672391	0.001013345	0.000932277	3.82201E-05	3.37711E-05	134242.2239	89772.00772	64.03607146	8304709.838
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.002356217	0.002851023	0.003392953	0.056729326	0.014750183	8.970589913	0.000706613	0.000650084	8.28669E-05	7.32168E-05	291041.2024	134082.55	95.64361955	18004862.15
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002815734	0.003407038	0.004054657	0.022237845	0.014691327	9.811361426	0.000696776	0.000641034	9.06264E-05	8.0079E-05	318318.8162	82866.46866	59.11021981	19692354.07
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.3826E-05	5.30295E-05	6.31095E-05	0.000654591	0.000435871	0.067836553	1.4548E-05	1.33842E-05	6.25868E-07	5.53673E-07	2200.882251	2589.577146	1.847194369	122472.3452
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.004864203	0.005885686	0.007004453	0.041268199	0.021111114	20.17886926	0.001034467	0.00095171	0.000186418	0.000164697	654681.1901	105309.4706	75.11923767	40500947.93
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001299859	0.00157283	0.001871798	0.019140809	0.014022786	2.595681797	0.000249034	0.000229111	2.39594E-05	2.11856E-05	84214.03727	82291.00707	58.69973217	5209785.144
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.001423731	0.001722715	0.002050173	0.010748995	0.00607405	5.043863894	0.00037032	0.000340695	4.65903E-05	4.11673E-05	163642.6092	15249.73208	10.8779224	10123524.08
Orange (SC)	2026 Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.009314653	0.01127073	0.0134131	0.069299216	0.144262883	32.97820195	0.00326575	0.00300449	0.00030462	0.000269164	1069941.443	54668.85085	38.99632557	66190450.15
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000227172	0.000274878	0.000327127	0.009469751	0.00398577	1.496941054	0.000279074	0.000256748	1.38331E-05	1.22178E-05	48566.60392	34933.83554	106.7267858	3004505.897
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000682866	0.000826268	0.000983327	0.026680434	0.007240727	4.841786514	0.000260533	0.000239691	4.47442E-05	3.9518E-05	157086.4312	72890.79146	222.6895434	9717935.18
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000249709	0.000302148	0.000359581	0.003185665	0.001569847	1.62489921	6.8053E-05	6.26088E-05	1.50155E-05	1.32622E-05	52718.06537	14309.43648	43.7169334	3261330.328
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.25636E-06	7.57019E-06	9.00915E-06	0.000145245	0.00013083	0.024662638	2.58061E-06	2.37416E-06	2.27831E-07	2.01293E-07	800.152123	1007.706794	3.078657282	44526.01085
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000337893	0.00040885	0.000486565	0.004033721	0.002475431	2.136931094	0.000100792	9.2729E-05	1.97469E-05	1.74413E-05	69330.37595	10077.06794	30.78657282	4289027.986
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.000149912	0.000181394	0.000215873	0.004107449	0.003238308	0.665130015	5.38409E-05	4.95336E-05	6.14496E-06	5.4287E-06	21579.41083	19482.33136	59.52070744	1334980.457
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000152897	0.000185005	0.000220171	0.001756187	0.001600155	0.93609046	6.59463E-05	6.06706E-05	8.65003E-06	7.64024E-06	30370.42406	2821.579024	8.620240389	1878824.353
Orange (SC)	2026 Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.001427189	0.001726899	0.002055152	0.015824399	0.031050077	8.259162629	0.000534936	0.000492141	7.63172E-05	6.74102E-05	267959.4357	7121.128013	21.75584479	16576940.52
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000110392	0.000133575	0.000158965	0.004549386	0.002095642	0.721332457	0.000140206	0.00012899	6.66576E-06	5.88742E-06	23402.83716	16359.74923	49.87424796	1447784.209
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.000175271	0.000212078	0.00025239	0.006947299	0.001910917	1.259419712	6.95917E-05	6.40244E-05	1.16387E-05	1.02792E-05	40860.48554	18918.06393	57.67351308	2527777.523
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000121619	0.000147159	0.000175131	0.001761312	0.000635988	0.928906072	2.84966E-05	2.62169E-05	8.58455E-06	7.58161E-06	30137.3345	8078.88851	24.62925825	1864404.589
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.41612E-06	1.7135E-06	2.03921E-06	3.08443E-05	2.35149E-05	0.004994871	2.72513E-07	2.50712E-07	4.61376E-08	4.07675E-08	162.0530872	201.9722127	0.615731456	9017.757139
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000226502	0.000274068	0.000326164	0.003228895	0.001702741	1.757037267	7.67799E-05	7.06375E-05	1.62379E-05	1.43407E-05	57005.1391	9021.425502	27.50267172	3526544.225
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	9.89943E-05	0.000119783	0.000142552	0.002362227	0.001922713	0.376208457	4.06686E-05	3.74151E-05	3.47526E-06	3.07056E-06	12205.66906	11108.4717	33.8652301	755086.8644
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000111554	0.000134981	0.000160638	0.001634337	0.001111604	0.89099901	6.18709E-05	5.69212E-05	8.23438E-06	7.27221E-06	28907.48161	2692.962837	8.209752751	1788321.438
Orange (SC)	2026 Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	8.37082E-05	0.000101287	0.00012054	0.000962889	0.00190258	0.508300757	3.10289E-05	2.85466E-05	4.69698E-06	4.14868E-06	16491.25828	807.888851	2.462925825	1020208.924
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.60966E-05	1.94768E-05	2.3179E-05	0.000499291	0.000247819	0.073799415	1.60793E-05	1.4793E-05	6.81829E-07	6.02341E-07	2394.340748	1808.189941	3.2839011	148122.5846
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000221499	0.000268014	0.000318959	0.009500336	0.001759871	1.726269438	6.5879E-05	6.06087E-05	1.59536E-05	1.40896E-05	56006.91077	25879.71853	47.0008345	3464790.208
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000142397	0.000172301	0.000205052	0.002108637	0.000488368	1.102912985	2.64806E-05	2.43621E-05	1.01927E-05	9.00183E-06	35782.79716	8023.842862	14.57231113	2213653.342
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	50	Diesel	7.03013E-06	8.50646E-06	1.01234E-05	0.0001620	0.00012757	0.027389417	1.91719E-06	1.76381E-06	2.53018E-07	2.23549E-07	888.6194757	1017.106842	1.847194369	49448.94762
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002134808	0.002583118	0.003074123	0.029576505	0.011004481	15.52474888	0.000493493	0.000454014	0.00014347	0.000126711	503683.3799	58540.14933	106.3162981	31159676.88
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.54535E-05	3.07988E-05	3.66531E-05	0.000524383	0.000394095	0.079386048	5.46813E-06	5.03068E-06	7.332E-07	6.47938E-07	2575.592887	2599.27304	4.720607832	159335.4979
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000275495	0.000333349	0.000396713	0.003108197	0.002406518	1.592190258	0.000125877	0.000115807	1.47123E-05	1.29952E-05	51656.85944	5198.546079	9.441215664	3195680.288
Orange (SC)	2026 Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000160083	0.000193701	0.0002305	0.0022119	0.003598619	1.169896709	5.96896E-05	5.49145E-05	1.08115E-05	9.54854E-06	37956.0103	2260.237426	4.104876376	2348096.173
Orange (SC)	2026 Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001746249	0.002112962	0.002514599	0.049244366	0.017397921	6.757871715	0.001451699	0.001335563	6.24275E-05	5.51568E-05	219251.7053	146381.4279	97.49081392	13563704.04
Orange (SC)	2026 Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002847088	0.003444976	0.004099806	0.081543622	0.013350734	13.0666405	0.000519588	0.000478021	0.000120722	0.000106648	423932.7608	183978.342	122.5305598	26226014.93
Orange (SC)	2026 Portable Equipment - Rental Generator	Aggregate	300	Diesel	0.00675847	0.008177748	0.009732196	0.058470522	0.026391596	26.69526903	0.00125841	0.001157737	0.000246608	0.000217883	866098.6041	218493.5418	145.5178675	53579994.35
Orange (SC)	2026 Portable Equipment - Rental Generator	Aggregate	50	Diesel	6.02415E-06	7.28922E-06	8.67478E-06	8.70155E-05	5.32

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	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9545.147614	32.59679789	0	0	841.805424	1.59544902	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	53103.85	48.85	23611.85	2.249033854	92991.05	112.06	91217.15	1.019447001	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	287386.4	158.36	76569.7	3.753265326	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	35244.4	10.66	5153.8	6.838526912	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2706.592526	15.03964046	0	0	19.80456043	9.237256514	0	0	55337.65	124.77	46825.85	1.181775665
Aerial Lifts50	Aerial Lifts	50	74193.55	129.44	46767.45	1.586435651	126648.6119	494.1174417	154904.7214	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	133024.8761	372.162075	116201.5128	1.14477749	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	133265.15	129.44	46767.45	2.849527823	87961.97169	226.4219141	71037.51378	1.238246766	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	13505.82758	20.75339892	6496.110369	2.079063749	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	807.0783301	0.699552773	220.1977773	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	573.1425822	0.233184258	73.39925911	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	219.0067882	2.308347746	0	0	9.282554067	1.460454044	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	693.5	2.51	281.05	2.467532468	2620.274137	6.131485409	2260.708759	1.159049845	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	3454.867393	3.356181487	1905.029006	1.813551071	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7858.45	11.49	1237.35	6.351032448	12470.29184	15.16735864	5808.875881	2.146765071	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2744.8	2.86	295.65	9.283950617	19066.82703	14.97373279	4882.519917	3.905120175	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	27874.63018	15.16735864	5146.778441	5.415937464	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	38680.74476	11.68209325	3844.656021	10.0609117	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	30996.93064	3.162555632	1876.311895	16.52013758	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	14122.75224	0.38725171	292.5937586	48.26744188	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	118.4608089	1.61196399	0	0	2.670803541	1.034147682	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	3894.362052	17.50595517	0	0	1.826340331	0.381958415	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	4901.95	6.11	3555.1	1.378850103	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	49.95392445	0.24317808	120.6686969	0.413975834	0	0	0	0
Cranes50	Cranes	50	2310.45	2.86	1178.95	1.959752322	808.7743706	2.593899515	1173.881965	0.688974185	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	400.8740445	1.134831038	393.2763571	1.019318953	0	0	0	0
Cranes100	Cranes	100	7832.9	5.7	2365.2	3.311728395	19407.35925	31.61315034	14745.1776	1.316183485	0	0	0	0
Cranes175	Cranes	175	507.35	0.16	87.6	5.791666667	54814.21787	52.76964325	24849.98195	2.205805138	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	93603.97482	58.68697652	28735.64828	3.257416499	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	170232.6316	61.3619354	31368.77738	5.426817552	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	4400.180035	0.972712318	472.5071549	9.312409325	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	9296.180575	1.296949757	665.404412	13.97072278	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	2627.343132	7.194237926	2543.16447	1.033099967	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	1984.501721	4.172657997	1183.853149	1.676307338	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	113827.5447	119.4243496	58447.15177	1.94752937	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	126354.3104	81.22294619	38146.87113	3.31231125	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	128475.4476	60.21577144	28487.13682	4.509945959	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	467677.1526	113.0214778	54830.89159	8.52944643	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	4288.469601	0.647481413	312.3513019	13.72963575	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	26905.38117	2.158271378	1237.742049	21.73747041	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	40.55268228	0.191414384	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14339.51263	281.2587523	41255.95	0.347574414	1.321468603	0.534129704	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	649.7	2.07	270.1	2.405405405	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	31.07507993	0.981714763	39.40988286	0.788509827	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	104941.8692	175.9625049	133349.8217	0.7869667	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	1242.758975	1.657983455	879.8981423	1.412389588	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	134759.3953	125.2858802	84202.71215	1.600416327	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	287199.3671	162.2661199	99488.62853	2.886755716	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	366116.0503	139.8473001	84628.71422	4.326144544	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	643829.9519	145.902544	96921.52677	6.642796223	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	15357.15151	2.090500878	1266.746235	12.12330543	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	18101.32794	1.081293558	760.3036493	23.80802454	0	0	0	0
Forklifts25	Forklifts	25	51.05162686	0.114774364	0	0	41.63964899	0.250519931	72.03762221	0.578026422	1467.3	1.19	1500.15	0.97810219
Forklifts50	Forklifts	50	1243945.55	433.93	778669.1	1.59752782	88727.53097	239.2245285	176957.7958	0.501405042	1949862.85	810.71	1460562.1	1.335008522
Forklifts75	Forklifts	75	0	0	0	0	21018.33205	39.99454608	25245.5985	0.832554318	0	0	0	0
Forklifts100	Forklifts	100	5796667.2	1547.26	2742624.6	2.113547439	1247734.137	1899.267022	1295987.662	0.962766987	12202555.9	2845.38	5126114.75	2.380468736
Forklifts175	Forklifts	175	405182.85	56.56	100214.4	4.043159965	372653.3303	347.233195	239230.0976	1.557719259	915858	104.13	187591.75	4.882186983
Forklifts300	Forklifts	300	0	0	0	0	74595.48535	45.07137025	33247.40563	2.243648307	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	19145.20599	7.020993448	4971.278587	3.851163369	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	242.485974	0.083506644	18.67642057	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1413.475213	0.189307263	154.570702	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	14415.64238	137.3504262	0	0	15488.10435	57.99448087	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	408989.8	1607.36	184620.65	2.215298235	256215.4	543.87	183605.95	1.395463491	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	184642.55	310.44	35653.2	5.178849304	0	0	0	0	16607.5	23.08	2660.85	6.241426612
Generator Sets175	Generator Sets	175	30265.8	29.33	3372.6	8.974025974	0	0	0	0	23998.75	19.15	2200.95	10.90381426
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	91.71240185	0.289758659	156.0979463	0.587531124	0	0	0	0
Graders50	Graders	50	0	0	0	0	601.4007086	1.955870946	645.3077097	0.93195959	0	0	0	0
Graders75	Graders	75	0	0	0	0	269.5644675	0.507077653	179.585501	1.50103692	0	0	0	0
Graders100	Graders	100	0	0	0	0	15572.68241	19.34139047	8294.278518	1.877521037	0	0	0	0
Graders175	Graders	175	0	0	0	0	175293.0975	115.9034635	55628.04478	3.151164098	0	0	0	0
Graders300	Graders	300	0	0	0	0	364355.4445	101.9226082	79941.95004	4.557750272	0	0	0	0
Graders600	Graders	600	0	0	0	0	20774.6643	3.477103905	2988.919929	6.950558998	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	12552.56148	0.434637988	328.1399991	38.25367684	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	52.29694637	0.284507083	83.57822672	0.625724527	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	43319.3674	67.2147984	46001.27082	0.941699362	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	22105.61783	22.61831311	13949.23129	1.584719428	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	33362.71976	26.45915874	18813.18108	1.773369406	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	47226.76261	18.63521395	13244.07682	3.565878032	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	39833.8208	12.30493135	8285.859546	4.807445815	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	133773.591	23.25845405	16604.96521	8.056240363	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	5571.63597	0.569014166	391.4625705	14.23287024	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	7040.910404	0.355633854	199.5609019	35.28201335	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	0	0	0	0	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	4189.589206	4.016970086	6694.449477	0.625830282	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	604.9412953	0.352365797	444.4063689	1.361234531	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3539.290094	1.409463188	2100.777038	1.684752846	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	99457.77279	22.05809889	32002.34559	3.107827597	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	202575.5694	37.13935501	48873.10882	4.144929069	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	868540.0968	82.87643546	116857.6929	7.432459729	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	296596.851	17.68876301	22515.53303	13.1729882	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	522580.1459	14.16510504	20758.92283	25.17376022	0	0	0	0
Pavers25	Pavers	25	744.6148766	2.39564151	0	0	2.488486359	0.331390934	0	0	0	0	0	0
Pavers50	Pavers	50	7398.55	8.09	3182.8	2.324541284	2875.141836	8.441727653	3102.976989	0.926575301	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	4977.108646	8.089989001	3215.941168	1.547636722	0	0	0	0
Pavers100	Pavers	100	6624.75	4.45	1741.05	3.805031447	22691.2614	32.64134693	13067.46648	1.736469838	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	37976.24033	27.99839672	11184.03645	3.395575517	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	29402.1882	13.29572105	6177.6505	4.759445068	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	5748.163682	1.6179978	749.9589456	7.664637799	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	1111.952278	0.140695461	69.01054122	16.11278884	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	846.7834274	6.008716664	0	0	12.6976423	0.890729187	16.62233088	0.763890599	0	0	0	0
Paving Equipment50	Paving Equipment	50	8621.3	22.11	3869	2.228301887	3570.423752	10.32448625	5056.596167	0.706092327	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	391.6552876	0.983284405	312.167374	1.254632355	0	0	0	0
Paving Equipment100	Paving Equipment	100	3562.4	5.68	996.45	3.575091575	14927.39008	18.89310749	9143.445549	1.632578222	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	16269.85698	12.92316646	6136.050334	2.651519478	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	9894.018982	4.986656623	2380.234671	4.156740973	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	12675.14864	3.581964617	1776.760948	7.133851438	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	2153.380226	0.351173002	184.1754262	11.69200621	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	1050.494887	0.140469201	67.81911001	15.489659	0	0	0	0
Rollers25	Rollers	25	2548.95444	12.90269439	0	0	38.78387118	6.574024918	17.12566497	2.264663664	0	0	0	0
Rollers50	Rollers	50	9756.45	5.7	3533.2	2.761363636	59053.06412	213.393609	76534.42551	0.771588259	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	589.2083492	1.809033647	428.1416243	1.37619964	0	0	0	0
Rollers100	Rollers	100	30156.3	10.71	6657.6	4.529605263	91645.67349	157.3859273	54091.49845	1.694271302	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	95353.61962	92.04363198	34201.15175	2.788023641	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	16636.1299	12.22906746	3909.4468	4.255366744	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	8391.203032	3.835151332	1211.127027	6.928425215	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	41.63964899	0.250519931	72.03762221	0.578026422	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3131.7	2.24	949	3.3	2963.831917	9.43625074	2673.099751	1.108762184	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	100.0826194	0.334026575	77.37374237	1.293495912	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68130.9	32.32	13366.3	5.097214637	238362.6926	407.7629413	118851.7009	2.005547172	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3825.2	1.2	467.2	8.1875	48044.80072	62.4629695	18130.15997	2.649993204	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	3915.736339	3.423772392	888.3651902	4.407800286	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1288.923	0.584546506	154.9451188	8.318577631	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	242.485974	0.083506644	18.67642057	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2602.637943	2.822644324	2777.137442	0.937165696	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	3170.988743	2.54726439	2115.704754	1.498786037	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	8344.626301	5.438753698	4822.373016	1.730398348	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	11237.63372	4.750303863	3767.046124	2.983142057	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	13218.89334	4.061854028	2887.607047	4.577802007	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	130456.486	22.85653453	17251.50708	7.562034168	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	4879.84946	0.344224918	358.4559461	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	20.96358441	0.070949588	30.22478316	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	166.8540538	0.425697531	157.924492	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1675.991029	1.915638889	964.1705827	1.738272314	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	6808.774179	5.17931996	2989.818758	2.277320042	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	90613.75699	46.11723252	21542.96607	4.206187611	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	104189.6597	44.69824075	18658.51426	5.584027658	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1309951.832	249.8844507	124002.4622	10.56391791	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	17744.18827	2.554185186	1166.172883	15.21574418	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	30216.74468	1.844689301	758.3062263	39.84768109	0	0	0	0
Sk

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2719.25	0.58	302.95	8.975903614	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.061005566	0	0	45.10426331	6.157828811	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	87981.70976	206.7829053	110737.6214	0.794506046	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	13707.25329	42.14912878	10016.55952	1.368459225	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25517.15	10.01	8727.15	2.923881221	1411290.292	1361.885183	884184.5239	1.596149055	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	246574.5889	157.0685483	90325.69372	2.729838861	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	149916.5327	65.85351061	38088.89628	3.935964215	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	206465.743	56.63113713	32176.05426	6.416751456	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	6074.037339	1.008697099	512.6662787	11.84793615	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	69010.19581	3.026091297	1956.453201	35.2731135	0	0	0	0
Trenchers25	Trenchers	25	4845.53705	14.88128526	0	0	43.90428779	4.402918064	0	0	0	0	0	0
Trenchers50	Trenchers	50	46347.7	51.83	20841.5	2.223817863	31271.30709	67.80606868	27061.31493	1.155572342	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	1581.768483	3.390303434	890.5491487	1.776172023	0	0	0	0
Trenchers100	Trenchers	100	28645.2	17.16	6909.45	4.145800317	20908.98314	27.81589863	9586.966284	2.180980147	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	4806.370749	4.391983994	1315.901025	3.65253211	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	10337.02847	5.470716905	1764.868365	5.857110181	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	17518.81788	4.469036345	1703.504633	10.28398605	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	3444.560494	0.385261754	192.7532405	17.87031172	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	407.7167908	0.077052351	18.23587895	22.35794566	0	0	0	0
Welders25	Welders	25	0	0	0	0	7707.160931	23.69803028	0	0	0	0	0	0
Welders50	Welders	50	127782.85	255.24	53023.55	2.409926344	426754.35	560.05	359663.7	1.186537173	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	179233.25	260.49	54125.85	3.311416818	0	0	0	0	0	0	0	0
Welders175	Welders	175	22429.25	17.98	3726.65	6.018609207	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2027
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower	B Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.5539E-08	9.14022E-08	1.08776E-07	1.17287E-06	2.71089E-07	3.75152E-05	2.82211E-09	2.59634E-09	3.39639E-10	3.05864E-10	1.215829136	7.193529569	0.003672603	32.44723111
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.001353495	0.001637729	0.001949033	0.013251998	0.011730579	2.179258926	0.000864825	0.000795639	1.98207E-05	1.77677E-05	70627.55391	2503.641319	36.93680039	2524473.479
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	8.23407E-08	9.96322E-08	1.18571E-07	1.34944E-06	6.11005E-07	8.07711E-05	6.07607E-09	5.58999E-09	7.33661E-10	6.58533E-10	2.617709352	8.859745488	0.006186493	69.85966768
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.00051269	0.000620355	0.000738274	0.005885856	0.00504633	1.005937827	0.000233664	0.000214971	9.15253E-06	8.20149E-06	32601.41665	2476.039584	13.63155633	1295469.508
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	1.98327E-06	2.39975E-06	2.8559E-06	2.64278E-05	4.47872E-07	7.50981E-05	4.6857E-08	4.31084E-08	6.24931E-10	6.12281E-10	2.43385401	90.93674649	0.034048683	64.95306046
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000136054	0.000164625	0.000195918	0.000517672	0.000375245	0.047350383	2.26996E-05	2.08836E-05	4.2746E-07	3.86051E-07	1534.5775	796.3411975	4.477056801	54851.11649
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.000195553	0.000236619	0.000281597	0.001447907	0.001380531	0.69982266	6.23414E-05	5.73541E-05	6.37217E-06	5.70571E-06	22680.53684	1496.689579	3.229546437	901247.4561
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	4.05871E-07	4.91104E-07	5.84455E-07	1.332E-05	1.10938E-06	0.000318033	2.39243E-08	2.20104E-08	2.88631E-09	2.59295E-09	10.30713981	53.05285194	0.038642726	275.0700212
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.002875691	0.003479586	0.004140995	0.012062653	0.009164802	1.156279873	0.000736938	0.000677983	1.04518E-05	9.42724E-06	37473.84862	2965.649985	49.25760806	1339445.186
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	0.000100806	0.000121975	0.00014516	0.000776855	0.000698482	0.374698697	3.12958E-05	2.87921E-05	3.4119E-06	3.05495E-06	12143.60165	1042.500026	1.037346595	482545.4615
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.60091E-08	5.5671E-08	6.62531E-08	7.77777E-07	1.62797E-07	2.35209E-05	1.76938E-09	1.62783E-09	2.12984E-10	1.91768E-10	0.762287689	14.38705762	0.003378859	20.34342141
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001563317	0.001891614	0.002251177	0.008451684	0.013003609	1.202284137	0.000813622	0.000748532	1.09105E-05	9.80232E-06	38964.79982	2647.057111	35.45380493	1392736.944
Orange (SC)	2027	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - ATVs	Aggregate	100	Gasoline	1.38693E-05	1.67818E-05	1.99718E-05	0.000658788	5.62051E-05	0.045312	3.40863E-06	3.13594E-06	4.12548E-07	3.69432E-07	1468.515585	52.45856686	1.867429357	47028.90829
Orange (SC)	2027	Agricultural - ATVs	Aggregate	175	Gasoline	1.53882E-05	1.86197E-05	2.2159E-05	0.00084325	8.11213E-05	0.065581984	4.93346E-06	4.53878E-06	5.97239E-07	5.34695E-07	2125.445057	29.52188652	1.646041233	68066.94084
Orange (SC)	2027	Agricultural - ATVs	Aggregate	175	Diesel	3.93798E-08	4.76495E-08	5.67068E-08	8.99924E-07	3.47656E-07	0.000164372	1.41621E-08	1.30292E-08	1.49687E-09	1.34014E-09	5.327131184	70.90108254	0.002445221	254.0185056
Orange (SC)	2027	Agricultural - ATVs	Aggregate	25	Gasoline	0.001256968	0.001520931	0.001810034	0.01615652	0.000673049	0.062419457	5.44846E-05	5.01258E-05	5.31169E-07	5.08911E-07	2022.950771	269.9935712	11.20489153	64784.58148
Orange (SC)	2027	Agricultural - ATVs	Aggregate	25	Diesel	2.45082E-05	2.96549E-05	3.52918E-05	0.000243601	0.000236188	0.036840094	9.31308E-06	8.56803E-06	3.35018E-07	3.0036E-07	1193.949778	294.8649695	3.552696271	51211.08234
Orange (SC)	2027	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	99.47231065	2.631906747	15617.95289
Orange (SC)	2027	Agricultural - ATVs	Aggregate	50	Gasoline	3.30828E-05	4.00301E-05	4.76392E-05	0.001922768	8.66932E-05	0.067704632	5.09314E-06	4.68569E-06	6.16053E-07	5.52001E-07	2194.237907	198.518963	7.499882757	70270.0159
Orange (SC)	2027	Agricultural - ATVs	Aggregate	50	Diesel	6.23999E-05	7.55039E-05	8.98559E-05	0.00069468	0.000591162	0.108576719	1.69188E-05	1.55653E-05	9.87673E-07	8.85234E-07	3518.860467	515.6869072	6.614758908	150931.5181
Orange (SC)	2027	Agricultural - ATVs	Aggregate	75	Gasoline	9.10819E-06	1.10209E-05	1.31158E-05	0.000526958	2.50423E-05	0.020831795	1.56709E-06	1.44172E-06	1.89583E-07	1.69843E-07	675.1371931	99.5556362	1.270579334	21621.12921
Orange (SC)	2027	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	7.50571E-08	9.08191E-08	1.08082E-07	7.82666E-07	7.09263E-07	0.00013447	3.26399E-08	3.00287E-08	1.22328E-09	1.09635E-09	4.358038665	135.1659933	0.001222611	166.2467019
Orange (SC)	2027	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Combine Harvesters	Aggregate	300	Diesel	3.257E-07	3.94097E-07	4.69008E-07	1.84511E-06	3.32594E-06	0.000733132	1.45026E-07	1.33424E-07	6.67184E-09	5.97728E-09	23.76004456	40.97475678	0.004922497	1021.316068
Orange (SC)	2027	Agricultural - Combine Harvesters	Aggregate	600	Diesel	2.58919E-05	3.13291E-05	3.72843E-05	0.000193923	0.000269725	0.06306932	1.07637E-05	9.90264E-06	5.74024E-07	5.14209E-07	2044.012187	683.7221732	0.263881005	87861.05145
Orange (SC)	2027	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	2.87311E-07	3.47647E-07	4.13728E-07	2.0953E-06	4.2389E-06	0.000629932	1.21018E-07	1.11337E-07	5.73244E-09	5.13588E-09	20.41543775	109.7458797	0.001206673	877.549481
Orange (SC)	2027	Agricultural - Construction Equipment	Aggregate	100	Diesel	5.46008E-06	6.6067E-06	7.86252E-06	5.84891E-05	5.16349E-05	0.009867108	3.44852E-06	3.17264E-06	8.9763E-08	8.04473E-08	319.7828819	88.74209775	0.263550116	13716.17783
Orange (SC)	2027	Agricultural - Construction Equipment	Aggregate	175	Diesel	4.5231E-05	5.47294E-05	6.51326E-05	0.000570517	0.0004942	0.100345438	2.11632E-05	1.94701E-05	9.1317E-07	8.18124E-07	3252.093077	186.5202351	2.122384628	155072.5519
Orange (SC)	2027	Agricultural - Construction Equipment	Aggregate	300	Diesel	7.25601E-06	8.77977E-06	1.04487E-05	3.84474E-05	7.24195E-05	0.013994741	3.372E-06	3.10224E-06	1.27327E-07	1.141E-07	453.555233	119.2968801	0.118993375	21627.29234
Orange (SC)	2027	Agricultural - Construction Equipment	Aggregate	50	Diesel	1.93487E-06	2.3412E-06	2.78622E-06	9.62627E-06	7.51266E-06	0.001136152	4.42798E-07	4.07374E-07	1.02966E-08	9.26314E-09	36.82152604	40.97475665	0.036918731	1579.354695
Orange (SC)	2027	Agricultural - Construction Equipment	Aggregate	600	Diesel	4.11157E-06	4.975E-06	5.92066E-06	3.3975E-05	3.96616E-05	0.007259604	1.87915E-06	1.72882E-06	6.60392E-08	5.91881E-08	235.2763608	47.64586469	0.037276648	11218.89968
Orange (SC)	2027	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.49002E-07	1.80292E-07	2.14563E-07	1.16746E-06	1.38E-06	0.000191007	6.56828E-08	6.04282E-08	1.73633E-09	1.5573E-09	6.190355533	135.1659842	0.00492595	265.5177029
Orange (SC)	2027	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	1.06225E-06	1.28532E-06	1.52963E-06	9.40339E-06	9.66362E-06	0.002500819	4.31497E-07	3.96977E-07	2.27601E-08	2.03894E-08	81.04900311	3.130013366	0.00658742	3483.859203
Orange (SC)	2027	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	7.22348E-06	8.74041E-06	1.04018E-05	5.95783E-05	7.31594E-05	0.012730396	3.53357E-06	3.25089E-06	1.15805E-07	1.03792E-07	412.5791163	95.29172913	0.031096984	17734.54948
Orange (SC)	2027	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	4.86529E-06	5.887E-06	7.00602E-06	3.94847E-05	6.60778E-05	0.008241193	2.25452E-06	2.07416E-06	7.49626E-08	6.71911E-08	267.0886533	46.4132319	0.015444689	11480.69973
Orange (SC)	2027	Agricultural - Forklifts	Aggregate	100	Diesel	1.70388E-05	2.06169E-05	2.45358E-05	0.000149962	0.000129286	0.0246147	9.47721E-06	8.71903E-06	2.23822E-07	2.00686E-07	797.7372602	395.9273176	0.520077616	34216.67252
Orange (SC)	2027	Agricultural - Forklifts	Aggregate	175	Diesel	1.80362E-06	2.18237E-06	2.59721E-06	1.88088E-05	1.70424E-05	0.003231393	7.84354E-07	7.21606E-07	2.93961E-08	2.63458E-08	104.7261561	41.43219414	0.052101883	4993.753788
Orange (SC)	2027	Agricultural - Forklifts	Aggregate	50	Diesel	2.59127E-05	3.13544E-05	3.73143E-05	0.000135022	0.000108134	0.016171319	6.24001E-06	5.74081E-06	1.46605E-07	1.31846E-07	524.0959236	536.0262297	0.726489493	22479.60501
Orange (SC)	2027	Agricultural - Forklifts	Aggregate	75	Diesel	6.69874E-05	8.10547E-05	9.64618E-05	0.000531344	0.000624582	0.08710682	2.96187E-05	2.72492E-05	7.91864E-07	7.10189E-07	2823.042994	1039.514156	2.177681426	121086.405
Orange (SC)	2027	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.44922E-07	2.96356E-07	3.52688E-07	2.74076E-06	2.16114E-06	0.000450872	1.09257E-07	1.00516E-07	4.10181E-09	3.67599E-09	14.61230186	3.130013349	0.00658742	663.5922418
Orange (SC)	2027	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	6.36345E-06	7.69977E-06	9.16336E-06	3.60493E-05	6.49815E-05	0.014323744	2.83349E-06	2.60681E-06	1.30353E-07	1.16783E-07	464.2178963	150.7206164	0.124126064	21081.64718
Orange (SC)	2027	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	2.15728E-08	2.61031E-08	3.10649E-08	1.69028E-07	1.998E-07	2.76545E-05	9.50969E-09	8.74892E-09	2.5139E-10	2.25469E-10	0.896252812	135.1660016	0.000611305	36.61163531
Orange (SC)	2027	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000110925	0.000134219	0.000159732	0.000862792	0.000923476	0.132245012	7.29049E-05	6.70725E-05	1.20193E-06	1.0782E-06	4285.925676	1204.17189	2.187867476	165715.6311
Orange (SC)	2027	Agricultural - Nut Harvester	Aggregate	175	Diesel	2.0896E-05	2.52841E-05	3.00902E-05	0.000209434	0.000201211	0.035117556	9.62991E-06	8.85952E-06	3.19427E-07	2.86316E-07	1138.124085	551.632106	0.470068803	48921.81139
Orange (SC)	2027	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.49491E-05	4.22884E-05	5.03266E-05	0.000173877	0.000147143	0.020521985	7.27316E-06	6.69131E-06	1.85985E-07	1.67317E-07	665.0965458	135.1659929	1.639453753	25716.00695
Orange (SC)	2027	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.28152E-05	1.55064E-05	1.84539E-05	7.09776E-05	0.000128775	0.027238093	5.78172E-06	5.31918E-06	2.47858E-07	2.22074E-07	882.7587492	156.1591116	0.183228329	37945.0338
Orange (SC)	2027	Agricultural - Nut Harvester	Aggregate	50	Diesel	1.01228E-05	1.22486E-05	1.45769E-05	4.93375E-05	3.76933E-05	0.005357583	2.50624E-06	2.30574E-06	4.85242E-08	4.36808E-08	173.6337936	226.1515416	0.198801367	6713.563425
Orange (SC)	2027	Agricultural - Nut Harvester	Aggregate	75	Diesel	2.06589E-05	2.49972E-05	2.97488E-05	0.000162529	0.00019176	0.026608357	9.11605E-06	8.38677E-06	2.41883E-07	2.1694E-07	862.3496612	293.1366556	0.550814231	33342.81327
Orange (SC)	2027	Agricultural - Other Harvesters	Aggregate	100	Diesel	2.15449E-05	2.60693E-05	3.10246E-05	0.000184129	0.000161435	0.029970784	1.20378E-05	1.10747E-05	2.72501E-07	2.44354E-07	971.322482	596.8725961	0.485688629	37556.25525
Orange (SC)	2027	Agricultural - Other Harvesters	Aggregate	175	Diesel	1.95045E-05	2.36004E-05	2.80864E-05	0.000198571	0.000186987	0.033585992	8.82922E-06	8.12289E-06	3.05511E-07	2.73829E-07	1088.487671	339.4843085	0.444358341	46788.21022
Orange (SC)	2027	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.34174E-07	1.6235E-07	1.9321E-07	7.60102E-07	1.37014E-06	0.000302017	5.97443E-08	5.49647E-08	2.7485E-09	2.46237E-09	9.78806955	135.1660016	0.001833916	420.7362782
Orange (SC)	2027	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.28883E-07	2.76949E-07	3.29592E-07	1.71427E-06	2.38437E-06	0.000557531	9.51512E-08	8.75391E-08	5.07436E-09	4.5456E-09	18.06902017	135.1660012	0.001833916	776.6896649
Orange (SC)	2027	Agricultural - Other Harvesters	Aggregate	75	Diesel	6.68123E-08	8.08428E-08	9.62096E-08	5.23488E-07	6.1879E-07	8.56474E-05	2.94521E-08	2.70959E-08	7.78568E-10	6.9829E-10	2.775745086	135.1660016	0.001833916	107.3243874
Orange (SC)	2027	Agricultural - Other Harvesters	Aggregate	750	Diesel	9.517E-08	1.15156E-07	1.37045E-07	7.09952E-07	1.02589E-06	0.000230897	4.18169E-08	3.84715E-08	2.10149E-09	1.88252E-09	7.483129472	135.1659933	0.000611305	321.6593479
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	3.66324E-06	4.43252E-06	5.27506E-06	3.59925E-05	3.54578E-05	0.005967845	1.72492E-06	1.58693E-06	5.42798E-08	4.86563E-08	193.4117573	267.1376044	0.075304546	8783.458189
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.65212E-05	1.99907E-05	2.37906E-05	8.30311E-05	0.000155098	0.026710753	7.84796E-06	7.22012E-06	2.42941E-07	2.17775E-07	865.6682056	47.64586469	0.181959197	39312.81457
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.2747E-06	3.96239E-06	4.71557E-06	1.67176E-05	1.32459E-05	0.001998225	7.66021E-07	7.0474E-07	1.81132E-08	1.62917E-08	64.76041417	65.31586736	0.087378849	2645.441834
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.63169E-05	1.97435E-05	2.34964E-05	0.000124688	0.000167509	0.037597914	6.91569E-06	6.36244E-06	3.4217E-07	3.06539E-07	1218.50995	157.3917443	0.183228329	55336.508
Orange (SC)	2027	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000450631	0.000545264	0.000648909	0.003185121	0.003988499	0.485249539	0.000235487	0.000216648	4.40894E-06	3.95628E-06	15726.44143	717.3935334	14.18321399	642420.0054
Orange (SC)	2027	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	2.91959E-05	3.5327E-05	4.20421E-05	0.000251733	0.000216419	0.041185793	1.6033E-05	1.47504E-05	3.74483E-07	3.35791E-07	1334.789456	395.6324914	0.614475259	47709.99945
Orange (SC)	2027	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	6.39068E-07	7.73272E-07	9.20258E-07	3.6291E-06	5.93184E-06	0.001400143	2.78126E-07	2.55876E-07	1.27414E-08	1.14155E-08	45.37719862	138.2960065	0.009032641	1803.135667
Orange (SC)	2027	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.5337E-09	1.85578E-09	2.20853E-09	1.28095E-08	1.45617E-08	2.0358E-06	7.00646E-10	6.44594E-10	1.85079E-11	1.65981E-11	0.065978354	0.457437496	4.25647E-05	2.358295
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	3.09376E-05	3.74345E-05	4.45502E-05	0.000794042	0.0004842	0.126236101	1.46151E-05	1.34459E-05	1.16619E-06	1.03032E-06	4095.59128	1629.383882	4.803916052	147892.5881
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	7.85193E-05	9.50083E-05	0.000113068	0.001594344	0.001061349	0.268684381	5.19225E-05	4.77687E-05	2.48176E-06	2.19297E-06	8717.168825	2310.990853	6.899241139	314767.5503
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.98031E-05	4.81617E-05	5.73164E-05	0.000302721	0.000595329	0.155708946	1.75161E-05	1.61148E-05	1.43841E-06	1.27088E-06	5051.805277	814.6919412	2.401958026	182421.6594
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	1.97116E-05	2.3851E-05	2.83847E-05	0.000101834	8.81455E-05	0.010168753	8.00183E-06	7.36168E-06	9.34238E-08	8.2996E-08	329.9139779	248.3753688	0.766582349	10714.69343
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.3577E-06	1.64281E-06	1.95508E-06	1.01718E-05	1.44052E-05	0.001473331	1.05482E-06	9.70436E-07	1.35809E-08	1.20251E-08	47.80061681	28.85139341	0.10221098	1725.036905
Orange (SC)	2027	Airport Ground Support - A/C Tug Narrow Body	Aggregate	750	Diesel	1.00413E-06	1.21499E-06	1.44594E-06	1.86892E-05	5.14629E-06	0.010356923	1.78418E-07	1.64145E-07	9.57248E-08	8.45318E-08	336.0189751	17.33387

Orange (SC)	2027	Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000131359	0.000120824	0.000144553	0.010228145	0.000277999	0.10302445	7.10241E-06	5.36627E-06	1.25259E-06	1.58301E-06	4518.7	1744.7	9.49	87235
Orange (SC)	2027	Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.11018E-05	0.001573598	0.000445671	0.093157129	0	0	0	0	4982.25	1828.65	1.78	91432.5
Orange (SC)	2027	Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.49761E-05	4.1369E-05	4.94935E-05	0.004517201	0.000435475	0.138189923	9.90675E-06	7.4851E-06	1.22302E-06	1.92697E-06	5500.55	828.55	4.39	103651.605
Orange (SC)	2027	Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	8.21638E-09	9.27138E-06	9.54575E-07	0.000377635	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2027	Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000805191	0.000740615	0.000886064	0.051174303	0.004808357	1.24159167	9.15928E-05	6.92035E-05	1.2692E-05	1.75576E-05	50118.15	15596.45	18.53	2807361
Orange (SC)	2027	Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.04571E-05	0.006129287	0.000519896	0.173351915	0	0	0	0	9490	2357.9	1.8	424422
Orange (SC)	2027	Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	6.12397E-06	5.63283E-06	6.73906E-06	0.000384509	3.26453E-05	0.009729844	6.78388E-07	5.1256E-07	8.03306E-08	1.36819E-07	390.55	160.6	0.44	8559.98
Orange (SC)	2027	Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.68783E-08	2.47255E-05	6.87647E-06	0.002062444	0	0	0	0	91.25	47.45	0.15	2135.25
Orange (SC)	2027	Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.31921E-05	1.21341E-05	1.45171E-05	0.001174209	0.00011267	0.03451489	2.47435E-06	1.86951E-06	3.42869E-07	4.79505E-07	1368.75	507.35	1.62	76102.5
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	100	Diesel	3.07953E-05	3.72623E-05	4.43453E-05	0.00077954	0.000434691	0.120836616	1.40688E-05	1.29433E-05	1.11627E-06	9.86252E-07	3920.41093	2715.253936	5.497317166	225980.6511
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	175	Diesel	8.77459E-05	0.000106172	0.000126354	0.002189263	0.0008337	0.370680436	3.35768E-05	3.08907E-05	3.42449E-06	3.02544E-06	12026.31853	4504.417226	9.197434489	693227.3332
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	300	Diesel	8.7154E-05	0.000105456	0.000125502	0.000786264	0.000847711	0.364737467	3.45329E-05	3.17703E-05	3.36956E-06	2.97694E-06	11833.50542	3026.770149	6.23734063	682116.628
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	50	Diesel	0.000109632	0.000132655	0.00015787	0.00134314	0.001134839	0.189279258	3.54425E-05	3.26071E-05	1.74669E-06	1.54487E-06	6140.957062	9267.577554	19.0291748	318410.311
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	600	Diesel	5.74224E-05	6.94811E-05	8.26883E-05	0.0005468	0.000542639	0.227512459	2.2405E-05	2.06126E-05	2.10174E-06	1.85693E-06	7381.391161	1184.833749	2.431505669	425483.1389
Orange (SC)	2027	Airport Ground Support - Other	Aggregate	75	Diesel	3.51595E-05	4.2543E-05	5.06297E-05	0.000588093	0.000461051	0.087077951	2.16174E-05	1.9888E-05	8.04024E-07	7.10719E-07	2825.148213	2522.864382	5.28588189	162852.3373
Orange (SC)	2027	Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	5.95243E-07	7.20244E-07	8.5715E-07	5.60157E-06	9.21225E-06	0.00089654	5.6103E-07	5.16147E-07	8.2711E-09	7.31744E-09	29.08726237	12.92962621	0.05737127	1422.258883
Orange (SC)	2027	Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.94096E-07	2.34856E-07	2.79498E-07	1.31787E-06	4.40754E-06	0.000747715	9.46799E-08	8.71055E-08	6.90717E-09	6.10275E-09	24.25879473	4.396072911	0.11474254	1197.929868
Orange (SC)	2027	Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.15691E-06	1.39986E-06	1.66595E-06	1.0526E-05	1.29873E-05	0.001905383	6.67468E-07	6.14071E-07	1.75815E-08	1.55515E-08	61.81805879	63.22587216	1.090054129	2733.452277
Orange (SC)	2027	Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	5.82076E-08	7.04312E-08	8.3819E-08	1.47158E-06	4.09298E-07	0.000843752	1.36403E-08	1.25491E-08	7.79916E-09	6.88659E-09	27.37460323	4.396072911	0.11474254	1351.79242
Orange (SC)	2027	Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.38244E-07	2.88275E-07	3.43071E-07	1.26474E-05	6.55031E-06	0.002173176	4.36057E-08	4.01172E-08	2.00849E-08	1.77372E-08	70.50629514	61.54502075	1.606395558	3481.689745
Orange (SC)	2027	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000355	0.0000429	0.0000511	0.000167717	0.000910379	0.127294585	0.0000409	0.0000391	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2027	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	5.31E-05	0.0000643	0.0000765	0.000400203	0.001138503	0.161520299	0.0000526	5.03E-05	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2027	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000273	0.000033	3.93E-05	0.000139867	0.000656807	0.087797776	0.0000237	0.0000227	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2027	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000282143	0.000341583	0.000406282	0.001163051	0.001744443	0.164016226	0.00013466	0.000128944	0	0	5320.743237	11062.28155	6.703054951	92409.8772
Orange (SC)	2027	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.00184662	0.002234441	0.002658964	0.007228687	0.011207709	1.199967243	0.000767815	0.000734151	0	0	38927.35786	42036.6788	25.47161511	669971.6948
Orange (SC)	2027	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000959897	0.001161584	0.001382166	0.003886489	0.012003152	1.40383599	0.000712178	0.000680834	0	0	45540.93007	28761.93628	17.42794603	805229.3187
Orange (SC)	2027	Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000148286	0.000179426	0.000213532	0.000880901	0.003005773	0.43995744	0.000131129	0.000125359	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2027	Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000321005	0.000388383	0.000462235	0.002226114	0.00811244	1.104411255	0.000318211	0.000304153	0	0	35827.48786	14573.56994	20.409706	692498.7369
Orange (SC)	2027	Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.25201E-05	3.93128E-05	4.68066E-05	0.000119174	0.000210346	0.022737923	1.49983E-05	1.43057E-05	0	0	737.6268945	3135.150353	5.102425988	11761.97385
Orange (SC)	2027	Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000820945	0.000993405	0.001182229	0.003686026	0.012692935	1.198652268	0.000522581	0.000499527	0	0	38884.69665	8115.264129	15.30727896	751594.1605
Orange (SC)	2027	Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000326828	0.0003953	0.0004706	0.00140934	0.00300058	0.380198762	0.000169942	0.000162454	0	0	12333.78261	15538.90144	25.51213203	205775.4353
Orange (SC)	2027	Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000311064	0.000376366	0.000447888	0.001841448	0.008456316	0.994453512	0.000262849	0.00025123	0	0	32260.41943	4151.633637	5.102426052	624624.6271
Orange (SC)	2027	Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.00066623	0.000806124	0.000959367	0.002619022	0.006293909	0.688311533	0.00045665	0.000436674	0	0	22329.06669	18054.53395	28.06334521	403681.7783
Orange (SC)	2027	Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	0.0000668	0.0000808	0.0000962	0.0000645	0.00153879	0.248144597	0.0000664	0.0000635	0	0	8049.897461	3548.810303	2	155594.0469
Orange (SC)	2027	Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.0000048	5.8E-06	0.00000691	0.0000449	0.0000958	0.012758453	0.00000497	0.00000476	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2027	Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.0000339	0.000041	0.0000487	0.000121596	0.000170026	0.017992692	0.0000216	0.0000206	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2027	Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.33434E-05	4.04156E-05	4.79946E-05	0.000332439	0.00064736	0.082998952	3.66279E-05	3.50134E-05	0	0	2692.516905	4401.614445	6.136045047	46771.55469
Orange (SC)	2027	Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000214948	0.000260087	0.000309525	0.00162719	0.004919314	0.796780953	0.000202329	0.000193427	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000802779	0.000971357	0.001156006	0.003152284	0.010650719	0.921408616	0.000383945	0.000367082	0	0	29890.81866	9472.179872	9.500724126	578418.6945
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.002882541	0.003487974	0.004150889	0.012250175	0.051318576	4.705412674	0.001496172	0.001430487	0	0	152645.2372	28416.54288	28.50217608	2953901.627
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000106552	0.000128928	0.000153435	0.000477966	0.002968337	0.413541555	0.0000441	0.0000421	0	0	13415.43262	1578.696655	1.583454013	260011.3422
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000100475	0.000121643	0.000144765	0.000423666	0.001296166	0.090154186	5.10624E-05	0.000048833	0	0	2924.633342	1599.417315	1.340611008	55275.85895
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000778783	0.000942383	0.001121517	0.003521225	0.020361613	2.027567316	0.000431123	0.000412168	0	0	65774.99183	15994.17666	13.406113	1271345.023
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.004828269	0.005842206	0.006952692	0.020617341	0.094521504	8.659507627	0.002567427	0.002454552	0	0	280917.4553	46383.11273	38.87772807	5436395.862
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.008527016	0.010317718	0.012278917	0.033540722	0.1017395	6.057013691	0.004502777	0.004304657	0	0	196491.6461	20792.43197	17.42794886	3800216.486
Orange (SC)	2027	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008579969	0.010381761	0.012355155	0.034563726	0.105722783	8.269492996	0.004429581	0.004234679	0	0	268265.2386	15994.17897	13.406115	5288980.066
Orange (SC)	2027	Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2027	Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001594229	0.001929102	0.002295823	0.006812764	0.04063947	4.864925641	0.000746852	0.000714168	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2027	Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001065	0.000129	0.000153458	0.000429879	0.001099871	0.134737155	7.609E-05	7.275E-05	0	0	4370.920506	3610.067691	12.75606513	77399.85517
Orange (SC)	2027	Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000624431	0.000755576	0.000899189	0.002765616	0.015947953	1.679807498	0.000338487	0.000323707	0	0	54493.54332	15571.51683	22.96091814	1054245.276
Orange (SC)	2027	Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005070167	0.006134856	0.007301012	0.020505839	0.102684453	9.816338297	0.002726837	0.002607094	0	0	318445.4507	51782.30992	81.63881313	6160637.861
Orange (SC)	2027	Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002851825	0.00345077	0.004106653	0.010859845	0.036509715	2.915895546	0.00142044	0.001357907	0	0	94592.67296	10624.30237	20.40970607	1831067.725
Orange (SC)	2027	Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001728121	0.002091027	0.002488494	0.00531375	0.026964129	2.936270505	0.000701726	0.00067085	0	0	95253.64356	6490.26294	10.2048521	1895210.049
Orange (SC)	2027	Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002455322	0.00297094	0.003535664	0.010007655	0.06202437	5.606853962	0.001461991	0.001397663	0	0	181888.2969	4744.229492	2	3515664
Orange (SC)	2027	Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000210618	0.000254848	0.00030329	0.000849636	0.005295897	0.542378247	0.000117876	0.000112689	0	0	17594.93945	8022.818359	3	340087.2813
Orange (SC)	2027	Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	0.0000332	0.0000402	0.0000479	0.00018076	0.001017015	0.090107121	0.0000217	0.0000208	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2027	Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000966	0.000116931	0.000139158	0.00055224	0.002527061	0.228271365	0.0000474	0.0000453	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2027	Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.0002399	0.000290277	0.000345447	0.001019682	0.003604345	0.321827069	0.000118831	0.0001136	0	0	10440.18263	3920.689629	6.136046031	195838.4555
Orange (SC)	2027	Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.000918793	0.001111739	0.001323061	0.004461412	0.024828232	2.485906292	0.000510655	0.000488184	0	0	80643.67203	11762.06798	18.40813703	1560179.498
Orange (SC)	2027	Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000302831	0.000366426	0.000436077	0.001193916	0.007366655	0.733968862	0.000163877	0.000156666	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	7.80652E-05	9.44589E-05	0.000112414	0.002400877	0.001165504	0.384364776	2.59457E-05	2.387E-05	3.5513E-06	3.13713E-06	12470.29184	5808.875881	15.16735864	483377.1352
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	0.000108201	0.000130923	0.000155809	0.003282009	0.00095204	0.587686061	4.48756E-05	4.12856E-05	5.4302E-06	4.79661E-06	19066.82703	4882.519917	14.97373279	729978.1042
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.000154778	0.000187282	0.000222881	0.001732869	0.001681091	0.859164012	5.60188E-05	5.15373E-05	7.93875E-06	7.01238E-06	27874.63018	5146.778441	15.16735864	1077514.768
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	6.55964E-05	7.93716E-05	9.44588E-05	0.000579746	0.000518459	0.080763233	2.36071E-05	2.17186E-05	7.44728E-07	6.59179E-07	2620.274137	2260.708759	6.131485409	88687.16455
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.00018489	0.000223717	0.000266242	0.002245223	0.0016644	1.19223479	5.97042E-05	5.49279E-05	1.10173E-05	9.73086E-06	38680.74476	3844.656021	11.68209325	1508247.451
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	2.31449E-05	2.80054E-05	3.33287E-05	0.000648691	0.000459	0.10648743	1.53198E-05	1.40942E-05	9.83835E-07	8.69136E-07	3454.867393	1905.029006	3.356181487	133218.2771
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.00011272	0.000136391	0.000162317	0.001743981	0.000761666	0.955400919	2.8713E-05	2.64159E-05	8.82977E-06	7.79785E-06	30996.93064	1876.311895	3.162555632	1185092.241
Orange (SC)	2027	Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.000121077	0.000146503	0.000174351	0.000826821	0.003201948	0.435297631	7.46247E-05	6.86547E-05	4.02091E-06	3.55284E-06	14122.75224	292.5937586	0.38725171	544350.3339
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	100	Diesel	0.000316368	0.000382806	0.00045557	0.004200055	0.003621226	0.598182094	0.000187717	0.000172699	5.521E-06	4.88228E-06	19407.35925	14745.1776	31.61315034	1304566.047
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	175	Diesel	0.000794498	0.000961343	0.001144077	0.010578063	0.008562985	1.689507737	0.000455691	0.000419236	1.55965E-05	1.37895E-05	54814.21787	24849.98195	52.76964325	3672078.562
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	25	Diesel	2.89268E-06	3.50015E-06	4.16546E-06	1.60874E-05	1.30377E-05	0.001539702	1.05659E-06	9.72059E-07	1.41485E-08	1.25668E-08	49.95392445	120.6686969	0.24317808	3016.717422
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	300	Diesel	0.001056103	0.001277885	0.001520789	0.007908091	0.012310508	2.885102549	0.000513922	0.000472808	2.66425E-05	2.35478E-05	93603.97482	28735.64828	58.68697652	6285427.699
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	50	Diesel	3.75212E-05	4.54006E-05	5.40305E-05	0.000239644	0.000198336	0.024928396	1.40066E-05	1.2886E-05	2.2935E-07	2.03462E-07	808.7743706	1173.881965	2.593899515	48770.29697
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	600	Diesel	0.001600172	0.001936208	0.002304247	0.016200078	0.01738604	5.24698444	0.000714167	0.000657034	4.8463E-05	4.28252E-05	170232.6316	31368.77738	61.3619354	11433255.16
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	75	Diesel	2.69724E-05	3.26366E-05	3.88402E-05	0.000111205	0.000227747	0.012355915	2.34344E-05	2.15596E-05	1.13427E-07	1.00847E-07	400.8740445	393.2763571	1.134831038	27031.78326
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	750	Diesel	5.76906E-05	6.98056E-05	8.30744E-05	0.000574593	0.000652306	0.135624269	3.23322E-05	2.97456E-05	1.25218E-06	1.10695E-06	4400.180035	472.5071549	0.972712318	295726.7226
Orange (SC)	2027	Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000184144	0.000222814	0.000265168	0.001813698	0.002877778	0.286530933	0.000110656	0.000101804	2.6436E-06	2.33863E-06	9296.180575	665.404412	1.296949757	624275.9063
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.00204054	0.002469054	0.002938378	0.024473942	0.021951674	3.508442242	0.001425907	0.001311834	3.23761E-05	2.86354E-05	113827.5447	58447.15177	119.4243496	5121359.989
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.001580785	0.00191275	0.002276331	0.023686744	0.016216793	3.89454768	0.000894125	0.000822595	3.59596E-05	3.17868E-05	126354.3104	38146.87113	81.22294619	5707623.844
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.001389985	0.001681882	0.002001578	0.010498548	0.016444001	3.959926295	0.00066717	0.000613797	3.65698E-05	3.23204E-05	128475.4476	28487.13682	60.21577144	5802140.916
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000180149	0.000217981	0.000259415	0.000886866	0.000652261	0.080981116	5.50664E-05	5.06611E-05	7.43306E-07	6.60957E-07	2627.343132	2543.16447	7.194237926	106769.5866
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.004006698	0.004848105	0.005769646	0.040278111	0.040050651	14.41494923	0.001643991	0.001512472	0.000133153	0.000117653	467677.1526	54830.89159	113.0214778	21076505.49
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	8.49561E-05	0.000102797	0.000122337	0.000546463	0.000869853	0.061167178	6.37285E-05	5.86302E-05	5.62972E-07	4.99238E-07	1984.501721	1183.853149	4.172657997	87224.12096
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	5.94722E-05	7.19613E-05	8.56399E-05	0.000452785	0.000906792	0.132181081	3.3557E-05	3.08725E-05	1.2203E-06	1.07884E-06	4288.469601	312.3513019	0.647481413	193494.3243
Orange (SC)	2027	Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000258385	0.000312646	0.000372074	0.002168073	0.005985165	0.829289396	0.000125916	0.000115843	7.65944E-06	6.76855E-06	26905.38117	1237.742049	2.158271378	1198222.969
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	100	Diesel	0.001132704	0.001370572	0.001631094	0.027246045	0.014582742	4.153612875	0.000447614	0.000411804	3.83682E-05	3.39012E-05	134759.3953	84202.71215	125.2858802	6858120.82
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	175	Diesel	0.001968803	0.002382252	0.002835077	0.05159833	0.015490126	8.852184191	0.000747667	0.000687853	8.17838E-05	7.22503E-05	287199.3671	99488.62853	162.2661199	14536281.3
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	25	Diesel	3.73282E-06	4.51671E-06	5.37526E-06	1.26838E-05	8.61536E-06	0.0006674	1.20072E-06	1.10467E-06	6.05846E-09	5.44723E-09	21.65307326	39.40988286	0.144172474	985.2470716
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	300	Diesel	0.002229929	0.002698214	0.003211098	0.023453068	0.017714908	11.28458863	0.000607872	0.000559242	0.000104265	9.21033E-05	366116.0503	84628.71422	139.8473001	18524910.32
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	50	Diesel	0.001720685	0.002082029	0.002477787	0.023218171	0.018540747	3.234564075	0.000488946	0.000449831	2.98535E-05	2.64001E-05	104941.8692	133349.8217	175.9625049	4774469.1
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	600	Diesel	0.003477604	0.004207901	0.005007749	0.039204832	0.023329144	19.84440766	0.000829606	0.000763238	0.000183367	0.000161967	643829.9519	96921.52677	145.902544	32648028.54
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	75	Diesel	4.06673E-05	4.92075E-05	5.85609E-05	0.000299659	0.000368897	0.038304859	3.72263E-05	3.42482E-05	3.52927E-07	3.12639E-07	1242.758975	879.8981423	1.657983455	61704.12804
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	750	Diesel	0.000124826	0.000151039	0.000179749	0.001155763	0.001272589	0.473344824	4.52362E-05	4.16173E-05	4.37256E-06	3.86338E-06	15357.15151	1266.746235	2.090500878	773459.143
Orange (SC)	2027	Construction and Mining - Excavators	Aggregate	9999	Diesel	7.86847E-05	9.52085E-05	0.000113306	0.001056481	0.002495838	0.557927027	2.32038E-05	2.13475E-05	5.15595E-06	4.55373E-06	18101.32794	760.3036493	1.081293558	904480.0141
Orange (SC)	2027	Construction and Mining - Graders	Aggregate	100	Diesel	0.000336867	0.000407609	0.000485088	0.003602326	0.003254823	0.479988011	0.000212217	0.000195239	4.42762E-06	3.9176E-06	15572.68241	8294.278518	19.34139047	739689.0258
Orange (SC)	2027	Construction and Mining - Graders	Aggregate	175	Diesel	0.002482431	0.003003741	0.0035747	0.0346362	0.02322886	5.402960328	0.001292088	0.001188721	4.98786E-05	4.40982E-05	175293.0975	55628.04478	115.9034635	8239759.611
Orange (SC)	2027	Construction and Mining - Graders	Aggregate	25	Diesel	1.

Orange (SC)	2027 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000122844	0.000147755	0.00017659	0.000504308	0.000933693	2.15516E-06	0.000031399	2.37237E-05	1.28104E-08	1.1035E-08	43.90428779	0	4.402918064	0
Orange (SC)	2027 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.021262386	0
Orange (SC)	2027 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.00189744	0.001745266	0.002088017	0.153446271	0.00260582	0.97613363	6.72938E-05	5.08442E-05	1.1868E-05	1.62367E-05	46347.7	20841.5	51.83	625245
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000340162	0.000411596	0.000489833	0.006935716	0.004416791	1.028320304	0.000192906	0.000177474	9.49713E-06	8.39301E-06	33362.71976	18813.18108	26.45915874	1474868.541
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000376953	0.000456113	0.000542812	0.008724041	0.003151728	1.455643881	0.000143986	0.000132467	1.34468E-05	1.18808E-05	47226.76261	13244.07682	18.63521395	2096523.703
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	9.09522E-06	1.10052E-05	1.30971E-05	3.06341E-05	2.09232E-05	0.001611919	2.90001E-06	2.66801E-06	1.46301E-08	1.31563E-08	52.29694637	83.57822672	0.284507083	2089.455668
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000280614	0.000339543	0.000404085	0.00265461	0.002131125	1.227775403	7.74285E-05	7.12342E-05	1.1343E-05	1.00209E-05	39833.8208	8285.859546	12.30493135	1769328.156
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.000852888	0.001031995	0.001228159	0.010407354	0.008055185	1.335208441	0.000243388	0.000223917	1.23191E-05	1.08978E-05	43319.3674	46001.27082	67.2147984	1731972.49
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.00082266	0.000995419	0.001184631	0.008293234	0.005111779	4.123227983	0.000179754	0.000165374	3.80966E-05	3.36532E-05	133773.591	16604.96521	23.25845405	5944346.826
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000298385	0.000361046	0.000429675	0.004766627	0.003135431	0.681348997	0.000140835	0.000129569	6.29046E-06	5.56108E-06	22105.61783	13949.23129	22.61831311	984186.1354
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	6.97748E-05	8.44275E-05	0.000100476	0.000360882	0.00056203	0.171731395	2.90762E-05	2.67501E-05	1.58565E-06	1.40165E-06	5571.63597	391.4625705	0.569014166	249048.016
Orange (SC)	2027 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	7.37345E-05	8.92187E-05	0.000106178	0.000444517	0.001189269	0.217018012	2.64805E-05	2.43621E-05	2.00423E-06	1.77127E-06	7040.910404	199.5609019	0.355633854	312726.0733
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	4.4302E-05	5.36054E-05	6.37949E-05	0.000778777	0.000461124	0.109089543	2.25449E-05	2.07413E-05	1.00726E-06	8.90374E-07	3539.290094	2100.777038	1.409463188	180429.4166
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.00093465	0.001130927	0.001345896	0.01949734	0.006178362	3.065530864	0.000307225	0.000282647	2.83143E-05	2.50205E-05	99457.77279	32002.34559	22.05809889	5044391.91
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.001793325	0.002169924	0.002582389	0.014581006	0.012166509	6.243872579	0.000464385	0.000427235	5.76739E-05	5.09616E-05	202575.5694	48873.10882	37.13935501	10288318.81
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	9.649E-05	0.000116753	0.000138946	0.001174872	0.000807847	0.129133346	2.30435E-05	2.12E-05	1.19101E-06	1.05397E-06	4189.589206	6694.449477	4.016970086	192056.3543
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.007381549	0.008931674	0.01062943	0.059645363	0.048834003	26.77052178	0.001728087	0.00158984	0.000247285	0.000218497	868540.0968	116857.6929	82.87643546	43876533.26
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	7.33086E-06	8.87035E-06	1.05564E-05	0.000140837	6.24757E-05	0.018645765	1.229E-06	1.13068E-06	1.72169E-07	1.52184E-07	604.9412953	444.4063689	0.352365797	30314.91067
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.003287725	0.003978148	0.004734324	0.0259036	0.026604698	9.14183754	0.000998834	0.000918927	8.44222E-05	7.46144E-05	296596.851	22515.53303	17.68876301	14986751.55
Orange (SC)	2027 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.004278457	0.005176932	0.006160978	0.034399991	0.087257624	16.10719324	0.00134368	0.001236186	0.000148791	0.000131465	522580.1459	20758.92283	14.16510504	26729559.54
Orange (SC)	2027 Construction and Mining - Other	Aggregate	100	Diesel	0.000855627	0.001035309	0.001232103	0.014295634	0.010257108	2.16426567	0.000543496	0.000500016	1.9984E-05	1.76644E-05	70217.21614	39816.65542	84.72371882	3270830.545
Orange (SC)	2027 Construction and Mining - Other	Aggregate	175	Diesel	0.000414328	0.000501337	0.000596633	0.007392017	0.004289913	1.23681484	0.000223202	0.000205346	1.14225E-05	1.00947E-05	40127.09537	12302.09671	28.75556682	1868061.923
Orange (SC)	2027 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Construction and Mining - Other	Aggregate	300	Diesel	0.000486136	0.000588225	0.000700036	0.004061746	0.005458429	1.608718555	0.000225317	0.000207291	1.48588E-05	1.31301E-05	52193.10184	11074.94123	26.23068778	2421730.931
Orange (SC)	2027 Construction and Mining - Other	Aggregate	50	Diesel	0.000630717	0.000763168	0.000908233	0.005573747	0.0047645	0.722379277	0.000239103	0.000219975	6.65983E-06	5.89596E-06	23436.80007	25674.40645	52.11069792	979044.344
Orange (SC)	2027 Construction and Mining - Other	Aggregate	600	Diesel	0.001504136	0.001820004	0.002165956	0.015483585	0.014982829	6.578346285	0.000573049	0.000527205	6.07749E-05	5.36916E-05	213427.2004	25644.86044	55.12652565	9909930.188
Orange (SC)	2027 Construction and Mining - Other	Aggregate	75	Diesel	0.000192565	0.000233003	0.000277293	0.00093443	0.001961478	0.103502074	0.000154331	0.000141984	9.51151E-07	8.4477E-07	3358.010792	2160.344722	7.083688411	157448.2801
Orange (SC)	2027 Construction and Mining - Other	Aggregate	750	Diesel	0.000232416	0.000281223	0.000334679	0.001949909	0.002623843	0.911474966	8.98033E-05	8.2619E-05	8.42007E-06	7.43934E-06	29571.80147	2225.827318	4.488673845	1374191.603
Orange (SC)	2027 Construction and Mining - Other	Aggregate	9999	Diesel	7.1233E-05	8.61919E-05	0.000102576	0.000748175	0.002004149	0.398055002	2.98666E-05	2.74772E-05	3.67808E-06	3.24887E-06	12914.45617	657.4817858	1.332575048	601686.2149
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	100	Diesel	0.00025197	0.000304883	0.000362836	0.004573298	0.003259019	0.699399958	0.000158838	0.000146131	6.45874E-06	5.70841E-06	22691.2614	13067.46648	32.64134693	1060277.935
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000305577	0.000369748	0.0044003	0.006688424	0.003061685	1.170520247	0.000150159	0.000138146	1.08129E-05	9.55363E-06	37976.24033	11184.03645	27.99839672	1765448.573
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000153138	0.000185297	0.000220519	0.001729087	0.001614008	0.906247072	5.42909E-05	4.99477E-05	8.37411E-06	7.39667E-06	29402.1882	6177.6505	13.29572105	1366225.046
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	50	Diesel	0.000105046	0.000127105	0.000151266	0.000732139	0.000598828	0.088618876	3.51411E-05	3.23298E-05	8.16174E-07	7.23295E-07	2875.141836	3102.976989	8.441727653	119939.5853
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	600	Diesel	2.69792E-05	3.26449E-05	3.88501E-05	0.0003298	0.00025759	0.177172409	8.47406E-06	7.79613E-06	1.63724E-06	1.44606E-06	5748.163682	749.9589456	1.6179978	267789.3461
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	75	Diesel	0.000101508	0.000122825	0.000146172	0.001036393	0.001087734	0.153406614	7.94384E-05	7.30833E-05	1.41527E-06	1.25208E-06	4977.108646	3215.941168	8.089989001	232057.6989
Orange (SC)	2027 Construction and Mining - Pavers	Aggregate	750	Diesel	3.8008E-06	4.59897E-06	5.47316E-06	6.28788E-05	1.72318E-05	0.034273078	6.08548E-07	5.59864E-07	3.16758E-07	2.79732E-07	1111.952278	69.01054122	0.140695461	51757.90592
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000132067	0.000159801	0.000190177	0.002965132	0.00175639	0.460098529	6.50381E-05	5.9835E-05	4.24988E-06	3.75526E-06	14927.39008	9143.445549	18.89310749	812454.8672
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.000134837	0.000163153	0.000194166	0.002918871	0.001346371	0.50147663	6.49958E-05	5.97961E-05	4.63236E-06	4.09298E-06	16269.85698	6136.050334	12.92316646	886212.4892
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	1.11421E-06	1.3482E-06	1.60447E-06	3.87342E-06	2.82047E-06	0.000261602	3.95152E-07	3.6354E-07	2.38521E-09	2.13516E-09	8.487388501	16.62233088	0.0702346	415.5582721
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	7.01708E-05	8.49066E-05	0.000101046	0.000642862	0.000670675	0.30495777	2.7515E-05	2.53138E-05	2.81738E-06	2.48902E-06	9894.018982	2380.234671	4.986656623	537399.7857
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	6.86229E-05	8.30337E-05	9.88169E-05	0.000781723	0.000673617	0.110049159	2.42347E-05	2.22959E-05	1.0154E-06	8.98206E-07	3570.423752	5056.596167	10.32448625	175110.5526
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	5.70677E-05	6.9052E-05	8.21775E-05	0.000743557	0.000378203	0.390678961	1.42401E-05	1.31009E-05	3.61031E-06	3.18867E-06	12675.14864	1776.760948	3.581964617	691512.0199
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.84825E-05	2.23639E-05	2.66149E-05	9.87334E-05	0.000173099	0.01207177	1.6779E-05	1.54367E-05	1.11055E-07	9.85282E-08	391.6552876	312.167374	0.983284405	21229.50078
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.13401E-05	1.37215E-05	1.63297E-05	0.000124202	9.00029E-05	0.066372425	1.40729E-06	1.2947E-06	6.13306E-07	5.41723E-07	2153.380226	184.1754262	0.351173002	117543.774
Orange (SC)	2027 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.45807E-06	7.81427E-06	9.29963E-06	6.28081E-05	0.000147182	0.032378812	2.54551E-06	2.34187E-06	2.99164E-07	2.64272E-07	1050.494887	67.81911001	0.140469201	57172.50708
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	100	Diesel	0.000977176	0.001182383	0.001407133	0.018243918	0.012752348	2.824742931	0.000564083	0.000518956	2.60868E-05	2.30552E-05	91645.67349	54091.49845	157.3859273	4719785.912
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000517758	0.000626488	0.000745572	0.016259024	0.004879507	2.939030864	0.000212117	0.000195148	2.71573E-05	2.3988E-05	95353.61962	34201.15175	92.04363198	4918044.472
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	25	Diesel	1.62625E-06	1.96776E-06	2.3418E-06	5.40727E-06	3.72334E-06	0.000284522	5.11885E-07	4.70935E-07	2.58176E-09	2.32223E-09	9.231013461	17.12566497	0.072361346	428.1416243
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000150743	0.000182399	0.00021707	0.001436098	0.001706255	0.512766054	7.14606E-05	6.57438E-05	4.73625E-06	4.18513E-06	16636.1299	3909.4468	12.22906746	856972.9456
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001354441	0.001638874	0.001950395	0.012727202	0.011088122	1.820159306	0.000452691	0.000416475	1.67876E-05	1.48559E-05	59053.06412	76534.42551	213.393609	2735940.182
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	600	Diesel	6.10628E-05	7.38859E-05	8.79304E-05	0.000714341	0.000735392	0.258637321	2.56834E-05	2.36288E-05	2.3894E-06	2.11096E-06	8391.203032	1211.127027	3.835151332	431698.6992
Orange (SC)	2027 Construction and Mining - Rollers	Aggregate	75	Diesel	5.42092E-05	6.55931E-05	7.80612E-05	0.000214219	0.00052411	0.018160837	3.78191E-05	3.47936E-05	1.6628E-07	1.48226E-07	589.2083492	428.1416243	1.809033647	30380.92966
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001296077	0.001568253	0.00186635	0.044690761	0.022502277	7.346918902	0.000445158	0.000409545	6.7887E-05	5.99646E-05	238362.6926	118851.7009	407.7629413	11446380.42
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.000360153	0.000435785	0.000518621	0.008189933	0.003151775	1.480857808	0.000228513	0.000210232	1.36805E-05	1.20866E-05	48044.80072	18130.15997	62.4629695	2310775.082
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	6.838E-07	8.27398E-07	9.84671E-07	9.06051E-06	1.10015E-05	0.001283435	5.76257E-07	5.30157E-07	1.18455E-08	1.04752E-08	41.63964899	72.03762221	0.250519931	1800.940555
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	1.70231E-05	2.0598E-05	2.45133E-05	0.000222113	0.000213386	0.120692534	4.4429E-06	4.08747E-06	1.11535E-06	9.85076E-07	3915.736339	888.3651902	3.423772392	188136.7516
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	4.8244E-05	5.83753E-05	6.94714E-05	0.00056606	0.000510949	0.09135252	1.41487E-05	1.30168E-05	8.43152E-07	7.45607E-07	2963.831917	2673.099751	9.43625074	128022.4963
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	4.91923E-06	5.95227E-06	7.0837E-06	7.26846E-05	3.97795E-05	0.039727747	7.01863E-07	6.45714E-07	3.67155E-07	3.24253E-07	1288.923	154.9451188	0.584546506	61948.40242
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	7.14848E-06	8.64966E-06	1.02938E-05	2.96931E-05	7.07433E-05	0.00308479	5.23048E-06	4.81204E-06	2.8306E-08	2.51776E-08	100.0826194	77.37374237	0.334026575	4792.972303
Orange (SC)	2027 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.46472E-06	1.77231E-06	2.1092E-06	1.40601E-05	1.91954E-05	0.007474008	1.38817E-07	1.27711E-07	6.9057E-08	6.10019E-08	242.485974	18.67642057	0.083506644	11672.76286
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000190593	0.000230618	0.000274454	0.001978418	0.001915899	0.257201712	0.000125379	0.000115349	2.37224E-06	2.09925E-06	8344.626301	4822.373016	5.438753698	403372.5295
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.000219711	0.00026585	0.000316384	0.002346971	0.002228056	0.346371249	0.000130376	0.000119946	3.19578E-06	2.82704E-06	11237.63372	3767.046124	4.750303863	549754.5445
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000283131	0.000342589	0.000407709	0.002680846	0.003564411	0.407438498	0.000158262	0.000145021	3.75848E-06	3.32546E-06	13218.89334	2887.607047	4.061854028	645796.7539
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	5.87885E-05	7.11341E-05	8.46555E-05	0.000751275	0.000504119	0.080219642	1.51828E-05	1.39682E-05	7.39907E-07	6.54742E-07	2602.637943	2777.137442	2.822644324	114482.5195
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.002139528	0.002588829	0.003080921	0.020056907	0.023338625	4.020986725	0.001023038	0.000941195	3.71118E-05	3.28188E-05	130456.486	17251.50708	22.85653453	6324504.123
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	7.58454E-05	9.1773E-05	0.000109217	0.000749772	0.000715628	0.097737598	4.85279E-05	4.46456E-05	9.01357E-07	7.97721E-07	3170.988743	2115.704754	2.54726439	155126.0117
Orange (SC)	2027 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	5.70057E-05	6.89769E-05	8.20883E-05	0.000318747	0.000818928	0.150408849	2.32877E-05	2.14247E-05	1.38889E-06	1.22762E-06	4879.84946	358.4559461	0.344224918	238673.0037
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.002902506	0.003512032	0.004179609	0.044299808	0.029324158	6.137239993	0.001497753	0.001377933	5.66548E-05	5.00913E-05	199115.9926	124750.1758	130.5265873	10742850.18
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.004591279	0.005555447	0.006611441	0.091563835	0.034372893	14.59500478	0.001754087	0.00161376	0.0001348	0.000119122	473518.8567	169205.4013	173.7245013	25365097.54
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.005445302	0.006588815	0.007841234	0.047361489	0.044356158	21.720571	0.001519009	0.001397488	0.000200654	0.00017728	704700.0051	179568.5929	162.5303574	37744853.52
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.00029937	0.000362238	0.000431093	0.00248994	0.001760945	0.252469976	8.69576E-05	8.0001E-05	2.32523E-06	2.06063E-06	8191.11031	9454.531538	10.62008517	392829.0669
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.007844359	0.009491674	0.011295877	0.063028161	0.060854787	26.68198129	0.002317092	0.002131724	0.000246453	0.000217775	865667.4979	140450.8646	139.5680111	46279272.48
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	3.60056E-05	4.35668E-05	5.18481E-05	0.000145232	0.000341329	0.014437038	2.77288E-05	2.55105E-05	1.32397E-07	1.17833E-07	468.3937949	355.0236329	0.789330654	25071.25778
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.00075451	0.000912957	0.001086494	0.006236268	0.00487241	2.723448162	0.000152782	0.00014056	2.5157E-05	2.22284E-05	88359.27626	7408.284347	7.17573322	4730681.321
Orange (SC)	2027 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000573233	0.000693612	0.000825456	0.004024401	0.012269123	1.891389008	0.000228858	0.000210549	1.74696E-05	1.54373E-05	61364.03337	3418.535383	2.798535956	3271721.001
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	100	Diesel	0.000134295	0.000162497	0.000193385	0.001529766	0.001749503	0.209863008	0.000114087	0.00010496	1.93626E-06	1.71287E-06	6808.774179	2989.818758	5.17931996	271353.5667
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.001112756	0.001346435	0.001602369	0.017136208	0.011475679	2.79293675	0.000596554	0.00054883	2.57887E-05	2.27956E-05	90613.75699	21542.96607	46.11723252	3612086.169
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	25	Diesel	2.13986E-07	2.58923E-07	3.0814E-07	4.28521E-06	3.29226E-06	0.000646149	1.41613E-08	1.30284E-08	5.96755E-09	5.27378E-09	20.96358441	30.22478316	0.070949588	755.6195789
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.001315801	0.001592119	0.001894753	0.009256406	0.014012316	3.211379146	0.000637529	0.000586526	2.96513E-05	2.62108E-05	104189.6597	18658.51426	44.69824075	4180938.774
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.54232E-05	3.07621E-05	3.66095E-05	8.65048E-05	6.03429E-05	0.005142848	8.52983E-06	7.84744E-06	4.67855E-08	4.19752E-08	166.8540538	157.924492	0.425697531	6116.40466
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.012028342	0.014554294	0.017320812	0.116240878	0.122903952	40.37590687	0.004838747	0.004451647	0.000372934	0.000329543	1309951.832	124002.4622	249.8844507	52419212.6
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	75	Diesel	3.66179E-05	4.43076E-05	5.27298E-05	0.00036756	0.000371143	0.051658127	2.651E-05	2.43892E-05	4.76506E-07	4.21627E-07	1675.991029	964.1705827	1.915638889	67065.61462
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000271408	0.000328403	0.000390827	0.003569179	0.004127495	0.546919112	0.000173802	0.000159898	5.0484E-06	4.46388E-06	17744.18827	1166.172883	2.554185186	710682.2967
Orange (SC)	2027 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.000622661	0.000753419	0.000896631	0.007177962	0.010553141	0.931353687	0.000363643	0.000334551	8.59215E-06	7.60158E-06	30216.74468	758.3062263	1.844689301	1211073.478
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	7.09094E-06	8.58004E-06	1.0211E-05	2.88463E-05	7.09821E-05	0.002587633	4.80789E-06	4.42326E-06	2.37112E-08	2.11199E-08	83.95289277	52.01017704	0.219759432	4403.528323
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	8.79542E-06	1.06425E-05	1.26654E-05	0.000272435	9.50544E-05	0.049429667	3.70542E-06	3.40899E-06	4.56738E-07	4.03438E-07	1603.691099	553.3882838	1.97783489	84109.55806
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	7.15645E-06	8.6593E-06	1.03053E-05	8.60228E-05	9.04858E-05	0.045956668	2.54856E-06	2.34468E-06	4.24677E-07	3.75092E-07	1491.013487	380.5411287	1.245303449	78184.47201
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000623402	0.000754317	0.0008977	0.008405824	0.007555305	1.376081699	0.000176166	0.000162073	1.27039E-05	1.12314E-05	44645.45524	48184.30842	147.7515916	2100850.337
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.61787E-06	4.37763E-06	5.20974E-06	2.52473E-05	5.2589E-05	0.013258714	2.32484E-06	2.13885E-06	1.22475E-07	1.08216E-07	430.1643624	47.67599562	0.146506288	22541.21073
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.001478789	0.001789335	0.002129456	0.044823337	0.024226237	7.305933272	0.000644623	0.000593053	6.75026E-05	5.963E-05	237032.959	176104.2057	476.5849554	12418079.45
Orange (SC)	2027 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.30623E-06	2.79054E-06	3.32097E-06	3.28693E-05	7.8543E-05	0.017947497	1.04954E-06	9.65581E-07	1.65864E-07	1.46485E-07	582.2867851	30.5126372	0.146506288	30512.6372
Orange (SC)	2027 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	1.68014E-05	2.03297E-05	2.41941E-05	0.000503663	0.000275679	0.08195495	7.01003E-06	6.44923E-06	7.5721E-07	6.68905E-07	2658.938102	1851.42081	6.379751451	169360.4584
Orange (SC)	2027 Construction and Mining - Surfacing Equipment	Aggregate	175	Diesel	2.23257E-05	2.70141E-05	3.2149E-05	0.000353998	0.000240551	0.061144785	1.37826E-05	1.268E-05	5.64644E-07	4.99056E-07	1983.775196	902.9441339	3.588610191	127231.6072
Orange (SC)	2027 Construction and Mining - Surfacing Equipment	Aggregate	25	Diesel	0

Orange (SC)	2027 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	2.40042E-05	2.64152E-05	2.42443E-05	0.000316993	2.56403E-06	0.000694666	1.09067E-08	8.24063E-09	1.28831E-08	1.77835E-08	47.61257238	0	20.76641278	0
Orange (SC)	2027 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.713907937	0
Orange (SC)	2027 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	2.07009E-06	2.97578E-06	2.48986E-06	8.49825E-06	0.000015734	0.002063913	5.29114E-07	3.99775E-07	1.97345E-08	1.69995E-08	67.63473019	0	0.161173579	0
Orange (SC)	2027 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	9.00749E-05	0.000099122	9.09757E-05	0.004312235	0.000032287	0.009449148	1.49043E-07	1.1261E-07	1.60147E-07	2.21062E-07	616.897268	0	95.45659438	0
Orange (SC)	2027 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	35.45838123	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000153993	0.00016946	0.000155533	0.010729699	6.97939E-05	0.021189819	1.05084E-06	7.93968E-07	3.77025E-07	5.20433E-07	1439.248217	0	198.8568805	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	88.91755029	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.80619E-06	1.07911E-05	9.90424E-06	0.000227666	4.7032E-06	0.000576055	4.39789E-07	3.32284E-07	9.97076E-09	1.37633E-08	36.10536578	0	13.23730072	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.918972221	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000127587	0.000140401	0.000128863	0.009038398	4.35334E-05	0.017849709	8.85197E-07	6.68816E-07	3.10634E-07	4.28789E-07	1212.10475	0	54.13906461	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	24.20792777	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.033319497	0.036666074	0.033652691	1.683610931	0.02047301	4.327949789	0.000180728	0.00013655	7.04016E-05	9.71803E-05	264436.5399	0	54367.20938	0
Orange (SC)	2027 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	24309.9412	0
Orange (SC)	2027 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000776918	0.00085495	0.000784687	0.05662048	0.000576766	0.136946429	2.09322E-06	1.58154E-06	2.1978E-06	3.03378E-06	8527.466044	0	445.4337848	0
Orange (SC)	2027 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.083770995	0.092184871	0.084608706	0.534145578	0.003701648	2.180078329	0.001177292	0.000889509	3.14864E-05	4.34628E-05	123520.502	0	14776.82631	0
Orange (SC)	2027 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	35701.64536	0
Orange (SC)	2027 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.66152E-05	1.82841E-05	1.67814E-05	0.001231383	1.8215E-05	0.004418626	5.18654E-08	3.91872E-08	6.09951E-08	8.41959E-08	239.1393336	0	4.491553325	0
Orange (SC)	2027 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.114133206	0.125596631	0.115274537	0.425060124	0.002841191	2.770590569	0.001752387	0.001324026	3.63634E-05	5.01949E-05	143102.9956	0	7174.166037	0
Orange (SC)	2027 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	19212.40255	0
Orange (SC)	2027 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000421425	0.000463753	0.00042564	0.023885537	0.000152149	0.058160673	1.03656E-06	7.83179E-07	9.31149E-07	1.28533E-06	3624.053803	0	442.369384	0
Orange (SC)	2027 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.77075E-07	1.11706E-06	9.3465E-07	5.50296E-06	6.56987E-06	0.000901248	2.31048E-07	1.7457E-07	8.63863E-09	7.4414E-09	29.60658319	0	0.124495346	0
Orange (SC)	2027 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.44856E-05	8.19667E-05	7.52303E-05	0.007014549	5.06342E-05	0.013798015	2.45914E-07	1.85801E-07	2.3825E-07	3.28874E-07	935.4559313	0	38.14794015	0
Orange (SC)	2027 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.42547E-07	2.04913E-07	1.71452E-07	5.85192E-07	1.08345E-06	0.000142122	3.6435E-08	2.75286E-08	1.35893E-09	1.17059E-09	4.657348392	0	0.014724145	0
Orange (SC)	2027 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000212403	0.000233736	0.000214527	0.010840593	8.22541E-05	0.022959935	3.77149E-07	2.84958E-07	3.97383E-07	5.48536E-07	1519.370424	0	360.2045896	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001596481	0.001756831	0.001612446	0.09011849	0.001282756	0.247690295	5.65712E-06	4.27426E-06	3.77549E-06	5.21157E-06	14727.96111	0	386.1759729	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.00019914	0.000286266	0.000239521	0.001410233	0.001683648	0.230961204	5.92103E-05	4.47367E-05	2.21381E-06	1.907E-06	7587.221606	0	268.5978465	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	23.41159041	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.053624084	0.059010032	0.054160324	3.30602781	0.027426255	6.424829068	0.000152112	0.000114929	0.00011224	0.000154932	440378.8315	0	4501.009797	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.0006011	0.00086409	0.00072299	0.002467671	0.004568734	0.599306516	0.000153641	0.000116084	5.73039E-06	4.93621E-06	19639.36649	0	547.4216056	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	267.4174736	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.000186063	0.000204752	0.000187924	0.006666006	7.5488E-05	0.014641715	3.40904E-07	2.57572E-07	2.50357E-07	3.45585E-07	961.016307	0	62.85822286	0
Orange (SC)	2027 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.810726381	0
Orange (SC)	2027 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000210346	0.000231473	0.000212449	0.016102331	0.000101021	0.02630857	4.79925E-07	3.62611E-07	5.28031E-07	7.28878E-07	1952.39344	0	461.9242232	0
Orange (SC)	2027 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	46.00071402	0
Orange (SC)	2027 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.65545E-07	7.32392E-07	6.722E-07	6.89407E-05	4.72851E-07	0.000112638	2.05476E-09	1.55249E-09	2.1797E-09	3.00878E-09	8.328418242	0	0.951440114	0
Orange (SC)	2027 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.094749144	0
Orange (SC)	2027 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	9.48118E-05	0.000104335	9.57599E-05	0.005057807	4.01147E-05	0.010823809	1.7908E-07	1.35305E-07	1.84847E-07	2.55158E-07	712.4839871	0	347.2756773	0
Orange (SC)	2027 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	34.58344099	0
Orange (SC)	2027 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000309016	0.000340054	0.000312106	0.020033204	0.000187715	0.047637442	7.80279E-07	5.89544E-07	7.72613E-07	1.06649E-06	2991.144222	0	483.6756907	0
Orange (SC)	2027 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001245589	0.001370695	0.001258045	0.003679871	2.27721E-05	0.020998409	2.04586E-06	1.54576E-06	3.30264E-07	4.55887E-07	1160.972477	0	654.5030493	0
Orange (SC)	2027 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	203.6885998	0
Orange (SC)	2027 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.00019177	0.000211031	0.000193688	0.009934646	6.24102E-05	0.02172206	3.1324E-07	2.3667E-07	3.71108E-07	5.12266E-07	1417.417142	0	325.1230383	0
Orange (SC)	2027 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.74295E-05	1.91801E-05	1.76038E-05	0.000978647	6.64408E-06	0.002367025	3.61696E-08	2.73281E-08	3.87041E-08	5.34261E-08	147.9120758	0	17.76081006	0
Orange (SC)	2027 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.122796399	0.135129945	0.124024361	0.697385674	0.00746998	3.568755225	0.001059864	0.000800786	4.85492E-05	6.70158E-05	189961.3447	0	39715.70853	0
Orange (SC)	2027 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	59975.79112	0
Orange (SC)	2027 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.94296E-05	2.13811E-05	1.96239E-05	0.000989481	8.04948E-06	0.003649647	4.09732E-08	3.09576E-08	5.0414E-08	6.959E-08	196.6462974	0	8.175610854	0
Orange (SC)	2027 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.004561365	0.005019502	0.004606978	0.085843453	0.000524479	0.27570519	5.43483E-05	4.10632E-05	4.04761E-06	5.5872E-06	15908.1365	0	1280.610791	0
Orange (SC)	2027 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	967.0147871	0
Orange (SC)	2027 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.005960139	0.006558769	0.00601974	0.31520074	0.003025813	0.752752449	2.12953E-05	1.60898E-05	1.21808E-05	1.6814E-05	47325.75036	0	1585.885766	0
Orange (SC)	2027 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.00011629	0.00012797	0.000117453	0.003187558	6.36403E-05	0.006916661	1.89331E-07	1.4305E-07	1.21082E-07	1.67137E-07	459.9346648	0	42.4744585	0
Orange (SC)	2027 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.53524E-06	3.89032E-06	3.57059E-06	0.000216895	1.53399E-06	0.000488588	1.30746E-08	9.87862E-09	8.00011E-09	1.10431E-08	31.39567355	0	0.345320772	0
Orange (SC)	2027 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000372447	0.000409855	0.000376171	0.018045078	0.000130583	0.039812971	1.08981E-06	8.23411E-07	6.73032E-07	9.29034E-07	2591.038486	0	152.804454	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.00638236	0.005870495	0.007023398	0.350907392	0.015877483	7.020200483	0.000489465	0.000369818	6.78249E-05	0.000100678	287386.4	76569.7	158.36	5359879
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.040621254	0.041027466	0.044701212	2.688244003	0.024653431	4.96452385	6.42476E-05	8.50335E-05	8.88541E-05	0.000122652	348011.8252	0	3149.472512	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.27365E-06	7.54582E-06	9.01847E-06	3.91707E-05	4.73395E-05	0.006404033	1.32217E-06	1.74993E-06	6.14173E-08	5.29054E-08	210.4911062	0	0.79556295	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	38715.55965	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000687808	0.000632646	0.000756891	0.031887956	0.002146288	0.87923334	6.30317E-05	4.76239E-05	8.73426E-06	1.23469E-05	35244.4	5153.8	10.66	690609.2
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.0005701	0.000575802	0.00062736	0.08471397	0.000829797	0.120806486	1.48336E-06	1.96327E-06	2.42661E-06	3.34963E-06	9545.147614	0	32.59679789	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	2.61102E-05	3.14048E-05	3.75338E-05	0.000106325	0.000197588	0.025685733	5.24672E-06	6.94419E-06	2.45623E-07	2.11582E-07	841.805424	0	1.59544902	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	205.1218482	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008607254	0.008693327	0.009471758	0.358016016	0.002540089	0.791858545	9.39517E-06	1.24348E-05	1.3202E-05	1.82237E-05	51638.24604	0	1187.067078	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	14592.27413	0
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.002201058	0.002024533	0.00242213	0.190858306	0.002904368	1.094779157	7.54731E-05	5.70241E-05	1.33105E-05	1.86035E-05	53103.85	23611.85	48.85	826414.75
Orange (SC)	2027 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.001974945	0.002350348	0.002843921	0.023396092	0.017259853	2.780294959	0.000391065	0.00035978	3.59423E-05	2.33936E-05	92991.05	91217.15	112.06	3375034.55
Orange (SC)	2027 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000887338	0.46104665	0.034962903	11.036051	0	0	0	0	610652.3	63075.65	7.42	5550657.2
Orange (SC)	2027 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000247467	0.09379465	0.009355908	2.872169	0	0	0	0	156825.9	10172.55	1.2	1485192.3
Orange (SC)	2027 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000190395	0.10792809	0.009054892	2.9601392	0	0	0	0	162417.7	8139.5	0.95	1709295
Orange (SC)	2027 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000162718	0.028830607	0.005908923	1.9638908	0	0	0	0	104346.2	30521.3	3.59	976681.6
Orange (SC)	2027 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.00026814	0.15199868	0.012752305	4.1688631	0	0	0	0	228741.85	7121.15	0.84	2406948.7
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002233467	0.002054343	0.002457794	0.105279791	0.013879418	4.707015262	0.000328184	0.000247962	4.54763E-05	6.46846E-05	184642.55	35653.2	310.44	2959215.6
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.10964E-05	0.009584772	0.00087984	0.305185501	0	0	0	0	16607.5	2660.85	23.08	220850.55
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.0377158	0.038092957	0.041503937	2.134134493	0.019379574	5.087646356	6.56349E-05	8.68698E-05	8.15758E-05	0.000112605	319749.143	0	7162.784105	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.000328067	0.000394592	0.000471601	0.002290108	0.00277388	0.374071599	7.80081E-05	0.000103246	3.58587E-06	3.08891E-06	12289.61453	0	79.28932285	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000230381	0.000211904	0.00025352	0.024318967	0.002397059	0.760854576	5.45452E-05	4.12119E-05	7.55829E-06	1.06028E-05	30265.8	3372.6	29.33	492399.6
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.23596E-05	0.011487711	0.001191179	0.445042332	0	0	0	0	23998.75	2200.95	19.15	321338.7
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.115112052	0.116263172	0.12667379	2.013854941	0.033427597	4.101984825	0.000130549	0.000172786	7.44246E-05	0.000102733	286008.7872	0	17292.77633	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5175.253369	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001326401	0.001339665	0.001459623	0.126504898	0.000749085	0.183080352	2.28585E-06	3.02539E-06	3.66485E-06	5.05884E-06	14415.64238	0	137.3504262	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.0004772	0.000573967	0.000685983	0.001959195	0.003639423	0.472593352	9.74723E-05	0.000129007	4.51913E-06	3.89282E-06	15488.10435	0	57.99448087	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.010859972	0.010968572	0.011950738	0.513279758	0.002436012	1.015412407	1.35612E-05	1.79486E-05	1.79288E-05	2.47484E-05	69369.58533	0	3959.604793	0
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.01125677	0.010353977	0.012387389	0.803784818	0.023627716	9.503165633	0.00065514	0.000494994	0.000115541	0.000143279	408989.8	184620.65	1607.36	5907860.8
Orange (SC)	2027 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.003549305	0.004223966	0.005110999	0.050073365	0.044371405	7.695193802	0.000876482	0.000806364	9.94796E-05	6.44557E-05	256215.4	183605.95	543.87	6058996.35
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.013685963	0.013822823	0.015060569	1.018101645	0.006883751	1.863368881	2.37798E-05	3.14732E-05	3.33297E-05	4.60073E-05	130952.1888	0	4214.56077	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.11888E-06	3.75133E-06	4.48344E-06	2.17881E-05	2.63709E-05	0.003560116	7.40823E-07	9.80501E-07	3.41272E-08	2.93975E-08	116.9619017	0	3.671407528	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7993.629101	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	8.05135E-06	8.13186E-06	8.86001E-06	0.000170163	2.7053E-06	0.000359666	4.34242E-09	5.74732E-09	6.28711E-09	8.67853E-09	24.43590607	0	3.079299324	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.84041328	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000215049	0.0002172	0.000236649	0.017860504	0.000104365	0.03268874	4.17164E-07	5.52129E-07	5.82506E-07	8.04074E-07	2294.019362	0	27.96336312	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.20702E-06	1.45178E-06	1.73511E-06	4.95266E-06	9.20205E-06	0.001197122	2.45166E-07	3.24484E-07	1.14471E-08	9.86067E-09	39.23198823	0	0.844688302	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	53.03725949	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.025432978	0.025687307	0.027987441	1.298927385	0.010212511	2.745579178	3.31487E-05	4.38732E-05	4.64346E-05	6.40971E-05	181844.7771	0	11013.48511	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	20888.9419	0
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000104629	9.62375E-05	0.000115137	0.00752728	0.000170093	0.096219029	6.63325E-06	5.01179E-06	1.16985E-06	1.43979E-06	4109.9	1653.45	14.37	47950.05
Orange (SC)	2027 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.1765E-05	1.40013E-05	1.69416E-05	0.000205977	0.000204932	0.036975482	3.37825E-06	3.10799E-06	4.78001E-07	3.08524E-07	1226.4	1879.75	13.03	71430.5
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.00266831	0.002454311	0.002936312	0.143068405	0.006778793	5.394130507	0.000376092	0.000284158	5.21148E-05	7.46008E-05	212948.3	35945.2	162.82	3342903.6
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004326636	0.004369902	0.0047612	0.287058884	0.002394609	0.612990908	7.60134E-06	1.00606E-05	1.02592E-05	1.41614E-05	40250.9648	0	988.8385227	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.000239692	0.000288297	0.000344561	0.001491467	0.00180808	0.243623258	5.09578E-05	6.74442E-05	2.33651E-06	2.01269E-06	8007.755917	0	59.55154994	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000101797	9.36328E-05	0.000112021	0.008012379	0.00033294	0.244885854	1.75557E-05	1.32643E-05	2.43268E-06	3.4128E-06	9741.85	1084.05	4.92	156103.2
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.001949069	0.00196856	0.002144831	0.018642737	0.000118481	0.053205382	5.18414E-07	6.86137E-07	8.75813E-07	1.20895E-06	3330.754104	0	358.425152	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	28151.65967	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.21305E-05	3.24519E-05	3.53577E-05	0.002364174	2.27635E-05	0.005048022	6.31107E-08	8.35288E-08	8.41125E-08	1.16107E-07	331.0271577	0	3.292835567	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.000194721	0.000234207	0.000279915	0.000791739	0.001470793	0.190998534	3.92449E-05	5.19418E-05	1.82649E-06	1.57335E-06	6259.7865	0	17.78586735	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.003333786	0.003367124	0.003668629	0.152580317	0.001095781	0.331858528	3.90819E-06	5.17261E-06	5.6034E-06	7.73476E-06	21754.2693	0	1085.647889	0
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.001793373	0.001649544	0.001973497	0.143930395	0.002733928	1.434721983	9.89084E-05	7.47308E-05	1.74436E-05	2.21046E-05	63097.55	28360.5	128.43	879175.5
Orange (SC)	2027 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.002292939	0.002728787	0.003301832	0.030723943	0.026308658	4.503889622	0.000546864	0.000503115	5.8224E-05	3.77538E-05	150073.4	95841.7	238.14	3546142.9
Orange (SC)	2027 Light Commercial - Misc - Welders	Aggregate	100	Gasoline	0.00281696	0.00259104	0.003099893	0.132354669	0.007600483	4.519065953	0.00031508	0.000238061	4.36605E-06	6.27896E-05	179233.25	54125.85	260.49	3788809.5
Orange (SC)	2027 Light Commercial - Misc - Welders	Aggregate	15	Gasoline	0.021714232	0.021931373	0.023895186	1.308483646	0.009692637	2.194587046	3.99104E-05	5.28224E-05	4.11338E-05	5.67798E-05	161370.165	0	3230.312264	0

Orange (SC)	2027 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001293856	0.001306795	0.00142381	0.00605221	0.000612303	0.06549964	6.83588E-06	5.16489E-06	7.54924E-07	1.04208E-06	2966.093533	0	1.756339609	0	0
Orange (SC)	2027 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.00017457	0.000176317	0.000192105	0.002176786	8.18486E-05	0.016320787	1.31243E-06	9.91614E-07	2.58969E-07	3.57474E-07	759.0297861	0	60.88369586	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002391987	0.002415907	0.002632237	0.020384076	0.002092754	0.227425703	2.27012E-05	1.7152E-05	2.6074E-06	3.59917E-06	9988.479394	0	47.38982605	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.023565822	0.02380148	0.025932749	0.267603524	0.009184366	3.058230622	0.000319173	0.000241153	3.41166E-05	4.70936E-05	132816.3384	0	444.1932178	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	8.41455E-05	0.000084987	0.000092597	0.001394288	2.87916E-05	0.021725177	2.26735E-06	1.71311E-06	2.30064E-07	3.17574E-07	902.9707279	0	1.893286215	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.005110329	0.005161434	0.005623606	0.015701869	0.000230391	0.05252431	0.000247539	0.00018703	9.17503E-07	1.26649E-06	3544.388034	0	34.82462948	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001059906	0.001070505	0.001166362	0.009782029	0.000409542	0.051035777	2.34848E-05	1.77441E-05	6.72306E-07	9.28031E-07	2614.785659	0	20.67944833	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.003587634	0.00362351	0.003947972	0.035136574	0.0014603	0.23094849	0.000360384	0.00027229	2.8434E-06	3.92495E-06	11140.12598	0	74.23553293	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.004401876	0.004445895	0.004843995	0.010117214	9.28442E-05	0.029568197	0.000214556	0.00016211	6.1032E-07	8.42467E-07	2268.65899	0	44.75055894	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.080530635	0.081335941	0.088619052	0.309594414	0.011433011	1.609793052	0.006641871	0.005018302	2.2974E-05	3.17126E-05	88667.34972	0	547.7843741	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.012003446	0.01212348	0.01320906	0.049004993	0.001200311	0.166189065	0.000618835	0.000467565	3.23056E-06	4.45937E-06	10632.80817	0	536.7796401	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.038301569	0.038684585	0.04214854	0.18669844	0.006695877	0.902640895	0.004329449	0.003271141	1.27183E-05	1.7556E-05	49593.51274	0	163.7581274	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.014246789	0.014389257	0.015677723	0.039630522	0.001382395	0.159673747	0.000852045	0.000643767	2.7983E-06	3.8627E-06	10132.30318	0	229.4529514	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.036398242	0.036762225	0.040054046	0.19210419	0.011644147	1.152588226	0.008212498	0.006204996	1.50947E-05	2.08363E-05	58985.12029	0	145.8069365	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.034050053	0.034390552	0.037470005	0.103849612	0.004102518	0.478414008	0.002508503	0.001895312	7.56378E-06	1.04408E-05	28361.6937	0	343.9936175	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.01567818	0.015834962	0.017252881	0.213692212	0.007387217	0.880908479	0.001986373	0.001500816	1.20802E-05	1.66752E-05	47420.88606	0	94.67975513	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	6.488E-07	6.55288E-07	7.13964E-07	5.53019E-06	3.21067E-07	0.00010688	9.76692E-09	7.37945E-09	1.16587E-09	1.60933E-09	4.394928517	0	0.06088532	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000419894	0.000424094	0.000462068	0.006839922	0.000434187	0.052863004	7.76902E-06	5.86992E-06	8.4934E-07	1.17241E-06	2427.207664	0	252.1369698	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.003158913	0.003190503	0.003476192	0.035653844	0.009203491	0.61812332	6.21844E-05	4.69839E-05	6.68508E-06	9.22788E-06	25555.39441	0	223.9448699	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.015828436	0.01598672	0.017418228	0.185299565	0.014173384	1.646440679	0.000164345	0.000124171	1.93388E-05	2.66946E-05	74328.94317	0	473.4818288	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.020236123	0.020438485	0.022268619	0.143328265	0.007673783	3.105516415	0.000324107	0.000244881	3.26332E-05	4.5046E-05	126862.8052	0	630.4629998	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.002018133	0.002038314	0.002220832	0.003763875	0.000619714	0.105738541	1.10354E-05	8.33787E-06	1.12821E-06	1.55734E-06	4427.048904	0	11.76358374	0	0
Orange (SC)	2027 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000202698	0.000245264	0.000291885	0.006806007	0.00268758	1.019971992	0.000203315	0.000187049	9.42407E-06	8.32487E-06	33091.86798	25422.87228	59.8493028	2025105.263	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.00027346	0.000330886	0.000393782	0.01183742	0.00164304	2.13965815	6.83414E-05	6.28741E-05	1.9774E-05	1.74636E-05	69418.85228	32900.18765	77.45203892	4248188.201	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000170303	0.000206066	0.000245236	0.002441433	0.000773285	1.283281751	3.70585E-05	3.40938E-05	1.18595E-05	1.0474E-05	41634.66314	9588.557364	22.57292043	2547894.108	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	8.59415E-06	1.03989E-05	1.23756E-05	0.000184176	0.00016724	0.029441789	4.32103E-06	3.97535E-06	2.71946E-07	2.403E-07	955.2064299	1319.526243	3.106365197	52581.07461	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000256041	0.000309809	0.000368698	0.003302658	0.001315425	1.756195647	6.0999E-05	5.61191E-05	1.62292E-05	1.43338E-05	56977.83365	7653.252208	18.01691814	3486841.869	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	9.65704E-05	0.00011685	0.000139061	0.002074125	0.001577533	0.317580706	2.28682E-05	2.10388E-05	2.93329E-06	2.59205E-06	10303.55625	10116.36786	23.81546651	630541.1952	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	8.53882E-05	0.00010332	0.000122959	0.001094497	0.000294921	0.57501981	1.93141E-05	1.7769E-05	5.31378E-06	4.69323E-06	18655.88447	1759.368324	4.141820263	1141674.137	
Orange (SC)	2027 Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	5.78355E-06	6.9981E-06	8.32832E-06	7.21473E-05	0.000116612	0.037398248	1.35541E-06	1.24697E-06	3.45592E-07	3.05239E-07	1213.344978	87.96841619	0.207091013	74252.42064	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.001115507	0.001349763	0.001606329	0.031032069	0.010446132	4.220425839	0.000897633	0.000825823	3.89865E-05	3.44465E-05	136927.0684	91567.44787	64.6123961	8379452.226	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.002257749	0.002731876	0.003251158	0.057863912	0.011798505	9.150010891	0.000534182	0.000491447	8.45287E-05	7.46812E-05	296862.0264	136764.201	96.50441213	18166905.91	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002574577	0.003115239	0.003707392	0.022357836	0.009302042	10.00758865	0.000468438	0.000430963	9.24479E-05	8.16806E-05	324685.1925	84523.79804	59.64221179	19869585.26	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.47025E-05	5.40901E-05	6.43716E-05	0.000667683	0.000416982	0.069193284	1.21053E-05	1.11369E-05	6.38385E-07	5.64746E-07	2244.899896	2641.368689	1.863819118	123574.5963	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.004670676	0.005651518	0.006725773	0.042093563	0.015140631	20.58244665	0.000790322	0.000727096	0.000190155	0.000167991	667774.8139	107415.66	75.79531081	40865456.46	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001325857	0.001604286	0.001909234	0.019523625	0.014303241	2.647595433	0.000254015	0.000233693	2.44386E-05	2.16093E-05	85898.31801	83936.82722	59.22802976	5256673.21	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.00142796	0.001727832	0.002056262	0.010963975	0.005468468	5.144741172	0.000342971	0.000315533	4.75228E-05	4.19907E-05	166915.4614	15554.72672	10.9758237	10214635.8	
Orange (SC)	2027 Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.008229593	0.009957807	0.011850613	0.0706852	0.130713749	33.63776599	0.002500433	0.002300399	0.000310751	0.000274547	1091340.272	55762.22787	39.3472925	66786164.2	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000218163	0.000263977	0.000314155	0.009659146	0.003183296	1.526879875	0.000239944	0.000220749	1.41102E-05	1.24622E-05	49537.936	35632.51225	107.6873268	3031546.45	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000657555	0.000795641	0.000946879	0.027214042	0.00540978	4.938622244	0.000195931	0.000180257	4.56403E-05	4.03084E-05	160228.1598	74348.60729	224.6937493	9805396.597	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000248299	0.000300442	0.00035755	0.003249378	0.001328667	1.657397194	6.04163E-05	5.5583E-05	1.5316E-05	1.35275E-05	53772.42668	14595.62521	44.1103858	3290682.301	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.38148E-06	7.7216E-06	9.18934E-06	0.00014815	0.000128107	0.025155891	2.1974E-06	2.02161E-06	2.32387E-07	2.05319E-07	816.1551655	1027.86093	3.106365197	44926.74495	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000333313	0.000403308	0.00047997	0.004114395	0.002065459	2.179669716	8.54361E-05	7.86012E-05	2.01421E-05	1.77902E-05	70716.98347	10278.6093	31.06365197	4327629.238	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.00015291	0.000185021	0.000220191	0.004189598	0.003295271	0.678432616	5.24646E-05	4.82674E-05	6.26786E-06	5.53728E-06	22010.99905	19871.97798	60.05639381	1346995.281	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000142202	0.000172065	0.000204771	0.001791311	0.001024143	0.954812269	4.68539E-05	4.31056E-05	8.82345E-06	7.79305E-06	30977.83255	2878.010605	8.697822552	1895733.772	
Orange (SC)	2027 Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.001338854	0.001620013	0.001927949	0.016140887	0.029150218	8.424345881	0.000448434	0.000412559	7.78471E-05	6.87584E-05	273318.6244	7263.550574	21.95164739	16726132.99	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000105892	0.000128129	0.000152484	0.004640091	0.001747031	0.735759106	0.000124344	0.000114397	6.79928E-06	6.00517E-06	23870.8939	16686.94422	50.32311619	1460814.267	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.00016821	0.000203534	0.000242222	0.007086245	0.001400836	1.284608106	5.06035E-05	4.65552E-05	1.18718E-05	1.04848E-05	41677.69525	19296.42521	58.19257469	2550527.521	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000121022	0.000146436	0.000174271	0.001796538	0.000498203	0.947484193	2.45626E-05	2.25976E-05	8.75633E-06	7.73324E-06	30740.08119	8240.46628	24.85092158	1881184.23	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.44444E-06	1.74777E-06	2.07999E-06	3.14612E-05	2.39852E-05	0.005094768	2.77963E-07	2.55726E-07	4.70603E-08	4.15828E-08	165.2941489	206.011657	0.621273039	9098.916953	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000206914	0.000250366	0.000297956	0.003293473	0.000828715	1.792178012	4.29724E-05	3.95346E-05	1.65634E-05	1.46275E-05	58145.24188	9201.854012	27.75019576	3558283.123	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	0.000100974	0.000122179	0.000145403	0.002409472	0.001959563	0.383732626	4.08072E-05	3.75426E-05	3.54477E-06	3.13197E-06	12449.78244	11330.64113	34.17001717	761882.6462	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000106304	0.000128628	0.000153078	0.001667024	0.00066888	0.90881899	3.89881E-05	3.58626E-05	8.39929E-06	7.41766E-06	29485.63124	2746.822093	8.283640526	1804416.331	
Orange (SC)	2027 Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	7.53256E-05	9.1144E-05	0.000108469	0.000982147	0.001705821	0.518466772	2.17929E-05	2.00495E-05	4.79122E-06	4.23166E-06	16821.08344	824.046628	2.485092158	1029390.805	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.5721E-05	1.90224E-05	2.26382E-05	0.000509277	0.00021089	0.075275403	1.41669E-05	1.30335E-05	6.95487E-07	6.14388E-07	2442.227563	1844.353739	3.31345621	149455.6879	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000209693	0.000253728	0.000301957	0.009690343	0.001013001	1.760794827	3.78723E-05	3.48425E-05	1.62731E-05	1.43714E-05	57127.04898	26397.3129	47.42384201	3495973.319	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000142815	0.000172806	0.000205653	0.002150809	0.000399814	1.124971245	2.37818E-05	2.18792E-05	1.03966E-05	9.18186E-06	36498.45311	8184.319719	14.70346193	2233576.222	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	50	Diesel	7.17073E-06	8.67659E-06	1.03259E-05	0.000165332	0.000130121	0.027937206	6.05024E-07	5.56622E-07	2.58078E-07	2.2802E-07	906.3918652	1037.448978	1.863819118	49893.98815	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.00212898	0.002576066	0.003065732	0.030168035	0.008740464	15.83524386	0.000436484	0.000401566	0.000146341	0.000129245	513757.0475	59710.95231	107.2731448	31440113.97	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.59626E-05	3.14147E-05	3.73861E-05	0.000534871	0.00039748	0.080973769	4.01895E-06	3.69743E-06	7.47864E-07	6.60897E-07	2627.104744	2651.2585	4.763093302	160769.5174	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000270582	0.000327404	0.000389637	0.003170361	0.002103992	1.624034063	0.00011414	0.000105009	1.50069E-05	1.32551E-05	52689.99663	5302.517001	9.526186605	3224441.411	
Orange (SC)	2027 Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000163285	0.000197575	0.00023513	0.002256138	0.003670591	1.193294643	6.08834E-05	5.60127E-05	1.10277E-05	9.73951E-06	38715.13051	2305.442174	4.141820263	2369229.038	
Orange (SC)	2027 Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001644889	0.001990315	0.00236864	0.050229253	0.012522691	6.893029149	0.001167597	0.001074189	6.36801E-05	5.626E-05	223636.7394	149309.0565	98.36823124	13685777.37	
Orange (SC)	2027 Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002815389	0.003406621	0.004054161	0.083174494	0.010169968	13.32797331	0.000428721	0.000394423	0.000123139	0.000108781	432411.416	187657.9088	123.6333348	26462049.07	
Orange (SC)	2027 Portable Equipment - Rental Generator	Aggregate	300	Diesel	0.006524116	0.00789418	0.009394727	0.059639932	0.019389089	27.22917441	0.

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	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9671.941257	33.02773885	0	0	845.9846482	1.603438973	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	53490.75	49.17	23765.15	2.250806328	93549.5	112.77	91793.85	1.019126009	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	289153	159.4	77051.5	3.752723828	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	35470.7	10.74	5179.35	6.848484848	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2744.984912	15.25153436	0	0	20.06396924	9.359387032	0	0	55874.2	125.97	47282.1	1.181719932
Aerial Lifts50	Aerial Lifts	50	74668.05	130.25	47055.8	1.586798014	128087.9609	497.6679807	156665.1982	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	125890.919	351.5851661	110183.6263	1.142555598	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	134126.55	130.25	47055.8	2.850373224	97607.42242	251.3000186	79183.35333	1.23267604	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	13659.31998	20.90252491	6569.938021	2.079063749	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	816.2506955	0.704579491	222.7003033	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	579.656291	0.23485983	74.23343444	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	219.9826912	2.319580154	0	0	9.45102877	1.486960703	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	693.5	2.52	273.75	2.533333333	2339.94201	5.587830846	2052.768614	1.139895648	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	3324.213377	3.219076466	1851.554997	1.795363023	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7858.45	11.5	1226.4	6.407738095	11809.31797	14.39473816	5520.96099	2.138996814	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2744.8	2.85	306.6	8.952380952	18026.0564	14.0910517	4614.200632	3.906647725	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	26363.29343	14.21252628	4862.181258	5.422112429	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	36100.54036	10.99344982	3610.586373	9.998525621	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	29695.28704	3.03686459	1796.993486	16.52498313	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	13349.01281	0.364423751	276.4882945	48.28057128	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	120.1255226	1.635190056	0	0	2.70265032	1.046641902	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	3947.568944	17.74425661	0	0	1.847869972	0.386461101	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	4964	6.21	3595.25	1.38071066	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	47.20427202	0.228843064	114.0266366	0.413975834	0	0	0	0
Cranes50	Cranes	50	2325.05	2.85	1186.25	1.96	764.289826	2.440992682	1109.085792	0.689116957	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	375.8294076	1.067934299	368.9097068	1.018757167	0	0	0	0
Cranes100	Cranes	100	7832.9	5.69	2365.2	3.311728395	18374.93859	29.74959832	13959.38015	1.316314793	0	0	0	0
Cranes175	Cranes	175	500.05	0.16	83.95	5.956521739	51753.70929	49.65894488	23456.22183	2.206395799	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	89351.30019	55.68514557	27367.48049	3.264871248	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	157806.9014	56.82936089	29173.59715	5.40923701	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	6394.083275	1.373058384	696.3057414	9.182867374	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	8784.889601	1.220496341	629.2312493	13.96130534	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	2483.201683	6.77014743	2403.339998	1.033229458	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	2053.651719	4.400595829	1227.69445	1.672771037	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	107236.3332	111.910537	55119.3861	1.945528438	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	119395.2721	76.43496448	36046.72121	3.312236678	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	122321.6342	57.07234283	27043.46768	4.523149012	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	441274.2726	105.9528073	51688.98529	8.537104572	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	3994.408339	0.609313269	291.7795539	13.68981577	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	25427.52938	2.031044229	1169.772951	21.73714939	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	40.56415732	0.191458594	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14431.32734	283.0438005	41533.35	0.347463601	1.337110821	0.540452191	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	657	2.07	259.15	2.535211268	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	30.6246807	0.983181706	38.44972511	0.796486337	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	99187.11261	165.5897557	126003.7795	0.787175694	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	1270.455938	1.763758151	907.0749615	1.400607439	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	127296.9694	117.6969382	79490.9778	1.601401479	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	271313.0543	152.7007538	94012.39914	2.885928418	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	345932.398	131.6034928	79970.8336	4.325732051	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	610569.9082	137.6409727	91809.07674	6.650430763	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	11868.09693	1.628084447	976.0748874	12.15900244	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	17090.32474	1.01755278	718.6148833	23.78231392	0	0	0	0
Forklifts25	Forklifts	25	52.27776882	0.117532588	0	0	39.34764564	0.235752123	68.07239975	0.578026422	1485.55	1.21	1514.75	0.980722892
Forklifts50	Forklifts	50	1248847.5	436.75	783611.2	1.593708079	89525.69271	240.3055816	178786.9864	0.500739425	1968558.15	818.5	1474563.5	1.335010768
Forklifts75	Forklifts	75	0	0	0	0	20203.45494	41.09800762	23616.15791	0.85549288	0	0	0	0
Forklifts100	Forklifts	100	5827761.55	1556.9	2759991.3	2.111514464	1246957.077	1884.902359	1304695.402	0.955745743	12319563.95	2872.66	5175258.35	2.380473228
Forklifts175	Forklifts	175	407683.1	56.81	100860.45	4.042051171	373798.9374	345.7536522	240795.0223	1.552353258	924643.55	105.12	189383.9	4.882376749
Forklifts300	Forklifts	300	0	0	0	0	75306.40818	45.35947481	33612.97691	2.240396868	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	19154.80309	6.842117524	4972.26807	3.852327111	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	229.1386313	0.078584041	17.64839994	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1429.539219	0.190667553	156.3273828	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	14665.57737	139.6882378	0	0	15560.3711	58.26683518	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	411406.1	1617.6	185788.65	2.214376928	257795.85	547.36	184770.3	1.395223421	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	185726.6	312.37	35875.85	5.176925425	0	0	0	0	16709.7	23.25	2671.8	6.254098361
Generator Sets175	Generator Sets	175	30444.65	29.51	3394.5	8.968817204	0	0	0	0	24155.7	19.25	2222.85	10.86699507
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	107.5380674	0.272677782	182.9848633	0.587688323	0	0	0	0
Graders50	Graders	50	0	0	0	0	544.0468139	1.840575026	574.2273998	0.947441404	0	0	0	0
Graders75	Graders	75	0	0	0	0	184.0094586	0.409016673	125.7160283	1.463691314	0	0	0	0
Graders100	Graders	100	0	0	0	0	14685.3042	18.20124193	7834.166028	1.874520421	0	0	0	0
Graders175	Graders	175	0	0	0	0	165828.6311	109.1392821	52616.61298	3.15164017	0	0	0	0
Graders300	Graders	300	0	0	0	0	344932.6541	96.05074859	75613.49286	4.561787071	0	0	0	0
Graders600	Graders	600	0	0	0	0	19208.31122	3.135794489	2747.28403	6.991745669	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	11861.62115	0.409016673	310.0779357	38.25367684	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	49.95965999	0.267735779	79.85264544	0.625648151	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	40928.70879	63.25257787	43469.02828	0.941560242	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	24444.83682	23.96235225	15326.85632	1.594902197	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	27938.85249	22.22206969	15632.26883	1.787255119	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	44626.98562	17.53669355	12513.64126	3.566266981	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	43378.68637	12.78438346	8681.509622	4.996675493	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	120868.4662	20.68258895	14840.42327	8.144543048	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	5254.437921	0.535471559	369.1991834	14.23198684	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	6650.173834	0.334669724	188.5763171	35.26515915	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	219.9465929	0.265275452	400.8740865	0.548667525	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	3743.392676	3.514899736	5925.481657	0.631744876	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	638.3007432	0.397913178	465.9658883	1.369844358	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3773.351657	1.525333848	2178.368857	1.732191334	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	93471.04652	20.49252865	30000.6223	3.115636922	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	191480.2985	34.95004077	46182.47573	4.146167903	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	820497.8744	77.99098282	110428.9509	7.430097522	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	280314.8593	16.6460346	21271.93777	13.17768331	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	494053.7669	13.33009145	19615.48538	25.1869254	0	0	0	0
Pavers25	Pavers	25	753.0902534	2.422877488	0	0	2.51529537	0.33496108	0	0	0	0	0	0
Pavers50	Pavers	50	7391.25	8.08	3175.5	2.327586207	2717.587699	7.944099341	2932.256095	0.926790707	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	4762.279467	7.67929603	3071.411611	1.550518156	0	0	0	0
Pavers100	Pavers	100	6602.85	4.44	1737.4	3.800420168	21408.05178	30.71718412	12331.03521	1.736111479	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	35845.49796	26.28172865	10552.69222	3.396810711	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	27808.7048	12.51195646	5840.991839	4.760955942	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	5403.975145	1.52261904	705.6105046	7.658580917	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	1050.746231	0.132401656	65.21194072	16.11278884	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	858.8039506	6.093971724	0	0	12.27797389	0.895847601	15.70737509	0.781669363	0	0	0	0
Paving Equipment50	Paving Equipment	50	8610.35	22.1	3872.65	2.223374175	3373.924519	9.715871889	4778.733261	0.706029053	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	311.1486716	0.859226766	257.6794884	1.207502675	0	0	0	0
Paving Equipment100	Paving Equipment	100	3555.1	5.68	989.15	3.594095941	14729.47909	18.50642265	8984.068794	1.639510942	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	14811.59218	11.50041979	5489.649058	2.698094546	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	9348.606475	4.692700028	2249.060502	4.156671848	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	11979.54664	3.370812696	1679.668155	7.132091299	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	2033.422405	0.330471833	173.9591791	11.68907795	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	992.6716863	0.132188733	64.08609037	15.489659	0	0	0	0
Rollers25	Rollers	25	2582.020986	13.06954758	0	0	38.70333688	6.663826538	16.18300377	2.39160402	0	0	0	0
Rollers50	Rollers	50	9796.6	5.69	3533.2	2.772727273	55776.30042	200.8143473	72321.84386	0.771223429	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	744.4604888	2.247159533	534.0391245	1.39401863	0	0	0	0
Rollers100	Rollers	100	30174.55	10.69	6650.3	4.537321625	86426.93707	147.563476	50984.55339	1.695159246	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	90110.55604	86.61778563	32316.24481	2.788398113	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	15838.75948	11.57627638	3713.918451	4.264703087	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	7813.977496	3.540978658	1124.961507	6.945995436	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	39.34764564	0.235752123	68.07239975	0.578026422	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3160.9	2.3	934.4	3.3828125	2799.618431	8.879996651	2526.522524	1.108091618	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	1054.41324	2.907609523	690.155153	1.527791592	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68160.1	32.3	13359	5.102185792	224189.4307	380.9754315	111666.282	2.007673459	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3839.8	1.1	481.8	7.96969697	45503.41899	58.93803087	17182.72496	2.648207377	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	3700.899842	3.221945688	840.8668858	4.401290982	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1218.076179	0.550088288	146.5097328	8.313960824	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	229.1386313	0.078584041	17.64839994	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2459.243575	2.656253298	2623.349526	0.937444115	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	2936.569165	2.332319969	1960.756887	1.497671223	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	7945.493797	5.182933264	4595.576879	1.728943723	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	10626.61517	4.47027994	3559.616713	2.985325677	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	12490.9657	3.822413282	2728.662263	4.577688442	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	123238.4482	21.50917305	16300.68733	7.560322198	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	4611.244138	0.323933329	338.7251787	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	19.80966965	0.066767207	28.56109708	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	157.6697773	0.400603243	149.2317322	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1531.899286	1.802714594	883.4106	1.734073924	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	6492.556948	4.874006125	2853.015589	2.275682254	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	85617.21344	43.39868467	20357.71531	4.205639589	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	98424.23072	42.06334053	17631.87594	5.582175775	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1241071.45	235.7550086	117359.1346	10.57498808	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	14022.64355	1.802714594	922.0474174	15.20815881	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	28553.50107	1.735947387	716.8835367	39.83004157

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2730.2	0.59	310.25	8.8	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.061102	0	0	45.70549981	6.239912234	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	83125.42189	194.5933356	104642.0439	0.794378806	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	12637.08878	38.71525944	9268.869409	1.363390531	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25513.5	10.02	8723.5	2.924686192	1334639.118	1282.553148	835746.657	1.596942215	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	232875.1272	147.809572	85350.12075	2.728468632	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	147886.271	63.2597847	37072.6578	3.989092764	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	188156.7325	51.93675785	29243.67534	6.434100032	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	6669.34961	1.017038339	564.6109975	11.81229136	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	65222.93246	2.84770735	1848.118104	35.29153917	0	0	0	0
Trenchers25	Trenchers	25	4902.19283	15.05509372	0	0	44.41873569	4.454509153	0	0	0	0	0	0
Trenchers50	Trenchers	50	46446.25	51.8	20837.85	2.228936767	29540.69395	63.80899357	25569.60407	1.155305099	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	1474.041369	3.190449679	826.4518704	1.783577994	0	0	0	0
Trenchers100	Trenchers	100	28637.9	17.18	6916.75	4.140369393	19809.13982	26.17618941	9076.064802	2.182569236	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	4535.143985	4.133082538	1240.970214	3.654514778	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	9756.851138	5.148225618	1666.344785	5.855241501	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	16668.18218	4.205592758	1618.353366	10.29947015	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	3143.410116	0.3625511	175.7674954	17.88391027	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	385.2745207	0.07251022	17.23210739	22.35794566	0	0	0	0
Welders25	Welders	25	0	0	0	0	7743.111891	23.80977358	0	0	0	0	0	0
Welders50	Welders	50	128593.15	256.86	53370.3	2.409451511	429356.8	563.61	361963.2	1.186189093	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	180291.75	262.17	54461.65	3.310434957	0	0	0	0	0	0	0	0
Welders175	Welders	175	22567.95	18.1	3755.85	6.008746356	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2028
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower	B Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.25309E-08	8.77624E-08	1.04444E-07	1.14848E-06	2.54645E-07	3.75739E-05	2.82653E-09	2.60041E-09	3.40265E-10	3.06343E-10	1.217732589	7.224677089	0.003678353	32.49802935
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.001273655	0.001541122	0.001834063	0.013120708	0.010871827	2.166126982	0.000810647	0.000745795	1.97034E-05	1.76606E-05	70201.96097	2520.388402	36.7051497	2509261.32
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	7.5995E-08	9.1954E-08	1.09433E-07	1.27037E-06	5.65898E-07	7.97213E-05	5.9971E-09	5.51733E-09	7.24284E-10	6.49974E-10	2.583686372	8.898106977	0.006106086	68.95168576
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000485733	0.000587737	0.000699455	0.005824237	0.004665234	0.997824736	0.000217351	0.000199963	9.07939E-06	8.13534E-06	32338.47962	2497.497395	13.52217352	1285021.279
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	1.72961E-06	2.09283E-06	2.49064E-06	2.46965E-05	4.3667E-07	7.46897E-05	4.44427E-08	4.08872E-08	6.28818E-10	6.08951E-10	2.420615821	91.33049375	0.033864321	64.59976823
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.0001316	0.000159236	0.000189504	0.000510105	0.000370047	0.047154437	2.20456E-05	2.02819E-05	4.25808E-07	3.84454E-07	1528.227076	802.4295982	4.457480488	54624.13059
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.000188633	0.000228245	0.000271631	0.001432758	0.00124002	0.696699022	5.68326E-05	5.2286E-05	6.34391E-06	5.68024E-06	22579.30305	1527.499496	3.214363189	897224.7728
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	3.68122E-07	4.45428E-07	5.30096E-07	1.25719E-05	9.84852E-07	0.000314048	2.36245E-08	2.17345E-08	2.85112E-09	2.56046E-09	10.17796634	53.53684812	0.038175491	271.6227257
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.002760342	0.003340014	0.003974893	0.011835669	0.008929512	1.145605579	0.000702587	0.00064638	1.0358E-05	9.34021E-06	37127.90558	2989.694493	48.82049798	1327079.987
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	9.7108E-05	0.000117501	0.000139836	0.000762958	0.000625398	0.37139711	2.84993E-05	2.62194E-05	3.38192E-06	3.02803E-06	12036.60068	1063.73206	1.028199117	478293.6096
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.31889E-08	5.22586E-08	6.2192E-08	7.5478E-07	1.49228E-07	2.32849E-05	1.75162E-09	1.61149E-09	2.10918E-10	1.89843E-10	0.754638963	14.44935303	0.003345488	20.13929737
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001509345	0.001826308	0.002173457	0.008352346	0.012616168	1.195859624	0.000779959	0.000717562	1.08535E-05	9.74994E-06	38756.58789	2665.601005	35.2643574	1385294.736
Orange (SC)	2028	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - ATVs	Aggregate	100	Gasoline	1.22053E-05	1.47684E-05	1.75756E-05	0.000645129	5.08589E-05	0.045226846	3.40223E-06	3.13005E-06	4.11822E-07	3.68738E-07	1465.755854	52.61970922	1.863346136	46940.52908
Orange (SC)	2028	Agricultural - ATVs	Aggregate	175	Gasoline	1.40272E-05	1.69729E-05	2.01991E-05	0.000844809	7.3625E-05	0.065680923	4.9409E-06	4.54563E-06	5.98181E-07	5.35502E-07	2128.65154	29.6125739	1.648543306	68169.62737
Orange (SC)	2028	Agricultural - ATVs	Aggregate	175	Diesel	3.66523E-08	4.43492E-08	5.27793E-08	8.88069E-07	3.03809E-07	0.000162236	1.25564E-08	1.15519E-08	1.47748E-09	1.32272E-09	5.257893497	71.11888205	0.00241344	250.7169825
Orange (SC)	2028	Agricultural - ATVs	Aggregate	25	Gasoline	0.001208348	0.001462101	0.001740021	0.015416509	0.000673076	0.062019825	5.43402E-05	4.9993E-05	5.28985E-07	5.05652E-07	2009.999113	270.736113	11.13193359	64369.80673
Orange (SC)	2028	Agricultural - ATVs	Aggregate	25	Diesel	2.30549E-05	2.78964E-05	3.31991E-05	0.000240742	0.000233767	0.036665388	9.029E-06	8.30668E-06	3.33469E-07	2.98936E-07	1188.287732	294.1262484	3.535728258	50968.22447
Orange (SC)	2028	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	99.77787359	2.61709296	15529.6224
Orange (SC)	2028	Agricultural - ATVs	Aggregate	50	Gasoline	2.95035E-05	3.56992E-05	4.2485E-05	0.00180343	7.78627E-05	0.067414807	5.07134E-06	4.66563E-06	6.13519E-07	5.49638E-07	2184.844991	199.1287805	7.468512078	69969.20994
Orange (SC)	2028	Agricultural - ATVs	Aggregate	50	Diesel	5.84383E-05	7.07103E-05	8.41511E-05	0.000687044	0.000577884	0.108134205	1.52062E-05	1.39897E-05	9.83759E-07	8.81627E-07	3504.519009	518.0968433	6.588215811	150316.3819
Orange (SC)	2028	Agricultural - ATVs	Aggregate	75	Gasoline	8.01934E-06	9.7034E-06	1.15478E-05	0.000500928	2.24764E-05	0.020670738	1.55497E-06	1.43058E-06	1.88148E-07	1.6853E-07	669.9174738	99.86145675	1.260635827	21453.96877
Orange (SC)	2028	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	7.14453E-08	8.64488E-08	1.02881E-07	7.69522E-07	6.61061E-07	0.000132722	3.04409E-08	2.80056E-08	1.20746E-09	1.0821E-09	4.301396483	135.3149856	0.00120672	164.0859627
Orange (SC)	2028	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Combine Harvesters	Aggregate	300	Diesel	3.12005E-07	3.77526E-07	4.49287E-07	1.79534E-06	3.15151E-06	0.000734279	1.35927E-07	1.25053E-07	6.68271E-09	5.98664E-09	23.79724176	41.0199229	0.004930204	1022.915003
Orange (SC)	2028	Agricultural - Combine Harvesters	Aggregate	600	Diesel	2.46439E-05	2.98191E-05	3.54872E-05	0.000180613	0.000253052	0.06256224	9.99316E-06	9.1937E-06	5.6944E-07	5.10075E-07	2027.578235	684.4757937	0.261767478	87154.64452
Orange (SC)	2028	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	2.72677E-07	3.29939E-07	3.92655E-07	1.94855E-06	4.0584E-06	0.000621744	1.12729E-07	1.0371E-07	5.65827E-09	5.06913E-09	20.15009392	109.8668511	0.00119099	866.1437769
Orange (SC)	2028	Agricultural - Construction Equipment	Aggregate	100	Diesel	4.95839E-06	5.99965E-06	7.14008E-06	5.74811E-05	4.68189E-05	0.009750418	3.16608E-06	2.91279E-06	8.87145E-08	7.94959E-08	316.0010809	86.80193679	0.26046176	13553.96816
Orange (SC)	2028	Agricultural - Construction Equipment	Aggregate	175	Diesel	4.12413E-05	4.9902E-05	5.93875E-05	0.000560069	0.000439159	0.098789314	1.8898E-05	1.73861E-05	8.99108E-07	8.05437E-07	3201.660667	186.6427403	2.090266514	152667.7359
Orange (SC)	2028	Agricultural - Construction Equipment	Aggregate	300	Diesel	6.95931E-06	8.42077E-06	1.00214E-05	3.7692E-05	6.73245E-05	0.013986137	3.16532E-06	2.91209E-06	1.27258E-07	1.1403E-07	453.2764055	119.4383159	0.118827548	21613.99672
Orange (SC)	2028	Agricultural - Construction Equipment	Aggregate	50	Diesel	1.86798E-06	2.26025E-06	2.68989E-06	9.54982E-06	7.42219E-06	0.001137931	4.21559E-07	3.87834E-07	1.03148E-08	9.27764E-09	36.8791715	41.01992018	0.036976529	1581.82726
Orange (SC)	2028	Agricultural - Construction Equipment	Aggregate	600	Diesel	3.99114E-06	4.82928E-06	5.74724E-06	3.29182E-05	3.75428E-05	0.007270969	1.79109E-06	1.6478E-06	6.61464E-08	5.92808E-08	235.644686	48.20513578	0.037335006	11236.46287
Orange (SC)	2028	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.42118E-07	1.71963E-07	2.0465E-07	1.14714E-06	1.32634E-06	0.000188525	6.12699E-08	5.63683E-08	1.71391E-09	1.53706E-09	6.109894114	135.3149762	0.004861927	262.0667152
Orange (SC)	2028	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	1.01905E-06	1.23305E-06	1.46743E-06	8.98692E-06	8.99631E-06	0.002476316	4.03544E-07	3.71261E-07	2.25381E-08	2.01896E-08	80.25486084	3.174765469	0.006522874	3449.723298
Orange (SC)	2028	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	6.94121E-06	8.39887E-06	9.99535E-06	5.71538E-05	6.86445E-05	0.012624131	3.34121E-06	3.07391E-06	1.14845E-07	1.02926E-07	409.1351719	93.93995809	0.030825785	17586.51288
Orange (SC)	2028	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	4.61626E-06	5.58568E-06	6.64742E-06	3.74388E-05	6.26034E-05	0.008083407	2.11248E-06	1.94348E-06	7.3532E-08	6.59047E-08	261.9749695	48.20513578	0.015148985	11260.89004
Orange (SC)	2028	Agricultural - Forklifts	Aggregate	100	Diesel	1.60626E-05	1.94357E-05	2.31301E-05	0.000147282	0.0001189	0.024285996	8.7656E-06	8.06435E-06	2.20856E-07	1.98006E-07	787.084303	398.4548479	0.513275399	33759.74409
Orange (SC)	2028	Agricultural - Forklifts	Aggregate	175	Diesel	1.72341E-06	2.08532E-06	2.48171E-06	1.85638E-05	1.59451E-05	0.003201622	7.34316E-07	6.75571E-07	2.91272E-08	2.61031E-08	103.7612901	41.483898	0.051622193	4947.745306
Orange (SC)	2028	Agricultural - Forklifts	Aggregate	50	Diesel	2.45132E-05	2.9661E-05	3.52991E-05	0.000131935	0.000104974	0.015974941	5.81828E-06	5.35282E-06	1.44857E-07	1.30245E-07	517.7314895	537.1576202	0.717846266	22206.62072
Orange (SC)	2028	Agricultural - Forklifts	Aggregate	75	Diesel	6.39416E-05	7.73693E-05	9.20759E-05	0.000523254	0.000601355	0.08617056	2.76298E-05	2.54194E-05	7.83422E-07	7.02555E-07	2792.699768	1040.169173	2.154230655	119784.9185
Orange (SC)	2028	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.33916E-07	2.83039E-07	3.36839E-07	2.70735E-06	2.0112E-06	0.000446454	1.02336E-07	9.41496E-08	4.06187E-09	3.63998E-09	14.4691253	3.17476525	0.006522874	657.0901363
Orange (SC)	2028	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	6.00479E-06	7.26579E-06	8.64689E-06	3.45528E-05	6.06534E-05	0.014131802	2.61602E-06	2.40674E-06	1.28614E-07	1.15218E-07	457.9972483	150.8867443	0.122536067	20799.14764
Orange (SC)	2028	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	2.05762E-08	2.48972E-08	2.96297E-08	1.66086E-07	1.92031E-07	2.7295E-05	8.87078E-09	8.16112E-09	2.48144E-10	2.22538E-10	0.884603948	135.3149771	0.00060336	36.13578289
Orange (SC)	2028	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000106465	0.000128822	0.000153309	0.000860001	0.000876558	0.132284022	6.98789E-05	6.42886E-05	1.20241E-06	1.07852E-06	4287.189899	1207.826761	2.188321764	165764.5127
Orange (SC)	2028	Agricultural - Nut Harvester	Aggregate	175	Diesel	2.01382E-05	2.43672E-05	2.8999E-05	0.000208567	0.000189981	0.035088434	9.11801E-06	8.38857E-06	3.19184E-07	2.86079E-07	1137.18027	553.7395831	0.469682162	48881.24173
Orange (SC)	2028	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.37407E-05	4.08263E-05	4.85867E-05	0.000172496	0.000146141	0.020554113	7.10186E-06	6.53371E-06	1.86314E-07	1.67579E-07	666.1378016	135.3149856	1.642020364	25756.26716
Orange (SC)	2028	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.21632E-05	1.47174E-05	1.7515E-05	6.83719E-05	0.00012058	0.026949259	5.37599E-06	4.94591E-06	2.45245E-07	2.19719E-07	873.3979418	158.0719736	0.181266367	37542.66373
Orange (SC)	2028	Agricultural - Nut Harvester	Aggregate	50	Diesel	9.77273E-06	1.1825E-05	1.40727E-05	4.89532E-05	3.71415E-05	0.005364372	2.39218E-06	2.20081E-06	4.85966E-08	4.37361E-08	173.8538066	226.9801526	0.199051769	6722.070251
Orange (SC)	2028	Agricultural - Nut Harvester	Aggregate	75	Diesel	1.99813E-05	2.41774E-05	2.8773E-05	0.000162017	0.000186951	0.026643862	8.62094E-06	7.93127E-06	2.42227E-07	2.17229E-07	863.5003441	293.1345735	0.551522082	33387.30421
Orange (SC)	2028	Agricultural - Other Harvesters	Aggregate	100	Diesel	2.05331E-05	2.4845E-05	2.95676E-05	0.000182165	0.000150067	0.029780721	1.12515E-05	1.03514E-05	2.70799E-07	2.42805E-07	965.1627262	598.2213551	0.482624235	37318.08803
Orange (SC)	2028	Agricultural - Other Harvesters	Aggregate	175	Diesel	1.85377E-05	2.24306E-05	2.66942E-05	0.000195046	0.000174081	0.033100505	8.23991E-06	7.58072E-06	3.01115E-07	2.69871E-07	1072.753519	338.9792021	0.438000495	46111.88373
Orange (SC)	2028	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.26663E-07	1.53262E-07	1.82395E-07	7.28845E-07	1.2794E-06	0.000298092	5.51815E-08	5.0767E-08	2.71295E-09	2.43037E-09	9.660851515	135.3149856	0.00181008	415.2678627
Orange (SC)	2028	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.16763E-07	2.62283E-07	3.12138E-07	1.58863E-06	2.2258E-06	0.000550285	8.78978E-08	8.0866E-08	5.00868E-09	4.48652E-09	17.83417339	135.3149856	0.00181008	766.5948593
Orange (SC)	2028	Agricultural - Other Harvesters	Aggregate	75	Diesel	6.37256E-08	7.71079E-08	9.17648E-08	5.14378E-07	5.94731E-07	8.45342E-05	2.74733E-08	2.52754E-08	7.68516E-10	6.89214E-10	2.739668002	135.3149856	0.00181008	105.9294659
Orange (SC)	2028	Agricultural - Other Harvesters	Aggregate	750	Diesel	9.01269E-08	1.09054E-07	1.29783E-07	6.57918E-07	9.58001E-07	0.000227896	3.87115E-08	3.56146E-08	2.07429E-09	1.85805E-09	7.38586988	135.3149856	0.00060336	317.4786791
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	3.51147E-06	4.24888E-06	5.056511E-06	3.5622E-05	3.33169E-05	0.005923356	1.62692E-06	1.49677E-06	5.38789E-08	4.82936E-08	191.9699071	267.9388178	0.074739543	8717.979066
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.5778E-05	1.90914E-05	2.27203E-05	8.04024E-05	0.000144741	0.026369919	7.36851E-06	6.77903E-06	2.39857E-07	2.14996E-07	854.6221142	46.96997917	0.179637369	38811.17529
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.14847E-06	3.80965E-06	4.5338E-06	1.65575E-05	1.30489E-05	0.001999502	7.25712E-07	6.67655E-07	1.81286E-08	1.63021E-08	64.80182444	65.2282891	0.087396282	2647.133412
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.55317E-05	1.87933E-05	2.23656E-05	0.000116689	0.000156804	0.037199225	6.43273E-06	5.91811E-06	3.3856E-07	3.03288E-07	1205.588843	156.8368167	0.18126637	54749.71865
Orange (SC)	2028	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000431772	0.000522444	0.000621752	0.003136088	0.003846548	0.479469153	0.000221657	0.000203924	4.35683E-06	3.90915E-06	15539.10505	722.8999709	14.0143284	634767.3775
Orange (SC)	2028	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	2.77066E-05	3.3525E-05	3.98975E-05	0.000248002	0.000200003	0.040757336	1.48883E-05	1.36973E-05	3.70623E-07	3.32298E-07	1320.90358	396.0685789	0.608038618	47213.67084
Orange (SC)	2028	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	6.09374E-07	7.37343E-07	8.77499E-07	3.51923E-06	5.52708E-06	0.001385242	2.5921E-07	2.38473E-07	1.26065E-08	1.1294E-08	44.89426364	138.4897509	0.008936314	1783.945474
Orange (SC)	2028	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.42966E-09	1.72989E-09	2.05871E-09	1.2266E-08	1.36882E-08	1.9557E-06	6.37856E-10	5.86828E-10	1.7781E-11	1.5945E-11	0.06338228	0.463977818	4.08899E-05	2.265502267
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	3.79227E-05	4.58864E-05	5.46086E-05	0.000902411	0.000629035	0.141312489	2.17855E-05	2.00427E-05	1.30537E-06	1.15337E-06	4584.728073	1807.910031	5.306408149	165555.4117
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	6.75645E-05	8.1753E-05	9.72928E-05	0.001517383	0.000832376	0.258589612	3.82014E-05	3.51453E-05	2.38876E-06	2.11057E-06	8389.655166	2182.169508	6.49133424	302940.8293
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.79259E-05	4.58903E-05	5.46133E-05	0.000305952	0.000523841	0.157673095	1.59456E-05	1.467E-05	1.45663E-06	1.28691E-06	5115.529923	824.9686547	2.421370709	184722.7686
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.02822E-05	2.45415E-05	2.92064E-05	0.000104709	8.96548E-05	0.010297024	8.19674E-06	7.541E-06	9.45926E-08	8.40429E-08	334.0755895	251.5084334	0.772777886	10849.85106
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.38736E-06	1.67871E-06	1.9978E-06	1.03353E-05	1.46583E-05	0.001491916	1.08187E-06	9.95321E-07	1.37519E-08	1.21768E-08	48.4035849	29.21533159	0.103037051	1746.796922
Orange (SC)	2028	Airport Ground Support - A/C Tug Narrow Body	Aggregate	750	Diesel	1.06709E-06	1.29118E-06	1.53661E-06	1.90336E-05	5.23244E-06	0.010487568	1.82576E-07	1.6797E-07	9.69308E-08	8.55981E-08	340.

Orange (SC)	2028	Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000130589	0.000120116	0.000143705	0.010342956	0.000277646	0.104150256	7.18003E-06	5.42491E-06	1.26628E-06	1.60602E-06	4584.4	1752	9.61	87600
Orange (SC)	2028	Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.10123E-05	0.001592193	0.000443009	0.094175113	0	0	0	0	5026.05	1846.9	1.8	92345
Orange (SC)	2028	Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.42918E-05	4.07396E-05	4.87404E-05	0.004568072	0.000431411	0.139699989	1.0015E-05	7.56689E-06	1.23638E-06	1.94743E-06	5558.95	824.9	4.43	103194.99
Orange (SC)	2028	Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	8.03758E-09	9.37281E-06	9.44887E-07	0.000381761	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2028	Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000799665	0.000735532	0.000879983	0.051773109	0.004759179	1.255159301	9.25937E-05	6.99597E-05	1.28307E-05	1.77519E-05	50672.95	15764.35	18.74	2837583
Orange (SC)	2028	Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.0586E-05	0.006208111	0.000525269	0.175246212	0	0	0	0	9603.15	2387.1	1.83	429678
Orange (SC)	2028	Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	5.95448E-06	5.47693E-06	6.55254E-06	0.000388426	3.24671E-05	0.009836167	6.85801E-07	5.18161E-07	8.12084E-08	1.39376E-07	397.85	156.95	0.44	8365.435
Orange (SC)	2028	Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.69234E-08	2.50173E-05	6.89151E-06	0.002084982	0	0	0	0	94.9	51.1	0.15	2299.5
Orange (SC)	2028	Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.30258E-05	1.19812E-05	1.43341E-05	0.001187562	0.0001116	0.034892055	2.50139E-06	1.88994E-06	3.46616E-07	4.88456E-07	1394.3	518.3	1.65	77745
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	100	Diesel	2.68186E-05	3.24505E-05	3.86188E-05	0.000735766	0.000390006	0.113302574	1.00935E-05	9.28601E-06	1.04673E-06	9.24766E-07	3675.977248	2535.749572	5.115458414	211891.1233
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	175	Diesel	8.98115E-05	0.000108672	0.000129329	0.00222022	0.00081253	0.37364178	3.44027E-05	3.16505E-05	3.45181E-06	3.04961E-06	12122.39607	4507.798189	9.165196325	698765.5358
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	300	Diesel	9.08366E-05	0.000109912	0.000130805	0.000801697	0.000861791	0.36933835	3.53081E-05	3.24835E-05	3.41199E-06	3.01449E-06	11982.77601	3064.950531	6.287750967	690721.0057
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	50	Diesel	0.000102192	0.000123652	0.000147156	0.001341979	0.001112389	0.19166687	2.91779E-05	2.68436E-05	1.76899E-06	1.56436E-06	6218.420521	9384.480932	19.18296905	322426.8126
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	600	Diesel	6.0261E-05	7.29158E-05	8.67758E-05	0.000557152	0.000551806	0.230382354	2.29529E-05	2.11167E-05	2.12819E-06	1.88035E-06	7474.501744	1199.779518	2.451157157	430850.2821
Orange (SC)	2028	Airport Ground Support - Other	Aggregate	75	Diesel	3.27504E-05	3.9628E-05	4.71606E-05	0.000654401	0.000449029	0.09894918	1.68803E-05	1.55299E-05	9.13852E-07	8.0761E-07	3210.297181	2821.88239	5.861462766	185053.0229
Orange (SC)	2028	Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	6.0414E-07	7.31009E-07	8.69661E-07	5.67718E-06	9.33411E-06	0.000907849	5.69426E-07	5.23872E-07	8.37539E-09	7.40975E-09	29.45417585	13.09272352	0.057834946	1440.199587
Orange (SC)	2028	Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.96943E-07	2.38301E-07	2.83597E-07	1.33537E-06	4.46558E-06	0.000757147	9.60343E-08	8.83516E-08	6.99429E-09	6.17973E-09	24.5648008	4.451525996	0.115669892	1213.040834
Orange (SC)	2028	Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.17243E-06	1.41864E-06	1.6883E-06	1.06438E-05	1.25021E-05	0.001929418	6.30112E-07	5.79703E-07	1.78033E-08	1.57477E-08	62.59784615	64.023418	1.098863972	2767.932679
Orange (SC)	2028	Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	5.91732E-08	7.15996E-08	8.52094E-08	1.49064E-06	4.14558E-07	0.000854395	1.38212E-08	1.27155E-08	7.89753E-09	6.97346E-09	27.71991283	4.451525996	0.115669892	1368.844244
Orange (SC)	2028	Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.43145E-07	2.94206E-07	3.50129E-07	1.28183E-05	6.63592E-06	0.002200589	4.42936E-08	4.07501E-08	2.03382E-08	1.79609E-08	71.39567794	62.32136395	1.619378485	3525.608589
Orange (SC)	2028	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000358	0.0000433	0.0000515	0.000168577	0.000914517	0.127294585	0.0000414	0.0000396	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2028	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	5.39E-05	0.0000653	7.77E-05	0.000404831	0.001140857	0.161520299	0.000053	0.0000507	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2028	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000275	0.0000333	0.0000396	0.000140577	0.000659765	0.087797776	0.000024	0.000023	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2028	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000277785	0.000336309	0.000400007	0.00115007	0.001734167	0.16419616	0.000133137	0.000127505	0	0	5326.579561	11062.28162	6.703055035	92409.87749
Orange (SC)	2028	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.00178718	0.002162446	0.002573393	0.007076026	0.011112385	1.200934103	0.000754215	0.000721085	0	0	38958.72277	42036.67837	25.4716148	669971.6963
Orange (SC)	2028	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000948638	0.001147909	0.001365929	0.003851775	0.011936025	1.403523972	0.000707597	0.000676359	0	0	45530.80812	28761.93623	17.42794603	805229.3169
Orange (SC)	2028	Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000151486	0.000183298	0.00021814	0.000897075	0.003015917	0.43995744	0.000133062	0.000127207	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2028	Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000321005	0.000388383	0.000462235	0.002226114	0.00811244	1.104411255	0.000318211	0.000304153	0	0	35827.48786	14573.56994	20.409706	692498.7379
Orange (SC)	2028	Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.22452E-05	3.89431E-05	4.63427E-05	0.000118227	0.000209646	0.02275009	1.49221E-05	1.42485E-05	0	0	738.019963	3135.150348	5.102425998	11761.97371
Orange (SC)	2028	Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000819856	0.000992088	0.00118066	0.003682669	0.012685691	1.198650012	0.000522095	0.000499136	0	0	38884.62342	8115.264124	15.30727897	751594.1623
Orange (SC)	2028	Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000326	0.000394407	0.000469529	0.00141095	0.003001581	0.380235107	0.000170306	0.000162809	0	0	12334.96166	15538.90146	25.51213209	205775.4357
Orange (SC)	2028	Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000315025	0.000381159	0.000453592	0.001857972	0.008510891	0.994453512	0.000266566	0.000254784	0	0	32260.41943	4151.633637	5.102426052	624624.6281
Orange (SC)	2028	Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000664876	0.000804386	0.000957334	0.002614523	0.006290868	0.688238319	0.000456223	0.000436189	0	0	22326.69299	18054.5339	28.06334515	403681.7741
Orange (SC)	2028	Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	6.64985E-05	8.05285E-05	9.57811E-05	0.000503923	0.001537912	0.248351402	6.57055E-05	6.28744E-05	0	0	8056.606584	3548.810367	2.00000006	155594.0468
Orange (SC)	2028	Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000486	0.00000588	0.00000699	0.0000454	0.000096	0.012758453	0.00000502	0.0000048	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2028	Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.0000341	0.0000413	0.0000491	0.000122207	0.000170785	0.017992692	0.0000218	0.0000209	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2028	Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.36217E-05	4.06731E-05	4.84392E-05	0.000332915	0.00064762	0.083078712	3.66867E-05	3.50564E-05	0	0	2695.104354	4401.614528	6.13604488	46771.55469
Orange (SC)	2028	Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000217581	0.000263273	0.000313317	0.001639707	0.004951821	0.796780953	0.000205713	0.000196662	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000791931	0.000958217	0.001140487	0.003106118	0.010564971	0.921392763	0.000378324	0.000361601	0	0	29890.30353	9472.179874	9.500724151	578418.6943
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.002860706	0.003461513	0.004119314	0.012135662	0.05119011	4.705357813	0.00148693	0.001421778	0	0	152643.4572	28416.54284	28.5021761	2953901.627
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000107876	0.00013053	0.000155341	0.000481533	0.002987169	0.413541555	0.0000448	0.0000429	0	0	13415.43262	1578.696655	1.583454013	260011.3422
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000093054	0.000112589	0.00013397	0.000392617	0.001232844	0.090307223	4.71257E-05	4.49778E-05	0	0	2929.597926	1599.417365	1.340611013	55275.86195
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000778783	0.000942383	0.001121517	0.003521225	0.020361613	2.027567316	0.000431123	0.000412168	0	0	65774.99183	15994.17666	13.406113	1271345.017
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.00475245	0.00575045	0.006843498	0.020285936	0.094001869	8.65938491	0.002526044	0.002414928	0	0	280913.474	46383.11257	38.87772797	5436395.798
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.008263325	0.009998473	0.011899354	0.032484166	0.099511826	6.056679508	0.004356202	0.004164552	0	0	196480.803	20792.43264	17.42794918	3800216.573
Orange (SC)	2028	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.00842996	0.010200249	0.012139142	0.034005387	0.104235696	8.264940067	0.004349964	0.004158564	0	0	268117.5409	15994.17887	13.40611494	5288980.046
Orange (SC)	2028	Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2028	Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001615851	0.001955268	0.002326932	0.006871113	0.040947535	4.864925641	0.000759755	0.000726524	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2028	Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001065	0.000129	0.000153458	0.000429879	0.001099871	0.134737155	7.609E-05	7.275E-05	0	0	4370.920506	3610.067691	12.75606513	77399.85643
Orange (SC)	2028	Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000625843	0.000757317	0.000901208	0.002768822	0.0159774	1.679805585	0.000339461	0.000324778	0	0	54493.48135	15571.51682	22.96091817	1054245.275
Orange (SC)	2028	Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005041202	0.006099707	0.007259216	0.020365415	0.102559698	9.816274987	0.002711608	0.002592387	0	0	318443.3969	51782.30986	81.63881298	6160637.857
Orange (SC)	2028	Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002823303	0.003416247	0.004065573	0.010741404	0.036355223	2.915840275	0.001405638	0.00134374	0	0	94590.87804	10624.30243	20.4097059	1831067.726
Orange (SC)	2028	Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001750317	0.002117884	0.002520456	0.005375006	0.027209344	2.936270505	0.000712229	0.000680891	0	0	95253.64356	6490.26294	10.2048521	1895210.051
Orange (SC)	2028	Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002413314	0.002920114	0.003475169	0.009920464	0.060986707	5.599376638	0.001438345	0.00137505	0	0	181645.7375	4744.229719	2.000000058	3515664
Orange (SC)	2028	Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000209011	0.000252904	0.000300976	0.000844653	0.005265016	0.542830249	0.00011656	0.000111431	0	0	17609.60373	8022.818441	3.00000009	340087.2812
Orange (SC)	2028	Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	0.0000332	0.0000402	0.0000479	0.0001807	0.001017015	0.090107121	0.0000217	0.0000208	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2028	Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000966	0.000116931	0.000139158	0.0005224	0.002527061	0.228271365	0.0000474	0.0000453	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2028	Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000226853	0.000274515	0.000326762	0.000965335	0.003496469	0.322099007	0.000111973	0.000107008	0	0	10449.00432	3920.689598	6.136045981	195838.4542
Orange (SC)	2028	Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.00092277	0.001116554	0.001328788	0.004464347	0.024850378	2.485871864	0.000512442	0.000489845	0	0	80642.55441	11762.06796	18.40813698	1560179.499
Orange (SC)	2028	Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000307284	0.000371814	0.000442489	0.001205179	0.007426663	0.733968862	0.0001671	0.000159748	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	7.59732E-05	9.19276E-05	0.000109401	0.002285782	0.001110069	0.36399195	2.45843E-05	2.26175E-05	3.36301E-06	2.97085E-06	11809.31797	5520.96099	14.39473816	458050.138
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	0.000102576	0.000124117	0.000147709	0.00311199	0.000895664	0.555606975	4.19222E-05	3.85684E-05	5.13378E-06	4.53479E-06	18026.0564	4614.200632	14.0910517	691403.899
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.000143802	0.000174	0.000207075	0.00162823	0.001561576	0.812580932	5.13177E-05	4.72123E-05	7.5084E-06	6.63218E-06	26363.29343	4862.181258	14.21252628	1020776.068
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	5.42055E-05	6.55886E-05	7.80559E-05	0.000514971	0.000454539	0.072122713	1.88704E-05	1.73608E-05	6.65184E-07	5.88656E-07	2339.94201	2052.768614	5.587830846	79861.56636
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.000176242	0.000213253	0.000253789	0.002100732	0.001583204	1.112706605	5.71195E-05	5.25499E-05	1.02822E-05	9.08176E-06	36100.54036	3610.586373	10.99344982	1407071.738
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	2.65116E-05	3.20791E-05	3.81767E-05	0.000631678	0.00041852	0.102460355	1.43919E-05	1.32405E-05	9.46501E-07	8.36268E-07	3324.213377	1851.554997	3.219076466	128577.3598
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000112659	0.000136317	0.000162228	0.001680185	0.000736922	0.915281092	2.78788E-05	2.56485E-05	8.45885E-06	7.4704E-06	29695.28704	1796.993486	3.03686459	1135892.934
Orange (SC)	2028	Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.000114475	0.000138515	0.000164844	0.00078056	0.003026229	0.411449097	7.06937E-05	6.50382E-05	3.80062E-06	3.35819E-06	13349.01281	276.4882945	0.364423751	514527.5393
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	100	Diesel	0.000290342	0.000351314	0.000418092	0.003974834	0.003296911	0.566360374	0.000167384	0.000153993	5.22757E-06	4.62256E-06	18374.93859	13959.38015	29.74959832	1234197.522
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	175	Diesel	0.000729203	0.000882335	0.001050052	0.010003012	0.007704682	1.595175406	0.000407689	0.000375074	1.47263E-05	1.30196E-05	51753.70929	23456.22183	49.65894488	3467789.752
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	25	Diesel	2.78322E-06	3.36769E-06	4.00783E-06	1.54809E-05	1.23923E-05	0.001454951	1.01064E-06	9.29787E-07	1.33682E-08	1.18751E-08	47.20427202	114.0266366	0.228843064	2850.665916
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	300	Diesel	0.000975195	0.001179986	0.001404281	0.007393664	0.010980549	2.754024756	0.000460101	0.000423293	2.54331E-05	2.2478E-05	89351.30019	27367.48049	55.68514557	6000062.912
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	50	Diesel	3.60474E-05	4.36173E-05	5.19082E-05	0.00023081	0.000188628	0.023557274	1.33741E-05	1.23041E-05	2.16717E-07	1.92271E-07	764.289826	1109.085792	2.440992682	46077.03992
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	600	Diesel	0.001427643	0.001727448	0.002055806	0.01500283	0.014757896	4.863993163	0.000610099	0.000561291	4.49272E-05	3.96993E-05	157806.9014	29173.59715	56.82936089	10592704.35
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	75	Diesel	2.53397E-05	3.0661E-05	3.64891E-05	0.000104409	0.000213511	0.011583978	2.20422E-05	2.02788E-05	1.06339E-07	9.45469E-08	375.8294076	368.9097068	1.067934299	25342.3928
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	750	Diesel	8.65241E-05	0.000104694	0.000124595	0.000686118	0.000955968	0.197081224	4.75388E-05	4.37357E-05	1.81952E-06	1.60855E-06	6394.083275	696.3057414	1.373058384	429454.9892
Orange (SC)	2028	Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000171257	0.000207222	0.000246611	0.001725865	0.00273322	0.2707717	0.00010398	9.56617E-05	2.49828E-06	2.21E-06	8784.889601	629.2312493	1.220496341	590419.8634
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.001759501	0.002128996	0.002533681	0.02294387	0.019130986	3.305285045	0.001160594	0.001067746	3.05062E-05	2.69773E-05	107236.3332	55119.3861	111.910537	4828775.631
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.001416618	0.001714107	0.00203993	0.022402109	0.014062308	3.680053166	0.000776929	0.000714774	3.39814E-05	3.00361E-05	119395.2721	36046.72121	76.43496448	5393526.948
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.001295327	0.001567346	0.001865271	0.010039559	0.014655844	3.770250773	0.000609656	0.000560884	3.4819E-05	3.07723E-05	122321.6342	27043.46768	57.07234283	5520682.711
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000158917	0.00019229	0.000228841	0.000818907	0.00060002	0.076538326	4.79728E-05	4.4135E-05	7.02867E-07	6.24696E-07	2483.201683	2403.339998	6.77014743	101102.2201
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.003618974	0.004378959	0.005211323	0.03752269	0.034354454	13.60114815	0.001411829	0.001298883	0.000125641	0.000111011	441274.2726	51688.98529	105.9528073	19883385.38
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	9.40586E-05	0.000113811	0.000135444	0.000565061	0.000944985	0.063298549	7.1989E-05	6.62298E-05	5.82405E-07	5.16634E-07	2053.651719	1227.69445	4.400595829	90518.19888
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	5.73858E-05	6.94368E-05	8.26355E-05	0.000428315	0.000865043	0.123117396	3.21409E-05	2.95696E-05	1.13656E-06	1.00487E-06	3994.408339	291.7795539	0.609313269	180745.4873
Orange (SC)	2028	Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000234939	0.000284276	0.000338312	0.001999528	0.005481334	0.783738404	0.000112055	0.00010309	7.239E-06	6.39677E-06	25427.52938	1169.772951	2.031044229	1131797.645
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	100	Diesel	0.001027285	0.001243015	0.001479291	0.025764386	0.013158387	3.923602728	0.000355867	0.000327397	3.62448E-05	3.20239E-05	127296.9694	79490.9778	117.6969382	6477932.062
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	175	Diesel	0.001795611	0.002172689	0.00258568	0.048882778	0.013251131	8.362529326	0.000636708	0.000585771	7.72619E-05	6.82538E-05	271313.0543	94012.39914	152.7007538	13728788.97
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	25	Diesel	3.63585E-06	4.39937E-06	5.23562E-06	1.23543E-05	8.39155E-06	0.000650063	1.16953E-06	1.07597E-06	5.90108E-09	5.30572E-09	21.09056389	38.44972511	0.135673704	961.2431276
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	300	Diesel	0.002071072	0.002505997	0.002982343	0.022190442	0.015325525	10.66247929	0.00054029	0.000497067	9.85178E-05	8.70257E-05	345932.398	79970.8336	131.6034928	17504816.23
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	50	Diesel	0.001573773	0.001904265	0.002266233	0.02196915	0.017371806	3.057188457	0.000422772	0.00038895	2.8218E-05	2.49524E-05	99187.11261	126003.7795	165.5897557	4511518.856
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	600	Diesel	0.003233143	0.003912103	0.004655726	0.037150742	0.020667319	18.81925209	0.00073995	0.000680754	0.000173896	0.0001536	610569.9082	91809.07674	137.6409727	30959782.93
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	75	Diesel	4.60321E-05	5.56988E-05	6.62862E-05	0.00031091	0.000403137	0.039158547	4.21623E-05	3.87893E-05	3.60659E-07	3.19607E-07	1270.455938	907.0749615	1.763758151	64087.84328
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	750	Diesel	0.000106114	0.000128398	0.000152805	0.000935905	0.001163181	0.365803661	4.1378E-05	3.80678E-05	3.37885E-06	2.98564E-06	11868.09693	976.0748874	1.628084447	599802.0285
Orange (SC)	2028	Construction and Mining - Excavators	Aggregate	9999	Diesel	7.43751E-05	8.99939E-05	0.0001071	0.000997582	0.002356608	0.526765445	2.1923E-05	2.01692E-05	4.86798E-06	4.29939E-06	17090.32474	718.6148833	1.01755278	854135.4937
Orange (SC)	2028	Construction and Mining - Graders	Aggregate	100	Diesel	0.000304882	0.000368907	0.00043903	0.003403564	0.002918889	0.452636853	0.00018203	0.000167468	4.17571E-06	3.69436E-06	14685.3042	7834.166028	18.20124193	697831.1754
Orange (SC)	2028	Construction and Mining - Graders	Aggregate	175	Diesel	0.002236048	0.002705618	0.003219909	0.032879168	0.020068391	5.111242414	0.001111098	0.00102221	4.71889E-05	4.17173E-05	165828.6311	52616.61298	109.1392821	7793722.54
Orange (SC)	2028	Construction and Mining - Graders	Aggregate

Orange (SC)	2028 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000124284	0.000149486	0.00017866	0.000510217	0.000944634	2.18041E-06	3.17669E-05	2.40017E-05	1.29605E-08	1.11643E-08	44.41873569	0	4.454509153	0
Orange (SC)	2028 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.020215124	0
Orange (SC)	2028 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.001846752	0.001698642	0.002032238	0.155416321	0.002528099	0.976133617	6.72938E-05	5.08442E-05	1.1868E-05	1.62712E-05	46446.25	20837.85	51.8	625135.5
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000295427	0.000357467	0.000425415	0.005876827	0.003686357	0.8611435	0.000161829	0.000148882	7.95284E-06	7.02854E-06	27938.85249	15632.26883	22.22206969	1233117.919
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000315604	0.000381881	0.00045447	0.008174541	0.002318298	1.37551242	9.97172E-05	9.17398E-05	1.27078E-05	1.12267E-05	44626.98562	12513.64126	17.53669355	1980748.154
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	8.6879E-06	1.05124E-05	1.25106E-05	2.9265E-05	1.99869E-05	0.001539878	2.7704E-06	2.54877E-06	1.39763E-08	1.25683E-08	49.95965999	79.85264544	0.267735779	1996.316136
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000287253	0.000347576	0.000413645	0.00286205	0.00184677	1.337036796	6.94986E-05	6.39387E-05	1.2353E-05	1.09127E-05	43378.68637	8681.509622	12.78438346	1926967.065
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.000785552	0.000950518	0.001131195	0.009897573	0.007536604	1.261522518	0.000207639	0.000191028	1.16398E-05	1.02964E-05	40928.70879	43469.02828	63.25257787	1636059.035
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000718424	0.000869293	0.00103453	0.00748637	0.004028222	3.725460596	0.000140978	0.0001297	3.44222E-05	3.04067E-05	120868.4662	14840.42327	20.68258895	5366898.545
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000292462	0.000353879	0.000421146	0.005183207	0.00320767	0.753449425	0.000127104	0.000116936	6.95724E-06	6.14955E-06	24444.83682	15326.85632	23.96235225	1087470.625
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	6.6358E-05	8.02932E-05	9.55555E-05	0.000341606	0.000529774	0.161954578	2.74157E-05	2.52225E-05	1.49536E-06	1.32185E-06	5254.437921	369.1991834	0.535471559	234871.7631
Orange (SC)	2028 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	7.22959E-05	8.7478E-05	0.000104106	0.000423711	0.001129782	0.204974559	2.53926E-05	2.33612E-05	1.89292E-06	1.67297E-06	6650.173834	188.5763171	0.334669724	295385.1954
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	4.73303E-05	5.72696E-05	6.81556E-05	0.000837055	0.00048172	0.116303891	2.20961E-05	2.03284E-05	1.07387E-06	9.49257E-07	3773.351657	2178.368857	1.525333848	192131.5999
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.000832162	0.001006916	0.001198313	0.018322543	0.005025533	2.881005375	0.000249705	0.000229729	2.66114E-05	2.35144E-05	93471.04652	30000.6223	20.49252865	4740796.301
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	4.8825E-06	5.90782E-06	7.0308E-06	6.00896E-05	4.99375E-05	0.00677929	3.03861E-06	2.79552E-06	6.25314E-08	5.53317E-08	219.9465929	400.8740865	0.265275452	10021.85216
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.001688018	0.002042502	0.002430746	0.013797916	0.011035367	5.901889299	0.00042831	0.000394045	5.45153E-05	4.81704E-05	191480.2985	46182.47573	34.95004077	9725410.643
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	8.37154E-05	0.000101296	0.00012055	0.001068789	0.000700971	0.115380482	1.47435E-05	1.3564E-05	1.06424E-06	9.4172E-07	3743.392676	5925.481657	3.514899736	171869.7803
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.006890505	0.008337511	0.009922327	0.05591904	0.042495441	25.28974344	0.001507624	0.001387014	0.00023361	0.000206411	820497.8744	110428.9509	77.99098282	41427031.51
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	7.05993E-06	8.54251E-06	1.01663E-05	0.000144584	6.39923E-05	0.019673984	1.1818E-06	1.08725E-06	1.81684E-07	1.60576E-07	638.3007432	465.9658883	0.397913178	32135.80676
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.0031542	0.003816583	0.004542049	0.024638641	0.025471512	8.639986885	0.00095906	0.000882335	7.97863E-05	7.05184E-05	280314.8593	21271.93777	16.6460346	14166156.99
Orange (SC)	2028 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.003906809	0.004727239	0.005625805	0.032259644	0.080402467	15.22794075	0.001161381	0.00106847	0.000140673	0.000124288	494053.7669	19615.48538	13.33009145	25354346.73
Orange (SC)	2028 Construction and Mining - Other	Aggregate	100	Diesel	0.000798792	0.000966538	0.00115026	0.013771079	0.009610071	2.081280254	0.000488367	0.000449298	1.92185E-05	1.69871E-05	67524.84572	38433.64796	81.57740313	3148519.048
Orange (SC)	2028 Construction and Mining - Other	Aggregate	175	Diesel	0.000386238	0.000467348	0.000556182	0.007004221	0.003897002	1.168567904	0.000202405	0.000186212	1.07924E-05	9.53769E-06	37912.8987	11625.57031	27.06046544	1767007.989
Orange (SC)	2028 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Construction and Mining - Other	Aggregate	300	Diesel	0.000454171	0.000549547	0.000654006	0.003850963	0.00483958	1.519956476	0.000205923	0.000189449	1.40391E-05	1.24057E-05	49313.31392	10464.94256	24.68442457	2288546.119
Orange (SC)	2028 Construction and Mining - Other	Aggregate	50	Diesel	0.000556426	0.000673275	0.000801253	0.005167015	0.004348354	0.683121283	0.0019714	0.000181369	6.2991E-06	5.57554E-06	22163.11772	24263.30778	49.03884347	927184.3059
Orange (SC)	2028 Construction and Mining - Other	Aggregate	600	Diesel	0.001376145	0.001665135	0.001981648	0.014575739	0.01295952	6.179384752	0.000501625	0.000461495	5.70902E-05	5.04353E-05	200483.3329	24127.78749	51.61288774	9292328.399
Orange (SC)	2028 Construction and Mining - Other	Aggregate	75	Diesel	0.000145398	0.000175931	0.000209373	0.000587086	0.001381045	0.058429398	0.000111634	0.000102703	5.35847E-07	4.76893E-07	1895.677476	1235.759946	4.818082871	88625.8221
Orange (SC)	2028 Construction and Mining - Other	Aggregate	750	Diesel	0.000231554	0.00028018	0.000333438	0.0019193	0.002614617	0.901527073	9.09648E-05	8.36876E-05	8.32812E-06	7.35814E-06	29249.05304	2208.557203	4.488077195	1363931.961
Orange (SC)	2028 Construction and Mining - Other	Aggregate	9999	Diesel	6.72638E-05	8.13892E-05	9.68598E-05	0.000708729	0.001897192	0.376086307	2.73652E-05	2.5176E-05	3.47509E-06	3.06957E-06	12201.70603	621.3699343	1.254021569	568348.4057
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	100	Diesel	0.000223855	0.000270864	0.000322351	0.004310187	0.002933852	0.659848312	0.000132274	0.000121692	6.09391E-06	5.38559E-06	21408.05178	12331.03521	30.71718412	1000152.243
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000268791	0.000325237	0.000387059	0.0063062	0.002560107	1.104845576	0.000123296	0.000113432	1.02068E-05	9.0176E-06	35845.49796	10552.69222	26.28172865	1666448.098
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000140969	0.000170572	0.000202995	0.001639011	0.001369757	0.857132032	4.65813E-05	4.28548E-05	7.92038E-06	6.9958E-06	27808.7048	5840.991839	12.51195646	1291942.184
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	50	Diesel	9.53388E-05	0.00011536	0.000137288	0.000688783	0.000559437	0.083762674	3.14506E-05	2.89346E-05	7.71567E-07	6.8366E-07	2717.587699	2932.256095	7.944099341	113419.7696
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	600	Diesel	2.6445E-05	3.19985E-05	3.80809E-05	0.000311503	0.000243849	0.16656368	8.07106E-06	7.42538E-06	1.53917E-06	1.35947E-06	5403.975145	705.6105046	1.52261904	251973.4887
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	75	Diesel	9.37092E-05	0.000113388	0.000134941	0.000991855	0.000998523	0.146785055	7.19735E-05	6.62156E-05	1.35429E-06	1.19804E-06	4762.279467	3071.411611	7.67929603	22037.481
Orange (SC)	2028 Construction and Mining - Pavers	Aggregate	750	Diesel	3.78928E-06	4.58503E-06	5.45657E-06	5.98448E-05	1.63667E-05	0.032386559	5.82549E-07	5.35945E-07	2.99316E-07	2.64335E-07	1050.746231	65.21194072	0.132401656	48908.95554
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000116113	0.000140497	0.000167203	0.002904271	0.001619484	0.453998431	4.96936E-05	4.57181E-05	4.19396E-06	3.70547E-06	14729.47909	8984.068794	18.50642265	801922.9945
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.00012417	0.000150246	0.000178805	0.002655811	0.001151382	0.456529356	6.17729E-05	5.6831E-05	4.21712E-06	3.72613E-06	14811.59218	5489.649058	11.50041979	806955.2111
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	1.07015E-06	1.29489E-06	1.54102E-06	3.71467E-06	2.67788E-06	0.000247202	3.78225E-07	3.47967E-07	2.2534E-09	2.01763E-09	8.020210623	15.70737509	0.066094367	392.6843773
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	6.84404E-05	8.28129E-05	9.85542E-05	0.000612433	0.000635768	0.288146827	2.62117E-05	2.41148E-05	2.66201E-06	2.35182E-06	9348.606475	2249.060502	4.692700028	507777.3488
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	6.367E-05	7.70407E-05	9.16848E-05	0.000742558	0.000635259	0.103992573	2.22701E-05	2.04885E-05	9.59553E-07	8.48773E-07	3373.924519	4778.733261	9.715871889	165300.061
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	5.64717E-05	6.83308E-05	8.13193E-05	0.000707913	0.000358649	0.369238813	1.35864E-05	1.24995E-05	3.4121E-06	3.01368E-06	11979.54664	1679.668155	3.370812696	653781.9894
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.65777E-05	2.0059E-05	2.38718E-05	8.06665E-05	0.000145834	0.00959036	1.49552E-05	1.37588E-05	8.81703E-08	7.82752E-08	311.1486716	257.6794884	0.859226766	16950.20151
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.12027E-05	1.35553E-05	1.61319E-05	0.000118203	8.52521E-05	0.062675032	1.34734E-06	1.23955E-06	5.79126E-07	5.11545E-07	2033.422405	173.9591791	0.330471833	111018.7454
Orange (SC)	2028 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.34274E-06	7.67471E-06	9.13354E-06	5.97663E-05	0.000139729	0.03059656	2.43772E-06	2.24271E-06	2.8269E-07	2.49725E-07	992.6716863	64.08609037	0.132188733	54025.51663
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	100	Diesel	0.000869003	0.001051493	0.001251364	0.017180039	0.01143968	2.66388876	0.000474525	0.000436563	2.46029E-05	2.17423E-05	86426.93707	50984.55339	147.563476	4449344.969
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	175	Diesel	0.00047214	0.00057129	0.000679882	0.015402461	0.004180327	2.777426871	0.000182068	0.000167503	2.56645E-05	2.2669E-05	90110.55604	32316.24481	86.61778563	4647519.894
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	25	Diesel	1.53674E-06	1.85945E-06	2.2129E-06	5.10963E-06	3.51839E-06	0.000268861	4.83709E-07	4.45013E-07	2.43965E-09	2.19441E-09	8.72290366	16.18300377	0.068095743	404.5750943
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000139881	0.000169256	0.000201428	0.00136319	0.001546671	0.488189155	6.53886E-05	6.01575E-05	4.50935E-06	3.98453E-06	15838.75948	3713.918451	11.57627638	815684.3976
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001211356	0.001465741	0.001744353	0.011959373	0.010275006	1.719161465	0.000386694	0.000355758	1.58582E-05	1.40316E-05	55776.30042	72321.84386	200.8143473	2584151.643
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	600	Diesel	5.38681E-05	6.51804E-05	7.757E-05	0.000669322	0.000587107	0.240845823	2.15389E-05	1.98158E-05	2.22512E-06	1.96575E-06	7813.977496	1124.961507	3.540978658	400524.0367
Orange (SC)	2028 Construction and Mining - Rollers	Aggregate	75	Diesel	6.88367E-05	8.32924E-05	9.91249E-05	0.000271575	0.000664216	0.022946086	4.80996E-05	4.42516E-05	2.10083E-07	1.87283E-07	744.4604888	534.0391245	2.247159533	38386.08495
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001178588	0.001426091	0.001697166	0.041932014	0.020604509	6.910064441	0.000377656	0.000347443	6.38516E-05	5.6399E-05	224189.4307	111666.282	380.9754315	10767483.75
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.000326087	0.000394566	0.000469566	0.00775628	0.002805636	1.402526232	0.000204987	0.000188588	1.29573E-05	1.14472E-05	45503.41899	17182.72496	58.93803087	2189258.182
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	6.6031E-07	7.98975E-07	9.50846E-07	8.67348E-06	1.04325E-05	0.00121279	5.50278E-07	5.06256E-07	1.1193E-08	9.89863E-09	39.34764564	68.07239975	0.235752123	1701.809994
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	1.57253E-05	1.90277E-05	2.26445E-05	0.000210413	0.000176657	0.11407075	3.63723E-06	3.34626E-06	1.05417E-06	9.3103E-07	3700.899842	840.8668858	3.221945688	178108.119
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	4.09986E-05	4.96082E-05	5.90379E-05	0.000527002	0.000471375	0.086291061	1.12083E-05	1.03116E-05	7.96574E-07	7.04296E-07	2799.618431	2526.522524	8.879996651	120984.3717
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	4.8085E-06	5.81828E-06	6.92424E-06	6.8987E-05	3.78959E-05	0.037544075	6.68508E-07	6.15028E-07	3.46969E-07	3.0643E-07	1218.076179	146.5097328	0.550088288	58590.82023
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	2.01101E-05	2.43332E-05	2.89586E-05	0.000225049	0.00035366	0.032499585	1.98176E-05	1.82322E-05	2.99871E-07	2.65257E-07	1054.41324	690.155153	2.907609523	50431.36393
Orange (SC)	2028 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.41737E-06	1.71501E-06	2.04101E-06	1.33322E-05	1.81807E-05	0.007062611	1.31982E-07	1.21424E-07	6.52548E-08	5.76441E-08	229.1386313	17.64839994	0.078584041	11030.24996
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000181771	0.000219943	0.00026175	0.001889737	0.00181736	0.244899476	0.000118623	0.000109133	2.25876E-06	1.99884E-06	7945.493797	4595.576879	5.182933264	384132.332
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.000171023	0.000206938	0.000246273	0.002191081	0.001596287	0.327538169	9.32522E-05	8.5792E-05	3.02312E-06	2.67332E-06	10626.61517	3559.616713	4.47027994	519258.813
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000264863	0.000320484	0.000381402	0.002537357	0.003233876	0.385001994	0.000146191	0.000134496	3.55159E-06	3.14233E-06	12490.9657	2728.662263	3.822413282	610244.2757
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	5.77817E-05	6.99158E-05	8.32056E-05	0.00073178	0.000480549	0.075799878	1.43501E-05	1.32021E-05	6.99074E-07	6.18668E-07	2459.243575	2623.349526	2.656253298	108134.2411
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.002015208	0.002438402	0.0029019	0.018986645	0.021676645	3.798509217	0.000953358	0.000877089	3.50586E-05	3.10029E-05	123238.4482	16300.68733	21.50917305	5971225.042
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	6.74441E-05	8.16074E-05	9.71195E-05	0.00069576	0.000623797	0.090512216	4.19439E-05	3.85884E-05	8.34807E-07	7.38749E-07	2936.569165	1960.756887	2.332319969	143704.0779
Orange (SC)	2028 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	5.47385E-05	6.62336E-05	7.88234E-05	0.000303083	0.000774218	0.142129779	2.20389E-05	2.02758E-05	1.31242E-06	1.16004E-06	4611.244138	338.7251787	0.323933329	225535.5412
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.002501912	0.003027313	0.003602753	0.041463687	0.025400693	5.756977515	0.001128638	0.001038347	5.31511E-05	4.69877E-05	186778.7953	116845.797	121.6167313	10063881.05
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.00412063	0.004985962	0.005933707	0.086773029	0.028726167	13.79108694	0.001423425	0.001309551	0.000127382	0.000112561	447436.6276	159876.7732	163.4161519	23945420.35
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	1.40903E-06	1.70493E-06	2.02901E-06	1.08794E-05	9.4626E-06	0.000958913	9.56084E-07	8.79597E-07	8.82336E-09	7.82652E-09	31.11088519	59.77850652	0.067527336	1494.462663
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.005117659	0.006192368	0.007369429	0.045333937	0.03797769	20.74657292	0.001311106	0.001206218	0.000191659	0.000169331	673099.71	170948.7957	153.4896336	36044661.91
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.00026833	0.00032468	0.000386396	0.002298636	0.001607862	0.237593371	7.2309E-05	6.65242E-05	2.18862E-06	1.93921E-06	7708.455264	8874.420192	9.92651832	370452.4547
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.007378064	0.008927458	0.010624412	0.059157778	0.054401335	25.23517223	0.0020666	0.001901272	0.00023309	0.000205966	818727.3714	132209.5151	131.4081949	43805285.7
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	0.000128417	0.000155385	0.000184921	0.00053087	0.001015594	0.060015154	0.000116405	0.000107093	5.51017E-07	4.89836E-07	1947.125588	1389.910456	2.025820065	102279.9611
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.000652098	0.000789039	0.000939021	0.005392816	0.003675725	2.300778676	0.000118525	0.000109043	2.12523E-05	1.87786E-05	74646.23028	6236.864101	6.144987531	4003047.98
Orange (SC)	2028 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000560798	0.000678565	0.000807549	0.003860414	0.01166542	1.787289128	0.000218471	0.000200993	1.65076E-05	1.45876E-05	57986.62742	3230.366301	2.633566085	3091647.029
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	100	Diesel	7.78711E-05	9.42241E-05	0.000112134	0.001330221	0.00105033	0.200116423	5.2928E-05	4.86937E-05	1.84784E-06	1.63332E-06	6492.556948	2853.015589	4.874006125	259727.8889
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.00098946	0.001197246	0.001424822	0.016172345	0.009859144	2.638931105	0.000507203	0.000466627	2.43685E-05	2.15386E-05	85617.21344	20357.71531	43.39868467	3410913.412
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	25	Diesel	2.18546E-07	2.6444E-07	3.14706E-07	4.20591E-06	3.14331E-06	0.000610582	1.39618E-08	1.28449E-08	5.63858E-09	4.98349E-09	19.80966965	28.56109708	0.066767207	714.027427
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.001231736	0.001490401	0.0017737	0.008708621	0.01280931	3.033674579	0.000585493	0.000538654	2.80109E-05	2.47604E-05	98424.23072	17631.87594	42.06334053	3951417.429
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.40239E-05	2.90689E-05	3.45944E-05	8.17433E-05	5.70214E-05	0.004859767	8.06032E-06	7.41549E-06	4.42102E-08	3.96648E-08	157.6697773	149.2317322	0.400603243	5779.734676
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.011065457	0.013389203	0.015934258	0.108571523	0.108055739	38.25284568	0.004279403	0.003937051	0.000353335	0.000312215	1241071.45	117359.1346	235.7550086	49671910.7
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	75	Diesel	3.00393E-05	3.63476E-05	4.32566E-05	0.000033404	0.00030977	0.047216868	2.01552E-05	1.85428E-05	4.35642E-07	3.85378E-07	1531.899286	883.4106	1.802714594	61462.23798
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000191393	0.000231585	0.000275605	0.002738144	0.002660368	0.432212037	0.000119627	0.000110057	3.99027E-06	3.52766E-06	14022.64355	922.0474174	1.802714594	561841.5985
Orange (SC)	2028 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.000592914	0.000717426	0.000853796	0.006792432	0.009976382	0.880088467	0.000344112	0.000316583	8.11907E-06	7.18316E-06	28553.50107	716.8835367	1.735947387	1145046.117
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	6.73242E-06	8.14623E-06	9.69468E-06	2.73427E-05	6.72605E-05	0.0024452	4.57241E-06	4.20662E-06	2.24051E-08	1.99574E-08	79.33180888	49.14734071	0.206804914	4161.141514
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	8.3002E-06	1.00432E-05	1.19523E-05	0.000258361	8.5207E-05	0.046714543	3.53563E-06	3.25278E-06	4.3165E-07	3.81278E-07	1515.601897	522.845793	1.861244226	79476.66979
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	6.96253E-06	8.42466E-06	1.0026E-05	8.1677E-05	8.7407E-05	0.043449894	2.45414E-06	2.25781E-06	4.01507E-07	3.54632E-07	1409.683974	359.6766218	1.171894512	73933.32758
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000560923	0.000678717	0.00080773	0.007895407	0.007058711	1.29900227	0.000152306	0.000140121	1.19931E-05	1.06023E-05	42144.69806	45536.32177	139.0418371	1983215.473
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.47432E-06	4.20393E-06	5.00303E-06	2.39195E-05	4.97813E-05	0.012528904	2.20957E-06	2.0328E-06	1.15732E-07	1.02259E-07	406.4864933	45.05172899	0.137869943	21300.45747
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.001363223	0.001649499	0.001963041	0.042383565	0.02235831	6.90512247	0.000559395	0.000514643	6.38004E-05	5.63587E-05	224029.0939	166404.2949	448.4909234	11737715.3
Orange (SC)	2028 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.28158E-06	2.76071E-06	3.28547E-06	3.12331E-05	7.44902E-05	0.016959599	1.01949E-06	9.37933E-07	1.56731E-07	1.38422E-07	550.235524	28.83310655	0.137869943	28833.10655
Orange (SC)	2028 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	1.35189E-05	1.63579E-05	1.94673E-05	0.000470435	0.000227949	0.076882997	4.30506E-06	3.96065E-06	7.10416E-07	6.27509E-07	2494.38416	1749.883182	5.878597281	159577.6532
Orange (SC)	2028 Construction and Mining - Surfacing Equipment	Aggregate	175	Diesel	2.25779E-

Orange (SC)	2028 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	2.42468E-05	2.66822E-05	2.44893E-05	0.000320214	2.58845E-06	0.000701649	1.09753E-08	8.29243E-09	1.30149E-08	1.79654E-08	48.09338756	0	20.97516718	0
Orange (SC)	2028 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.804392258	0
Orange (SC)	2028 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	2.10386E-06	3.02433E-06	2.53048E-06	8.63688E-06	1.59906E-05	0.002097581	5.37746E-07	4.06297E-07	2.00565E-08	1.72768E-08	68.73806391	0	0.163802823	0
Orange (SC)	2028 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	9.11397E-05	0.000100294	9.20511E-05	0.004355799	3.26532E-05	0.009544135	1.49496E-07	1.12952E-07	1.61773E-07	2.23307E-07	623.1320088	0	96.41617198	0
Orange (SC)	2028 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	35.87430887	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000153872	0.000169327	0.000155411	0.010810621	6.98452E-05	0.021309678	9.07677E-07	6.858E-07	3.79447E-07	5.23778E-07	1448.4458	0	200.3273138	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	91.42608072	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.86355E-06	1.08542E-05	9.96217E-06	0.000229116	4.73253E-06	0.000579313	4.40749E-07	3.3301E-07	1.00316E-08	1.38474E-08	36.31933805	0	13.33518301	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	6.0859575	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000127568	0.00014038	0.000128843	0.009106563	4.34777E-05	0.017950676	7.64601E-07	5.77699E-07	3.12626E-07	4.3154E-07	1219.863342	0	54.53939212	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	24.89087869	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.03337763	0.036730045	0.033711406	1.695747444	0.020566944	4.352430706	0.000154124	0.000116449	7.08427E-05	9.77891E-05	266068.5177	0	54769.2239	0
Orange (SC)	2028 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	24995.77012	0
Orange (SC)	2028 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000777854	0.000855981	0.000785633	0.056683853	0.000577462	0.137099695	2.09508E-06	1.58295E-06	2.2003E-06	3.03722E-06	8537.018699	0	446.0920299	0
Orange (SC)	2028 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.083873883	0.092298092	0.084712622	0.534745334	0.003706077	2.182518199	0.001178605	0.000890502	3.1522E-05	4.3512E-05	123660.0452	0	14798.66292	0
Orange (SC)	2028 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36116.87204	0
Orange (SC)	2028 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.66359E-05	1.83068E-05	1.68023E-05	0.001232755	1.82372E-05	0.004423571	5.19104E-08	3.92212E-08	6.10638E-08	8.42906E-08	239.4068163	0	4.498190945	0
Orange (SC)	2028 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.11427147	0.125748782	0.115414185	0.425535782	0.002844625	2.773691319	0.00175435	0.001325509	3.64044E-05	5.02515E-05	143264.5188	0	7184.767736	0
Orange (SC)	2028 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	19435.8517	0
Orange (SC)	2028 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000425385	0.00046811	0.000429639	0.024116115	0.000153057	0.058730795	1.00657E-06	7.60518E-07	9.39936E-07	1.29746E-06	3659.347642	0	448.1523577	0
Orange (SC)	2028 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.85281E-07	1.12885E-06	9.44521E-07	5.56107E-06	6.63925E-06	0.000910766	2.33488E-07	1.76413E-07	8.72986E-09	7.51998E-09	29.91924253	0	0.125810075	0
Orange (SC)	2028 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.49883E-05	8.25201E-05	7.57382E-05	0.007087825	5.09969E-05	0.01393327	2.38798E-07	1.80425E-07	2.40621E-07	3.32146E-07	944.8608469	0	38.64663772	0
Orange (SC)	2028 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.43817E-07	2.06739E-07	1.7298E-07	5.90407E-07	1.0931E-06	0.000143388	3.67596E-08	2.7774E-08	1.37104E-09	1.18102E-09	4.698851861	0	0.014855357	0
Orange (SC)	2028 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000214056	0.000235555	0.000216196	0.010957367	8.29338E-05	0.023185001	3.66148E-07	2.76645E-07	4.01267E-07	5.53897E-07	1534.824211	0	364.9134455	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001582786	0.001741761	0.001598615	0.090698156	0.001283313	0.249756373	5.13907E-06	3.88285E-06	3.7992E-06	5.24431E-06	14837.21357	0	389.2170903	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.000201728	0.000289987	0.000242634	0.001428561	0.00170553	0.233962939	5.99799E-05	4.53181E-05	2.24258E-06	1.93178E-06	7685.83052	0	272.1209103	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	23.5787571	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.053442765	0.058810503	0.053977191	3.337278922	0.027295367	6.478420974	0.000136934	0.000103461	0.000113161	0.000156205	444185.7419	0	4536.455036	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000608912	0.00087532	0.000732387	0.002499742	0.004628113	0.607095528	0.000155638	0.000117593	5.80487E-06	5.00037E-06	19894.61364	0	554.6018615	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	269.3269249	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.000187981	0.000206862	0.000189861	0.006724677	7.58127E-05	0.014763847	3.11773E-07	2.35562E-07	2.51799E-07	3.47575E-07	969.2598824	0	63.35322837	0
Orange (SC)	2028 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.837936258	0
Orange (SC)	2028 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000212585	0.000233937	0.000214711	0.01632955	0.000101769	0.026656529	4.68917E-07	3.54293E-07	5.35418E-07	7.39075E-07	1978.980515	0	467.9640987	0
Orange (SC)	2028 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	47.25282316	0
Orange (SC)	2028 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.71748E-07	7.39218E-07	6.78466E-07	6.99137E-05	4.77119E-07	0.000114128	2.00763E-09	1.51687E-09	2.20978E-09	3.05031E-09	8.441807889	0	0.963880639	0
Orange (SC)	2028 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.097328153	0
Orange (SC)	2028 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	9.60836E-05	0.000105734	9.70444E-05	0.005126233	4.05313E-05	0.010966966	1.75837E-07	1.32855E-07	1.87313E-07	2.58561E-07	721.9993905	0	351.8164694	0
Orange (SC)	2028 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	35.52477949	0
Orange (SC)	2028 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.00031225	0.000343612	0.000315373	0.02025962	0.000189537	0.048173461	7.66621E-07	5.79226E-07	7.80799E-07	1.07779E-06	3024.827835	0	489.2069953	0
Orange (SC)	2028 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001264316	0.001391303	0.001276959	0.003721874	2.30658E-05	0.021234684	2.06612E-06	1.56108E-06	3.34279E-07	4.6143E-07	1174.683898	0	661.9879317	0
Orange (SC)	2028 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	206.9542177	0
Orange (SC)	2028 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000194127	0.000213626	0.000196068	0.010060765	6.30853E-05	0.021966478	3.09337E-07	2.33721E-07	3.75496E-07	5.18324E-07	1434.232131	0	328.8411381	0
Orange (SC)	2028 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.74421E-05	1.9194E-05	1.76165E-05	0.000979331	6.64881E-06	0.002368681	3.61915E-08	2.73447E-08	3.87327E-08	5.34655E-08	148.0156217	0	17.78207699	0
Orange (SC)	2028 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.122915938	0.13526149	0.124145097	0.697873382	0.007476469	3.57125212	0.001060605	0.000801346	4.85844E-05	6.70645E-05	190098.6149	0	39763.26436	0
Orange (SC)	2028 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	60654.02176	0
Orange (SC)	2028 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.94446E-05	2.13975E-05	0.000019639	0.000990171	8.05563E-06	0.0036522	4.09974E-08	3.09758E-08	5.045E-08	6.96397E-08	196.7839028	0	8.185400391	0
Orange (SC)	2028 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.004565156	0.005023676	0.004610808	0.085903477	0.000524987	0.275898088	5.43862E-05	4.10918E-05	4.05047E-06	5.59115E-06	15919.34285	0	1282.144203	0
Orange (SC)	2028 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	977.9501836	0
Orange (SC)	2028 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.00594759	0.00654496	0.006007066	0.319863986	0.003027397	0.765237074	1.96595E-05	1.48538E-05	1.23598E-05	1.7061E-05	48063.08179	0	1612.248744	0
Orange (SC)	2028 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.000117985	0.000129835	0.000119165	0.00324964	6.5001E-05	0.007031375	1.75011E-07	1.32231E-07	1.23098E-07	1.69921E-07	468.0725984	0	43.18053281	0
Orange (SC)	2028 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.52083E-06	3.87447E-06	3.55605E-06	0.00022027	1.52587E-06	0.000496692	1.19886E-08	9.05804E-09	8.1247E-09	1.12151E-08	31.89387607	0	0.351061212	0
Orange (SC)	2028 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.00036747	0.000404378	0.000371144	0.018454616	0.000129683	0.040473281	1.00738E-06	7.61131E-07	6.85031E-07	9.45596E-07	2639.022239	0	155.3445994	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.006119448	0.005628668	0.006734079	0.352772626	0.015274861	7.064900265	0.000492582	0.000372173	6.82568E-05	0.000101297	289153	77051.5	159.4	5393605
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.041149934	0.041561433	0.045282992	2.724026121	0.024968635	5.029960717	6.448E-05	8.53411E-05	9.00298E-05	0.000124274	352618.4899	0	3191.10962	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.27131E-06	7.54301E-06	9.01511E-06	0.000039304	4.73243E-05	0.006431447	1.30464E-06	1.72673E-06	6.16784E-08	5.31304E-08	211.3860864	0	0.798968495	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	39220.29566	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000684519	0.000629621	0.000753272	0.03209224	0.002049725	0.884831668	6.3433E-05	4.79272E-05	8.78988E-06	1.24262E-05	35470.7	5179.35	10.74	694032.9
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000576436	0.0005822	0.000634332	0.085849916	0.00084058	0.122398823	1.48684E-06	1.96788E-06	2.45884E-06	3.39411E-06	9671.941257	0	33.02773885	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	2.60901E-05	3.13806E-05	3.75049E-05	0.000106578	0.000198054	0.025814366	5.20598E-06	6.89027E-06	2.46842E-07	2.12632E-07	845.9846482	0	1.603438973	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	207.7960284	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008716427	0.008803592	0.009591897	0.362883827	0.002570732	0.802295948	9.45352E-06	1.2512E-05	1.33778E-05	1.84663E-05	52327.05118	0	1202.760512	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	14782.51408	0
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.00215705	0.001984055	0.002373702	0.193087068	0.002847763	1.101749978	7.59537E-05	5.73872E-05	1.33953E-05	1.87391E-05	53490.75	23765.15	49.17	831780.25
Orange (SC)	2028 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.001883864	0.002241953	0.002712764	0.023407163	0.016899004	2.797997867	0.000317619	0.00029221	3.61711E-05	2.35341E-05	93549.5	91793.85	112.77	3396372.45
Orange (SC)	2028 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000892988	0.46398242	0.035185537	11.106321	0	0	0	0	614543.2	63477.15	7.47	5585989.2
Orange (SC)	2028 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000249043	0.09439189	0.009415484	2.8904567	0	0	0	0	157822.35	10238.25	1.2	1494784.5
Orange (SC)	2028 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000191608	0.10861533	0.009112548	2.9789873	0	0	0	0	163454.3	8190.6	0.97	1720026
Orange (SC)	2028 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000163754	0.029014183	0.005946549	1.9763955	0	0	0	0	105010.5	30714.75	3.62	982872
Orange (SC)	2028 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000269847	0.15296652	0.012833505	4.1954075	0	0	0	0	230194.55	7168.6	0.84	2422986.8
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002151357	0.001978819	0.002367438	0.104732595	0.013633018	4.736986203	0.000330274	0.00024954	4.57659E-05	6.50644E-05	185726.6	35875.85	312.37	2977695.55
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.07675E-05	0.009644798	0.000864413	0.307128705	0	0	0	0	16709.7	2671.8	23.25	221759.4
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.03835021	0.038733714	0.042202069	2.170582244	0.019686177	5.17495305	6.57476E-05	8.7019E-05	8.29694E-05	0.000114529	325224.2756	0	7284.700288	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.00032794	0.00039444	0.000471419	0.002298104	0.002772784	0.375831741	7.72407E-05	0.00010223	3.60263E-06	3.10334E-06	12347.05323	0	79.66240789	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000223698	0.000205757	0.000246166	0.024477637	0.002351084	0.765699165	5.48925E-05	4.14743E-05	7.60642E-06	1.06655E-05	30444.65	3394.5	29.51	495597
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.20063E-05	0.011559916	0.001167009	0.447876075	0	0	0	0	24155.7	2222.85	19.25	324536.1
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.117163393	0.118335027	0.128931166	2.049438674	0.034020331	4.172377121	0.00012958	0.000171502	7.5717E-05	0.000104518	290986.8079	0	17587.11288	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5198.943134	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001347847	0.001361326	0.001483223	0.128722299	0.000760974	0.186222111	2.2853E-06	3.02466E-06	3.72833E-06	5.14647E-06	14665.57737	0	139.6882378	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.000478378	0.000575384	0.000687676	0.001962277	0.003646369	0.47481275	0.00009671	0.000127998	4.54022E-06	3.91099E-06	15560.3711	0	58.26683518	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.011034561	0.011144907	0.012142862	0.522497467	0.002470164	1.032837438	1.29676E-05	1.71631E-05	1.82416E-05	2.51801E-05	70582.47683	0	4027.000358	0
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.011090034	0.010200614	0.012203906	0.806549734	0.023335588	9.563674958	0.000659311	0.000498146	0.000116277	0.000144125	411406.1	185788.65	1617.6	5945236.8
Orange (SC)	2028 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.003334234	0.003968014	0.004801296	0.050066047	0.043480138	7.744191269	0.000717609	0.000660201	0.000100113	6.48533E-05	257795.85	184770.3	547.36	6097419.9
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.013809439	0.013947533	0.015196446	1.027191136	0.006945325	1.879978835	2.39677E-05	3.1722E-05	3.3627E-05	4.64178E-05	132120.513	0	4252.023043	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.11945E-06	3.75201E-06	4.48426E-06	2.18732E-05	2.63754E-05	0.003578025	7.3387E-07	9.71299E-07	3.42979E-08	2.95445E-08	117.546791	0	3.689876429	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	8073.820526	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	8.12674E-06	8.208E-06	8.94298E-06	0.000171685	2.73059E-06	0.000362872	4.36368E-09	5.77546E-09	6.3435E-09	8.75639E-09	24.65452376	0	3.106670516	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.89900382	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000216985	0.000219155	0.000238779	0.018019894	0.000105297	0.032980126	4.20461E-07	5.56491E-07	5.87702E-07	8.11247E-07	2314.481193	0	28.21192311	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.20889E-06	1.45403E-06	1.7378E-06	4.95818E-06	9.21012E-06	0.001201206	2.43032E-07	3.2166E-07	1.14859E-08	9.89408E-09	39.36491431	0	0.847569902	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	53.56932488	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.025666021	0.025922683	0.028243892	1.310569906	0.01030596	2.770053099	3.3311E-05	4.40881E-05	4.68503E-05	6.46707E-05	183470.3036	0	11111.38148	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21098.49803	0
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000104622	9.62311E-05	0.00011513	0.00757482	0.000169481	0.096831682	6.67549E-06	5.0437E-06	1.1773E-06	1.44747E-06	4131.8	1664.4	14.49	48267.6
Orange (SC)	2028 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.10095E-05	1.31022E-05	1.58537E-05	0.000206163	0.000200912	0.037210914	2.75666E-06	2.53612E-06	4.81044E-07	3.1036E-07	1233.7	1894.35	13.1	71985.3
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.002648653	0.002436231	0.002914681	0.143824652	0.006674358	5.428476579	0.000378486	0.000285968	5.24467E-05	7.50701E-05	214287.85	36171.5	163.86	3363949.5
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004404666	0.004448712	0.004847065	0.292353672	0.002436377	0.624258035	7.66134E-06	1.014E-05	1.04474E-05	1.44212E-05	40991.68914	0	1003.244117	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.000239417	0.000287966	0.000344166	0.001496729	0.001806731	0.244777627	5.02276E-05	6.64777E-05	2.34749E-06	2.02215E-06	8045.398976	0	59.83372511	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000101865	9.3695E-05	0.000112096	0.008063874	0.000326878	0.246445115	1.76675E-05	1.33488E-05	2.44817E-06	3.43837E-06	9814.85	1091.35	4.95	157154.4
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.001985136	0.002004987	0.002184521	0.018980933	0.000120714	0.054183328	5.25074E-07	6.9495E-07	8.91828E-07	1.23105E-06	3391.744905	0	363.6467594	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	28489.14401	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.27138E-05	3.30408E-05	3.59994E-05	0.002407671	2.31818E-05	0.005140807	6.33466E-08	8.38412E-08	8.5657E-08	1.18239E-07	337.1130836	0	3.340806243	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.000194329	0.000233735	0.000279351	0.000792948	0.001473501	0.191880612	3.88714E-05	5.14474E-05	1.83483E-06	1.58054E-06	6288.380223	0	17.86800681	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.003393401	0.003427335	0.003734231	0.155445134	0.001114889	0.337958279	3.94881E-06	5.22636E-06	5.70717E-06	7.87801E-06	22157.44347	0	1101.463821	0
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.00179295	0.001649156	0.001973032	0.144976348	0.002721823	1.443857328	9.95382E-05	7.52067E-05	1.75547E-05	2.22478E-05	63506.35	28532.05	129.29	884493.55
Orange (SC)	2028 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.002155708	0.002565471	0.003104219	0.030710711	0.025776228	4.532567305	0.000448069	0.000412223	5.85948E-05	3.79842E-05	150989.55	96447.6	239.66	3568561.2
Orange (SC)	2028 Light Commercial - Misc - Welders	Aggregate	100	Gasoline	0.00269965	0.002483138	0.0029708	0.132260239	0.007174439	4.547840089	0.000317086	0.000239576	4.39385E-05	6.31605E-05	180291.75	54461.65	262.17	3812315.5
Orange (SC)	2028 Light Commercial - Misc - Welders	Aggregate	15	Gasoline	0.021925294	0.022144547	0.024127448	1.329083804	0.009702997	2.223224833	3.6625E-05	4.84743E-05	4.1704E-05	5.7567E-05	163673.1472	0	3271.735902	0

Orange (SC)	2028 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001253122	0.001265652	0.001378984	0.005901177	0.000593159	0.063524515	6.62974E-06	5.00914E-06	7.32565E-07	1.01121E-06	2878.272515	0	1.703377611	0
Orange (SC)	2028 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.00016708	0.000168751	0.000183862	0.002082147	7.82468E-05	0.015616695	1.25581E-06	9.48834E-07	2.48392E-07	3.42873E-07	726.2470743	0	58.25712502	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002282683	0.00230551	0.002511953	0.019451586	0.001996953	0.217024995	2.1663E-05	1.63675E-05	2.48866E-06	3.43526E-06	9531.677826	0	45.22257884	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.023332444	0.023565768	0.025675931	0.26903691	0.009057433	3.12716166	0.000326367	0.000246588	3.47826E-05	4.80129E-05	135440.9502	0	454.2051178	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	8.97298E-05	9.06271E-05	9.87422E-05	0.001486468	3.06926E-05	0.02317115	2.41826E-06	1.82713E-06	2.4537E-07	3.38701E-07	963.0317066	0	2.019298574	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.004702498	0.004749523	0.005174812	0.015109434	0.000236535	0.052022602	0.000226114	0.000170842	8.89482E-07	1.22781E-06	3437.877663	0	34.38665383	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.00104732	0.001057793	0.001152511	0.009683509	0.000404785	0.050764934	2.29649E-05	1.73513E-05	6.67872E-07	9.21911E-07	2597.271485	0	20.56996098	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.003736662	0.003774029	0.004111968	0.036762633	0.00150188	0.242932845	0.000353598	0.000267163	2.9867E-06	4.12276E-06	11701.8141	0	78.09433387	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.003660854	0.003697462	0.004028546	0.008545691	8.78827E-05	0.026165941	0.000177454	0.000134076	5.24844E-07	7.24479E-07	1953.218763	0	39.39770303	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.075995013	0.076754963	0.083627878	0.307225936	0.011369505	1.618160847	0.006407683	0.004841361	2.28574E-05	3.15516E-05	88250.37089	0	551.0045962	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.011284208	0.01139705	0.012417582	0.048575331	0.001177147	0.16423953	0.000570699	0.000431195	3.16162E-06	4.3642E-06	10441.31142	0	523.0664096	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.036678549	0.037045334	0.040362506	0.186541519	0.006724678	0.909863504	0.004286313	0.003238547	1.27287E-05	1.75703E-05	49642.4846	0	165.0247838	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.013210596	0.013342701	0.014537454	0.038354842	0.001355288	0.155531235	0.00078521	0.00059327	2.69683E-06	3.72263E-06	9768.179256	0	223.3679156	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.034981036	0.035330845	0.038494495	0.190609809	0.011414049	1.144875396	0.008122761	0.006137198	1.49501E-05	2.06368E-05	58425.42856	0	144.7787201	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.031773628	0.032091363	0.034964939	0.101323616	0.004029502	0.472905646	0.002389012	0.001805032	7.38385E-06	1.01925E-05	27711.94254	0	338.6809132	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.016265173	0.016427826	0.017898832	0.222894236	0.007587552	0.916841059	0.002015593	0.001522893	1.25778E-05	1.7362E-05	49376.81782	0	98.61913171	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	6.30435E-07	6.36739E-07	6.93755E-07	5.38369E-06	3.12002E-07	0.000104048	9.50818E-09	7.18396E-09	1.13574E-09	1.56775E-09	4.278345702	0	0.059272358	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.00039806	0.00040204	0.000438041	0.006466447	0.000409493	0.049995806	7.43354E-06	5.61645E-06	8.05928E-07	1.11248E-06	2295.536538	0	238.4710038	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.002987711	0.003017589	0.003287794	0.033844829	0.008658679	0.58584927	5.89376E-05	4.45307E-05	6.33776E-06	8.74846E-06	24223.33763	0	212.2520447	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.015647381	0.015803855	0.017218988	0.18797961	0.014065561	1.640028467	0.000163704	0.000123688	1.92993E-05	2.66402E-05	74223.29932	0	471.6378108	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.020344926	0.020548375	0.022388351	0.146465294	0.007605418	3.234067883	0.000337524	0.000255018	3.3909E-05	4.6807E-05	131855.5068	0	656.5607349	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.002172611	0.002194338	0.002390826	0.004052341	0.000667151	0.113842402	1.18812E-05	8.97689E-06	1.21469E-06	1.67673E-06	4766.315428	0	12.66515133	0
Orange (SC)	2028 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000206258	0.000249572	0.000297012	0.006942127	0.002690501	1.040371432	0.000204484	0.000188125	9.61256E-06	8.49137E-06	33753.70534	25931.32972	60.38794652	2043331.21
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.000277697	0.000336013	0.000399883	0.012074168	0.001639237	2.182451313	6.78134E-05	6.23883E-05	2.01695E-05	1.78129E-05	70807.22932	33558.19141	78.14910727	4286421.894
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000173709	0.000210188	0.000250141	0.002490262	0.000788751	1.308947386	3.77996E-05	3.47757E-05	1.20967E-05	1.06835E-05	42467.35641	9780.328512	22.77607672	2570825.155
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	8.76603E-06	1.06069E-05	1.26231E-05	0.000187859	0.000166256	0.030030625	4.05691E-06	3.73236E-06	2.77385E-07	2.45106E-07	974.3105585	1345.916768	3.134322484	53054.30428
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000258737	0.000313072	0.000372581	0.003368711	0.00119678	1.79131956	5.79947E-05	5.33551E-05	1.65539E-05	1.46205E-05	58117.39032	7806.317253	18.17907041	3518223.446
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	9.85018E-05	0.000119187	0.000141843	0.002115608	0.001596205	0.32393232	2.03312E-05	1.87047E-05	2.99196E-06	2.64389E-06	10509.62738	10318.69522	24.02980571	636216.066
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	8.7096E-05	0.000105386	0.000125418	0.001116387	0.0003008	0.586520206	1.97004E-05	1.81244E-05	5.42006E-06	4.7871E-06	19029.00216	1794.55569	4.179096645	1151949.205
Orange (SC)	2028 Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	5.89922E-06	7.13806E-06	8.49488E-06	7.35903E-05	0.000118944	0.038146213	1.38252E-06	1.27191E-06	3.52504E-07	3.11344E-07	1237.611878	89.72778451	0.208954832	74920.69242
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.001135266	0.001373672	0.001634783	0.031652711	0.009650709	4.304834356	0.00085175	0.00078361	3.97663E-05	3.51355E-05	139665.6098	93398.79683	65.19390767	8454867.296
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.00227275	0.002750027	0.00327276	0.059021191	0.011521578	9.333011109	0.000517886	0.000476455	8.62201E-05	7.61748E-05	302799.267	139499.485	97.37295183	18330408.07
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002622266	0.003172942	0.003776063	0.022804993	0.009031208	10.20774043	0.000458021	0.000421379	9.4297E-05	8.33142E-05	331178.8964	86214.274	60.17899169	20048411.52
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.55966E-05	5.51719E-05	6.56591E-05	0.000681036	0.00041812	0.07057715	1.03043E-05	9.48E-06	6.51153E-07	5.76041E-07	2289.797894	2694.196062	1.88059349	124686.7676
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.004739131	0.005734348	0.006824348	0.042935434	0.014772441	20.99409558	0.000780317	0.000717892	0.000193959	0.000171351	681130.3102	109563.9732	76.47746861	41233245.57
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001352374	0.001636372	0.001947418	0.019914098	0.014541204	2.700547341	0.00024464	0.000225069	2.49273E-05	2.20415E-05	87616.28437	85615.56376	59.76108203	5303983.269
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.001442687	0.001745652	0.00207747	0.011183255	0.005328651	5.247635995	0.000346414	0.000318701	4.84737E-05	4.28305E-05	170253.7706	15865.82126	11.07460611	10306567.52
Orange (SC)	2028 Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.008359038	0.010114436	0.012037014	0.072098904	0.132428156	34.31052131	0.002511131	0.002310241	0.000316967	0.000280038	1113167.077	56877.47243	39.70141813	67387239.68
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000219517	0.000265615	0.000316104	0.009852329	0.002958819	1.557417473	0.000231642	0.000213111	1.43925E-05	1.27114E-05	50528.69472	36345.16249	108.6565128	3058830.368
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000661903	0.000800902	0.00095314	0.027758323	0.005085991	5.037394689	0.000186842	0.000171894	4.65534E-05	4.11145E-05	163432.723	75835.57943	226.715993	9893645.166
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000250455	0.00030305	0.000360655	0.003314365	0.001233387	1.690545138	5.76038E-05	5.29955E-05	1.56224E-05	1.3798E-05	54847.87521	14887.53771	44.50737927	3320298.442
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.50911E-06	7.87603E-06	9.37312E-06	0.000151113	0.000125112	0.025659008	1.80757E-06	1.66297E-06	2.37035E-07	2.09425E-07	832.4782688	1048.418149	3.134322484	45331.08566
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000338636	0.000409749	0.000487636	0.004196683	0.001980025	2.223263111	8.32898E-05	7.66266E-05	2.0545E-05	1.8146E-05	72131.32314	10484.18149	31.34322484	4366577.901
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.000155968	0.000188722	0.000224595	0.00427339	0.003352973	0.692001268	5.14997E-05	4.73797E-05	6.39322E-06	5.64802E-06	22451.21903	20269.41754	60.59690136	1359118.239
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000145046	0.000175506	0.000208867	0.001827137	0.000978932	0.973908515	4.5267E-05	4.16457E-05	8.99992E-06	7.94891E-06	31597.3892	2935.570817	8.776102955	1912795.376
Orange (SC)	2028 Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.001365631	0.001652413	0.001966508	0.016463705	0.029894605	8.592832799	0.000459806	0.000423022	7.9404E-05	7.01335E-05	278784.9969	7408.821585	22.14921222	16876668.18
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000105691	0.000127886	0.000152195	0.004732893	0.00164341	0.750474288	0.000121858	0.000112109	6.93534E-06	6.12527E-06	24348.31178	17020.6831	50.77602424	1473961.595
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.000169605	0.000205222	0.000244231	0.00722797	0.001364507	1.310300268	4.92407E-05	4.53015E-05	1.21093E-05	1.06945E-05	42511.24916	19682.35371	58.71630787	2573482.269
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000123442	0.000149365	0.000177757	0.001832469	0.000508167	0.966433877	2.50539E-05	2.30496E-05	8.93146E-06	7.8879E-06	31354.88281	8405.275605	25.07457987	1898114.888
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.47333E-06	1.78273E-06	2.12159E-06	3.20904E-05	2.44649E-05	0.005196664	2.83522E-07	2.6084E-07	4.80015E-08	4.24145E-08	168.6000319	210.1318901	0.626864497	9180.807205
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000210112	0.000254236	0.000302562	0.003359342	0.000772644	1.828021573	4.17912E-05	3.84479E-05	1.68947E-05	1.49201E-05	59308.14672	9385.891093	27.99994752	3590307.671
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	0.000102994	0.000124622	0.000148311	0.002457661	0.001987823	0.391407278	3.89964E-05	3.58767E-05	3.61566E-06	3.19461E-06	12698.77809	11557.25396	34.47754732	768739.59
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000106458	0.000128814	0.000153299	0.001700364	0.000538117	0.92699537	3.40955E-05	3.13679E-05	8.56734E-06	7.56601E-06	30075.34386	2801.758535	8.358193291	1820656.078
Orange (SC)	2028 Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	7.68321E-05	9.29669E-05	0.000110638	0.00100179	0.001821752	0.528836108	2.51851E-05	2.31703E-05	4.88705E-06	4.31629E-06	17157.50511	840.5275605	2.507457987	1038655.322
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.60354E-05	1.94028E-05	2.30915E-05	0.000519462	0.000193748	0.076780911	1.33056E-05	1.22411E-05	7.09397E-07	6.26675E-07	2491.072115	1881.240814	3.343277316	150800.7891
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000209327	0.000253286	0.000301431	0.009884149	0.000775794	1.796010723	3.55836E-05	3.27369E-05	1.65987E-05	1.46588E-05	58269.58996	26925.25915	47.85065659	3527437.079
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000145671	0.000176262	0.000209766	0.002193826	0.000407811	1.14747067	2.42574E-05	2.23168E-05	1.06046E-05	9.3655E-06	37228.42217	8348.006113	14.83579309	2253678.408
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	50	Diesel	7.31415E-06	8.85012E-06	1.05324E-05	0.000168638	0.000132724	0.02849595	6.17124E-07	5.67754E-07	2.6324E-07	2.3258E-07	924.5197025	1058.197958	1.88059349	50343.03404
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002131455	0.002579061	0.003069296	0.030771396	0.006711877	16.15194873	0.000389093	0.000357966	0.000149269	0.00013183	524032.1885	60905.17136	108.2386031	31723075
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.64818E-05	3.2043E-05	3.81338E-05	0.000545569	0.00040543	0.082593244	4.08377E-06	3.75707E-06	7.62821E-07	6.74115E-07	2679.646839	2704.28367	4.805961142	162216.443
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000275993	0.000333952	0.00039743	0.003233768	0.002146072	1.656514745	0.000116423	0.000107109	1.5307E-05	1.35203E-05	53743.79657	5408.567341	9.611922284	3253461.384
Orange (SC)	2028 Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000166551	0.000201526	0.000239833	0.002301261	0.003744003	1.217160536	6.21011E-05	5.7133E-05	1.12483E-05	9.9343E-06	39489.43312	2351.551018	4.179096645	2390552.1
Orange (SC)	2028 Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001652244	0.001999215	0.002379231	0.051233838	0.011567294	7.030889732	0.001121877	0.001032127	6.49545E-05	5.73852E-05	228109.4742	152295.2376	99.25354532	13808949.37
Orange (SC)	2028 Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002848085	0.003446183	0.004101242	0.084837984	0.009443462	13.59453278	0.00041041	0.000377577	0.000125603	0.000110957	441059.6443	191411.067	124.7460349	26700207.51
Orange (SC)	2028 Portable Equipment - Rental Generator	Aggregate	300	Diesel	0.006607136	0.007994634	0.009514276	0.060832731	0.018543959	27.7737579	0.000963361	0.000886293	0.000256584	0.000226686	901088.9877	227320.6809	148.1489761	54548774.22
Orange (SC)	2028 Portable Equipment - Rental Generator	Aggregate	50	Diesel	6.26753E-06	7.58371E-06	9.02524E-06	9.0531E-05	4.85246E-05	0.008810141	1.10379E-06	1.01549E-06	8.12661E-08	7.19072E-08	285.8353178	320.6215528	0.208954832	15564.64086
Orange (SC)	2028 Portable Equipment - Rental Generator	Aggregate	600	Diesel	0.009196788	0.011128113	0.013243374	0.087697254

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	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9778.665408	33.3913878	0	0	850.8676174	1.612741802	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	53866.7	49.47	23922.1	2.251754654	94129.85	113.5	92385.15	1.01888507	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	290952.45	160.42	77555.2	3.751553087	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	35707.95	10.79	5212.2	6.850840336	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2781.437486	15.45739183	0	0	20.3757329	9.505437399	0	0	56403.45	127.16	47727.4	1.18178342
Aerial Lifts50	Aerial Lifts	50	75091.45	131.1	47373.35	1.585099006	129527.3098	501.2000348	158425.6751	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	82538.72345	235.8170999	73968.96989	1.115856062	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	134962.4	131.1	47373.35	2.848909777	143366.7145	371.1103608	117469.5209	1.220458833	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	13917.20959	21.28740119	6700.207485	2.077131138	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	825.4230609	0.70958004	225.2028293	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	586.1699998	0.23652668	75.06760976	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	221.6599108	2.33740641	0	0	9.597759141	1.510046274	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	682.55	2.52	270.1	2.527027027	2304.845444	5.402614802	2008.594496	1.147491665	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	3256.207354	3.070959992	1790.446016	1.818657097	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7851.15	11.52	1230.05	6.382789318	10787.42229	13.25062367	5061.72327	2.131175829	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2748.45	2.81	313.9	8.755813953	16950.86427	13.19375404	4339.220932	3.906430332	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	24181.9479	13.19375404	4480.966554	5.396591919	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	34698.06601	10.4071422	3485.89736	9.95384041	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	27915.97924	2.843481474	1687.173237	16.54600644	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	12551.18677	0.341217777	259.9461359	48.2837982	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	121.7930569	1.657945786	0	0	2.738078555	1.060478139	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	4001.038064	17.9841651	0	0	1.863506925	0.389731389	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	5018.75	6.24	3624.45	1.38469285	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	44.38006366	0.214270671	107.2044791	0.413975834	0	0	0	0
Cranes50	Cranes	50	2336	2.81	1175.3	1.98757764	718.594758	2.285553822	1042.814953	0.689091345	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	354.4733053	0.999929797	347.7754207	1.019259224	0	0	0	0
Cranes100	Cranes	100	7825.6	5.7	2365.2	3.308641975	16247.90424	26.42671607	12438.61699	1.306246848	0	0	0	0
Cranes175	Cranes	175	503.7	0.16	83.95	6	49681.50439	47.92520671	22738.59837	2.184897397	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	84337.69568	52.28204368	25805.08961	3.268258199	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	150927.9552	53.63909126	27682.36104	5.452134484	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	3092.807686	0.714235569	328.771765	9.407157229	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	8264.691959	1.142776911	591.2437806	13.97848439	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	2334.940538	6.339034298	2259.398082	1.03343477	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	1570.441992	3.296297835	931.1990487	1.686472934	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	100651.9365	105.2913597	51807.09873	1.94282133	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	112779.2202	71.88464894	34126.49379	3.304740911	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	114898.9958	53.37466879	25413.97404	4.521095192	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	414209.0345	99.20588676	48566.20536	8.528750216	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	4306.810174	0.63390343	317.8873946	13.54822572	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	23909.42877	1.901710289	1099.483477	21.74605555	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	40.60896294	0.19167382	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14526.78987	284.9585613	41785.2	0.347653951	1.354182734	0.547352556	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	649.7	2.06	262.8	2.472222222	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	17.98463932	0.922480588	15.15693794	1.18656152	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	93252.26315	155.1087582	118487.5435	0.78702166	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	502.747652	1.0797907	373.0122426	1.347804695	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	120290.8503	110.7738224	75216.68343	1.599257569	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	255052.8666	142.9769921	88387.00151	2.885637733	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	325235.2984	123.223174	75188.71888	4.325586381	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	574838.7357	128.939713	86369.4615	6.655578554	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	10485.2662	1.4608933	859.625735	12.19747824	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	16057.72271	0.9527565	675.4689391	23.77270334	0	0	0	0
Forklifts25	Forklifts	25	52.96008654	0.119064178	0	0	36.99349537	0.220739771	63.99966158	0.578026422	1496.5	1.22	1525.7	0.980861244
Forklifts50	Forklifts	50	1256990.65	439.59	788702.95	1.593744071	90320.68043	241.3689835	180613.4015	0.500077401	1987472.45	826.36	1488729.15	1.335012786
Forklifts75	Forklifts	75	0	0	0	0	18590.98147	38.1915446	21443.42423	0.866978206	0	0	0	0
Forklifts100	Forklifts	100	5865261.65	1566.87	2777817.9	2.111463696	1237336.985	1858.145628	1309262.407	0.945064166	12437988.2	2900.26	5224989.6	2.380480949
Forklifts175	Forklifts	175	410274.6	57.13	101495.55	4.042291509	384158.6139	360.1493166	246783.7994	1.556660587	933524	106.12	191212.55	4.882127245
Forklifts300	Forklifts	300	0	0	0	0	77745.68761	46.22144793	34562.65645	2.249412967	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	17427.29671	6.083661514	4385.306391	3.974020321	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	215.4293798	0.073579924	16.59250485	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1445.603225	0.19202076	158.0840635	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	14898.84852	141.8852804	0	0	15635.63547	58.54992796	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	413899.05	1628.07	186985.85	2.213531398	259401.85	550.88	185967.5	1.394877331	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	186858.1	314.45	36116.75	5.173724103	0	0	0	0	16808.25	23.42	2693.7	6.239837398
Generator Sets175	Generator Sets	175	30656.35	29.69	3412.75	8.982887701	0	0	0	0	24312.65	19.41	2226.5	10.91967213
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	100.6415491	0.255314058	171.2754065	0.587600702	0	0	0	0
Graders50	Graders	50	0	0	0	0	511.9958691	1.723369888	540.7093758	0.946896599	0	0	0	0
Graders75	Graders	75	0	0	0	0	235.5504601	0.638285144	162.6697503	1.448028658	0	0	0	0
Graders100	Graders	100	0	0	0	0	13300.09699	16.14861414	7098.60023	1.873622484	0	0	0	0
Graders175	Graders	175	0	0	0	0	156535.9497	102.8277367	49689.21158	3.150300533	0	0	0	0
Graders300	Graders	300	0	0	0	0	320870.7647	89.29609162	70550.00777	4.548132238	0	0	0	0
Graders600	Graders	600	0	0	0	0	21627.30236	3.574396805	3125.14788	6.920409271	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	11151.94619	0.382971086	291.678438	38.23370103	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	47.50851792	0.250686755	75.89763693	0.625955166	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	38504.30124	59.2247458	40866.57787	0.942195389	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	22904.91489	22.56180792	14419.95281	1.588418159	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	26295.40922	20.68165726	14686.67879	1.790425841	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	41963.52046	16.41998243	11764.58238	3.566936684	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	40642.58553	11.97029254	8143.928607	4.990538043	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	114447.0575	19.42822349	14021.69585	8.162140923	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	4333.871939	0.438701821	296.038172	14.63957134	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	6249.151273	0.313358443	177.2191128	35.2622873	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	136.6225564	0.186287323	249.0126297	0.548657137	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	3586.894897	3.353171813	5698.469919	0.629448773	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	697.5171143	0.372574646	515.658406	1.352672828	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3435.416206	1.428202809	1970.318915	1.743583833	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	87899.08936	19.18759426	28206.44072	3.116277245	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	180107.6828	32.72447306	43419.62321	4.148071068	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	776072.8935	73.21091791	104215.7493	7.446790902	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	259092.1347	15.39975203	19605.91049	13.21500141	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	464583.0431	12.48125064	18442.34508	25.19110456	0	0	0	0
Pavers25	Pavers	25	761.9358144	2.451380624	0	0	2.549926784	0.339572936	0	0	0	0	0	0
Pavers50	Pavers	50	7387.6	8.06	3179.15	2.323765786	2554.061168	7.438230661	2756.746699	0.926476549	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	4119.480819	6.694407595	2645.071648	1.55741748	0	0	0	0
Pavers100	Pavers	100	6610.15	4.44	1741.05	3.796645702	20452.88299	29.19505535	11821.43275	1.730152633	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	33732.87044	24.67013169	9935.973319	3.395024258	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	25955.84186	11.65322804	5462.315162	4.75180232	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	5235.671132	1.487646132	692.1634434	7.564212155	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	0	0	0	0	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	987.8806007	0.123970511	61.23638542	16.13224873	0	0	0	0
Paving Equipment25	Paving Equipment	25	870.409643	6.17615578	0	0	11.84794913	0.901347845	14.76761057	0.802292901	0	0	0	0
Paving Equipment50	Paving Equipment	50	8621.3	22.07	3865.35	2.230406043	3173.091009	9.097179313	4492.233298	0.706350449	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	592.8185272	1.299597045	467.8379029	1.267145145	0	0	0	0
Paving Equipment100	Paving Equipment	100	3569.7	5.69	989.15	3.608856089	13545.42813	16.83287601	8222.162537	1.647428894	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	13922.28688	10.7680898	5161.870599	2.697139848	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	8962.304133	4.455761296	2150.828642	4.166907563	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	11099.2271	3.094278678	1543.067629	7.192962184	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	1910.368938	0.309427868	163.403611	11.69110601	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	933.2806279	0.123771147	60.25185113	15.489659	0	0	0	0
Rollers25	Rollers	25	2615.284196	13.23769011	0	0	38.574716	6.746009298	15.21478262	2.535344537	0	0	0	0
Rollers50	Rollers	50	9829.45	5.7	3540.5	2.77628866	52437.22221	188.0267821	67996.76539	0.771172304	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	699.9197842	2.104063685	502.0878265	1.39401863	0	0	0	0
Rollers100	Rollers	100	30181.85	10.65	6650.3	4.538419319	81264.05186	138.1668487	47935.31376	1.695285698	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	84706.60613	81.10209115	30380.57365	2.788183236	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	14879.19021	10.83911596	3489.890764	4.263511731	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	7354.089576	3.315494292	1059.177092	6.943210564	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	36.99349537	0.220739771	63.99966158	0.578026422	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3153.6	2.32	956.3	3.297709924	2632.131553	8.314531393	2375.010761	1.108260895	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	967.0016418	2.648877258	637.9774221	1.515730194	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68145.5	32.38	13366.3	5.098306936	201416.7681	340.6750473	100459.9791	2.004945352	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3810.6	1.04	459.9	8.285714286	52176.0978	71.29894619	20658.89762	2.525599321	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	3479.248494	3.016776877	789.9436967	4.404425921	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1145.297325	0.515059467	137.6563366	8.319975338	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	215.4293798	0.073579924	16.59250485	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2311.974834	2.487106955	2466.395815	0.937390025	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	2691.210904	2.123140084	1797.992923	1.49678615	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	7447.04691	4.85289162	4326.488324	1.721268232	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	10073.16226	4.246280167	3386.30927	2.974672853	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	11742.79058	3.57900757	2565.697252	4.576841858	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	115744.3876	20.13950022	15326.51088	7.551907182	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	4335.355671	0.303305726	318.459418	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	18.62446687	0.062515569	26.8523007	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	148.2364721	0.375093412	140.3032712	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1291.641764	1.562889216	742.6898835	1.739140108	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	6254.241996	4.688667648	2770.113176	2.257756849	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	80502.39128	40.63511962	19140.31994	4.205906251	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	92497.12723	39.38480824	16577.64079	5.579631531	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1176459.151	221.6176908	110963.1794	10.60224804	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	3608.00371	0.812702392	232.4961702	15.51855115	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	26845.15915	1.625404785	673.3960298	39.86533625

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2759.4	0.59	306.6	9	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.0613298	0	0	46.30639103	6.321948505	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	78102.92021	182.2019153	98382.42233	0.793870677	0	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	11787.48937	35.93250315	8637.510689	1.364685938	0	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25502.55	10.01	8716.2	2.925879397	1254831.023	1201.199456	785808.503	1.59686618	0	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	218823.2058	138.3972736	80246.69489	2.726881226	0	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	130308.4824	57.45391405	33319.16416	3.910916906	0	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	186846.9656	50.47056538	29087.36565	6.42364688	0	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	5660.737778	0.888789831	470.6122309	12.02845444	0	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	61320.67651	2.666369492	1737.924839	35.28384837	0	0	0	0	0
Trenchers25	Trenchers	25	4959.760676	15.23223758	0	0	44.86069111	4.498830406	0	0	0	0	0	0	0
Trenchers50	Trenchers	50	46519.25	51.76	20848.8	2.231267507	27762.26864	59.74572976	24039.70624	1.154850578	0	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	1795.564002	3.598322361	1000.419091	1.794811813	0	0	0	0	0
Trenchers100	Trenchers	100	28641.55	17.18	6927.7	4.134351949	18249.92573	23.96618478	8326.241029	2.191856525	0	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	4218.546818	3.802000985	1149.064357	3.671288551	0	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	9338.140781	4.88828698	1587.466634	5.882417042	0	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	15550.45698	3.869893859	1504.921933	10.33306555	0	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	2878.190242	0.339464374	160.6340938	17.91767971	0	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	362.2237358	0.067892875	16.20111889	22.35794566	0	0	0	0	0
Welders25	Welders	25	0	0	0	0	7780.327235	23.9250526	0	0	0	0	0	0	0
Welders50	Welders	50	129425.35	258.53	53717.05	2.409390501	432035.9	567.28	364284.6	1.18598453	0	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	181390.4	263.85	54815.7	3.309095752	0	0	0	0	0	0	0	0	0
Welders175	Welders	175	22713.95	18.2	3777.75	6.012560386	0	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2029
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower B	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.26739E-08	8.79355E-08	1.0465E-07	1.15393E-06	2.52107E-07	3.76327E-05	2.83095E-09	2.60448E-09	3.40797E-10	3.06823E-10	1.219638893	7.304068206	0.003684111	32.54890321
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.00119433	0.001445139	0.001719835	0.012986739	0.010029918	2.153190117	0.000754969	0.000694571	1.95879E-05	1.75551E-05	69782.69075	2528.219433	36.47696924	2494275.145
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	7.40222E-08	8.95669E-08	1.06592E-07	1.24316E-06	5.50928E-07	7.86852E-05	5.91916E-09	5.44562E-09	7.14899E-10	6.41526E-10	2.550105394	8.995887863	0.006026724	68.05550098
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000458818	0.00055517	0.000660698	0.005760865	0.004293975	0.989823623	0.000201127	0.000185037	9.00728E-06	8.07011E-06	32079.17176	2504.044945	13.41429511	1274717.268
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	1.74007E-06	2.10548E-06	2.50569E-06	2.4182E-05	4.42874E-07	7.4287E-05	4.5008E-08	4.14074E-08	6.24835E-10	6.05668E-10	2.407567312	92.33411829	0.033682605	64.25153828
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000127127	0.000153823	0.000183062	0.000502435	0.000364946	0.046961562	2.14039E-05	1.96916E-05	4.24184E-07	3.82881E-07	1521.976222	803.193634	4.438206841	54400.70352
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.000180519	0.000218428	0.000259947	0.001412776	0.001097043	0.693632594	5.07936E-05	4.67301E-05	6.31621E-06	5.65524E-06	22479.92328	1530.739756	3.199446599	893275.7576
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	3.40427E-07	4.11917E-07	4.90215E-07	1.1946E-05	9.0031E-07	0.000310113	2.33285E-08	2.14622E-08	2.81609E-09	2.52838E-09	10.05045182	53.73459089	0.037714177	268.2197036
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.002647444	0.003203407	0.003812319	0.011610254	0.008700869	1.135067571	0.000668997	0.000615477	1.02653E-05	9.25429E-06	36786.37954	2993.544878	48.38897247	1314872.657
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	9.29009E-05	0.00011241	0.000133777	0.00073823	0.000551808	0.36813311	2.55205E-05	2.34788E-05	3.3523E-06	3.00142E-06	11930.81772	1066.181181	1.019154615	474090.1519
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.17071E-08	5.04656E-08	6.00582E-08	7.26284E-07	1.46051E-07	2.30537E-05	1.73424E-09	1.5955E-09	2.08856E-10	1.87959E-10	0.747147516	14.60813683	0.003312805	19.93937073
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001456255	0.001762068	0.002097007	0.008254051	0.01223585	1.189534584	0.000746691	0.000686956	1.07975E-05	9.69837E-06	38551.59984	2673.138153	35.07784842	1377967.745
Orange (SC)	2029	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - ATVs	Aggregate	100	Gasoline	1.07076E-05	1.29562E-05	1.5419E-05	0.000632424	4.58108E-05	0.045142678	3.3959E-06	3.12422E-06	4.111E-07	3.68052E-07	1463.028035	52.64684042	1.859306595	46853.17108
Orange (SC)	2029	Agricultural - ATVs	Aggregate	175	Gasoline	1.27568E-05	1.54357E-05	1.83698E-05	0.000845459	6.6542E-05	0.065780049	4.94836E-06	4.55249E-06	5.99123E-07	5.3631E-07	2131.864136	29.62784034	1.651050031	68272.50899
Orange (SC)	2029	Agricultural - ATVs	Aggregate	175	Diesel	3.4122E-08	4.12876E-08	4.91357E-08	8.76183E-07	2.63727E-07	0.000160127	1.10719E-08	1.01861E-08	1.45834E-09	1.30553E-09	5.189554759	71.15553877	0.002382072	247.4583226
Orange (SC)	2029	Agricultural - ATVs	Aggregate	25	Gasoline	0.001159417	0.001402894	0.00166956	0.014731795	0.000666755	0.061625381	5.38877E-05	4.95767E-05	5.26858E-07	5.02437E-07	1997.215606	270.5866646	11.05993014	63960.41777
Orange (SC)	2029	Agricultural - ATVs	Aggregate	25	Diesel	2.16976E-05	2.62541E-05	3.12445E-05	0.000237892	0.000231487	0.036493108	8.76683E-06	8.06548E-06	3.3194E-07	2.97531E-07	1182.704334	294.6312702	3.518994071	50728.74083
Orange (SC)	2029	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	99.8293143	2.602467923	15442.40789
Orange (SC)	2029	Agricultural - ATVs	Aggregate	50	Gasoline	2.70054E-05	3.26765E-05	3.88877E-05	0.001719714	6.89157E-05	0.067129062	5.04984E-06	4.64585E-06	6.1099E-07	5.47308E-07	2175.584287	199.2314347	7.437585873	69672.63768
Orange (SC)	2029	Agricultural - ATVs	Aggregate	50	Diesel	5.47551E-05	6.62536E-05	7.88473E-05	0.000679415	0.000565399	0.107697331	1.35954E-05	1.25078E-05	9.79888E-07	8.78065E-07	3490.360402	518.7202011	6.562010794	149709.0881
Orange (SC)	2029	Agricultural - ATVs	Aggregate	75	Gasoline	7.15293E-06	8.65505E-06	1.03002E-05	0.000480037	2.00529E-05	0.02051179	1.54302E-06	1.41958E-06	1.86726E-07	1.67234E-07	664.7661561	99.91294063	1.250822155	21288.99897
Orange (SC)	2029	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	6.79619E-08	8.2234E-08	9.78652E-08	7.56959E-07	6.15459E-07	0.000130997	2.83511E-08	2.6083E-08	1.19184E-09	1.06803E-09	4.245490193	136.2720962	0.001191036	161.9532987
Orange (SC)	2029	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Combine Harvesters	Aggregate	300	Diesel	2.98914E-07	3.61685E-07	4.30436E-07	1.74902E-06	2.98287E-06	0.000735429	1.27202E-07	1.17025E-07	6.69358E-09	5.99601E-09	23.83449528	41.31006036	0.004937922	1024.516317
Orange (SC)	2029	Agricultural - Combine Harvesters	Aggregate	600	Diesel	2.34633E-05	2.83906E-05	3.37872E-05	0.000168588	0.000237169	0.062059682	9.26844E-06	8.52696E-06	5.64895E-07	5.05977E-07	2011.290837	689.3172298	0.259672668	86454.53781
Orange (SC)	2029	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	2.58853E-07	3.13212E-07	3.72749E-07	1.81501E-06	3.88728E-06	0.000613663	1.05099E-07	9.6691E-08	5.58503E-09	5.00324E-09	19.88819785	110.6439559	0.00117551	854.8862866
Orange (SC)	2029	Agricultural - Construction Equipment	Aggregate	100	Diesel	4.55176E-06	5.50763E-06	6.55453E-06	5.6594E-05	4.27732E-05	0.009635165	2.92699E-06	2.69283E-06	8.76763E-08	7.85563E-08	312.2658338	89.11805024	0.257411496	13393.7554
Orange (SC)	2029	Agricultural - Construction Equipment	Aggregate	175	Diesel	3.80609E-05	4.60537E-05	5.48077E-05	0.000550717	0.000394221	0.097259772	1.70642E-05	1.5699E-05	8.85263E-07	7.92967E-07	3152.089783	187.5813203	2.058681191	150304.0038
Orange (SC)	2029	Agricultural - Construction Equipment	Aggregate	300	Diesel	6.69542E-06	8.10146E-06	9.64141E-06	3.70206E-05	6.27643E-05	0.013977885	2.97826E-06	2.74E-06	1.27191E-07	1.13963E-07	453.0089676	116.3173796	0.118665695	21601.2442
Orange (SC)	2029	Agricultural - Construction Equipment	Aggregate	50	Diesel	1.79943E-06	2.17731E-06	2.59118E-06	9.47108E-06	7.33349E-06	0.001139712	4.00708E-07	3.68651E-07	1.03331E-08	9.29216E-09	36.93690788	41.31006295	0.037034417	1584.303686
Orange (SC)	2029	Agricultural - Construction Equipment	Aggregate	600	Diesel	3.87252E-06	4.68575E-06	5.57643E-06	3.18544E-05	3.54892E-05	0.007282353	1.70457E-06	1.5682E-06	6.62537E-08	5.93736E-08	236.013617	47.17088953	0.037393456	11254.05487
Orange (SC)	2029	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.35465E-07	1.63912E-07	1.95069E-07	1.1275E-06	1.27524E-06	0.000186075	5.70264E-08	5.24643E-08	1.69178E-09	1.51708E-09	6.030486569	136.2720887	0.004798735	258.6605826
Orange (SC)	2029	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	9.7772E-07	1.18304E-06	1.40792E-06	8.58512E-06	8.37084E-06	0.002452052	3.77081E-07	3.46915E-07	2.23182E-08	1.99918E-08	79.46849405	3.217081119	0.006458961	3415.921647
Orange (SC)	2029	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	6.66783E-06	8.06807E-06	9.60167E-06	5.47653E-05	6.43249E-05	0.012520117	3.15484E-06	2.90246E-06	1.13906E-07	1.02077E-07	405.7641989	96.81622583	0.030560286	17441.61288
Orange (SC)	2029	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	4.37778E-06	5.29711E-06	6.304E-06	3.54569E-05	5.92967E-05	0.007928643	1.97619E-06	1.8181E-06	7.21287E-08	6.46428E-08	256.959224	48.40811292	0.014858943	11045.29005
Orange (SC)	2029	Agricultural - Forklifts	Aggregate	100	Diesel	1.51421E-05	1.8322E-05	2.18047E-05	0.000144718	0.000109537	0.023962273	8.0814E-06	7.43489E-06	2.17933E-07	1.95366E-07	776.5927807	398.6826642	0.506574592	33309.74024
Orange (SC)	2029	Agricultural - Forklifts	Aggregate	175	Diesel	1.64567E-06	1.99126E-06	2.36977E-06	1.83308E-05	1.4902E-05	0.003172128	6.86529E-07	6.31606E-07	2.88607E-08	2.58626E-08	102.8054113	41.78022258	0.051146957	4902.165193
Orange (SC)	2029	Agricultural - Forklifts	Aggregate	300	Diesel	2.31939E-05	2.80646E-05	3.33992E-05	0.000129018	0.00010203	0.015781628	5.4289E-06	4.99459E-06	1.43135E-07	1.28669E-07	511.4664294	540.4480437	0.70933225	21937.89868
Orange (SC)	2029	Agricultural - Forklifts	Aggregate	75	Diesel	6.10332E-05	7.38501E-05	8.78878E-05	0.000515489	0.000579413	0.085245194	2.57358E-05	2.36769E-05	7.75076E-07	6.95011E-07	2762.709572	1044.938867	2.131055059	118498.5743
Orange (SC)	2029	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.23417E-07	2.70334E-07	3.2172E-07	2.67438E-06	1.87086E-06	0.00044208	9.578E-08	8.81176E-08	4.02232E-09	3.60431E-09	14.32735125	3.217080901	0.006458961	650.65172
Orange (SC)	2029	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	5.66737E-06	6.85752E-06	8.16102E-06	3.31613E-05	5.6555E-05	0.013943663	2.41173E-06	2.21879E-06	1.2691E-07	1.13684E-07	451.8998744	151.9539997	0.120977745	20522.24598
Orange (SC)	2029	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	1.96129E-08	2.37316E-08	2.82425E-08	1.63242E-07	1.84632E-07	2.69403E-05	8.2564E-09	7.59589E-09	2.4494E-10	2.19646E-10	0.873106608	136.2720962	0.000595518	35.66611992
Orange (SC)	2029	Agricultural - Nut Harvester	Aggregate	100	Diesel	0.000102118	0.000123563	0.00014705	0.0008572	0.000830008	0.132325263	6.68179E-05	6.14725E-05	1.20292E-06	1.07886E-06	4288.52649	1214.328651	2.188814336	165816.1934
Orange (SC)	2029	Agricultural - Nut Harvester	Aggregate	175	Diesel	1.93992E-05	2.3473E-05	2.79348E-05	0.000207771	0.000179197	0.035060392	8.62263E-06	7.93282E-06	3.18951E-07	2.8585E-07	1136.271457	556.9805143	0.469309984	48842.1771
Orange (SC)	2029	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.25025E-05	3.93281E-05	4.68037E-05	0.000171073	0.000145135	0.020586291	6.93171E-06	6.37717E-06	1.86644E-07	1.67842E-07	667.1806478	136.2720887	1.644591015	25796.58871
Orange (SC)	2029	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.15451E-05	1.39696E-05	1.6625E-05	6.59329E-05	0.000112777	0.026664206	4.99181E-06	4.59246E-06	2.42666E-07	2.17395E-07	864.1596572	157.8148388	0.179330028	37145.55927
Orange (SC)	2029	Agricultural - Nut Harvester	Aggregate	50	Diesel	9.42334E-06	1.14022E-05	1.35696E-05	4.85618E-05	3.66038E-05	0.005371192	2.28003E-06	2.09763E-06	4.86692E-08	4.37917E-08	174.0748312	228.2374191	0.199303355	6730.616209
Orange (SC)	2029	Agricultural - Nut Harvester	Aggregate	75	Diesel	1.93175E-05	2.33741E-05	2.78172E-05	0.000161558	0.000182352	0.026679522	8.13659E-06	7.48566E-06	2.42572E-07	2.1752E-07	864.6560133	293.483848	0.552233368	33431.98876
Orange (SC)	2029	Agricultural - Other Harvesters	Aggregate	100	Diesel	1.9549E-05	2.36543E-05	2.81506E-05	0.00018028	0.000139604	0.029593766	1.04748E-05	9.6368E-06	2.69125E-07	2.4128E-07	959.1036955	601.9448721	0.479609935	37083.81539
Orange (SC)	2029	Agricultural - Other Harvesters	Aggregate	175	Diesel	1.76128E-05	2.13114E-05	2.53624E-05	0.000191665	0.000161929	0.032623589	7.68176E-06	7.06722E-06	2.96796E-07	2.65983E-07	1057.297168	342.3826178	0.431754666	45447.49853
Orange (SC)	2029	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.19584E-07	1.44697E-07	1.72201E-07	6.99718E-07	1.19334E-06	0.000294217	5.08886E-08	4.68175E-08	2.67785E-09	2.39878E-09	9.535286922	136.2720887	0.001786554	409.870513
Orange (SC)	2029	Agricultural - Other Harvesters	Aggregate	600	Diesel	2.05346E-07	2.48468E-07	2.95698E-07	1.47545E-06	2.07565E-06	0.000543133	8.11154E-08	7.46261E-08	4.94384E-09	4.4282E-09	17.60237733	136.2720887	0.001786554	756.6311985
Orange (SC)	2029	Agricultural - Other Harvesters	Aggregate	75	Diesel	6.07421E-08	7.3498E-08	8.74687E-08	5.0557E-07	5.71816E-07	8.34355E-05	2.55705E-08	2.35249E-08	7.58592E-10	6.80256E-10	2.704059871	136.2720887	0.001786554	104.5526733
Orange (SC)	2029	Agricultural - Other Harvesters	Aggregate	750	Diesel	8.53746E-08	1.03303E-07	1.22939E-07	6.11043E-07	8.93955E-07	0.000224934	3.58154E-08	3.29502E-08	2.04744E-09	1.8339E-09	7.289873913	136.2720962	0.000595518	313.3523321
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	3.36418E-06	4.07066E-06	4.84442E-06	3.52644E-05	3.12695E-05	0.005879564	1.53246E-06	1.40986E-06	5.34842E-08	4.79365E-08	190.5506619	268.4587749	0.074183378	8653.526548
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.50601E-05	1.82227E-05	2.16865E-05	7.78602E-05	0.000134885	0.026033433	6.90767E-06	6.35506E-06	2.36811E-07	2.12253E-07	843.716964	48.40810713	0.177345168	38315.93729
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	3.02411E-06	3.65918E-06	4.35472E-06	1.64031E-05	1.28638E-05	0.002000797	6.87297E-07	6.32314E-07	1.81441E-08	1.63127E-08	64.84377442	65.68422062	0.08741465	2648.847032
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.47879E-05	1.78933E-05	2.12945E-05	0.000109394	0.000146628	0.036805751	5.97777E-06	5.49955E-06	3.34996E-07	3.0008E-07	1192.83678	157.8148322	0.179330031	54170.60575
Orange (SC)	2029	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.00041367	0.000500541	0.000595685	0.003087613	0.003710445	0.473764162	0.000208372	0.000191702	4.30538E-06	3.86264E-06	15354.21216	725.426824	13.84764487	627214.563
Orange (SC)	2029	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	2.62669E-05	3.1783E-05	3.78243E-05	0.000244422	0.000185035	0.040337636	1.37671E-05	1.26658E-05	3.66841E-07	3.28876E-07	1307.301549	398.870044	0.601733444	46727.48621
Orange (SC)	2029	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	5.81097E-07	7.03128E-07	8.3678E-07	3.41455E-06	5.14614E-06	0.001370502	2.413E-07	2.21996E-07	1.2473E-08	1.11738E-08	44.41655714	139.4891773	0.008841033	1764.963049
Orange (SC)	2029	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.33295E-09	1.61287E-09	1.91945E-09	1.1746E-08	1.28725E-08	1.87875E-06	5.80221E-10	5.33803E-10	1.70825E-11	1.53176E-11	0.060888353	0.470162087	3.9281E-05	2.176360716
Orange (SC)	2029	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	3.42975E-05	4.14999E-05	4.93884E-05	0.000838051	0.000549049	0.130786043	1.75894E-05	1.61823E-05	1.20815E-06	1.06746E-06	4243.209131	1688.261915	4.933274222	153223.0971
Orange (SC)	2029	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	7.07365E-05	8.55911E-05	0.000101861	0.001617554	0.00085933	0.274097676	3.81194E-05	3.50699E-05	2.53205E-06	2.23715E-06	8892.797242	2351.522427	6.958513113	321109.2464
Orange (SC)	2029	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.2742E-05	3.96178E-05	4.71484E-05	0.000306941	0.000370266	0.159637244	1.23543E-05	1.1366E-05	1.47494E-06	1.30294E-06	5179.254569	835.2453682	2.44067251	187023.8778
Orange (SC)	2029	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.08579E-05	2.52381E-05	3.00354E-05	0.000107614	9.11722E-05	0.010425295	8.39323E-06	7.72177E-06	9.57613E-08	8.50899E-08	338.2372011	254.6414981	0.778938035	10985.00869
Orange (SC)	2029	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.42329E-06	1.72218E-06	2.04953E-06	1.0538E-05	1.49217E-05	0.001510501	1.10968E-06	1.02091E-06	1.39226E-08	1.23285E-08	49.00655299	29.57926977	0.103858405	1768.556938
Orange (SC)	2029	Airport Ground Support - A/C Tug

Orange (SC)	2029	Airport Ground Support - Misc - Maint. Truck	Aggregate	175	Gasoline	0.00016409	0.00015093	0.000180571	0.015255498	0.001345093	0.437467256	3.13617E-05	2.36955E-05	4.34578E-06	6.12233E-06	17476.2	2956.5	6.56	384345
Orange (SC)	2029	Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000130316	0.000119864	0.000143404	0.010476176	0.000278203	0.105314097	7.26026E-06	5.48553E-06	1.28043E-06	1.62009E-06	4624.55	1784.85	9.73	89242.5
Orange (SC)	2029	Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.09826E-05	0.001613217	0.000441952	0.095227491	0	0	0	0	5088.1	1868.8	1.81	93440
Orange (SC)	2029	Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.3833E-05	4.03176E-05	4.82356E-05	0.004620979	0.000429079	0.141261103	1.01269E-05	7.65145E-06	1.2502E-06	1.97045E-06	5624.65	843.15	4.48	105478.065
Orange (SC)	2029	Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	7.91374E-09	9.47783E-06	9.39502E-07	0.000386027	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2029	Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000796869	0.00073296	0.000876906	0.052418954	0.004727302	1.269185315	9.36284E-05	7.07415E-05	1.2974E-05	1.79527E-05	51246	15939.55	18.95	2869119
Orange (SC)	2029	Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.07486E-05	0.006289218	0.000531837	0.177204533	0	0	0	0	9716.3	2409	1.85	433620
Orange (SC)	2029	Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	5.82995E-06	5.36239E-06	6.41551E-06	0.000393405	3.24136E-05	0.009946083	6.93465E-07	5.23951E-07	8.21159E-08	1.38098E-07	394.2	160.6	0.44	8559.98
Orange (SC)	2029	Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.73173E-08	2.53183E-05	6.9298E-06	0.002108281	0	0	0	0	94.9	51.1	0.15	2299.5
Orange (SC)	2029	Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.2919E-05	1.18829E-05	1.42166E-05	0.001201566	0.000110967	0.035281961	2.52934E-06	1.91106E-06	3.50489E-07	4.94857E-07	1412.55	514.65	1.68	77197.5
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	100	Diesel	2.41445E-05	2.92148E-05	3.47681E-05	0.000638582	0.000351173	0.097962917	9.9786E-06	9.18032E-06	9.04991E-07	7.9956E-07	3178.298971	2242.71068	4.511706467	183204.169
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	175	Diesel	9.80183E-05	0.000118602	0.000141146	0.002371559	0.000867376	0.393340418	3.57322E-05	3.28736E-05	3.63369E-06	3.21039E-06	12761.49667	4834.474735	9.775364012	735604.462
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	25	Diesel	7.92017E-07	9.58341E-07	1.1405E-06	1.31515E-05	8.70627E-06	0.001608156	4.44554E-08	4.08989E-08	1.48444E-08	1.31256E-08	52.17486538	108.2089889	0.214843165	2705.224722
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	300	Diesel	9.39501E-05	0.00011368	0.000135288	0.000815439	0.000875689	0.373939233	3.60678E-05	3.31824E-05	3.45444E-06	3.05204E-06	12132.0466	3103.130913	6.337873371	699325.3833
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	50	Diesel	0.000102609	0.000124157	0.000147758	0.001352826	0.001111598	0.192446326	2.84623E-05	2.61853E-05	1.77618E-06	1.57072E-06	6243.709116	9393.17532	19.12104169	323738.0896
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	600	Diesel	6.31522E-05	7.64142E-05	9.09392E-05	0.000567589	0.000561032	0.233252249	2.35074E-05	2.16268E-05	2.15464E-06	1.90377E-06	7567.612328	1214.725286	2.470696399	436217.4253
Orange (SC)	2029	Airport Ground Support - Other	Aggregate	75	Diesel	3.41237E-05	4.12896E-05	4.91381E-05	0.000677541	0.000456958	0.101888732	1.70711E-05	1.57054E-05	9.40988E-07	8.31602E-07	3305.667687	2911.139344	6.015608623	190550.4113
Orange (SC)	2029	Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	6.1307E-07	7.41815E-07	8.82821E-07	5.75291E-06	9.45611E-06	0.000919159	5.77856E-07	5.31628E-07	8.47969E-09	7.50205E-09	29.82108934	13.25582083	0.058295973	1458.140291
Orange (SC)	2029	Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	1.99799E-07	2.41757E-07	2.8771E-07	1.3529E-06	4.52368E-06	0.000766579	9.73927E-08	8.96013E-08	7.08141E-09	6.25671E-09	24.87080688	4.506979082	0.116591947	1228.1518
Orange (SC)	2029	Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.19321E-06	1.44378E-06	1.71822E-06	1.08114E-05	1.26663E-05	0.001953453	6.39542E-07	5.88379E-07	1.80248E-08	1.59438E-08	63.37763351	64.82096385	1.107623496	2802.413081
Orange (SC)	2029	Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	6.03749E-08	7.30537E-08	8.69399E-08	1.51022E-06	4.19919E-07	0.000865039	1.4011E-08	1.28901E-08	7.9959E-09	7.06033E-09	28.06522244	4.506979082	0.116591947	1385.896068
Orange (SC)	2029	Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.42704E-07	2.93672E-07	3.49494E-07	1.29705E-05	6.55928E-06	0.002228002	3.70547E-08	3.40904E-08	2.05917E-08	1.81847E-08	72.28506073	63.09770714	1.632287257	3569.527433
Orange (SC)	2029	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000361	0.0000436	0.0000519	0.000169437	0.000918655	0.127294585	0.0000419	0.0000401	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2029	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	0.0000546	0.0000662	0.0000787	0.000409449	0.001143211	0.161520299	0.0000535	0.0000512	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2029	Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000277	0.0000335	0.0000399	0.000141287	0.000662724	0.087797776	0.0000243	0.0000232	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2029	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000273308	0.000330921	0.000393592	0.001136822	0.00172365	0.164380339	0.000131728	0.000126078	0	0	5332.555636	11062.28145	6.703054952	92409.87581
Orange (SC)	2029	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.001726268	0.002088763	0.002485598	0.006919733	0.011014466	1.201926056	0.0074041	0.00070782	0	0	38990.90176	42036.67887	25.47161507	669971.6978
Orange (SC)	2029	Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000937661	0.001134613	0.001350245	0.003818237	0.011872039	1.4032214	0.000703161	0.000672271	0	0	45520.99244	28761.93622	17.427946	805229.3169
Orange (SC)	2029	Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000154686	0.00018717	0.000222748	0.00091325	0.00302606	0.43995744	0.000134995	0.000129055	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2029	Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000321005	0.000388383	0.000462235	0.002226114	0.00811244	1.104411255	0.000318211	0.000304153	0	0	35827.48786	14573.56994	20.409706	692498.7355
Orange (SC)	2029	Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.18731E-05	3.85769E-05	4.58827E-05	0.000117299	0.000208887	0.022763283	1.47485E-05	1.41435E-05	0	0	738.4469246	3135.15038	5.1024261	11761.97379
Orange (SC)	2029	Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.000815255	0.000986521	0.001174034	0.003668454	0.012654842	1.198640497	0.000519997	0.000497168	0	0	38884.3143	8115.264229	15.30727908	751594.1675
Orange (SC)	2029	Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000325091	0.000393139	0.000468004	0.001412062	0.003002302	0.380274545	0.000170585	0.000163081	0	0	12336.24112	15538.90149	25.51213226	205775.4352
Orange (SC)	2029	Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000318986	0.000385952	0.000459296	0.001874497	0.008565466	0.994453512	0.000270282	0.000258336	0	0	32260.41943	4151.633637	5.102426052	624624.6258
Orange (SC)	2029	Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000663167	0.000802374	0.000955114	0.002609574	0.006286987	0.688158453	0.000455538	0.000435518	0	0	22324.1035	18054.53379	28.06334501	403681.7741
Orange (SC)	2029	Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	6.63329E-05	0.0000802	0.000095413	0.000501458	0.001537304	0.248560923	6.50395E-05	0.000062177	0	0	8063.4032	3548.810304	2.00000003	155594.0469
Orange (SC)	2029	Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000492	0.00000595	0.00000708	0.0000459	0.0000962	0.012758453	0.00000506	0.00000484	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2029	Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	0.0000344	0.0000416	0.0000495	0.000122818	0.000171544	0.017992692	0.0000221	0.0000211	0	0	583.689209	421.2630615	0.40625	10148.22754
Orange (SC)	2029	Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.34355E-05	4.0474E-05	4.81353E-05	0.000329706	0.000646516	0.083164945	3.64781E-05	3.48304E-05	0	0	2697.90108	4401.6145	6.136045198	46771.55469
Orange (SC)	2029	Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000220214	0.000266459	0.000317108	0.001652224	0.004984327	0.796780953	0.000209097	0.000199897	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.000769694	0.000931376	0.00110835	0.003020554	0.010410116	0.92135209	0.000367137	0.000350994	0	0	29888.98338	9472.179723	9.500724091	578418.6819
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.002833159	0.003428056	0.004079739	0.012013163	0.051042036	4.70530659	0.001474021	0.001409168	0	0	152641.7963	28416.54277	28.50217605	2953901.638
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000109201	0.000132133	0.000157249	0.0004851	0.003006001	0.413541555	0.0000456	0.0000436	0	0	13415.43262	1578.696655	1.583454013	260011.344
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000086254	0.000104312	0.000124134	0.000364218	0.001175329	0.090447319	4.34687E-05	4.14997E-05	0	0	2934.142619	1599.417304	1.340611002	55275.85746
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000778783	0.000942383	0.001121517	0.003521225	0.020361612	2.027567316	0.000431123	0.000412168	0	0	65774.99183	15994.17666	13.406113	1271345.006
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.004677808	0.005660151	0.006736056	0.019958742	0.093493843	8.659263317	0.002485289	0.002376087	0	0	280909.5283	46383.11286	38.8777281	5436395.843
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.007998671	0.009678668	0.01151833	0.031423339	0.09728124	6.056343016	0.004209213	0.004024028	0	0	196469.8879	20792.4321	17.42794892	3800216.463
Orange (SC)	2029	Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008274962	0.010012712	0.011915958	0.033428889	0.102698725	8.260247594	0.004267743	0.004079967	0	0	267965.3159	15994.17923	13.40611511	5288980.13
Orange (SC)	2029	Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2029	Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001634417	0.001977594	0.002353453	0.006920695	0.041209317	4.864925641	0.000770759	0.000736781	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2029	Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001065	0.000129	0.000153458	0.000429879	0.001099871	0.134737155	7.609E-05	7.275E-05	0	0	4370.920506	3610.067691	12.75606513	77399.85528
Orange (SC)	2029	Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000627269	0.000758974	0.000903247	0.002771815	0.016006483	1.679803543	0.000340542	0.000325656	0	0	54493.41496	15571.51682	22.96091818	1054245.276
Orange (SC)	2029	Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.005010262	0.006062396	0.007214825	0.020219206	0.102427285	9.816207586	0.002695431	0.002576852	0	0	318441.2104	51782.30979	81.63881289	6160637.848
Orange (SC)	2029	Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002783021	0.003367495	0.00400755	0.010589173	0.036047806	2.915781798	0.001384016	0.00132309	0	0	94588.98066	10624.30238	20.40970582	1831067.736
Orange (SC)	2029	Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001750317	0.002117884	0.002520456	0.005375006	0.027209344	2.936270505	0.000712229	0.000680891	0	0	95253.64356	6490.26294	10.2048521	1895210.052
Orange (SC)	2029	Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002370957	0.002868852	0.00341418	0.009833898	0.059938413	5.59180212	0.001414608	0.001352358	0	0	181400.0205	4744.229518	2.000000031	3515664
Orange (SC)	2029	Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.000207428	0.000250984	0.000298696	0.000839719	0.005234315	0.543288208	0.000115255	0.000110184	0	0	17624.45901	8022.818031	3.000000046	340087.2812
Orange (SC)	2029	Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	0.0000332	0.0000402	0.0000479	0.00018076	0.001017015	0.090107121	0.0000217	0.0000208	0	0	2923.106445	777.4315796	0.8125	56499.84375
Orange (SC)	2029	Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000966	0.000116931	0.000139158	0.00055224	0.002527061	0.228271365	0.0000474	0.0000453	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2029	Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000214806	0.000259946	0.000309289	0.000914512	0.003396663	0.322353303	0.000105485	0.000100787	0	0	10457.25377	3920.689598	6.136045962	195838.4484
Orange (SC)	2029	Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.00092662	0.0011212	0.001334324	0.004466317	0.024868027	2.485834533	0.000514069	0.000491428	0	0	80641.34404	11762.06809	18.40813706	1560179.505
Orange (SC)	2029	Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000311737	0.000377202	0.000448901	0.001216442	0.007486671	0.733968862	0.000170324	0.00016283	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	6.90596E-05	8.35621E-05	9.94458E-05	0.002085913	0.001003611	0.332494636	2.18657E-05	2.01165E-05	3.07201E-06	2.71378E-06	10787.42229	5061.72327	13.25062367	418662.324
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	9.39144E-05	0.000113636	0.000135237	0.002916562	0.000798037	0.522466934	3.7862E-05	3.4833E-05	4.82765E-06	4.2643E-06	16950.86427	4339.220932	13.19375404	650520.612
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.000130355	0.000157729	0.000187711	0.001495768	0.001382955	0.745346548	4.54733E-05	4.18354E-05	6.88719E-06	6.08342E-06	24181.9479	4480.966554	13.19375404	935264.5468
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	5.69169E-05	6.88695E-05	8.19603E-05	0.000514638	0.000449658	0.071040952	1.93738E-05	1.78239E-05	6.55101E-07	5.79827E-07	2304.845444	2008.594496	5.402614802	78520.44726
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.000164138	0.000198607	0.000236359	0.002013083	0.001438843	1.069478928	5.23471E-05	4.81593E-05	9.88294E-06	8.72894E-06	34698.06601	3485.89736	10.4071422	1349416.06
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	2.06121E-05	2.49406E-05	2.96814E-05	0.000615729	0.000378147	0.100364244	1.09913E-05	1.0112E-05	9.27299E-07	8.19159E-07	3256.207354	1790.446016	3.070959992	127280.7098
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000108944	0.000131822	0.000156879	0.001585834	0.000694325	0.860438491	2.63628E-05	2.42538E-05	7.95191E-06	7.02278E-06	27915.97924	1687.173237	2.843481474	1067260.301
Orange (SC)	2029	Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	0.000108737	0.000131572	0.000156582	0.000735301	0.002848902	0.386858154	6.67345E-05	6.13958E-05	3.57343E-06	3.15748E-06	12551.18677	259.9461359	0.341217777	483775.3652
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	100	Diesel	0.000258228	0.000312456	0.000371848	0.003529079	0.002869594	0.500799993	0.000150492	0.000138453	4.6224E-06	4.08746E-06	16247.90424	12438.61699	26.42671607	1091057.941
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	175	Diesel	0.000689478	0.000834268	0.000992848	0.009653812	0.007167708	1.531305003	0.000372912	0.000343079	1.4137E-05	1.24983E-05	49681.50439	22738.59837	47.92520671	3329540.193
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	25	Diesel	2.63438E-06	3.1876E-06	3.7935E-06	1.47241E-05	1.16972E-05	0.001367902	9.53568E-07	8.77282E-07	1.25679E-08	1.11646E-08	44.38006366	107.2044791	0.214270671	2680.111977
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	300	Diesel	0.00091528	0.001107489	0.001318003	0.006953188	0.010046811	2.59949325	0.000422581	0.000388774	2.40061E-05	2.12167E-05	84337.69568	25805.08961	52.28204368	5663015.985
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	50	Diesel	3.04819E-05	3.68831E-05	4.3894E-05	0.000209539	0.000172441	0.022148841	1.14586E-05	1.05419E-05	2.03863E-07	1.80776E-07	718.594758	1042.814953	2.285553822	43316.28509
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	600	Diesel	0.001323948	0.001601977	0.001906485	0.014156454	0.01308308	4.651967282	0.000547827	0.000504001	4.297E-05	3.79687E-05	150927.9552	27682.36104	53.63909126	10133714.17
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	75	Diesel	2.39393E-05	2.89666E-05	3.44726E-05	9.8585E-05	0.000201523	0.010925731	2.08415E-05	1.91742E-05	1.00296E-07	8.91743E-08	354.4733053	347.7754207	0.999929797	23891.39591
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	750	Diesel	4.13729E-05	5.00612E-05	5.95769E-05	0.000460811	0.000461341	0.095327868	2.29459E-05	2.11102E-05	8.80112E-07	7.78053E-07	3092.807686	328.771765	0.714235569	207645.5316
Orange (SC)	2029	Construction and Mining - Cranes	Aggregate	9999	Diesel	0.000119969	0.000145162	0.000172755	0.001235402	0.002096842	0.254737941	6.92985E-05	6.37546E-05	2.35158E-06	2.07914E-06	8264.691959	591.2437806	1.142776911	555328.0218
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.001569747	0.001899394	0.002260436	0.021523601	0.017121614	3.102337898	0.000983399	0.000904727	2.86356E-05	2.53209E-05	100651.9365	51807.09873	105.2913597	4528702.886
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.0012924	0.001563804	0.001861055	0.021199457	0.012320822	3.476130327	0.000691257	0.000635957	3.20998E-05	2.83717E-05	112779.2202	34126.49379	71.88464894	5094133.018
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.001163309	0.001407603	0.001675164	0.009351385	0.012480116	3.541466977	0.000527098	0.00048493	3.27077E-05	2.8905E-05	114898.9958	25413.97404	53.37466879	5186452.903
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000136923	0.000165677	0.000197169	0.000743543	0.000546137	0.071968556	4.06067E-05	3.73582E-05	6.61277E-07	5.87398E-07	2334.940538	2259.398082	6.339034298	95201.33745
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.003347814	0.004050856	0.004820853	0.034997303	0.030407164	12.76693157	0.00126108	0.001160194	0.000117936	0.000104202	414209.0345	48566.20536	99.20588676	18667999.76
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	6.32427E-05	7.65236E-05	9.10694E-05	0.000414903	0.000640399	0.048404848	4.95628E-05	4.55978E-05	4.4563E-07	3.95074E-07	1570.441992	931.1990487	3.296297835	68843.2577
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	5.68851E-05	6.8831E-05	8.19146E-05	0.000436886	0.000830849	0.132746382	3.09666E-05	2.84892E-05	1.2256E-06	1.08346E-06	4306.810174	317.8873946	0.63390343	194633.7614
Orange (SC)	2029	Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.00022187	0.000268463	0.000319493	0.001884246	0.005139639	0.736946845	0.0010492	9.65262E-05	6.80678E-06	6.01486E-06	23909.42877	1099.483477	1.901710289	1062978.879
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	100	Diesel	0.000947362	0.001146308	0.001364201	0.024349367	0.0120341	3.707657066	0.000300409	0.000276376	3.42507E-05	3.02614E-05	120290.8503	75216.68343	110.7738224	6124848.302
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	175	Diesel	0.001665557	0.002015324	0.002398402	0.046052028	0.011761481	7.861350728	0.000569302	0.000523758	7.26321E-05	6.41633E-05	255052.8666	88387.00151	142.9769921	12905768.88
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	25	Diesel	1.43459E-06	1.73585E-06	2.06581E-06	4.87459E-06	3.31103E-06	0.000256494	4.61459E-07	4.24542E-07	2.32837E-09	2.09347E-09	8.321652838	15.15693794	0.0635171	378.9234484
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	300	Diesel	0.001943523	0.002351663	0.002798673	0.020915797	0.013834026	10.02454426	0.000495487	0.000455848	9.26236E-05	8.1819E-05	325235.2984	75188.71888	123.223174	16459021.73
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	50	Diesel	0.00144284	0.001745836	0.002077689	0.020649217	0.016189056	2.874261938	0.000363833	0.000334726	2.65307E-05	2.34593E-05	93252.26315	118487.5435	155.1087582	4237789.638
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	600	Diesel	0.003004518	0.003635467	0.004326506	0.034984709	0.01843381	17.7179303	0.000661105	0.000608217	0.000163721	0.000144611	574838.7357	86369.4615	128.939713	29133364.13
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	75	Diesel	3.25315E-05	3.93631E-05	4.68454E-05	0.000134926	0.00025152	0.015495907	3.00299E-05	2.76275E-05	1.42291E-07	1.26476E-07	502.747652	373.0122426	1.0797907	25494.09952
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	750	Diesel	9.85251E-05	0.000119215	0.000141876	0.000843482	0.001086418	0.323181449	3.87587E-05	3.5658E-05	2.98502E-06	2.63776E-06	10485.2662	859.625735	1.4608933	527548.8957
Orange (SC)	2029	Construction and Mining - Excavators	Aggregate	9999	Diesel	6.02715E-05	7.29285E-05	8.6791E-05	0.000916476	0.002181668	0.494938135	1.96324E-05	1.80618E-05	4.57414E-06	4.03962E-06	16057.72271	675.4689391	0.9527565	812075.503
Orange (SC)	2029	Construction and Mining - Graders	Aggregate	100	Diesel	0.000257556	0.000311643	0.000370881	0.003069659	0.002443209	0.409941392

Orange (SC)	2029 Construction and Mining - Misc - Trenchers	Aggregate	25	Gasoline	0.00239985	0.002423848	0.002640888	0.079291698	0.001546826	2.76464E-06	0.000895742	0.000676782	1.26066E-06	1.74017E-06	4959.760676	0	15.23223758	0
Orange (SC)	2029 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.00012552	0.000150973	0.000180437	0.000515293	0.000954033	2.20211E-06	0.000032083	2.42405E-05	1.30895E-08	1.12754E-08	44.86069111	0	0.498830406	0
Orange (SC)	2029 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.019576988	0
Orange (SC)	2029 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.001797076	0.001652951	0.001977573	0.156713519	0.002453087	0.97613364	6.72938E-05	5.08442E-05	1.1868E-05	1.62968E-05	46519.25	20848.8	51.76	625464
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000258638	0.000312952	0.000372439	0.005496719	0.003128467	0.810488575	0.0001218	0.000112056	7.48561E-06	6.6151E-06	26295.40922	14686.67879	20.68165726	1163934.541
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000285512	0.000345469	0.000411137	0.007688611	0.001949077	1.293417935	8.89467E-05	8.18309E-05	1.19497E-05	1.05567E-05	41963.52046	11764.58238	16.41998243	1862957.438
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	8.26084E-06	9.99562E-06	1.18956E-05	2.78291E-05	1.90051E-05	0.001464328	2.63448E-06	2.42372E-06	1.32906E-08	1.19517E-08	47.50851792	75.89763693	0.250686755	1897.440923
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000273772	0.000331264	0.000394231	0.002702281	0.001666124	1.252703502	6.43956E-05	5.9244E-05	1.15737E-05	1.02244E-05	40642.58553	8143.928607	11.97029254	1806579.038
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.000716292	0.000866714	0.001031461	0.00932964	0.007000221	1.186796371	0.000172364	0.000158575	1.0951E-05	9.68647E-06	38504.30124	40866.57787	59.2247458	1539263.747
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000666551	0.000806527	0.000959833	0.007080003	0.003621898	3.527537136	0.000125882	0.000115811	3.25938E-05	2.87913E-05	114447.0575	14021.69585	19.42822349	5086218.391
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000267702	0.000323919	0.00038549	0.004864173	0.002954218	0.705985279	0.000111807	0.000102862	6.51915E-06	5.76216E-06	22904.91489	14419.95281	22.56180792	1019132.687
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	5.27477E-05	6.38247E-05	7.59567E-05	0.000282065	0.000403396	0.133580492	2.0801E-05	1.91369E-05	1.23344E-06	1.09027E-06	4333.871939	296.038172	0.438701821	192350.4845
Orange (SC)	2029 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	7.00118E-05	8.47143E-05	0.000100817	0.000401348	0.001066515	0.192614067	2.41221E-05	2.21923E-05	1.77871E-06	1.57209E-06	6249.151273	177.2191128	0.313358443	277443.251
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	4.53336E-05	5.48537E-05	6.52804E-05	0.000774438	0.000446125	0.105887897	2.08381E-05	1.9171E-05	9.77626E-07	8.64243E-07	3435.416206	1970.318915	1.428202809	174038.2312
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.000744256	0.000900549	0.001071728	0.017231084	0.004118972	2.70926408	0.000205057	0.000188653	2.50262E-05	2.21126E-05	87899.08936	28206.44072	19.18759426	4457034.452
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	4.18294E-06	5.06136E-06	6.02344E-06	4.48891E-05	3.67633E-05	0.00421104	2.88155E-06	2.65102E-06	3.88077E-08	3.43699E-08	136.6225564	249.0126297	0.186287323	6225.315742
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.001597307	0.001932742	0.002300122	0.013000227	0.010364645	5.551357575	0.000400428	0.000368394	5.12771E-05	4.53094E-05	180107.6828	43419.62321	32.72447306	9144626.482
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	8.15586E-05	9.86859E-05	0.000117444	0.001043846	0.000667162	0.110556839	1.22622E-05	1.12812E-05	1.01971E-06	9.0235E-07	3586.894897	5698.469919	3.353171813	164689.5024
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.006408148	0.007753859	0.009227733	0.052181725	0.037168577	23.9204573	0.001322757	0.001216937	0.000220964	0.000195236	776072.8935	104215.7493	73.21091791	39168386.83
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	5.23417E-06	6.33335E-06	7.53721E-06	0.000144759	5.85656E-05	0.021499177	5.71965E-07	5.26207E-07	1.98614E-07	1.75473E-07	697.5171143	515.658406	0.372574646	35173.45995
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.002797989	0.003385567	0.004029105	0.021607421	0.021736693	7.985850811	0.000802955	0.000738718	7.37492E-05	6.51794E-05	259092.1347	19605.91049	15.39975203	13091596.72
Orange (SC)	2029 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.003572934	0.00432325	0.005145025	0.030303996	0.073471016	14.31958124	0.000989715	0.000910538	0.000132284	0.000116874	464583.0431	18442.34508	12.48125064	23832509.14
Orange (SC)	2029 Construction and Mining - Other	Aggregate	100	Diesel	0.000728846	0.000881903	0.001049538	0.012868207	0.008691843	1.941234361	0.00042499	0.000390991	1.79258E-05	1.58441E-05	62981.21096	35810.9323	75.33210213	2936893.669
Orange (SC)	2029 Construction and Mining - Other	Aggregate	175	Diesel	0.00036254	0.000438673	0.000522057	0.006608398	0.003570586	1.098348906	0.000185241	0.000170422	1.01439E-05	8.96458E-06	35634.72064	10929.94443	25.3372944	1661269.764
Orange (SC)	2029 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029 Construction and Mining - Other	Aggregate	300	Diesel	0.000414411	0.000501437	0.000596752	0.003623827	0.004135341	1.429263106	0.000182838	0.000168211	1.32018E-05	1.16655E-05	46370.86741	9838.977668	23.11255635	2153177.741
Orange (SC)	2029 Construction and Mining - Other	Aggregate	50	Diesel	0.000487373	0.000589721	0.000701817	0.004798149	0.003980377	0.642857239	0.000162582	0.000149576	5.92891E-06	5.24691E-06	20856.79513	22810.39254	45.91612131	871911.5916
Orange (SC)	2029 Construction and Mining - Other	Aggregate	600	Diesel	0.001292363	0.001563759	0.001861002	0.013462894	0.01183551	5.724271451	0.000463142	0.000426091	5.2885E-05	4.67207E-05	185717.6831	22469.37326	48.20265764	8612309.049
Orange (SC)	2029 Construction and Mining - Other	Aggregate	75	Diesel	0.000143511	0.000173648	0.000206656	0.000663539	0.001391052	0.070732706	0.000111741	0.000102802	6.49654E-07	5.77311E-07	2294.844749	1484.042173	5.561845112	106430.1899
Orange (SC)	2029 Construction and Mining - Other	Aggregate	750	Diesel	0.000193229	0.000233807	0.00027825	0.001944086	0.001829165	0.935786748	6.41423E-05	5.9011E-05	8.64602E-06	7.63777E-06	30360.57045	2291.42836	4.325879532	1416164.011
Orange (SC)	2029 Construction and Mining - Other	Aggregate	9999	Diesel	6.60448E-05	7.99142E-05	9.51045E-05	0.000671578	0.001792616	0.353608849	2.61214E-05	2.40316E-05	3.26731E-06	2.88611E-06	11472.44967	584.0462092	1.174167301	534250.6845
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	100	Diesel	0.000207672	0.000251283	0.000299047	0.004113794	0.002690793	0.630407683	0.000117945	0.000108509	5.8222E-06	5.1453E-06	20452.88299	11821.43275	29.19505535	955625.5537
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000250439	0.000303031	0.000360632	0.005945084	0.002319102	1.03972925	0.000114385	0.000105235	9.6053E-06	8.48613E-06	33732.87044	9935.973319	24.67013169	1568686.43
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000125152	0.000151434	0.00018022	0.001529804	0.001074551	0.800022282	3.75901E-05	3.45829E-05	7.39285E-06	6.52967E-06	25955.84186	5462.315162	11.65322804	1206482.692
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	50	Diesel	8.85868E-05	0.00010719	0.000127565	0.000651049	0.000523944	0.078722388	2.89693E-05	2.66518E-05	7.2517E-07	6.42522E-07	2554.061168	2756.746699	7.438230661	106490.6338
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	600	Diesel	2.52032E-05	3.04959E-05	3.62926E-05	0.000301086	0.000231973	0.16137614	7.70148E-06	7.08536E-06	1.49125E-06	1.31713E-06	5235.671132	692.1634434	1.487646132	245032.9958
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	75	Diesel	8.22686E-05	9.95451E-05	0.000118467	0.000864993	0.000871325	0.126972435	6.25499E-05	5.75459E-05	1.17146E-06	1.03633E-06	4119.480819	2645.071648	6.694407595	192173.1827
Orange (SC)	2029 Construction and Mining - Pavers	Aggregate	9999	Diesel	3.74403E-06	4.53027E-06	5.3914E-06	5.66564E-05	1.54641E-05	0.030448887	5.54578E-07	5.10212E-07	2.81403E-07	2.4852E-07	987.8806007	61.23638542	0.123970511	45927.28906
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	0.000107038	0.000129516	0.000154135	0.002678121	0.001460184	0.417503095	4.23651E-05	3.89759E-05	3.85681E-06	3.4076E-06	13545.42813	8222.162537	16.83287601	737877.0314
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.000114226	0.000138214	0.000164486	0.002498877	0.001017678	0.4291188	5.46547E-05	5.02823E-05	3.96399E-06	3.50241E-06	13922.28688	5161.870599	10.7680898	758265.8765
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	1.02237E-06	1.23706E-06	1.47221E-06	3.54362E-06	2.52957E-06	0.000232412	3.6013E-07	3.3132E-07	2.1181E-09	1.89692E-09	7.540365368	14.76761057	0.061885574	369.1902643
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	6.77338E-05	8.19578E-05	9.75366E-05	0.000588823	0.000625356	0.276240048	2.60769E-05	2.39907E-05	2.55194E-06	2.25463E-06	8962.304133	2150.828642	4.455761296	487174.0473
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	6.04576E-05	7.31537E-05	8.7059E-05	0.000704359	0.000594601	0.097802395	2.04686E-05	1.88311E-05	9.02418E-07	7.9825E-07	3173.091009	4492.233298	9.097179313	155476.6834
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	4.88972E-05	5.91656E-05	7.0412E-05	0.000655617	0.000266595	0.34210522	9.39543E-06	8.64379E-06	3.16147E-06	2.79222E-06	11099.2271	1543.067629	3.094278678	604355.415
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.56012E-05	1.88775E-05	2.24657E-05	0.000132611	0.000159015	0.018272111	1.37293E-05	1.26309E-05	1.68467E-07	1.49135E-07	592.8185272	467.8379029	1.299597045	32157.2104
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.09798E-05	1.32855E-05	1.58109E-05	0.000111898	8.03267E-05	0.058882225	1.28277E-06	1.18015E-06	5.44066E-07	4.80589E-07	1910.368938	163.403611	0.309427868	104277.7901
Orange (SC)	2029 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	6.18457E-06	7.48333E-06	8.90578E-06	5.65733E-05	0.000131968	0.028765983	2.32166E-06	2.13593E-06	2.6577E-07	2.34784E-07	933.2806279	60.25185113	0.123711147	50793.19656
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	100	Diesel	0.000796823	0.000964155	0.001147424	0.016159835	0.010468842	2.50475606	0.000419751	0.000386171	2.31338E-05	2.04435E-05	81264.05186	47935.31376	138.1668487	4183130.267
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000438807	0.000530957	0.000631883	0.014505394	0.003706803	2.610863969	0.000163997	0.000150877	2.41256E-05	2.13095E-05	84706.60613	30380.57365	81.10209115	4368460.261
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	25	Diesel	1.44479E-06	1.7482E-06	2.0805E-06	4.80392E-06	3.30789E-06	0.000252775	4.54769E-07	4.18388E-07	2.29369E-09	2.06312E-09	8.201016627	15.21478262	0.063759506	380.3695656
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	300	Diesel	0.00013141	0.000159006	0.00018923	0.001281952	0.001437984	0.458612892	6.16622E-05	5.67292E-05	4.23616E-06	3.74314E-06	14879.19021	3489.890764	10.83911596	766292.3844
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	50	Diesel	0.001113202	0.001346974	0.00160301	0.011270598	0.009580001	1.61624294	0.000345006	0.000317406	1.49096E-05	1.31916E-05	52437.22221	67996.76539	188.0267821	2429476.234
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	600	Diesel	5.13707E-05	6.21586E-05	7.39738E-05	0.000632654	0.000553408	0.226670957	2.0387E-05	1.8756E-05	2.09414E-06	1.85006E-06	7354.089576	1059.177092	3.315494292	376645.4813
Orange (SC)	2029 Construction and Mining - Rollers	Aggregate	75	Diesel	6.50561E-05	7.87179E-05	9.36808E-05	0.000256222	0.000626449	0.021573233	4.55317E-05	4.18892E-05	1.97504E-07	1.76078E-07	699.9197842	502.0878265	2.104063685	36089.46438
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.001022592	0.001237336	0.001472532	0.03755265	0.018301587	6.208155498	0.000319967	0.00029437	5.73668E-05	5.06701E-05	201416.7681	100459.9791	340.6750473	9671479.555
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.000367287	0.000444417	0.000528893	0.009091251	0.003430262	1.608194449	0.000211385	0.000194474	1.48575E-05	1.31259E-05	52176.0978	20658.89762	71.29894619	2509269.042
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	6.34106E-07	7.67269E-07	9.13113E-07	8.25957E-06	9.84266E-06	0.00114023	5.22752E-07	4.80932E-07	1.0523E-08	9.3064E-09	36.99349537	63.99966158	0.220739771	1599.991539
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	1.49437E-05	1.80818E-05	2.15189E-05	0.000198035	0.000166492	0.107238915	3.43991E-06	3.16471E-06	9.91029E-07	8.7527E-07	3479.248494	789.9436967	3.016776877	167323.0059
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	3.76663E-05	4.55762E-05	5.42395E-05	0.000490313	0.000436828	0.081128707	9.87767E-06	9.08746E-06	7.48945E-07	6.62162E-07	2632.131553	2375.010761	8.314531393	113767.385
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	4.66927E-06	5.64981E-06	6.72375E-06	6.51394E-05	3.59235E-05	0.035300854	6.33379E-07	5.82709E-07	2.36234E-07	2.88121E-07	1145.297325	137.6563366	0.515059467	55059.02298
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	1.88037E-05	2.27525E-05	2.70773E-05	0.000207502	0.000326186	0.029805346	1.84355E-05	1.69607E-05	2.75001E-07	2.43267E-07	967.0016418	637.9774221	2.648877258	46165.84641
Orange (SC)	2029 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.36385E-06	1.65025E-06	1.96394E-06	1.25777E-05	1.71323E-05	0.006640058	1.24844E-07	1.14857E-07	6.13497E-08	5.41953E-08	215.4293798	16.59250485	0.073579924	10370.31553
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000154703	0.000187191	0.000222773	0.001752518	0.001545269	0.229536129	9.7552E-05	8.97478E-05	2.11753E-06	1.87344E-06	7447.04691	4326.488324	4.85289162	359397.7251
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.000151124	0.000182861	0.000217619	0.002090294	0.001385301	0.310479402	7.56499E-05	6.95979E-05	2.866E-06	2.53409E-06	10073.16226	3386.30927	4.246280167	492703.1325
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.0002499	0.000302379	0.000359856	0.002388072	0.003040592	0.361941414	0.000137474	0.000126476	3.33883E-06	2.95412E-06	11742.79058	2565.697252	3.57900757	573723.8781
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	5.45078E-05	6.59545E-05	7.84913E-05	0.000695075	0.000447087	0.071260697	1.20909E-05	1.11237E-05	6.57205E-07	5.8162E-07	2311.974834	2466.395815	2.487106955	101660.6629
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.001850368	0.002238945	0.002664529	0.01759976	0.019141847	3.567524011	0.000856238	0.000787739	3.2928E-05	2.91177E-05	115744.3876	15326.51088	20.13950022	5612681.255
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	5.79847E-05	7.01615E-05	8.3498E-05	0.000635989	0.000525048	0.082949677	3.48435E-05	3.2056E-05	7.65171E-07	6.77024E-07	2691.210904	1797.992923	2.123140084	131697.5368
Orange (SC)	2029 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	5.22637E-05	6.32391E-05	7.52597E-05	0.000286678	0.000728235	0.133626224	2.07507E-05	1.90906E-05	1.23387E-06	1.09064E-06	4335.355671	318.459418	0.303305726	212041.8608
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.002328351	0.002817305	0.003352826	0.039237462	0.023160697	5.42492153	0.000981113	0.000902624	5.00862E-05	4.42775E-05	176005.6046	110044.6993	114.0620367	9477107.739
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.003739722	0.004525064	0.0053852	0.08200667	0.024050193	12.97521727	0.001183836	0.001089129	0.00011985	0.000105902	420966.6347	150310.2175	153.0100493	22522627.65
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	1.39412E-06	1.68689E-06	2.00754E-06	1.07643E-05	9.36246E-06	0.000948766	9.45966E-07	8.70289E-07	8.72998E-09	7.7437E-09	30.78165483	59.14410539	0.063227293	1478.602635
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.004853097	0.005872247	0.006988459	0.043634927	0.033581531	19.5213327	0.001179561	0.001085197	0.000180339	0.00015933	633348.1405	160816.9717	144.1582283	33921532.19
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.000239228	0.000289466	0.000344488	0.002165382	0.001487535	0.223749318	6.05039E-05	5.56636E-05	2.0615E-06	1.82621E-06	7259.300197	8340.299565	9.294412085	348229.8051
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.00685134	0.008290121	0.009865929	0.054636664	0.047939961	23.74311093	0.001813948	0.001668832	0.000219311	0.000193788	770319.0857	124385.9379	122.7874032	41262349.26
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	0.000101738	0.000123103	0.000146503	0.00042031	0.000812025	0.047368331	9.1692E-05	8.43566E-05	4.34892E-07	3.86614E-07	1536.813324	1115.515161	1.707136914	80937.08042
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.000590583	0.000714606	0.00085044	0.004797817	0.002837045	2.096902251	9.09968E-05	8.3717E-05	1.93692E-05	1.71146E-05	68031.68421	5685.076252	5.564001793	3649821.401
Orange (SC)	2029 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000476645	0.000576741	0.000686369	0.003619871	0.009924959	1.680253094	0.000165107	0.000151898	1.55205E-05	1.3714E-05	54513.96118	3037.170514	2.465864431	2906615.956
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	100	Diesel	7.36154E-05	8.90746E-05	0.000106006	0.00128083	0.000987298	0.192770975	4.86512E-05	4.47591E-05	1.78005E-06	1.57337E-06	6254.241996	2770.113176	4.688667648	250104.6055
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.000918272	0.001111109	0.001322312	0.015272984	0.008899328	2.481279825	0.000455323	0.000418897	2.29131E-05	2.02519E-05	80502.39128	19140.31994	40.63511962	3207670.577
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	25	Diesel	2.20396E-07	2.66679E-07	3.1737E-07	4.09731E-06	2.98472E-06	0.000574051	1.36564E-08	1.25639E-08	5.30078E-09	4.68533E-09	18.62446687	26.8523007	0.062515569	671.3075175
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.001152362	0.001394358	0.001659402	0.008173291	0.011669772	2.850986809	0.00053756	0.000494555	2.63242E-05	2.32694E-05	92497.12723	16577.64079	39.38480824	3712491.785
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.25865E-05	2.73297E-05	3.25246E-05	7.68526E-05	5.36098E-05	0.004569009	7.57807E-06	6.97183E-06	4.15652E-08	3.72916E-08	148.2364721	140.3032712	0.375093412	5433.935995
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.010158231	0.01229146	0.014627853	0.100813767	0.094267823	36.2613372	0.003747518	0.003447717	0.000334949	0.00029596	1176459.151	110963.1794	221.6176908	47093711.82
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	75	Diesel	2.13667E-05	2.58537E-05	3.07681E-05	0.000279294	0.000234806	0.039811546	1.23158E-05	1.13306E-05	3.67436E-07	3.24936E-07	1291.641764	742.6898835	1.562889216	51854.46794
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000141584	0.000171317	0.000203881	0.001846677	0.002179494	0.111207464	9.81966E-05	9.03408E-05	1.02392E-06	9.0766E-07	3608.00371	232.4961702	0.812702392	144646.78
Orange (SC)	2029 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.000512546	0.000620181	0.000738066	0.005680596	0.008783037	0.827433207	0.00029116	0.000267867	7.63465E-06	6.7534E-06	26845.15915	673.3960298	1.625404785	1075658.412
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	1.67109E-05	2.02202E-05	2.40637E-05	0.000283987	0.000256124	0.042423443	5.26284E-06	4.84181E-06	3.91724E-07	3.46254E-07	1376.381888	958.4847039	4.389079904	72641.79025
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	7.92898E-06	9.59406E-06	1.14177E-05	0.000243693	8.07683E-05	0.043926139	3.35674E-06	3.0882E-06	4.05881E-07	3.58519E-07	1425.135212	491.641198	1.742722903	74707.02608
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	6.77196E-06	8.19407E-06	9.75162E-06	7.72788E-05	8.39647E-05	0.040876865	2.35647E-06	2.16796E-06	3.77724E-07	3.33631E-07	1326.204877	338.0803351	1.097269976	69536.11688
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000520685	0.000630029	0.000749787	0.007386858	0.006600197	1.221413788	0.000139216	0.000128079	1.1277E-05	9.96902E-06	39627.42521	42810.44283	130.1878554	1865308.763
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.31872E-06	4.01565E-06	4.77896E-06	2.25465E-05	4.68847E-05	0.011779306	2.0893E-06	1.92216E-06	1.08806E-07	9.61411E-08	382.1666064	42.35630622	0.129090585	20026.06158
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.001253733	0.001517017	0.001805375	0.039606532	0.020532189	6.456194993	0.000499912	0.000459919	5.96531E-05	5.26946E-05	209464.1363	155534.6668	415.7362303	10966327.41
Orange (SC)	2029 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.23896E-06	2.70914E-06	3.2241E-06	2.95177E-05	7.0273E-05	0.015944915	9.85959E-07	9.07082E-07	1.47351E-07	1.3014E-07	517.3152034	27.18504744	0.129090585	27185.04744
Orange (SC)	2029 Construction and Mining - Surfacing Equipment	Aggregate	100	Diesel	1.47535

Orange (SC)	2029	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	22.75740011	0
Orange (SC)	2029	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	0.00002442	2.68727E-05	2.46642E-05	0.000322506	2.60649E-06	0.000706648	1.10412E-08	8.34223E-09	1.31099E-08	1.80965E-08	48.43668508	0	21.12460558	0
Orange (SC)	2029	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.872538151	0
Orange (SC)	2029	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	2.12918E-06	3.06074E-06	2.56094E-06	8.74086E-06	1.61831E-05	0.002122833	5.44219E-07	4.11188E-07	2.02979E-08	1.74848E-08	69.56557721	0	0.165774788	0
Orange (SC)	2029	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	0.000091906	0.000101137	0.000092825	0.004386897	3.29231E-05	0.009612133	1.50249E-07	1.13521E-07	1.6294E-07	2.24917E-07	627.5905228	0	97.10309276	0
Orange (SC)	2029	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36.18755386	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000153913	0.000169373	0.000155453	0.010876014	6.99211E-05	0.021408937	8.05204E-07	6.08376E-07	3.81484E-07	5.26589E-07	1455.98605	0	201.573337	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	93.78919368	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.91087E-06	1.09063E-05	1.001E-05	0.000230301	4.75631E-06	0.000582011	4.41681E-07	3.33715E-07	1.00852E-08	1.39213E-08	36.49560042	0	13.418127	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	6.243262778	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000127675	0.000140499	0.000128952	0.009161649	4.34663E-05	0.018034288	6.7828E-07	5.12479E-07	3.14273E-07	4.33813E-07	1226.224491	0	54.87862368	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	25.53423951	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.033453402	0.036813427	0.033787936	1.705528391	0.020650942	4.372703996	0.00013557	0.000102431	7.12185E-05	9.83079E-05	267407.7948	0	55109.885	0
Orange (SC)	2029	Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	25641.8421	0
Orange (SC)	2029	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000778435	0.00085662	0.000786219	0.056722811	0.000577893	0.137193918	2.0963E-06	1.58387E-06	2.20183E-06	3.03934E-06	8542.892038	0	446.4938083	0
Orange (SC)	2029	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.083936391	0.092366878	0.084775757	0.535113704	0.003708781	2.184018184	0.001179414	0.000891113	3.15439E-05	4.35423E-05	123745.7166	0	14811.99154	0
Orange (SC)	2029	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36503.7069	0
Orange (SC)	2029	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.66488E-05	1.8321E-05	1.68153E-05	0.001233599	1.8251E-05	0.004426612	5.19402E-08	3.92437E-08	6.1106E-08	8.43488E-08	239.5712928	0	4.50224101	0
Orange (SC)	2029	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.114355584	0.125841345	0.115499141	0.425828214	0.002846715	2.775597602	0.001755557	0.001326422	3.64295E-05	5.02863E-05	143363.7048	0	7191.238801	0
Orange (SC)	2029	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	19644.02213	0
Orange (SC)	2029	Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000428691	0.000471749	0.000432978	0.024306657	0.000153839	0.059200914	9.83722E-07	7.43257E-07	9.47204E-07	1.30749E-06	3688.480115	0	453.0790611	0
Orange (SC)	2029	Lawn and Garden - Misc - Other	Aggregate	15	Diesel	7.9841E-07	1.14773E-06	9.60312E-07	5.65405E-06	6.75025E-06	0.000925993	2.37392E-07	1.79363E-07	8.87581E-09	7.64571E-09	30.41945209	0	0.12791345	0
Orange (SC)	2029	Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.54139E-05	8.29884E-05	7.6168E-05	0.007148093	5.12996E-05	0.014044801	2.33378E-07	1.7633E-07	2.42576E-07	3.34844E-07	952.6084486	0	39.0714944	0
Orange (SC)	2029	Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.46363E-07	2.10399E-07	1.76042E-07	6.00858E-07	1.11245E-06	0.000145926	3.74103E-08	2.82656E-08	1.3953E-09	1.20193E-09	4.782024102	0	0.015118305	0
Orange (SC)	2029	Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.000215504	0.000237149	0.00021766	0.011053397	8.35194E-05	0.023370588	3.58125E-07	2.70584E-07	4.04491E-07	5.58348E-07	1547.563071	0	368.9250729	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001574417	0.00173255	0.001590162	0.091297099	0.001284895	0.25176283	4.71252E-06	3.56058E-06	3.82334E-06	5.27763E-06	14946.06521	0	392.2123171	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.000204425	0.000293863	0.000245878	0.001447659	0.001728329	0.237090649	6.07817E-05	4.59239E-05	2.27256E-06	1.9576E-06	7788.577789	0	275.7341522	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	23.69477202	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.053375433	0.058736408	0.053909187	3.367354533	0.027206864	6.530466395	0.000124421	9.40072E-05	0.00011406	0.000157446	447880.9089	0	4571.365404	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000617052	0.000887022	0.000742178	0.00253316	0.004689983	6.615211425	0.000157718	0.000119165	5.88247E-06	5.06721E-06	20160.57282	0	561.9659067	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	270.6520985	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.000189838	0.000208904	0.000191735	0.006781841	7.61575E-05	0.014882455	2.87682E-07	2.1736E-07	2.53268E-07	3.49603E-07	977.2756598	0	63.84076425	0
Orange (SC)	2029	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.856820116	0
Orange (SC)	2029	Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000214291	0.000235815	0.000216434	0.016506284	0.000102323	0.026927001	4.60232E-07	3.47731E-07	5.41173E-07	7.47018E-07	1999.649096	0	472.7204783	0
Orange (SC)	2029	Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	48.36362422	0
Orange (SC)	2029	Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.76447E-07	7.44389E-07	6.83213E-07	7.06703E-05	4.80345E-07	0.000115286	1.97044E-09	1.48878E-09	2.23319E-09	3.08262E-09	8.529959565	0	0.973677507	0
Orange (SC)	2029	Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.099616105	0
Orange (SC)	2029	Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	9.70731E-05	0.000106823	9.80438E-05	0.005179458	4.08523E-05	0.011078244	1.73196E-07	1.30859E-07	1.89232E-07	2.6121E-07	729.3980917	0	355.3923263	0
Orange (SC)	2029	Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36.35988224	0
Orange (SC)	2029	Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000314931	0.000346563	0.000318081	0.020440978	0.000191066	0.048602974	7.59321E-07	5.73709E-07	7.87452E-07	1.08698E-06	3051.826211	0	493.6445005	0
Orange (SC)	2029	Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001279288	0.001407779	0.001292081	0.003755464	2.33053E-05	0.02142401	2.0832E-06	1.57397E-06	3.37502E-07	4.65879E-07	1185.66259	0	667.9927005	0
Orange (SC)	2029	Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	209.3216472	0
Orange (SC)	2029	Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000196109	0.000215807	0.0001980 7	0.01015922	6.36711E-05	0.022162331	3.07596E-07	2.32406E-07	3.79001E-07	5.23161E-07	1447.565425	0	331.8239947	0
Orange (SC)	2029	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.74409E-05	1.91926E-05	1.76153E-05	0.000979252	6.64832E-06	0.00236849	3.61873E-08	2.73415E-08	3.87297E-08	5.34613E-08	148.0037278	0	17.77745419	0
Orange (SC)	2029	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.122899748	0.135243675	0.124128745	0.697817129	0.007475644	3.570964585	0.001060519	0.000801282	4.85802E-05	6.70587E-05	190082.4863	0	39752.92711	0
Orange (SC)	2029	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	61305.75052	0
Orange (SC)	2029	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.94437E-05	2.13966E-05	1.96382E-05	0.00099009	8.05527E-06	0.003651905	4.09926E-08	3.09722E-08	5.0446E-08	6.96341E-08	196.7681033	0	8.183272438	0
Orange (SC)	2029	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.00456495	0.00502345	0.0046106	0.085896551	0.000524992	0.275875874	5.43818E-05	4.10884E-05	4.05015E-06	5.59072E-06	15918.08155	0	1281.810884	0
Orange (SC)	2029	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	988.4582794	0
Orange (SC)	2029	Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.005944017	0.006541028	0.006003458	0.324020601	0.003021826	0.776085682	1.80917E-05	1.36693E-05	1.25158E-05	1.72765E-05	48710.86748	0	1635.160956	0
Orange (SC)	2029	Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.000119543	0.00013155	0.000120739	0.003305885	6.61931E-05	0.007131057	1.6123E-07	1.21818E-07	1.24873E-07	1.72371E-07	475.289847	0	43.79418598	0
Orange (SC)	2029	Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.5101E-06	3.86266E-06	3.54521E-06	0.000223245	1.51408E-06	0.000503733	1.0949E-08	8.27259E-09	8.23335E-09	1.13651E-08	32.32942298	0	0.356050263	0
Orange (SC)	2029	Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000363474	0.00039998	0.000367108	0.018833331	0.000128552	0.041047063	9.28056E-07	7.01198E-07	6.95755E-07	9.604E-07	2682.099685	0	157.552254	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.005900903	0.005427651	0.006493584	0.35443964	0.014781877	7.11072972	0.000495777	0.000374587	6.86996E-05	0.000101928	290952.45	77555.2	160.42	5428864
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.041603568	0.042019605	0.04578219	2.754118316	0.025241072	5.085206011	6.48823E-05	8.58737E-05	9.10213E-05	0.000125643	356501.775	0	3226.24403	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.28308E-06	7.55716E-06	9.03203E-06	3.94774E-05	4.74044E-05	0.006463089	1.29435E-06	1.71311E-06	6.19807E-08	5.33908E-08	212.4222524	0	0.802899369	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	39657.40754	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.00068203	0.000627331	0.000750532	0.032291601	0.001969578	0.890571535	6.38445E-05	4.82381E-05	8.8469E-06	1.25093E-05	35707.95	5212.2	10.79	698434.8
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000582211	0.000588033	0.000640687	0.086802479	0.000849788	0.123743199	1.49517E-06	1.9789E-06	2.48597E-06	3.43157E-06	9778.665408	0	33.3913878	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	2.61357E-05	3.14355E-05	3.75705E-05	0.000107007	0.000198789	0.025964136	5.18283E-06	6.85963E-06	2.48267E-07	2.13859E-07	850.8676174	0	1.612741802	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	210.1119241	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.008810255	0.008898357	0.009695147	0.366943562	0.00259762	0.811107762	9.52475E-06	1.26063E-05	1.35257E-05	1.86705E-05	52905.86636	0	1216.003016	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	14947.26584	0
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.002121083	0.001950972	0.002334123	0.195022638	0.002799025	1.108896984	7.64464E-05	5.77595E-05	1.34822E-05	1.88708E-05	53866.7	23922.1	49.47	837273.5
Orange (SC)	2029	Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.001810419	0.002154548	0.002607003	0.023437208	0.016720648	2.816148638	0.000267445	0.00024605	3.64058E-05	2.36801E-05	94129.85	92385.15	113.5	3418250.55
Orange (SC)	2029	Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000898773	0.46699004	0.035413453	11.178368	0	0	0	0	618525.35	63889.6	7.52	5622284.8
Orange (SC)	2029	Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000250656	0.09500384	0.009476473	2.9092066	0	0	0	0	158848	10307.6	1.21	1504909.6
Orange (SC)	2029	Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000192849	0.10931947	0.009171635	2.9983118	0	0	0	0	164516.45	8245.35	0.97	1731523.5
Orange (SC)	2029	Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000164815	0.029202267	0.005985072	1.9892159	0	0	0	0	105689.4	30915.5	3.64	989296
Orange (SC)	2029	Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000271596	0.15395831	0.012916724	4.2226232	0	0	0	0	231691.05	7212.4	0.85	2437791.2
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002085953	0.001918659	0.002295464	0.104354747	0.013449895	4.767715067	0.000332417	0.000251159	4.60628E-05	6.54608E-05	186858.1	36116.75	314.45	2997690.25
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.05098E-05	0.009705772	0.00085308	0.309121054	0	0	0	0	16808.25	2693.7	23.42	223577.1
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.038956372	0.039345937	0.042869112	2.204776021	0.019985347	5.25671237	6.61787E-05	8.75895E-05	8.42769E-05	0.000116334	330356.7201	0	7399.275416	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.00032823	0.000394788	0.000471836	0.002307416	0.002775205	0.377673484	0.000076628	0.000101419	3.6202E-06	3.118488-06	12407.26537	0	80.05278902	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000218356	0.000200844	0.000240288	0.024635792	0.002316613	0.770666246	5.52486E-05	4.17434E-05	7.65576E-06	1.07396E-05	30656.35	3412.75	29.69	498261.5
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.17286E-05	0.011633411	0.001149092	0.450781421	0	0	0	0	24312.65	2226.5	19.41	325069
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.119067535	0.120258211	0.13102656	2.082436998	0.034571187	4.23829674	0.000129701	0.000171663	7.69236E-05	0.000106183	295627.3192	0	17863.72629	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5214.029986	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001368583	0.001382268	0.001506041	0.130784	0.00077253	0.189164245	2.29755E-06	3.04089E-06	3.78759E-06	5.22828E-06	14898.84852	0	141.8852804	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.000479892	0.000577204	0.000689852	0.001967554	0.003655853	0.477119655	9.61227E-05	0.000127221	4.56218E-06	3.9299E-06	15635.63547	0	58.54992796	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.011202301	0.011314324	0.012327449	0.530999806	0.002504655	1.049155295	1.26768E-05	1.67782E-05	1.85331E-05	2.55824E-05	71711.25354	0	4090.337775	0
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.010963286	0.010084031	0.012064428	0.809440218	0.023120198	9.625714054	0.000663588	0.000501378	0.000117031	0.000144999	413899.05	186985.85	1628.07	5983547.2
Orange (SC)	2029	Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.00315804	0.003758329	0.004547578	0.05011419	0.043040826	7.794427685	0.000606266	0.000557765	0.000100762	6.52574E-05	259401.85	185967.5	550.88	6136927.5
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.013920827	0.014060035	0.01531902	1.035377544	0.007001079	1.894948735	2.41465E-05	3.19587E-05	3.38949E-05	4.67876E-05	133173.1636	0	4285.83889	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.12011E-06	3.7528E-06	4.485211E-06	2.19452E-05	2.63807E-05	0.003592508	7.2745E-07	9.62801E-07	3.4436E-08	2.96635E-08	118.0199943	0	3.704812519	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	8145.346704	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	8.19388E-06	8.27583E-06	9.01686E-06	0.000173055	2.75313E-06	0.000365762	4.38973E-09	5.80994E-09	6.39427E-09	8.82646E-09	24.85132202	0	3.131377508	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.951263244	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000218733	0.000220921	0.000240702	0.018163472	0.000106142	0.03324274	4.23598E-07	5.60644E-07	5.92384E-07	8.1771E-07	2332.918825	0	28.43628926	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.21194E-06	1.45769E-06	1.74218E-06	4.96947E-06	9.22837E-06	0.001205848	2.41423E-07	3.1953E-07	1.15301E-08	9.93216E-09	39.51639736	0	0.8508453	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	54.04389688	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.025875609	0.026134366	0.02847453	1.321037642	0.010390053	2.792110487	3.35098E-05	4.43511E-05	4.72245E-05	6.51873E-05	184933.7913	0	11199.74901	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21285.41016	0
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000105092	9.66638E-05	0.000115648	0.007627478	0.000169801	0.097459824	6.71879E-06	5.07642E-06	1.18493E-06	1.45898E-06	4164.65	1671.7	14.56	48479.3
Orange (SC)	2029	Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	1.03962E-05	1.23724E-05	1.49706E-05	0.000206572	0.00019896	0.037452299	2.32719E-06	2.14102E-06	4.84165E-07	3.12197E-07	1241	1919.9	13.21	72956.2
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.002653975	0.002441126	0.002920537	0.144823365	0.006655283	5.463690954	0.000380942	0.000287823	5.27869E-05	7.5556E-05	215674.85	36408.75	164.93	3386013.75
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004468	0.004512679	0.00491676	0.296539681	0.00247083	0.633177056	7.73187E-06	1.02334E-05	1.05965E-05	1.46271E-05	41577.93571	0	1015.717366	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.00023954	0.000288114	0.000344342	0.001502815	0.001807843	0.245979157	4.96996E-05	6.57789E-05	2.35895E-06	2.03202E-06	8084.671369	0	60.12742846	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.000102372	9.41618E-05	0.000112654	0.008117117	0.000325353	0.248043775	1.77821E-05	1.34354E-05	2.46406E-06	3.46139E-06	9880.55	1095	4.97	157680
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.002014026	0.002034166	0.002216312	0.019249783	0.000122478	0.054957467	5.31205E-07	7.03065E-07	9.04554E-07	1.24862E-06	3440.13563	0	368.1679481	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	28804.6201	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.31882E-05	3.35201E-05	3.65217E-05	0.00244209	2.35202E-05	0.005214256	6.37995E-08	8.44405E-08	8.68803E-08	1.19927E-07	341.9316677	0	3.382342204	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.000194356	0.000233767	0.000279389	0.000795147	0.001477449	0.192827368	3.86181E-05	5.11122E-05	1.84382E-06	1.58828E-06	6319.1827	0	17.95616916	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.00344136	0.003475773	0.003787006	0.157693115	0.001130413	0.342786823	3.98859E-06	5.27901E-06	5.7891E-06	7.9911E-06	22475.53429	0	1115.158227	0
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.001801091	0.001656644	0.001981991	0.146064411	0.002723979	1.45322351	0.000100184	7.56945E-05	1.76685E-05	2.23961E-05	63929.75	28718.2	130.11	890264.2
Orange (SC)	2029	Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.002043152	0.00243152	0.002942139	0.03073195	0.025512598	4.561969767	0.00037859	0.000348303	5.89749E-05	3.82211E-05	151931.25	97086.35	241.19	3592194.95
Orange (SC)	2029	Light Commercial - Misc - Welders	Aggregate	100	Gasoline	0.002603853	0.002395024	0.002865381	0.132258981	0.006826572	4.577341652	0.000319

Orange (SC)	2029	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Gasoline	0.000298789	0.000301776	0.000328799	0.00354405	0.000324145	0.032747156	3.41766E-06	2.58224E-06	3.74869E-07	5.17458E-07	1467.998073	0	1.646434439	0
Orange (SC)	2029	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001209403	0.001221497	0.001330875	0.005735717	0.000572609	0.061400918	6.40811E-06	4.84169E-06	7.08476E-07	9.77959E-07	2783.680048	0	1.646434439	0
Orange (SC)	2029	Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.000159738	0.000161335	0.000175782	0.00198936	7.47235E-05	0.014928462	1.20046E-06	9.07018E-07	2.38002E-07	3.2853E-07	694.1837368	0	55.68971317	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002174204	0.002195946	0.002392579	0.01852646	0.001901842	0.206707004	2.0633E-05	1.55894E-05	2.37082E-06	3.2726E-06	9078.500551	0	43.07256759	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.023101153	0.023332165	0.025421411	0.270442559	0.008932517	3.195021743	0.000333449	0.000251939	3.54381E-05	4.89178E-05	138024.264	0	464.0614671	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	9.52412E-05	9.61936E-05	0.000104807	0.001577469	3.25695E-05	0.024597967	2.56717E-06	1.93964E-06	2.60474E-07	3.59551E-07	1022.299614	0	2.143641529	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.004303525	0.004346561	0.004735767	0.014537985	0.00024282	0.051570055	0.000205038	0.000154918	8.62524E-07	1.1906E-06	3335.583895	0	33.98191694	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001031057	0.001041368	0.001134616	0.009547112	0.000398696	0.050342779	2.2262E-05	1.68202E-05	6.61295E-07	9.12832E-07	2571.415339	0	20.39923607	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.003887651	0.003926528	0.004278123	0.038388455	0.001535964	0.255007325	0.000347999	0.000262933	3.13094E-06	4.32186E-06	12267.10513	0	81.98183469	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.002951315	0.002980828	0.003247743	0.007043467	8.31272E-05	0.022928952	0.000141915	0.000107225	4.43077E-07	6.1161E-07	1652.101444	0	34.30096025	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.071706687	0.072423755	0.078908834	0.305215555	0.011316678	1.627651121	0.006189013	0.004676144	2.27655E-05	3.14248E-05	87928.42889	0	554.5849368	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.010602391	0.010708415	0.011667284	0.04819988	0.001155714	0.162496137	0.000524962	0.000396638	3.09755E-06	4.27577E-06	10265.55048	0	510.315203	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.034824827	0.035173076	0.038322597	0.185987438	0.006741071	0.915511773	0.00422744	0.003194065	1.27101E-05	1.75447E-05	49579.43583	0	166.0033125	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.012226809	0.012349077	0.013454857	0.037162783	0.001330502	0.151691511	0.000721703	0.000545287	2.60161E-06	3.59119E-06	9427.070018	0	217.7230503	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.033628725	0.033965012	0.03700636	0.189237916	0.011190345	1.137689851	0.008038337	0.006073411	1.48146E-05	2.04496E-05	57901.02841	0	143.8195698	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.029614707	0.029910853	0.032589178	0.098982532	0.003961847	0.46802711	0.002276583	0.001720085	7.21719E-06	9.96239E-06	27111.81225	0	333.8684519	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.016843915	0.017012354	0.0185357	0.231980658	0.007785021	0.952284268	0.002044087	0.001544421	1.30687E-05	1.80397E-05	51306.64767	0	102.5053475	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	6.10147E-07	6.16248E-07	6.71429E-07	5.21418E-06	3.01969E-07	0.000100772	9.2088E-09	6.95776E-09	1.10078E-09	1.51948E-09	4.143580624	0	0.057406107	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000376335	0.000380098	0.000414133	0.006095402	0.000385019	0.047149439	7.08113E-06	5.35018E-06	7.62486E-07	1.05251E-06	2164.798885	0	224.9021835	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.002818562	0.002846747	0.003101656	0.032057411	0.008120083	0.553957034	5.57292E-05	4.21065E-05	5.99425E-06	8.27429E-06	22907.05468	0	200.6975499	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.015468569	0.015623255	0.017022218	0.190649137	0.013959672	1.63374821	0.000163078	0.000123214	1.92607E-05	2.6587E-05	74122.25254	0	469.8317409	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.020442996	0.020647426	0.02249627	0.149524505	0.007534625	3.361597332	0.000350834	0.000265074	3.51736E-05	4.85525E-05	136804.1316	0	682.4509855	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.002326747	0.002350015	0.002560444	0.004340176	0.000714483	0.121928545	1.27251E-05	9.61451E-06	0.000001301	1.79586E-06	5104.839542	0	13.56474789	0
Orange (SC)	2029	Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000202958	0.000245579	0.00029226	0.00708097	0.002668043	1.06117886	0.000204518	0.000188156	9.80504E-06	8.6612E-06	34428.77944	26449.95632	60.93143804	2061721.191
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.00027528	0.000333089	0.000396403	0.012315652	0.001471651	2.22610034	6.01992E-05	5.53833E-05	2.05731E-05	1.81691E-05	72223.37391	34229.35524	78.85244923	4324999.691
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.000173574	0.000210025	0.000249947	0.002540067	0.000739738	1.335126334	3.57292E-05	3.28709E-05	1.23387E-05	1.08971E-05	43316.70353	9975.935082	22.98106141	2593962.581
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	8.94135E-06	1.0819E-05	1.28755E-05	0.000191617	0.000169581	0.030631238	3.98338E-06	3.66471E-06	2.82933E-07	2.50008E-07	993.7967696	1372.835103	3.162531386	53531.79302
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000257299	0.000311332	0.000370511	0.003436086	0.000996735	1.827145951	5.03944E-05	4.63629E-05	1.68852E-05	1.49129E-05	59279.73813	7962.443598	18.34268204	3549887.457
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	0.000100472	0.000121571	0.000144679	0.00215792	0.00162123	0.330410966	1.77393E-05	1.63202E-05	3.0518E-06	2.69677E-06	10719.81992	10525.06912	24.24607396	641942.0106
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	8.83879E-05	0.000107494	0.000127927	0.001138714	0.000306836	0.598250611	2.00944E-05	1.84869E-05	5.52846E-06	4.88284E-06	19409.5822	1830.446804	4.216708515	1162316.747
Orange (SC)	2029	Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	6.01721E-06	7.28082E-06	8.66478E-06	7.50621E-05	0.000121323	0.038909137	1.41017E-06	1.29735E-06	3.59554E-07	3.17571E-07	1262.364115	91.5223402	0.210835426	75594.97865
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.001131242	0.001368803	0.001628989	0.032285765	0.008731312	4.390931043	0.00078229	0.000719707	4.05624E-05	3.58382E-05	142458.9219	95266.77277	65.78065283	8530961.102
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.002247559	0.002719546	0.003236484	0.060201614	0.010134929	9.519671331	0.000428948	0.000394632	8.79467E-05	7.76983E-05	308855.2523	142289.4747	98.2493084	18495381.74
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002536793	0.003069519	0.003652982	0.023082764	0.007365185	10.41189524	0.000382144	0.000351572	9.6187E-05	8.49805E-05	337802.4743	87938.55948	60.72060262	20228847.23
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.65085E-05	5.62753E-05	6.69723E-05	0.000694657	0.00039776	0.071988693	7.66631E-06	7.05301E-06	6.64176E-07	5.87562E-07	2335.593851	2748.079984	1.897518832	125808.9485
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.004769573	0.005771184	0.006868186	0.043794143	0.014081102	21.41397749	0.000741106	0.000681818	0.00019784	0.000174778	694752.9164	111755.2527	77.16576583	41604344.78
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.001379421	0.0016691	0.001986367	0.02031238	0.01478392	2.754558288	0.000227742	0.000209523	2.54259E-05	2.24823E-05	89368.61006	87327.87504	60.29893177	5351719.118
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.001397755	0.001691283	0.002012767	0.01140692	0.004623742	5.352588715	0.000308435	0.00028376	4.94454E-05	4.36871E-05	173658.846	16183.13768	11.17427756	10399326.63
Orange (SC)	2029	Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.008429134	0.010199252	0.012137953	0.073540882	0.134142036	34.99673173	0.002518856	0.002317347	0.000323309	0.000285639	1135430.419	58015.02188	40.05873089	67993724.83
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000209873	0.000253946	0.000302217	0.010049376	0.002512769	1.588565822	0.000204329	0.000187982	1.46808E-05	1.29657E-05	51539.26861	37072.06574	109.6344214	3086359.842
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000650125	0.000786651	0.000936179	0.02831349	0.004288497	5.138142583	0.000155916	0.000143443	4.74852E-05	4.19368E-05	166701.3775	77352.29102	228.7564369	9982687.973
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000244764	0.000296165	0.00035246	0.003349745	0.001070701	1.724356041	5.15291E-05	4.74067E-05	1.59352E-05	1.4074E-05	55944.83272	15185.28847	44.90794569	3350181.128
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.6393E-06	8.03355E-06	9.56059E-06	0.000154135	0.000125934	0.026172189	1.59329E-06	1.46583E-06	2.41776E-07	2.13614E-07	849.1278342	1069.386512	3.162531386	45739.06543
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000341364	0.000413051	0.000491564	0.004280617	0.001920963	2.267728373	7.99599E-05	7.35631E-05	2.0956E-05	1.85089E-05	73573.9496	10693.86512	31.62531386	4405877.102
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.000159088	0.000192496	0.000229086	0.004358857	0.003405508	0.705841293	4.61078E-05	4.24192E-05	6.52108E-06	5.76098E-06	22900.24341	20674.80589	61.14227347	1371350.303
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000145297	0.00017581	0.000209228	0.00186368	0.000941611	0.993386685	4.57624E-05	4.21014E-05	9.17999E-06	8.10789E-06	32229.33698	2994.282233	8.855087882	1930010.535
Orange (SC)	2029	Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.001389872	0.001681745	0.002001416	0.016792979	0.030226879	8.764689455	0.000460944	0.000424069	8.09922E-05	7.15362E-05	284360.6968	7556.998017	22.34855513	17028558.2
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000100912	0.000122104	0.000145314	0.004827551	0.001496173	0.765483774	0.000112934	0.000103899	7.07425E-06	6.24778E-06	24835.27801	17361.09676	51.23300846	1487227.25
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.000169905	0.000205585	0.000244663	0.007372529	0.001253407	1.336506273	4.57195E-05	4.2062E-05	1.23516E-05	1.09084E-05	43361.47414	20076.00078	59.24475464	2596643.609
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000123456	0.000149381	0.000177776	0.001869118	0.00044864	0.985762555	2.34036E-05	2.15313E-05	9.11016E-06	8.04566E-06	31981.98046	8573.381117	25.30025109	1915197.922
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.50279E-06	1.81838E-06	2.16402E-06	3.27322E-05	2.49542E-05	0.005300597	2.14099E-07	1.96971E-07	4.89616E-08	4.32628E-08	171.9720326	214.3345279	0.632506277	9263.43447
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000213428	0.000258247	0.000307336	0.003426529	0.000747983	1.864582004	4.10859E-05	3.77991E-05	1.72326E-05	1.52185E-05	60494.30965	9573.608915	28.25194705	3622620.44
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	0.000105054	0.000127115	0.000151277	0.002506814	0.002016889	0.399235424	3.56688E-05	3.28153E-05	3.68798E-06	3.25851E-06	12952.75365	11788.39904	34.78784525	775658.2463
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.000108587	0.00013139	0.000156365	0.001734372	0.000548879	0.945535277	3.47774E-05	3.19952E-05	8.73868E-06	7.71733E-06	30676.85074	2857.793706	8.43341703	1837041.982
Orange (SC)	2029	Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	7.83688E-05	9.48262E-05	0.000112851	0.001021825	0.001858188	0.53941283	2.56888E-05	2.36337E-05	4.98479E-06	4.40262E-06	17500.65521	857.3381117	2.530025109	1048003.22
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.56028E-05	1.88793E-05	2.2468E-05	0.000529852	0.000189765	0.07831653	1.36698E-05	1.25763E-05	7.23607E-07	6.39209E-07	2540.893557	1918.865631	3.373366812	152157.9962
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000212806	0.000257496	0.000306441	0.010081832	0.000728228	1.831930938	3.46679E-05	3.18945E-05	1.69307E-05	1.4952E-05	59434.98176	27463.76434	48.2813125	3559184.013
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000148585	0.000179787	0.000213962	0.002237702	0.000415967	1.170420083	2.47425E-05	2.27631E-05	1.08167E-05	9.55281E-06	37972.99061	8514.966235	14.96931523	2273961.514
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	50	Diesel	7.46043E-06	9.02712E-06	1.0743E-05	0.000172011	0.000135378	0.029065869	6.29467E-07	5.79109E-07	2.68505E-07	2.37232E-07	943.0100966	1079.361917	1.897518832	50796.12135
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002149248	0.00260059	0.003094917	0.031386824	0.005028902	16.47498771	0.00034849	0.000320611	0.000152255	0.000134467	534512.8322	62123.27479	109.2127505	32008582.67
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.70115E-05	3.26839E-05	3.88965E-05	0.00055648	0.000413538	0.084245109	4.1514E-06	3.81929E-06	7.78077E-07	6.87597E-07	2733.239776	2758.369344	4.849214792	163676.391
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000281513	0.000340631	0.000405379	0.003298444	0.002188994	1.68964504	0.000118751	0.000109251	1.56132E-05	1.37907E-05	54818.6725	5516.738688	9.698429585	3282742.536
Orange (SC)	2029	Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000169882	0.000205557	0.0002446	0.002347286	0.003818883	1.241503746	6.33431E-05	5.82757E-05	1.14732E-05	1.0133E-05	40279.22178	2398.582038	4.216708515	2412067.068
Orange (SC)	2029	Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001664105	0.002013567	0.002396311	0.052258515	0.010614304	7.171507526	0.001070677	0.000985023	6.62542E-05	5.85329E-05	232671.6637	155341.1423	100.1468272	13933229.91
Orange (SC)	2029	Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002874486	0.003478129	0.004139261	0.086534744	0.00812583	13.86642343	0.000366182	0.000336887	0.000128116	0.000113176	449880.8372	195239.2884	125.8687492	26940509.38
Orange (SC)	2029	Portable Equipment - Rental Generator	Aggregate	300	Diesel	0.006591698	0.007975955	0.009492046	0.062049385	0.015892479	28.32923306	0.0008676	0.000798202	0.00026172	0.000231219	919110

OFFROAD 2030

	Equipment Type	Horsepower	Gas				Diesel				Natural Gas			
		HP	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr	Fuel (Gal/Yr)	Population	Hrs/Yr	Gal/Hr
Air Compressors25	Air Compressors	25	9870.482807	33.70463818	0	0	855.7610429	1.622041287	0	0	0	0	0	0
Air Compressors50	Air Compressors	50	54257.25	49.84	24075.4	2.253638569	94732.1	114.28	93005.65	1.018562851	0	0	0	0
Air Compressors75	Air Compressors	75	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors100	Air Compressors	100	292813.95	161.51	78069.85	3.75066623	0	0	0	0	0	0	0	0
Air Compressors175	Air Compressors	175	35952.5	10.84	5245.05	6.854558107	0	0	0	0	0	0	0	0
Air Compressors300	Air Compressors	300	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors600	Air Compressors	600	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors750	Air Compressors	750	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors9999	Air Compressors	9999	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lifts25	Aerial Lifts	25	2815.948012	15.64842857	0	0	20.68122758	9.648136339	0	0	56947.3	128.38	48194.6	1.181611633
Aerial Lifts50	Aerial Lifts	50	75591.5	131.95	47683.6	1.585272505	130966.6588	504.7138898	160186.1519	0.817590392	0	0	0	0
Aerial Lifts75	Aerial Lifts	75	0	0	0	0	83455.92018	237.4703861	74790.93678	1.115856062	0	0	0	0
Aerial Lifts100	Aerial Lifts	100	135856.65	131.95	47683.6	2.849127373	144959.8513	373.7121723	118774.8799	1.220458833	0	0	0	0
Aerial Lifts175	Aerial Lifts	175	0	0	0	0	14071.86208	21.43664468	6774.662336	2.077131138	0	0	0	0
Aerial Lifts300	Aerial Lifts	300	0	0	0	0	834.5954263	0.714554823	227.7053552	3.665242855	0	0	0	0
Aerial Lifts600	Aerial Lifts	600	0	0	0	0	592.6837086	0.238184941	75.90178508	7.808560865	0	0	0	0
Bore/Drill rigs25	Bore/Drill rigs	25	223.4714108	2.356653456	0	0	9.716984485	1.528804374	0	0	0	0	0	0
Bore/Drill rigs50	Bore/Drill rigs	50	678.9	2.49	266.45	2.547945205	2154.300286	5.029249681	1877.399506	1.147491665	0	0	0	0
Bore/Drill rigs75	Bore/Drill rigs	75	0	0	0	0	3043.522269	2.858731398	1673.49979	1.818657097	0	0	0	0
Bore/Drill rigs100	Bore/Drill rigs	100	7840.2	11.51	1226.4	6.392857143	10082.82225	12.33489659	4731.10764	2.131175829	0	0	0	0
Bore/Drill rigs175	Bore/Drill rigs	175	2752.1	2.83	306.6	8.976190476	15843.68785	12.28195712	4055.796853	3.906430332	0	0	0	0
Bore/Drill rigs300	Bore/Drill rigs	300	0	0	0	0	22462.56821	12.17607818	4169.511376	5.387338272	0	0	0	0
Bore/Drill rigs600	Bore/Drill rigs	600	0	0	0	0	32571.59087	9.793802011	3276.982383	9.939507469	0	0	0	0
Bore/Drill rigs750	Bore/Drill rigs	750	0	0	0	0	26092.59646	2.646973517	1576.972459	16.54600644	0	0	0	0
Bore/Drill rigs9999	Bore/Drill rigs	9999	0	0	0	0	11731.38326	0.317636822	242.9672829	48.2837982	0	0	0	0
Cement and Mortar Mixers25	Cement and Mortar Mixers	25	123.4085574	1.679789862	0	0	2.77207212	1.073720948	0	0	0	0	0	0
Cement and Mortar Mixers50	Cement and Mortar Mixers	50	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers75	Cement and Mortar Mixers	75	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers100	Cement and Mortar Mixers	100	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers175	Cement and Mortar Mixers	175	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers300	Cement and Mortar Mixers	300	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers600	Cement and Mortar Mixers	600	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers750	Cement and Mortar Mixers	750	0	0	0	0	0	0	0	0	0	0	0	0
Cement and Mortar Mixers9999	Cement and Mortar Mixers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws25	Concrete/Industrial Saws	25	4053.00607	18.2187479	0	0	1.887925978	0.394838355	0	0	0	0	0	0
Concrete/Industrial Saws50	Concrete/Industrial Saws	50	15771.65	9.33	5701.3	2.766325224	5073.5	6.35	3664.6	1.384462151	0	0	0	0
Concrete/Industrial Saws75	Concrete/Industrial Saws	75	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws100	Concrete/Industrial Saws	100	15388.4	5.35	3266.75	4.710614525	0	0	0	0	0	0	0	0
Concrete/Industrial Saws175	Concrete/Industrial Saws	175	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws300	Concrete/Industrial Saws	300	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws600	Concrete/Industrial Saws	600	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws750	Concrete/Industrial Saws	750	0	0	0	0	0	0	0	0	0	0	0	0
Concrete/Industrial Saws9999	Concrete/Industrial Saws	9999	0	0	0	0	0	0	0	0	0	0	0	0
Cranes25	Cranes	25	0	0	0	0	41.48129936	0.199462805	100.2022242	0.413975834	0	0	0	0
Cranes50	Cranes	50	2336	2.83	1175.3	1.98757764	671.658439	2.127603254	974.7016042	0.689091345	0	0	0	0
Cranes75	Cranes	75	0	0	0	0	331.3202389	0.930826424	325.0598387	1.019259224	0	0	0	0
Cranes100	Cranes	100	7836.55	5.66	2354.25	3.328682171	15186.64293	24.60041262	11626.16618	1.306246848	0	0	0	0
Cranes175	Cranes	175	503.7	0.17	80.3	6.272727273	46436.46689	44.61318073	21253.3856	2.184897397	0	0	0	0
Cranes300	Cranes	300	0	0	0	0	78829.02623	48.66892444	24119.58341	3.268258199	0	0	0	0
Cranes600	Cranes	600	0	0	0	0	141069.8223	49.93218887	25874.23746	5.452134484	0	0	0	0
Cranes750	Cranes	750	0	0	0	0	2890.795346	0.664876017	307.2974413	9.407157229	0	0	0	0
Cranes9999	Cranes	9999	0	0	0	0	7724.868624	1.063801627	552.6256215	13.97848439	0	0	0	0
Crawler Tractors25	Crawler Tractors	25	0	0	0	0	0	0	0	0	0	0	0	0
Crawler Tractors50	Crawler Tractors	50	0	0	0	0	2182.429665	5.900954888	2111.821401	1.03343477	0	0	0	0
Crawler Tractors75	Crawler Tractors	75	0	0	0	0	1467.865727	3.068496542	870.3760952	1.686472934	0	0	0	0
Crawler Tractors100	Crawler Tractors	100	0	0	0	0	94077.67283	98.0148607	48423.22418	1.94282133	0	0	0	0
Crawler Tractors175	Crawler Tractors	175	0	0	0	0	105412.841	66.91682844	31897.46	3.304740911	0	0	0	0
Crawler Tractors300	Crawler Tractors	300	0	0	0	0	107394.1597	49.68604016	23754.01426	4.521095192	0	0	0	0
Crawler Tractors600	Crawler Tractors	600	0	0	0	0	387154.2206	92.349944	45394.01563	8.528750216	0	0	0	0
Crawler Tractors750	Crawler Tractors	750	0	0	0	0	4025.503062	0.590095489	297.1240032	13.54822572	0	0	0	0
Crawler Tractors9999	Crawler Tractors	9999	0	0	0	0	22347.7411	1.770286467	1027.668721	21.74605555	0	0	0	0
Crushing/Proc. Equipment25	Crushing/Proc. Equipment	25	40.93993586	0.19325742	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment50	Crushing/Proc. Equipment	50	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment75	Crushing/Proc. Equipment	75	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment100	Crushing/Proc. Equipment	100	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment175	Crushing/Proc. Equipment	175	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment300	Crushing/Proc. Equipment	300	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment600	Crushing/Proc. Equipment	600	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment750	Crushing/Proc. Equipment	750	0	0	0	0	0	0	0	0	0	0	0	0
Crushing/Proc. Equipment9999	Crushing/Proc. Equipment	9999	0	0	0	0	0	0	0	0	0	0	0	0
Dumpers/Tenders25	Dumpers/Tenders	25	14615.05256	286.8746904	42073.55	0.347369132	1.371476811	0.554342722	0	0	0	0	0	0
Dumpers/Tenders100	Dumpers/Tenders	100	642.4	2.04	262.8	2.444444444	0	0	0	0	0	0	0	0
Excavators25	Excavators	25	0	0	0	0	17.5499134	0.927764102	14.16693506	1.238793947	0	0	0	0
Excavators50	Excavators	50	0	0	0	0	87161.32257	144.3894672	110748.3148	0.78702166	0	0	0	0
Excavators75	Excavators	75	0	0	0	0	469.9097779	1.005168281	348.6482719	1.347804695	0	0	0	0
Excavators100	Excavators	100	0	0	0	0	112433.8354	103.1184402	70303.76943	1.599257569	0	0	0	0
Excavators175	Excavators	175	0	0	0	0	238393.6264	133.096106	82613.84431	2.885637733	0	0	0	0
Excavators300	Excavators	300	0	0	0	0	303991.9654	114.7074392	70277.63143	4.325586381	0	0	0	0
Excavators600	Excavators	600	0	0	0	0	537292.1018	120.0289183	80728.08359	6.655578554	0	0	0	0
Excavators750	Excavators	750	0	0	0	0	9800.402034	1.359933557	803.4777221	12.19747824	0	0	0	0
Excavators9999	Excavators	9999	0	0	0	0	15008.88344	0.886913189	631.3494611	23.77270334	0	0	0	0
Forklifts25	Forklifts	25	53.25638106	0.119730838	0	0	34.57719817	0.205484838	59.81940769	0.578026422	1507.45	1.24	1543.95	0.976359338
Forklifts50	Forklifts	50	1265513.4	442.48	793911.5	1.594023263	91111.33034	242.4149387	182434.1179	0.499420456	2006616.7	834.32	1503073.65	1.3350089
Forklifts75	Forklifts	75	0	0	0	0	18663.32175	38.21982651	21621.27236	0.863192575	0	0	0	0
Forklifts100	Forklifts	100	5904090.35	1577.04	2796199.3	2.11146979	1235741.864	1845.367827	1316164.24	0.938896398	12557777.55	2928.19	5275312.15	2.380480471
Forklifts175	Forklifts	175	412990.2	57.5	102159.85	4.04258816	384369.3792	357.1092499	247913.9121	1.550414723	942510.3	107.13	193055.8	4.882061559
Forklifts300	Forklifts	300	0	0	0	0	78343.70664	46.31586675	34886.35305	2.245683478	0	0	0	0
Forklifts600	Forklifts	600	0	0	0	0	17533.42033	6.087107488	4423.516365	3.96368384	0	0	0	0
Forklifts750	Forklifts	750	0	0	0	0	201.3582194	0.068494946	15.50873533	12.98353574	0	0	0	0
Forklifts9999	Forklifts	9999	0	0	0	0	1461.667231	0.193366995	159.8407442	9.144522179	0	0	0	0
Generator Sets25	Generator Sets	25	15120.16332	143.9754116	0	0	15714.29293	58.84520244	0	0	0	0	0	0
Generator Sets50	Generator Sets	50	416501.5	1638.88	188241.45	2.21259186	261095.45	554.55	187204.85	1.394704518	0	0	0	0
Generator Sets75	Generator Sets	75	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets100	Generator Sets	100	188033.4	316.56	36346.7	5.173327978	0	0	0	0	16917.75	23.55	2704.65	6.255060729
Generator Sets175	Generator Sets	175	30846.15	29.93	3445.6	8.952330508	0	0	0	0	24469.6	19.54	2252.05	10.86547812
Generator Sets300	Generator Sets	300	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets600	Generator Sets	600	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets750	Generator Sets	750	0	0	0	0	0	0	0	0	0	0	0	0
Generator Sets9999	Generator Sets	9999	0	0	0	0	0	0	0	0	0	0	0	0
Graders25	Graders	25	0	0	0	0	94.06796387	0.237669756	160.0882429	0.587600702	0	0	0	0
Graders50	Graders	50	0	0	0	0	478.553931	1.604270854	505.391963	0.946896599	0	0	0	0
Graders75	Graders	75	0	0	0	0	220.1650549	0.59417439	152.0446807	1.448028658	0	0	0	0
Graders100	Graders	100	0	0	0	0	12431.37705	15.03261208	6634.94229	1.873622484	0	0	0	0
Graders175	Graders	175	0	0	0	0	146311.5204	95.72149429	46443.67067	3.150300533	0	0	0	0
Graders300	Graders	300	0	0	0	0	299912.5092	83.12499722	65941.90614	4.548132238	0	0	0	0
Graders600	Graders	600	0	0	0	0	20214.67591	3.327376586	2921.023182	6.920409271	0	0	0	0
Graders750	Graders	750	0	0	0	0	0	0	0	0	0	0	0	0
Graders9999	Graders	9999	0	0	0	0	10423.53662	0.356504634	272.6269321	38.23370103	0	0	0	0
Off-Highway Tractors25	Off-Highway Tractors	25	0	0	0	0	44.40541297	0.233362238	70.94024522	0.625955166	0	0	0	0
Off-Highway Tractors50	Off-Highway Tractors	50	0	0	0	0	35989.32302	55.13182873	38197.30327	0.942195389	0	0	0	0
Off-Highway Tractors75	Off-Highway Tractors	75	0	0	0	0	20900.55923	20.41919583	13174.96643	1.586384249	0	0	0	0
Off-Highway Tractors100	Off-Highway Tractors	100	0	0	0	0	25086.15654	19.83579023	14030.51277	1.787971469	0	0	0	0
Off-Highway Tractors175	Off-Highway Tractors	175	0	0	0	0	39222.59706	15.28522659	10996.15736	3.566936684	0	0	0	0
Off-Highway Tractors300	Off-Highway Tractors	300	0	0	0	0	37987.94139	11.14304687	7611.993149	4.990538043	0	0	0	0
Off-Highway Tractors600	Off-Highway Tractors	600	0	0	0	0	106971.7405	18.08557345	13105.84337	8.162140923	0	0	0	0
Off-Highway Tractors750	Off-Highway Tractors	750	0	0	0	0	4050.797238	0.408383917	276.7019023	14.63957134	0	0	0	0
Off-Highway Tractors9999	Off-Highway Tractors	9999	0	0	0	0	5840.976631	0.291702798	165.6437253	35.2622873	0	0	0	0
Off-Highway Trucks25	Off-Highway Trucks	25	0	0	0	0	127.6988066	0.173413337	232.7479184	0.548657137	0	0	0	0
Off-Highway Trucks50	Off-Highway Trucks	50	0	0	0	0	3352.610356	3.12144006	5326.264028	0.629448773	0	0	0	0
Off-Highway Trucks75	Off-Highway Trucks	75	0	0	0	0	651.9575198	0.346826673	481.9772426	1.352672828	0	0	0	0
Off-Highway Trucks100	Off-Highway Trucks	100	0	0	0	0	3211.02577	1.329502248	1841.623964	1.743583833	0	0	0	0
Off-Highway Trucks175	Off-Highway Trucks	175	0	0	0	0	82157.80103	17.86157368	26364.08592	3.116277245	0	0	0	0
Off-Highway Trucks300	Off-Highway Trucks	300	0	0	0	0	168343.6231	30.46294281	40583.59182	4.148071068	0	0	0	0
Off-Highway Trucks600	Off-Highway Trucks	600	0	0	0	0	725382.2859	68.15144131	97408.70872	7.446790902	0	0	0	0
Off-Highway Trucks750	Off-Highway Trucks	750	0	0	0	0	242169.0624	14.3355025	18325.31491	13.21500141	0	0	0	0
Off-Highway Trucks9999	Off-Highway Trucks	9999	0	0	0	0	434237.9596	11.61869356	17237.74988	25.19110456	0	0	0	0
Pavers25	Pavers	25	770.4326532	2.478688994	0	0	2.587908851	0.344630996	0	0	0	0	0	0
Pavers50	Pavers	50	7380.3	8.09	3171.85	2.326812428	2387.238034	6.924187742	2576.684792	0.926476549	0	0	0	0
Pavers75	Pavers	75	0	0	0	0	3850.409463	6.231768968	2472.303999	1.55741748	0	0	0	0
Pavers100	Pavers	100	6610.15	4.43	1744.7	3.788702929	19116.96587	27.17743689	11049.29445	1.730152633	0	0	0	0
Pavers175	Pavers	175	0	0	0	0	31529.54687	22.96522268	9286.987213	3.395024258	0	0	0	0
Pavers300	Pavers	300	0	0	0	0	24260.48901	10.84789413	5105.534147	4.75180232	0	0	0	0
Pavers600	Pavers	600	0	0	0	0	4893.693783	1.384837548	646.9535336	7.564212155	0	0	0	0
Pavers750	Pavers	750	0	0	0	0	923.3553888	0.115403129	57.23661992	16.13224873	0	0	0	0
Pavers9999	Pavers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Paving Equipment25	Paving Equipment	25	881.97368	6.257922448	0	0	11.40932802	0.907573413	13.80303732	0.826580973	0	0	0	0
Paving Equipment50	Paving Equipment	50	8624.95	22.11	3869	2.229245283	2965.834819	8.468489397	4198.814938	0.706350449	0	0	0	0
Paving Equipment75	Paving Equipment	75	0	0	0	0	554.0975107	1.2097842	437.2802223	1.267145145	0	0	0	0
Paving Equipment100	Paving Equipment	100	3558.75	5.7	1000.1	3.558394161	12660.68394	15.66958582	7685.117089	1.647428894	0	0	0	0
Paving Equipment175	Paving Equipment	175	0	0	0	0	13012.92748	10.02392622	4824.713665	2.697139848	0	0	0	0
Paving Equipment300	Paving Equipment	300	0	0	0	0	8376.914995	4.147831541	2010.343371	4.166907563	0	0	0	0
Paving Equipment600	Paving Equipment	600	0	0	0	0	10374.26097	2.88043857	1442.27937	7.192962184	0	0	0	0
Paving Equipment750	Paving Equipment	750	0	0	0	0	1785.589728	0.288043857	152.730608	11.69110601	0	0	0	0
Paving Equipment9999	Paving Equipment	9999	0	0	0	0	872.3217122	0.115217543	56.31639227	15.489659	0	0	0	0
Rollers25	Rollers	25	2648.563156	13.40697524	0	0	38.42087693	6.825604979	14.22100152	2.701699798	0	0	0	0
Rollers50	Rollers	50	9825.8	5.66	3525.9	2.786749482	49012.19	175.0325849	63555.43342	0.771172304	0	0	0	0
Rollers75	Rollers	75	0	0	0	0	654.2032549	1.958655578	469.2930502	1.39401863	0	0	0	0
Rollers100	Rollers	100	30170.9	10.72	6650.3	4.536772777	75956.14302	128.618383	44804.33186	1.695285698	0	0	0	0
Rollers175	Rollers	175	0	0	0	0	79173.84063	75.49726957	28396.21142	2.788183236	0	0	0	0
Rollers300	Rollers	300	0	0	0	0	13907.32894	10.09004389	3261.942224	4.263511731	0	0	0	0
Rollers600	Rollers	600	0	0	0	0	6873.743887	3.086366366	989.9950208	6.943210564	0	0	0	0
Rollers750	Rollers	750	0	0	0	0	0	0	0	0	0	0	0	0
Rollers9999	Rollers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rough Terrain Forklifts25	Rough Terrain Forklifts	25	0	0	0	0	34.57719817	0.205484838	59.81940769	0.578026422	0	0	0	0
Rough Terrain Forklifts50	Rough Terrain Forklifts	50	3146.3	2.32	927.1	3.393700787	2460.20911	7.739928885	2219.882628	1.108260895	0	0	0	0
Rough Terrain Forklifts75	Rough Terrain Forklifts	75	0	0	0	0	903.8401769	2.465818052	596.3067705	1.515730194	0	0	0	0
Rough Terrain Forklifts100	Rough Terrain Forklifts	100	68116.3	32.36	13373.6	5.093340611	188329.1318	317.2685893	93931.07618	2.004971512	0	0	0	0
Rough Terrain Forklifts175	Rough Terrain Forklifts	175	3817.9	1.04	452.6	8.435483871	48699.85642	66.23461267	19276.70156	2.526358375	0	0	0	0
Rough Terrain Forklifts300	Rough Terrain Forklifts	300	0	0	0	0	3251.995073	2.808292781	738.3470924	4.404425921	0	0	0	0
Rough Terrain Forklifts600	Rough Terrain Forklifts	600	0	0	0	0	1070.490155	0.479464621	128.6650634	8.319975338	0	0	0	0
Rough Terrain Forklifts750	Rough Terrain Forklifts	750	0	0	0	0	201.3582194	0.068494946	15.50873533	12.98353574	0	0	0	0
Rough Terrain Forklifts9999	Rough Terrain Forklifts	9999	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers25	Rubber Tired Dozers	25	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Dozers50	Rubber Tired Dozers	50	0	0	0	0	2160.964008	2.315227408	2305.298702	0.937390025	0	0	0	0
Rubber Tired Dozers75	Rubber Tired Dozers	75	0	0	0	0	2515.429586	1.976413641	1680.553756	1.49678615	0	0	0	0
Rubber Tired Dozers100	Rubber Tired Dozers	100	0	0	0	0	6960.629544	4.517516893	4043.895898	1.721268232	0	0	0	0
Rubber Tired Dozers175	Rubber Tired Dozers	175	0	0	0	0	9415.215408	3.952827281	3165.126343	2.974672853	0	0	0	0
Rubber Tired Dozers300	Rubber Tired Dozers	300	0	0	0	0	10002.70925	3.049323903	2239.407898	4.466675883	0	0	0	0
Rubber Tired Dozers600	Rubber Tired Dozers	600	0	0	0	0	109157.4128	19.03003991	14484.13823	7.536341553	0	0	0	0
Rubber Tired Dozers750	Rubber Tired Dozers	750	0	0	0	0	4052.184058	0.282344806	297.6586639	13.61352633	0	0	0	0
Rubber Tired Dozers9999	Rubber Tired Dozers	9999	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers25	Scrapers	25	0	0	0	0	17.40797606	0.058195229	25.09839401	0.693589241	0	0	0	0
Scrapers50	Scrapers	50	0	0	0	0	138.5541383	0.349171372	131.1391087	1.056543236	0	0	0	0
Scrapers75	Scrapers	75	0	0	0	0	1207.275841	1.454880716	694.1797477	1.739140108	0	0	0	0
Scrapers100	Scrapers	100	0	0	0	0	5845.734845	4.364642148	2589.178213	2.257756849	0	0	0	0
Scrapers175	Scrapers	175	0	0	0	0	70768.47349	36.31382268	16864.79614	4.196224663	0	0	0	0
Scrapers300	Scrapers	300	0	0	0	0	90931.26793	38.17606999	16520.18125	5.504253651	0	0	0	0
Scrapers600	Scrapers	600	0	0	0	0	1099616.589	206.3020856	103715.4182	10.60224804	0	0	0	0
Scrapers750	Scrapers	750	0	0	0	0	3372.340408	0.756537972	217.3102615	15.51855115	0	0	0	0
Scrapers9999	Scrapers	9999	0	0	0	0	25091.71893	1.513075945	629.4119476

Sweepers/Scrubbers175	Sweepers/Scrubbers	175	2774	0.6	310.25	8.941176471	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers300	Sweepers/Scrubbers	300	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers600	Sweepers/Scrubbers	600	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers750	Sweepers/Scrubbers	750	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweepers/Scrubbers9999	Sweepers/Scrubbers	9999	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes25	Tractors/Loaders/Backhoes	25	0	0.06148603	0	0	46.9104948	6.404423325	0	0	0	0	0	0	0
Tractors/Loaders/Backhoes50	Tractors/Loaders/Backhoes	50	0	0	0	0	73001.48642	169.6102643	91956.39611	0.793870677	0	0	0	0	0
Tractors/Loaders/Backhoes75	Tractors/Loaders/Backhoes	75	0	0	0	0	11017.56814	33.44927163	8073.336024	1.364685938	0	0	0	0	0
Tractors/Loaders/Backhoes100	Tractors/Loaders/Backhoes	100	25498.9	10.01	8723.5	2.923012552	1172869.46	1118.186694	734481.9964	1.59686618	0	0	0	0	0
Tractors/Loaders/Backhoes175	Tractors/Loaders/Backhoes	175	0	0	0	0	204530.3715	128.8328837	75005.23657	2.726881226	0	0	0	0	0
Tractors/Loaders/Backhoes300	Tractors/Loaders/Backhoes	300	0	0	0	0	121797.1477	53.48337602	31142.86256	3.910916906	0	0	0	0	0
Tractors/Loaders/Backhoes600	Tractors/Loaders/Backhoes	600	0	0	0	0	174642.7174	46.98263418	27187.47164	6.42364688	0	0	0	0	0
Tractors/Loaders/Backhoes750	Tractors/Loaders/Backhoes	750	0	0	0	0	5290.99643	0.827367143	439.8733401	12.02845444	0	0	0	0	0
Tractors/Loaders/Backhoes9999	Tractors/Loaders/Backhoes	9999	0	0	0	0	57315.40538	2.482101428	1624.409128	35.28384837	0	0	0	0	0
Trenchers25	Trenchers	25	5019.25228	15.41484343	0	0	45.26473314	4.539349559	0	0	0	0	0	0	0
Trenchers50	Trenchers	50	46526.55	51.82	20848.8	2.231617647	25948.92575	55.61680842	22469.50925	1.154850578	0	0	0	0	0
Trenchers75	Trenchers	75	0	0	0	0	1678.283485	3.349648689	935.0749051	1.794811813	0	0	0	0	0
Trenchers100	Trenchers	100	28634.25	17.16	6909.45	4.144215531	17057.89875	22.30992429	7782.397506	2.191856525	0	0	0	0	0
Trenchers175	Trenchers	175	0	0	0	0	3943.004787	3.539251445	1074.011136	3.671288551	0	0	0	0	0
Trenchers300	Trenchers	300	0	0	0	0	8728.203192	4.550466143	1483.778374	5.882417042	0	0	0	0	0
Trenchers600	Trenchers	600	0	0	0	0	14534.7507	3.602452363	1406.62523	10.33306555	0	0	0	0	0
Trenchers750	Trenchers	750	0	0	0	0	2690.19603	0.316004593	150.1419868	17.91767971	0	0	0	0	0
Trenchers9999	Trenchers	9999	0	0	0	0	338.564436	0.063200919	15.14291344	22.35794566	0	0	0	0	0
Welders25	Welders	25	0	0	0	0	7819.449125	24.04583612	0	0	0	0	0	0	0
Welders50	Welders	50	130279.45	260.25	54063.8	2.40973535	434831.8	571.05	366722.8	1.185723386	0	0	0	0	0
Welders75	Welders	75	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders100	Welders	100	182532.85	265.62	55184.35	3.307692308	0	0	0	0	0	0	0	0	0
Welders175	Welders	175	22863.6	18.32	3806.95	6.005752637	0	0	0	0	0	0	0	0	0
Welders300	Welders	300	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders600	Welders	600	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders750	Welders	750	0	0	0	0	0	0	0	0	0	0	0	0	0
Welders9999	Welders	9999	0	0	0	0	0	0	0	0	0	0	0	0	0

Model Output: OFFROAD2021 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: Orange (SC)
Calendar Year: 2030
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower B	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumptio	Total_Activity_	Total_Population	Horsepower_Hours_hhpy
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	100	Gasoline	7.45088E-08	9.01557E-08	1.07293E-07	1.18741E-06	2.54507E-07	3.76917E-05	2.83539E-09	2.60856E-09	3.41279E-10	3.07303E-10	1.2215484	7.578198117	0.003689879	32.59986298
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	100	Diesel	0.001125095	0.001361365	0.001620137	0.012867119	0.009279364	2.140445446	0.00070437	0.000648023	1.94738E-05	1.74512E-05	69369.64874	2546.538742	36.25220716	2479511.597
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	175	Gasoline	7.34029E-08	8.88175E-08	1.057E-07	1.2361E-06	5.4595E-07	7.76625E-05	5.84222E-09	5.37485E-09	7.05597E-10	6.33188E-10	2.516961151	9.333512648	0.005948393	67.17096799
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	175	Diesel	0.000435308	0.000526723	0.000626844	0.005703632	0.00396522	0.981932874	0.000186891	0.00017194	8.93607E-06	8.00578E-06	31823.44062	2519.209127	13.30789927	1264555.383
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	25	Gasoline	1.79486E-06	2.17178E-06	2.5846E-06	2.40064E-05	4.50343E-07	7.38902E-05	4.59632E-08	4.22861E-08	6.19574E-10	6.02433E-10	2.394706109	95.79951256	0.033503504	63.90830763
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	25	Diesel	0.000122612	0.00014836	0.000176561	0.000494613	0.000359924	0.046771716	2.07722E-05	1.91104E-05	4.22589E-07	3.81333E-07	1515.823506	808.4116896	4.419232081	54180.78416
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	300	Diesel	0.00017506	0.000211822	0.000252086	0.001401244	0.00098595	0.69062247	4.64739E-05	4.2756E-05	6.28894E-06	5.6307E-06	22382.36838	1560.655588	3.184792493	889399.2596
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	50	Gasoline	3.16512E-07	3.8298E-07	4.55778E-07	1.13694E-05	8.25279E-07	0.000306229	2.30363E-08	2.11934E-08	2.78141E-09	2.49671E-09	9.924573605	55.40464229	0.037258709	264.8603515
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	50	Diesel	0.002536428	0.003069078	0.003652457	0.011385246	0.008477835	1.124664228	0.000636026	0.000585144	1.01739E-05	9.16948E-06	36449.2178	3011.454178	47.9629611	1302821.333
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	600	Diesel	8.99257E-05	0.00010881	0.000129493	0.00072819	0.000494509	0.364906277	2.33338E-05	2.14671E-05	3.32298E-06	2.97511E-06	11826.23941	1086.976409	1.010211879	469934.5633
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	75	Gasoline	4.04811E-08	4.89822E-08	5.82928E-08	6.96342E-07	1.45902E-07	2.28273E-05	1.7172E-09	1.57983E-09	2.06829E-10	1.86113E-10	0.739810402	15.15639623	0.003280798	19.7435632
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	75	Diesel	0.001403428	0.001698148	0.002020936	0.008155783	0.011859183	1.183307705	0.000713457	0.000656381	1.07423E-05	9.6476E-06	38349.79292	2689.644363	34.89423624	1370754.469
Orange (SC)	2030	Agricultural - Agricultural Tractors	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - ATVs	Aggregate	100	Gasoline	9.36538E-06	1.13321E-05	1.34861E-05	0.000620576	4.13206E-05	0.045059483	3.38964E-06	3.11847E-06	4.10382E-07	3.67373E-07	1460.331782	52.57217863	1.855310461	46766.82395
Orange (SC)	2030	Agricultural - ATVs	Aggregate	175	Gasoline	1.15944E-05	1.40292E-05	1.66959E-05	0.000845686	6.05126E-05	0.065879363	4.95583E-06	4.55936E-06	6.00063E-07	5.3712E-07	2135.082787	29.58582212	1.6535614	68375.58612
Orange (SC)	2030	Agricultural - ATVs	Aggregate	175	Diesel	3.18234E-08	3.85064E-08	4.58258E-08	8.64354E-07	2.27728E-07	0.000158046	9.72674E-09	8.9486E-09	1.43944E-09	1.28856E-09	5.122105067	71.0546342	0.002351112	244.2420589
Orange (SC)	2030	Agricultural - ATVs	Aggregate	25	Gasoline	0.001131293	0.001368865	0.001629062	0.015073062	0.000656529	0.061236061	5.27644E-05	4.85432E-05	5.24154E-07	4.99262E-07	1984.598119	270.2228459	10.98886849	63556.34453
Orange (SC)	2030	Agricultural - ATVs	Aggregate	25	Diesel	2.04601E-05	2.47567E-05	2.94625E-05	0.000235136	0.00022936	0.036323229	8.5285E-06	7.84622E-06	3.30428E-07	2.96146E-07	1177.198711	294.7182833	3.502491017	50492.59292
Orange (SC)	2030	Agricultural - ATVs	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	99.68773983	2.588029379	15356.29588
Orange (SC)	2030	Agricultural - ATVs	Aggregate	50	Gasoline	2.47259E-05	2.99183E-05	3.56053E-05	0.001651444	6.09475E-05	0.066847357	5.02865E-06	4.62636E-06	6.08491E-07	5.45012E-07	2166.454496	198.9488976	7.40709877	69380.25788
Orange (SC)	2030	Agricultural - ATVs	Aggregate	50	Diesel	5.14252E-05	6.22245E-05	7.40523E-05	0.000672057	0.000553846	0.107266043	1.21109E-05	1.1142E-05	9.76057E-07	8.74548E-07	3476.382774	518.4962189	6.536140264	149109.5592
Orange (SC)	2030	Agricultural - ATVs	Aggregate	75	Gasoline	6.21023E-06	7.51438E-06	8.94274E-06	0.000455019	1.80212E-05	0.020354927	1.53122E-06	1.40872E-06	1.85324E-07	1.65955E-07	659.6823855	99.77124348	1.241136703	21126.19211
Orange (SC)	2030	Agricultural - Bale Wagons (Self Propelled)	Aggregate	175	Diesel	6.45742E-08	7.81347E-08	9.29868E-08	7.449E-07	5.71949E-07	0.000129295	2.63527E-08	2.42445E-08	1.17643E-09	1.05415E-09	4.190310553	136.2552719	0.001175556	159.8483522
Orange (SC)	2030	Agricultural - Bale Wagons (Self Propelled)	Aggregate	300	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Balers (Self Propelled)	Aggregate	75	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Combine Harvesters	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Combine Harvesters	Aggregate	300	Diesel	2.86322E-07	3.46449E-07	4.12303E-07	1.70599E-06	2.81802E-06	0.00073658	1.18788E-07	1.09285E-07	6.70445E-09	6.0054E-09	23.87181019	41.30496226	0.004945653	1026.120281
Orange (SC)	2030	Agricultural - Combine Harvesters	Aggregate	600	Diesel	2.23405E-05	2.7032E-05	3.21703E-05	0.00015777	0.0002219	0.061561599	8.58359E-06	7.8969E-06	5.60389E-07	5.01917E-07	1995.148482	689.2321271	0.257596387	85760.66447
Orange (SC)	2030	Agricultural - Combine Harvesters	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Combine Harvesters	Aggregate	9999	Diesel	2.45706E-07	2.97304E-07	3.53816E-07	1.69368E-06	3.72357E-06	0.000605687	9.80297E-08	9.01873E-08	5.51274E-09	4.93822E-09	19.62970617	110.630295	0.001160232	843.775113
Orange (SC)	2030	Agricultural - Construction Equipment	Aggregate	100	Diesel	4.1655E-06	5.04025E-06	5.99832E-06	5.57174E-05	3.87907E-05	0.009521331	2.68822E-06	2.47317E-06	8.66505E-08	7.76282E-08	308.5766083	87.4347892	0.254398853	13235.51649
Orange (SC)	2030	Agricultural - Construction Equipment	Aggregate	175	Diesel	3.50324E-05	4.23892E-05	5.04466E-05	0.000541401	0.000351131	0.095756348	1.52957E-05	1.40721E-05	8.71652E-07	7.80709E-07	3103.365362	187.9013957	2.027619479	147980.6314
Orange (SC)	2030	Agricultural - Construction Equipment	Aggregate	300	Diesel	6.43754E-06	7.78943E-06	9.27006E-06	3.63729E-05	5.83575E-05	0.013969985	2.79611E-06	2.57242E-06	1.27126E-07	1.13898E-07	452.7529372	120.3488766	0.118507767	21589.0357
Orange (SC)	2030	Agricultural - Construction Equipment	Aggregate	50	Diesel	1.7286E-06	2.09161E-06	2.48919E-06	9.38852E-06	7.24521E-06	0.001141496	3.8004E-07	3.49637E-07	1.03515E-08	9.30671E-09	36.99473339	41.30496239	0.037092395	1586.783943
Orange (SC)	2030	Agricultural - Construction Equipment	Aggregate	600	Diesel	3.75603E-06	4.5448E-06	5.40869E-06	3.07885E-05	3.35049E-05	0.007293754	1.61984E-06	1.49026E-06	6.63611E-08	5.94665E-08	236.383113	47.35641344	0.037451996	11271.67383
Orange (SC)	2030	Agricultural - Construction Equipment	Aggregate	75	Diesel	1.28987E-07	1.56074E-07	1.85741E-07	1.10843E-06	1.22639E-06	0.000183656	5.2925E-08	4.8691E-08	1.66993E-09	1.49736E-09	5.952106799	136.2552632	0.004736365	255.2987041
Orange (SC)	2030	Agricultural - Cotton Pickers	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Forage & Silage Harvesters	Aggregate	600	Diesel	9.38216E-07	1.13524E-06	1.35103E-06	8.19809E-06	7.78421E-06	0.002428026	3.52032E-07	3.2387E-07	2.21004E-08	1.97959E-08	78.68984034	3.256823741	0.006395674	3382.451521
Orange (SC)	2030	Agricultural - Forage & Silage Harvesters	Aggregate	750	Diesel	6.40361E-06	7.74837E-06	9.2212E-06	5.24203E-05	6.02035E-05	0.012418309	2.97483E-06	2.73685E-06	1.12986E-07	1.01247E-07	402.4647082	97.19057452	0.030300378	17299.78559
Orange (SC)	2030	Agricultural - Forage & Silage Harvesters	Aggregate	9999	Diesel	4.14989E-06	5.02137E-06	5.97585E-06	3.35426E-05	5.61573E-05	0.007776842	1.84587E-06	1.6982E-06	7.0752E-08	6.34052E-08	252.0394956	47.35641357	0.014574454	10833.8176
Orange (SC)	2030	Agricultural - Forklifts	Aggregate	100	Diesel	1.42501E-05	1.72426E-05	2.05201E-05	0.000142228	0.000100851	0.023643453	7.42319E-06	6.82933E-06	2.15054E-07	1.92767E-07	766.2601345	401.249067	0.49997355	32866.55059
Orange (SC)	2030	Agricultural - Forklifts	Aggregate	175	Diesel	1.56964E-06	1.89926E-06	2.26028E-06	1.81079E-05	1.39017E-05	0.003142908	6.40586E-07	5.89339E-07	2.85967E-08	2.56244E-08	101.8584413	41.78093521	0.050676134	4857.009958
Orange (SC)	2030	Agricultural - Forklifts	Aggregate	50	Diesel	2.18945E-05	2.64923E-05	3.15281E-05	0.00012612	9.91591E-05	0.015591332	5.0519E-06	4.64775E-06	1.41439E-07	1.27117E-07	505.2991153	541.6560834	0.700945409	21673.36934
Orange (SC)	2030	Agricultural - Forklifts	Aggregate	75	Diesel	5.81987E-05	7.04205E-05	8.38062E-05	0.000507942	0.000558424	0.084330587	2.39003E-05	2.19883E-05	7.66825E-07	6.87554E-07	2733.068119	1044.872554	2.108151258	117227.1886
Orange (SC)	2030	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	175	Diesel	2.13403E-07	2.58218E-07	3.07301E-07	2.64187E-06	1.73943E-06	0.000437748	8.95684E-08	8.24029E-08	3.98314E-09	3.56899E-09	14.18696825	3.256823512	0.006395674	644.2764598
Orange (SC)	2030	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	300	Diesel	5.34846E-06	6.47164E-06	7.70178E-06	3.18678E-05	5.26404E-05	0.013759255	2.21896E-06	2.04144E-06	1.25239E-07	1.1218E-07	445.9234033	151.9352366	0.119450492	20250.83506
Orange (SC)	2030	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	600	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Hay Squeeze/Stack Retriever	Aggregate	75	Diesel	1.8675E-08	2.25967E-08	2.6892E-08	1.6048E-07	1.77559E-07	2.65901E-05	7.6626E-09	7.04959E-09	2.41777E-10	2.16791E-10	0.861758619	136.2552719	0.000587778	35.20255849
Orange (SC)	2030	Agricultural - Nut Harvester	Aggregate	100	Diesel	9.78827E-05	0.000118438	0.000140951	0.000854393	0.000784172	0.13236868	6.37296E-05	5.86312E-05	1.20344E-06	1.07921E-06	4289.933608	1214.093722	2.189344689	165870.5975
Orange (SC)	2030	Agricultural - Nut Harvester	Aggregate	175	Diesel	1.86706E-05	2.25914E-05	2.68856E-05	0.00020703	0.000168743	0.035033425	8.13965E-06	7.48847E-06	3.18727E-07	2.8563E-07	1135.39749	557.4466097	0.468952084	48804.6103
Orange (SC)	2030	Agricultural - Nut Harvester	Aggregate	25	Diesel	3.12232E-05	3.77801E-05	4.49615E-05	0.000169582	0.000144121	0.020618519	6.76165E-06	6.22071E-06	1.86976E-07	1.68104E-07	668.2251118	136.2552632	1.647165664	25836.97346
Orange (SC)	2030	Agricultural - Nut Harvester	Aggregate	300	Diesel	1.0957E-05	1.3258E-05	1.57781E-05	6.36499E-05	0.000105296	0.026382881	4.62675E-06	4.25661E-06	2.40119E-07	2.15102E-07	855.0421988	159.2255723	0.177418989	36753.64926
Orange (SC)	2030	Agricultural - Nut Harvester	Aggregate	50	Diesel	9.07357E-06	1.0979E-05	1.30659E-05	4.8161E-05	3.60778E-05	0.005378043	2.16951E-06	1.99595E-06	4.87421E-08	4.38476E-08	174.2968693	228.4852121	0.199556114	6739.201256
Orange (SC)	2030	Agricultural - Nut Harvester	Aggregate	75	Diesel	1.86565E-05	2.25743E-05	2.68653E-05	0.000161134	0.00017791	0.026715335	7.65726E-06	7.04468E-06	2.42918E-07	2.17812E-07	865.8166941	293.49135	0.552948054	33476.86675
Orange (SC)	2030	Agricultural - Other Harvesters	Aggregate	100	Diesel	1.85838E-05	2.24865E-05	2.67607E-05	0.00017846	0.000129871	0.029409873	9.72091E-06	8.94324E-06	2.67478E-07	2.39781E-07	953.1439214	602.2675548	0.476644997	36853.37993
Orange (SC)	2030	Agricultural - Other Harvesters	Aggregate	175	Diesel	1.67181E-05	2.02289E-05	2.4074E-05	0.000188403	0.000150362	0.03215509	7.14834E-06	6.57647E-06	2.92553E-07	2.62163E-07	1042.113604	341.2200064	0.425618807	44794.83933
Orange (SC)	2030	Agricultural - Other Harvesters	Aggregate	300	Diesel	1.12881E-07	1.36586E-07	1.62549E-07	6.7258E-07	1.11099E-06	0.000290393	4.68318E-08	4.30852E-08	2.6432E-09	2.3676E-09	9.411354387	136.2552632	0.001763334	404.5433275
Orange (SC)	2030	Agricultural - Other Harvesters	Aggregate	600	Diesel	1.94539E-07	2.35393E-07	2.80137E-07	1.37385E-06	1.93229E-06	0.000536074	7.47452E-08	6.87656E-08	4.87983E-09	4.37065E-09	17.37359515	136.2552632	0.001763334	746.797089
Orange (SC)	2030	Agricultural - Other Harvesters	Aggregate	75	Diesel	5.78375E-08	6.99834E-08	8.3286E-08	4.97017E-07	5.49911E-07	8.23511E-05	2.37315E-08	2.1833E-08	7.48795E-10	6.71415E-10	2.66891455	136.2552632	0.001763334	103.1937767
Orange (SC)	2030	Agricultural - Other Harvesters	Aggregate	750	Diesel	8.08745E-08	9.78581E-08	1.16459E-07	5.68968E-07	8.3299E-07	0.00022201	3.31014E-08	3.04532E-08	2.02093E-09	1.81007E-09	7.19512569	136.2552719	0.000587778	309.2796211
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	100	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	175	Diesel	3.2207E-06	3.89705E-06	4.63781E-06	3.49182E-05	2.93043E-05	0.00583646	1.44121E-06	1.32591E-06	5.30957E-08	4.75851E-08	189.1537152	269.8558677	0.073635921	8590.086725
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	300	Diesel	1.4368E-05	1.73853E-05	2.069E-05	7.54035E-05	0.000125531	0.025701244	6.46587E-06	5.9486E-06	2.33805E-07	2.09544E-07	832.9510428	48.59528448	0.175082218	37827.02168
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	50	Diesel	2.89708E-06	3.50547E-06	4.1718E-06	1.62429E-05	1.26803E-05	0.002002107	6.49297E-07	5.97354E-07	1.81599E-08	1.63233E-08	64.88625031	65.69879564	0.087433947	2650.582183
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	600	Diesel	1.40804E-05	1.70372E-05	2.02757E-05	0.00010276	0.000136891	0.036417429	5.54766E-06	5.10384E-06	3.31478E-07	2.96914E-07	1180.251627	159.2255723	0.177418991	53599.07241
Orange (SC)	2030	Agricultural - Sprayers/Spray Rigs	Aggregate	75	Diesel	0.000396319	0.000479546	0.0005707	0.003039766	0.003580081	0.468133592	0.000195641	0.000179989	4.25458E-06	3.81673E-06	15171.73108	727.4016758	13.68313466	619760.2691
Orange (SC)	2030	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	100	Diesel	2.4863E-05	3.00842E-05	3.58027E-05	0.00024097	0.000171233	0.03992653	1.26884E-05	1.16734E-05	3.63136E-07	3.25524E-07	1293.978015	398.8208026	0.595557239	46251.25749
Orange (SC)	2030	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	300	Diesel	5.54144E-07	6.70514E-07	7.97967E-07	3.31486E-06	4.78659E-06	0.001355921	2.24323E-07	2.06377E-07	1.2341E-08	1.10549E-08	43.94402423	139.5120955	0.008746786	1746.186175
Orange (SC)	2030	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate	75	Diesel	1.24305E-09	1.50409E-09	1.78999E-09	1.12488E-08	1.21106E-08	1.80483E-06	5.27327E-10	4.85141E-10	1.64115E-11	1.47149E-11	0.058492556	0.475970269	3.77354E-05	2.090726608
Orange (SC)	2030	Airport Ground Support - A/C Tug Narrow Body	Aggregate	100	Diesel	3.04492E-05	3.68435E-05	4.38468E-05	0.000845966	0.000479613	0.132395212	1.39699E-05	1.28523E-05	1.22315E-06	1.08059E-06	4295.416837	1709.033995	4.972068176	155108.3274
Orange (SC)	2030	Airport Ground Support - A/C Tug Narrow Body	Aggregate	175	Diesel	6.81857E-05	8.25047E-05	9.81874E-05	0.001625838	0.000781031	0.277470126	3.7308E-05	3.43233E-05	2.5633E-06	2.26467E-06	9002.21267	2380.455149	7.013233006	325060.1186
Orange (SC)	2030	Airport Ground Support - A/C Tug Narrow Body	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030	Airport Ground Support - A/C Tug Narrow Body	Aggregate	300	Diesel	3.18145E-05	3.84955E-05	4.58129E-05	0.000310717	0.000315732	0.161601393	1.24926E-05	1.14932E-05	1.49313E-06	1.31897E-06	5242.979215	845.5220817	2.459865308	189324.987
Orange (SC)	2030	Airport Ground Support - A/C Tug Narrow Body	Aggregate	50	Diesel	2.01747E-05	2.44114E-05	2.90516E-05	0.000107598	9.19898E-05	0.010553566	8.30959E-06	7.64482E-06	9.69677E-08	8.61368E-08	342.3988127	257.7745627	0.785063396	11120.16633
Orange (SC)	2030	Airport Ground Support - A/C Tug Narrow Body	Aggregate	75	Diesel	1.4408E-06	1.74337E-06	2.07475E-06	1.06677E-05	1.25706E-05	0.001529086	1.24654E-06	1.14682E-06	1.40939E-08	1.24802E-08	49.60952108	29.94320796	0.104675119	1790.316955
Orange (SC)	2030

Orange (SC)	2030 Airport Ground Support - Misc - Maint. Truck	Aggregate	175	Gasoline	0.000165346	0.000152086	0.000181954	0.015440047	0.001357826	0.442532664	3.17249E-05	2.39699E-05	4.3961E-06	6.19393E-06	17680.6	2996.65	6.65	389564.5
Orange (SC)	2030 Airport Ground Support - Misc - Other	Aggregate	50	Gasoline	0.000130476	0.000120012	0.000143581	0.010616264	0.00027943	0.106533522	7.34433E-06	5.54905E-06	1.29525E-06	1.64183E-06	4686.6	1799.45	9.82	89972.5
Orange (SC)	2030 Airport Ground Support - Misc - Other	Aggregate	50	Nat Gas	0	0	1.09873E-05	0.001635345	0.00044201	0.096330125	0	0	0	0	5142.85	1887.05	1.84	94352.5
Orange (SC)	2030 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Gasoline	4.35606E-05	4.0067E-05	4.79358E-05	0.004676185	0.000428339	0.142896757	1.02442E-05	7.74004E-06	1.26467E-06	1.99346E-06	5690.35	854.1	4.54	106847.91
Orange (SC)	2030 Airport Ground Support - Misc - Passenger Stand	Aggregate	175	Nat Gas	0	0	7.83785E-09	9.58788E-06	9.38019E-07	0.000390497	0	0	0	0	3.65	0	0.17	0
Orange (SC)	2030 Airport Ground Support - Misc - Service Truck	Aggregate	300	Gasoline	0.000795837	0.000732011	0.00087577	0.053093327	0.004710856	1.283881078	9.47126E-05	7.15606E-05	1.31243E-05	1.81586E-05	51833.65	16133	19.16	2903940
Orange (SC)	2030 Airport Ground Support - Misc - Service Truck	Aggregate	300	Nat Gas	0	0	1.09088E-05	0.006371489	0.000538558	0.179256375	0	0	0	0	9814.85	2445.5	1.88	440190
Orange (SC)	2030 Airport Ground Support - Misc - Sweeper	Aggregate	100	Gasoline	5.74263E-06	5.28207E-06	6.31942E-06	0.000398786	3.24586E-05	0.010061248	7.01494E-07	5.30018E-07	8.30667E-08	1.43212E-07	408.8	156.95	0.44	8365.435
Orange (SC)	2030 Airport Ground Support - Misc - Sweeper	Aggregate	50	Nat Gas	0	0	8.80333E-08	2.56312E-05	6.98759E-06	0.002132693	0	0	0	0	98.55	51.1	0.15	2299.5
Orange (SC)	2030 Airport Ground Support - Misc - Water Truck	Aggregate	175	Gasoline	1.28587E-05	1.18274E-05	1.41502E-05	0.001216181	0.000110734	0.035690488	2.55863E-06	1.93319E-06	3.54548E-07	4.98686E-07	1423.5	518.3	1.67	77745
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	100	Diesel	2.27655E-05	2.75463E-05	3.27823E-05	0.000645347	0.00031034	0.099168236	8.02979E-06	7.38741E-06	9.16177E-07	8.09398E-07	3217.404207	2270.304602	4.547185325	185458.2812
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	175	Diesel	9.71606E-05	0.000117564	0.000139911	0.002400317	0.000852815	0.39818001	3.57521E-05	3.28919E-05	3.67846E-06	3.24989E-06	12918.5119	4893.95727	9.85223487	744655.2112
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	25	Diesel	8.01762E-07	9.70132E-07	1.15454E-06	1.33133E-05	8.81339E-06	0.001627943	4.50023E-08	4.14021E-08	1.50271E-08	1.32871E-08	52.81681584	109.5403734	0.216532635	2738.509335
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	300	Diesel	9.25609E-05	0.000111999	0.000133288	0.000815738	0.000833379	0.378540116	3.53214E-05	3.24957E-05	3.49701E-06	3.08959E-06	12281.31718	3141.311295	6.387712718	707929.761
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	50	Diesel	9.66005E-05	0.000116887	0.000139105	0.001357527	0.001121224	0.194814152	2.53585E-05	2.33298E-05	1.79826E-06	1.59005E-06	6320.530625	9508.747313	19.27140447	327721.3066
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	600	Diesel	6.39292E-05	7.73543E-05	9.20581E-05	0.000574573	0.000567934	0.236122144	2.37966E-05	2.18929E-05	2.18115E-06	1.9272E-06	7660.722912	1229.671054	2.490125297	441584.5685
Orange (SC)	2030 Airport Ground Support - Other	Aggregate	75	Diesel	3.28649E-05	3.97665E-05	4.73255E-05	0.000682854	0.000428613	0.103142353	1.71133E-05	1.57442E-05	9.52616E-07	8.41834E-07	3346.340047	2946.957495	6.062913766	192894.9104
Orange (SC)	2030 Airport Ground Support - Passenger Stand	Aggregate	175	Diesel	3.87683E-07	4.69096E-07	5.58263E-07	5.66171E-06	8.84305E-06	0.000930468	4.34984E-07	4.00185E-07	8.59101E-09	7.59435E-09	30.18800283	13.41891814	0.058754397	1476.080995
Orange (SC)	2030 Airport Ground Support - Passenger Stand	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Airport Ground Support - Passenger Stand	Aggregate	300	Diesel	2.02257E-07	2.44731E-07	2.9125E-07	1.36955E-06	4.57934E-06	0.000776011	9.8591E-08	9.07037E-08	7.16854E-09	6.3337E-09	25.17681295	4.562432167	0.117508795	1243.262766
Orange (SC)	2030 Airport Ground Support - Passenger Stand	Aggregate	50	Diesel	1.20789E-06	1.46155E-06	1.73936E-06	1.09444E-05	1.28221E-05	0.001977488	6.47411E-07	5.95618E-07	1.82466E-08	1.614E-08	64.15742087	65.6185097	1.116333552	2836.893484
Orange (SC)	2030 Airport Ground Support - Passenger Stand	Aggregate	600	Diesel	6.11178E-08	7.39525E-08	8.80096E-08	1.5288E-06	4.25085E-07	0.000875682	1.41834E-08	1.30487E-08	8.09428E-09	7.1472E-09	28.41053205	4.562432167	0.117508795	1402.947891
Orange (SC)	2030 Airport Ground Support - Passenger Stand	Aggregate	75	Diesel	2.31088E-07	2.79617E-07	3.32767E-07	1.31301E-05	5.69153E-06	0.002255415	3.75107E-08	3.45098E-08	2.08455E-08	1.84084E-08	73.17444352	63.87405034	1.645123129	3613.446276
Orange (SC)	2030 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	100	Diesel	0.0000363	0.000044	0.0000523	0.000170297	0.000922793	0.127294585	0.0000424	0.0000405	0	0	4129.480957	1884.309448	1.583454013	71796.61719
Orange (SC)	2030 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	50	Diesel	0.0000554	0.0000671	0.0000797	0.000414069	0.001145564	0.161520299	0.000054	5.16E-05	0	0	5239.774902	5652.928344	4.750362039	87484.7168
Orange (SC)	2030 Commercial Harbor Craft - AE - Commercial Fishing	Aggregate	75	Diesel	0.0000279	3.38E-05	0.0000402	0.000141997	0.000665682	0.087797776	0.0000246	0.0000235	0	0	2848.190674	1884.309448	1.583454013	49519.65234
Orange (SC)	2030 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	25	Diesel	0.000268851	0.000325448	0.000387081	0.001123395	0.001713008	0.164567693	0.000130131	0.000124664	0	0	5338.633651	11062.28156	6.703055045	92409.87753
Orange (SC)	2030 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	50	Diesel	0.001663372	0.002012694	0.002395176	0.006756454	0.010912387	1.202937045	0.00072567	0.000693753	0	0	39023.69902	42036.67844	25.47161478	669971.6988
Orange (SC)	2030 Commercial Harbor Craft - AE - Commercial Passenger Fishing	Aggregate	75	Diesel	0.000927146	0.001121938	0.001335015	0.003786124	0.011810765	1.402929805	0.000698995	0.000668256	0	0	45511.53309	28761.93614	17.42794598	805229.3144
Orange (SC)	2030 Commercial Harbor Craft - AE - Crew/Supply	Aggregate	50	Diesel	0.000157887	0.000191043	0.000227357	0.000929424	0.003036203	0.43995744	0.000136928	0.000130903	0	0	14272.37305	15178.02637	7.213346004	233817.4844
Orange (SC)	2030 Commercial Harbor Craft - AE - Excursion	Aggregate	175	Diesel	0.000321005	0.000388383	0.000462235	0.002226114	0.00811244	1.104411255	0.000318211	0.000304153	0	0	35827.48786	14573.56994	20.409706	692498.7395
Orange (SC)	2030 Commercial Harbor Craft - AE - Excursion	Aggregate	25	Diesel	3.15039E-05	3.81141E-05	4.54271E-05	0.000116286	0.000208066	0.022777508	1.46772E-05	1.40313E-05	0	0	738.9095384	3135.150375	5.102426095	11761.97369
Orange (SC)	2030 Commercial Harbor Craft - AE - Excursion	Aggregate	300	Diesel	0.00081025	0.000980464	0.001166828	0.003652993	0.012621416	1.198630158	0.000517746	0.00049505	0	0	38883.97881	8115.264185	15.30727901	751594.1631
Orange (SC)	2030 Commercial Harbor Craft - AE - Excursion	Aggregate	50	Diesel	0.000323802	0.000391793	0.000466308	0.001412659	0.003002694	0.380317235	0.000170781	0.000163469	0	0	12337.62599	15538.90145	25.51213209	205775.4351
Orange (SC)	2030 Commercial Harbor Craft - AE - Excursion	Aggregate	600	Diesel	0.000322264	0.000389982	0.000464149	0.00188911	0.008600972	0.994444647	0.000273049	0.000261069	0	0	32260.13289	4151.633697	5.102426062	624624.624
Orange (SC)	2030 Commercial Harbor Craft - AE - Excursion	Aggregate	75	Diesel	0.000661416	0.000800319	0.000952502	0.002604118	0.006282337	0.688071611	0.000454734	0.000434773	0	0	22321.2848	18054.53392	28.06334503	403681.7767
Orange (SC)	2030 Commercial Harbor Craft - AE - Ferry-Catamaran	Aggregate	175	Diesel	6.60996E-05	0.000079912	9.5096E-05	0.000499052	0.001537137	0.248772872	6.45054E-05	6.16074E-05	0	0	8070.278967	3548.810406	2.000000036	155594.0469
Orange (SC)	2030 Commercial Harbor Craft - AE - Research Boat	Aggregate	50	Diesel	0.00000498	0.00000603	0.00000717	0.0000464	0.0000964	0.012758453	0.00000511	0.00000488	0	0	413.8887024	421.2630615	0.40625	7196.015625
Orange (SC)	2030 Commercial Harbor Craft - AE - Research Boat	Aggregate	75	Diesel	3.4263E-05	4.13762E-05	4.92907E-05	0.000122018	0.000171437	0.017976098	2.20507E-05	2.10484E-05	0	0	583.1506705	421.2630296	0.406249995	10148.22754
Orange (SC)	2030 Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	3.32865E-05	4.0221E-05	4.78874E-05	0.000326282	0.000645342	0.083257814	3.62018E-05	3.4636E-05	0	0	2700.913737	4401.614934	6.136045241	46771.55468
Orange (SC)	2030 Commercial Harbor Craft - AE - Work Boat	Aggregate	800	Diesel	0.000222847	0.000269645	0.0003209	0.001664741	0.005016834	0.796780953	0.000212481	0.000203132	0	0	25847.85184	2200.807641	3.068023	499605.3438
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	300	Diesel	0.00073665	0.000891262	0.001060693	0.002898087	0.010191643	0.921288123	0.00035073	0.000335329	0	0	29886.91059	9472.179595	9.500723909	578418.6818
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	600	Diesel	0.002808217	0.003398084	0.004043887	0.011901292	0.05091851	4.705258595	0.001462617	0.001398058	0	0	152640.2392	28416.5428	28.50217601	2953901.638
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Fishing	Aggregate	800	Diesel	0.000110525	0.000133735	0.000159156	0.000488667	0.003024834	0.413541555	0.0000464	0.0000444	0	0	13415.43262	1578.696655	1.583454013	260011.3441
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	175	Diesel	0.000080006	0.000096751	0.000115245	0.000338395	0.001123479	0.090575212	4.00877E-05	3.84007E-05	0	0	2938.291594	1599.417326	1.340611016	55275.85886
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	300	Diesel	0.000778783	0.000942383	0.001121517	0.003521225	0.020361613	2.027567316	0.000431123	0.000412168	0	0	65774.99183	15994.17666	13.406113	1271345.017
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	600	Diesel	0.004601111	0.005567303	0.006625552	0.019628367	0.092948501	8.659143461	0.00244328	0.002335911	0	0	280905.6403	46383.11251	38.87722788	5436395.849
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	800	Diesel	0.007735106	0.009359543	0.01113868	0.030364662	0.095061738	6.056006829	0.004062697	0.003883933	0	0	196458.9823	20792.43219	17.42794878	3800216.493
Orange (SC)	2030 Commercial Harbor Craft - ME - Commercial Passenger Fishing	Aggregate	9999	Diesel	0.008102688	0.009804244	0.011667878	0.032801706	0.100975399	8.255442603	0.004177163	0.003993359	0	0	267809.4407	15994.17891	13.40611494	5288980.078
Orange (SC)	2030 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	100	Diesel	0.000241301	0.000291975	0.000347474	0.000856555	0.001861818	0.124247803	0.000155749	0.000148896	0	0	4030.642128	3455.531226	3.606673037	70078.17335
Orange (SC)	2030 Commercial Harbor Craft - ME - Crew/Supply	Aggregate	800	Diesel	0.001649991	0.00199648	0.002375983	0.006962766	0.041431436	4.864925641	0.000779962	0.000745738	0	0	157819.8878	19597.09846	10.82002012	3057147.25
Orange (SC)	2030 Commercial Harbor Craft - ME - Excursion	Aggregate	100	Diesel	0.0001065	0.000129	0.000153458	0.000429879	0.001099871	0.134737156	7.609E-05	7.275E-05	0	0	4370.920536	3610.067691	12.75606513	77399.85748
Orange (SC)	2030 Commercial Harbor Craft - ME - Excursion	Aggregate	300	Diesel	0.000628613	0.00076055	0.000905108	0.002774591	0.01603521	1.679801318	0.000341429	0.000326539	0	0	54493.34283	15571.5168	22.96091806	1054245.272
Orange (SC)	2030 Commercial Harbor Craft - ME - Excursion	Aggregate	600	Diesel	0.004980151	0.006025884	0.007171387	0.02007584	0.102302903	9.816140531	0.002679742	0.002561901	0	0	318439.0354	51782.30985	81.63881313	6160637.849
Orange (SC)	2030 Commercial Harbor Craft - ME - Excursion	Aggregate	800	Diesel	0.002740928	0.003316566	0.003946943	0.010430608	0.035728226	2.915720158	0.001361473	0.001301514	0	0	94586.9824	10624.30247	20.40970597	1831067.737
Orange (SC)	2030 Commercial Harbor Craft - ME - Excursion	Aggregate	9999	Diesel	0.001750317	0.002117884	0.002520456	0.005375006	0.027209344	2.936270505	0.000712229	0.000680891	0	0	95253.64356	6490.26294	10.2048521	1895210.051
Orange (SC)	2030 Commercial Harbor Craft - ME - Ferry-Catamaran	Aggregate	9999	Diesel	0.002328334	0.002817269	0.0033528	0.009748211	0.05888125	5.584139885	0.001390845	0.001329652	0	0	181151.4548	4744.229599	2.000000036	3515664
Orange (SC)	2030 Commercial Harbor Craft - ME - Ferry-Short Run	Aggregate	175	Diesel	0.00020587	0.000249115	0.0002964	0.000834844	0.005204283	0.543751467	0.000113964	0.000108949	0	0	17639.4884	8022.818205	3.000000057	340087.2813
Orange (SC)	2030 Commercial Harbor Craft - ME - Research Boat	Aggregate	300	Diesel	3.31013E-05	3.9965E-05	4.76342E-05	0.000179554	0.001011155	0.090103667	2.15187E-05	2.06135E-05	0	0	2922.990983	777.4315473	0.812499992	56499.84375
Orange (SC)	2030 Commercial Harbor Craft - ME - Research Boat	Aggregate	600	Diesel	0.0000966	0.000116931	0.000139158	0.00055224	0.002527061	0.228271365	0.0000474	0.0000453	0	0	7405.203125	777.4315796	0.8125	143132.9375
Orange (SC)	2030 Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.000203551	0.000246332	0.000293247	0.000867527	0.003304893	0.322590194	9.94648E-05	9.51403E-05	0	0	10464.93859	3920.689598	6.13604594	195838.4482
Orange (SC)	2030 Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.000930326	0.001125705	0.0013967	0.004467305	0.024881119	2.485794254	0.000515425	0.000492809	0	0	80640.03738	11762.06806	18.40813699	1560179.505
Orange (SC)	2030 Commercial Harbor Craft - ME - Work Boat	Aggregate	800	Diesel	0.000316191	0.000382591	0.000455315	0.001227706	0.007546678	0.733968862	0.000173548	0.000165912	0	0	23810.20729	1960.344748	3.068023	460220.3125
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	100	Diesel	6.44756E-05	7.80154E-05	9.28448E-05	0.001949668	0.000935963	0.310777146	1.93931E-05	1.78417E-05	2.87135E-06	2.53652E-06	10082.82225	4731.10764	12.33489659	391316.6355
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	175	Diesel	8.62351E-05	0.000104344	0.000124179	0.002726061	0.000701622	0.488341059	3.49545E-05	3.21582E-05	4.51237E-06	3.98577E-06	15843.68785	4055.796853	12.28195712	608030.6792
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	300	Diesel	0.000115181	0.000139369	0.000165861	0.001372329	0.001161782	0.692351077	3.87875E-05	3.56845E-05	6.39767E-06	5.65088E-06	22462.56821	4169.511376	12.17607818	868544.2298
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	50	Diesel	4.8984E-05	5.92706E-05	7.05369E-05	0.000473797	0.000415275	0.066400783	1.63766E-05	1.50665E-05	6.12439E-07	5.41954E-07	2154.300286	1877.399506	5.029249681	73391.74193
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	600	Diesel	0.000153419	0.000185637	0.000220923	0.001890061	0.001316291	1.003935784	4.93571E-05	4.54085E-05	9.27728E-06	8.19399E-06	32571.59087	3276.982383	9.793802011	1266908.323
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	75	Diesel	1.79079E-05	2.16685E-05	2.57873E-05	0.000574657	0.000312578	0.093808771	8.94683E-06	8.23108E-06	8.66771E-07	7.656555E-07	3043.522269	1673.49979	2.858731398	118967.1396
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	750	Diesel	0.000101125	0.000122361	0.00014562	0.001482252	0.00062846	0.804237392	2.46409E-05	2.26696E-05	7.43254E-06	6.56408E-06	26092.59646	1576.972459	2.646973517	997550.2601
Orange (SC)	2030 Construction and Mining - Bore/Drill Rigs	Aggregate	9999	Diesel	9.68275E-05	0.000117161	0.000139432	0.000687273	0.002544136	0.361589813	6.18415E-05	5.68941E-05	3.34017E-06	2.95125E-06	11731.38326	242.9672829	0.317636822	452176.7004
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	100	Diesel	0.000238859	0.00028902	0.000343958	0.003293825	0.002639843	0.468089334	0.000132652	0.00012204	4.32055E-06	3.82048E-06	15186.64293	11626.16618	24.60041262	1019793.514
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	175	Diesel	0.000610118	0.000738243	0.00087857	0.008994948	0.006152816	1.431285041	0.000331144	0.000304653	1.32146E-05	1.1682E-05	46436.46689	21253.3856	44.61318073	3112065.241
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	25	Diesel	2.46231E-06	2.97939E-06	3.54572E-06	1.37624E-05	1.09332E-05	0.001278555	8.91284E-07	8.19981E-07	1.1747E-08	1.04354E-08	41.48129936	100.2022242	0.199462805	2505.055606
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	300	Diesel	0.000816697	0.000988203	0.001176044	0.006185747	0.008696464	2.429702637	0.000369622	0.000340053	2.24393E-05	1.98309E-05	78829.02623	24119.58341	48.66892444	5293125.832
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	50	Diesel	2.5882E-05	3.13172E-05	3.727E-05	0.000191045	0.00015935	0.020702149	9.89314E-06	9.10169E-06	1.90625E-07	1.68968E-07	671.658439	974.7016042	2.127603254	40487.00342
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	600	Diesel	0.001209389	0.00146336	0.00174152	0.013221728	0.011788787	4.348115608	0.000500339	0.000460312	4.01642E-05	3.54887E-05	141069.8223	25874.23746	49.93218887	9471812.263
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	75	Diesel	2.08979E-05	2.52865E-05	3.0093E-05	9.11151E-05	0.000182814	0.010212097	1.81342E-05	1.66835E-05	9.3789E-08	8.33498E-08	331.3202389	325.0598387	0.930826424	22330.88609
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	750	Diesel	3.66525E-05	4.43496E-05	5.27796E-05	0.000430713	0.000420662	0.089101355	2.02211E-05	1.86034E-05	8.22687E-07	7.27233E-07	2890.795346	307.2974413	0.664876017	194082.7873
Orange (SC)	2030 Construction and Mining - Cranes	Aggregate	9999	Diesel	9.93516E-05	0.000120215	0.000143066	0.0011547	0.001892755	0.238099271	5.66896E-05	5.21544E-05	2.19837E-06	1.94333E-06	7724.868624	552.6256215	1.063801627	519055.7656
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	100	Diesel	0.001387891	0.001679348	0.001998563	0.020047339	0.015414092	2.899703075	0.00085018	0.000782165	2.67676E-05	2.3667E-05	94077.67283	48423.22418	98.0148607	4232902.449
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	175	Diesel	0.001151588	0.001393422	0.001658287	0.019793115	0.010840276	3.249080575	0.000611238	0.000562339	3.00048E-05	2.65186E-05	105412.841	31897.46	66.91682844	4761400.487
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	300	Diesel	0.001046107	0.001265789	0.001506394	0.008666473	0.010793888	3.310149642	0.000464179	0.000427045	3.05726E-05	2.7017E-05	107394.1597	23754.01426	49.68604016	4847690.331
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	50	Diesel	0.000126528	0.000153098	0.0001822	0.000693062	0.000508552	0.067267799	3.7025E-05	3.4063E-05	6.18128E-07	5.49031E-07	2182.429665	2111.821401	5.900954888	88983.08955
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	600	Diesel	0.003050483	0.003691084	0.004392695	0.032276785	0.026710039	11.93303629	0.001126838	0.001036691	0.000110235	9.73958E-05	387154.2206	45394.01563	92.349944	17448665.52
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	75	Diesel	5.91119E-05	7.15253E-05	8.51211E-05	0.000387803	0.00059857	0.045243198	4.63255E-05	4.26195E-05	4.16522E-07	3.69269E-07	1467.865727	870.3760952	3.068496542	64346.63555
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	750	Diesel	5.2563E-05	6.36013E-05	7.56907E-05	0.00040835	0.000752228	0.124075812	2.837E-05	2.61004E-05	1.14557E-06	1.01269E-06	4025.503062	297.1240032	0.590095489	181920.9045
Orange (SC)	2030 Construction and Mining - Crawler Tractors	Aggregate	9999	Diesel	0.000203471	0.0002462	0.000292998	0.001761173	0.004622792	0.688811826	9.42225E-05	8.66847E-05	6.3623E-06	5.62199E-06	22347.7411	1027.668721	1.770286467	993548.4866
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	100	Diesel	0.000855964	0.001035717	0.001232589	0.022740717	0.01098348	3.465484725	0.000251249	0.000231149	3.20144E-05	2.82848E-05	112433.8354	70303.76943	103.1184402	5724792.734
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	175	Diesel	0.001513925	0.001831849	0.002180051	0.043022679	0.010191921	7.347872357	0.000497395	0.000457603	6.78893E-05	5.99723E-05	238393.6264	82613.84431	133.096106	12062805.19
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	25	Diesel	1.34088E-06	1.62247E-06	1.93087E-06	4.5562E-06	3.09477E-06	0.00023974	4.31318E-07	3.96812E-07	2.17629E-09	1.95673E-09	7.778109	14.16693506	0.059127546	354.1733766
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	300	Diesel	0.001778466	0.002151944	0.002560991	0.01950821	0.012071495	9.369772982	0.000438418	0.000403345	8.65748E-05	7.64748E-05	303991.9654	70277.63143	114.7074392	15383970.89
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	50	Diesel	0.001237352	0.001497196	0.001781787	0.019139778	0.015059959	2.68652431	0.000302325	0.000278139	2.48011E-05	2.19271E-05	87161.32257	110748.3148	144.3894672	3960990.727
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	600	Diesel	0.002770706	0.003352554	0.003989816	0.032644385	0.016212339	16.56065157	0.000599442	0.000551486	0.000153028	0.000135166	537292.1018	80728.08359	120.0289183	27230465.65
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	75	Diesel	3.04067E-05	3.67921E-05	4.37856E-05	0.000126113	0.000235092	0.014483764	2.80684E-05	2.58229E-05	1.32997E-07	1.18215E-07	469.9097779	348.6482719	1.005168281	23828.90621
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	750	Diesel	8.68452E-05	0.000105083	0.000125057	0.000763189	0.000795548	0.302072267	3.17137E-05	2.91766E-05	2.7902E-06	2.46547E-06	9800.402034	803.4777221	1.359933557	493091.0834
Orange (SC)	2030 Construction and Mining - Excavators	Aggregate	9999	Diesel	5.63348E-05	6.81651E-05	8.11221E-05	0.000856614	0.002039168	0.462610353	1.83501E-05	1.68821E-05	4.27537E-06	3.77576E-06	15008.88344	631.3494611	0.886913189	759033.3197
Orange (SC)	2030 Construction and Mining - Graders	Aggregate	100	Diesel	0.000232236	0.000281006	0.00033442	0.002862185	0.002204976	0.383165327	0.000127088	0.000116921	3.53559E-06	3.12734E-06	12431.37705	6634.94229

Orange (SC)	2030 Construction and Mining - Misc - Trenchers	Aggregate	25	Gasoline	0.002428878	0.002453166	0.002672832	0.080242252	0.001565536	2.79778E-06	0.00090648	0.000684896	1.27578E-06	1.76105E-06	5019.25228	0	15.41484343	0
Orange (SC)	2030 Construction and Mining - Misc - Trenchers	Aggregate	25	Diesel	0.000126651	0.000152333	0.000182062	0.000519934	0.000962625	2.22194E-06	3.23719E-05	2.44588E-05	1.32074E-08	1.1377E-08	45.26473314	0	4.539349559	0
Orange (SC)	2030 Construction and Mining - Misc - Trenchers	Aggregate	5	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0.019177378	0
Orange (SC)	2030 Construction and Mining - Misc - Trenchers	Aggregate	50	Gasoline	0.001747228	0.0016071	0.001922718	0.156977397	0.002380454	0.976133611	6.72938E-05	5.08442E-05	1.1868E-05	1.62993E-05	46526.55	20848.8	51.82	625464
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	100	Diesel	0.000240596	0.000291121	0.000346458	0.005250455	0.002868353	0.773216461	0.000110821	0.000101955	7.14155E-06	6.31089E-06	25086.15654	14030.51277	19.83579023	1110644.124
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	175	Diesel	0.000257348	0.000311391	0.000370581	0.007186097	0.001636898	1.208935998	8.13914E-05	7.48801E-05	1.11695E-05	9.86717E-06	39222.59706	10996.15736	15.28522659	1741274.997
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	25	Diesel	7.72127E-06	9.34274E-06	1.11186E-05	2.60114E-05	1.77638E-05	0.001368683	2.4624E-06	2.26541E-06	1.24225E-08	1.1171E-08	44.40541297	70.94024522	0.233362238	1773.50613
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	300	Diesel	0.000249609	0.000302027	0.000359437	0.002525776	0.001447054	1.170880903	5.80902E-05	5.3443E-05	1.08179E-05	9.55657E-06	37987.94139	7611.993149	11.14304687	1688579.054
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	50	Diesel	0.00064246	0.000777376	0.000925142	0.008678543	0.006460311	1.109278615	0.000143653	0.000132161	1.02366E-05	9.05378E-06	35989.32302	38197.30327	55.13182873	1438723.945
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	600	Diesel	0.000605743	0.000732949	0.00087227	0.00661756	0.00308338	3.297129655	0.00011106	0.000102176	3.04654E-05	2.69107E-05	106971.7405	13105.84337	18.08557345	4754002.819
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	75	Diesel	0.000233992	0.00028313	0.000336948	0.004423762	0.002585283	0.644206155	8.80576E-05	8.1013E-05	5.94899E-06	5.25792E-06	20900.55923	13174.96643	20.41919583	929832.1113
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	750	Diesel	4.93024E-05	5.96559E-05	7.09954E-05	0.000263641	0.000377047	0.12485544	1.94423E-05	1.78869E-05	1.15287E-06	1.01905E-06	4050.797238	276.7019023	0.408383917	179786.764
Orange (SC)	2030 Construction and Mining - Off-Highway Tractors	Aggregate	9999	Diesel	6.54389E-05	7.9181E-05	9.4232E-05	0.000375133	0.000858845	0.18003313	1.78317E-05	1.64051E-05	1.66253E-06	1.46941E-06	5840.976631	165.6437253	0.291702798	259321.5422
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	100	Diesel	4.22302E-05	5.10985E-05	6.08114E-05	0.000723854	0.00041464	0.098971637	1.8838E-05	1.73309E-05	9.13775E-07	8.07793E-07	3211.02577	1841.623964	1.329502248	162670.6087
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	175	Diesel	0.000678127	0.000820534	0.000976503	0.016105604	0.003540899	2.532303586	0.000178508	0.000164227	2.33921E-05	2.06683E-05	82157.80103	26364.08592	17.86157368	4165915.169
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	25	Diesel	2.80006E-06	3.38807E-06	4.03209E-06	4.04453E-05	3.40847E-05	0.003935988	1.23105E-06	1.13257E-06	3.63062E-08	3.2125E-08	127.6988066	232.7479184	0.173413337	5818.697961
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	300	Diesel	0.001452659	0.001757717	0.002091828	0.012112155	0.008947266	5.188760594	0.000343089	0.000315642	4.79291E-05	4.235E-05	168343.6231	40583.59182	30.46294281	8547328.629
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	50	Diesel	7.62314E-05	9.224E-05	0.000109773	0.000975666	0.000623585	0.103335619	1.1507E-05	1.05864E-05	9.53102E-07	8.43411E-07	3352.610356	5326.264028	3.12144006	153932.5091
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	600	Diesel	0.005889099	0.00712581	0.008480303	0.048602091	0.032876157	22.35804928	0.001190776	0.001095514	0.000206535	0.000182483	725382.2859	97408.70872	68.15144131	36610032.65
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	75	Diesel	4.89229E-06	5.91967E-06	7.0449E-06	0.000135303	5.47403E-05	0.020094919	5.34606E-07	4.91837E-07	1.85641E-07	1.64012E-07	651.9575198	481.9772426	0.346826673	32876.04167
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	750	Diesel	0.002516266	0.003044682	0.003623424	0.019589473	0.017909021	7.464240491	0.000724564	0.000666599	6.89351E-05	6.09221E-05	242169.0624	18325.31491	14.3355025	12236495.36
Orange (SC)	2030 Construction and Mining - Off-Highway Trucks	Aggregate	9999	Diesel	0.003258616	0.003942925	0.004692407	0.028324635	0.067905652	13.38427184	0.00088015	0.000809738	0.000123646	0.000109241	434237.9596	17237.74988	11.61869356	22275845.61
Orange (SC)	2030 Construction and Mining - Other	Aggregate	100	Diesel	0.000668108	0.000808411	0.000962076	0.012085786	0.008011044	1.825137632	0.000384333	0.000353586	1.68543E-05	1.48965E-05	59214.58043	33687.31351	70.93141939	2761222.923
Orange (SC)	2030 Construction and Mining - Other	Aggregate	175	Diesel	0.000325291	0.000393602	0.000468419	0.006175391	0.003200289	1.026608256	0.000165515	0.000152274	9.48174E-06	8.37904E-06	33307.17427	10216.0353	23.58627895	1552760.919
Orange (SC)	2030 Construction and Mining - Other	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Construction and Mining - Other	Aggregate	300	Diesel	0.000358809	0.000434159	0.000516685	0.003268465	0.003550068	1.335908195	0.000149342	0.000137395	1.23404E-05	1.09035E-05	43342.07016	9196.327009	21.51528861	2012539.035
Orange (SC)	2030 Construction and Mining - Other	Aggregate	50	Diesel	0.000423699	0.000512676	0.000610127	0.004435312	0.003702084	0.600867853	0.000137662	0.000126649	5.54261E-06	4.9042E-06	19494.49575	21320.49041	42.74293966	814961.1057
Orange (SC)	2030 Construction and Mining - Other	Aggregate	600	Diesel	0.001158612	0.001401921	0.001668402	0.012581425	0.010099244	5.350380286	0.000394146	0.000362614	4.94322E-05	4.36691E-05	173587.196	21001.74542	44.87145752	8049780.474
Orange (SC)	2030 Construction and Mining - Other	Aggregate	75	Diesel	0.000111993	0.000135512	0.00016127	0.00052793	0.001091441	0.05541416	8.63255E-05	7.94194E-05	5.08972E-07	4.52283E-07	1797.851395	1171.672116	4.372090733	83320.72273
Orange (SC)	2030 Construction and Mining - Other	Aggregate	750	Diesel	0.000176947	0.000214105	0.000254803	0.001817104	0.001496106	0.87466414	5.98288E-05	5.50425E-05	8.0814E-06	7.13889E-06	28377.51477	2141.759564	4.026925675	1323664.692
Orange (SC)	2030 Construction and Mining - Other	Aggregate	9999	Diesel	6.04419E-05	7.31347E-05	8.70363E-05	0.000627712	0.001663114	0.330512246	2.34182E-05	2.15448E-05	3.05394E-06	2.6976E-06	10723.10582	545.8981725	1.093022683	499355.1328
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	100	Diesel	0.000181638	0.000219782	0.000261559	0.00383701	0.00239178	0.589231462	9.74981E-05	8.96982E-05	5.44229E-06	4.80923E-06	19116.96587	11049.29445	27.17743689	893207.1386
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	175	Diesel	0.000225101	0.000272372	0.000324146	0.005553237	0.002021488	0.971817449	0.000100294	9.22708E-05	8.97818E-06	7.93184E-06	31529.54687	9286.987213	22.96522268	1466224.833
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	300	Diesel	0.000115912	0.000140254	0.000166914	0.001429882	0.000919348	0.747767376	3.40457E-05	3.1322E-05	6.91E-06	6.10318E-06	24260.48901	5105.534147	10.84789413	1127679.088
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	50	Diesel	8.04735E-05	9.73729E-05	0.000115882	0.000603758	0.000483516	0.073580492	2.51429E-05	2.31315E-05	6.77874E-07	6.00554E-07	2387.238034	2576.684792	6.924187742	99535.00509
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	600	Diesel	2.32563E-05	2.81401E-05	3.3489E-05	0.00028142	0.000179516	0.150835565	6.92039E-06	6.36676E-06	1.39385E-06	1.2311E-06	4893.693783	646.9535336	1.384837548	229028.2216
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	75	Diesel	7.244E-05	8.76525E-05	0.000104314	0.000805363	0.000785801	0.118679	5.53471E-05	5.09193E-05	1.09507E-06	9.68642E-07	3850.409463	2472.303999	6.231768968	179621.043
Orange (SC)	2030 Construction and Mining - Pavers	Aggregate	750	Diesel	3.49948E-06	4.23437E-06	5.03925E-06	5.29558E-05	1.4454E-05	0.028460063	5.18354E-07	4.76886E-07	2.63022E-07	2.32287E-07	923.3553888	57.23661992	0.115403129	42927.46494
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	100	Diesel	9.92353E-05	0.000120075	0.000142899	0.002503195	0.001340921	0.390233124	3.8421E-05	3.53473E-05	3.60492E-06	3.18503E-06	12660.68394	7685.117089	15.66958582	689681.2557
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	175	Diesel	0.000105427	0.000127566	0.000151815	0.002335658	0.000929789	0.401090128	5.07321E-05	4.66736E-05	3.70511E-06	3.27364E-06	13012.92748	4824.713665	10.02392622	708738.3665
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	25	Diesel	9.55587E-07	1.15626E-06	1.37605E-06	3.31217E-06	2.36434E-06	0.000217232	3.36608E-07	3.09679E-07	1.97975E-09	1.77302E-09	7.047852738	13.80303732	0.057608771	345.075933
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	300	Diesel	6.19346E-05	7.49408E-05	8.91858E-05	0.000550363	0.000554572	0.258196929	2.18761E-05	2.0126E-05	2.3853E-06	2.10737E-06	8376.914995	2010.343371	4.147831541	455353.3914
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	50	Diesel	5.15308E-05	6.23522E-05	7.42043E-05	0.000650424	0.000542339	0.091414255	1.60547E-05	1.47703E-05	8.43624E-07	7.46111E-07	2965.834819	4198.814938	8.468489397	145321.4421
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	600	Diesel	4.53069E-05	5.48214E-05	6.52419E-05	0.000612795	0.00024009	0.319759997	8.78175E-06	8.07921E-06	2.95498E-06	2.60984E-06	10374.26097	1442.27937	2.88043857	564880.8457
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	75	Diesel	1.32838E-05	1.60734E-05	1.91287E-05	0.000123036	0.000140422	0.017078635	1.17566E-05	1.0816E-05	1.57502E-07	1.39394E-07	554.0975107	437.2802223	1.2097842	30056.80392
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	750	Diesel	1.02626E-05	1.24178E-05	1.47782E-05	0.000104589	7.508E-05	0.055036226	1.19899E-06	1.10307E-06	5.08529E-07	4.49198E-07	1785.589728	152.730608	0.288043857	97466.69728
Orange (SC)	2030 Construction and Mining - Paving Equipment	Aggregate	9999	Diesel	5.78061E-06	6.99454E-06	8.32408E-06	5.28781E-05	0.000123348	0.02688708	2.17002E-06	1.99642E-06	2.48411E-07	2.19449E-07	872.3217122	56.31639227	0.115217543	47475.54687
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	100	Diesel	0.000726628	0.00087922	0.001046345	0.01509337	0.009571244	2.341153378	0.00037079	0.000341127	2.16233E-05	1.91082E-05	75956.14302	44804.33186	128.618383	3909901.532
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	175	Diesel	0.000398382	0.000482042	0.00057367	0.013551876	0.003277146	2.440330657	0.000146003	0.000134323	2.25501E-05	1.99177E-05	79173.84063	28396.21142	75.49726957	4083126.362
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	25	Diesel	1.35042E-06	1.63401E-06	1.94461E-06	4.49015E-06	3.09183E-06	0.000236265	4.25065E-07	3.9106E-07	2.14387E-09	1.92836E-09	7.665352363	14.22100152	0.059353199	355.525038
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	300	Diesel	0.000113739	0.000137625	0.000163785	0.001197354	0.001205734	0.42865776	5.07839E-05	4.67212E-05	3.95974E-06	3.49865E-06	13907.32894	3261.942224	10.09004389	716240.6085
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	50	Diesel	0.000992697	0.001201163	0.001429483	0.010459206	0.008903759	1.510675103	0.00030517	0.000280757	1.39372E-05	1.23299E-05	49012.19	63555.43342	175.0325849	2270790.59
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	600	Diesel	4.6613E-05	5.64017E-05	6.71227E-05	0.000591331	0.000483949	0.211865533	1.71846E-05	1.58098E-05	1.9574E-06	1.72922E-06	6873.743887	989.9950208	3.086366366	352044.199
Orange (SC)	2030 Construction and Mining - Rollers	Aggregate	75	Diesel	5.60664E-05	6.78404E-05	8.07357E-05	0.0002231	0.000537449	0.020164138	4.06705E-05	3.74168E-05	1.84745E-07	1.64577E-07	654.2032549	469.2930502	1.958655578	33732.21561
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	100	Diesel	0.000943724	0.001141906	0.001358962	0.035106018	0.01692274	5.804762663	0.000282609	0.000260001	5.36396E-05	4.73777E-05	188329.1318	93931.07618	317.2685893	9043051.612
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	175	Diesel	0.000334951	0.00040529	0.00048232	0.008472239	0.003092113	1.501048221	0.000190292	0.000175069	1.38679E-05	1.22514E-05	48699.85642	19276.70156	66.23461267	2342089.315
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	25	Diesel	4.94233E-07	5.98022E-07	7.11696E-07	7.57503E-06	8.24005E-06	0.001065753	3.88622E-07	3.57532E-07	9.83859E-09	8.69854E-09	34.57719817	59.81940769	0.205484838	1495.485192
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	300	Diesel	1.35759E-05	1.64268E-05	1.95493E-05	0.0001851	0.000142937	0.100234411	3.21522E-06	2.958E-06	9.2631E-07	8.181E-07	3251.995073	738.3470924	2.808292781	156394.0005
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	50	Diesel	3.49411E-05	4.22788E-05	5.03152E-05	0.000457919	0.000408191	0.075829638	9.18212E-06	8.44755E-06	7.00034E-07	6.18911E-07	2460.20911	2219.882628	7.739928885	106336.4621
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	600	Diesel	4.36429E-06	5.28079E-06	6.28457E-06	6.08847E-05	3.35771E-05	0.032995115	5.92009E-07	5.44648E-07	3.04925E-07	2.69302E-07	1070.490155	128.6650634	0.479464621	51462.74311
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	75	Diesel	1.75755E-05	2.12664E-05	2.53087E-05	0.000193948	0.000304881	0.027858556	1.72314E-05	1.58528E-05	2.57039E-07	2.27378E-07	903.8401769	596.3067705	2.465818052	43150.44048
Orange (SC)	2030 Construction and Mining - Rough Terrain Forklifts	Aggregate	750	Diesel	1.27476E-06	1.54246E-06	1.83566E-06	1.17562E-05	1.60133E-05	0.006206351	1.1669E-07	1.07355E-07	5.73425E-08	5.06554E-08	201.3582194	15.50873533	0.068494946	9692.959579
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	100	Diesel	0.000129601	0.000156818	0.000186626	0.001628662	0.001302792	0.214543561	7.79772E-05	7.1739E-05	1.97967E-06	1.75108E-06	6960.629544	4043.895898	4.517516893	335923.0113
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	175	Diesel	0.000135026	0.000163381	0.000194437	0.001953118	0.001162727	0.290199877	6.90142E-05	6.3493E-05	2.67899E-06	2.36857E-06	9415.215408	3165.126343	3.952827281	460521.3344
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	300	Diesel	0.000167293	0.000202424	0.000240902	0.001395824	0.002018133	0.308307868	8.56937E-05	7.88382E-05	2.84544E-06	2.51637E-06	10002.70925	2239.407898	3.049323903	488638.2069
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	50	Diesel	4.82287E-05	5.83567E-05	6.94493E-05	0.00064576	0.000417276	0.066606175	1.07683E-05	9.90688E-06	6.1436E-07	5.43631E-07	2160.964008	2305.298702	2.315227408	95019.95168
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	600	Diesel	0.00171729	0.002077921	0.002472898	0.016890271	0.017521578	3.364497401	0.000796027	0.000732345	3.10549E-05	2.74606E-05	109157.4128	14484.13823	19.03003991	5293690.663
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	75	Diesel	5.13374E-05	6.21182E-05	7.39258E-05	0.000592431	0.000480107	0.077531668	2.99667E-05	2.75693E-05	7.15279E-07	6.32803E-07	2515.429586	1680.553756	1.976413641	123095.4735
Orange (SC)	2030 Construction and Mining - Rubber Tired Dozers	Aggregate	750	Diesel	4.885E-05	5.91085E-05	7.0344E-05	0.000267953	0.000680669	0.124898185	1.93953E-05	1.78437E-05	1.15328E-06	1.0194E-06	4052.184058	297.6586639	0.282344806	198191.9624
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	100	Diesel	0.002109187	0.002552116	0.003037229	0.036622946	0.020961556	5.070582948	0.000838267	0.000771206	4.68168E-05	4.13854E-05	164509.4795	102856.9303	106.1794118	8858093.271
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	175	Diesel	0.003391044	0.004103164	0.004883104	0.076645034	0.020778952	12.12771744	0.001039673	0.000956499	0.000112025	9.89848E-05	393470.436	140492.4332	142.4357964	21051521.41
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	25	Diesel	9.72403E-07	1.17661E-06	1.40026E-06	9.5778E-06	8.67818E-06	0.000886795	8.17466E-07	7.52069E-07	8.16969E-09	7.2379E-09	28.77109526	55.28100095	0.058857767	1382.025024
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	300	Diesel	0.00447204	0.005411168	0.006439737	0.040672303	0.029490854	18.24626147	0.001053372	0.000969102	0.000168562	0.000148924	591979.8588	150312.9197	134.195709	31705885.84
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	50	Diesel	0.000217808	0.000263548	0.000313643	0.002011857	0.001381037	0.209134725	5.45125E-05	5.01515E-05	1.92702E-06	1.70693E-06	6785.145848	7795.537783	8.652091762	325484.5443
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	600	Diesel	0.006284057	0.00760371	0.009049043	0.050360739	0.040951088	22.19228661	0.001619861	0.001490272	0.00020499	0.00018113	720004.2985	116261.4449	114.3017837	38567224.14
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	75	Diesel	7.29472E-05	8.82661E-05	0.000105044	0.000377405	0.000647915	0.044274382	6.68357E-05	6.14889E-05	4.0715E-07	3.61362E-07	1436.433576	1042.653267	1.589159711	75650.52832
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	750	Diesel	0.000543585	0.000657737	0.000782762	0.004484439	0.00251142	1.95993928	8.50531E-05	7.82489E-05	1.81043E-05	1.59968E-05	63588.07146	5313.745193	5.179483504	3411426.701
Orange (SC)	2030 Construction and Mining - Rubber Tired Loaders	Aggregate	9999	Diesel	0.000425216	0.000514511	0.00061231	0.00324432	0.00890641	1.570504318	0.000140897	0.000129625	1.45073E-05	1.28182E-05	50953.283	2838.792217	2.295452917	2716765.067
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	100	Diesel	6.33781E-05	7.66875E-05	9.12645E-05	0.001193289	0.000901077	0.18017979	3.98997E-05	3.67077E-05	1.66395E-06	1.4706E-06	5845.734845	2589.178213	4.364642148	233768.5699
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	175	Diesel	0.000792331	0.000958721	0.001140957	0.013497883	0.00743937	2.181256764	0.000395941	0.000364265	2.0143E-05	1.78031E-05	70768.47349	16864.79614	36.31382268	2818721.415
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	25	Diesel	2.06E-07	2.4926E-07	2.9664E-07	3.82968E-06	2.78977E-06	0.000536556	1.27644E-08	1.17432E-08	4.95455E-09	4.3793E-09	17.40797606	25.09839401	0.058195229	627.4598503
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	300	Diesel	0.001051451	0.001272255	0.001514089	0.008277758	0.010321457	2.802723211	0.000480993	0.000442514	2.5881E-05	2.28755E-05	90931.26793	16520.18125	38.17606999	3649438
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	50	Diesel	2.11112E-05	2.55446E-05	3.04002E-05	7.18329E-05	5.01082E-05	0.004270576	7.0831E-06	6.51645E-06	3.88503E-08	3.48559E-08	138.5541383	131.1391087	0.349171372	5079.008617
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	600	Diesel	0.009272691	0.011219956	0.013352674	0.09323684	0.082118216	33.89286224	0.003384923	0.003114129	0.000313078	0.000276629	1099616.589	103715.4182	206.3020856	44017700.68
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	75	Diesel	1.91028E-05	2.31144E-05	2.75081E-05	0.000258642	0.000206824	0.037211183	1.09647E-05	1.00875E-05	3.43463E-07	3.03713E-07	1207.275841	694.1797477	1.454880716	48467.49938
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	750	Diesel	0.000109782	0.000132836	0.000158086	0.000597392	0.001677807	0.103943747	6.96316E-05	6.40611E-05	9.57718E-07	8.48375E-07	3372.340408	217.3102615	0.756537972	135198.9134
Orange (SC)	2030 Construction and Mining - Scrapers	Aggregate	9999	Diesel	0.00047469	0.000574375	0.000683554	0.005309558	0.007899542	0.773387908	0.000266281	0.000244978	7.13611E-06	6.31229E-06	25091.71893	629.4119476	1.513075945	1005399.833
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	100	Diesel	1.33449E-05	1.61474E-05	1.92167E-05	0.000265438	0.000158971	0.039652479	4.91908E-06	4.52556E-06	3.66206E-07	3.23638E-07	1286.48101	895.8795383	4.085758382	67897.06006
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	175	Diesel	7.14454E-06	8.64489E-06	1.02881E-05	0.000227776	6.47005E-05	0.041057024	2.76599E-06	2.54471E-06	3.79378E-07	3.35102E-07	1332.049923	459.5287621	1.622286416	69827.40127
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	300	Diesel	6.06965E-06	7.34427E-06	8.74029E-06	7.22312E-05	6.32905E-05	0.038206919	2.19362E-06	2.01813E-06	3.5306E-07	3.1184E-07	1239.581401	315.9980052	1.021439595	64994.23938
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	50	Diesel	0.000470467	0.000569266	0.000677473	0.006878266	0.006121058	1.141634933	0.000122304	0.00011252	1.05409E-05	9.31787E-06	37039.08811	40014.20117	121.1908038	1743472.741
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	600	Diesel	3.10195E-06	3.75336E-06	4.46681E-06	2.10738E-05	4.38224E-05	0.011009919	1.95284E-06	1.79661E-06	1.01699E-07	8.98615E-08	357.2047019	39.58972731	0.120169364	18718.02307
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	75	Diesel	0.00112565	0.001362036	0.001620936	0.036986183	0.018873561	6.034496916	0.000422546	0.000388742	5.57581E-05	4.92528E-05	195782.6066	145375.6381	387.0054373	10250041.86
Orange (SC)	2030 Construction and Mining - Skid Steer Loaders	Aggregate	9999	Diesel	2.09272E-06	2.53219E-06	3.01351E-06	2.75897E-05	6.5683E-05	0.014903444	9.21559E-07	8.47835E-07	1.37727E-07	1.2164E-07	483.5258233	25.4094068	0.120169364	25409.4068
Orange (SC)	2030 Construction and Mining - Surfacing Equipment	Aggreg

Orange (SC)	2030 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	22.90655419	0
Orange (SC)	2030 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Gasoline	0.000024544	2.70092E-05	2.47895E-05	0.000324146	2.61959E-06	0.000710235	1.10936E-08	8.3818E-09	1.31783E-08	1.81909E-08	48.68272606	0	21.23182565	0
Orange (SC)	2030 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	7.924135484	0
Orange (SC)	2030 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	25	Diesel	2.15789E-06	0.000003102	2.59546E-06	8.8587E-06	1.64013E-05	0.002151452	5.51556E-07	4.16731E-07	2.05716E-08	1.77205E-08	70.50341422	0	0.168009654	0
Orange (SC)	2030 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Gasoline	9.24589E-05	0.000101745	9.33835E-05	0.004409182	3.31198E-05	0.00966092	1.50918E-07	1.14027E-07	1.63778E-07	2.26075E-07	630.7883102	0	97.59594931	0
Orange (SC)	2030 Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36.42473039	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Gasoline	0.000154004	0.000169471	0.000155544	0.010926591	6.99925E-05	0.021486515	7.31235E-07	5.52488E-07	3.83094E-07	5.28813E-07	1461.855646	0	202.5585187	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	96.04619088	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Gasoline	9.9478E-06	1.0947E-05	1.00473E-05	0.00023122	4.77469E-06	0.000584121	4.42466E-07	3.34309E-07	1.01286E-08	1.39812E-08	36.63298451	0	13.48370756	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	6.393504251	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Gasoline	0.000127811	0.000140648	0.000129089	0.009204254	4.34711E-05	0.018099639	6.15972E-07	4.65401E-07	3.15562E-07	4.35591E-07	1231.176726	0	55.14684078	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	26.14871016	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Gasoline	0.033523861	0.036890963	0.033859099	1.713062531	0.020718828	4.388549249	0.000122528	9.25769E-05	7.15179E-05	9.87211E-05	268449.5376	0	55379.23237	0
Orange (SC)	2030 Lawn and Garden - Misc - Lawn Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	26258.90216	0
Orange (SC)	2030 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	15	Gasoline	0.000778713	0.000856927	0.0007865	0.056741154	0.000578101	0.137238282	2.09688E-06	1.58431E-06	2.20255E-06	3.04034E-06	8545.658018	0	446.5992785	0
Orange (SC)	2030 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Gasoline	0.08396555	0.092398966	0.084805207	0.535287135	0.003710097	2.184724416	0.001179794	0.0008914	3.15541E-05	4.35563E-05	123786.017	0	14815.49046	0
Orange (SC)	2030 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	36870.61613	0
Orange (SC)	2030 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	25	Gasoline	1.66553E-05	1.83281E-05	1.68218E-05	0.001233995	1.82578E-05	0.004428043	5.19543E-08	3.92543E-08	6.11258E-08	8.43762E-08	239.6488545	0	4.503305388	0
Orange (SC)	2030 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Gasoline	0.114394101	0.12588373	0.115538042	0.425965893	0.002847672	2.776495131	0.001756125	0.00132685	3.64415E-05	5.03027E-05	143410.2628	0	7192.937534	0
Orange (SC)	2030 Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	19841.46982	0
Orange (SC)	2030 Lawn and Garden - Misc - Other	Aggregate	15	Gasoline	0.000431449	0.000474783	0.000435763	0.024463276	0.000154511	0.059586026	9.66948E-07	7.30583E-07	9.53187E-07	1.31575E-06	3712.382353	0	457.1999917	0
Orange (SC)	2030 Lawn and Garden - Misc - Other	Aggregate	15	Diesel	8.09898E-07	1.16424E-06	9.74129E-07	5.7354E-06	6.84737E-06	0.000939316	2.40807E-07	1.81943E-07	9.00352E-09	7.75571E-09	30.8571284	0	0.129753874	0
Orange (SC)	2030 Lawn and Garden - Misc - Other	Aggregate	25	Gasoline	7.5777E-05	8.33879E-05	7.65347E-05	0.00719733	5.15518E-05	0.014136165	2.29399E-07	1.73323E-07	2.44176E-07	3.37054E-07	958.9491872	0	39.42686486	0
Orange (SC)	2030 Lawn and Garden - Misc - Other	Aggregate	25	Diesel	1.45077E-07	2.08551E-07	1.74496E-07	5.95581E-07	1.10268E-06	0.000144645	3.70818E-08	2.80173E-08	1.38305E-09	1.19137E-09	4.740028112	0	0.014985536	0
Orange (SC)	2030 Lawn and Garden - Misc - Other	Aggregate	5	Gasoline	0.00021677	0.000238542	0.000218937	0.011132189	8.4016E-05	0.023522618	3.52224E-07	2.66124E-07	4.07152E-07	5.62021E-07	1558.01617	0	372.2805902	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Gasoline	0.001575742	0.001734008	0.001591499	0.092066859	0.001289827	0.254089681	4.40377E-06	3.3273E-06	3.85422E-06	5.32025E-06	15078.13996	0	395.7686915	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Diesel	0.000207163	0.000297799	0.000249171	0.001467048	0.001751478	0.240266131	6.15957E-05	4.6539E-05	2.30299E-06	1.98383E-06	7892.89434	0	279.406071	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	23.77542629	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Gasoline	0.053553039	0.058931851	0.054088568	3.401352236	0.027214837	6.590822493	0.00011532	8.71306E-05	0.000115114	0.0001589	452147.7981	0	4612.816133	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Diesel	0.000625316	0.000898903	0.000752118	0.002567088	0.004752798	0.623451278	0.000159831	0.000120761	5.96126E-06	5.13508E-06	20430.59405	0	569.4495395	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	271.5733668	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Gasoline	0.000191921	0.000211198	0.00019384	0.00684767	7.66662E-05	0.015020002	2.71679E-07	2.05268E-07	2.55191E-07	3.52257E-07	986.5353863	0	64.4196386	0
Orange (SC)	2030 Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	3.869948285	0
Orange (SC)	2030 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Gasoline	0.000216052	0.000237752	0.000218212	0.016655443	0.000103077	0.027164187	4.59701E-07	3.47329E-07	5.461E-07	7.5382E-07	2017.466902	0	476.6585909	0
Orange (SC)	2030 Lawn and Garden - Misc - Snowblowers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	49.29916422	0
Orange (SC)	2030 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Gasoline	6.82006E-07	7.50506E-07	6.88825E-07	7.13089E-05	4.84255E-07	0.000116301	1.96817E-09	1.48706E-09	2.2533E-09	3.1104E-09	8.60598764	0	0.981788962	0
Orange (SC)	2030 Lawn and Garden - Misc - Snowblowers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0.101543067	0
Orange (SC)	2030 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Gasoline	9.80073E-05	0.000107851	9.89874E-05	0.005225162	4.12415E-05	0.011175825	1.7441E-07	1.31777E-07	1.90905E-07	2.6352E-07	735.8380646	0	358.3530083	0
Orange (SC)	2030 Lawn and Garden - Misc - Snowblowers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	37.06322332	0
Orange (SC)	2030 Lawn and Garden - Misc - Tillers	Aggregate	15	Gasoline	0.000317016	0.000348857	0.000320186	0.020578539	0.000192266	0.048928881	7.55723E-07	5.7099E-07	7.92551E-07	1.09401E-06	3072.315671	0	497.0157702	0
Orange (SC)	2030 Lawn and Garden - Misc - Tillers	Aggregate	2	Gasoline	0.001290637	0.001420268	0.001303544	0.003780921	2.34888E-05	0.021567671	2.09646E-06	1.58399E-06	3.39954E-07	4.69262E-07	1193.989803	0	672.5546547	0
Orange (SC)	2030 Lawn and Garden - Misc - Tillers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	210.9624407	0
Orange (SC)	2030 Lawn and Garden - Misc - Tillers	Aggregate	5	Gasoline	0.000197657	0.00021751	0.000199634	0.010232809	6.41363E-05	0.022310941	3.06871E-07	2.31857E-07	3.81657E-07	5.26827E-07	1457.6228	0	334.0901361	0
Orange (SC)	2030 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	15	Gasoline	1.743E-05	1.91806E-05	1.76043E-05	0.000978643	6.64415E-06	0.002367016	3.61644E-08	2.73242E-08	3.87046E-08	5.34266E-08	147.9116397	0	17.75450391	0
Orange (SC)	2030 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Gasoline	0.122805298	0.135139737	0.124033349	0.697382959	0.007470352	3.568742921	0.00105986	0.000800783	4.85492E-05	6.70158E-05	189961.8846	0	39701.60713	0
Orange (SC)	2030 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	61940.41179	0
Orange (SC)	2030 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	25	Gasoline	1.94318E-05	2.13835E-05	1.96261E-05	0.000989474	8.0503E-06	0.003649634	4.09666E-08	3.09526E-08	5.04141E-08	6.95901E-08	196.6456861	0	8.172708023	0
Orange (SC)	2030 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Gasoline	0.004562078	0.005020288	0.0046077	0.085843108	0.000524636	0.275704239	5.4348E-05	4.10629E-05	4.04761E-06	5.58721E-06	15908.17373	0	1280.156098	0
Orange (SC)	2030 Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	998.6911887	0
Orange (SC)	2030 Lawn and Garden - Misc - Wood Splitters	Aggregate	15	Gasoline	0.005954892	0.006552996	0.006014442	0.328018833	0.003019019	0.78627486	1.67544E-05	1.26589E-05	1.26649E-05	1.74824E-05	49326.65534	0	1656.683933	0
Orange (SC)	2030 Lawn and Garden - Misc - Wood Splitters	Aggregate	2	Gasoline	0.000121056	0.000133215	0.000122266	0.003357918	6.72772E-05	0.007224681	1.50295E-07	1.13557E-07	1.26547E-07	1.74683E-07	482.0283106	0	44.37063152	0
Orange (SC)	2030 Lawn and Garden - Misc - Wood Splitters	Aggregate	25	Gasoline	3.50815E-06	3.8605E-06	3.54322E-06	0.000226075	1.50463E-06	0.000510346	1.00612E-08	7.60177E-09	8.33637E-09	1.15073E-08	32.74172886	0	0.360736811	0
Orange (SC)	2030 Lawn and Garden - Misc - Wood Splitters	Aggregate	5	Gasoline	0.000361235	0.000397518	0.000364848	0.019179167	0.00012782	0.041585966	8.65114E-07	6.53642E-07	7.05796E-07	9.74258E-07	2722.178047	0	159.6260521	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	100	Gasoline	0.005723442	0.005264422	0.006298299	0.356207857	0.014387925	7.157976083	0.000499071	0.000377076	6.9156E-05	0.00010258	292813.95	78069.85	161.51	5464889.5
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	15	Gasoline	0.041997079	0.042417049	0.046215223	2.779994935	0.025478411	5.132824883	6.53375E-05	8.64761E-05	9.18754E-05	0.000126822	359845.7093	0	3256.509863	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	15	Diesel	6.29293E-06	7.56901E-06	9.04619E-06	3.96076E-05	4.74647E-05	0.006486283	1.28612E-06	1.70221E-06	6.22025E-08	5.35818E-08	213.1820974	0	0.805780668	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	40046.17812	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	175	Gasoline	0.000680679	0.000626089	0.000749046	0.032494979	0.0019042	0.896488808	6.42687E-05	4.85586E-05	8.90568E-06	1.2595E-05	35952.5	5245.05	10.84	702836.7
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	25	Gasoline	0.000587405	0.000593279	0.000646403	0.087620117	0.000857767	0.124901958	1.50518E-06	1.99215E-06	2.50932E-06	3.46379E-06	9870.482807	0	33.70463818	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	25	Diesel	2.62299E-05	3.15488E-05	3.77059E-05	0.000107535	0.000199633	0.026113852	5.16883E-06	6.8411E-06	2.49695E-07	2.15089E-07	855.7610429	0	1.622041287	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	212.1716991	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	5	Gasoline	0.00889194	0.008980859	0.009785038	0.370416627	0.002621315	0.818703135	9.59769E-06	1.27028E-05	1.3653E-05	1.88462E-05	53403.34591	0	1227.410505	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	15093.79728	0
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	50	Gasoline	0.002093089	0.001925223	0.002303317	0.196848335	0.002758263	1.116264867	7.69543E-05	5.81433E-05	1.35717E-05	1.90076E-05	54257.25	24075.4	49.84	842639
Orange (SC)	2030 Light Commercial - Misc - Air Compressors	Aggregate	50	Diesel	0.001753151	0.002086395	0.002524538	0.023492672	0.016635065	2.83486002	0.000229992	0.000211593	3.66477E-05	2.38316E-05	94732.1	93005.65	114.28	3441209.05
Orange (SC)	2030 Light Commercial - Misc - Gas Compressors	Aggregate	100	Nat Gas	0	0	0.000904735	0.47009041	0.035648363	11.252645	0	0	0	0	622635.25	64316.65	7.57	5659865.2
Orange (SC)	2030 Light Commercial - Misc - Gas Compressors	Aggregate	175	Nat Gas	0	0	0.000252319	0.09563463	0.009539334	2.9285363	0	0	0	0	159902.85	10373.3	1.22	1514501.8
Orange (SC)	2030 Light Commercial - Misc - Gas Compressors	Aggregate	300	Nat Gas	0	0	0.000194128	0.11004533	0.009232545	3.0182338	0	0	0	0	165607.8	8300.1	0.98	1743021
Orange (SC)	2030 Light Commercial - Misc - Gas Compressors	Aggregate	50	Nat Gas	0	0	0.000165908	0.029396136	0.006024779	2.0024334	0	0	0	0	106393.85	31119.9	3.66	995836.8
Orange (SC)	2030 Light Commercial - Misc - Gas Compressors	Aggregate	600	Nat Gas	0	0	0.000273398	0.15498052	0.013002497	4.2506788	0	0	0	0	233231.35	7263.5	0.85	2455063
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	100	Gasoline	0.002036392	0.001873073	0.002240925	0.104164957	0.013324922	4.799393464	0.000334625	0.000252828	4.63688E-05	6.58725E-05	188033.4	36346.7	316.56	3016776.1
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	100	Nat Gas	0	0	1.03165E-05	0.00976874	0.00084541	0.31117494	0	0	0	0	16917.75	2704.65	23.55	224485.95
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	15	Gasoline	0.03953832	0.039933703	0.043509509	2.237326522	0.020276528	5.334456139	6.6792E-05	8.84012E-05	8.55217E-05	0.000118052	335239.929	0	7508.275141	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	15	Diesel	0.000328955	0.000395661	0.000472879	0.002318016	0.002781308	0.379578252	7.62088E-05	0.000100865	3.63841E-06	3.13416E-06	12469.65032	0	80.4565293	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	175	Gasoline	0.000214295	0.000197109	0.000235819	0.024797189	0.002292868	0.775786824	5.56156E-05	4.20207E-05	7.70663E-06	1.08061E-05	30846.15	3445.6	29.93	503057.6
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	175	Nat Gas	0	0	1.15193E-05	0.011709281	0.001136738	0.453776588	0	0	0	0	24469.6	2252.05	19.54	328799.3
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	2	Gasoline	0.120865114	0.122073767	0.133004686	2.113609941	0.035091778	4.300978741	0.00013046	0.000172667	7.80684E-05	0.000107763	300026.2195	0	18126.87925	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5223.70036	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	25	Gasoline	0.001388654	0.00140254	0.001528129	0.132735133	0.000783762	0.191961876	2.3172E-06	3.06687E-06	3.84383E-06	5.30592E-06	15120.16332	0	143.9754116	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	25	Diesel	0.000481774	0.000579469	0.000692558	0.001975208	0.003668157	0.479525828	9.57709E-05	0.000126756	4.58513E-06	3.94967E-06	15714.29293	0	58.84520244	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	5	Gasoline	0.011364306	0.011477948	0.012505726	0.539002827	0.00253901	1.064671705	1.25658E-05	1.66313E-05	1.88093E-05	2.59638E-05	72780.12662	0	4150.593091	0
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	50	Gasoline	0.01087795	0.010005538	0.01197052	0.812697826	0.022976572	9.689671169	0.000667997	0.000504709	0.000117809	0.00014591	416501.5	188241.45	1638.88	6023726.4
Orange (SC)	2030 Light Commercial - Misc - Generator Sets	Aggregate	50	Diesel	0.003017399	0.003590954	0.004345055	0.050223517	0.042832469	7.846216746	0.000521369	0.00047966	0.000101432	6.56834E-05	261095.45	187204.85	554.55	6177760.05
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	15	Gasoline	0.014022256	0.014162478	0.015430637	1.042845679	0.007051955	1.908610482	2.43146E-05	3.21811E-05	3.41395E-05	4.71251E-05	134133.6285	0	4316.566723	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	15	Diesel	3.13029E-06	3.76506E-06	4.49985E-06	2.20668E-05	2.64665E-05	0.003613719	7.24315E-07	9.58652E-07	3.46388E-08	2.98382E-08	118.7151944	0	3.726686683	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	15	Electric	0	0	0	0	0	0	0	0	0	0	0	0	8209.122289	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	2	Gasoline	8.25445E-06	8.337E-06	9.08353E-06	0.000174304	2.77348E-06	0.000368399	4.41703E-09	5.84607E-09	6.44053E-09	8.89032E-09	25.03076532	0	3.153828291	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	5.997859823	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	25	Gasoline	0.000220327	0.00022253	0.000242456	0.018294468	0.000106913	0.033482406	4.26547E-07	5.64547E-07	5.96656E-07	8.23607E-07	2349.74302	0	28.64016663	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	25	Diesel	1.21694E-06	1.46371E-06	1.74937E-06	4.99046E-06	9.26206E-06	0.001211788	2.4064E-07	3.18494E-07	1.15868E-08	9.98101E-09	39.71074357	0	0.855036775	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	25	Electric	0	0	0	0	0	0	0	0	0	0	0	0	54.46704413	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	5	Gasoline	0.026065855	0.026326513	0.028683883	1.330577675	0.010466412	2.812240374	3.37181E-05	4.46271E-05	4.75656E-05	6.56582E-05	186268.4969	0	11280.04694	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	5	Electric	0	0	0	0	0	0	0	0	0	0	0	0	21452.06845	0
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	50	Gasoline	0.000105823	9.73362E-05	0.000116452	0.007684283	0.000170636	0.098107385	6.76343E-06	5.11015E-06	1.19281E-06	1.46793E-06	4190.2	1682.65	14.68	48796.85
Orange (SC)	2030 Light Commercial - Misc - Pressure Washers	Aggregate	50	Diesel	9.90954E-06	1.17932E-05	1.42697E-05	0.000207205	0.000198061	0.037701148	2.00344E-06	1.84317E-06	4.87382E-07	3.14951E-07	1251.95	1923.55	13.3	73094.9
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	100	Gasoline	0.0026727	0.00245835	0.002941144	0.145984087	0.006682169	5.499993594	0.000383473	0.000289735	5.31376E-05	7.60611E-05	217116.6	36646	166.05	3408078
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	15	Gasoline	0.004519517	0.004564713	0.004973455	0.299923588	0.002499023	0.640390852	7.79714E-06	1.03197E-05	1.07171E-05	1.47935E-05	42052.03169	0	1026.694527	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	15	Diesel	0.00024007	0.000288751	0.000345104	0.001509622	0.001811435	0.24720319	0.000049361	6.53307E-05	2.37065E-06	2.0421E-06	8124.770018	0	60.42663251	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	175	Gasoline	0.00010313	9.48594E-05	0.000113489	0.008172387	0.000326282	0.249691876	1.79002E-05	1.35246E-05	2.48043E-06	3.48441E-06	9946.25	1105.95	4.99	159256.8
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	2	Gasoline	0.002037517	0.002057891	0.002242164	0.019467873	0.0001239	0.055583597	5.36591E-07	7.10195E-07	9.14862E-07	1.26285E-06	3479.328488	0	372.1468464	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	2	Electric	0	0	0	0	0	0	0	0	0	0	0	0	29100.30231	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	25	Gasoline	3.35736E-05	3.39093E-05	3.69457E-05	0.002469925	2.37943E-05	0.005273663	6.42733E-08	8.50676E-08	8.78699E-08	1.21293E-07	345.828947	0	3.418896186	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	25	Diesel	0.00019483	0.000234338	0.000280072	0.000798381	0.001482667	0.193831821	0.000038479	5.09281E-05	1.85338E-06	1.59652E-06	6351.974131	0	18.0497042	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	5	Gasoline	0.003480345	0.003515148	0.003829907	0.159504936	0.001143082	0.346692199	4.02375E-06	5.32556E-06	5.85528E-06	8.08245E-06	22732.4615	0	1127.210075	0
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	50	Gasoline	0.001813997	0.001668514	0.001996193	0.147210444	0.002734334	1.462879369	0.00010085	7.61975E-05	1.77859E-05	2.25521E-05	64375.05	28911.65	130.98	896261.15
Orange (SC)	2030 Light Commercial - Misc - Pumps	Aggregate	50	Diesel	0.001953172	0.002324436	0.002812567	0.030791764	0.025386441	4.592281226	0.000325461	0.000299425	5.93667E-05	3.84681E-05	152913.1	97728.75	242.82	3615963.75
Orange (SC)	2030 Light Commercial - Misc - Welders	Aggregate	100	Gasoline	0.00252715	0.002324472	0.002780974	0.132413154	0.006546109	4.60775534	0.000321264	0.000242733	4.45173E-05	6.39456E-05	182532.85	55184.35	265.62	3862904.5
Orange (SC)	2030 Light Commercial - Misc - Welders	Aggregate	15	Gaso

Orange (SC)	2030 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Gasoline	0.000290767	0.000293675	0.000319972	0.003492343	0.00031206	0.031731903	3.3117E-06	2.50218E-06	3.64137E-07	5.02643E-07	1426.056962	0	1.595390387	0
Orange (SC)	2030 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Gasoline	0.001170094	0.001181794	0.001287616	0.005588754	0.000554137	0.059497319	6.20945E-06	4.69158E-06	6.86894E-07	9.48168E-07	2698.950686	0	1.595390387	0
Orange (SC)	2030 Pleasure Craft - Sailboat Auxiliary Inboard Engine	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Gasoline	0.000152515	0.00015404	0.000167834	0.001897927	0.00007125	0.014250126	1.14592E-06	8.65805E-07	2.2774E-07	3.14366E-07	662.5844184	0	53.15922289	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Gasoline	0.002068144	0.002088825	0.002275866	0.017621578	0.001808834	0.1966146	1.96257E-05	1.48283E-05	2.25554E-06	3.11348E-06	8635.238312	0	40.96956317	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Gasoline	0.022880751	0.023109559	0.025178871	0.271907741	0.008812198	3.262477084	0.000340489	0.000257258	3.60914E-05	4.98195E-05	140597.3877	0	473.8590292	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Gasoline	0.000100661	0.000101668	0.000110772	0.001666933	3.44145E-05	0.026001466	2.71365E-06	2.05031E-06	2.75333E-07	3.80061E-07	1080.595873	0	2.265952379	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Gasoline	0.003977017	0.004016788	0.004376466	0.014120269	0.000249686	0.051480966	0.000187626	0.000141763	8.43927E-07	1.16493E-06	3265.287021	0	33.82895158	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Gasoline	0.001011317	0.001021431	0.001112893	0.009387857	0.000392098	0.049761852	2.15141E-05	1.62551E-05	6.52727E-07	9.01006E-07	2537.845121	0	20.16415968	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Gasoline	0.004041122	0.004081532	0.004447007	0.040034111	0.001571476	0.267206447	0.000343048	0.000259192	3.27677E-06	4.52316E-06	12838.53019	0	85.90928311	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Gasoline	0.002429831	0.002454129	0.002673881	0.005944371	8.00412E-05	0.020645302	0.000115733	8.74424E-05	3.84017E-07	5.30086E-07	1434.642229	0	30.68705939	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Inboard Jet Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Gasoline	0.067628456	0.068304741	0.074420991	0.303485844	0.011271774	1.637931694	0.005982565	0.00452016	2.26926E-05	3.13242E-05	87679.75509	0	558.4176553	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Gasoline	0.009952389	0.010051913	0.010951997	0.047864396	0.001135611	0.160909528	0.000481297	0.000363647	3.03727E-06	4.19255E-06	10102.12008	0	498.3403536	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Gasoline	0.033061672	0.033392288	0.036382352	0.185544975	0.006760042	0.921454655	0.004173142	0.003153042	1.26991E-05	1.75294E-05	49545.70383	0	167.0371119	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Gasoline	0.011288106	0.011400987	0.012421872	0.036040338	0.001307606	0.148103059	0.00066107	0.000499476	2.51161E-06	3.46695E-06	9105.279931	0	212.4437983	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Gasoline	0.032341803	0.032665221	0.035590181	0.187987553	0.010974894	1.131100149	0.007958201	0.006012864	1.46887E-05	2.02758E-05	57414.48422	0	142.9362527	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Gasoline	0.027556482	0.027832047	0.030324228	0.096789492	0.003898464	0.463638329	0.002170137	0.001639659	7.0612E-06	9.74708E-06	26551.73008	0	329.4512089	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Gasoline	0.017412463	0.017586588	0.019161354	0.240921614	0.007978668	0.987138253	0.002071644	0.001565243	1.35515E-05	1.87061E-05	53204.64856	0	106.3276486	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Outboard Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Gasoline	5.89996E-07	5.95896E-07	6.49255E-07	5.04952E-06	2.92013E-07	9.75899E-05	8.91801E-09	6.73805E-09	1.06675E-09	1.4725E-09	4.012620511	0	0.055593349	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	120	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Gasoline	0.000354839	0.000358388	0.000390479	0.005729717	0.000360977	0.044341348	6.74653E-06	5.09738E-06	7.19383E-07	9.93015E-07	2035.833018	0	211.5172746	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	15	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Gasoline	0.002653483	0.002680018	0.002919997	0.03031469	0.007593914	0.522850129	5.25998E-05	3.97421E-05	5.65898E-06	7.81149E-06	21623.21238	0	189.4275791	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	175	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	25	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Gasoline	0.01530165	0.015454666	0.016838531	0.193411226	0.013864413	1.628583545	0.000162561	0.000122824	1.92348E-05	2.65511E-05	74069.78746	0	468.3464911	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	250	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	50	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Gasoline	0.020533321	0.020738655	0.022595667	0.152535381	0.00746261	3.488277988	0.000364054	0.000275064	3.64289E-05	5.02854E-05	141717.2574	0	708.1689198	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	500	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Gasoline	0.002480376	0.00250518	0.002729502	0.004627079	0.000761658	0.129988517	1.35663E-05	1.02501E-05	1.38703E-06	1.91461E-06	5442.266855	0	14.46143271	0
Orange (SC)	2030 Pleasure Craft - Vessels W/Sterndrive Engines	Aggregate	750	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	100	Diesel	0.000205285	0.000248395	0.000295611	0.007222589	0.00269425	1.082402438	0.000207267	0.000190685	1.00012E-05	8.83442E-06	35117.35503	26978.95544	61.47982098	2080276.682
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	175	Diesel	0.000279893	0.000338671	0.000403047	0.012561965	0.0014379	2.270622346	5.9495E-05	5.47354E-05	2.09846E-05	1.85325E-05	73667.84139	34913.94234	79.56212127	4363924.689
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	300	Diesel	0.00017648	0.000213541	0.000254131	0.002590868	0.00071746	1.361828861	3.57728E-05	3.2911E-05	1.25855E-05	1.11151E-05	44183.03761	10175.45378	23.18789096	2617308.245
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	50	Diesel	9.12018E-06	1.10354E-05	1.31331E-05	0.000195449	0.000167108	0.031243862	3.20637E-06	2.94986E-06	2.88591E-07	2.55008E-07	1013.672705	1400.291805	3.190994169	54013.57916
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	600	Diesel	0.000262445	0.000317559	0.000377921	0.003504807	0.001016669	1.86368887	5.10398E-05	4.69567E-05	1.72229E-05	1.52112E-05	60465.33289	8121.69247	18.50776618	3581836.444
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	75	Diesel	0.000102481	0.000124002	0.000147573	0.002201079	0.001648001	0.337019186	1.60866E-05	1.47996E-05	3.11284E-06	2.75071E-06	10934.21632	10735.57051	24.46428863	647719.4887
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	750	Diesel	9.06146E-05	0.000109644	0.000130485	0.001161489	0.000312973	0.610215623	2.04963E-05	1.88566E-05	5.63903E-06	4.9805E-06	19797.77385	1867.05574	4.254658892	1172777.598
Orange (SC)	2030 Portable Equipment - Non-Rental Compressor	Aggregate	9999	Diesel	6.13755E-06	7.42644E-06	8.83807E-06	7.65633E-05	0.000123749	0.03968732	1.43837E-06	1.3233E-06	3.66745E-07	3.23923E-07	1287.611398	93.35278701	0.212732945	76275.33346
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	0.00110911	0.001392602	0.001657312	0.03293148	0.008045556	4.478749664	0.000731221	0.000672723	4.13737E-05	3.6555E-05	145308.1004	97172.10822	66.37267871	8607739.752
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	175	Diesel	0.00227949	0.002758183	0.003282465	0.061405647	0.009962067	9.710064758	0.000421777	0.000388035	8.9706E-05	7.92522E-05	315032.3573	145135.2642	99.13355218	18661840.17
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	300	Diesel	0.002570415	0.003110203	0.003701398	0.023544419	0.007094068	10.62013314	0.000378513	0.000348232	9.81113E-05	8.66801E-05	344558.5238	89697.33067	61.26708804	20410906.85
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	50	Diesel	4.74387E-05	5.74008E-05	6.83117E-05	0.00070855	0.000399336	0.073428466	6.70851E-06	6.17183E-06	6.77459E-07	5.99313E-07	2382.305729	2803.041583	1.914596501	126941.2291
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	600	Diesel	0.004860621	0.005881351	0.006999294	0.044670026	0.014189666	21.84225704	0.000746732	0.000686993	0.000201797	0.000178274	708647.9748	113990.3577	77.86025772	41978783.88
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	75	Diesel	0.00140701	0.001702482	0.002026094	0.020718628	0.01504568	2.809649454	0.000220846	0.000203178	2.59344E-05	2.2932E-05	91155.98226	89074.43254	60.84162215	5399884.59
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	750	Diesel	0.00142571	0.001725109	0.002053022	0.011635058	0.004620668	5.459640489	0.000307533	0.00028293	5.04343E-05	4.45609E-05	177132.023	16506.80043	11.27484606	10492920.57
Orange (SC)	2030 Portable Equipment - Non-Rental Generator	Aggregate	9999	Diesel	0.008547314	0.01034225	0.012308132	0.0750117	0.135042454	35.69666637	0.002455015	0.002258613	0.000329777	0.000291351	1158139.027	59175.32231	40.41925947	68605668.36
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	100	Diesel	0.000213169	0.000257934	0.000306963	0.010250363	0.00254539	1.620337139	0.000207282	0.000190699	1.49744E-05	1.3225E-05	52570.05399	37813.50706	110.6211312	3114137.08
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	175	Diesel	0.000658635	0.000796948	0.000948434	0.028879759	0.004137508	5.240905435	0.000154323	0.000141977	4.8435E-05	4.27756E-05	170035.405	78899.33684	230.8152449	10072532.16
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	300	Diesel	0.000249659	0.000302088	0.00035951	0.00341674	0.001073234	1.758843162	5.22144E-05	4.80373E-05	1.62539E-05	1.43554E-05	57063.72937	15488.99424	45.3121172	3380332.758
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	50	Diesel	6.77208E-06	8.19422E-06	9.7518E-06	0.000157218	0.000127152	0.026695632	1.31808E-06	1.21264E-06	2.46611E-07	2.17886E-07	866.1103908	1090.774242	3.190994169	46150.71702
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	600	Diesel	0.000346903	0.000419752	0.0004954	0.004366229	0.001876993	2.31308294	7.95506E-05	7.31865E-05	2.13752E-05	1.88791E-05	75045.42859	10907.74242	31.90994169	4445529.996
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	75	Diesel	0.00016227	0.000196346	0.000233668	0.004446035	0.003467398	0.719958119	4.49432E-05	4.13477E-05	6.6515E-06	5.8762E-06	23358.24828	21088.30201	61.69255393	1383692.456
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	750	Diesel	0.000148203	0.000179326	0.000213413	0.001900953	0.000960443	1.013254419	4.66776E-05	4.29434E-05	9.36359E-06	8.27005E-06	32873.92372	3054.167878	8.934783673	1947380.63
Orange (SC)	2030 Portable Equipment - Non-Rental Other	Aggregate	9999	Diesel	0.00141486	0.00171198	0.002037398	0.017128838	0.030593303	8.939983244	0.000456226	0.000419728	8.26121E-05	7.29669E-05	290047.9107	7708.137977	22.54969213	17181815.22
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	100	Diesel	0.000102274	0.000123752	0.000147275	0.004924102	0.001479135	0.780793449	0.0001117	0.000102764	7.21575E-06	6.37273E-06	25331.98357	17708.3187	51.69410553	1500612.295
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	175	Diesel	0.000170215	0.00020596	0.00024511	0.00751998	0.001131077	1.363236399	4.23376E-05	3.89506E-05	1.25987E-05	1.11266E-05	44228.70362	20477.5208	59.77795743	2620013.402
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	300	Diesel	0.000125925	0.000152369	0.000181332	0.001906501	0.000457612	1.005477806	2.38717E-05	2.1962E-05	9.29236E-06	8.20657E-06	32621.62007	8744.84874	25.52795335	1932434.704
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	50	Diesel	1.53285E-06	1.85475E-06	2.2073E-06	3.33869E-05	2.54533E-05	0.005406609	2.18381E-07	2.00911E-07	4.99408E-08	4.4128E-08	175.4114732	218.6212185	0.638198834	9346.80538
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	600	Diesel	0.000217205	0.000262818	0.000312775	0.00349506	0.000731531	1.901873644	4.11418E-05	3.78505E-05	1.75772E-05	1.55228E-05	61704.19584	9765.081093	28.50621457	3655224.024
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	0.000107155	0.000129657	0.000154303	0.002556951	0.002051442	0.407220132	3.4369E-05	3.16195E-05	3.76174E-06	3.32368E-06	13211.80872	12024.16702	35.10093586	782639.1705
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	750	Diesel	0.00010887	0.000131732	0.000156772	0.001769059	0.000418293	0.964445983	2.94786E-05	2.71203E-05	8.91352E-06	7.87168E-06	31290.38775	2914.94958	8.509317783	1853575.36
Orange (SC)	2030 Portable Equipment - Non-Rental Pump	Aggregate	9999	Diesel	7.99362E-05	9.67228E-05	0.000115108	0.001042262	0.001895351	0.550201087	2.62026E-05	2.41064E-05	5.08448E-06	4.49067E-06	17850.66832	874.484874	2.552795335	1057435.249
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	100	Diesel	1.59148E-05	1.92569E-05	2.29173E-05	0.000540449	0.00017845	0.07988286	1.29568E-05	1.19202E-05	7.38079E-07	6.51993E-07	2591.711428	1957.242943	3.403727113	153527.4181
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	175	Diesel	0.000216413	0.00026186	0.000311635	0.010283469	0.000639282	1.868569556	3.38053E-05	3.11008E-05	1.72694E-05	1.5251E-05	60623.6814	28013.03962	48.71584431	3591216.669
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	300	Diesel	0.000151556	0.000183383	0.000218241	0.002282456	0.000292554	1.193828485	2.04039E-05	1.87716E-05	1.1033E-05	9.74387E-06	38732.45042	8685.26556	15.10403907	2294427.168
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	50	Diesel	7.60964E-06	9.20766E-06	1.09579E-05	0.000175451	0.000138086	0.029647186	6.42056E-07	5.90691E-07	2.73875E-07	2.41976E-07	961.8702985	1100.949156	1.914596501	51253.28644
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	600	Diesel	0.002192233	0.002652602	0.003156816	0.03201456	0.005080567	16.80448746	0.000353343	0.000325075	0.0001553	0.000137156	545203.0889	63365.74028	110.1956653	32296659.92
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	75	Diesel	2.75517E-05	3.33376E-05	3.96745E-05	0.000567609	0.000421809	0.085930011	4.23443E-06	3.89567E-06	7.93639E-07	7.01349E-07	2787.904572	2813.536731	4.892857725	165149.4785
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	750	Diesel	0.000287143	0.000347443	0.000413486	0.003364413	0.001319843	1.72343794	8.65265E-05	7.96044E-05	1.59254E-05	1.40665E-05	55915.04595	5627.073461	9.785715451	3312287.219
Orange (SC)	2030 Portable Equipment - Rental Compressor	Aggregate	9999	Diesel	0.000173279	0.000209668	0.000249522	0.002394232	0.003895261	1.266333821	6.461E-05	5.94412E-05	1.17027E-05	1.03356E-05	41084.80622	2446.553679	4.254658892	2433775.672
Orange (SC)	2030 Portable Equipment - Rental Generator	Aggregate	100	Diesel	0.001690595	0.00204562	0.002434457	0.053303685	0.009590827	7.314937677	0.000997264	0.000917483	6.75795E-05	5.97035E-05	237325.097	158447.9652	101.0481487	14058628.98
Orange (SC)	2030 Portable Equipment - Rental Generator	Aggregate	175	Diesel	0.002921388	0.00353488	0.004206799	0.088265438	0.00752236	14.1437519	0.000361833	0.000332887	0.000130678	0.000115439	458878.4539	199144.0741	127.0015679	27182973.96
Orange (SC)	2030 Portable Equipment - Rental Generator	Aggregate	300	Diesel	0.006692444	0.008097857	0.009637119	0.063290373	0.015054025	28.89581772	0.000851826	0.000783679	0.000266955	0.000235844	937492.9828	236504.4364	150.8276577	55535070.61
Orange (SC)	2030 Portable Equipment - Rental Generator	Aggregate	50	Diesel	6.52074E-06	7.89009E-06	9.38986E-06	9.41884

Construction Worker Trips Fuel Usage Worksheet

Note: Per CalEEMod methodology, worker vehicles are "LD_Mix", which is 50% LDA, 25% LDT1, and 25% LDT2

Activity[1]	Daily trips[1,2]	Trip miles[2]	Trip days[1]	Annual VMT
	2023			
West Rem Area - Site Preparation	18	14.7	6	1,588
West Rem Area - Rough Grading	20	14.7	17	4,998
Phase 1 - Site Preparation	18	14.7	46	12,172
Phase 1 - Rough Grading	20	14.7	63	18,522
Phase 1 - Utility Trenching	8	14.7	30	3,528
	2024			
Phase 1 - Rough Grading	20	14.7	28	8,232
Phase 1 - Utility Trenching	8	14.7	50	5,880
Phase 1 - Fine Grading	20	14.7	90	26,460
Phase 1 - Asphalt Paving	15	14.7	92	20,286
Phase 1 - Finishing/Landscaping	3	14.7	91	4,013
Phase 1 - Building Construction	236	14.7	167	579,356
East Rem Area - Site Preparation	18	14.7	6	1,588
East Rem Area - Rough Grading	20	14.7	17	4,998
Phase 2 - Site Preparation	18	14.7	17	4,498
	2025			
Phase 1 - Building Construction	236	14.7	108	374,674
Phase 1 - Architectural Coating	47	14.7	90	62,181
Phase 2 - Site Preparation	18	14.7	66	17,464
Phase 2 - Rough Grading	20	14.7	139	40,866
Phase 2 - Utility Trenching	8	14.7	121	14,230
Phase 2 - Fine Grading	20	14.7	141	41,454
Phase 2 - Asphalt Paving	15	14.7	82	18,081
Phase 2 - Finishing/Landscaping	3	14.7	46	2,029
Phase 2 - Building Construction	685	14.7	11	110,765
	2026			
Phase 2 - Asphalt Paving	15	14.7	61	13,451
Phase 2 - Finishing/Landscaping	3	14.7	95	4,190
Phase 2 - Building Construction	685	14.7	261	2,628,140
Phase 3 - Site Preparation	18	14.7	47	12,436
Phase 3 - Rough Grading	20	14.7	62	18,228
	2027			
Phase 2 - Building Construction	685	14.7	151	1,520,495
Phase 2 - Architectural Coating	137	14.7	142	285,974
Phase 3 - Rough Grading	20	14.7	173	50,862
Phase 3 - Utility Trenching	8	14.7	165	19,404
Phase 3 - Fine Grading	20	14.7	135	39,690
Phase 3 - Asphalt Paving	15	14.7	86	18,963
Phase 3 - Finishing/Landscaping	3	14.7	40	1,764
	2028			
Phase 3 - Fine Grading	20	14.7	55	16,170
Phase 3 - Asphalt Paving	15	14.7	55	12,128
Phase 3 - Finishing/Landscaping	3	14.7	104	4,586
Phase 3 - Building Construction	49	14.7	204	146,941
	2029			
Phase 3 - Building Construction	49	14.7	261	187,998
Phase 3 - Architectural Coating	10	14.7	33	4,851
	2030			
Phase 3 - Building Construction	49	14.7	109	78,513
Phase 3 - Architectural Coating	10	14.7	109	16,023

[1] *Based on information provided.*

[2] *Based on CalEEMod defaults.*

PhaseName	PhaseType
Site Preparation	Site Prepar
Rough Grading	Grading
Rough Grading Soil	Grading
Fine Grading	Grading
Building Constructio	Building Cc
Utility Trenching	Trenching
Finishing/Landscap	Trenching
Architectural Coatir	Architectur

Year	LDA VMT	LDT1 VMT	LDT2 VMT	Gasoline[1]						Diesel[1]						Electricity[1]					
				LDA mpg	LDA gallons	LDT1 mpg	LDT1 gallons	LDT2 mpg	LDT2 gallons	LDA mpg	LDA gallons	LDT1 mpg	LDT1 gallons	LDT2 mpg	LDT2 gallons	LDA m/kWh	LDA kWh	LDT1 m/kWh	LDT1 kWh	LDT2 m/kWh	LDT2 kWh
2023	20,404	10,202	10,202	29.27	645	24.63	413	23.64	426	42.40	1	23.84	0	31.32	1	2.71	548	2.75	11	2.92	28
2024	327,656	163,828	163,828	29.76	10,070	25.00	6,525	24.10	6,699	42.70	16	23.85	1	31.72	21	2.70	10,102	2.77	239	2.90	598
2025	681,742	170,435	170,435	30.28	20,356	25.39	6,674	24.56	6,820	43.05	30	23.88	1	32.16	21	2.70	23,779	2.78	344	2.88	777
2026	1,338,222	669,111	669,111	30.80	39,018	25.78	25,763	25.01	26,239	43.40	53	23.92	3	32.57	81	2.70	49,742	2.78	1,751	2.87	3,577
2027	1,937,151	484,288	484,288	31.26	55,312	26.13	18,362	25.38	18,667	43.77	68	24.75	1	32.93	58	2.70	76,019	2.79	1,611	2.86	2,984
2028	179,825	44,956	44,956	31.75	5,027	26.51	1,676	25.77	1,703	44.33	6	25.81	0	33.36	5	2.70	7,402	2.79	187	2.86	315
2029	192,849	48,212	48,212	32.20	5,288	26.89	1,768	26.13	1,797	44.87	5	26.17	0	33.77	6	2.70	8,286	2.79	245	2.85	380
2030	94,536	23,634	23,634	32.61	2,547	27.25	853	26.45	868	45.49	2	27.37	0	34.16	3	2.69	4,225	2.78	145	2.84	208

Gasoline		Diesel		Electricity	
VMT	Gallons	VMT	Gallons	VMT	kWh
39,124	1,484	90	2	1,593	587
624,260	23,294	1,364	38	29,687	10,939
953,274	33,850	1,989	52	67,350	24,900
2,522,104	91,020	5,001	137	149,338	55,070
2,682,760	92,341	4,892	127	218,075	80,614
247,935	8,406	423	11	21,380	7,904
264,748	8,853	423	11	24,102	8,912
129,231	4,267	194	5	12,378	4,578
7,463,437	**263,515**	**14,377**	**382**	**523,904**	**193,504**

[1] *EMFAC2021 v1.0.1.*

Year	VMT from gasoline			VMT from diesel			VMT from electricity		
	LDA	LDT1	LDT2	LDA	LDT1	LDT2	LDA	LDT1	LDT2
2023	92.51%	99.70%	98.79%	0.23%	0.02%	0.40%	7.26%	0.29%	0.81%
2024	91.46%	99.58%	98.54%	0.21%	0.01%	0.40%	8.33%	0.40%	1.06%
2025	90.40%	99.43%	98.29%	0.19%	0.01%	0.40%	9.41%	0.56%	1.31%
2026	89.80%	99.26%	98.07%	0.17%	0.01%	0.40%	10.03%	0.73%	1.54%
2027	89.26%	99.07%	97.84%	0.15%	0.01%	0.39%	10.58%	0.93%	1.76%
2028	88.76%	98.84%	97.61%	0.14%	0.00%	0.39%	11.10%	1.16%	2.00%
2029	88.29%	98.58%	97.37%	0.12%	0.00%	0.39%	11.58%	1.42%	2.25%
2030	87.85%	98.29%	97.12%	0.11%	0.00%	0.38%	12.04%	1.71%	2.50%

Vendor Trips Fuel Usage Worksheet

Note: Based on CalEEMod methodology, vendor vehicles are 50% HHDT (T7) and 50% MHDT (T6).

Activity[1]	Daily trips[1,2]	Trip miles[2]	Trip days[1]	Annual VMT
2023				
West Rem Area - Rough Grading	16	6.9	6	662
Phase 1 - Site Preparation	32	6.9	17	3,754
Phase 1 - Rough Grading	18	6.9	46	5,713
Phase 1 - Utility Trenching	20	6.9	63	8,694
2024				
Phase 1 - Rough Grading	18	6.9	28	3,478
Phase 1 - Utility Trenching	20	6.9	50	6,900
Phase 1 - Fine Grading	20	6.9	90	12,420
Phase 1 - Asphalt Paving	15	6.9	92	9,522
Phase 1 - Finishing/Landscaping	3	6.9	91	1,884
Phase 1 - Building Construction	236	6.9	167	3,478
East Rem Area - Site Preparation	32	6.9	6	1,325
East Rem Area - Rough Grading	16	6.9	17	1,877
Phase 2 - Site Preparation	8	6.9	17	938
2025				
Phase 1 - Building Construction	236	6.9	108	175,867
Phase 1 - Architectural Coating	47	6.9	90	29,187
Phase 2 - Site Preparation	8	6.9	66	3,643
Phase 2 - Rough Grading	16	6.9	139	15,346
Phase 2 - Utility Trenching	0	6.9	121	0
Phase 2 - Fine Grading	16	6.9	141	15,566
Phase 2 - Asphalt Paving	0	6.9	82	0
Phase 2 - Finishing/Landscaping	0	6.9	46	0
Phase 2 - Building Construction	176	6.9	11	13,358
2026				
Phase 2 - Asphalt Paving	0	6.9	61	0
Phase 2 - Finishing/Landscaping	0	6.9	95	0
Phase 2 - Building Construction	176	6.9	261	316,958
Phase 3 - Site Preparation	8	6.9	47	2,594
Phase 3 - Rough Grading	16	6.9	62	6,845
2027				
Phase 2 - Building Construction	176	6.9	151	183,374
Phase 2 - Architectural Coating	0	6.9	142	0
Phase 3 - Rough Grading	16	6.9	173	19,099
Phase 3 - Utility Trenching	0	6.9	165	0
Phase 3 - Fine Grading	16	6.9	135	14,904
Phase 3 - Asphalt Paving	0	6.9	86	0
Phase 3 - Finishing/Landscaping	0	6.9	40	0
2028				
Phase 3 - Fine Grading	16	6.9	55	6,072
Phase 3 - Asphalt Paving	0	6.9	55	0
Phase 3 - Finishing/Landscaping	0	6.9	104	0
Phase 3 - Building Construction	14	6.9	204	19,706
2029				
Phase 3 - Building Construction	14	6.9	261	25,213
Phase 3 - Architectural Coating	0	6.9	33	0
2030				
Phase 3 - Building Construction	14	6.9	109	10,529
Phase 3 - Architectural Coating	0	6.9	109	0

[1] *Based on information provided.*

[2] *Based on CalEEMod defaults.*

Year	HHDT (T7) VMT	MHDT (T6) VMT	Gasoline[1]				Diesel[1]			
			HHDT (T7) mpg	HHDT (T7) gallons	MHDT (T6) mpg	MHDT (T6) gallons	HHDT (T7) mpg	HHDT (T7) gallons	MHDT (T6) mpg	MHDT (T6) gallons
2023	9,412	9,412	4.11	1	5.15	481	5.97	1,475	8.93	768
2024	20,910	20,910	4.20	2	5.17	1,026	6.03	3,232	8.94	1,722
2025	126,484	126,484	4.31	12	5.20	5,901	6.11	18,132	8.98	10,439
2026	163,199	163,199	4.43	14	5.25	7,244	6.27	22,766	9.04	13,538
2027	108,689	108,689	4.50	9	5.25	4,637	6.27	15,136	9.04	9,116
2028	12,889	12,889	4.57	1	5.29	510	6.36	1,842	9.08	1,058
2029	12,606	12,606	4.65	1	5.32	466	6.45	1,757	9.12	1,019
2030	5,265	5,265	4.73	0	5.35	195	6.54	701	9.17	449

[1] *EMFAC2021 v1.0.1.*

Year	VMT from gasoline		VMT from diesel	
	HHDT (T7)	MHDT (T6)	HHDT (T7)	MHDT (T6)
2023	0.05%	26.29%	93.59%	72.92%
2024	0.05%	25.33%	93.26%	73.63%
2025	0.04%	24.25%	87.60%	74.10%
2026	0.04%	23.32%	87.40%	74.95%
2027	0.04%	22.41%	87.25%	75.78%
2028	0.04%	20.92%	90.86%	74.48%
2029	0.04%	19.68%	89.90%	73.75%
2030	0.04%	19.83%	87.06%	78.15%

VENDOR

Gasoline		Diesel	
VMT	Gallons	VMT	Gallons
2,479	482	15,671	2,243
5,306.68	1,027.84	34,896	4,954
30,718.11	5,913.36	204,521	28,571
38,112.89	7,257.81	264,963	36,304
24,400.51	4,646.45	177,198	24,252
2,700.80	511.05	21,311	2,900
2,485.10	467.22	20,630	2,776
1,045.61	195.33	8,697	1,150
107,248.77	**20,501.01**	**747,888.07**	**103,148.86**

Truck Haul Trips Fuel Usage Worksheet

Note: Hauling vehicles are HHDT (T7)

Activity	Total Trips[1]	Mi/Trip[1]	Annual VMT
2023			
West Rem Area - Rough Grading	2,270	75	170,250
2024			
East Rem Area - Rough Grading	2,187	75	164,025

Year	VMT	Gasoline[1]		Diesel[1]	
		HHDT (T7) mpg	HHDT (T7) gallons	HHDT (T7) mpg	HHDT (T7) gallons
2023	170,250	4.11	0	5.97	28,505
2024	164,025	4.20	0	6.03	27,183

Gasoline		Diesel	
VMT	Gallons	VMT	Gallons
0	0	170,250	28,505
0	0	164,025	27,183
0	**0**	**334,275**	**55,688**

[1] *EMFAC2021 v1.0.1.*

Operation - Vehicle Fuel Usage

Land Use

Vehicle type	Fleet percent	VMT					
	Condo/Townhouse	Condo/Townhouse	Single-Family	Single-Family	City Park	City Park	Total
LDA	56.38%	8,853,265	56.38%	7,684,259	56.38%	1,685,463	18,222,988
LDT1	6.56%	1,030,460	6.56%	894,395	6.56%	196,176	2,121,031
LDT2	18.45%	2,897,620	18.45%	2,515,011	18.45%	551,642	5,964,273
MDV	12.21%	1,917,127	12.21%	1,663,985	12.21%	364,978	3,946,090
LHD1	2.48%	389,119	2.48%	337,739	2.48%	74,080	800,938
LHD2	0.74%	115,856	0.74%	100,558	0.74%	22,056	238,471
MHD	0.37%	58,713	0.37%	50,961	0.37%	11,178	120,852
HHD	0.00%	0	0.00%	0	0.00%	0	0
OBUS	0.02%	2,638	0.02%	2,290	0.02%	502	5,430
UBUS	0.01%	1,366	0.01%	1,186	0.01%	260	2,812
MCY	2.68%	420,996	2.68%	365,407	2.68%	80,148	866,552
SBUS	0.02%	2,654	0.02%	2,303	0.02%	505	5,462
MH	0.08%	13,143	0.08%	11,408	0.08%	2,502	27,053
	100.00%	15,702,959	100.00%	13,629,503	100.00%	2,989,491	32,321,953

32,321,953

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	428.00	2,429.00	1857.00	2,989,491	2,989,491
Condo/Townhouse	4,680.00	5,694.00	4659.98	15,702,959	15,702,959
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	4,243.01	4,266.00	3816.00	13,629,503	13,629,503
Total	9,351.01	12,389.00	10,332.98	32,321,954	32,321,954

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Condo/Townhouse	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837
Other Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Other Non-Asphalt Surfaces	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Parking Lot	0.552483	0.064305	0.180824	0.119637	0.024283	0.007230	0.015168	0.004685	0.000681	0.000351	0.026272	0.000685	0.003397
Single Family Housing	0.563796	0.065622	0.184527	0.122087	0.024780	0.007378	0.003739	0.000000	0.000168	0.000087	0.026810	0.000169	0.000837

PROPOSED CONDITIONS

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	86.36%	0.07%	0.00%	13.57%	
LDT1	97.03%	0.00%	0.00%	2.97%	
LDT2	96.17%	0.37%	0.00%	3.47%	
MDV	94.09%	1.09%	0.00%	4.82%	
LHD1	44.86%	31.03%	0.00%	24.12%	
LHD2	24.10%	52.89%	0.00%	23.01%	
MHD	11.88%	62.62%	0.90%	24.61%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	83.12%	5.72%	12.53%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	33.50%	50.14%	7.90%	12.71%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	25.86%	0.00%	41.15%	32.99%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	42.35%	13.45%	30.85%	13.35%	
MH	63.15%	36.85%	0.00%	0.00%	

PROPOSED CONDITIONS

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	15,737,019	34.15	460,771	12,425	48.71	255	0	0.00	0	2,473,544	2.69	919,631
LDT1	2,058,029	28.78	71,498	19	27.83	1	0	0.00	0	62,983	2.78	22,669
LDT2	5,735,712	27.71	207,018	21,832	35.84	609	0	0.00	0	206,730	2.82	73,269
MDV	3,712,778	22.74	163,283	43,049	27.04	1,592	0	0.00	0	190,263	2.76	68,978
LHD1	359,277	16.31	22,027	248,513	21.58	11,515	0	0.00	0	193,147	1.78	0
LHD2	57,469	14.22	4,041	126,139	18.44	6,841	0	0.00	0	54,864	1.78	0
MHD	14,355	5.55	2,585	75,674	9.46	7,999	1,085	8.56	0	29,738	0.00	0
HHD	0	5.01	0	0	7.00	0	0	6.60	0	0	0.56	0
OBUS	1,819	5.70	319	2,723	8.38	325	429	9.77	0	690	0.00	0
UBUS	727	15.82	46	0	0.00	0	1,157	3.05	380	928	0.47	0
MCY	866,552	43.09	20,109	0	0.00	0	0	0.00	0	0	0.00	0
SBUS	2,313	9.26	250	735	7.83	94	1,685	4.43	0	729	0.86	0
MH	17,084	4.89	3,492	9,969	10.15	982	0	0.00	0	0	0.00	0
	28,563,135		**955,438**	**541,078**		**30,213**	**4,356**		**380**	**3,213,615**		**1,084,548**

EMFAC Fuel Usage: Year 2023

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,713	2,114	9.33	5,163	584	8.83	0	0	0.00
LDA	43,202,899	1,476,109	29.27	107,965	2,546	42.40	0	0	0.00	3,390,395	1,253,282	2.71
LDT1	3,535,544	143,537	24.63	542	23	23.84	0	0	0.00	10,161	3,700	2.75
LDT2	21,052,164	890,627	23.64	85,235	2,722	31.32	0	0	0.00	173,344	59,274	2.92
LHD1	1,651,744	120,883	13.66	883,472	43,064	20.52	0	0	0.00	0	0	0.00
LHD2	254,112	21,160	12.01	371,136	21,537	17.23	0	0	0.00	0	0	0.00
MCY	315,261	7,508	41.99	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,569,172	651,716	19.29	185,305	7,858	23.58	0	0	0.00	136,995	48,772	2.81
MH	60,121	12,273	4.90	29,797	2,936	10.15	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	16,661	2,987	5.58	0	0	0.00	0	0	0.00
OBUS	37,020	7,203	5.14	0	0	0.00	0	0	0.00	0	0	0.00
PTO	0	0	0.00	44,230	9,021	4.90	0	0	0.00	18	37	0.48
SBUS	29,787	3,359	8.87	17,539	2,387	7.35	18,220	4,267	4.27	9	10	0.86
T6	413,802	80,409	5.15	1,147,552	128,477	8.93	12,024	1,429	8.42	397	415	0.96
T7	607	148	4.11	1,203,555	201,513	5.97	81,318	14,027	5.80	465	830	0.56
UBUS	42,088	3,656	11.51	0	0	0.00	110,641	37,305	2.97	78	165	0.47
Total	**83,164,321**	**3,418,590**	**24.33**	**4,112,701**	**427,185**	**9.63**	**227,365**	**57,612**	**3.95**	**3,711,862**	**1,366,485**	**2.72**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumption	Energy Consumption
Orange	2023	All Other Buses	Aggregate	Aggregate	Diesel	344.1513351	19712.88559	19712.88559	0	3062.946883	2.113981463	0
Orange	2023	All Other Buses	Aggregate	Aggregate	Natural Gas	82.4698802	5162.726383	5162.726383	0	733.9819338	0.584452721	0
Orange	2023	LDA	Aggregate	Aggregate	Gasoline	1076181.788	42528216.69	42528216.69	0	5027536.604	1452.688975	0
Orange	2023	LDA	Aggregate	Aggregate	Diesel	3514.160863	107965.2638	107965.2638	0	14934.48731	2.546148122	0
Orange	2023	LDA	Aggregate	Aggregate	Electricity	59474.26903	2727828.291	0	2727828.291	297047.6338	0	1053166.86
Orange	2023	LDA	Aggregate	Aggregate	Plug-in Hybrid	28501.98182	1337249.552	674682.5697	662566.9819	117855.6948	23.4198944	200114.9762
Orange	2023	LDT1	Aggregate	Aggregate	Gasoline	99223.58776	3533281.003	3533281.003	0	441285.8098	143.4582617	0
Orange	2023	LDT1	Aggregate	Aggregate	Diesel	34.75929356	542.0338996	542.0338996	0	100.8765649	0.022735583	0
Orange	2023	LDT1	Aggregate	Aggregate	Electricity	191.5905712	7503.643869	0	7503.643869	904.4236168	0	2897.025843
Orange	2023	LDT1	Aggregate	Aggregate	Plug-in Hybrid	92.38650547	4919.504479	2262.527472	2656.977007	382.0182001	0.078709254	802.4862467
Orange	2023	LDT2	Aggregate	Aggregate	Gasoline	516653.7857	20968860.09	20968860.09	0	2429660.177	887.7184413	0
Orange	2023	LDT2	Aggregate	Aggregate	Diesel	2003.36011	85234.509	85234.509	0	9627.099816	2.721634991	0
Orange	2023	LDT2	Aggregate	Aggregate	Electricity	2218.112632	82315.88053	0	82315.88053	11392.79038	0	31780.72378
Orange	2023	LDT2	Aggregate	Aggregate	Plug-in Hybrid	3400.552925	174332.1824	83304.18595	91027.99647	14061.28635	2.908453393	27493.168
Orange	2023	LHD1	Aggregate	Aggregate	Gasoline	41394.67541	1651744.117	1651744.117	0	616718.9856	120.8831513	0
Orange	2023	LHD1	Aggregate	Aggregate	Diesel	20789.38864	883471.7136	883471.7136	0	261504.3561	43.06403864	0
Orange	2023	LHD2	Aggregate	Aggregate	Gasoline	6757.483486	254111.7405	254111.7405	0	100676.4353	21.16016017	0
Orange	2023	LHD2	Aggregate	Aggregate	Diesel	8706.571129	371136.2979	371136.2979	0	109517.7119	21.53680933	0
Orange	2023	MCY	Aggregate	Aggregate	Gasoline	49410.95758	315261.4897	315261.4897	0	98821.91517	7.508408221	0
Orange	2023	MDV	Aggregate	Aggregate	Gasoline	323460.5581	12520789.89	12520789.89	0	1501677.358	650.0021614	0
Orange	2023	MDV	Aggregate	Aggregate	Diesel	4630.543523	185304.7669	185304.7669	0	21856.46692	7.858423577	0
Orange	2023	MDV	Aggregate	Aggregate	Electricity	2366.549836	87987.32368	0	87987.32368	12162.87966	0	33970.36893
Orange	2023	MDV	Aggregate	Aggregate	Plug-in Hybrid	2109.808178	97389.76861	48381.74353	49008.02509	8724.056816	1.714229078	14801.88425
Orange	2023	MH	Aggregate	Aggregate	Gasoline	6246.542371	60121.11097	60121.11097	0	624.9040988	12.27338692	0
Orange	2023	MH	Aggregate	Aggregate	Diesel	2943.826344	29796.95492	29796.95492	0	294.3826344	2.935881151	0
Orange	2023	Motor Coach	Aggregate	Aggregate	Diesel	116.9385067	16660.75178	16660.75178	0	2687.246885	2.986737061	0
Orange	2023	OBUS	Aggregate	Aggregate	Gasoline	876.9027969	37020.1996	37020.1996	0	17545.07116	7.203304301	0
Orange	2023	PTO	Aggregate	Aggregate	Diesel	0	44229.87717	44229.87717	0	0	9.021384546	0
Orange	2023	PTO	Aggregate	Aggregate	Electricity	0	17.82980411	0	17.82980411	0	0	36.93477384
Orange	2023	SBUS	Aggregate	Aggregate	Gasoline	661.9447764	29787.08397	29787.08397	0	2647.779106	3.359332103	0
Orange	2023	SBUS	Aggregate	Aggregate	Diesel	854.0901222	17539.34852	17539.34852	0	12367.22497	2.386688805	0
Orange	2023	SBUS	Aggregate	Aggregate	Electricity	0.774914199	8.998995356	0	8.998995356	11.2207576	0	10.40555041
Orange	2023	SBUS	Aggregate	Aggregate	Natural Gas	715.5663177	18219.78605	18219.78605	0	10361.40028	4.267223725	0
Orange	2023	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	8.90806566	596.5282368	596.5282368	0	204.7073489	0.065031625	0
Orange	2023	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.011396266	0.419236653	0	0.419236653	0.261886203	0	0.440321245
Orange	2023	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	11.95144074	818.416663	818.416663	0	274.6441082	0.089093425	0
Orange	2023	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.012815247	0.487925228	0	0.487925228	0.294494384	0	0.512464363
Orange	2023	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	37.75149226	2137.20524	2137.20524	0	867.5292922	0.229391797	0
Orange	2023	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0.08919049	2.615878344	0	2.615878344	2.049597458	0	2.747438235
Orange	2023	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	65.05836483	13401.97621	13401.97621	0	1495.041224	1.352703639	0
Orange	2023	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0.071017508	7.399387054	0	7.399387054	1.631982324	0	7.771523072
Orange	2023	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.063857268	12.66403866	12.66403866	0	1.467440018	0.001274661	0
Orange	2023	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2476.152649	85240.98266	85240.98266	0	35334.6983	9.680704091	0
Orange	2023	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	2.076721432	37.96979534	0	37.96979534	29.63481484	0	39.64504399
Orange	2023	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	7.531217008	261.9732584	261.9732584	0	107.4704667	0.031935795	0
Orange	2023	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1996.835467	69504.30536	69504.30536	0	28494.84211	7.862891	0
Orange	2023	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	1.371248041	25.09192889	0	25.09192889	19.56770954	0	26.19899885
Orange	2023	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	4.944550118	176.1026214	176.1026214	0	70.55873018	0.021244166	0
Orange	2023	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6209.602575	214969.0551	214969.0551	0	88611.02874	24.41743892	0
Orange	2023	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	5.891830087	107.5820741	0	107.5820741	84.07641534	0	112.3286555
Orange	2023	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	15.41270124	531.8815177	531.8815177	0	219.9392467	0.064447817	0
Orange	2023	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	812.0083033	44926.9356	44926.9356	0	11587.35849	4.871872986	0
Orange	2023	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	0.232472631	5.004564182	0	5.004564182	3.317384444	0	5.225368358
Orange	2023	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	23.94808577	1333.848624	1333.848624	0	341.739184	0.156681191	0
Orange	2023	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2132.635555	90267.79709	90267.79709	0	24653.26701	10.18413389	0
Orange	2023	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	0.37826809	7.849905835	0	7.849905835	4.372779126	0	8.198941207
Orange	2023	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	5.230463379	226.9178962	226.9178962	0	60.46415666	0.027602202	0
Orange	2023	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	4921.508542	218523.7642	218523.7642	0	56892.63874	24.68124259	0
Orange	2023	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	3.106793029	64.81594999	0	64.81594999	35.91452741	0	67.69790293
Orange	2023	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	11.45532401	500.9603161	500.9603161	0	132.4235455	0.05992257	0
Orange	2023	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4076.739501	178129.8422	178129.8422	0	47127.10864	20.08741131	0
Orange	2023	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	3.299933497	69.03751263	0	69.03751263	38.14723123	0	72.1071716
Orange	2023	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	10.17800924	439.6399469	439.6399469	0	117.6577868	0.052546066	0
Orange	2023	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	1994.734146	98900.72074	98900.72074	0	23059.12673	10.97454034	0
Orange	2023	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	1.293849061	40.63727623	0	40.63727623	14.95689515	0	42.44415737
Orange	2023	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	52.12894663	2635.758636	2635.758636	0	602.610623	0.312433487	0
Orange	2023	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	30.75606508	1625.122448	1625.122448	0	355.5401123	0.179804649	0
Orange	2023	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	0.040553411	1.143914509	0	1.143914509	0.468797433	0	1.19477711
Orange	2023	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.078584345	4.038961546	4.038961546	0	0.908435034	0.000470505	0
Orange	2023	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1221.714558	80005.93468	80005.93468	0	14123.02029	8.352061221	0
Orange	2023	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	0.483430375	18.10522075	0	18.10522075	5.588455134	0	18.91024473
Orange	2023	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	29.37311954	1941.5141	1941.5141	0	339.5532619	0.223374124	0
Orange	2023	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.223362554	346.7605493	346.7605493	0	120.0328715	0.03778763	0
Orange	2023	T6 OOS Class 5	Aggregate	Aggregate	Diesel	6.978410097	475.6931179	475.6931179	0	160.363864	0.051769842	0
Orange	2023	T6 OOS Class 6	Aggregate	Aggregate	Diesel	22.11260974	1242.999727	1242.999727	0	508.1477719	0.133319139	0
Orange	2023	T6 OOS Class 7	Aggregate	Aggregate	Diesel	35.90090173	9038.15367	9038.15367	0	825.0027217	0.9072807	0
Orange	2023	T6 Public Class 4	Aggregate	Aggregate	Diesel	133.6610867	4568.762334	4568.762334	0	685.6813746	0.540348939	0
Orange	2023	T6 Public Class 4	Aggregate	Aggregate	Electricity	0.007991942	0.144905984	0	0.144905984	0.040998662	0	0.151852782
Orange	2023	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	14.2168853	587.7193076	587.7193076	0	72.93262157	0.072449238	0
Orange	2023	T6 Public Class 5	Aggregate	Aggregate	Diesel	115.4741945	4158.673679	4158.673679	0	592.3826176	0.483352249	0
Orange	2023	T6 Public Class 5	Aggregate	Aggregate	Electricity	0.009709622	0.176060809	0	0.176060809	0.04981036	0	0.184501171
Orange	2023	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	20.46962371	841.7125119	841.7125119	0	105.0091696	0.102706123	0
Orange	2023	T6 Public Class 6	Aggregate	Aggregate	Diesel	198.9239513	6865.52188	6865.52188	0	1020.47987	0.815293808	0
Orange	2023	T6 Public Class 6	Aggregate	Aggregate	Electricity	0.102072656	1.854048834	0	1.854048834	0.523632727	0	1.942932006
Orange	2023	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	22.55391696	921.2673558	921.2673558	0	115.701594	0.113336876	0
Orange	2023	T6 Public Class 7	Aggregate	Aggregate	Diesel	357.0725556	15525.54856	15525.54856	0	1831.78221	1.809403909	0
Orange	2023	T6 Public Class 7	Aggregate	Aggregate	Electricity	0.197977167	5.686126618	0	5.686126618	1.015622865	0	5.958719744
Orange	2023	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	27.61403432	1558.150962	1558.150962	0	141.6599961	0.182538145	0
Orange	2023	T6 Utility Class 5	Aggregate	Aggregate	Diesel	106.5747691	4335.205791	4335.205791	0	1364.157045	0.463566082	0

Orange	2023 T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.645671067	25.93406375	25.93406375	0	8.264589654	0.002958164	0
Orange	2023 T6 Utility Class 6	Aggregate	Aggregate	Diesel	20.16560355	814.5795629	814.5795629	0	258.1197255	0.086708077	0
Orange	2023 T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.242287204	9.5875887	9.5875887	0	3.101276213	0.001088975	0
Orange	2023 T6 Utility Class 7	Aggregate	Aggregate	Diesel	22.96641916	1131.14166	1131.14166	0	293.9701653	0.120166728	0
Orange	2023 T6 Utility Class 7	Aggregate	Aggregate	Electricity	0.037219952	1.062337564	0	1.062337564	0.476415389	0	1.113266067
Orange	2023 T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.325221353	14.48627974	14.48627974	0	4.162833325	0.001624474	0
Orange	2023 T6TS	Aggregate	Aggregate	Gasoline	7581.400632	413802.2854	413802.2854	0	151688.6638	80.40931741	0
Orange	2023 T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1064.693157	220321.6801	220321.6801	0	24466.64874	35.90168739	0
Orange	2023 T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	2.393755946	253.7265054	0	253.7265054	55.00851163	0	453.0742125
Orange	2023 T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.580388394	939.6697719	939.6697719	0	105.2573253	0.168792683	0
Orange	2023 T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	960.8288702	262508.6039	262508.6039	0	22079.84744	42.36637626	0
Orange	2023 T7 NOOS Class 8	Aggregate	Aggregate	Diesel	402.0228659	95317.14382	95317.14382	0	9238.485459	15.5618677	0
Orange	2023 T7 POLA Class 8	Aggregate	Aggregate	Diesel	1340.221874	174632.599	174632.599	0	21926.02986	29.05312492	0
Orange	2023 T7 POLA Class 8	Aggregate	Aggregate	Electricity	0.417241901	22.73816743	0	22.73816743	6.826077508	0	40.57024101
Orange	2023 T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	15.84587167	2045.687922	2045.687922	0	259.2384605	0.364911337	0
Orange	2023 T7 Public Class 8	Aggregate	Aggregate	Diesel	810.6537496	32521.01066	32521.01066	0	4158.653735	5.690186271	0
Orange	2023 T7 Public Class 8	Aggregate	Aggregate	Electricity	0.336127107	9.642944947	0	9.642944947	1.724332057	0	17.19480722
Orange	2023 T7 Public Class 8	Aggregate	Aggregate	Natural Gas	219.2111575	11476.29468	11476.29468	0	1124.553238	1.898874637	0
Orange	2023 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	280.7241034	19917.78366	19917.78366	0	2644.421054	3.301971841	0
Orange	2023 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	0.411378178	15.68067558	0	15.68067558	3.875182432	0	27.91946065
Orange	2023 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	16.60271832	1219.700044	1219.700044	0	156.3976066	0.206980107	0
Orange	2023 T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	977.975946	60029.89192	60029.89192	0	9212.533411	10.09649412	0
Orange	2023 T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	70.04537168	4637.707658	4637.707658	0	659.8274013	0.822977616	0
Orange	2023 T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2168.836696	126828.9048	126828.9048	0	20430.44168	21.01937504	0
Orange	2023 T7 Single Other Class 8	Aggregate	Aggregate	Electricity	2.255714055	74.11378179	0	74.11378179	21.2488264	0	131.9596725
Orange	2023 T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	163.4508613	10116.51417	10116.51417	0	1539.707114	1.756382131	0
Orange	2023 T7 SWCV Class 8	Aggregate	Aggregate	Diesel	294.5301242	19124.77372	19124.77372	0	1354.838571	7.151952364	0
Orange	2023 T7 SWCV Class 8	Aggregate	Aggregate	Electricity	0.440553166	11.91938013	0	11.91938013	2.026544565	0	21.19082514
Orange	2023 T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	688.7474284	44532.71917	44532.71917	0	3168.238171	7.668595054	0
Orange	2023 T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2334.218312	188909.7778	188909.7778	0	33916.19207	30.81332335	0
Orange	2023 T7 Tractor Class 8	Aggregate	Aggregate	Electricity	1.808556376	76.84834858	0	76.84834858	26.27832415	0	137.2565723
Orange	2023 T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	76.22241346	6349.503578	6349.503578	0	1107.511668	1.139277711	0
Orange	2023 T7 Utility Class 8	Aggregate	Aggregate	Diesel	74.70038187	3442.985972	3442.985972	0	956.164888	0.55695995	0
Orange	2023 T7 Utility Class 8	Aggregate	Aggregate	Electricity	0.021899289	0.623993032	0	0.623993032	0.280310895	0	1.112672523
Orange	2023 T7IS	Aggregate	Aggregate	Gasoline	8.73145324	606.548947	606.548947	0	174.6989164	0.147681734	0
Orange	2023 UBUS	Aggregate	Aggregate	Gasoline	255.1048963	42087.53345	42087.53345	0	1020.419585	3.65617145	0
Orange	2023 UBUS	Aggregate	Aggregate	Electricity	4.037405551	77.72005682	0	77.72005682	16.1496222	0	165.3142978
Orange	2023 UBUS	Aggregate	Aggregate	Natural Gas	575.5609189	110640.6384	110640.6384	0	2302.243676	37.30456442	0

EMFAC Fuel Usage: Year 2024

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,762	2,115	9.34	5,234	586	8.93	0	0	0.00
LDA	43,002,806	1,444,963	29.76	98,494	2,307	42.70	0	0	0.00	3,916,166	1,449,657	2.70
LDT1	3,498,899	139,946	25.00	484	20	23.85	0	0	0.00	14,209	5,134	2.77
LDT2	21,419,307	888,796	24.10	86,973	2,742	31.72	0	0	0.00	229,955	79,295	2.90
LHD1	1,661,882	118,308	14.05	922,159	44,516	20.72	0	0	0.00	11,777	6,618	1.78
LHD2	253,092	20,601	12.29	391,528	22,431	17.45	0	0	0.00	2,888	1,624	1.78
MCY	321,577	7,623	42.19	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,678,421	645,388	19.64	183,420	7,694	23.84	0	0	0.00	190,181	68,121	2.79
MH	58,496	11,966	4.89	29,762	2,929	10.16	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	16,718	2,986	5.60	0	0	0.00	0	0	0.00
OBUS	35,950	6,945	5.18	0	0	0.00	0	0	0.00	184	193	0.96
PTO	0	0	0.00	44,613	9,012	4.95	0	0	0.00	195	404	0.48
SBUS	30,257	3,398	8.90	16,793	2,277	7.38	18,872	4,392	4.30	162	187	0.86
T6	397,726	77,003	5.17	1,155,909	129,268	8.94	12,501	1,475	8.48	3,856	4,045	0.95
T7	590	140	4.20	1,220,548	202,276	6.03	84,362	14,237	5.93	3,263	5,837	0.56
UBUS	42,204	3,456	12.21	0	0	0.00	110,818	37,371	2.97	78	165	0.47
Total	**83,401,207**	**3,368,534**	**24.76**	**4,187,161**	**430,573**	**9.72**	**231,787**	**58,062**	**3.99**	**4,372,913**	**1,621,280**	**2.70**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2024
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2024	All Other Buses	Aggregate	Aggregate	Diesel	350.3073076	19761.52253	19761.52253	0	3117.735038	2.114742998	0
Orange	2024	All Other Buses	Aggregate	Aggregate	Natural Gas	85.0569544	5233.822967	5233.822967	0	757.0068942	0.586275139	0
Orange	2024	LDA	Aggregate	Aggregate	Gasoline	1065891.765	42285386.13	42285386.13	0	4977599.192	1420.11895	0
Orange	2024	LDA	Aggregate	Aggregate	Diesel	3266.416655	98494.14462	98494.14462	0	13787.61952	2.306901725	0
Orange	2024	LDA	Aggregate	Aggregate	Electricity	67229.20858	3174887.786	0	3174887.786	334614.1416	0	1225768.723
Orange	2024	LDA	Aggregate	Aggregate	Plug-in Hybrid	31196.5885	1458697.84	717420.0362	741277.8035	128997.8935	24.84391801	223887.9903
Orange	2024	LDT1	Aggregate	Aggregate	Gasoline	97776.1357	3495530.367	3495530.367	0	434581.8932	139.8289369	0
Orange	2024	LDT1	Aggregate	Aggregate	Diesel	31.55516109	483.8937201	483.8937201	0	89.92548515	0.020285161	0
Orange	2024	LDT1	Aggregate	Aggregate	Electricity	234.5800758	10019.73277	0	10019.73277	1123.798767	0	3868.443823
Orange	2024	LDT1	Aggregate	Aggregate	Plug-in Hybrid	142.9646924	7558.03441	3369.065326	4188.969084	591.1590033	0.116962428	1265.193515
Orange	2024	LDT2	Aggregate	Aggregate	Gasoline	523220.8345	21321177.46	21321177.46	0	2459651.448	885.3763802	0
Orange	2024	LDT2	Aggregate	Aggregate	Diesel	2063.415332	86972.74449	86972.74449	0	9872.064019	2.742318454	0
Orange	2024	LDT2	Aggregate	Aggregate	Electricity	3182.504872	117085.3103	0	117085.3103	16279.4577	0	45204.59334
Orange	2024	LDT2	Aggregate	Aggregate	Plug-in Hybrid	4167.835855	210999.7343	98129.62463	112870.1097	17234.00126	3.419988632	34090.13719
Orange	2024	LHD1	Aggregate	Aggregate	Gasoline	41326.42062	1661881.956	1661881.956	0	615702.0909	118.308255	0
Orange	2024	LHD1	Aggregate	Aggregate	Diesel	21602.56979	922158.8233	922158.8233	0	271733.1519	44.51642193	0
Orange	2024	LHD1	Aggregate	Aggregate	Electricity	155.3882898	11776.85136	0	11776.85136	2170.676004	0	6617.55844
Orange	2024	LHD2	Aggregate	Aggregate	Gasoline	6721.102951	253091.6297	253091.6297	0	100134.4195	20.60060746	0
Orange	2024	LHD2	Aggregate	Aggregate	Diesel	9173.234432	391527.7031	391527.7031	0	115387.7492	22.43146289	0
Orange	2024	LHD2	Aggregate	Aggregate	Electricity	40.21934854	2888.100628	0	2888.100628	532.3823485	0	1624.384362
Orange	2024	MCY	Aggregate	Aggregate	Gasoline	50238.99817	321576.5516	321576.5516	0	100477.9963	7.622889471	0
Orange	2024	MDV	Aggregate	Aggregate	Gasoline	324536.5237	12620485.4	12620485.4	0	1506316.198	643.3391553	0
Orange	2024	MDV	Aggregate	Aggregate	Diesel	4623.453247	183419.8343	183419.8343	0	21700.57164	7.694115836	0
Orange	2024	MDV	Aggregate	Aggregate	Electricity	3450.063477	127073.3453	0	127073.3453	17655.07327	0	49060.79921
Orange	2024	MDV	Aggregate	Aggregate	Plug-in Hybrid	2619.629178	121042.8119	57935.42614	63107.38578	10832.16665	2.048796748	19060.31141
Orange	2024	MH	Aggregate	Aggregate	Gasoline	6023.474387	58495.55977	58495.55977	0	602.5883777	11.96604106	0
Orange	2024	MH	Aggregate	Aggregate	Diesel	2969.063612	29761.94653	29761.94653	0	296.9063612	2.928854631	0
Orange	2024	Motor Coach	Aggregate	Aggregate	Diesel	119.8209857	16717.60593	16717.60593	0	2753.486251	2.986440651	0
Orange	2024	OBUS	Aggregate	Aggregate	Gasoline	859.2545526	35950.2379	35950.2379	0	17191.96509	6.944890861	0
Orange	2024	OBUS	Aggregate	Aggregate	Electricity	2.385794078	184.4758931	0	184.4758931	47.73496791	0	192.6532925
Orange	2024	PTO	Aggregate	Aggregate	Diesel	0	44612.76747	44612.76747	0	0	9.011873802	0
Orange	2024	PTO	Aggregate	Aggregate	Electricity	0	195.2469558	0	195.2469558	0	0	404.4577334
Orange	2024	SBUS	Aggregate	Aggregate	Gasoline	669.6299914	30256.65941	30256.65941	0	2678.519966	3.39846975	0
Orange	2024	SBUS	Aggregate	Aggregate	Diesel	821.2477494	16793.01525	16793.01525	0	11891.66741	2.276611833	0
Orange	2024	SBUS	Aggregate	Aggregate	Electricity	5.553480404	162.1392305	0	162.1392305	66.70275891	0	187.4818099
Orange	2024	SBUS	Aggregate	Aggregate	Natural Gas	748.1584339	18872.09631	18872.09631	0	10833.33412	4.392357878	0
Orange	2024	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	9.060919927	599.330203	599.330203	0	208.2199399	0.064929034	0
Orange	2024	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.047517754	3.488504623	0	3.488504623	1.091957976	0	3.673456405
Orange	2024	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	12.08490979	822.7786756	822.7786756	0	277.7112269	0.089116521	0
Orange	2024	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.05438187	4.180190194	0	4.180190194	1.249695382	0	4.401813413
Orange	2024	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	39.55945946	2143.198636	2143.198636	0	909.0763784	0.228564439	0
Orange	2024	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0.321383507	17.66853994	0	17.66853994	7.385392994	0	18.6052817
Orange	2024	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	66.57538332	13491.85683	13491.85683	0	1529.902309	1.347277156	0
Orange	2024	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0.260135192	50.08761069	0	50.08761069	5.977906703	0	52.74313042
Orange	2024	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.062205134	12.10670573	12.10670573	0	1.429473983	0.001208106	0
Orange	2024	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2517.503882	85865.94538	85865.94538	0	35924.7804	9.740764994	0
Orange	2024	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	6.242172167	231.3997561	0	231.3997561	89.07579682	0	242.5522715
Orange	2024	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	8.134299295	284.912234	284.912234	0	116.0764509	0.034311307	0
Orange	2024	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2034.209318	69987.89456	69987.89456	0	29028.16697	7.909641767	0
Orange	2024	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	5.503746993	206.4269938	0	206.4269938	78.5384696	0	216.375925
Orange	2024	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	5.492435498	196.7618184	196.7618184	0	78.37705456	0.02344848	0
Orange	2024	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6321.506783	216636.1944	216636.1944	0	90207.90179	24.58946624	0
Orange	2024	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	14.02285844	504.2946118	0	504.2946118	200.1061899	0	528.5995358
Orange	2024	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	16.81014342	588.6318279	588.6318279	0	239.8807466	0.070392613	0
Orange	2024	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	818.5953979	45349.04918	45349.04918	0	11681.35633	4.918788042	0
Orange	2024	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	0.769944858	33.77479584	0	33.77479584	10.98711313	0	35.40260193
Orange	2024	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	23.97232683	1338.00867	1338.00867	0	342.0851038	0.156075287	0
Orange	2024	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2147.558755	90934.82738	90934.82738	0	24825.77921	10.26451298	0
Orange	2024	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	5.035993163	215.4284103	0	215.4284103	58.21608097	0	225.7890446
Orange	2024	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	5.612595018	242.4406029	242.4406029	0	64.88159841	0.029163188	0
Orange	2024	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5008.917816	220256.623	220256.623	0	57903.08996	24.88078886	0
Orange	2024	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	9.985148541	438.9113693	0	438.9113693	115.4283171	0	460.0200065
Orange	2024	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	12.48430867	548.845646	548.845646	0	144.3186082	0.06479821	0
Orange	2024	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4138.433981	179486.4555	179486.4555	0	47840.29682	20.23472632	0
Orange	2024	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	10.05295951	427.4385402	0	427.4385402	116.212212	0	447.9954128
Orange	2024	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	11.10081202	481.6120155	481.6120155	0	128.3253869	0.056807498	0
Orange	2024	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2060.196214	99699.32221	99699.32221	0	23815.86823	11.04811795	0
Orange	2024	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	3.700578005	239.6806844	0	239.6806844	42.77868174	0	251.2076873
Orange	2024	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	53.66000786	2637.168225	2637.168225	0	620.3096908	0.310967522	0
Orange	2024	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	31.10983311	1641.93936	1641.93936	0	359.6296708	0.181722674	0
Orange	2024	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.082388076	4.400714958	4.400714958	0	0.952406163	0.00050483	0
Orange	2024	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1260.719584	80675.0067	80675.0067	0	14573.91839	8.384010854	0
Orange	2024	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	1.955525502	144.2456044	0	144.2456044	22.6058748	0	151.1828321
Orange	2024	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	30.27525882	1952.468043	1952.468043	0	349.9819919	0.22296105	0
Orange	2024	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.337059374	350.1710879	350.1710879	0	122.6456244	0.037761042	0
Orange	2024	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.085523768	480.3717635	480.3717635	0	162.8253362	0.051818199	0
Orange	2024	T6 OOS Class 6	Aggregate	Aggregate	Diesel	23.30373401	1255.225162	1255.225162	0	535.5198077	0.133001344	0
Orange	2024	T6 OOS Class 7	Aggregate	Aggregate	Diesel	36.5205093	9127.047784	9127.047784	0	839.2413037	0.904804874	0
Orange	2024	T6 Public Class 4	Aggregate	Aggregate	Diesel	131.4948415	4531.611838	4531.611838	0	674.5685368	0.53261314	0
Orange	2024	T6 Public Class 4	Aggregate	Aggregate	Electricity	0.59878373	25.81505499	0	25.81505499	3.071760536	0	27.1439804
Orange	2024	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	15.21742115	624.0199905	624.0199905	0	78.06537052	0.076464533	0
Orange	2024	T6 Public Class 5	Aggregate	Aggregate	Diesel	115.0623611	4141.160704	4141.160704	0	590.2699123	0.479878815	0
Orange	2024	T6 Public Class 5	Aggregate	Aggregate	Electricity	0.48179373	20.64858479	0	20.64858479	2.471601836	0	21.71154704
Orange	2024	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	21.23872952	862.8221157	862.8221157	0	108.9546824	0.104893471	0
Orange	2024	T6 Public Class 6	Aggregate	Aggregate	Diesel	195.5636311	6814.377545	6814.377545	0	1003.241428	0.80369886	0
Orange	2024	T6 Public Class 6	Aggregate	Aggregate	Electricity	0.932767182	37.50934126	0	37.50934126	4.785095646	0	39.4402733
Orange	2024	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	24.04110405	974.2453924	974.2453924	0	123.3308638	0.119157113	0
Orange	2024	T6 Public Class 7	Aggregate	Aggregate	Diesel	347.6409066	15355.5417	15355.5417	0	1783.397851	1.772860026	0
Orange	2024	T6 Public Class 7	Aggregate	Aggregate	Electricity	1.749470849	111.2740282	0	111.2740282	8.974785454	0	117.0022702
Orange	2024	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	30.91752592	1704.826079	1704.826079	0	158.606908	0.198499172	0
Orange	2024	T6 Utility Class 5	Aggregate	Aggregate	Diesel	106.4465252	4321.638763	4321.638763	0	1362.515522	0.462355913	0
Orange	2024	T6 Utility Class 5	Aggregate	Aggregate	Electricity	0.804727459	35.00981011	0	35.00981011	10.30051147	0	36.81206953

Orange	2024 T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.636176826	25.48270929	25.48270929	0	8.143063372	0.002878817	0
Orange	2024 T6 Utility Class 6	Aggregate	Aggregate	Diesel	20.1109506	812.7357324	812.7357324	0	257.4201676	0.086570793	0
Orange	2024 T6 Utility Class 6	Aggregate	Aggregate	Electricity	0.150126736	6.531290153	0	6.531290153	1.921622224	0	6.867512464
Orange	2024 T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.22572922	8.867083958	8.867083958	0	2.889334021	0.001000755	0
Orange	2024 T6 Utility Class 7	Aggregate	Aggregate	Diesel	22.87424918	1128.387997	1128.387997	0	292.7903895	0.119736904	0
Orange	2024 T6 Utility Class 7	Aggregate	Aggregate	Electricity	0.179982128	10.65749026	0	10.65749026	2.303771235	0	11.20612398
Orange	2024 T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.299420712	13.16414158	13.16414158	0	3.832585112	0.001467182	0
Orange	2024 T6TS	Aggregate	Aggregate	Gasoline	7429.609302	397726.4227	397726.4227	0	148651.6229	77.00341058	0
Orange	2024 T6TS	Aggregate	Aggregate	Electricity	12.87238758	1091.368558	0	1091.368558	257.5507307	0	1145.879351
Orange	2024 T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1086.955178	222819.8979	222819.8979	0	24978.22999	35.89004102	0
Orange	2024 T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	6.852129077	1236.502528	0	1236.502528	157.4619262	0	2214.298954
Orange	2024 T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.582112671	929.6001851	929.6001851	0	105.2969492	0.165236246	0
Orange	2024 T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	980.7338213	266621.8565	266621.8565	0	22537.26321	42.18067921	0
Orange	2024 T7 NOOS Class 8	Aggregate	Aggregate	Diesel	412.9177816	96810.67006	96810.67006	0	9488.850622	15.572463	0
Orange	2024 T7 POLA Class 8	Aggregate	Aggregate	Diesel	1446.809942	181915.9591	181915.9591	0	23669.81065	30.37534344	0
Orange	2024 T7 POLA Class 8	Aggregate	Aggregate	Electricity	1.441616491	138.9246565	0	138.9246565	23.58484579	0	248.6787396
Orange	2024 T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	15.91667671	1982.767928	1982.767928	0	260.3968309	0.348340783	0
Orange	2024 T7 Public Class 8	Aggregate	Aggregate	Diesel	788.8911969	31718.2653	31718.2653	0	4047.01184	5.516769438	0
Orange	2024 T7 Public Class 8	Aggregate	Aggregate	Electricity	3.332745813	212.8578628	0	212.8578628	17.09698602	0	380.6971027
Orange	2024 T7 Public Class 8	Aggregate	Aggregate	Natural Gas	239.0342786	12287.64329	12287.64329	0	1226.245849	2.006827345	0
Orange	2024 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	284.2658029	19859.99233	19859.99233	0	2677.783863	3.267425998	0
Orange	2024 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	2.511885238	193.1106102	0	193.1106102	23.66195894	0	345.1357499
Orange	2024 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	17.47037076	1266.401057	1266.401057	0	164.5708925	0.210709624	0
Orange	2024 T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1002.222664	60384.3462	60384.3462	0	9440.937495	10.18782142	0
Orange	2024 T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	0.599228764	46.10309397	0	46.10309397	5.644734956	0	82.39747103
Orange	2024 T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	73.11647962	4745.669165	4745.669165	0	688.757238	0.837051942	0
Orange	2024 T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2276.349601	128098.2835	128098.2835	0	21443.21324	21.1860493	0
Orange	2024 T7 Single Other Class 8	Aggregate	Aggregate	Electricity	11.20609119	744.088992	0	744.088992	105.561379	0	1329.868473
Orange	2024 T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	174.1894671	10324.12208	10324.12208	0	1640.86478	1.775249301	0
Orange	2024 T7 SWCV Class 8	Aggregate	Aggregate	Diesel	267.6922451	17383.17811	17383.17811	0	1231.384327	6.473220832	0
Orange	2024 T7 SWCV Class 8	Aggregate	Aggregate	Electricity	3.100818419	180.0823399	0	180.0823399	14.26376473	0	321.3424113
Orange	2024 T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	717.7209722	46412.61113	46412.61113	0	3301.516472	7.747731974	0
Orange	2024 T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2470.126358	191485.5457	191485.5457	0	35890.93598	31.06855125	0
Orange	2024 T7 Tractor Class 8	Aggregate	Aggregate	Electricity	6.480989834	497.7272977	0	497.7272977	94.16878229	0	891.2163493
Orange	2024 T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	80.83573621	6413.582429	6413.582429	0	1174.543247	1.145866141	0
Orange	2024 T7 Utility Class 8	Aggregate	Aggregate	Diesel	76.54399619	3450.320743	3450.320743	0	979.7631512	0.557276459	0
Orange	2024 T7 Utility Class 8	Aggregate	Aggregate	Electricity	0.156109992	9.864313022	0	9.864313022	1.998207895	0	17.64236162
Orange	2024 T7IS	Aggregate	Aggregate	Gasoline	7.623311802	590.1042313	590.1042313	0	152.5272225	0.140377911	0
Orange	2024 T7IS	Aggregate	Aggregate	Electricity	0.012090741	3.3282409	0	3.3282409	0.241911542	0	5.947994162
Orange	2024 UBUS	Aggregate	Aggregate	Gasoline	255.8303759	42204.05	42204.05	0	1023.321504	3.455588309	0
Orange	2024 UBUS	Aggregate	Aggregate	Electricity	4.037405551	77.72005682	0	77.72005682	16.1496222	0	165.4036891
Orange	2024 UBUS	Aggregate	Aggregate	Natural Gas	576.5236337	110818.2763	110818.2763	0	2306.094535	37.37116031	0

EMFAC Fuel Usage: Year 2019

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,776	2,095	9.44	5,360	593	9.03	0	0	0.00
LDA	42,635,135	1,408,232	30.28	89,138	2,071	43.05	0	0	0.00	4,438,074	1,645,028	2.70
LDT1	3,448,061	135,799	25.39	428	18	23.88	0	0	0.00	19,475	7,007	2.78
LDT2	21,680,190	882,682	24.56	87,947	2,735	32.16	0	0	0.00	289,844	100,521	2.88
LHD1	1,660,486	115,615	14.36	951,495	45,634	20.85	0	0	0.00	30,122	16,925	1.78
LHD2	250,353	19,996	12.52	407,867	23,157	17.61	0	0	0.00	7,389	4,156	1.78
MCY	325,908	7,697	42.34	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,727,540	636,037	20.01	180,507	7,479	24.14	0	0	0.00	244,708	87,912	2.78
MH	56,944	11,647	4.89	29,597	2,914	10.16	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	16,801	2,971	5.66	0	0	0.00	0	0	0.00
OBUS	34,719	6,628	5.24	0	0	0.00	0	0	0.00	444	464	0.96
PTO	0	0	0.00	44,817	8,944	5.01	0	0	0.00	527	1,092	0.48
SBUS	30,658	3,432	8.93	16,073	2,171	7.40	19,463	4,505	4.32	361	417	0.86
T6	379,777	73,083	5.20	1,160,619	129,277	8.98	12,989	1,531	8.48	11,432	11,990	0.95
T7	573	133	4.31	1,236,191	202,294	6.11	87,198	14,516	6.01	7,839	14,024	0.56
UBUS	42,289	3,462	12.21	0	0	0.00	111,030	37,288	2.98	78	165	0.47
Total	**83,272,633**	**3,304,443**	**25.20**	**4,241,256**	**431,758**	**9.82**	**236,040**	**58,434**	**4.04**	**5,050,293**	**1,889,701**	**2.67**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2025	All Other Buses	Aggregate	Aggregate	Diesel	357.9591136	19775.5479	19775.5479	0	3185.836111	2.095482609	0
Orange	2025	All Other Buses	Aggregate	Aggregate	Natural Gas	89.06555643	5360.043363	5360.043363	0	792.6834523	0.593269269	0
Orange	2025	LDA	Aggregate	Aggregate	Gasoline	1056312.531	41885606.83	41885606.83	0	4931031.913	1382.253543	0
Orange	2025	LDA	Aggregate	Aggregate	Diesel	3018.286484	89138.09087	89138.09087	0	12663.8649	2.070760418	0
Orange	2025	LDA	Aggregate	Aggregate	Electricity	74944.83017	3623884.151	0	3623884.151	371723.8789	0	1399118.378
Orange	2025	LDA	Aggregate	Aggregate	Plug-in Hybrid	33699.13897	1563717.835	749528.1309	814189.7037	139345.9396	25.97830013	245909.5572
Orange	2025	LDT1	Aggregate	Aggregate	Gasoline	96356.97279	3443415.123	3443415.123	0	428003.9752	135.6373362	0
Orange	2025	LDT1	Aggregate	Aggregate	Diesel	28.50822088	428.3760164	428.3760164	0	79.77223022	0.017940676	0
Orange	2025	LDT1	Aggregate	Aggregate	Electricity	292.0687492	13382.73952	0	13382.73952	1415.876564	0	5166.841994
Orange	2025	LDT1	Aggregate	Aggregate	Plug-in Hybrid	205.3971672	10738.80692	4646.357439	6092.449478	849.3172863	0.161489121	1840.101326
Orange	2025	LDT2	Aggregate	Aggregate	Gasoline	529834.4659	21568112.97	21568112.97	0	2489358.817	878.7704302	0
Orange	2025	LDT2	Aggregate	Aggregate	Diesel	2111.525403	87946.98549	87946.98549	0	10062.68846	2.734963301	0
Orange	2025	LDT2	Aggregate	Aggregate	Electricity	4251.506284	154415.472	0	154415.472	21660.49213	0	59617.11678
Orange	2025	LDT2	Aggregate	Aggregate	Plug-in Hybrid	4967.68538	247505.896	112077.2463	135428.6497	20541.37905	3.911737562	40903.48862
Orange	2025	LHD1	Aggregate	Aggregate	Gasoline	41223.98689	1660486.368	1660486.368	0	614175.9809	115.6151536	0
Orange	2025	LHD1	Aggregate	Aggregate	Diesel	22344.74546	951494.9678	951494.9678	0	281068.7882	45.63388289	0
Orange	2025	LHD1	Aggregate	Aggregate	Electricity	428.3107595	30121.52667	0	30121.52667	5987.787693	0	16925.44598
Orange	2025	LHD2	Aggregate	Aggregate	Gasoline	6668.437484	250352.8675	250352.8675	0	99349.78253	19.99612697	0
Orange	2025	LHD2	Aggregate	Aggregate	Diesel	9609.574779	407866.7845	407866.7845	0	120876.3619	23.15667142	0
Orange	2025	LHD2	Aggregate	Aggregate	Electricity	110.6168929	7389.195621	0	7389.195621	1466.888675	0	4155.863955
Orange	2025	MCY	Aggregate	Aggregate	Gasoline	51011.4251	325908.2941	325908.2941	0	102022.8502	7.696840101	0
Orange	2025	MDV	Aggregate	Aggregate	Gasoline	325579.9564	12660247.41	12660247.41	0	1510578.221	633.6536815	0
Orange	2025	MDV	Aggregate	Aggregate	Diesel	4600.640767	180507.4796	180507.4796	0	21493.78288	7.478554396	0
Orange	2025	MDV	Aggregate	Aggregate	Electricity	4586.98934	166596.8195	0	166596.8195	23370.26872	0	64320.12231
Orange	2025	MDV	Aggregate	Aggregate	Plug-in Hybrid	3164.448377	145403.8052	67292.41503	78111.39018	13084.99404	2.383002691	23591.96793
Orange	2025	MH	Aggregate	Aggregate	Gasoline	5833.176957	56944.1428	56944.1428	0	583.5510228	11.64679864	0
Orange	2025	MH	Aggregate	Aggregate	Diesel	2988.17924	29596.96588	29596.96588	0	298.817924	2.913597583	0
Orange	2025	Motor Coach	Aggregate	Aggregate	Diesel	125.6742224	16801.32956	16801.32956	0	2887.993631	2.971004862	0
Orange	2025	OBUS	Aggregate	Aggregate	Gasoline	835.2077651	34718.74829	34718.74829	0	16710.83696	6.628377733	0
Orange	2025	OBUS	Aggregate	Aggregate	Electricity	5.857415532	444.1426882	0	444.1426882	117.19517	0	463.8305298
Orange	2025	PTO	Aggregate	Aggregate	Diesel	0	44816.61842	44816.61842	0	0	8.943723643	0
Orange	2025	PTO	Aggregate	Aggregate	Electricity	0	527.0739208	0	527.0739208	0	0	1091.843519
Orange	2025	SBUS	Aggregate	Aggregate	Gasoline	678.7674095	30657.60454	30657.60454	0	2715.069638	3.431527869	0
Orange	2025	SBUS	Aggregate	Aggregate	Diesel	788.6124051	16073.03349	16073.03349	0	11419.10763	2.170748419	0
Orange	2025	SBUS	Aggregate	Aggregate	Electricity	11.85785342	361.0238769	0	361.0238769	141.8049378	0	417.4523934
Orange	2025	SBUS	Aggregate	Aggregate	Natural Gas	779.1807775	19462.92499	19462.92499	0	11282.53766	4.505240075	0
Orange	2025	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	9.158955168	599.8220333	599.8220333	0	210.4727898	0.064431278	0
Orange	2025	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.112113595	8.925654634	0	8.925654634	2.57637041	0	9.398870498
Orange	2025	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	12.12652461	824.1841272	824.1841272	0	278.6675354	0.088578889	0
Orange	2025	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.129648134	10.90823342	0	10.90823342	2.979314117	0	11.48656065
Orange	2025	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	40.98526681	2139.303489	2139.303489	0	941.8414314	0.226318305	0
Orange	2025	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0.732023034	42.81674139	0	42.81674139	16.82188932	0	45.08677784
Orange	2025	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	67.58038688	13546.16946	13546.16946	0	1552.997291	1.334079277	0
Orange	2025	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0.620493715	129.9028269	0	129.9028269	14.25894556	0	136.7899496
Orange	2025	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.058530786	11.28875568	11.28875568	0	1.345037467	0.00111981	0
Orange	2025	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2558.177985	86213.73094	86213.73094	0	36505.19984	9.742464756	0
Orange	2025	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	18.03414456	708.8627762	0	708.8627762	257.3472428	0	743.0270434
Orange	2025	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	8.840999003	309.270171	309.270171	0	126.1610558	0.037068978	0
Orange	2025	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2068.394814	70276.1874	70276.1874	0	29515.99399	7.91333991	0
Orange	2025	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	14.83208272	588.6984259	0	588.6984259	211.6538204	0	617.0712661
Orange	2025	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	6.102526307	218.5240178	218.5240178	0	87.0830504	0.025921992	0
Orange	2025	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6438.547158	217570.9147	217570.9147	0	91878.06794	24.60801984	0
Orange	2025	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	42.79642419	1648.001988	0	1648.001988	610.7049732	0	1727.428899
Orange	2025	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	18.59471292	651.6633721	651.6633721	0	265.3465533	0.077550284	0
Orange	2025	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	835.731603	45713.87403	45713.87403	0	11925.88997	4.948558679	0
Orange	2025	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	2.64181505	123.4071179	0	123.4071179	37.69870076	0	129.3548329
Orange	2025	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	24.34144562	1343.070906	1343.070906	0	347.352429	0.156655129	0
Orange	2025	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2178.40364	91239.5928	91239.5928	0	25182.34608	10.26428846	0
Orange	2025	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	17.19747195	780.6484863	0	780.6484863	198.8027757	0	818.1923434
Orange	2025	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	6.319930812	271.3414412	271.3414412	0	73.05840018	0.032362386	0
Orange	2025	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5118.036011	221201.9288	221201.9288	0	59164.49629	24.91208318	0
Orange	2025	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	34.83898607	1605.469526	0	1605.469526	402.738679	0	1682.681638
Orange	2025	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	14.028186	613.0149668	613.0149668	0	162.1658302	0.07192211	0
Orange	2025	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4216.015421	180218.8185	180218.8185	0	48737.13827	20.25268909	0
Orange	2025	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	31.20497269	1417.781584	0	1417.781584	360.7294843	0	1485.967189
Orange	2025	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	12.36199839	533.173009	533.173009	0	142.9047014	0.062515494	0
Orange	2025	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2143.920921	100079.4114	100079.4114	0	24783.72585	11.04129451	0
Orange	2025	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	13.02765135	876.441568	0	876.441568	150.5996496	0	918.5924176
Orange	2025	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	55.76692597	2629.198729	2629.198729	0	644.6656642	0.310346466	0
Orange	2025	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	31.87209418	1649.366656	1649.366656	0	368.4414087	0.182105132	0
Orange	2025	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	0.140410891	8.262687877	0	8.262687877	1.623149903	0	8.660066694
Orange	2025	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.091563737	4.903191458	4.903191458	0	1.058476798	0.000558831	0
Orange	2025	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1310.18148	81211.95928	81211.95928	0	15145.69791	8.383359798	0
Orange	2025	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	5.276529212	413.2220563	0	413.2220563	60.99667769	0	433.0952132
Orange	2025	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	31.44661499	1960.634351	1960.634351	0	363.5228693	0.223633802	0
Orange	2025	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.437705578	353.6151706	353.6151706	0	124.9584742	0.037559318	0
Orange	2025	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.164060599	485.0964257	485.0964257	0	164.6301126	0.051606919	0
Orange	2025	T6 OOS Class 6	Aggregate	Aggregate	Diesel	24.39050555	1267.570839	1267.570839	0	560.4938176	0.132107814	0
Orange	2025	T6 OOS Class 7	Aggregate	Aggregate	Diesel	36.93201986	9216.81621	9216.81621	0	848.6978164	0.900067874	0
Orange	2025	T6 Public Class 4	Aggregate	Aggregate	Diesel	129.5350628	4496.205229	4496.205229	0	664.5148722	0.525078759	0
Orange	2025	T6 Public Class 4	Aggregate	Aggregate	Electricity	1.309628615	56.63827696	0	56.63827696	6.718394796	0	59.5539417
Orange	2025	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	16.18039777	657.6758298	657.6758298	0	83.00544055	0.080472571	0
Orange	2025	T6 Public Class 5	Aggregate	Aggregate	Diesel	114.6589983	4123.680165	4123.680165	0	588.2006612	0.475814698	0
Orange	2025	T6 Public Class 5	Aggregate	Aggregate	Electricity	1.085932782	46.80942352	0	46.80942352	5.570835173	0	49.21911168
Orange	2025	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	22.0034829	882.3343964	882.3343964	0	112.8778673	0.107324667	0
Orange	2025	T6 Public Class 6	Aggregate	Aggregate	Diesel	192.3965365	6763.534039	6763.534039	0	986.9942321	0.791946686	0
Orange	2025	T6 Public Class 6	Aggregate	Aggregate	Electricity	2.017284765	84.11753859	0	84.11753859	10.34867084	0	88.44779992
Orange	2025	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	25.44975636	1022.392153	1022.392153	0	130.5572501	0.124882813	0
Orange	2025	T6 Public Class 7	Aggregate	Aggregate	Diesel	340.0376487	15194.0733	15194.0733	0	1744.393138	1.738046581	0
Orange	2025	T6 Public Class 7	Aggregate	Aggregate	Electricity	3.708429328	238.4484616	0	238.4484616	19.02424245	0	250.7234778
Orange	2025	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	34.07416812	1835.467982	1835.467982	0	174.8004824	0.213559516	0
Orange	2025	T6 Utility Class 5	Aggregate	Aggregate	Diesel	106.3590475	4301.322713	4301.322713	0	1361.395808	0.458777459	0

Orange	2025 T6 Utility Class 5	Aggregate	Aggregate	Electricity	1.848701188	80.33890184	0	80.33890184	23.6633752	0	84.47464387
Orange	2025 T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.628118604	25.05725926	25.05725926	0	8.039918137	0.002816017	0
Orange	2025 T6 Utility Class 6	Aggregate	Aggregate	Diesel	20.09416281	809.3458131	809.3458131	0	257.205284	0.085963818	0
Orange	2025 T6 Utility Class 6	Aggregate	Aggregate	Electricity	0.351828266	15.2897157	0	15.2897157	4.503401809	0	16.07681035
Orange	2025 T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.209715604	8.145134825	8.145134825	0	2.684359735	0.000917391	0
Orange	2025 T6 Utility Class 7	Aggregate	Aggregate	Diesel	22.73893778	1122.178959	1122.178959	0	291.0584035	0.118544657	0
Orange	2025 T6 Utility Class 7	Aggregate	Aggregate	Electricity	0.397702442	24.53462737	0	24.53462737	5.090591254	0	25.79763803
Orange	2025 T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.27442441	11.9609473	11.9609473	0	3.512632453	0.001330022	0
Orange	2025 T6TS	Aggregate	Aggregate	Gasoline	7268.413445	379776.8426	379776.8426	0	145426.4162	73.08335708	0
Orange	2025 T6TS	Aggregate	Aggregate	Electricity	30.3127107	2522.407626	0	2522.407626	606.4967157	0	2648.3948
Orange	2025 T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1102.818845	224901.0205	224901.0205	0	25342.77706	35.7296734	0
Orange	2025 T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	13.64571349	2693.166869	0	2693.166869	313.5784959	0	4822.858381
Orange	2025 T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.546730089	917.123243	917.123243	0	104.4838574	0.161809726	0
Orange	2025 T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	997.9532453	270799.5596	270799.5596	0	22932.96558	41.79929679	0
Orange	2025 T7 NOOS Class 8	Aggregate	Aggregate	Diesel	422.6777093	98327.59833	98327.59833	0	9713.133759	15.54966697	0
Orange	2025 T7 POLA Class 8	Aggregate	Aggregate	Diesel	1512.029018	189044.5386	189044.5386	0	24736.79474	31.57963099	0
Orange	2025 T7 POLA Class 8	Aggregate	Aggregate	Electricity	3.320246863	353.9057575	0	353.9057575	54.31923868	0	633.5004883
Orange	2025 T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	16.44405747	2037.52091	2037.52091	0	269.0247802	0.353290504	0
Orange	2025 T7 Public Class 8	Aggregate	Aggregate	Diesel	766.9152993	30898.55035	30898.55035	0	3934.275485	5.34886604	0
Orange	2025 T7 Public Class 8	Aggregate	Aggregate	Electricity	7.298718278	470.1453073	0	470.1453073	37.44242477	0	840.8566826
Orange	2025 T7 Public Class 8	Aggregate	Aggregate	Natural Gas	259.049126	13098.17678	13098.17678	0	1328.922016	2.125383907	0
Orange	2025 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	285.0956578	19717.73384	19717.73384	0	2685.601097	3.213433342	0
Orange	2025 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	5.206711953	426.6582631	0	426.6582631	49.0472266	0	762.5423557
Orange	2025 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	18.11582343	1302.586435	1302.586435	0	170.6510567	0.214145559	0
Orange	2025 T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1034.115653	60272.01386	60272.01386	0	9741.369451	10.1360248	0
Orange	2025 T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	6.518716158	510.0304544	0	510.0304544	61.4063062	0	911.5487916
Orange	2025 T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	76.46095165	4783.778138	4783.778138	0	720.2621645	0.840035443	0
Orange	2025 T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2379.060835	129172.3941	129172.3941	0	22410.75306	21.27554808	0
Orange	2025 T7 Single Other Class 8	Aggregate	Aggregate	Electricity	24.81746245	1717.760901	0	1717.760901	233.7804963	0	3070.057601
Orange	2025 T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	183.7034623	10456.94206	10456.94206	0	1730.486615	1.79231289	0
Orange	2025 T7 SWCV Class 8	Aggregate	Aggregate	Diesel	242.7793991	15765.31724	15765.31724	0	1116.785236	5.867958956	0
Orange	2025 T7 SWCV Class 8	Aggregate	Aggregate	Electricity	7.32485694	450.4542748	0	450.4542748	33.69434193	0	803.7993227
Orange	2025 T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	743.9504684	48119.06069	48119.06069	0	3422.172155	7.871513443	0
Orange	2025 T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2599.004956	193841.2304	193841.2304	0	37763.54201	31.23820146	0
Orange	2025 T7 Tractor Class 8	Aggregate	Aggregate	Electricity	14.4868721	1181.380584	0	1181.380584	210.4942515	0	2115.346488
Orange	2025 T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	85.41069563	6482.928599	6482.928599	0	1241.017408	1.157614108	0
Orange	2025 T7 Utility Class 8	Aggregate	Aggregate	Diesel	78.19966656	3451.350584	3451.350584	0	1000.955732	0.555584509	0
Orange	2025 T7 Utility Class 8	Aggregate	Aggregate	Electricity	0.441786397	28.24913889	0	28.24913889	5.654865875	0	50.5236931
Orange	2025 T7IS	Aggregate	Aggregate	Gasoline	6.722292417	572.5132259	572.5132259	0	134.4996267	0.132943836	0
Orange	2025 T7IS	Aggregate	Aggregate	Electricity	0.027208508	7.235020643	0	7.235020643	0.544387836	0	12.92991158
Orange	2025 UBUS	Aggregate	Aggregate	Gasoline	256.3483478	42289.47506	42289.47506	0	1025.393391	3.462280467	0
Orange	2025 UBUS	Aggregate	Aggregate	Electricity	4.037405551	77.72005682	0	77.72005682	16.1496222	0	165.4036891
Orange	2025 UBUS	Aggregate	Aggregate	Natural Gas	577.6938563	111029.5135	111029.5135	0	2310.775425	37.28808911	0

EMFAC Fuel Usage: Year 2026

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,790	2,075	9.54	5,486	600	9.14	0	0	0.00
LDA	42,344,311	1,374,802	30.80	80,362	1,851	43.40	0	0	0.00	4,728,130	1,752,668	2.70
LDT1	3,398,185	131,817	25.78	363	15	23.92	0	0	0.00	24,949	8,960	2.78
LDT2	21,908,058	876,052	25.01	88,467	2,716	32.57	0	0	0.00	343,057	119,437	2.87
LHD1	1,657,395	113,326	14.62	976,534	46,636	20.94	0	0	0.00	54,881	30,841	1.78
LHD2	247,700	19,476	12.72	422,249	23,820	17.73	0	0	0.00	13,513	7,601	1.78
MCY	330,192	7,779	42.45	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,768,075	626,769	20.37	177,255	7,260	24.42	0	0	0.00	292,686	105,368	2.78
MH	55,665	11,392	4.89	29,469	2,903	10.15	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	16,902	2,957	5.71	0	0	0.00	0	0	0.00
OBUS	33,711	6,364	5.30	0	0	0.00	0	0	0.00	733	765	0.96
PTO	0	0	0.00	44,948	8,862	5.07	0	0	0.00	915	1,896	0.48
SBUS	31,112	3,471	8.96	15,380	2,069	7.43	20,002	4,608	4.34	599	693	0.86
T6	361,927	69,266	5.23	1,163,540	129,172	9.01	13,433	1,582	8.49	21,163	22,201	0.95
T7	553	125	4.43	1,251,031	202,226	6.19	89,889	14,755	6.09	13,717	24,550	0.56
UBUS	42,376	3,474	12.20	0	0	0.00	111,248	37,358	2.98	78	165	0.47
Total	**83,179,262**	**3,244,113**	**25.64**	**4,286,290**	**432,565**	**9.91**	**240,059**	**58,903**	**4.08**	**5,494,420**	**2,075,146**	**2.65**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2026
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2026	All Other Buses	Aggregate	Aggregate	Diesel	364.8114073	19789.95104	19789.95104	0	3246.821525	2.074966085	0
Orange	2026	All Other Buses	Aggregate	Aggregate	Natural Gas	92.91719861	5486.130001	5486.130001	0	826.9630677	0.600318324	0
Orange	2026	LDA	Aggregate	Aggregate	Gasoline	1049515.92	41577927.11	41577927.11	0	4898979.591	1348.191093	0
Orange	2026	LDA	Aggregate	Aggregate	Diesel	2742.173139	80362.1723	80362.1723	0	11498.25795	1.851478704	0
Orange	2026	LDA	Aggregate	Aggregate	Electricity	81098.87481	3862245.078	0	3862245.078	400525.9224	0	1491145.368
Orange	2026	LDA	Aggregate	Aggregate	Plug-in Hybrid	35696.79687	1632268.837	766384.0341	865884.803	147606.2551	26.61054862	261523.018
Orange	2026	LDT1	Aggregate	Aggregate	Gasoline	95040.06341	3392265.426	3392265.426	0	421984.1489	131.6106754	0
Orange	2026	LDT1	Aggregate	Aggregate	Diesel	24.49979621	362.8616544	362.8616544	0	67.50286897	0.015170689	0
Orange	2026	LDT1	Aggregate	Aggregate	Electricity	361.8710153	16951.55958	0	16951.55958	1768.990103	0	6544.701086
Orange	2026	LDT1	Aggregate	Aggregate	Plug-in Hybrid	270.687928	13917.21072	5919.6857	7997.525016	1119.294582	0.206100722	2415.490919
Orange	2026	LDT2	Aggregate	Aggregate	Gasoline	536812.5168	21784157.47	21784157.47	0	2520480.791	871.7183654	0
Orange	2026	LDT2	Aggregate	Aggregate	Diesel	2150.46559	88467.05453	88467.05453	0	10208.80139	2.716312944	0
Orange	2026	LDT2	Aggregate	Aggregate	Electricity	5257.386579	188253.2028	0	188253.2028	26659.30339	0	72681.27368
Orange	2026	LDT2	Aggregate	Aggregate	Plug-in Hybrid	5706.320321	278704.4829	123900.7496	154803.7333	23595.63453	4.333629361	46755.34134
Orange	2026	LHD1	Aggregate	Aggregate	Gasoline	41098.7832	1657395.449	1657395.449	0	612310.6325	113.3264813	0
Orange	2026	LHD1	Aggregate	Aggregate	Diesel	23010.07791	976534.0014	976534.0014	0	289437.8334	46.63641428	0
Orange	2026	LHD1	Aggregate	Aggregate	Electricity	815.1958673	54881.04636	0	54881.04636	11396.70188	0	30841.11106
Orange	2026	LHD2	Aggregate	Aggregate	Gasoline	6615.094062	247700.2283	247700.2283	0	98555.04503	19.47647629	0
Orange	2026	LHD2	Aggregate	Aggregate	Diesel	10012.14742	422248.7801	422248.7801	0	125940.2192	23.82033186	0
Orange	2026	LHD2	Aggregate	Aggregate	Electricity	211.0818991	13512.73317	0	13512.73317	2800.081371	0	7600.693106
Orange	2026	MCY	Aggregate	Aggregate	Gasoline	51778.70958	330192.3764	330192.3764	0	103557.4192	7.778574027	0
Orange	2026	MDV	Aggregate	Aggregate	Gasoline	326894.2358	12693098.03	12693098.03	0	1516229.941	624.1086297	0
Orange	2026	MDV	Aggregate	Aggregate	Diesel	4570.655518	177255.4948	177255.4948	0	21257.30604	7.259930172	0
Orange	2026	MDV	Aggregate	Aggregate	Electricity	5641.41152	201874.3361	0	201874.3361	28601.64001	0	77940.15535
Orange	2026	MDV	Aggregate	Aggregate	Plug-in Hybrid	3648.256691	165788.2556	74976.88572	90811.36993	15085.54142	2.660564782	27427.74033
Orange	2026	MH	Aggregate	Aggregate	Gasoline	5656.411647	55665.04345	55665.04345	0	565.8674212	11.39189816	0
Orange	2026	MH	Aggregate	Aggregate	Diesel	3003.794796	29469.38598	29469.38598	0	300.3794796	2.903244461	0
Orange	2026	Motor Coach	Aggregate	Aggregate	Diesel	130.9543581	16901.90221	16901.90221	0	3009.331149	2.957474151	0
Orange	2026	OBUS	Aggregate	Aggregate	Gasoline	819.5446697	33711.35172	33711.35172	0	16397.44975	6.36419335	0
Orange	2026	OBUS	Aggregate	Aggregate	Electricity	9.821208849	732.8008896	0	732.8008896	196.5027467	0	765.2842969
Orange	2026	PTO	Aggregate	Aggregate	Diesel	0	44947.88717	44947.88717	0	0	8.862128643	0
Orange	2026	PTO	Aggregate	Aggregate	Electricity	0	915.2479975	0	915.2479975	0	0	1895.953404
Orange	2026	SBUS	Aggregate	Aggregate	Gasoline	688.5633033	31112.44458	31112.44458	0	2754.253213	3.471010776	0
Orange	2026	SBUS	Aggregate	Aggregate	Diesel	756.2070806	15379.61859	15379.61859	0	10949.87853	2.069129743	0
Orange	2026	SBUS	Aggregate	Aggregate	Electricity	19.66639619	599.0783053	0	599.0783053	235.5635237	0	692.7150486
Orange	2026	SBUS	Aggregate	Aggregate	Natural Gas	808.8277787	20001.58816	20001.58816	0	11711.82624	4.607682648	0
Orange	2026	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	9.197205943	599.0064288	599.0064288	0	211.3517926	0.063878622	0
Orange	2026	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.197818415	15.72855393	0	15.72855393	4.545867175	0	16.56713098
Orange	2026	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	12.10786522	823.7739746	823.7739746	0	278.2387428	0.087968545	0
Orange	2026	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.230584554	19.53187773	0	19.53187773	5.298833061	0	20.5732312
Orange	2026	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	42.05639022	2131.583654	2131.583654	0	966.4558474	0.224017824	0
Orange	2026	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	1.26234416	71.99866557	0	71.99866557	29.00866879	0	75.83731651
Orange	2026	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	68.31950463	13570.46233	13570.46233	0	1569.982216	1.319853958	0
Orange	2026	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	1.139588869	240.578455	0	240.578455	26.18775221	0	253.4050359
Orange	2026	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.057210546	10.94132941	10.94132941	0	1.31469834	0.001079399	0
Orange	2026	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2586.043416	86413.55772	86413.55772	0	36902.83954	9.732549568	0
Orange	2026	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	34.09877882	1341.796944	0	1341.796944	486.5895737	0	1406.831565
Orange	2026	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	9.539587441	334.4720394	334.4720394	0	136.1299128	0.039930021	0
Orange	2026	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2093.730466	70452.59078	70452.59078	0	29877.53376	7.909045091	0
Orange	2026	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	27.52549632	1089.022643	0	1089.022643	392.7888325	0	1141.805722
Orange	2026	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	6.719672057	240.9322593	240.9322593	0	95.88972026	0.028481798	0
Orange	2026	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6518.815314	218111.2759	218111.2759	0	93023.49453	24.59200181	0
Orange	2026	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	82.57837742	3203.137636	0	3203.137636	1178.393446	0	3358.388282
Orange	2026	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	20.38516577	718.6879902	718.6879902	0	290.8963155	0.085161646	0
Orange	2026	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	855.101694	46087.71776	46087.71776	0	12202.30117	4.989020257	0
Orange	2026	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	4.444552364	217.2036069	0	217.2036069	63.42376223	0	227.7310972
Orange	2026	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	24.61893157	1339.469696	1339.469696	0	351.3121536	0.156397681	0
Orange	2026	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2201.786653	91362.53169	91362.53169	0	25452.6537	10.24473807	0
Orange	2026	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	33.09459871	1533.144296	0	1533.144296	382.5735611	0	1607.513196
Orange	2026	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	7.046790801	303.6340678	303.6340678	0	81.46090166	0.035901136	0
Orange	2026	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5208.918376	221675.1418	221675.1418	0	60215.09643	24.89281429	0
Orange	2026	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	69.73080303	3256.159535	0	3256.159535	806.088083	0	3414.107489
Orange	2026	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	15.68949722	686.5475389	686.5475389	0	181.3705879	0.08003703	0
Orange	2026	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4279.73843	180555.5027	180555.5027	0	49473.77625	20.22925291	0
Orange	2026	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	61.09648027	2814.561976	0	2814.561976	706.2753119	0	2951.089164
Orange	2026	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	13.69706692	591.4263383	591.4263383	0	158.3380936	0.068926053	0
Orange	2026	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2226.508752	100470.6886	100470.6886	0	25738.44117	11.05886173	0
Orange	2026	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	22.49766136	1525.168153	0	1525.168153	260.0729654	0	1599.150151
Orange	2026	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	57.45540403	2607.99841	2607.99841	0	664.1844706	0.308254601	0
Orange	2026	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	32.60112683	1647.584886	1647.584886	0	376.8690261	0.181313435	0
Orange	2026	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	0.414170629	25.67110097	0	25.67110097	4.787812471	0	26.91634029
Orange	2026	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.103926738	5.628269372	5.628269372	0	1.201393091	0.000636334	0
Orange	2026	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1359.903966	81684.61633	81684.61633	0	15720.48984	8.394129444	0
Orange	2026	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	9.620207738	765.1278135	0	765.1278135	111.2096014	0	802.2422029
Orange	2026	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	32.43592152	1958.173914	1958.173914	0	374.9592527	0.223204344	0
Orange	2026	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.515292358	357.0931276	357.0931276	0	126.7414184	0.037393787	0
Orange	2026	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.222760049	489.8675572	489.8675572	0	165.9790259	0.051440633	0
Orange	2026	T6 OOS Class 6	Aggregate	Aggregate	Diesel	25.33880455	1280.037942	1280.037942	0	582.2857287	0.131458628	0
Orange	2026	T6 OOS Class 7	Aggregate	Aggregate	Diesel	37.29136542	9307.467553	9307.467553	0	856.9555774	0.895965293	0
Orange	2026	T6 Public Class 4	Aggregate	Aggregate	Diesel	127.6407249	4462.049446	4462.049446	0	654.7969185	0.51813934	0
Orange	2026	T6 Public Class 4	Aggregate	Aggregate	Electricity	2.108041319	91.05022215	0	91.05022215	10.81425197	0	95.77013567
Orange	2026	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	17.05443762	686.5427022	686.5427022	0	87.489265	0.083946483	0
Orange	2026	T6 Public Class 5	Aggregate	Aggregate	Diesel	114.2331315	4105.032491	4105.032491	0	586.0159644	0.471901497	0
Orange	2026	T6 Public Class 5	Aggregate	Aggregate	Electricity	1.823513214	78.51110852	0	78.51110852	9.354622786	0	82.58101229
Orange	2026	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	22.69319145	897.5220176	897.5220176	0	116.4160721	0.109274792	0
Orange	2026	T6 Public Class 6	Aggregate	Aggregate	Diesel	189.2070522	6711.654597	6711.654597	0	970.6321777	0.780659218	0
Orange	2026	T6 Public Class 6	Aggregate	Aggregate	Electricity	3.314560272	138.4217734	0	138.4217734	17.0036942	0	145.5973605
Orange	2026	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	26.7294115	1063.955213	1063.955213	0	137.121881	0.12986917	0
Orange	2026	T6 Public Class 7	Aggregate	Aggregate	Diesel	334.6062925	15048.05689	15048.05689	0	1716.53028	1.708580112	0
Orange	2026	T6 Public Class 7	Aggregate	Aggregate	Electricity	5.911771415	372.3812057	0	372.3812057	30.32738736	0	391.6849158
Orange	2026	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	36.9534519	1944.067226	1944.067226	0	189.5712082	0.2263051	0
Orange	2026	T6 Utility Class 5	Aggregate	Aggregate	Diesel	106.0095624	4273.921218	4273.921218	0	1356.922399	0.454714375	0

Orange	2026	T6 Utility Class 5	Aggregate	Aggregate	Electricity	3.059997766	132.7708252	0	132.7708252	39.16797141	0	139.6534752
Orange	2026	T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.619794839	24.65720309	24.65720309	0	7.933373944	0.002757746	0
Orange	2026	T6 Utility Class 6	Aggregate	Aggregate	Diesel	20.02556311	804.5898869	804.5898869	0	256.3272078	0.085267826	0
Orange	2026	T6 Utility Class 6	Aggregate	Aggregate	Electricity	0.584488904	25.36131168	0	25.36131168	7.481457971	0	26.67600587
Orange	2026	T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.194604931	7.484106818	7.484106818	0	2.490943123	0.0008411	0
Orange	2026	T6 Utility Class 7	Aggregate	Aggregate	Diesel	22.51661068	1113.755398	1113.755398	0	288.2126167	0.117240893	0
Orange	2026	T6 Utility Class 7	Aggregate	Aggregate	Electricity	0.666881285	40.48458256	0	40.48458256	8.536080452	0	42.58324552
Orange	2026	T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.250752597	10.91070534	10.91070534	0	3.209633247	0.001209851	0
Orange	2026	T6TS	Aggregate	Aggregate	Gasoline	7090.881325	361926.9994	361926.9994	0	141874.3536	69.26601079	0
Orange	2026	T6TS	Aggregate	Aggregate	Electricity	50.88473986	4165.412643	0	4165.412643	1018.101875	0	4374.665833
Orange	2026	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1114.634198	226467.1438	226467.1438	0	25614.29386	35.47339112	0
Orange	2026	T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	23.50576537	4724.599304	0	4724.599304	540.1624882	0	8463.227113
Orange	2026	T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.478118547	900.1156392	900.1156392	0	102.9071642	0.157409174	0
Orange	2026	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1013.571423	275042.7231	275042.7231	0	23291.8713	41.48072507	0
Orange	2026	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	432.115432	99868.29538	99868.29538	0	9930.012627	15.51502973	0
Orange	2026	T7 POLA Class 8	Aggregate	Aggregate	Diesel	1549.248632	196150.9589	196150.9589	0	25345.70762	32.75841219	0
Orange	2026	T7 POLA Class 8	Aggregate	Aggregate	Electricity	6.120626687	678.1897633	0	678.1897633	100.1334526	0	1214.172155
Orange	2026	T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	17.88459274	2246.260266	2246.260266	0	292.5919372	0.384408237	0
Orange	2026	T7 Public Class 8	Aggregate	Aggregate	Diesel	742.6363792	29997.49481	29997.49481	0	3809.724625	5.166127011	0
Orange	2026	T7 Public Class 8	Aggregate	Aggregate	Electricity	12.26566289	774.161004	0	774.161004	62.92285064	0	1385.193355
Orange	2026	T7 Public Class 8	Aggregate	Aggregate	Natural Gas	279.7460288	13943.75429	13943.75429	0	1435.097128	2.248747782	0
Orange	2026	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	284.5974388	19517.784	19517.784	0	2680.907873	3.15340163	0
Orange	2026	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	8.606968028	698.3122191	0	698.3122191	81.07763882	0	1248.976512
Orange	2026	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	18.6356686	1329.782087	1329.782087	0	175.5479982	0.216102638	0
Orange	2026	T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1055.257696	60011.47421	60011.47421	0	9940.527498	10.05507641	0
Orange	2026	T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	13.02789238	1059.432647	0	1059.432647	122.7227462	0	1894.863725
Orange	2026	T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	78.83107725	4797.263307	4797.263307	0	742.5887477	0.836972531	0
Orange	2026	T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2477.30808	130151.8167	130151.8167	0	23336.24211	21.35908998	0
Orange	2026	T7 Single Other Class 8	Aggregate	Aggregate	Electricity	42.06767996	2851.626992	0	2851.626992	396.2775452	0	5100.319081
Orange	2026	T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	192.541744	10558.4238	10558.4238	0	1813.743229	1.80231407	0
Orange	2026	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	220.5038576	14317.99521	14317.99521	0	1014.317745	5.323102856	0
Orange	2026	T7 SWCV Class 8	Aggregate	Aggregate	Electricity	12.47925415	772.6671926	0	772.6671926	57.4045691	0	1379.990823
Orange	2026	T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	766.5704393	49603.75499	49603.75499	0	3526.224021	7.946606305	0
Orange	2026	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2718.928123	196057.1286	196057.1286	0	39506.02562	31.38783257	0
Orange	2026	T7 Tractor Class 8	Aggregate	Aggregate	Electricity	25.87760544	2095.804151	0	2095.804151	376.0016071	0	3752.747068
Orange	2026	T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	89.20321661	6510.001122	6510.001122	0	1296.122737	1.16214513	0
Orange	2026	T7 Utility Class 8	Aggregate	Aggregate	Diesel	79.39724546	3448.680265	3448.680265	0	1016.284742	0.553533348	0
Orange	2026	T7 Utility Class 8	Aggregate	Aggregate	Electricity	0.801111883	50.36790436	0	50.36790436	10.2542321	0	90.12245009
Orange	2026	T7IS	Aggregate	Aggregate	Gasoline	5.642094151	552.7116358	552.7116358	0	112.8870198	0.124867026	0
Orange	2026	T7IS	Aggregate	Aggregate	Electricity	0.044825649	11.55600118	0	11.55600118	0.89687158	0	20.65592366
Orange	2026	UBUS	Aggregate	Aggregate	Gasoline	256.8740368	42376.0564	42376.0564	0	1027.496147	3.473985672	0
Orange	2026	UBUS	Aggregate	Aggregate	Electricity	4.037405551	77.72005682	0	77.72005682	16.1496222	0	165.4036891
Orange	2026	UBUS	Aggregate	Aggregate	Natural Gas	578.8563618	111248.4647	111248.4647	0	2315.425447	37.35819755	0

EMFAC Fuel Usage: Year 2027

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,841	2,050	9.68	5,573	603	9.24	0	0	0.00
LDA	42,183,196	1,349,353	31.26	72,324	1,652	43.77	0	0	0.00	5,002,094	1,854,509	2.70
LDT1	3,359,150	128,562	26.13	181	7	24.75	0	0	0.00	31,434	11,281	2.79
LDT2	22,156,656	872,852	25.38	88,904	2,700	32.93	0	0	0.00	399,458	139,512	2.86
LHD1	1,647,637	110,671	14.89	995,052	47,320	21.03	0	0	0.00	91,019	51,230	1.78
LHD2	244,223	18,892	12.93	433,595	24,312	17.83	0	0	0.00	22,491	12,669	1.78
MCY	334,154	7,865	42.49	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,834,343	620,425	20.69	174,319	7,066	24.67	0	0	0.00	340,852	122,887	2.77
MH	54,533	11,171	4.88	29,338	2,890	10.15	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	16,999	2,936	5.79	0	0	0.00	0	0	0.00
OBUS	32,636	6,073	5.37	0	0	0.00	0	0	0.00	1,154	1,203	0.96
PTO	0	0	0.00	44,891	8,745	5.13	0	0	0.00	1,482	3,071	0.48
SBUS	31,450	3,497	8.99	14,694	1,969	7.46	20,460	4,694	4.36	956	1,106	0.86
T6	343,883	65,465	5.25	1,162,783	128,692	9.04	13,849	1,626	8.52	35,495	37,288	0.95
T7	548	122	4.50	1,264,203	201,773	6.27	92,095	14,890	6.19	22,133	39,682	0.56
UBUS	42,461	3,256	13.04	0	0	0.00	111,470	37,402	2.98	80	171	0.47
Total	**83,264,870**	**3,198,204**	**26.03**	**4,317,125**	**432,113**	**9.99**	**243,447**	**59,215**	**4.11**	**5,948,649**	**2,274,608**	**2.62**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2027
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2027	All Other Buses	Aggregate	Aggregate	Diesel	371.6890688	19841.34329	19841.34329	0	3308.032712	2.05037298	0
Orange	2027	All Other Buses	Aggregate	Aggregate	Natural Gas	96.22385011	5572.787403	5572.787403	0	856.392266	0.603392792	0
Orange	2027	LDA	Aggregate	Aggregate	Gasoline	1043775.809	41402174.22	41402174.22	0	4872251.968	1322.171407	0
Orange	2027	LDA	Aggregate	Aggregate	Diesel	2455.862765	72324.22786	72324.22786	0	10337.70864	1.652262204	0
Orange	2027	LDA	Aggregate	Aggregate	Electricity	86904.1211	4089426.711	0	4089426.711	427431.4574	0	1578856.229
Orange	2027	LDA	Aggregate	Aggregate	Plug-in Hybrid	37476.38962	1693688.99	781021.4536	912667.5359	154964.8711	27.18159793	275652.7977
Orange	2027	LDT1	Aggregate	Aggregate	Gasoline	93827.3378	3351768.879	3351768.879	0	416522.3719	128.3043508	0
Orange	2027	LDT1	Aggregate	Aggregate	Diesel	11.77289151	181.1937183	181.1937183	0	32.8525084	0.007320099	0
Orange	2027	LDT1	Aggregate	Aggregate	Electricity	446.5153511	21261.3118	0	21261.3118	2195.338138	0	8208.621145
Orange	2027	LDT1	Aggregate	Aggregate	Plug-in Hybrid	345.6382808	17553.4455	7381.058493	10172.38701	1429.214291	0.257531014	3072.364062
Orange	2027	LDT2	Aggregate	Aggregate	Gasoline	543469.3082	22020144.82	22020144.82	0	2549564.241	868.0648363	0
Orange	2027	LDT2	Aggregate	Aggregate	Diesel	2178.395085	88903.81695	88903.81695	0	10309.86027	2.699983263	0
Orange	2027	LDT2	Aggregate	Aggregate	Electricity	6350.417939	224424.9867	0	224424.9867	32062.44745	0	86646.56765
Orange	2027	LDT2	Aggregate	Aggregate	Plug-in Hybrid	6479.43822	311543.8729	136510.9878	175032.8851	26792.47704	4.78680113	52865.14811
Orange	2027	LHD1	Aggregate	Aggregate	Gasoline	40902.86203	1647637.185	1647637.185	0	609391.6989	110.6705061	0
Orange	2027	LHD1	Aggregate	Aggregate	Diesel	23584.12171	995051.7389	995051.7389	0	296658.5823	47.32037824	0
Orange	2027	LHD1	Aggregate	Aggregate	Electricity	1389.11065	91018.59866	0	91018.59866	19418.03963	0	51230.26421
Orange	2027	LHD2	Aggregate	Aggregate	Gasoline	6543.090594	244222.6914	244222.6914	0	97482.30064	18.89234936	0
Orange	2027	LHD2	Aggregate	Aggregate	Diesel	10371.194	433595.3221	433595.3221	0	130456.5736	24.31202845	0
Orange	2027	LHD2	Aggregate	Aggregate	Electricity	360.8389761	22491.2628	0	22491.2628	4786.406154	0	12668.88114
Orange	2027	MCY	Aggregate	Aggregate	Gasoline	52507.36673	334153.7498	334153.7498	0	105014.7335	7.864502999	0
Orange	2027	MDV	Aggregate	Aggregate	Gasoline	328296.2492	12751503.06	12751503.06	0	1522194.431	617.4785471	0
Orange	2027	MDV	Aggregate	Aggregate	Diesel	4528.513812	174319.4796	174319.4796	0	20991.88139	7.065867318	0
Orange	2027	MDV	Aggregate	Aggregate	Electricity	6724.905683	237227.8074	0	237227.8074	33934.69456	0	91589.51313
Orange	2027	MDV	Aggregate	Aggregate	Plug-in Hybrid	4138.74125	186464.0296	82839.71767	103624.312	17113.69507	2.946701112	31297.63071
Orange	2027	MH	Aggregate	Aggregate	Gasoline	5494.773608	54533.35177	54533.35177	0	549.6971517	11.17103301	0
Orange	2027	MH	Aggregate	Aggregate	Diesel	3015.208329	29337.83692	29337.83692	0	301.5208329	2.889580714	0
Orange	2027	Motor Coach	Aggregate	Aggregate	Diesel	135.9850046	16998.53797	16998.53797	0	3124.935406	2.935600236	0
Orange	2027	OBUS	Aggregate	Aggregate	Gasoline	799.5744215	32636.05253	32636.05253	0	15997.88503	6.073477703	0
Orange	2027	OBUS	Aggregate	Aggregate	Electricity	15.63862172	1154.463508	0	1154.463508	312.8975434	0	1203.347361
Orange	2027	PTO	Aggregate	Aggregate	Diesel	0	44890.50256	44890.50256	0	0	8.745232988	0
Orange	2027	PTO	Aggregate	Aggregate	Electricity	0	1482.338246	0	1482.338246	0	0	3070.691498
Orange	2027	SBUS	Aggregate	Aggregate	Gasoline	695.8799126	31450.32858	31450.32858	0	2783.519651	3.497434635	0
Orange	2027	SBUS	Aggregate	Aggregate	Diesel	723.187469	14694.20454	14694.20454	0	10471.75455	1.969072882	0
Orange	2027	SBUS	Aggregate	Aggregate	Electricity	31.29977754	956.1003922	0	956.1003922	373.87255	0	1105.540167
Orange	2027	SBUS	Aggregate	Aggregate	Natural Gas	836.1689696	20460.01826	20460.01826	0	12107.72668	4.69411426	0
Orange	2027	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	9.175583402	595.4063397	595.4063397	0	210.8549066	0.063118698	0
Orange	2027	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.32008698	25.37482499	0	25.37482499	7.355598808	0	26.75224104
Orange	2027	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	12.0067881	819.6192179	819.6192179	0	275.9159906	0.087065372	0
Orange	2027	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.375892642	31.98090883	0	31.98090883	8.638012921	0	33.71692149
Orange	2027	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	42.80714032	2113.872227	2113.872227	0	983.7080845	0.221011218	0
Orange	2027	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	1.999073355	111.3832686	0	111.3832686	45.93870569	0	117.4294621
Orange	2027	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	68.80760981	13552.52306	13552.52306	0	1581.198873	1.302666016	0
Orange	2027	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	1.8586368	394.8536829	0	394.8536829	42.71147365	0	416.2874387
Orange	2027	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.055473451	10.55049012	10.55049012	0	1.274779895	0.001033136	0
Orange	2027	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2601.678175	86340.95658	86340.95658	0	37125.94756	9.693273207	0
Orange	2027	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	57.57364946	2256.833474	0	2256.833474	821.5759777	0	2369.63152
Orange	2027	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	10.21426031	358.4378341	358.4378341	0	145.7574946	0.042496167	0
Orange	2027	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2109.043101	70402.53555	70402.53555	0	30096.04505	7.879860431	0
Orange	2027	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	46.32942023	1823.568209	0	1823.568209	661.1208267	0	1914.711367
Orange	2027	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	7.323971484	262.4540137	262.4540137	0	104.5130731	0.030832024	0
Orange	2027	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6566.317418	217971.0328	217971.0328	0	93701.34955	24.50086938	0
Orange	2027	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	141.1433355	5461.927975	0	5461.927975	2014.115397	0	5734.918785
Orange	2027	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	22.15866965	783.9315353	783.9315353	0	316.204216	0.092246499	0
Orange	2027	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	877.3483334	46404.97909	46404.97909	0	12519.76072	5.032663093	0
Orange	2027	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	7.435202966	364.0498476	0	364.0498476	106.1003463	0	382.2453023
Orange	2027	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	25.15643864	1343.965129	1343.965129	0	358.9823793	0.156468306	0
Orange	2027	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2218.711066	91129.83186	91129.83186	0	25648.29992	10.18400153	0
Orange	2027	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	57.08537977	2650.683139	0	2650.683139	659.9069902	0	2783.286886
Orange	2027	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	7.770947639	335.4502027	335.4502027	0	89.83215471	0.039253438	0
Orange	2027	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5279.223956	221287.3256	221287.3256	0	61027.82894	24.76945709	0
Orange	2027	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	123.5178052	5787.343617	0	5787.343617	1427.865828	0	6076.862736
Orange	2027	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	17.40031892	762.2279324	762.2279324	0	201.1476867	0.088091426	0
Orange	2027	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4327.921205	180205.3952	180205.3952	0	50030.76913	20.1244658	0
Orange	2027	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	106.244464	4914.601195	0	4914.601195	1228.186004	0	5160.460281
Orange	2027	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	15.05338965	650.8347208	650.8347208	0	174.0171844	0.075206139	0
Orange	2027	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2308.814895	100613.6379	100613.6379	0	26689.90018	11.0669812	0
Orange	2027	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	36.14349322	2424.562689	0	2424.562689	417.8187817	0	2545.854477
Orange	2027	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	59.44466495	2594.478259	2594.478259	0	687.1803269	0.30616848	0
Orange	2027	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	33.04945633	1639.087007	1639.087007	0	382.0517151	0.179727966	0
Orange	2027	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	0.776229385	49.98856668	0	49.98856668	8.973211686	0	52.48930739
Orange	2027	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.115382163	6.321228441	6.321228441	0	1.33381781	0.000707522	0
Orange	2027	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1410.649895	82052.11816	82052.11816	0	16307.11278	8.410309242	0
Orange	2027	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	15.24615463	1224.035919	0	1224.035919	176.2455475	0	1285.26985
Orange	2027	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	33.61023359	1961.952021	1961.952021	0	388.5343003	0.222842884	0
Orange	2027	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.57415337	360.6052915	360.6052915	0	128.0940444	0.037236434	0
Orange	2027	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.248075821	494.6856145	494.6856145	0	166.5607824	0.051277525	0
Orange	2027	T6 OOS Class 6	Aggregate	Aggregate	Diesel	26.20285218	1292.627664	1292.627664	0	602.141543	0.130888201	0
Orange	2027	T6 OOS Class 7	Aggregate	Aggregate	Diesel	37.60108619	9399.010484	9399.010484	0	864.0729607	0.890571961	0
Orange	2027	T6 Public Class 4	Aggregate	Aggregate	Diesel	125.4271432	4421.311513	4421.311513	0	643.4412445	0.51059313	0
Orange	2027	T6 Public Class 4	Aggregate	Aggregate	Electricity	3.260675774	140.6493854	0	140.6493854	16.72726672	0	148.1270136
Orange	2027	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	17.73561193	706.2986766	706.2986766	0	90.98368919	0.086167143	0
Orange	2027	T6 Public Class 5	Aggregate	Aggregate	Diesel	113.5137448	4077.398756	4077.398756	0	582.3255108	0.467020868	0
Orange	2027	T6 Public Class 5	Aggregate	Aggregate	Electricity	2.979445682	128.1534665	0	128.1534665	15.28455635	0	134.9667489
Orange	2027	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	23.17762925	903.2645055	903.2645055	0	118.901238	0.109866104	0
Orange	2027	T6 Public Class 6	Aggregate	Aggregate	Diesel	185.7897506	6644.180976	6644.180976	0	953.1014204	0.767844969	0
Orange	2027	T6 Public Class 6	Aggregate	Aggregate	Electricity	5.229640019	218.5713402	0	218.5713402	26.8280533	0	230.1916912
Orange	2027	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	27.77422471	1094.503107	1094.503107	0	142.4817728	0.13327714	0
Orange	2027	T6 Public Class 7	Aggregate	Aggregate	Diesel	329.1638416	14852.76727	14852.76727	0	1688.610507	1.674191926	0
Orange	2027	T6 Public Class 7	Aggregate	Aggregate	Electricity	9.220217374	573.0841719	0	573.0841719	47.29971513	0	603.5522066
Orange	2027	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	39.57635917	2033.493104	2033.493104	0	203.0267225	0.236457853	0
Orange	2027	T6 Utility Class 5	Aggregate	Aggregate	Diesel	104.9449495	4219.517975	4219.517975	0	1343.295353	0.447865438	0

Orange	2027 T6 Utility Class 5	Aggregate	Aggregate	Electricity	4.890149529	211.8718901	0	211.8718901	62.59391397	0	223.1360646
Orange	2027 T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.608520002	24.16195481	24.16195481	0	7.789056023	0.002684207	0
Orange	2027 T6 Utility Class 6	Aggregate	Aggregate	Diesel	19.81977959	794.6791377	794.6791377	0	253.6931787	0.084042663	0
Orange	2027 T6 Utility Class 6	Aggregate	Aggregate	Electricity	0.933903039	40.4635888	0	40.4635888	11.9539589	0	42.61483654
Orange	2027 T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.180029721	6.866375296	6.866375296	0	2.304380429	0.000767992	0
Orange	2027 T6 Utility Class 7	Aggregate	Aggregate	Diesel	22.16512003	1098.170419	1098.170419	0	283.7135364	0.115265234	0
Orange	2027 T6 Utility Class 7	Aggregate	Aggregate	Electricity	1.055276134	63.37559445	0	63.37559445	13.50753451	0	66.74495956
Orange	2027 T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.228344138	9.968342573	9.968342573	0	2.922804965	0.001099161	0
Orange	2027 T6TS	Aggregate	Aggregate	Gasoline	6899.471297	343882.9475	343882.9475	0	138044.6217	65.46522009	0
Orange	2027 T6TS	Aggregate	Aggregate	Electricity	81.47799046	6597.977682	0	6597.977682	1630.211633	0	6938.741137
Orange	2027 T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1123.270795	227292.9946	227292.9946	0	25812.76288	35.06570634	0
Orange	2027 T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	36.83552535	7551.112092	0	7551.112092	846.4803726	0	13544.81375
Orange	2027 T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.413461337	884.4038239	884.4038239	0	101.4213415	0.1528795	0
Orange	2027 T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1028.194189	279352.3728	279352.3728	0	23627.90246	41.16052162	0
Orange	2027 T7 NOOS Class 8	Aggregate	Aggregate	Diesel	441.3585966	101433.1336	101433.1336	0	10142.42055	15.43767994	0
Orange	2027 T7 POLA Class 8	Aggregate	Aggregate	Diesel	1565.242038	203235.862	203235.862	0	25607.35974	33.89279835	0
Orange	2027 T7 POLA Class 8	Aggregate	Aggregate	Electricity	10.25233485	1191.293586	0	1191.293586	167.7281981	0	2136.016714
Orange	2027 T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	19.65528744	2534.028446	2534.028446	0	321.5605025	0.426573337	0
Orange	2027 T7 Public Class 8	Aggregate	Aggregate	Diesel	720.464846	29102.53707	29102.53707	0	3695.98466	4.986877357	0
Orange	2027 T7 Public Class 8	Aggregate	Aggregate	Electricity	19.4232239	1211.354986	0	1211.354986	99.64113859	0	2170.961024
Orange	2027 T7 Public Class 8	Aggregate	Aggregate	Natural Gas	298.4485783	14645.73892	14645.73892	0	1531.041207	2.346365764	0
Orange	2027 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	281.9818804	19194.86585	19194.86585	0	2656.269314	3.077073094	0
Orange	2027 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	13.48252785	1086.881143	0	1086.881143	127.0054124	0	1948.43946
Orange	2027 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	18.9570775	1342.390377	1342.390377	0	178.5756701	0.215595062	0
Orange	2027 T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1072.386968	59443.08072	59443.08072	0	10101.88524	9.924212072	0
Orange	2027 T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	23.21761969	1880.538042	0	1880.538042	218.7099775	0	3371.219152
Orange	2027 T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	80.90685613	4783.798154	4783.798154	0	762.1425847	0.828024519	0
Orange	2027 T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2566.741112	130693.3529	130693.3529	0	24178.70128	21.380438	0
Orange	2027 T7 Single Other Class 8	Aggregate	Aggregate	Electricity	67.50131726	4497.932518	0	4497.932518	635.8624085	0	8063.392451
Orange	2027 T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	200.655578	10620.05576	10620.05576	0	1890.175544	1.803015122	0
Orange	2027 T7 SWCV Class 8	Aggregate	Aggregate	Diesel	201.180016	13062.66306	13062.66306	0	925.4280737	4.846983122	0
Orange	2027 T7 SWCV Class 8	Aggregate	Aggregate	Electricity	19.66795143	1221.810914	0	1221.810914	90.47257659	0	2187.490435
Orange	2027 T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	784.120537	50763.28307	50763.28307	0	3606.95447	7.956836694	0
Orange	2027 T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2828.175268	197958.6405	197958.6405	0	41093.38664	31.45129418	0
Orange	2027 T7 Tractor Class 8	Aggregate	Aggregate	Electricity	42.06709991	3389.713712	0	3389.713712	611.2349617	0	6075.816995
Orange	2027 T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	92.52712444	6521.447081	6521.447081	0	1344.419118	1.16028273	0
Orange	2027 T7 Utility Class 8	Aggregate	Aggregate	Diesel	79.97384173	3433.969045	3433.969045	0	1023.665174	0.54972217	0
Orange	2027 T7 Utility Class 8	Aggregate	Aggregate	Electricity	1.35705402	84.18977497	0	84.18977497	17.37029145	0	150.8828726
Orange	2027 T7IS	Aggregate	Aggregate	Gasoline	5.373929496	547.76404	547.76404	0	107.5215814	0.121762202	0
Orange	2027 T7IS	Aggregate	Aggregate	Electricity	0.072471287	18.29358992	0	18.29358992	1.450005515	0	32.76618674
Orange	2027 UBUS	Aggregate	Aggregate	Gasoline	257.3894016	42461.24538	42461.24538	0	1029.557606	3.256425155	0
Orange	2027 UBUS	Aggregate	Aggregate	Electricity	4.076617891	80.22081704	0	80.22081704	16.30647157	0	170.6688483
Orange	2027 UBUS	Aggregate	Aggregate	Natural Gas	579.9899791	111469.7643	111469.7643	0	2319.959916	37.40176332	0

EMFAC Fuel Usage: Year 2028

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,904	2,033	9.79	5,647	605	9.34	0	0	0.00
LDA	42,055,839	1,324,606	31.75	64,953	1,465	44.33	0	0	0.00	5,259,175	1,950,338	2.70
LDT1	3,322,377	125,303	26.51	106	4	25.81	0	0	0.00	38,866	13,948	2.79
LDT2	22,380,125	868,365	25.77	89,168	2,673	33.36	0	0	0.00	458,764	160,687	2.86
LHD1	1,631,919	107,911	15.12	1,007,078	47,698	21.11	0	0	0.00	138,806	78,128	1.78
LHD2	240,108	18,305	13.12	441,952	24,642	17.94	0	0	0.00	34,416	19,386	1.78
MCY	337,881	7,932	42.60	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,894,957	613,459	21.02	171,182	6,849	25.00	0	0	0.00	389,103	140,461	2.77
MH	53,472	10,952	4.88	29,192	2,876	10.15	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	17,092	2,918	5.86	0	0	0.00	0	0	0.00
OBUS	31,514	5,808	5.43	0	0	0.00	0	0	0.00	1,791	1,867	0.96
PTO	0	0	0.00	44,588	8,586	5.19	0	0	0.00	2,319	4,805	0.48
SBUS	31,667	3,511	9.02	13,991	1,867	7.49	20,823	4,762	4.37	1,492	1,725	0.86
T6	324,620	61,407	5.29	1,155,990	127,354	9.08	14,162	1,662	8.52	57,294	60,187	0.95
T7	542	118	4.57	1,275,057	200,546	6.36	93,896	15,025	6.25	33,845	60,680	0.56
UBUS	42,546	3,263	13.04	0	0	0.00	111,678	37,334	2.99	96	204	0.47
Total	**83,347,567**	**3,150,939**	**26.45**	**4,330,251**	**429,509**	**10.08**	**246,206**	**59,388**	**4.15**	**6,415,969**	**2,492,415**	**2.57**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2028
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2028	All Other Buses	Aggregate	Aggregate	Diesel	377.6499467	19904.03366	19904.03366	0	3361.084526	2.033369829	0
Orange	2028	All Other Buses	Aggregate	Aggregate	Natural Gas	99.23244446	5646.857996	5646.857996	0	883.1687557	0.604829383	0
Orange	2028	LDA	Aggregate	Aggregate	Gasoline	1038995.892	41263326.11	41263326.11	0	4850372.514	1297.002877	0
Orange	2028	LDA	Aggregate	Aggregate	Diesel	2171.612574	64952.63275	64952.63275	0	9216.032668	1.465292455	0
Orange	2028	LDA	Aggregate	Aggregate	Electricity	92523.87745	4305755.793	0	4305755.793	453346.0319	0	1662377.109
Orange	2028	LDA	Aggregate	Aggregate	Plug-in Hybrid	39072.49176	1745931.998	792512.4185	953419.5792	161564.7534	27.60271216	287961.1294
Orange	2028	LDT1	Aggregate	Aggregate	Gasoline	92684.36641	3313373.272	3313373.272	0	411372.6436	124.9882378	0
Orange	2028	LDT1	Aggregate	Aggregate	Diesel	6.507772921	106.1649511	106.1649511	0	18.48953657	0.004113234	0
Orange	2028	LDT1	Aggregate	Aggregate	Electricity	546.4474323	26285.09612	0	26285.09612	2696.832429	0	10148.21653
Orange	2028	LDT1	Aggregate	Aggregate	Plug-in Hybrid	430.0680074	21585.23805	9003.928319	12581.30973	1778.331211	0.314343894	3799.930521
Orange	2028	LDT2	Aggregate	Aggregate	Gasoline	549816.574	22230739.4	22230739.4	0	2576807.596	863.1214574	0
Orange	2028	LDT2	Aggregate	Aggregate	Diesel	2199.451121	89167.78654	89167.78654	0	10380.95949	2.672754337	0
Orange	2028	LDT2	Aggregate	Aggregate	Electricity	7541.699421	263248.3292	0	263248.3292	37922.71052	0	101635.5821
Orange	2028	LDT2	Aggregate	Aggregate	Plug-in Hybrid	7280.311558	344900.8933	149385.3025	195515.5909	30104.08829	5.243321264	59051.53574
Orange	2028	LHD1	Aggregate	Aggregate	Gasoline	40643.11047	1631919.233	1631919.233	0	605521.7877	107.9106307	0
Orange	2028	LHD1	Aggregate	Aggregate	Diesel	24055.01767	1007077.961	1007077.961	0	302581.861	47.69752071	0
Orange	2028	LHD1	Aggregate	Aggregate	Electricity	2171.230816	138805.7173	0	138805.7173	30348.60724	0	78127.54043
Orange	2028	LHD2	Aggregate	Aggregate	Gasoline	6462.82446	240107.6	240107.6	0	96286.45484	18.30522632	0
Orange	2028	LHD2	Aggregate	Aggregate	Diesel	10682.49761	441951.9889	441951.9889	0	134372.3813	24.64155253	0
Orange	2028	LHD2	Aggregate	Aggregate	Electricity	565.7731753	34416.31633	0	34416.31633	7504.464058	0	19386.02774
Orange	2028	MCY	Aggregate	Aggregate	Gasoline	53242.81767	337881.2058	337881.2058	0	106485.6353	7.932212537	0
Orange	2028	MDV	Aggregate	Aggregate	Gasoline	329659.4277	12804464.08	12804464.08	0	1527928.351	610.2369103	0
Orange	2028	MDV	Aggregate	Aggregate	Diesel	4475.198106	171182.0914	171182.0914	0	20685.77449	6.848635184	0
Orange	2028	MDV	Aggregate	Aggregate	Electricity	7844.227849	272931.8885	0	272931.8885	39405.23885	0	105374.2353
Orange	2028	MDV	Aggregate	Aggregate	Plug-in Hybrid	4626.528268	206664.2109	90492.82387	116171.387	19130.69439	3.221774448	35087.22134
Orange	2028	MH	Aggregate	Aggregate	Gasoline	5341.240362	53472.45404	53472.45404	0	534.3376858	10.95233594	0
Orange	2028	MH	Aggregate	Aggregate	Diesel	3021.622086	29192.12881	29192.12881	0	302.1622086	2.876155506	0
Orange	2028	Motor Coach	Aggregate	Aggregate	Diesel	140.4254601	17091.52282	17091.52282	0	3226.977073	2.917765811	0
Orange	2028	OBUS	Aggregate	Aggregate	Gasoline	782.1654895	31513.71967	31513.71967	0	15649.56711	5.807835831	0
Orange	2028	OBUS	Aggregate	Aggregate	Electricity	24.44236773	1790.777584	0	1790.777584	489.0428935	0	1866.605107
Orange	2028	PTO	Aggregate	Aggregate	Diesel	0	44587.69832	44587.69832	0	0	8.585723443	0
Orange	2028	PTO	Aggregate	Aggregate	Electricity	0	2319.452931	0	2319.452931	0	0	4804.790279
Orange	2028	SBUS	Aggregate	Aggregate	Gasoline	700.6254389	31666.65086	31666.65086	0	2802.501756	3.510852764	0
Orange	2028	SBUS	Aggregate	Aggregate	Diesel	688.6435349	13991.01927	13991.01927	0	9971.558385	1.866988828	0
Orange	2028	SBUS	Aggregate	Aggregate	Electricity	48.55751581	1491.992111	0	1491.992111	578.3095953	0	1725.192481
Orange	2028	SBUS	Aggregate	Aggregate	Natural Gas	860.7431203	20823.36815	20823.36815	0	12463.56038	4.761519927	0
Orange	2028	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	9.05114051	587.2987658	587.2987658	0	207.9952089	0.061870545	0
Orange	2028	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.496982339	39.5880476	0	39.5880476	11.42065415	0	41.7369969
Orange	2028	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	11.77357167	809.3362317	809.3362317	0	270.5566771	0.085462285	0
Orange	2028	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.58802559	50.63974711	0	50.63974711	13.51282807	0	53.38861338
Orange	2028	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	43.13045353	2079.269811	2079.269811	0	991.1378221	0.216220354	0
Orange	2028	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	3.046533488	167.8720258	0	167.8720258	70.00933955	0	176.9845861
Orange	2028	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	69.08542986	13490.71788	13490.71788	0	1587.583178	1.279361423	0
Orange	2028	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	2.790696902	594.3176023	0	594.3176023	64.1302148	0	626.5788143
Orange	2028	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.053728863	10.1739421	10.1739421	0	1.234689283	0.000991226	0
Orange	2028	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2601.020856	85803.91485	85803.91485	0	37116.56762	9.587270584	0
Orange	2028	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	92.78126115	3648.262907	0	3648.262907	1323.988597	0	3830.605525
Orange	2028	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	10.81406845	378.9727522	378.9727522	0	154.3167568	0.044802012	0
Orange	2028	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2110.778711	69970.17585	69970.17585	0	30120.81221	7.79575165	0
Orange	2028	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	74.7591634	2949.910838	0	2949.910838	1066.813262	0	3097.349353
Orange	2028	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	7.877132209	281.4271089	281.4271089	0	112.4066766	0.032988123	0
Orange	2028	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6570.920804	216668.3286	216668.3286	0	93767.03988	24.24018878	0
Orange	2028	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	229.0707739	8912.062995	0	8912.062995	3268.839944	0	9357.49386
Orange	2028	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	23.78464016	841.7698789	841.7698789	0	339.4068151	0.098779067	0
Orange	2028	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	899.3585733	46609.4465	46609.4465	0	12833.84684	5.055608191	0
Orange	2028	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	12.91311901	635.6327147	0	635.6327147	184.2702083	0	667.4020627
Orange	2028	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	25.63788293	1341.126761	1341.126761	0	365.8525894	0.156255041	0
Orange	2028	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2223.817013	90323.11843	90323.11843	0	25707.32467	10.04342773	0
Orange	2028	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	92.97246556	4354.551899	0	4354.551899	1074.761702	0	4572.393817
Orange	2028	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	8.429807795	363.9657151	363.9657151	0	97.44857811	0.042352737	0
Orange	2028	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5317.524548	219511.0044	219511.0044	0	61470.58377	24.44882601	0
Orange	2028	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	206.2033173	9734.433328	0	9734.433328	2383.710348	0	10221.41056
Orange	2028	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	19.00977758	832.332912	832.332912	0	219.7530288	0.095792136	0
Orange	2028	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4351.817903	178745.5339	178745.5339	0	50307.01496	19.86334935	0
Orange	2028	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	174.4958206	8147.234246	0	8147.234246	2017.171687	0	8554.809853
Orange	2028	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	16.31265402	705.1987371	705.1987371	0	188.5742805	0.081155996	0
Orange	2028	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2384.801936	100328.8794	100328.8794	0	27568.31038	11.02135315	0
Orange	2028	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	56.27244839	3776.519576	0	3776.519576	650.5095034	0	3965.444703
Orange	2028	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	61.06055947	2566.222599	2566.222599	0	705.8600675	0.303498626	0
Orange	2028	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	33.10796328	1620.442539	1620.442539	0	382.7280555	0.176647512	0
Orange	2028	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	1.293749592	84.71025045	0	84.71025045	14.95574528	0	88.94798692
Orange	2028	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.12528574	6.918966926	6.918966926	0	1.448303152	0.000770983	0
Orange	2028	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1458.436674	82280.77296	82280.77296	0	16859.52796	8.402605931	0
Orange	2028	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	22.86659513	1839.123564	0	1839.123564	264.3378398	0	1931.128026
Orange	2028	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	34.60649819	1956.562868	1956.562868	0	400.0511191	0.22225552	0
Orange	2028	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.603511425	364.151999	364.151999	0	128.7686925	0.037055416	0
Orange	2028	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.234701872	499.5510595	499.5510595	0	166.253449	0.051056945	0
Orange	2028	T6 OOS Class 6	Aggregate	Aggregate	Diesel	26.97767134	1305.341211	1305.341211	0	619.9468875	0.130265294	0
Orange	2028	T6 OOS Class 7	Aggregate	Aggregate	Diesel	37.87534274	9491.453779	9491.453779	0	870.3753761	0.883639262	0
Orange	2028	T6 Public Class 4	Aggregate	Aggregate	Diesel	122.9585089	4362.278742	4362.278742	0	630.7771508	0.500890185	0
Orange	2028	T6 Public Class 4	Aggregate	Aggregate	Electricity	4.97654356	214.4563467	0	214.4563467	25.52966846	0	225.8579239
Orange	2028	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	18.25857282	719.8745533	719.8745533	0	93.66647858	0.08781433	0
Orange	2028	T6 Public Class 5	Aggregate	Aggregate	Diesel	112.4318868	4030.103827	4030.103827	0	576.7755791	0.459555877	0
Orange	2028	T6 Public Class 5	Aggregate	Aggregate	Electricity	4.755187868	204.4876703	0	204.4876703	24.39411377	0	215.3592625
Orange	2028	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	23.4978209	901.7172871	901.7172871	0	120.5438212	0.1098189	0
Orange	2028	T6 Public Class 6	Aggregate	Aggregate	Diesel	181.9384903	6548.544307	6548.544307	0	933.3444554	0.751713878	0
Orange	2028	T6 Public Class 6	Aggregate	Aggregate	Electricity	7.985755873	335.0857503	0	335.0857503	40.96692763	0	352.9005928
Orange	2028	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	28.57142771	1116.445716	1116.445716	0	146.5714242	0.135914482	0
Orange	2028	T6 Public Class 7	Aggregate	Aggregate	Diesel	323.2477799	14583.59519	14583.59519	0	1658.261111	1.631459865	0
Orange	2028	T6 Public Class 7	Aggregate	Aggregate	Electricity	14.06503989	869.6455362	0	869.6455362	72.15365461	0	915.8802635
Orange	2028	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	41.86923805	2100.057725	2100.057725	0	214.7891912	0.244592453	0
Orange	2028	T6 Utility Class 5	Aggregate	Aggregate	Diesel	102.9187964	4127.087119	4127.087119	0	1317.360594	0.436198288	0

Orange	2028	T6 Utility Class 5	Aggregate	Aggregate	Electricity	7.601672608	328.9400595	0	328.9400595	97.30140938	0	346.4281663
Orange	2028	T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.59278529	23.50128632	23.50128632	0	7.587651717	0.00260036	0
Orange	2028	T6 Utility Class 6	Aggregate	Aggregate	Diesel	19.43136508	777.5459777	777.5459777	0	248.721473	0.081905665	0
Orange	2028	T6 Utility Class 6	Aggregate	Aggregate	Electricity	1.449258633	62.71308107	0	62.71308107	18.55051051	0	66.04722363
Orange	2028	T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.165797947	6.281143663	6.281143663	0	2.122213727	0.000700642	0
Orange	2028	T6 Utility Class 7	Aggregate	Aggregate	Diesel	21.6399361	1071.90997	1071.90997	0	276.9911821	0.112000747	0
Orange	2028	T6 Utility Class 7	Aggregate	Aggregate	Electricity	1.613176203	96.80966206	0	96.80966206	20.6486554	0	101.9565502
Orange	2028	T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.20705074	9.09899027	9.09899027	0	2.650249471	0.000999759	0
Orange	2028	T6TS	Aggregate	Aggregate	Gasoline	6678.491886	324620.0907	324620.0907	0	133623.2656	61.40701597	0
Orange	2028	T6TS	Aggregate	Aggregate	Electricity	127.5289171	10247.21038	0	10247.21038	2551.598574	0	10776.44449
Orange	2028	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1128.292707	227400.2811	227400.2811	0	25928.16642	34.48189355	0
Orange	2028	T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	53.64753285	11153.86906	0	11153.86906	1232.820305	0	20007.26214
Orange	2028	T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.340877207	867.9950177	867.9950177	0	99.75335821	0.148445473	0
Orange	2028	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1042.162717	283729.5506	283729.5506	0	23948.89923	40.76741934	0
Orange	2028	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	449.9746376	103022.4914	103022.4914	0	10340.41717	15.32935054	0
Orange	2028	T7 POLA Class 8	Aggregate	Aggregate	Diesel	1564.769497	210236.4101	210236.4101	0	25599.62898	34.88951926	0
Orange	2028	T7 POLA Class 8	Aggregate	Aggregate	Electricity	16.07981098	1967.156649	0	1967.156649	263.0657077	0	3527.156975
Orange	2028	T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	21.68151394	2894.917147	2894.917147	0	354.709568	0.479283237	0
Orange	2028	T7 Public Class 8	Aggregate	Aggregate	Diesel	693.2770903	28002.28418	28002.28418	0	3556.511473	4.771265277	0
Orange	2028	T7 Public Class 8	Aggregate	Aggregate	Electricity	30.79260619	1911.098439	0	1911.098439	157.9660698	0	3425.024266
Orange	2028	T7 Public Class 8	Aggregate	Aggregate	Natural Gas	316.5018127	15288.18946	15288.18946	0	1623.654299	2.441414549	0
Orange	2028	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	277.1832614	18722.60325	18722.60325	0	2611.066322	2.973249941	0
Orange	2028	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	20.58335603	1663.446491	0	1663.446491	193.8952138	0	2982.041599
Orange	2028	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	19.06678782	1338.20156	1338.20156	0	179.6091413	0.213369138	0
Orange	2028	T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1084.915788	58621.2805	58621.2805	0	10219.90672	9.730248406	0
Orange	2028	T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	37.4331775	3053.791972	0	3053.791972	352.6205321	0	5474.498123
Orange	2028	T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	82.47154741	4738.40397	4738.40397	0	776.8819766	0.816334791	0
Orange	2028	T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2644.554405	130523.0958	130523.0958	0	24911.7025	21.24695374	0
Orange	2028	T7 Single Other Class 8	Aggregate	Aggregate	Electricity	105.3380464	6963.99012	0	6963.99012	992.2843974	0	12484.26586
Orange	2028	T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	207.5425137	10608.97601	10608.97601	0	1955.050479	1.797640358	0
Orange	2028	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	182.6918569	11862.00519	11862.00519	0	840.3825419	4.399733492	0
Orange	2028	T7 SWCV Class 8	Aggregate	Aggregate	Electricity	30.1706418	1885.773831	0	1885.773831	138.7849523	0	3376.228
Orange	2028	T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	797.4955053	51650.01928	51650.01928	0	3668.479325	7.972573992	0
Orange	2028	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2926.157845	199536.0734	199536.0734	0	42517.07348	31.41404665	0
Orange	2028	T7 Tractor Class 8	Aggregate	Aggregate	Electricity	63.52624382	5081.061983	0	5081.061983	923.0363228	0	9107.436608
Orange	2028	T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	95.23425281	6509.781887	6509.781887	0	1383.753693	1.155788338	0
Orange	2028	T7 Utility Class 8	Aggregate	Aggregate	Diesel	79.82118679	3400.504439	3400.504439	0	1021.711191	0.542100413	0
Orange	2028	T7 Utility Class 8	Aggregate	Aggregate	Electricity	2.213002904	136.5866365	0	136.5866365	28.32643717	0	244.7872568
Orange	2028	T7IS	Aggregate	Aggregate	Gasoline	5.168598081	541.7999038	541.7999038	0	103.4133104	0.118465212	0
Orange	2028	T7IS	Aggregate	Aggregate	Electricity	0.114935358	28.54445204	0	28.54445204	2.299626639	0	51.12680724
Orange	2028	UBUS	Aggregate	Aggregate	Gasoline	257.9047648	42546.43435	42546.43435	0	1031.619059	3.26298699	0
Orange	2028	UBUS	Aggregate	Aggregate	Electricity	1.844789609	95.88250074	0	95.88250074	7.379158437	0	203.9888969
Orange	2028	UBUS	Aggregate	Aggregate	Natural Gas	583.3946385	111677.9029	111677.9029	0	2333.578554	37.33431172	0

EMFAC Fuel Usage: Year 2029

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	19,987	2,020	9.89	5,697	605	9.42	0	0	0.00
LDA	41,950,466	1,302,844	32.20	58,348	1,300	44.87	0	0	0.00	5,502,925	2,041,477	2.70
LDT1	3,288,655	122,310	26.89	56	2	26.17	0	0	0.00	47,280	16,974	2.79
LDT2	22,577,608	864,182	26.13	89,349	2,646	33.77	0	0	0.00	520,659	182,850	2.85
LHD1	1,609,504	104,949	15.34	1,013,330	47,826	21.19	0	0	0.00	197,245	111,021	1.78
LHD2	235,312	17,700	13.29	447,486	24,829	18.02	0	0	0.00	49,072	27,641	1.78
MCY	341,399	7,998	42.69	0	0	0.00	0	0	0.00	0	0	0.00
MDV	12,951,234	607,181	21.33	168,243	6,647	25.31	0	0	0.00	437,440	158,075	2.77
MH	52,457	10,743	4.88	29,056	2,864	10.15	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	17,185	2,900	5.93	0	0	0.00	0	0	0.00
OBUS	30,255	5,526	5.48	0	0	0.00	0	0	0.00	2,640	2,752	0.96
PTO	0	0	0.00	44,033	8,388	5.25	0	0	0.00	3,416	7,077	0.48
SBUS	31,754	3,510	9.05	13,265	1,762	7.53	21,089	4,809	4.39	2,214	2,560	0.86
T6	304,742	57,279	5.32	1,142,312	125,255	9.12	14,404	1,691	8.52	87,359	91,768	0.95
T7	533	115	4.65	1,283,903	199,042	6.45	95,070	15,069	6.31	48,676	87,269	0.56
UBUS	42,629	3,269	13.04	0	0	0.00	111,673	37,371	2.99	327	696	0.47
Total	**83,416,548**	**3,107,606**	**26.84**	**4,326,553**	**425,480**	**10.17**	**247,933**	**59,544**	**4.16**	**6,899,254**	**2,730,160**	**2.53**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2029
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2029	All Other Buses	Aggregate	Aggregate	Diesel	382.9055396	19987.05782	19987.05782	0	3407.859303	2.020034089	0
Orange	2029	All Other Buses	Aggregate	Aggregate	Natural Gas	101.5128518	5697.140521	5697.140521	0	903.4643814	0.604629293	0
Orange	2029	LDA	Aggregate	Aggregate	Gasoline	1034856.174	41149375.45	41149375.45	0	4831959.143	1274.922527	0
Orange	2029	LDA	Aggregate	Aggregate	Diesel	1925.877657	58348.44754	58348.44754	0	8229.360616	1.300354132	0
Orange	2029	LDA	Aggregate	Aggregate	Electricity	98016.32358	4514188.416	0	4514188.416	478573.8303	0	1742849.305
Orange	2029	LDA	Aggregate	Aggregate	Plug-in Hybrid	40493.97117	1789827.298	801090.9793	988736.3183	167442.5708	27.92183472	298627.8372
Orange	2029	LDT1	Aggregate	Aggregate	Gasoline	91581.52842	3277866.345	3277866.345	0	406550.9974	121.9336008	0
Orange	2029	LDT1	Aggregate	Aggregate	Diesel	2.902217211	55.85633946	55.85633946	0	8.800510802	0.002134382	0
Orange	2029	LDT1	Aggregate	Aggregate	Electricity	662.9227227	32054.50283	0	32054.50283	3278.766565	0	12375.6837
Orange	2029	LDT1	Aggregate	Aggregate	Plug-in Hybrid	524.2522056	26014.61978	10788.81563	15225.80414	2167.78287	0.376872534	4598.646653
Orange	2029	LDT2	Aggregate	Aggregate	Gasoline	555722.2366	22415240.23	22415240.23	0	2601799.259	858.477667	0
Orange	2029	LDT2	Aggregate	Aggregate	Diesel	2216.820715	89349.39377	89349.39377	0	10434.57417	2.645889939	0
Orange	2029	LDT2	Aggregate	Aggregate	Electricity	8828.976102	304521.1035	0	304521.1035	44223.7459	0	117570.2794
Orange	2029	LDT2	Aggregate	Aggregate	Plug-in Hybrid	8103.093235	378506.3844	162368.0922	216138.2922	33506.29053	5.704204888	65280.20621
Orange	2029	LHD1	Aggregate	Aggregate	Gasoline	40268.54793	1609503.505	1609503.505	0	599941.3641	104.948662	0
Orange	2029	LHD1	Aggregate	Aggregate	Diesel	24434.47216	1013330.39	1013330.39	0	307354.9212	47.8258656	0
Orange	2029	LHD1	Aggregate	Aggregate	Electricity	3159.739873	197245.2106	0	197245.2106	44160.44382	0	111020.6576
Orange	2029	LHD2	Aggregate	Aggregate	Gasoline	6367.767391	235311.5961	235311.5961	0	94870.24615	17.70025781	0
Orange	2029	LHD2	Aggregate	Aggregate	Diesel	10948.49634	447485.6852	447485.6852	0	137718.3107	24.82858777	0
Orange	2029	LHD2	Aggregate	Aggregate	Electricity	825.914217	49071.70376	0	49071.70376	10954.10094	0	27641.13103
Orange	2029	MCY	Aggregate	Aggregate	Gasoline	53993.0701	341399.2508	341399.2508	0	107986.1402	7.997771221	0
Orange	2029	MDV	Aggregate	Aggregate	Gasoline	331005.2666	12853071.73	12853071.73	0	1533580.051	603.6832554	0
Orange	2029	MDV	Aggregate	Aggregate	Diesel	4422.111559	168242.7577	168242.7577	0	20389.51482	6.646867557	0
Orange	2029	MDV	Aggregate	Aggregate	Electricity	8994.905126	308794.0816	0	308794.0816	44989.64087	0	119220.0016
Orange	2029	MDV	Aggregate	Aggregate	Plug-in Hybrid	5123.004283	226808.5696	98162.23747	128646.3322	21183.62271	3.497796744	38855.02659
Orange	2029	MH	Aggregate	Aggregate	Gasoline	5192.597132	52456.55971	52456.55971	0	519.4674171	10.74280936	0
Orange	2029	MH	Aggregate	Aggregate	Diesel	3027.333223	29055.74108	29055.74108	0	302.7333223	2.863629808	0
Orange	2029	Motor Coach	Aggregate	Aggregate	Diesel	143.9169713	17185.0163	17185.0163	0	3307.212	2.900318192	0
Orange	2029	OBUS	Aggregate	Aggregate	Gasoline	761.1596295	30255.30829	30255.30829	0	15229.28187	5.525730761	0
Orange	2029	OBUS	Aggregate	Aggregate	Electricity	36.31806959	2640.030273	0	2640.030273	726.6519364	0	2751.818001
Orange	2029	PTO	Aggregate	Aggregate	Diesel	0	44032.74944	44032.74944	0	0	8.387872929	0
Orange	2029	PTO	Aggregate	Aggregate	Electricity	0	3416.194041	0	3416.194041	0	0	7076.710072
Orange	2029	SBUS	Aggregate	Aggregate	Gasoline	702.653337	31753.64333	31753.64333	0	2810.613348	3.510382783	0
Orange	2029	SBUS	Aggregate	Aggregate	Diesel	651.9418709	13265.18631	13265.18631	0	9440.118291	1.761992045	0
Orange	2029	SBUS	Aggregate	Aggregate	Electricity	71.74051726	2213.73253	0	2213.73253	853.411093	0	2559.741896
Orange	2029	SBUS	Aggregate	Aggregate	Natural Gas	882.3732596	21088.64613	21088.64613	0	12776.7648	4.80915817	0
Orange	2029	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	8.818701859	573.8086557	573.8086557	0	202.6537687	0.060053054	0
Orange	2029	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.738959332	59.24385841	0	59.24385841	16.98128545	0	62.45977977
Orange	2029	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	11.42228988	791.8119764	791.8119764	0	262.4842215	0.083087481	0
Orange	2029	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.879222422	76.62223509	0	76.62223509	20.20453126	0	80.78150306
Orange	2029	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	42.95705179	2025.585429	2025.585429	0	987.1530502	0.209546549	0
Orange	2029	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	4.456367889	243.6580114	0	243.6580114	102.4073341	0	256.8844457
Orange	2029	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	68.97746579	13387.42469	13387.42469	0	1585.102164	1.253367523	0
Orange	2029	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	3.925811078	836.6570649	0	836.6570649	90.21513858	0	882.0731367
Orange	2029	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.051556004	9.760101585	9.760101585	0	1.184756972	0.000946122	0
Orange	2029	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2581.637504	84724.51285	84724.51285	0	36839.96718	9.420603636	0
Orange	2029	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	141.940417	5595.217777	0	5595.217777	2025.489751	0	5874.870502
Orange	2029	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	11.30330664	394.9477783	394.9477783	0	161.2981857	0.046589195	0
Orange	2029	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2097.985113	69110.08666	69110.08666	0	29938.24757	7.664197141	0
Orange	2029	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	114.1650744	4514.70106	0	4514.70106	1629.135612	0	4740.348836
Orange	2029	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	8.346010379	296.6943617	296.6943617	0	119.0975681	0.03472702	0
Orange	2029	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6526.409794	213987.5316	213987.5316	0	93131.86776	23.82465728	0
Orange	2029	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	352.4133026	13772.47653	0	13772.47653	5028.937829	0	14460.83411
Orange	2029	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	25.17146237	889.1124625	889.1124625	0	359.196768	0.104130728	0
Orange	2029	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	919.0965034	46722.36685	46722.36685	0	13115.5071	5.071415954	0
Orange	2029	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	19.74512368	992.8236589	0	992.8236589	281.762915	0	1042.445649
Orange	2029	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	26.1814084	1348.881643	1348.881643	0	373.6086979	0.157231984	0
Orange	2029	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2214.241211	88855.21703	88855.21703	0	25596.6284	9.827912088	0
Orange	2029	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	142.7158886	6733.430002	0	6733.430002	1649.795673	0	7070.278279
Orange	2029	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	8.992906535	387.7642695	387.7642695	0	103.9579995	0.044922609	0
Orange	2029	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5317.429784	216143.448	216143.448	0	61469.4883	23.94663678	0
Orange	2029	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	322.1547174	15304.62849	0	15304.62849	3724.108533	0	16070.26171
Orange	2029	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	20.42382531	892.6077209	892.6077209	0	236.0994206	0.102396038	0
Orange	2029	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4345.405053	175984.9471	175984.9471	0	50232.88241	19.45388282	0
Orange	2029	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	270.0139535	12706.68893	0	12706.68893	3121.361303	0	13342.35698
Orange	2029	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	17.4068818	751.4372313	751.4372313	0	201.2235536	0.086202114	0
Orange	2029	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2450.35786	99557.16777	99557.16777	0	28326.13687	10.92726124	0
Orange	2029	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	83.88330775	5630.067864	0	5630.067864	969.6910376	0	5911.719067
Orange	2029	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	62.58301135	2533.547073	2533.547073	0	723.4596112	0.300371929	0
Orange	2029	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	32.95210135	1592.748292	1592.748292	0	380.9262916	0.172475387	0
Orange	2029	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	1.944801805	128.777978	0	128.777978	22.48190886	0	135.2202578
Orange	2029	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.132858961	7.38444644	7.38444644	0	1.535849584	0.00082054	0
Orange	2029	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1499.637596	82372.02569	82372.02569	0	17335.81061	8.382483441	0
Orange	2029	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	32.13891631	2587.147793	0	2587.147793	371.5258726	0	2716.573104
Orange	2029	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	35.57946899	1963.884803	1963.884803	0	411.2986615	0.223099795	0
Orange	2029	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.613994831	367.7335901	367.7335901	0	129.0096012	0.036882338	0
Orange	2029	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.207259533	504.4643584	504.4643584	0	165.6228241	0.050843637	0
Orange	2029	T6 OOS Class 6	Aggregate	Aggregate	Diesel	27.688977	1318.179801	1318.179801	0	636.2926914	0.129800728	0
Orange	2029	T6 OOS Class 7	Aggregate	Aggregate	Diesel	38.02946827	9584.806298	9584.806298	0	873.9171807	0.877656586	0
Orange	2029	T6 Public Class 4	Aggregate	Aggregate	Diesel	120.3081171	4285.281676	4285.281676	0	617.1806409	0.489346688	0
Orange	2029	T6 Public Class 4	Aggregate	Aggregate	Electricity	7.25517169	312.3162484	0	312.3162484	37.21903077	0	328.9205498
Orange	2029	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	18.64211362	726.6457216	726.6457216	0	95.63404286	0.088667232	0
Orange	2029	T6 Public Class 5	Aggregate	Aggregate	Diesel	110.9599604	3963.920437	3963.920437	0	569.2245969	0.450038661	0
Orange	2029	T6 Public Class 5	Aggregate	Aggregate	Electricity	7.134001258	306.6591736	0	306.6591736	36.59742646	0	322.9627164
Orange	2029	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	23.64162144	892.526841	892.526841	0	121.281518	0.108868385	0
Orange	2029	T6 Public Class 6	Aggregate	Aggregate	Diesel	177.6712554	6423.882196	6423.882196	0	911.4535404	0.732578623	0
Orange	2029	T6 Public Class 6	Aggregate	Aggregate	Electricity	11.64334606	490.0277798	0	490.0277798	59.73036528	0	516.0801193
Orange	2029	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	29.14546352	1127.904598	1127.904598	0	149.5162278	0.137327626	0
Orange	2029	T6 Public Class 7	Aggregate	Aggregate	Diesel	316.9954764	14248.28229	14248.28229	0	1626.186794	1.582690155	0
Orange	2029	T6 Public Class 7	Aggregate	Aggregate	Electricity	20.38561591	1252.881974	0	1252.881974	104.5782096	0	1319.491476
Orange	2029	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	43.80227995	2143.715021	2143.715021	0	224.7056961	0.250198805	0
Orange	2029	T6 Utility Class 5	Aggregate	Aggregate	Diesel	99.97930338	3998.359353	3998.359353	0	1279.735083	0.420732235	0

Orange	2029	T6 Utility Class 5	Aggregate	Aggregate	Electricity	11.15014445	481.8623002	0	481.8623002	142.721849	0	507.4805218
Orange	2029	T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.572767065	22.67785815	22.67785815	0	7.331418432	0.002500545	0
Orange	2029	T6 Utility Class 6	Aggregate	Aggregate	Diesel	18.87084848	753.5503461	753.5503461	0	241.5468606	0.079051211	0
Orange	2029	T6 Utility Class 6	Aggregate	Aggregate	Electricity	2.121404463	91.67749678	0	91.67749678	27.15397713	0	96.55153325
Orange	2029	T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.151993071	5.729014224	5.729014224	0	1.945511313	0.000637297	0
Orange	2029	T6 Utility Class 7	Aggregate	Aggregate	Diesel	20.94255818	1035.06007	1035.06007	0	268.0647446	0.107674244	0
Orange	2029	T6 Utility Class 7	Aggregate	Aggregate	Electricity	2.345671905	140.6172129	0	140.6172129	30.02460039	0	148.0931306
Orange	2029	T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.186917413	8.286373597	8.286373597	0	2.392542882	0.000907281	0
Orange	2029	T6TS	Aggregate	Aggregate	Gasoline	6434.040691	304742.1499	304742.1499	0	128732.2861	57.27871773	0
Orange	2029	T6TS	Aggregate	Aggregate	Electricity	189.4689607	15101.12899	0	15101.12899	3790.894965	0	15881.05174
Orange	2029	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1129.190783	226856.6267	226856.6267	0	25948.8042	33.80866615	0
Orange	2029	T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	73.67518728	15461.6025	0	15461.6025	1693.055804	0	27734.26266
Orange	2029	T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.284507784	855.4261337	855.4261337	0	98.45798888	0.144813679	0
Orange	2029	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1055.869133	288175.3144	288175.3144	0	24263.87267	40.49449931	0
Orange	2029	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	457.5036262	104636.7528	104636.7528	0	10513.43333	15.22888881	0
Orange	2029	T7 POLA Class 8	Aggregate	Aggregate	Diesel	1552.409729	217093.4126	217093.4126	0	25397.42317	35.78146561	0
Orange	2029	T7 POLA Class 8	Aggregate	Aggregate	Electricity	23.78667087	3067.567534	0	3067.567534	389.1499355	0	5500.218922
Orange	2029	T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	23.95244581	3331.506939	3331.506939	0	391.8620135	0.541997263	0
Orange	2029	T7 Public Class 8	Aggregate	Aggregate	Diesel	670.5309652	26979.61095	26979.61095	0	3439.823851	4.576802778	0
Orange	2029	T7 Public Class 8	Aggregate	Aggregate	Electricity	44.66073965	2754.47908	0	2754.47908	229.1095944	0	4936.510595
Orange	2029	T7 Public Class 8	Aggregate	Aggregate	Natural Gas	331.1730194	15703.31223	15703.31223	0	1698.917589	2.503205747	0
Orange	2029	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	270.0057681	18089.0255	18089.0255	0	2543.454335	2.846889359	0
Orange	2029	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	29.85043375	2419.500973	0	2419.500973	281.1910859	0	4337.411867
Orange	2029	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	18.94379382	1316.302249	1316.302249	0	178.4505378	0.208660289	0
Orange	2029	T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1091.415021	57558.74238	57558.74238	0	10281.1295	9.495889473	0
Orange	2029	T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	55.06060739	4502.905422	0	4502.905422	518.6709216	0	8072.307319
Orange	2029	T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	83.42425003	4659.305123	4659.305123	0	785.8564353	0.799496314	0
Orange	2029	T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2706.556676	129614.0807	129614.0807	0	25495.76389	20.99761336	0
Orange	2029	T7 Single Other Class 8	Aggregate	Aggregate	Electricity	156.7074232	10282.22964	0	10282.22964	1476.183927	0	18432.83609
Orange	2029	T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	212.9250352	10520.27159	10520.27159	0	2005.753831	1.780545153	0
Orange	2029	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	164.5522483	10685.1008	10685.1008	0	756.9403422	3.959345342	0
Orange	2029	T7 SWCV Class 8	Aggregate	Aggregate	Electricity	45.13116308	2833.724584	0	2833.724584	207.6033502	0	5073.40813
Orange	2029	T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	806.0298534	52220.17289	52220.17289	0	3707.737326	7.945589759	0
Orange	2029	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	3014.227164	200863.4166	200863.4166	0	43796.72069	31.31968099	0
Orange	2029	T7 Tractor Class 8	Aggregate	Aggregate	Electricity	89.68686788	7107.490557	0	7107.490557	1303.15019	0	12739.66346
Orange	2029	T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	97.14828211	6464.161792	6464.161792	0	1411.564539	1.144594826	0
Orange	2029	T7 Utility Class 8	Aggregate	Aggregate	Diesel	79.1405822	3350.915153	3350.915153	0	1012.999452	0.531811464	0
Orange	2029	T7 Utility Class 8	Aggregate	Aggregate	Electricity	3.337556868	204.6299897	0	204.6299897	42.72072791	0	366.732904
Orange	2029	T7IS	Aggregate	Aggregate	Gasoline	4.943091464	533.4895587	533.4895587	0	98.90137401	0.114806492	0
Orange	2029	T7IS	Aggregate	Aggregate	Electricity	0.173164598	42.21366893	0	42.21366893	3.464677275	0	75.61014348
Orange	2029	UBUS	Aggregate	Aggregate	Gasoline	258.4023617	42628.96157	42628.96157	0	1033.609447	3.268690854	0
Orange	2029	UBUS	Aggregate	Aggregate	Electricity	5.944034594	327.053411	0	327.053411	23.77613837	0	695.8022999
Orange	2029	UBUS	Aggregate	Aggregate	Natural Gas	580.4859911	111673.1941	111673.1941	0	2321.943964	37.37097777	0

EMFAC Fuel Usage: Year 2030

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	20,074	2,011	9.98	5,744	605	9.50	0	0	0.00
LDA	41,866,853	1,283,872	32.61	52,379	1,152	45.49	0	0	0.00	5,738,426	2,129,880	2.69
LDT1	3,257,540	119,562	27.25	23	1	27.37	0	0	0.00	56,763	20,393	2.78
LDT2	22,755,681	860,394	26.45	89,411	2,617	34.16	0	0	0.00	585,577	206,165	2.84
LHD1	1,581,440	101,836	15.53	1,014,029	47,712	21.25	0	0	0.00	265,572	149,479	1.78
LHD2	229,965	17,087	13.46	450,253	24,876	18.10	0	0	0.00	66,288	37,339	1.78
MCY	344,659	8,057	42.78	0	0	0.00	0	0	0.00	0	0	0.00
MDV	13,006,553	601,691	21.62	165,314	6,451	25.63	0	0	0.00	486,182	175,857	2.76
MH	51,637	10,574	4.88	28,939	2,853	10.14	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	17,279	2,888	5.98	0	0	0.00	0	0	0.00
OBUS	28,895	5,234	5.52	0	0	0.00	0	0	0.00	3,686	3,842	0.96
PTO	0	0	0.00	43,265	8,162	5.30	0	0	0.00	4,733	9,805	0.48
SBUS	31,661	3,490	9.07	12,523	1,655	7.57	21,253	4,836	4.39	3,117	3,605	0.86
T6	284,676	53,167	5.35	1,122,126	122,431	9.17	14,549	1,708	8.52	125,291	131,612	0.95
T7	521	110	4.73	1,290,825	197,340	6.54	95,703	15,043	6.36	66,486	119,199	0.56
UBUS	42,709	3,274	13.05	0	0	0.00	111,673	37,371	2.99	556	1,183	0.47
Total	**83,482,790**	**3,068,350**	**27.21**	**4,306,440**	**420,147**	**10.25**	**248,923**	**59,564**	**4.18**	**7,402,679**	**2,988,359**	**2.48**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2030
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2030	All Other Buses	Aggregate	Aggregate	Diesel	386.5723803	20074.10877	20074.10877	0	3440.494185	2.010953942	0
Orange	2030	All Other Buses	Aggregate	Aggregate	Natural Gas	103.3945211	5744.296048	5744.296048	0	920.2112376	0.604829248	0
Orange	2030	LDA	Aggregate	Aggregate	Gasoline	1031374.505	41059903.02	41059903.02	0	4816955.176	1255.7267	0
Orange	2030	LDA	Aggregate	Aggregate	Diesel	1682.171192	52378.96755	52378.96755	0	7280.49944	1.151539841	0
Orange	2030	LDA	Aggregate	Aggregate	Electricity	103443.2334	4719711.511	0	4719711.511	503483.2028	0	1822198.182
Orange	2030	LDA	Aggregate	Aggregate	Plug-in Hybrid	41736.5307	1825664.512	806949.725	1018714.787	172580.5544	28.14526627	307682.2281
Orange	2030	LDT1	Aggregate	Aggregate	Gasoline	90507.2226	3244801.129	3244801.129	0	401998.5473	119.1163704	0
Orange	2030	LDT1	Aggregate	Aggregate	Diesel	0.502843385	23.30486049	23.30486049	0	2.478857338	0.000851487	0
Orange	2030	LDT1	Aggregate	Aggregate	Electricity	797.5521109	38652.4259	0	38652.4259	3949.371779	0	14923.02656
Orange	2030	LDT1	Aggregate	Aggregate	Plug-in Hybrid	628.5188609	30850.12666	12739.2795	18110.84716	2598.92549	0.445245647	5470.015632
Orange	2030	LDT2	Aggregate	Aggregate	Gasoline	561274.5262	22580196.34	22580196.34	0	2624971.592	854.2241757	0
Orange	2030	LDT2	Aggregate	Aggregate	Diesel	2227.827443	89411.01445	89411.01445	0	10463.55475	2.617433073	0
Orange	2030	LDT2	Aggregate	Aggregate	Electricity	10223.18338	348630.7104	0	348630.7104	51020.15624	0	134600.2283
Orange	2030	LDT2	Aggregate	Aggregate	Plug-in Hybrid	8947.672319	412430.9883	175484.421	236946.5673	36998.62504	6.170256609	71564.92547
Orange	2030	LHD1	Aggregate	Aggregate	Gasoline	39791.07051	1581440.061	1581440.061	0	592827.662	101.8364753	0
Orange	2030	LHD1	Aggregate	Aggregate	Diesel	24714.62427	1014028.569	1014028.569	0	310878.8823	47.71167867	0
Orange	2030	LHD1	Aggregate	Aggregate	Electricity	4352.797084	265572.4029	0	265572.4029	60826.70791	0	149479.2427
Orange	2030	LHD2	Aggregate	Aggregate	Gasoline	6261.73377	229965.1224	229965.1224	0	93290.50319	17.0872741	0
Orange	2030	LHD2	Aggregate	Aggregate	Diesel	11162.1853	450252.8174	450252.8174	0	140406.249	24.87552136	0
Orange	2030	LHD2	Aggregate	Aggregate	Electricity	1141.138301	66287.99037	0	66287.99037	15133.12431	0	37338.76708
Orange	2030	MCY	Aggregate	Aggregate	Gasoline	54660.25356	344658.5469	344658.5469	0	109320.5071	8.057242641	0
Orange	2030	MDV	Aggregate	Aggregate	Gasoline	332433.7502	12900815.72	12900815.72	0	1539526.506	597.9203327	0
Orange	2030	MDV	Aggregate	Aggregate	Diesel	4362.656488	165314.4645	165314.4645	0	20077.99942	6.451283801	0
Orange	2030	MDV	Aggregate	Aggregate	Electricity	10185.4352	345209.4403	0	345209.4403	50734.42342	0	133279.3356
Orange	2030	MDV	Aggregate	Aggregate	Plug-in Hybrid	5621.676864	246709.3765	105737.1185	140972.258	23245.63383	3.77072831	42577.82357
Orange	2030	MH	Aggregate	Aggregate	Gasoline	5068.714656	51637.0341	51637.0341	0	507.0742141	10.57394996	0
Orange	2030	MH	Aggregate	Aggregate	Diesel	3033.205135	28939.37037	28939.37037	0	303.3205135	2.853026373	0
Orange	2030	Motor Coach	Aggregate	Aggregate	Diesel	145.9523847	17279.02122	17279.02122	0	3353.985801	2.887800998	0
Orange	2030	OBUS	Aggregate	Aggregate	Gasoline	739.3951504	28895.27372	28895.27372	0	14793.81817	5.234235056	0
Orange	2030	OBUS	Aggregate	Aggregate	Electricity	51.15070153	3685.625488	0	3685.625488	1023.423236	0	3841.687221
Orange	2030	PTO	Aggregate	Aggregate	Diesel	0	43264.96905	43264.96905	0	0	8.16193558	0
Orange	2030	PTO	Aggregate	Aggregate	Electricity	0	4733.361562	0	4733.361562	0	0	9805.247311
Orange	2030	SBUS	Aggregate	Aggregate	Gasoline	700.8125163	31661.32861	31661.32861	0	2803.250065	3.489895445	0
Orange	2030	SBUS	Aggregate	Aggregate	Diesel	613.3791069	12523.3106	12523.3106	0	8881.729468	1.654803237	0
Orange	2030	SBUS	Aggregate	Aggregate	Electricity	100.5027561	3117.409718	0	3117.409718	1194.167251	0	3604.665042
Orange	2030	SBUS	Aggregate	Aggregate	Natural Gas	901.0263282	21253.03875	21253.03875	0	13046.86123	4.836169767	0
Orange	2030	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	8.522988897	555.3462228	555.3462228	0	195.8582849	0.057721572	0
Orange	2030	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	1.038510558	83.93263427	0	83.93263427	23.86497262	0	88.48873103
Orange	2030	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	10.98144611	767.4817467	767.4817467	0	252.3536316	0.079993908	0
Orange	2030	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	1.241086456	109.4938878	0	109.4938878	28.52016675	0	115.4375204
Orange	2030	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	42.43966026	1955.815844	1955.815844	0	975.2633929	0.201291435	0
Orange	2030	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	6.16812259	335.7465795	0	335.7465795	141.7434571	0	353.9718373
Orange	2030	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	68.63939365	13248.22822	13248.22822	0	1577.333266	1.225698361	0
Orange	2030	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	5.244638433	1116.030993	0	1116.030993	120.5217912	0	1176.612259
Orange	2030	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.050781005	9.578586161	9.578586161	0	1.166947506	0.000924873	0
Orange	2030	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2545.628828	83141.55415	83141.55415	0	36326.12337	9.199724687	0
Orange	2030	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	203.754819	8059.066548	0	8059.066548	2907.581268	0	8461.86408
Orange	2030	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	11.68311106	406.2754783	406.2754783	0	166.7179948	0.047850156	0
Orange	2030	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2072.03139	67848.12047	67848.12047	0	29567.88794	7.489790148	0
Orange	2030	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	163.7584245	6492.318539	0	6492.318539	2336.832717	0	6816.808959
Orange	2030	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	8.727800721	308.09256	308.09256	0	124.5457163	0.036030876	0
Orange	2030	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	6439.61782	210050.7714	210050.7714	0	91893.3463	23.2736232	0
Orange	2030	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	506.906832	19921.8219	0	19921.8219	7233.560493	0	20917.52787
Orange	2030	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	26.31623678	925.3894341	925.3894341	0	375.5326989	0.108245231	0
Orange	2030	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	933.6362588	46738.46266	46738.46266	0	13322.98941	5.067042008	0
Orange	2030	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	28.44041535	1452.767288	0	1452.767288	405.844727	0	1525.377568
Orange	2030	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	26.77107615	1355.408395	1355.408395	0	382.0232566	0.15815602	0
Orange	2030	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2190.526378	86760.94007	86760.94007	0	25322.48493	9.543449279	0
Orange	2030	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	205.0485659	9752.960656	0	9752.960656	2370.361422	0	10240.86474
Orange	2030	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	9.458425668	406.4797411	406.4797411	0	109.3394007	0.046926689	0
Orange	2030	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	5280.289755	211246.7595	211246.7595	0	61040.14956	23.27519175	0
Orange	2030	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	469.1180712	22437.48331	0	22437.48331	5423.004903	0	23559.94654
Orange	2030	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	21.62828987	941.6116301	941.6116301	0	250.0230309	0.107756124	0
Orange	2030	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	4309.719257	171988.9355	171988.9355	0	49820.35461	18.90821273	0
Orange	2030	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	390.2601315	18528.7448	0	18528.7448	4511.40712	0	19455.66849
Orange	2030	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	18.32926922	788.646908	788.646908	0	211.8863522	0.090253064	0
Orange	2030	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2503.442259	98248.76051	98248.76051	0	28939.79252	10.77285793	0
Orange	2030	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	119.421659	8030.754432	0	8030.754432	1380.514378	0	8432.50299
Orange	2030	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	64.12773273	2500.747866	2500.747866	0	741.3165904	0.297400509	0
Orange	2030	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	32.63753651	1552.243145	1552.243145	0	377.289922	0.166991665	0
Orange	2030	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	2.797583125	185.9501748	0	185.9501748	32.34006092	0	195.2525655
Orange	2030	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.139414807	7.721974856	7.721974856	0	1.611635174	0.000856756	0
Orange	2030	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1532.617717	82379.93619	82379.93619	0	17717.0608	8.345476909	0
Orange	2030	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	42.65966906	3430.362454	0	3430.362454	493.1457744	0	3601.970636
Orange	2030	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	36.50738291	1967.685207	1967.685207	0	422.0253464	0.223662904	0
Orange	2030	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.621386969	371.3504077	371.3504077	0	129.1794726	0.036712496	0
Orange	2030	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.170554622	509.4259817	509.4259817	0	164.7793452	0.050613823	0
Orange	2030	T6 OOS Class 6	Aggregate	Aggregate	Diesel	28.38681531	1331.144665	1331.144665	0	652.3290158	0.129490981	0
Orange	2030	T6 OOS Class 7	Aggregate	Aggregate	Diesel	38.22719132	9679.076979	9679.076979	0	878.4608566	0.8722338	0
Orange	2030	T6 Public Class 4	Aggregate	Aggregate	Diesel	117.4308088	4191.024114	4191.024114	0	602.420049	0.476014212	0
Orange	2030	T6 Public Class 4	Aggregate	Aggregate	Electricity	10.10465385	434.4844359	0	434.4844359	51.83687424	0	457.5838121
Orange	2030	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	18.88066044	726.5556268	726.5556268	0	96.85778805	0.088713281	0
Orange	2030	T6 Public Class 5	Aggregate	Aggregate	Diesel	108.7851234	3873.445327	3873.445327	0	558.0676829	0.437570409	0
Orange	2030	T6 Public Class 5	Aggregate	Aggregate	Electricity	10.23654775	439.8064266	0	439.8064266	52.51348994	0	463.1887466
Orange	2030	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	23.63445898	876.833245	876.833245	0	121.2447746	0.10714565	0
Orange	2030	T6 Public Class 6	Aggregate	Aggregate	Diesel	173.0853189	6272.97379	6272.97379	0	887.9276859	0.710787178	0
Orange	2030	T6 Public Class 6	Aggregate	Aggregate	Electricity	16.14925048	682.2583406	0	682.2583406	82.84565498	0	718.5306229
Orange	2030	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	29.49662043	1128.602974	1128.602974	0	151.3176628	0.137483171	0
Orange	2030	T6 Public Class 7	Aggregate	Aggregate	Diesel	310.6467594	13863.5033	13863.5033	0	1593.617876	1.529980822	0
Orange	2030	T6 Public Class 7	Aggregate	Aggregate	Electricity	27.98463087	1708.692075	0	1708.692075	143.5611564	0	1799.534733
Orange	2030	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	45.34201174	2164.882901	2164.882901	0	232.6045202	0.253270117	0
Orange	2030	T6 Utility Class 5	Aggregate	Aggregate	Diesel	96.16658697	3837.91235	3837.91235	0	1230.932313	0.401992279	0

Orange	2030 T6 Utility Class 5	Aggregate	Aggregate	Electricity	15.45280589	666.8240493	0	666.8240493	197.7959153	0	702.275767
Orange	2030 T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.548589767	21.69190902	21.69190902	0	7.021949013	0.002384773	0
Orange	2030 T6 Utility Class 6	Aggregate	Aggregate	Diesel	18.1499328	723.4583539	723.4583539	0	232.3191399	0.075569253	0
Orange	2030 T6 Utility Class 6	Aggregate	Aggregate	Electricity	2.937001294	126.7361616	0	126.7361616	37.59361656	0	133.4740929
Orange	2030 T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.138666315	5.208808047	5.208808047	0	1.774928837	0.00057784	0
Orange	2030 T6 Utility Class 7	Aggregate	Aggregate	Diesel	20.11242737	989.2504176	989.2504176	0	257.4390704	0.102482642	0
Orange	2030 T6 Utility Class 7	Aggregate	Aggregate	Electricity	3.226335971	193.3633496	0	193.3633496	41.29710043	0	203.643517
Orange	2030 T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.16814765	7.536400825	7.536400825	0	2.152289921	0.000822268	0
Orange	2030 T6TS	Aggregate	Aggregate	Gasoline	6172.407022	284675.9431	284675.9431	0	123497.5197	53.16742578	0
Orange	2030 T6TS	Aggregate	Aggregate	Electricity	267.1966877	21101.64944	0	21101.64944	5346.071328	0	22191.47898
Orange	2030 T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1126.386764	225728.3076	225728.3076	0	25884.36783	33.07977264	0
Orange	2030 T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	96.69270853	20410.9413	0	20410.9413	2221.998442	0	36612.14336
Orange	2030 T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.235824131	844.6993301	844.6993301	0	97.33923854	0.141722863	0
Orange	2030 T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1069.737986	292690.7392	292690.7392	0	24582.57892	40.350603	0
Orange	2030 T7 NOOS Class 8	Aggregate	Aggregate	Diesel	464.3407139	106276.3081	106276.3081	0	10670.54961	15.14748301	0
Orange	2030 T7 POLA Class 8	Aggregate	Aggregate	Diesel	1531.736007	223731.6872	223731.6872	0	25059.20107	36.55390642	0
Orange	2030 T7 POLA Class 8	Aggregate	Aggregate	Electricity	33.63346392	4573.587178	0	4573.587178	550.2434698	0	8200.546675
Orange	2030 T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	26.43277312	3843.076695	3843.076695	0	432.4401682	0.614468568	0
Orange	2030 T7 Public Class 8	Aggregate	Aggregate	Diesel	643.4866526	25791.48084	25791.48084	0	3301.086528	4.352903527	0
Orange	2030 T7 Public Class 8	Aggregate	Aggregate	Electricity	62.75706958	3844.389554	0	3844.389554	321.943767	0	6889.821709
Orange	2030 T7 Public Class 8	Aggregate	Aggregate	Natural Gas	344.5958688	16038.95388	16038.95388	0	1767.776807	2.553446435	0
Orange	2030 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	260.9508665	17323.88348	17323.88348	0	2458.157163	2.703326374	0
Orange	2030 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	40.8316543	3322.902211	0	3322.902211	384.6341835	0	5956.928988
Orange	2030 T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	18.62430902	1279.086084	1279.086084	0	175.4409909	0.201849798	0
Orange	2030 T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1091.455675	56365.97519	56365.97519	0	10281.51246	9.240803086	0
Orange	2030 T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	74.84683451	6116.485606	0	6116.485606	705.0571811	0	10964.95416
Orange	2030 T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	83.68701614	4547.392092	4547.392092	0	788.331692	0.7777524	0
Orange	2030 T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2751.803553	128022.3456	128022.3456	0	25921.98947	20.64253604	0
Orange	2030 T7 Single Other Class 8	Aggregate	Aggregate	Electricity	220.862254	14398.76713	0	14398.76713	2080.522432	0	25812.50601
Orange	2030 T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	216.6463586	10352.34962	10352.34962	0	2040.808698	1.751259811	0
Orange	2030 T7 SWCV Class 8	Aggregate	Aggregate	Diesel	149.3701827	9698.783521	9698.783521	0	687.1028405	3.592645511	0
Orange	2030 T7 SWCV Class 8	Aggregate	Aggregate	Electricity	63.39746612	4012.62561	0	4012.62561	291.6283441	0	7184.074102
Orange	2030 T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	808.2025505	52371.09216	52371.09216	0	3717.731732	7.867961825	0
Orange	2030 T7 Tractor Class 8	Aggregate	Aggregate	Diesel	3091.323582	201910.3466	201910.3466	0	44916.93165	31.1566181	0
Orange	2030 T7 Tractor Class 8	Aggregate	Aggregate	Electricity	120.5678232	9458.175231	0	9458.175231	1751.850471	0	16953.09595
Orange	2030 T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	98.9462988	6426.53451	6426.53451	0	1437.689722	1.134845898	0
Orange	2030 T7 Utility Class 8	Aggregate	Aggregate	Diesel	78.02646443	3284.766981	3284.766981	0	998.7387448	0.51913972	0
Orange	2030 T7 Utility Class 8	Aggregate	Aggregate	Electricity	4.758188198	289.3567909	0	289.3567909	60.90480893	0	518.578222
Orange	2030 T7IS	Aggregate	Aggregate	Gasoline	4.582857622	521.3588388	521.3588388	0	91.6938153	0.110300404	0
Orange	2030 T7IS	Aggregate	Aggregate	Electricity	0.248022689	59.18348652	0	59.18348652	4.962437969	0	106.0052827
Orange	2030 UBUS	Aggregate	Aggregate	Gasoline	258.8791012	42708.82681	42708.82681	0	1035.516405	3.273674248	0
Orange	2030 UBUS	Aggregate	Aggregate	Electricity	7.155489529	556.1774777	0	556.1774777	28.62195812	0	1183.261067
Orange	2030 UBUS	Aggregate	Aggregate	Natural Gas	580.4859911	111673.1941	111673.1941	0	2321.943964	37.37097777	0

EMFAC Fuel Usage: Year 2035

Vehicle type	GAS			DSL			NG			ELEC		
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	kWh/day	Miles/kWh
All other buses	0	0	0.00	20,425	1,991	10.26	6,019	616	9.77	0	0	0.00
LDA	41,884,228	1,226,348	34.15	33,070	679	48.71	0	0	0.00	6,583,360	2,447,608	2.69
LDT1	3,154,492	109,590	28.78	30	1	27.83	0	0	0.00	96,539	34,746	2.78
LDT2	23,416,191	845,155	27.71	89,128	2,487	35.84	0	0	0.00	843,979	299,122	2.82
LHD1	1,365,840	83,738	16.31	944,756	43,777	21.58	0	0	0.00	734,274	413,234	1.78
LHD2	194,698	13,692	14.22	427,344	23,175	18.44	0	0	0.00	185,874	104,696	1.78
MCY	359,272	8,337	43.09	0	0	0.00	0	0	0.00	0	0	0.00
MDV	13,281,710	584,111	22.74	154,000	5,696	27.04	0	0	0.00	680,626	246,756	2.76
MH	48,882	9,991	4.89	28,525	2,810	10.15	0	0	0.00	0	0	0.00
Motor coach	0	0	0.00	17,757	2,857	6.22	0	0	0.00	0	0	0.00
OBUS	22,272	3,905	5.70	0	0	0.00	0	0	0.00	9,675	10,084	0.96
PTO	0	0	0.00	40,155	7,282	5.51	0	0	0.00	13,715	28,410	0.48
SBUS	28,659	3,096	9.26	9,103	1,163	7.83	20,876	4,711	4.43	9,035	10,447	0.86
T6	192,489	34,657	5.55	1,014,720	107,260	9.46	14,551	1,700	8.56	398,761	418,821	0.95
T7	458	91	5.01	1,405,359	200,869	7.00	96,722	14,650	6.60	188,243	337,362	0.56
UBUS	40,472	2,559	15.82	0	0	0.00	64,390	21,126	3.05	51,621	109,822	0.47
Total	**83,989,663**	**2,925,270**	**28.71**	**4,184,371**	**400,046**	**10.46**	**202,558**	**42,803**	**4.73**	**9,795,701**	**4,461,109**	**2.20**

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2035
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Fuel Consumptio	Energy Consumption
Orange	2035	All Other Buses	Aggregate	Aggregate	Diesel	392.1758187	20425.37	20425.37	0	3490.364786	1.990750631	0
Orange	2035	All Other Buses	Aggregate	Aggregate	Natural Gas	110.8721532	6019.031748	6019.031748	0	986.7621634	0.616082131	0
Orange	2035	LDA	Aggregate	Aggregate	Gasoline	1025015.836	41066804.72	41066804.72	0	4797830.996	1197.840567	0
Orange	2035	LDA	Aggregate	Aggregate	Diesel	1040.668003	33069.74659	33069.74659	0	4521.409438	0.678940302	0
Orange	2035	LDA	Aggregate	Aggregate	Electricity	124692.9087	5463675.36	0	5463675.36	598914.6369	0	2109429.631
Orange	2035	LDA	Aggregate	Aggregate	Plug-in Hybrid	46045.15464	1937108.274	817423.2534	1119685.021	190396.7145	28.50698894	338178.2482
Orange	2035	LDT1	Aggregate	Aggregate	Gasoline	86348.82504	3133690.319	3133690.319	0	385455.5982	108.8624583	0
Orange	2035	LDT1	Aggregate	Aggregate	Diesel	0.685063439	29.51032249	29.51032249	0	3.300456234	0.00106048	0
Orange	2035	LDT1	Aggregate	Aggregate	Electricity	1428.625051	66488.58384	0	66488.58384	6994.229377	0	25670.08096
Orange	2035	LDT1	Aggregate	Aggregate	Plug-in Hybrid	1110.994899	50851.99441	20801.34508	30050.64932	4593.963907	0.727560665	9076.191749
Orange	2035	LDT2	Aggregate	Aggregate	Gasoline	581729.3208	23190849.88	23190849.88	0	2710991.291	837.2225323	0
Orange	2035	LDT2	Aggregate	Aggregate	Diesel	2227.902118	89127.81902	89127.81902	0	10426.20969	2.486673576	0
Orange	2035	LDT2	Aggregate	Aggregate	Electricity	16449.16596	526039.6701	0	526039.6701	80433.83172	0	203094.7291
Orange	2035	LDT2	Aggregate	Aggregate	Plug-in Hybrid	12546.47934	543280.3585	225341.5044	317938.8541	51879.69207	7.932824489	96027.01003
Orange	2035	LHD1	Aggregate	Aggregate	Gasoline	35991.75907	1365839.649	1365839.649	0	536223.5825	83.73761561	0
Orange	2035	LHD1	Aggregate	Aggregate	Diesel	24672.20821	944755.5899	944755.5899	0	310345.3417	43.77694659	0
Orange	2035	LHD1	Aggregate	Aggregate	Electricity	13272.19033	734273.8963	0	734273.8963	185323.0412	0	413234.1012
Orange	2035	LHD2	Aggregate	Aggregate	Gasoline	5517.319644	194698.0898	194698.0898	0	82199.84189	13.69167528	0
Orange	2035	LHD2	Aggregate	Aggregate	Diesel	11396.41709	427343.9656	427343.9656	0	143352.5904	23.17490647	0
Orange	2035	LHD2	Aggregate	Aggregate	Electricity	3522.207796	185873.7855	0	185873.7855	46675.46267	0	104695.9393
Orange	2035	MCY	Aggregate	Aggregate	Gasoline	58172.20192	359272.2254	359272.2254	0	116344.4038	8.33700843	0
Orange	2035	MDV	Aggregate	Aggregate	Gasoline	340237.1875	13145806.32	13145806.32	0	1572404.948	579.2589376	0
Orange	2035	MDV	Aggregate	Aggregate	Diesel	4102.008105	154000.4141	154000.4141	0	18767.0556	5.695739745	0
Orange	2035	MDV	Aggregate	Aggregate	Electricity	15443.6702	490013.4289	0	490013.4289	75325.92721	0	189185.6266
Orange	2035	MDV	Aggregate	Aggregate	Plug-in Hybrid	7788.106551	326516.9132	135903.8505	190613.0627	32203.82059	4.851887698	57570.82611
Orange	2035	MH	Aggregate	Aggregate	Gasoline	4610.156808	48881.72073	48881.72073	0	461.200087	9.99096781	0
Orange	2035	MH	Aggregate	Aggregate	Diesel	3038.248776	28524.71627	28524.71627	0	303.8248776	2.810321112	0
Orange	2035	Motor Coach	Aggregate	Aggregate	Diesel	146.819704	17756.81561	17756.81561	0	3373.916798	2.856568734	0
Orange	2035	OBUS	Aggregate	Aggregate	Gasoline	631.5891032	22271.63055	22271.63055	0	12636.83478	3.904998889	0
Orange	2035	OBUS	Aggregate	Aggregate	Electricity	143.0287546	9674.830969	0	9674.830969	2861.719322	0	10084.49573
Orange	2035	PTO	Aggregate	Aggregate	Diesel	0	40155.03068	40155.03068	0	0	7.282405896	0
Orange	2035	PTO	Aggregate	Aggregate	Electricity	0	13714.65447	0	13714.65447	0	0	28410.16412
Orange	2035	SBUS	Aggregate	Aggregate	Gasoline	636.0164784	28659.18273	28659.18273	0	2544.065914	3.096219677	0
Orange	2035	SBUS	Aggregate	Aggregate	Diesel	435.9791603	9103.164671	9103.164671	0	6312.978241	1.163112019	0
Orange	2035	SBUS	Aggregate	Aggregate	Electricity	291.6171112	9034.537489	0	9034.537489	3467.803096	0	10446.64783
Orange	2035	SBUS	Aggregate	Aggregate	Natural Gas	953.2575516	20875.86953	20875.86953	0	13803.16935	4.710579749	0
Orange	2035	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	6.92789634	458.7773279	458.7773279	0	159.2030579	0.046220547	0
Orange	2035	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	3.08202006	249.799235	0	249.799235	70.82482097	0	263.4003118
Orange	2035	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	8.676673582	634.3842468	634.3842468	0	199.3899589	0.063990114	0
Orange	2035	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	3.749613589	337.6553786	0	337.6553786	86.16612029	0	356.0400494
Orange	2035	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	37.0485223	1616.875442	1616.875442	0	851.3750425	0.162520584	0
Orange	2035	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	17.5644694	923.0919097	0	923.0919097	403.6315068	0	973.3524475
Orange	2035	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	67.4269418	13139.87282	13139.87282	0	1549.471123	1.161640094	0
Orange	2035	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	12.96824196	2783.129783	0	2783.129783	298.0102003	0	2934.665723
Orange	2035	T6 CAIRP Class 7	Aggregate	Aggregate	Natural Gas	0.046308907	8.956458589	8.956458589	0	1.064178676	0.000848945	0
Orange	2035	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2287.355383	74084.82985	74084.82985	0	32640.56132	7.959123388	0
Orange	2035	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	701.9744803	27011.67315	0	27011.67315	10017.17583	0	28356.48707
Orange	2035	T6 Instate Delivery Class 4	Aggregate	Aggregate	Natural Gas	13.01320712	440.5631993	440.5631993	0	185.6984656	0.051418619	0
Orange	2035	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1870.280814	60512.38339	60512.38339	0	26688.90722	6.493020254	0
Orange	2035	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	567.9181097	21882.52294	0	21882.52294	8104.191426	0	22971.97495
Orange	2035	T6 Instate Delivery Class 5	Aggregate	Aggregate	Natural Gas	10.1447857	345.5117745	345.5117745	0	144.7660919	0.040166202	0
Orange	2035	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	5784.461488	187133.9015	187133.9015	0	82544.26543	20.12749516	0
Orange	2035	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	1765.014475	67744.88941	0	67744.88941	25186.75655	0	71117.66347
Orange	2035	T6 Instate Delivery Class 6	Aggregate	Aggregate	Natural Gas	30.70459013	1048.48899	1048.48899	0	438.1545011	0.121795141	0
Orange	2035	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	949.8982595	46192.43709	46192.43709	0	13555.04816	4.956568283	0
Orange	2035	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	141.0419135	7417.572445	0	7417.572445	2012.668106	0	7786.866663
Orange	2035	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	27.09319072	1307.474928	1307.474928	0	386.6198315	0.151550865	0
Orange	2035	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	1996.357888	75939.2018	75939.2018	0	23077.89718	8.057367531	0
Orange	2035	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	654.9531628	31016.33252	0	31016.33252	7571.258563	0	32568.27617
Orange	2035	T6 Instate Other Class 4	Aggregate	Aggregate	Natural Gas	11.12804836	470.9968505	470.9968505	0	128.6402391	0.053604145	0
Orange	2035	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	4854.086305	184415.4625	184415.4625	0	56113.23768	19.5990714	0
Orange	2035	T6 Instate Other Class 5	Aggregate	Aggregate	Electricity	1568.156849	74528.62804	0	74528.62804	18127.89317	0	78257.76755
Orange	2035	T6 Instate Other Class 5	Aggregate	Aggregate	Natural Gas	26.14808459	1115.161711	1115.161711	0	302.2718579	0.126336563	0
Orange	2035	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	3954.070997	150402.0137	150402.0137	0	45709.06072	15.95662972	0
Orange	2035	T6 Instate Other Class 6	Aggregate	Aggregate	Electricity	1281.862188	60721.97875	0	60721.97875	14818.32689	0	63760.28411
Orange	2035	T6 Instate Other Class 6	Aggregate	Aggregate	Natural Gas	21.70826143	919.9039819	919.9039819	0	250.9475021	0.104205883	0
Orange	2035	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2537.347728	91741.09154	91741.09154	0	29331.73973	9.89170177	0
Orange	2035	T6 Instate Other Class 7	Aggregate	Aggregate	Electricity	409.4438985	26540.08924	0	26540.08924	4733.171467	0	27868.05808
Orange	2035	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	64.6884236	2290.841697	2290.841697	0	747.7981768	0.272672691	0
Orange	2035	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	29.51895326	1351.817018	1351.817018	0	341.2390997	0.141233173	0
Orange	2035	T6 Instate Tractor Class 6	Aggregate	Aggregate	Electricity	8.890398909	574.8430669	0	574.8430669	102.7730114	0	603.606108
Orange	2035	T6 Instate Tractor Class 6	Aggregate	Aggregate	Natural Gas	0.160984248	8.512094035	8.512094035	0	1.860977902	0.000939959	0
Orange	2035	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1620.778611	85383.66556	85383.66556	0	18736.20074	8.425220465	0
Orange	2035	T6 Instate Tractor Class 7	Aggregate	Aggregate	Electricity	125.5301776	9890.989315	0	9890.989315	1451.128853	0	10385.89818
Orange	2035	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	38.56324521	2018.445626	2018.445626	0	445.7911146	0.226481576	0
Orange	2035	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.876691566	411.6047209	411.6047209	0	135.0463722	0.038593404	0
Orange	2035	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.293680593	564.6476607	564.6476607	0	167.60878	0.053023183	0
Orange	2035	T6 OOS Class 6	Aggregate	Aggregate	Diesel	31.9477669	1475.440492	1475.440492	0	734.1596833	0.137874939	0
Orange	2035	T6 OOS Class 7	Aggregate	Aggregate	Diesel	40.36965123	10728.28707	10728.28707	0	927.6945853	0.911244272	0
Orange	2035	T6 Public Class 4	Aggregate	Aggregate	Diesel	102.2269811	3606.497435	3606.497435	0	524.424413	0.398872731	0
Orange	2035	T6 Public Class 4	Aggregate	Aggregate	Electricity	28.53979524	1209.407914	0	1209.407914	146.4091496	0	1273.685843
Orange	2035	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	18.62393271	665.9257793	665.9257793	0	95.54077481	0.081549701	0
Orange	2035	T6 Public Class 5	Aggregate	Aggregate	Diesel	96.90228818	3390.300052	3390.300052	0	497.1087383	0.373878918	0
Orange	2035	T6 Public Class 5	Aggregate	Aggregate	Electricity	28.03245797	1187.364119	0	1187.364119	143.8065094	0	1250.470458
Orange	2035	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	21.6657647	738.2604085	738.2604085	0	111.1453729	0.090845685	0
Orange	2035	T6 Public Class 6	Aggregate	Aggregate	Diesel	151.5315347	5403.24318	5403.24318	0	777.3567729	0.595305788	0
Orange	2035	T6 Public Class 6	Aggregate	Aggregate	Electricity	43.91935944	1845.208734	0	1845.208734	225.3063139	0	1943.278372
Orange	2035	T6 Public Class 6	Aggregate	Aggregate	Natural Gas	28.85917756	1031.385071	1031.385071	0	148.0475809	0.12600389	0
Orange	2035	T6 Public Class 7	Aggregate	Aggregate	Diesel	280.2989661	11903.77337	11903.77337	0	1437.933696	1.27727918	0
Orange	2035	T6 Public Class 7	Aggregate	Aggregate	Electricity	73.24925016	4147.945707	0	4147.945707	375.7686533	0	4368.401814
Orange	2035	T6 Public Class 7	Aggregate	Aggregate	Natural Gas	48.89674038	2115.415067	2115.415067	0	250.8402782	0.249389295	0
Orange	2035	T6 Utility Class 5	Aggregate	Aggregate	Diesel	74.23498124	2936.27389	2936.27389	0	950.2077598	0.30010132	0

Orange	2035	T6 Utility Class 5	Aggregate	Aggregate	Electricity	39.47592683	1683.219932	0	1683.219932	505.2918634	0	1772.680146
Orange	2035	T6 Utility Class 5	Aggregate	Aggregate	Natural Gas	0.420342158	16.68294801	16.68294801	0	5.380379616	0.001810344	0
Orange	2035	T6 Utility Class 6	Aggregate	Aggregate	Diesel	14.00500158	555.0487033	555.0487033	0	179.2640202	0.056660377	0
Orange	2035	T6 Utility Class 6	Aggregate	Aggregate	Electricity	7.451755617	317.7079715	0	317.7079715	95.3824719	0	334.5935981
Orange	2035	T6 Utility Class 6	Aggregate	Aggregate	Natural Gas	0.087457745	3.386886293	3.386886293	0	1.119459135	0.000369119	0
Orange	2035	T6 Utility Class 7	Aggregate	Aggregate	Diesel	15.50369586	738.3511437	738.3511437	0	198.4473071	0.074871367	0
Orange	2035	T6 Utility Class 7	Aggregate	Aggregate	Electricity	8.331327949	476.0326067	0	476.0326067	106.6409977	0	501.3329126
Orange	2035	T6 Utility Class 7	Aggregate	Aggregate	Natural Gas	0.099846057	4.622977453	4.622977453	0	1.27802953	0.000495633	0
Orange	2035	T6TS	Aggregate	Aggregate	Gasoline	4716.416682	192489.3921	192489.3921	0	94366.06498	34.65744969	0
Orange	2035	T6TS	Aggregate	Aggregate	Electricity	761.8392398	56270.99597	0	56270.99597	15242.87951	0	59171.95137
Orange	2035	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1160.563422	239502.4612	239502.4612	0	26669.74744	32.84819798	0
Orange	2035	T7 CAIRP Class 8	Aggregate	Aggregate	Electricity	230.284113	51044.51751	0	51044.51751	5291.928916	0	91534.48459
Orange	2035	T7 CAIRP Class 8	Aggregate	Aggregate	Natural Gas	4.272546348	880.7123299	880.7123299	0	98.18311507	0.142730129	0
Orange	2035	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1208.588618	345359.2305	345359.2305	0	27773.36644	44.84793407	0
Orange	2035	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	524.1131413	125400.2915	125400.2915	0	12044.11999	16.56090385	0
Orange	2035	T7 POLA Class 8	Aggregate	Aggregate	Diesel	1412.600096	254765.3169	254765.3169	0	23110.13756	38.64337407	0
Orange	2035	T7 POLA Class 8	Aggregate	Aggregate	Electricity	111.5771972	19494.19183	0	19494.19183	1825.402946	0	34938.57379
Orange	2035	T7 POLA Class 8	Aggregate	Aggregate	Natural Gas	40.56238457	7300.157318	7300.157318	0	663.6006115	1.082345564	0
Orange	2035	T7 Public Class 8	Aggregate	Aggregate	Diesel	492.1445138	19364.88232	19364.88232	0	2524.701356	3.162625179	0
Orange	2035	T7 Public Class 8	Aggregate	Aggregate	Electricity	182.4005762	10430.39527	0	10430.39527	935.7149559	0	18687.73719
Orange	2035	T7 Public Class 8	Aggregate	Aggregate	Natural Gas	392.9984512	16986.98533	16986.98533	0	2016.082055	2.680380315	0
Orange	2035	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Diesel	206.5550095	13249.3492	13249.3492	0	1945.74819	1.990640261	0
Orange	2035	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Electricity	103.8328529	8172.863044	0	8172.863044	978.1054746	0	14644.89301
Orange	2035	T7 Single Concrete/Transit Mix Cl	Aggregate	Aggregate	Natural Gas	15.60337481	1015.935348	1015.935348	0	146.9837907	0.157766169	0
Orange	2035	T7 Single Dump Class 8	Aggregate	Aggregate	Diesel	1008.540214	49279.72071	49279.72071	0	9500.448812	7.821608266	0
Orange	2035	T7 Single Dump Class 8	Aggregate	Aggregate	Electricity	202.417353	15439.90173	0	15439.90173	1906.771465	0	27666.64603
Orange	2035	T7 Single Dump Class 8	Aggregate	Aggregate	Natural Gas	79.67691181	3876.315152	3876.315152	0	750.5565092	0.653002655	0
Orange	2035	T7 Single Other Class 8	Aggregate	Aggregate	Diesel	2880.226304	124922.8445	124922.8445	0	27131.73178	19.61385289	0
Orange	2035	T7 Single Other Class 8	Aggregate	Aggregate	Electricity	721.9436371	45456.97645	0	45456.97645	6800.709061	0	81454.02081
Orange	2035	T7 Single Other Class 8	Aggregate	Aggregate	Natural Gas	229.6703056	9884.595956	9884.595956	0	2163.494279	1.660212841	0
Orange	2035	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	96.09254803	6238.584369	6238.584369	0	442.0257209	2.303203857	0
Orange	2035	T7 SWCV Class 8	Aggregate	Aggregate	Electricity	177.8027285	11410.3857	0	11410.3857	817.892551	0	20421.07219
Orange	2035	T7 SWCV Class 8	Aggregate	Aggregate	Natural Gas	771.6922553	50035.77748	50035.77748	0	3549.784374	7.117100105	0
Orange	2035	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	3510.847675	224426.7395	224426.7395	0	51012.61671	32.63678801	0
Orange	2035	T7 Tractor Class 8	Aggregate	Aggregate	Electricity	332.2101579	25817.84702	0	25817.84702	4827.013594	0	46266.63027
Orange	2035	T7 Tractor Class 8	Aggregate	Aggregate	Natural Gas	107.3606085	6741.791966	6741.791966	0	1559.949642	1.156434863	0
Orange	2035	T7 Utility Class 8	Aggregate	Aggregate	Diesel	69.21879648	2849.530438	2849.530438	0	886.0005949	0.439815423	0
Orange	2035	T7 Utility Class 8	Aggregate	Aggregate	Electricity	14.40514605	811.2520768	0	811.2520768	184.3858695	0	1453.489078
Orange	2035	T7IS	Aggregate	Aggregate	Gasoline	4.010125732	457.9285063	457.9285063	0	80.23459565	0.091455018	0
Orange	2035	T7IS	Aggregate	Aggregate	Electricity	0.800919925	164.6176419	0	164.6176419	16.02480587	0	294.6057494
Orange	2035	UBUS	Aggregate	Aggregate	Gasoline	241.642597	40472.17597	40472.17597	0	966.570388	2.558657671	0
Orange	2035	UBUS	Aggregate	Aggregate	Electricity	293.4176801	51620.652	0	51620.652	1173.67072	0	109822.3323
Orange	2035	UBUS	Aggregate	Aggregate	Natural Gas	319.9012769	64390.31693	64390.31693	0	1279.605108	21.12616529	0

Appendix D Biological Resources Technical Report

Appendices

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Biological Resources Technical Report

Brea 265 Specific Plan
City of Brea, Orange County, California

FINAL REPORT



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GLOSSARY

APN	Assessor's Parcel Number
BMP	Best Management Practices
CDFG	California Department of Fish and Game (CDFW effective Jan 1st 2013)
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Ranking
CWA	Clean Water Act
EIR	Environmental Impact Report
FAC	Facultative (wetland indicator status)
FACW	Facultative Wetland (wetland indicator status)
FESA	federal Endangered Species Act
FMZ	Fuel Modification Zone
GIS	Geographic Information System
GLA	Glenn Lukos Associates
GPS	Global Positioning System
HMMP	Habitat Mitigation Monitoring Plan
HR	Hillside Residential Ordinance City of Brea Standards
LDR	Low Density Residential
MCV II	A Manual of California Vegetation, Second Edition
NCCP/HCP	Natural Community Conservation Plan/Habitat Conservation Plan
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High Water Mark
PBF	Physical and Biological Features
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SSC	California Species of Special Concern
UPL	Upland (wetland indicator status)
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	State Waste Discharge Requirements

APPENDIX A/B - FLORAL/FAUNAL COMPENDIUM

INTRODUCTION

The following biological resources technical report describes a detailed assessment of potential sensitive natural resources located within and immediately adjacent to the Brea 265 Specific Plan Project Site. Specifically, the report has been prepared to support the preparation of an Environmental Impact Report (EIR) to ensure compliance with the California Environmental Quality Act (CEQA), State and Federal Endangered Species Acts (CESA and FESA), the Federal Clean Water Act (CWA), California Fish and Game Codes, and review process conducted by the City of Brea, Orange County, California.

As discussed below, the assessment includes a thorough literature review, site reconnaissance characterizing baseline conditions (including floral and faunal and dominant vegetation communities), focused sensitive species surveys, impact analysis, and proposed mitigation measures. As appropriate, this report is consistent with accepted scientific and technical standards and survey guideline requirements issued by the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW), the California Native Plant Society (CNPS), and other applicable agencies/organizations.

PROJECT LOCATION/DESCRIPTION

The 262.10-acre Brea 265 Specific Plan project site, Assessor's Parcel Numbers (APNs) 320-073-08, 320-071-29, 308-011-23, 322-031-24, 322-031-12, 322-031-11, 322-031-13, 322-031-14, 322-031-20, 322-031-21, 320-072-02 and 322-031-19 (Project Site) is located in the central region of the City of Brea and City of Brea Sphere of Influence, Orange County, California as illustrated in Figure 1, *Regional Location Map* and Figure 2, *Project Site Map*. This report also evaluates impacts to an offsite 0.45-acre (APN 306-032-01) north of the Project Site.

Specifically, the Project Site is located within an unsectioned area of Township 2, Range 5 west, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Yorba Linda (dated 1964 and photorevised in 1981). The Project Site is bordered by Carbon Canyon Dam to the east, bordered and bisected by Carbon Canyon (State Route 142)/East Lambert Roads to the north and bordered/bisected by Valencia Avenue and North Rose Drive in the central and southwest region. With the exception Carbon Canyon Regional Park extending from the northeast Project Site boundary, the balance of the property is bounded by residential developments and institutional facilities (The Olinda Elementary School, the Brea Sports Park, and the mixed-use community of La Floresta) as illustrated in Figure 2, *Project Site Map*.

The majority of the Project Site is an active oil operations site operated by Aera Energy LLC and the southern region (APN's 322-031-14, 322-031-20, 322-031-21, and 322-031-19) is an active agricultural area. The Project Site has been used for oil production continuously since the early 1900s. Of the approximately 190 wells drilled on the site 110 remain in operation and produce approximately 500 barrels per day. The majority of the site is relatively flat with elevations gradually increasing in the north-eastern portions of the project, falling into the 0-10% slope range.

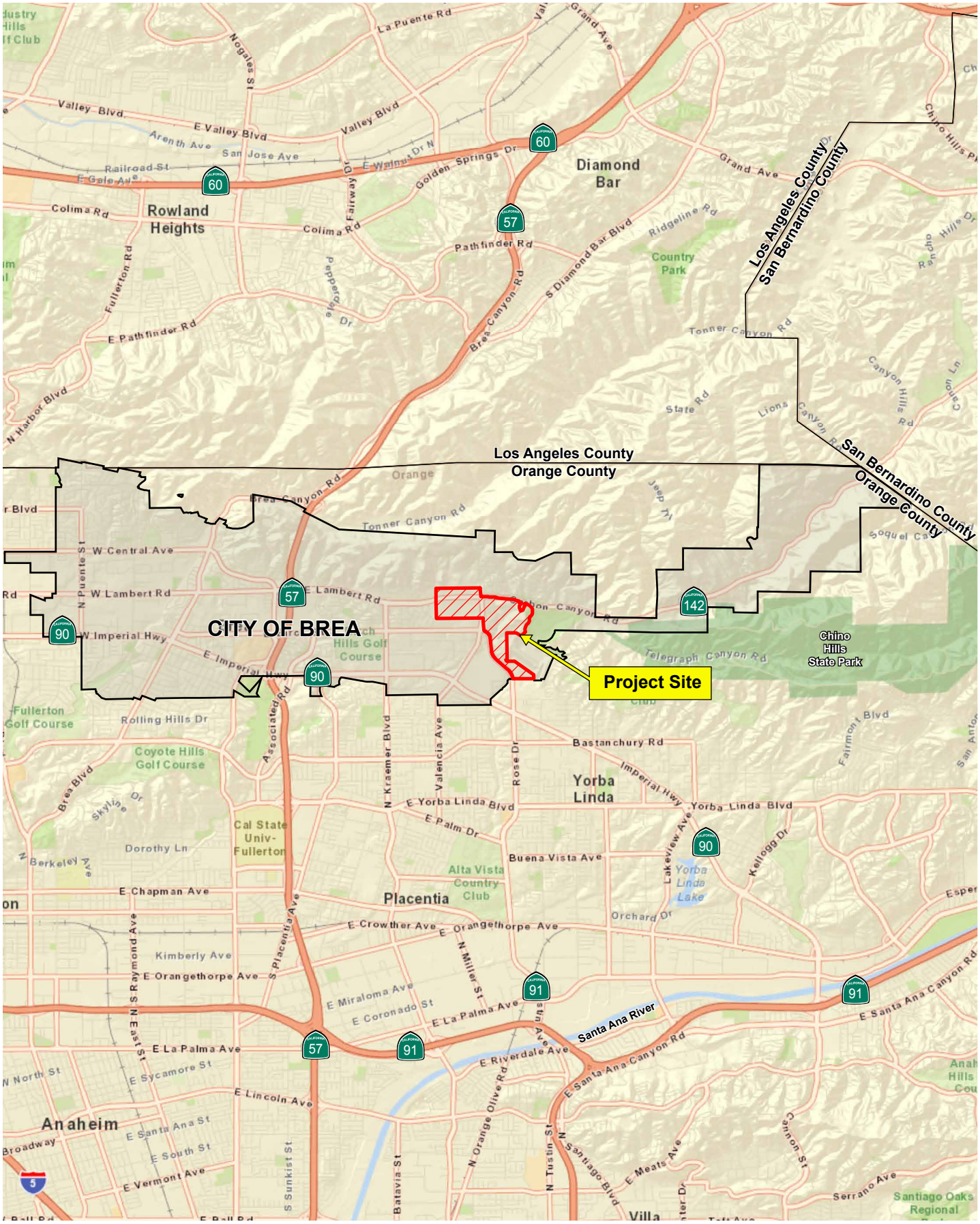


Figure 1 - Regional Location Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

not to scale



Figure 2 - Project Site Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

The Brea 265 Specific Plan proposes a master planned residential community of low-, medium-, and high-density residential neighborhoods, parks, recreational amenities and open space, linked together by an extensive trail network that connects to the Tracks at Brea and other regional systems. At buildout, the Proposed Project would provide low density units, medium-density units, and high-density units, totaling 1,100 units with an overall average density of approximately 4 dwelling units per acre, provide up to 15.1-acres of parks/recreations uses (including up to 13 acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.0-acre Trail Staging Area) and approximately 47.50-acres of open space. These acreages include an approximately 1.4-acre site on the northeast corner of Valencia and Rose Dr. option for additional landscaped open space.

Once the project entitlements are complete, all on-site oil operations would be discontinued and abandoned, and wells and production facilities would be remediated in accordance with Federal, State and local regulations. No residual oil operations will remain in the proposed residential community. The Brea 265 Specific Plan would change its existing HR and LDR General Plan land use designations to Brea 265 Specific Plan, and change the current HR Hillside Residential and R-1 Single-Family Residential zoning designations to "Brea 265 Specific Plan."

PROJECT BACKGROUND

Interagency Meetings

The following outline summarizes interagency meetings held to present/discuss the existing biological conditions, anticipated impacts to sensitive resources, critical habitat, jurisdictional features, and mitigation approaches. Representative agencies/jurisdictions included the United States Army Corps of Engineers (USACE) and United States Fish and Wildlife Service (USFWS).

- July 9th, 2019. USFWS/Aera Energy, Inc./ Glenn Lukos Associates (GLA) – site visit
- August 8th, 2019. USACE/Aera Energy, Inc./GLA – site visit

Collectively the interagency meetings resulted in directives to achieve the following goals.

- Mitigate for impacts to occupied coastal California gnatcatcher habitat
- Mitigate for impacts to coastal California Gnatcatcher USFWS designated critical habitat.
- Verify jurisdictional delineation and review proposed mitigation options.

The preceding agency directives/goals have been achieved and incorporated into the overall project design as presented in the following biological resources technical report.

LITERATURE REVIEW

Existing biological resource conditions within and adjacent to the Project Site were initially investigated through review of pertinent scientific literature. Federal register listings, protocols, and species data provided by the USFWS were reviewed in conjunction with anticipated Federally listed species potentially occurring within the Project Site. The California Natural Diversity Database (CNDDB 2022a), a CDFW Natural Heritage Division species account database, was also reviewed for all pertinent information regarding the locations of known occurrences of sensitive species in the vicinity of the property. In addition, numerous regional floral and faunal field guides were utilized in the identification of species and suitable habitats. Combined, the reviewed sources provided an excellent baseline from which to inventory and review the biological resources potentially occurring in the area. Other sources of information included the review of unpublished biological resource letter reports and assessments.

Other CDFW reports and publications consulted include the following:

- Special Animals (CDFW 2022b);
- Special Vascular Plants and Bryophytes List (CDFW 2022c);
- Endangered, Threatened, and Rare Plants of California (CDFW 2022d); and
- State and Federally Listed Endangered and Threatened Animals of California (CDFW 2022e);

FIELD SURVEYS

The field study focused on a number of primary objectives that would comply with CEQA requirements, including (1) general reconnaissance survey and vegetation mapping; (2) general biological surveys; (3) habitat assessments for special-status plant species; (4) focused surveys for special-status plants; (5) habitat assessments for special-status wildlife species; (6) focused surveys for special-status animals; and (7) jurisdictional delineation. Specifically, the focus of the biological surveys was determined through initial site reconnaissance, a review of the CNDDB [CDFW 2022a], CNPS 8th edition online inventory (CNPS 2022), Natural Resource Conservation Service (NRCS) soil data, other pertinent literature, and knowledge of the region. Site-specific general surveys within the Project Site were conducted on foot in the proposed development areas for each target plant or animal species identified below. Biological studies were conducted in order to identify and analyze potential direct, indirect and cumulative impacts to biological resources associated with development of the Project Site.

Observations of all plant and wildlife species were recorded during each of the above-mentioned survey efforts [Appendix A: Floral Compendium and Appendix B: Faunal Compendium].

As outlined in Table 1, *Summary of Biological Surveys for the Project Site*, the studies conducted include the following:

- Performance of vegetation mapping;
- Performance of site-specific habitat assessments and associated focused biological surveys to evaluate the potential presence/absence of special-status species (or potentially suitable habitat) to the satisfaction of CEQA and federal and state regulations; and
- Delineation of aquatic resources (including the potential for wetlands and riparian habitat) potentially subject to the jurisdiction of the USACE, Regional Water Quality Control Board (RWQCB), and CDFW.

Table 1.
Summary of Biological Surveys for the Project Site.

Survey Type	2018 Survey Dates	Biologists
Focused Burrowing Owl Surveys	**4/9, 5/2, 5/25, 7/3**	**JA**
Focused California Gnatcatcher Surveys	**4/6, 4/13, 4/19, 5/4, 5/11, 5/18**	**KL**
Vegetation Mapping and Habitat Assessment	**4/17, 4/19, 5/11, 6/18**	**KL, TB**
Jurisdictional Delineation	**4/25**	**KL, TB**
Focused and General Plant Surveys	**4/17, 4/18, 4/20, 4/25 5/18, 6/18**	**KL, DM, TB, JS**
Focused Bat Surveys	**7/3, 7/9**	**JA, SC. TB**
Survey Type	**2019 Survey Dates**	**Biologists**
Jurisdictional Delineation	**4/22, 8/8**	**TB**
Survey Type	**2020 Survey Dates**	**Biologists**
Jurisdictional Delineation	**5/4, 5/18**	**TB**
Focused Crotch Bumblebee Surveys	**4/11, 5/7, 7/6, 2020**	**JA, TB**
Survey Type	**2021 Survey Dates**	**Biologists**
Vegetation Mapping & JD	**7/12, 7/23**	**TB**

JA = Jeff Ahrens, KL = Kevin Livergood, TB = Tony Bomkamp, SC = Stephanie Cashin, DM = Dave Moskovitz, JS = Jillian Stephens

Individual plants and wildlife species are evaluated in this report based on their "special-status." For the purpose of this report, plants were considered "special-status" based on one or more of the following criteria:

- Listing through the Federal and/or State Endangered Species Act (FESA, CESA);
- Occurrence in the CNPS Rare Plant Inventory (Rank 1A/1B, 2A/2B, 3, or 4);
- Occurrence in the CNDDB inventory.

Wildlife species were considered "special-status" based on one or more of the following criteria:

- Listing through the FESA and/or CESA;
- Designation by the State as a Species of Special Concern (SSC) or California Fully Protected (CFP) species.

Vegetation communities and habitats were considered "special-status" based on one or more of the following criteria:

- Global (G) and/or State (S) ranking of category 3 or less based on CDFW;
- Riparian habitat;
- Occurrence of vegetation community or habitat in the CNDDB inventory.

Floral Resources

A site-specific survey program was designed to accurately document the botanical resources within the Project Site, and consisted of five components: (1) a literature search; (2) preparation of a list of target special-status plant species and sensitive vegetation communities that could occur within the Project Site; (3) general field reconnaissance surveys; (4) vegetation mapping according to the List of Vegetation Alliances and Associations; and (5) habitat assessments and focused surveys for special-status plants.

Prior to conducting fieldwork, pertinent literature on the flora of the region was examined. A thorough archival review was conducted using available literature and other historical records. These resources included the following:

- California Native Plant Society, Rare Plant Program. 2018/2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39) for the USGS 7.5' quadrangles: Yorba Linda, San Dimas, Ontario, Prado Dam, Black Star Canyon, Orange, Anaheim, La Habra, and Baldwin Park (CNPS 2022); and

- CNDDB for the USGS 7.5' quadrangles: Yorba Linda, San Dimas, Ontario, Prado Dam, Black Star Canyon, Orange, Anaheim, La Habra, and Baldwin Park (CNDDB 2022a).

Vegetation alliances within the Project Site were mapped in accordance with A Manual of California Vegetation, Second Edition or MCV II, which is the California expression of the National Vegetation Classification. Where necessary, deviations were made when areas were not consistent with the "membership rules" set forth in the MCV II. Such modifications to the vegetation alliances were designated based on the dominant plant species. Vegetation alliances were mapped in the field directly onto a 200-scale (1" = 200') aerial photograph.

Based on this information, vegetation profiles and a list of target sensitive plant species and habitats that could occur within the Project Site were developed and incorporated into a mapping and survey program to achieve the following goals: (1) characterize the vegetation associations and land use; (2) prepare a detailed floristic compendium; (3) identify the potential for any special status plants that may occur within the Project Site; and (4) prepare a map showing the distribution of any sensitive botanical resources associated with the Project Site.

All faunal surveys were conducted by GLA biologists Dave Moskovitz, Tony Bomkamp, Jillian Stephens, and Kevin Livergood on April 17th, April 19th, April 25th, May 11th, and June 18th, 2018 to conduct general and focused plant surveys. Surveys were conducted in accordance with accepted botanical survey guidelines (CDFG 2009, CNPS 2001, USFWS 2000). As applicable, surveys were conducted at appropriate times based on precipitation and flowering periods. An aerial photograph, a soil map, and/or a topographic map were used to determine the community types and other physical features that may support sensitive and uncommon taxa or communities within the Project Site. Surveys were conducted by following meandering transects within target areas of suitable habitat. All plant species encountered during the field surveys were identified and recorded following the above-referenced guidelines adopted by CNPS (2010) and CDFW by Nelson (1984). A complete list of the plant species observed is provided in Appendix A, Floral Compendium. Scientific nomenclature and common names used in this report follow Baldwin et al (2012), Munz (1974), and Allen and Roberts (2013).

Faunal Resources

Faunal species were evaluated and detected during field surveys by sight, call, tracks, and scat. Site reconnaissance was conducted in such a manner as to allow inspection of the entire Project Site by direct observation, including the use of binoculars. Observations of physical evidence and direct sightings of wildlife were recorded in field notes during the visit. A complete list of wildlife species observed within the Project Site is provided in Appendix B: Faunal Compendium. Scientific nomenclature and common names for vertebrate species referred to in this report follow the Complete List of Amphibian, Reptile, Bird, and Mammal Species in California (CDFG 2008), Standard Common and Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians 6th Edition, Collins and Taggert (2009) for amphibians and reptiles, and the American Ornithologists' Union Checklist 7th Edition (2009) for birds. The methodology (including any applicable survey protocols) utilized to conduct general surveys, habitat assessments, and/or focused surveys for special-status animals are included below.

General Surveys

Birds - During the general biological and reconnaissance surveys within the Project Site, birds were detected by direct observation and/or by vocalizations, with identifications recorded in field notes.

Mammals - During general biological and reconnaissance surveys within the Project Site, mammals were identified and detected by direct observations and/or by the presence of diagnostic sign (i.e., tracks, burrows, scat, etc.). In addition, focused

surveys were conducted for special-status bats as well as common bat species that could potentially roost on the site.

Focused bat surveys were conducted by GLA biologists Jeff Ahrens, Stephanie Cashin and Tony Bomkamp on July 3rd and July 9th, 2018. All surveys were conducted approximately 30 minutes before dusk and extended between three and four hours. Bat surveys were comprised of a combination of acoustic and emergence surveys from throughout the Project Site. Areas determined to support the best bat roosting habitat (including Eucalyptus and palm trees) were visually inspected for evidence of roosting (e.g., urine staining, guano concentrations, and/or audible bats) and were visually and acoustically surveyed for bat emergence.

Two ultrasonic acoustic recording devices were deployed throughout the bat Project Site. Recording devices included two Wildlife Acoustics EchoMeter 2 Pro microphones attached to an Apple iTouch and an Apple iPad. A Seek Compact Pro Thermal imager attached to an iPhone or iPad was used to assist in detecting heat signatures of bats within and exiting from potential roost areas. A combination of walking and driving transects with the ultrasonic devices were also employed throughout the Project Site. Driving transects averaged 5 miles per hour.

All acoustic data was recorded in full spectrum and was processed and analyzed with Sonobat 4.2.2 bat call analysis software using the California Southwest classifier. All acoustic calls were manually reviewed and vetted using multiple Sonobat acoustic reference libraries and reference materials including Echolocation Call Characteristics of California Bats (Humboldt State University, 2018) and Echolocation Call Characteristics of Western U.S. Bats (Humboldt State University, 2018).

Reptiles and Amphibians - During general biological and reconnaissance surveys within the Project Site, reptiles and amphibians were identified incidentally during surveys. Habitats were examined for diagnostic reptile sign, which include shed skins, scat, tracks, snake prints, and lizard tail drag marks. All reptiles and amphibian species observed, as well as diagnostic sign, were recorded in field notes.

Special Status Species

A literature search was conducted to obtain a list of special-status wildlife species with the potential to occur within the Project Site. Species were evaluated based on two factors: 1) species identified by the CNDDB as occurring (either currently or historically) on or in vicinity of the Project Site, and 2) any other special-status animals that are known to occur within the vicinity of the Project Site, or for which potentially suitable habitat occurs on the Project Site. Biologists Tony Bomkamp, Kevin Livergood, and Dave Moskovitz conducted habitat assessments for special-status animal species. An aerial photograph, soil map and/or topographic map were used to determine the community types and other physical features that may support special-status and uncommon taxa within the Project Site.

Burrowing Owls

Glenn Lukos Associations biologist Jeff Ahrens conducted focused surveys for the burrowing owl (*Athene cunicularia*) within all suitable habitat areas within the Project

Site. Surveys were conducted in accordance with survey guidelines described in the 2012 California Department of Fish and Game (CDFG) Staff Report on Burrowing Owl Mitigation. The guidelines stipulate that four (4) focused survey visits should be conducted between February 15th and July 15th, with the first visit occurring between February 15th and April 15th. The remaining three (3) visits should be conducted three weeks apart, with at least (1) one visit occurring between June 15th and July 15th. Focused surveys were conducted on April 9th, May 2nd, May 25th and July 3rd, 2018. As recommended by the survey guidelines, the survey visits were conducted between morning civil twilight and 10:00 AM. Weather conditions during the surveys were conducive to avian activity, including burrowing owl.

Surveys were conducted by walking meandering transects throughout areas of suitable habitat. Transects were spaced between 7 meters (m) and 20 m apart, adjusting for vegetation height and density, to ensure adequate visual coverage of the survey areas. At the start of each transect, and at least every 100 m along transects, the survey area was scanned for burrowing owls using binoculars. All suitable burrows were inspected for diagnostic owl sign (e.g., pellets, prey remains, whitewash, feathers, bones, and/or decoration) to identify potentially occupied burrows. Table 2, Summary of Burrowing Owl Surveys, summarizes the burrowing owl survey visits.

Table 2.
Summary of Burrowing Owl Surveys

Survey Date	Biologist	Start/End Time	Start/End Temperature (°F)	Start/End Wind Speed (mph)	Cloud Cover
4/9/18	J. Ahrens	0610-0850	55-64	2-4	Clear
5/2/18	J. Ahrens	0600-0845	51-55	1-3	Overcast
5/25/18	J. Ahrens	0550-0845	57-67	1-3	Clear
7/3/18	J. Ahrens	1720-1935	79-71	1-3	Clear

Source: GLA 2019

Coastal California Gnatcatcher

Glenn Lukos Associations biologist Kevin Livergood (TE-172638-2) conducted focused surveys for the coastal California gnatcatcher (*Polioptila californica californica*) for all suitable habitat areas within the Project Site. Surveys were conducted in accordance with the 1997 USFWS survey guidelines, which during the breeding season (March 15th through June 30th) require a minimum of six (6) surveys (per survey polygon) with at least one week separating each survey visit. The survey guidelines limit individual biologists to surveying a maximum of 80 acres per day. The Project Site contains approximately 13.49 acres of suitable scrub habitat for the coastal California gnatcatcher. Therefore, the survey area was not divided into multiple survey polygons.

Updated focused surveys were conducted on April 6th, April 13th, April 19th, May 4th, May 11th, and May 18th, 2018. Initial protocol surveys were conducted in 2017 in accordance with USFWS survey guidelines (USFWS 1997). Pursuant to the survey guidelines, the surveys were conducted between sunrise and 12:00 p.m. Weather conditions during the surveys were conducive to avian activity. Table 3, *Summary of Coastal California Gnatcatcher Surveys,* summarizes the gnatcatcher survey visits.

Table 3.
Summary of Coastal California Gnatcatcher Surveys

Survey Date	Biologist	Start/End Time	Start/End Temperature (°F)	Start/End Wind Speed (mph)	Cloud Cover
4/6/18	K. Livergood	0700-1130	53-66	2-5	Partly Cloudy
4/13/18	K. Livergood	0715-1200	60-75	3-5	Clear
4/19/18	K. Livergood	0730-1145	53-78	1-3	Clear
5/4/18	K. Livergood	0730-1140	61-83	0-3	Clear
5/11/18	K. Livergood	0740-1200	58-63	3-5	Overcast
5/18/18	K. Livergood	0815-1200	62-66	2-3	Overcast

Source: GLA 2019

Crotch Bumblebee

Focused surveys for were conducted by GLA senior biologists Jeff Ahrens and Tony Bomkamp on April 11 and May 7, 2020 and by Mr. Ahrens on July 6, 2020. Weather conditions during the surveys were conducive to a high level of bee activity. The timing for each survey was adjusted based on the phenology of pollinator host plants available during the field season. Surveys generally took place on sunny days when temperatures were generally above 60° F, wind speeds were calm to low (less than 8 mph).

Due to the fragmented nature of the potential suitable habitat, during each focused survey, the biologists surveyed all suitable flowering areas within the Project site. The surveyor scanned suitable flowering areas for bumble bee activity and focused on those areas. Minimal time was spent in lesser quality habitat. Pursuant to the survey guidelines, focused surveys did not begin for at least two hours after sunrise (or unless bumble bees or other bee species were detected earlier) and were completed no later than two hours before sunset.

Jurisdictional Resources

Prior to beginning the field delineation, a 200-scale color aerial photograph and the previously cited USGS topographic maps were examined to determine the locations of potential areas of USACE/CDFW/Regional Board jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils, and hydrology. Specifically, on April 25th, 2018, April 22nd, 2019, and May 4th and May 18th, 2020 regulatory specialists of Glenn Lukos Associates, Inc. examined the project site to determine the limits of. Potential wetland habitats at the subject site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[1] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[2]. The presence of an Ordinary High Water Mark

[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[2] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Version 2.0). Ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

(OHWM) was determined using the 2008 Field Guide to Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States[3] in conjunction with the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States.[4] While in the field the limits of the OHWM, wetlands as appropriate, and CDFW and Regional Board jurisdiction were recorded using GPS technology and/or on ortho-rectified aerial photographs. Other data were recorded onto the appropriate datasheets.

EXISTING ENVIRONMENTAL SETTING

The following section (Existing Environmental Setting) has been extracted, reviewed and updated from the GLA baseline studies report and modifications have been made to the GLA text to ensure consistency with this document.

This section provides the results of general biological surveys, vegetation mapping, habitat assessments and a jurisdictional delineation for Waters of the United States (including wetlands) subject to the jurisdiction of the USACE, RWQCB, and streams (including riparian vegetation) and lakes subject to the jurisdiction of CDFW.

The Project Site is not located within or adjacent to an existing or proposed Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) including the NCCP/HCP Central and Coastal Subregion of Orange County.

SURROUNDING LAND USES/TOPOGRAPHY/SOILS

Surrounding Land Uses

The Project Site includes portions on the west and east sides of Valencia Avenue with the area west of Valencia Avenue further divided by East Lambert Road. The Project Site on the east side of Valencia Avenue consists of land associated with oil operations including oil fields, roads and paths, and related equipment and infrastructure. Disturbed, undeveloped land occurs scattered within the oilfield operations. Areas east of Valencia Avenue also support agricultural fields and operations bordering North Rose Drive as shown in Figure 3, *Vegetation Communities Map* and Figure 4 to 7, *Current Project Site Photographs*. The areas west of Valencia Avenue includes active and abandoned nursery facilities while still containing active oil operations. Three (3) ephemeral, disturbed drainages traverse the Project Site including a single drainage in the western region and a drainage with a tributary on the eastern region. Surrounding land uses include residential properties, businesses, and several parks including Carbon Canyon Regional Park to the east and Wildcatters Park to the north.

Topography

[3] Lichvar, R. W., and S. M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TR-08-12. Hanover, NH: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory. (http://www.crrel.usace.army.mil/library/technicalreports/ERDC-CRREL-TR-08-12.pdf).

[4] Curtis, Katherine E. and Robert Lichevar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TN-10-1. Hanover, NH: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

The western region of the Project Site is relatively flat, whereas the eastern region has slopes ranging from 2 to 75 percent. Elevations range from approximately 400 to 590 feet above sea level.

Soils

The Natural Resource Conservation Service (NRCS) identifies the following soil types (series) as occurring (currently or historically) within the Project Site as shown in Figure 8, *Soils Association Map*.

- Alo clay, 15 to 30 percent slopes (101)
  This well-drained soil type consists of 85 percent Alo soils and 15 percent minor components. The parent material is residuum weathered from sedimentary rock, and slopes range from 15 to 30 percent. A typical profile for this soil is clay from 0 to 22 inches and weathered bedrock from 22 to 59 inches.
- Anaheim loam, 30 to 50 percent slopes (107)
  This well-drained soil type was formed in fine grained residuum weathered from sandstone and shale. It consists of 85 percent Anaheim soils and 15 percent minor components. The common landform is hillslopes ranging from 30 to 50 percent slope. A typical profile consists of loam from 0 to 26 inches and bedrock from 26 to 54 inches.
- Balcom clay loam, 15 to 30 percent slopes (112), 30 to 50 percent slopes (113)
  This well-drained soil type was formed in calcareous residuum weathered from sandstone and shale. It consists of 85 percent Balcom soils and 15 percent minor components. The common landform is hillslopes ranging from 15 to 30 percent slopes. A typical profile consists of clay loam from 0 to 34 inches and bedrock from 34 to 44 inches.
- Calleguas clay loam, 50 to 75 percent slopes, eroded (134)
  This well-drained soil type consists of 85 percent Calleguas soils and 15 percent minor components. The parent material is residuum weathered from calcareous shale. Hillslopes with 50 to 75 percent slopes are the most common landform. A typical profile consists of clay loam from 0 to 11 inches, channery clay loam from 11 to 15 inches, and bedrock from 15 to 42 inches.
- Metz loamy sand (163)
  This soil type consists of 80 percent Metz soils and 20 percent minor components. The associated landform is alluvial fans with 0 to 2 percent slope. A typical profile consists of loamy sand from 0 to 17 inches, and stratified sand to fine sandy loam from 17 to 63 inches.
- Mocho loam, 2 to 9 percent slopes (167)
  This well-drained soil type consists of 85 percent Mocho soils and 15 percent minor components. The parent material is alluvium derived from sedimentary rock. Alluvial fans with 2 to 9 percent slopes are the most common landform. A typical profile consists of loam from 0 to 60 inches.
- Myford sandy loam, 2 to 30 percent slopes, eroded (173, 175, 176 and 177)
  This soil type is moderately well-drained and commonly occurs on terraces with slopes ranging from 2 to 30 percent. It consists of 75 to 85 percent Myford soils and 15 to 25 percent minor components. The parent material is alluvium derived from sandstone. A typical profile consists of a combination of sandy loam, sandy clay, and sandy clay loam from 0 to 79 inches.

- Pits - Omni clay, drained (187)
  This poorly-drained soil type consists of 85 percent Omni soils and 15 percent minor components. The associated landform is depressions with 0 to 2 percent slope. A typical profile consists of clay from 0 to 17 inches, and silty clay or clay from 17 to 60 inches.
- San Emigdio fine sandy loam, 2 to 9 percent slopes (195)
  This well-drained soil type consists of 85 percent San emigdio soils and 15 percent minor components. The parent material is mixed alluvium derived from igneous, metamorphic, and sedimentary rock. The common landform is alluvial fans ranging from 2 to 9 percent slope. A typical profile for this soil is fine sandy loam from 0 to 7 inches, and stratified gravelly loamy coarse sand to very fine sandy loam from 7 to 61 inches.
- Sorrento loam, 2 to 9 percent slopes (207)
  This well-drained soil type consists of 85 percent Sorrento soils and 15 percent minor components. The parent material is alluvium derived from sedimentary rock. The common landform is alluvial fans ranging from 2 to 9 percent slope. A typical profile for this soil is loam from 0 to 12 inches, silty clay loam from 12 to 62 inches, and sandy loam from 72 to 72 inches.
- Yorba cobbly sandy loam, 30 to 50 percent slopes (223 and 226)
  This well-drained soil type consists of 85 percent Yorba soils and 15 percent minor components. The parent material is sandy and gravelly alluvium derived from mixed substrates. The common landform is terraces with slopes ranging from 30 to 50 percent. A typical profile for this soil is cobbly sandy loam from 0 to 11 inches, gravelly sandy clay loam from 11 to 40 inches, and gravelly sandy loam from 40 to 63 inches.

VEGETATION COMMUNITIES

During vegetation alliance mapping of the Project Site, a total of 34 different vegetation alliances or land-cover types were identified. Table 4, Vegetation Community Acreages, provides a summary of vegetation alliances/land uses and the corresponding acreage; detailed descriptions of each alliance/land use is provided in the following section as shown in Figure 3, *Vegetation Communities* and Figure 4 to 7, *Current Project Site Photographs*. The table below includes CNDDB Rarity Rankings and as appropriate, the threat code listed by the California Invasive Plant Council (Cal-IPC) for invasive plant species.

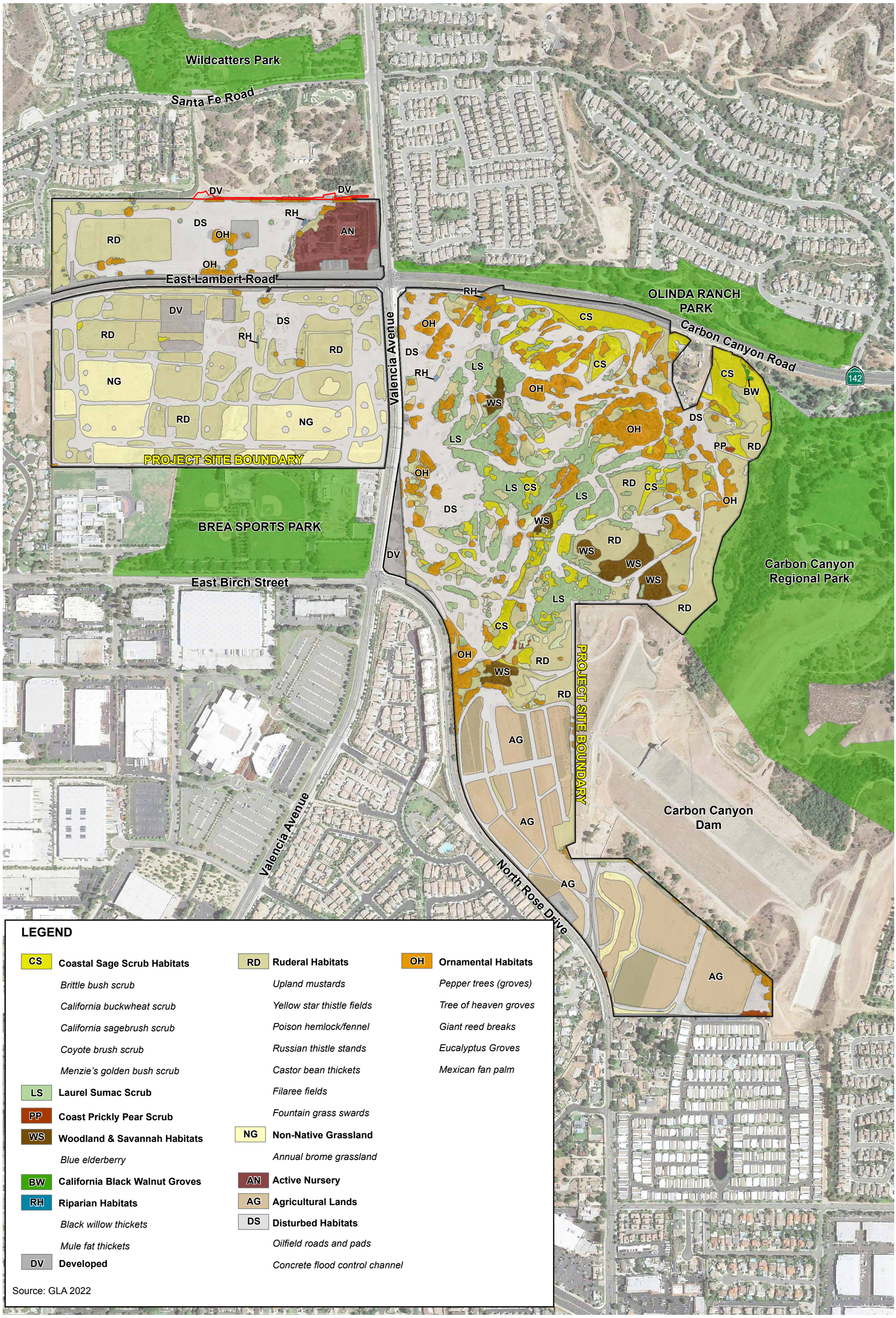


Figure 3 - Vegetation Communities Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet



Coastal Sage Scrub Habitat (California Sagebrush Scrub)



Laurel Sumac Scrub in foreground and Peruvian Pepper Trees in background.

Figure 4 - Current Project Site Photographs

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental



Blue Elderberry Savannah



Ruderal Habitat.

Figure 5 - Current Project Site Photographs

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental



Non-native Grassland (Annual Brome Grassland)



Agricultural Lands

Figure 6 - Current Project Site Photographs

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental



Disturbed (Oilfield Roads and Pads) and Ornamental Habitats (Eucalyptus Groves)

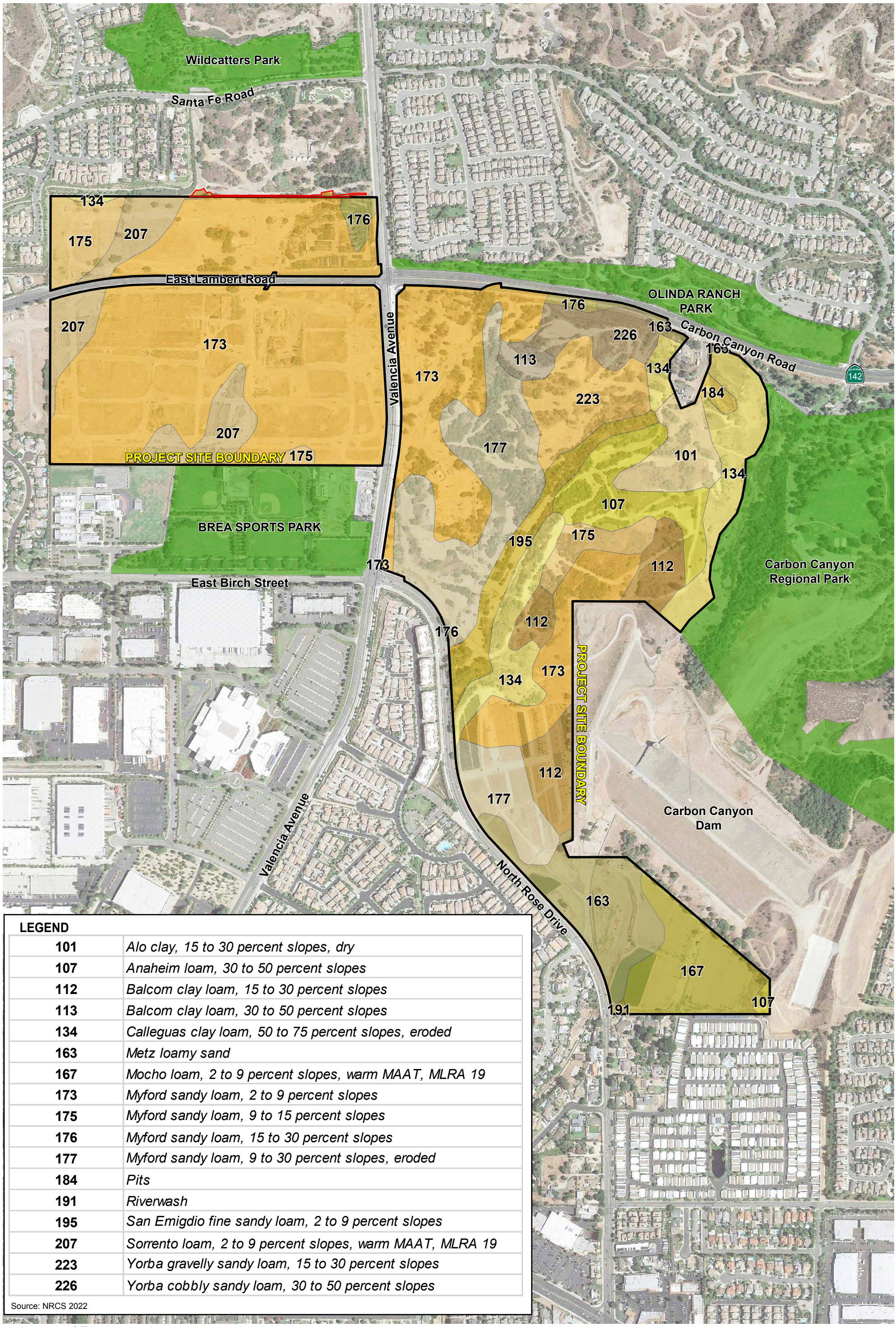


Disturbed (Oilfield Roads and Pads)

Figure 7 - Current Project Site Photographs

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental



LEGEND

101	*Alo clay, 15 to 30 percent slopes, dry*
107	*Anaheim loam, 30 to 50 percent slopes*
112	*Balcom clay loam, 15 to 30 percent slopes*
113	*Balcom clay loam, 30 to 50 percent slopes*
134	*Calleguas clay loam, 50 to 75 percent slopes, eroded*
163	*Metz loamy sand*
167	*Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19*
173	*Myford sandy loam, 2 to 9 percent slopes*
175	*Myford sandy loam, 9 to 15 percent slopes*
176	*Myford sandy loam, 15 to 30 percent slopes*
177	*Myford sandy loam, 9 to 30 percent slopes, eroded*
184	*Pits*
191	*Riverwash*
195	*San Emigdio fine sandy loam, 2 to 9 percent slopes*
207	*Sorrento loam, 2 to 9 percent slopes, warm MAAT, MLRA 19*
223	*Yorba gravelly sandy loam, 15 to 30 percent slopes*
226	*Yorba cobbly sandy loam, 30 to 50 percent slopes*

Source: NRCS 2022

Offsite Impact Area

Figure 8 - Soils Association Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

Table 4. Vegetation Communities Acreages

Vegetation Alliances/Land Use Type	Rank	CA Code	Acres (onsite)	Acres (offsite)
Coastal Sage Scrub Habitats				
California sagebrush scrub (Artemisia californica Shrubland Alliance)	G5 S5	32.010.01	9.84	
California buckwheat scrub (Eriogonum fasciculatum Shrubland Alliance)	G5 S5		2.94	
Coyote brush scrub (Baccharis pilularis Shrubland Alliance)	G5 S5		0.34	
Coast prickly pear scrub (Opuntia littoralis Shrubland Alliance)	G3 S3		0.27	
Brittle bush scrub (Encelia farinosa Shrubland Alliance)	G5 S4		0.05	
Chaparral Habitats				
Laurel sumac scrub (Malosma laurina Shrubland Alliance)	G4 S4		16.99	
Woodland & Savannah Habitats				
Blue elderberry savannah (Sambucus nigra Shrubland Alliance)	NA	NA	2.56	
Blue elderberry stands (Sambucus nigra Shrubland Alliance)	S3 G3	*63.410.01	1.54	
Blue elderberry woodland (Sambucus nigra Shrubland Alliance)	S3 G3	*63.410.01	1.37	
Walnut Grove Habitats				
Southern California black walnut groves (Juglans californica Woodland Alliance)	G3, S3.2		0.07	
Riparian Habitats				
Mule fat thickets (Baccharis salicifolia Shrubland Alliance)	G5 S4	63.510.01	0.11	
Black Willow thickets (Salix gooddingii Woodland Alliance)	G4 S3	*61.211.01	0.03	
Non-native Grassland Habitats				
Red brome or Mediterranean grass grasslands (Bromus rubens-Schismus (arabicus, barbatus) Semi-Natural Herbaceous Stands)	Cal-IPC high		16.36	
Ruderal Habitats				
Upland mustards (Brassica (nigra) and Other Mustards Semi-Natural Herbaceous Stands)	Cal-IPC moderate		36.48	
Russian thistle stands (Salsola tragus Semi-Natural Herbaceous Stands)	NA	NA	18.01	
Filaree Fields	NA	NA	5.10	
Poison hemlock or fennel patches (Conium maculatum-Foeniculum vulgare Semi-Natural Herbaceous Stands)	Cal-IPC moderate		0.90	
Castor bean thickets (Ricinus communis Semi-Natural Shrubland Alliance)	NA	NA	0.80	0.05
Yellow star-thistle fields (Centaurea (solstitialis, melitensis) Semi-Natural Herbaceous Stands)	Cal-IPC moderate		0.30	
Fountain grass swards (Pennisetum setaceum Semi-Natural Herbaceous Stands)	Cal-IPC moderate		0.06	
Ornamental Habitats				
Pepper tree groves (Schinus (molle, terebinthifolius) Semi-Natural Woodland Stands)	Cal-IPC limited	Cal-IPC limited	8.05	
Eucalyptus groves (Eucalyptus (globulus, camaldulensis) Semi-Natural Woodland Stands)	Cal-IPC moderate	79.100.00	6.80	0.06
Pepper tree or Laurel sumac groves (Schinus (molle, terebinthifolius)-Malosma laurina Semi-Natural Woodland Stands)	NA	NA	3.13	
Pepper tree individuals (Schinus (molle, terebinthifolius) Semi-Natural Woodland Stand)	Cal-IPC limited		1.76	0.07
Giant reed breaks (Arundo donax Semi-Natural Herbaceous Stands)	Cal-IPC high	42.080.01	0.15	0.02
Other Ornamental	NA	NA	0.07	
Mexican fan palm (Washingtonia robusta Semi-Natural Woodland Alliance)	NA	NA	0.03	
Tree of Heaven Groves (Ailanthus altissima Semi-Natural Woodland Stands)	NA	NA	0.01	
Developed/Disturbed				
Oil Field Roads and Pads	NA	NA	83.52	0.24
Agriculture	NA	NA	27.71	
Developed	NA	NA	10.61	0.01
Active Nursery	NA	NA	4.61	
Bare	NA	NA	1.37	
Concrete Flood Control Channel	NA	NA	0.16	
		TOTAL	**262.10**	**0.45**

Source: GLA 2022

Coastal Sage Scrub Habitats

California sagebrush scrub (*Artemisia californica* Shrubland Alliance) - Approximately 9.84-acres, primarily in the areas of the Project Site east of Valencia Avenue, consist of California sagebrush scrub (*Artemisia californica*). These areas, which generally occur in small isolated patches, match the membership rule for the *Artemisia californica* Shrubland Alliance in the MCV II which requires greater than 60 percent relative cover of California sagebrush in the shrub canopy. This alliance has a G5 S5 rarity ranking which defines this vegetation type as demonstrably secure in both its global and California range. Other commonly occurring species include California buckwheat, laurel sumac, summer mustard, Russian thistle, and annual grasses.

California buckwheat scrub (*Eriogonum fasciculatum* Shrubland Alliance) - California buckwheat (*Eriogonum fasciculatum*) scrub accounts for approximately 2.94-acres along the northern edge of the portion of the Project Site east of Valencia Avenue. This native vegetation community matches the membership rule for the *Eriogonum fasciculatum* Shrubland Alliance in the MCV II which requires greater than 5 percent absolute cover of California buckwheat in the shrub canopy. The *Eriogonum fasciculatum* shrubland alliance has a G5 S5 rarity ranking which is defined as demonstrably secure in both its global and California range.

Coyote brush scrub (*Baccharis pilularis* Shrubland Alliance) - Coyote brush (*Baccharis pilularis*) scrub accounts for approximately 0.34-acre throughout the entire Project Site. In these areas, coyote brush covers over 50 percent of the shrub layer; however, other occurring species include California sagebrush, Russian thistle, and summer mustard. This vegetation cover is part of the *Baccharis pilularis* Shrubland Alliance which has a G5 S5 rarity ranking. This rarity ranking is defined as secure in both its global and California range.

Coast prickly pear scrub (*Opuntia littoralis* Shrubland Alliance) - In the portion of the Site east of Valencia Avenue and at the southern end of the site, approximately 0.27-acre consists of coast prickly pear (*Opuntia littoralis*) scrub, which occurs in small isolated patches. This native vegetation alliance matches and is classified as the *Opuntia littoralis* Shrubland Alliance in the MCV II which has a rarity ranking of G3 S3. However, however, none of the small patches meets the minimum mapping unit as set forth in the CNDDB. Specifically, the Survey of California Vegetation and Mapping Standards (CDFW, 2020) specifies that the minimum mapping unit (MMU) is usually 1 or 2 acres, varying with the size of the project. Wetlands and other special vegetation types are mapped at ¼ acre, but none of the cactus patches onsite cover the 0.25-acre minimum and is thus below the MMU standards identified.

Brittle bush scrub (*Encelia farinosa* Shrubland Alliance) - Approximately 0.05-acre near the central-eastern boundary of the area of the Project Site east of Valencia Avenue consists of a patch of brittle bush (*Encelia farinosa*) scrub. This vegetation type matches the *Encelia farinosa* Shrubland Alliance which has a rarity ranking of G5 S4 which is defined as secure within and outside of California. This alliance a desert alliance and has been introduced in this area. Summer mustard is also common in this alliance.

Chaparral Habitats

Laurel sumac scrub (*Malosma laurina* Shrubland Alliance) - Laurel sumac scrub covers approximately 16.99-acres primarily in the portion of the Project Site east of Valencia Avenue. In these areas, laurel sumac exhibits greater than 50 percent relative cover in the shrub canopy, which fits the MCV II requirement for the *Malosma laurina* Shrubland Alliance (G4 S4). This alliance has a rarity ranking of G4 S4 which is defined as secure throughout its range. Other commonly occurring species include California sagebrush, southern California black walnut, California buckwheat, eucalyptus, Peruvian pepper, blue elderberry, summer mustard, and Russian thistle.

Woodland & Savannah Habitats

Blue elderberry stands (*Sambucus nigra* Shrubland Alliance) - Approximately 1.54-acres scattered throughout the eastern parcel of the Project Site consist of blue elderberry stands. In these areas, blue elderberry covers greater than 50-percent of the shrub overstory and cover a minimum of 0.20-acre. Other species include Russian thistle, California sagebrush, California walnut, laurel sumac, and pepper tree. Due to the dominance of blue elderberry, this vegetation type belongs to the *Sambucas nigra* Shrubland Alliance which has a G3 S3 rarity ranking. S3 alliances are defined as susceptible to becoming extirpated in the state, and may be, if additional populations are destroyed. In addition to these stands, additional areas consist of individual or small groupings that account for less than 0.20-acre and do not meet the minimum mapping unit of 0.25-acre recognized by the CNDDB for special-status vegetation alliances. Specifically, the Survey of California Vegetation and Mapping Standards (CDFW, 2020) specifies that the minimum mapping unit (MMU) is usually 1 or 2 acres, varying with the size of the project. Wetlands and other special vegetation types are mapped at ¼ acre, but many of the patches of elderberry shrubs onsite are well below the 0.25-acre threshold which is below both of the MMU standards identified.

Blue elderberry savannah (*Sambucus nigra* Shrubland Alliance) - Blue elderberry savannahs account for 2.56-acres in the central-portion of the Project Site east of Valencia Avenue. These areas have well below 50-percent cover of blue elderberry in the shrub overstory, occurring within areas dominated by upland mustard species and areas that include California brittlebush (*Encelia californica*) as an understory component. This alliance does not fit the membership requirement for the *Sambucas nigra* Shrubland Alliance described above.

Blue elderberry woodland (*Sambucus nigra* Shrubland Alliance) - Approximately 1.37 acres scattered throughout the eastern parcel of the Project Site consist of blue elderberry stands. In these areas, blue elderberry covers greater than 50-percent of the shrub overstory. Other species include Russian thistle, California sagebrush, southern California black walnut, laurel sumac, and pepper tree. Due to the dominance of blue elderberry, this vegetation type belongs to the *Sambucas nigra* Shrubland Alliance which has a G3 S3 rarity ranking. S3 alliances are defined as susceptible to becoming extirpated in the state, and may be, if additional populations are destroyed.

Walnut Grove Habitats

Southern California black walnut groves (*Juglans californica* Woodland Alliance) - On the northeastern edge of the Project Site, east of Valencia Avenue, approximately 0.07-acre consists of a southern California black walnut (*Juglans californica*) grove. This area matches the membership rule for the *Juglans californica* Woodland Alliance in the MCV II which requires greater than 50 percent relative cover of southern California black walnut in the tree canopy; however, the 0.07-acre area does not meet the minimum mapping unit as set forth in the CNDDB. Specifically, the Survey of California Vegetation and Mapping Standards (CDFW, 2020) specifies that the minimum mapping unit (MMU) is usually 1 or 2 acres, varying with the size of the project. Wetlands and other special vegetation types are mapped at ¼ acre, but the patch of walnut trees onsite encompasses well under the 0.25-acre minimum and is thus below the MMU standards identified[5]. . While the *Juglans californica* Woodland Alliance has a rarity ranking of G3 S3.2 given the limited size, would not be considered walnut grove as discussed in the impact section below. Also, as noted above, S3 ranked species are not yet susceptible to becoming extirpated in the state, and may be, if additional populations are destroyed. Other species occurring include California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*).

Riparian Habitats

Mule fat thickets (*Baccharis salicifolia* Shrubland Alliance) - Primarily in the ephemeral drainage west of Valencia Avenue, approximately 0.11-acre consists of mule fat (*Baccharis salicifolia*) thickets. According to the MCV II, these areas fit the *Baccharis salicifolia* Shrubland Alliance which has a rarity ranking of G5 S4 which is defined as secure within and outside of California. Other co-occurring species include non-native Spanish sunflower (*Pulicaria paludosa*) and Russian thistle.

Black Willow thickets (*Salix gooddingii* Woodland Alliance) - Approximately 0.03-acre near the northeastern boundary of the Site east of Valencia Avenue consists of two patches of black willow (*Salix gooddingii*) thickets. Due to the extent of black willow cover in the canopy, this vegetation type is best described as *Salix goodinggii* Woodland Alliance; however, the 0.03-acre area does not meet the minimum mapping unit as set forth in the CNDDB. Specifically, the Survey of California Vegetation and Mapping Standards (CDFW, 2020) specifies that the minimum mapping unit (MMU) is usually 1 or 2 acres, varying with the size of the project. Wetlands and other special vegetation types are mapped at ¼ acre, but the patch of black willow onsite encompasses well under the 0.25-acre minimum and is thus below the MMU standards identified[6].. This alliance has a G4 S3 rarity ranking which is defined as secure outside of California, and susceptible to becoming extirpated in the state, and may be, if additional populations are destroyed. Other dominating species in these areas include eucalyptus trees.

[5] California Department of Fish and Wildlife: Vegetation Classification and Mapping Program (VegCAMP). June 22, 2020. *Survey of California Vegetation Classification and Mapping Standards.*
[6] Ibid.

Non-native Grassland Habitats

Red brome or Mediterranean grass grasslands (*Bromus rubens-Schismus* (*arabicus, barbatus*) Semi-Natural Herbaceous Stands) - Approximately 16.36-acres throughout the Project Site are dominated by exotic, annual brome grasses. These areas most closely match the *Bromus rubens-Schismus* (*arabicus, barbatus*) Semi-Natural Herbaceous Stands vegetation description in the MCV II.

Ruderal Habitats

Upland mustards (*Brassica* (*nigra*) and Other Mustards Semi-Natural Herbaceous Stands) - Disturbed areas dominated by invasive, non-native upland mustard species (*Hirschfeldia incana* and *Brassica nigra*) account for approximately 36.48-acres throughout the Project Site. These vegetation alliances belong to the *Brassica* (*nigra*) and Other Mustards Semi-Natural Herbaceous Stands classification in the MCV II.

Russian thistle stands (*Salsola tragus* Semi-Natural Herbaceous Stands) - Approximately 18.01-acres throughout the Project Site are dominated by Russian thistle, a non-native, invasive species. Other species occurring in these areas are upland mustards, yellow star-thistle, and exotic, annual grasses. This vegetation cover type does not have a close analog in the MCV II.

Filaree Fields - Filaree fields cover approximately 5.10-acres primarily in the portion of the Project Site west of Valencia Avenue. Some patches also occur in the southern portion of the Project Site east of Valencia Avenue, near the agricultural fields. These areas are dominated by long beaked filaree (*Erodium botrys*); however, red stemmed filaree (*Erodium cicutarium*) and white stemmed filaree (*Erodium moschatum*) also occur. None of the *Erodium* species are native to this area. This vegetation cover type does not have a close analog in the MCV II.

Poison hemlock or fennel patches (*Conium maculatum-Foeniculum vulgare* Semi-Natural Herbaceous Stands) - Poison hemlock (*Conium maculatum*), a non-native, invasive species, dominates several areas in the portion of the Project Site east of Valencia Avenue. These areas cover approximately 0.90-acres and match the *Conium maculatum-Foeniculum vulgare* Semi-Natural Herbaceous Stands description in the MCV II.

Castor bean thickets (*Ricinus communis* Semi-Natural Shrubland Alliance) - Castor bean (*Ricinus communis*) is a non-native, invasive species that was introduced and has naturalized in the wild. This species occurs on approximately a total of 0.85-acre scattered throughout the Project Site. This vegetation type does not have an analog in the MCV II.

Yellow star-thistle fields (*Centaurea* (*solstitialis, melitensis*) Semi-Natural Herbaceous Stands) - A patch of yellow star-thistle, a non-native, invasive species, covers approximately 0.30-acre on the eastern side Project Site west of Valencia Avenue. This stand includes tocalote (*Centaurea melitensis*) and matches the membership rule for the *Centaurea* (*solstitialis, melitensis*) Semi-Natural Herbaceous Stands classification in the MCV II.

Fountain grass swards (*Pennisetum setaceum* Semi-Natural Herbaceous Stands) - The northern portion of the Project Site east of Valencia Avenue contains an approximately 0.06-acre patch of fountain grass swards. This highly invasive non-native species was introduced ornamentally and has naturalized in the wild. According to the MCV II, this area fits the vegetation description for the *Pennisetum setaceum* Semi-Natural Herbaceous Stands classification.

Ornamental Habitats

Pepper tree groves (*Schinus* (*molle, terebinthifolius*) Semi-Natural Woodland Stands - Within the western and eastern parcels of the Project Site, approximately 8.05-acres consist of Brazilian pepper tree (*Schinus terebinthifolius*) and Peruvian pepper tree (*Schinus molle*) groves. These areas match the requirements for the *Schinus* (*molle, terebinthifolius*)-*Myoporum laetum* Semi-Natural Woodland Stands vegetation classification. The understory includes intermittently occurring laurel sumac and California sagebrush individuals along with non-native herbs and grasses.

Eucalyptus groves (*Eucalyptus* (*globulus, camaldulensis*) Semi-Natural Woodland Stands) - Approximately 6.86-acres, primarily in the central and northern areas of the Project Site east of Valencia Avenue, are dominated by non-native eucalyptus species that have naturalized in the environment. Within these areas, the herbaceous layer includes non-native grasses and forbs. The shrub strata include intermittently occurring laurel sumac (*Malosma laurina*) and coyote brush (*Baccharis pilularis*). According to the MCV II, this vegetation cover fits the following description: *Eucalyptus* (*globulus, camaldulensis*) Semi-Natural Woodland Stands.

Pepper tree or Laurel sumac groves (*Schinus* (*molle, terebinthifolius*)-*Malosma laurina* Semi-Natural Woodland Stands) - Approximately 3.13-acres in the Project Site east of Valencia Avenue contain groves dominated by Peruvian pepper tree and laurel sumac. These areas are considered disturbed, non-native vegetation communities; however, they have assimilations with the following two alliances in the MCV II: *Schinus* (*molle, terebinthifolius*)-*Myoporum laetum* Semi-Natural Woodland Stands and *Malosma laurina* Shrubland Alliance – Laurel Sumac Scrub (G4 S4).

Pepper tree individuals (*Schinus* (*molle, terebinthifolius*) Semi-Natural Woodland Stand) - Pepper tree individuals account for 1.83 acres in the western and eastern portions of the Project Site, collectively. Although these areas are not considered groves, they most closely match the following alliance in the MCV II: *Schinus* (*molle, terebinthifolius*)-*Myoporum laetum* Semi-Natural Woodland Stands.

Giant reed breaks (*Arundo donax* Semi-Natural Herbaceous Stands) - Giant reed (*Arundo* donax) is a non-native, invasive species. Near the northern boundary of the Project Site east of Valencia Avenue, approximately 0.17-acre of consists of a giant reed thicket. According to the membership rules in the MCV II, this area matches the *Arundo donax* Semi-Natural Shrubland Alliance. Surrounding habitat includes California sagebrush scrub.

Other Ornamental - In the northwest corner of the Project Site, east of Valencia Avenue, approximately 0.07-acre consists of escaped non-native ornamental species.

Mexican fan palm (*Washingtonia robusta* Semi-Natural Woodland Alliance) - Mexican fan palms (*Washingtonia robusta*) cover approximately 0.03-acre in both the western and eastern portions of the Project Site. This vegetation cover type is non-native and does not have a close analog in the MCV II.

Tree of Heaven Groves (*Ailanthus altissima* Semi-Natural Woodland Stands) - Tree of heaven (*Ailanthus altissima*) is a non-native, invasive species that was introduced and has naturalized in the wild. This species occurs on approximately 0.01 acre along East Lambert Road in the portion of the Project Site west of Valencia Avenue. This vegetation alliance does not have a close analog in the MCV II.

Developed/Disturbed

Oil Field Roads and Pads - Existing oilfield operations, including roads, paths, and infrastructure, account for approximately 83.52-acres throughout the Project Site.

Agriculture - Existing agriculture fields and operations account for approximately 27.71-acres. This area is located in the southern half of the portion of the Project Site East of Valencia Avenue.

Developed - Developed areas account for approximately 10.61-acres, primarily consisting of adjacent roads and structures throughout the Project Site.

Active Nursery - In the area west of Valencia Avenue and north of East Lambert Road, an active nursery accounts for approximately 4.61-acres.

Bare - Bare ground accounts for approximately 1.37-acres, primarily in the southern portion of the Project Site east of Valencia Avenue, adjacent to the agricultural operations.

Concrete Flood Control Channel - The concrete flood control channel is located between the agricultural areas in the southern portion of the Project Site east of Valencia Avenue. This channel accounts for approximately 0.16-acre.

GENERAL PLANT & WILDLIFE SPECIES

General plant species documented within the Project Site are presented in the previous section.

A total of 65, species, including reptiles, birds, and mammals were recorded from within the Project Site. Two species of reptiles were observed including the western fence lizard (*Sceloporus occidentalis*) and the side blotched lizard (*Uta stansburiana*). Mammal species observed and/or detected onsite include mule deer (*Odocoileus hemionus*), coyote (*Canius latrans*), brush rabbit (*Sylvilagus bachmani*), bobcat (*Lynx rufus*), dusky woodrat (*Neotoma fuscipes*), Mexican free-tailed bat (*Tadarida brasiliensis*), canyon bat (*Parastrellus hesperus*), and California ground squirrel (*Otospermophilus beecheyi*). Birds were the most commonly observed wildlife, with 57 species observed. These include the acorn woodpecker (*Melanerpes formicivorus*), Allen's hummingbird (*Selasphorus sasin*), American crow (*Corvus brachyrhynchos*), American kestrel (*Falco sparverius*), American pipit (*Anthus rubescens)*, Anna's

hummingbird (*Calypte anna*), ash-throated flycatcher (*Myiarchus cinerascens*), brown-headed cowbird (*Molothrus ater*), blue-gray gnatcatcher (*Polioptila caerulea*), barn swallow (*Hirundo rustica),* Bewick's wren (*Thryomanes bewickii*), black phoebe (*Sayornis nigricans*), black-headed grosbeak (*Pheucticus melanocephalus*), blue grosbeak (*Passerina caerulea*), bushtit (*Psaltriparus minimus*), Bullock's oriole (*Icterus bullockii*), California quail (*Callipepla californica*), California scrub-jay (*Aphelocoma californica*), California thrasher (*Toxostoma redivivum*), California towhee (*Melozone crissalis*), Canada goose (*Branta canadensis*), cliff swallow (*Hirundo pyrrhonota*), common raven (*Corvus corax*), common yellowthroat (*Geothlypis trichas*), European starling (*Sturnus vulgaris*), greater roadrunner (*Geococcyx californianus*), hooded oriole (*Icterus cucullatus*), house finch (*Carpodacus mexicanus*), house wren (*Troglodytes aedon*), killdeer (*Charadrius vociferus*), lesser goldfinch (*Carduelis psaltria*), northern mockingbird (*Mimus polyglottos*), Nuttall's woodpecker (*Picoides nuttallii*), mourning dove (*Zenaida macroura*), northern rough-winged swallow (*Stelgidopteryx serripennis*), olive-sided flycatcher (*Contopus cooperi*), orange-crowned warbler (*Oreothlypis celata*), pacific-slope flycatcher (*Empidonax difficilis*), phainopepla (*Phainopepla nitens*), red-tailed hawk (*Buteo jamaicensis*), Say's phoebe (*Sayornis saya*), song sparrow (*Melospiza melodia*), spotted towhee (*Pipilo maculatus*), turkey vulture (*Cathartes aura*), Vaux's swift (*Chaetura vauxi*), western bluebird (*Sialia mexicana*), western kingbird (*Tyrranis verticalis*), western meadowlark (*Sturnella neglecta*), whimbrel (*Numenius phaeopus*), white-crowned sparrow (*Zonotrichia leucophrys*), white-throated swift (*Aeronautes saxatalis*), Wilson's warbler (*Cardellina pusilla*), wrentit (*Chamaea fasciata*), yellow warbler (*Setophaga petechia*), and yellow-rumped warbler (*Setophaga coronata*).

A complete list of floral and faunal species documented onsite is included in Appendix A–Floral/Faunal Compendia.

JURISDICTIONAL RESOURCES

United States Army Corps of Engineers/Regional Water Quality Control Board

United States Army Corps of Engineer and RWQCB jurisdiction on the Project Site is associated with four ephemeral drainage features, one of which traverses the western portion of the Project Site and one which traverses the eastern portion of the site and are designated as the "Drainage A" and "Drainage B." Drainage B includes a small tributary "Drainage C". The southern portion of the Project Site includes a concrete channelized segment of Carbon Canyon Creek ("Drainage D") as summarized in Table 5, *USACE/RWQCB Jurisdictional Resources Acreages*, and shown in Figure 9, *USACE/RWQCB Jurisdictional Resources Map*.

Table 5. USACE/RWQCB Jurisdictional Resource Acreages

Drainage Feature	Type	Acres	Linear Feet
Drainage A	Non-Wetland Channel	0.363	2,422
Drainage B	Non-Wetland Ephemeral Channel	0.043	241
Drainage C	Non-Wetland Ephemeral Channel	0.086	1,149
Drainage D	Concrete Ephemeral Channel	0.159	687
	Total	**0.651**	**4,499**

Source: GLA 2022.

Drainage A

Drainage A, which accounts for 0.363 acre of non-wetland waters, originates on the portion of the site north of East Lambert Road, where an offsite drainage ditch discharges to the site, and extends eastward, where the channel enters a 48-inch concrete pipe and is carried beneath an oil field road, turning to the south. The drainage, at this point, is depicted as a blue-line drainage on the U.S. Geological Survey (USGS) topographic map Yorba Linda, California. For the segment north of East Lambert, the drainage varies from five to ten feet in width and the banks and channel support dense stands of non-native invasive castor bean (*Ricinus communis*, FACU), summer mustard (*Hirschfeldia incana*, UPL), with a few small patches of mulefat (*Baccharis salicifolia*, FAC). The OHWM was indicated by the presence of an incised channel with debris wrack and shelving, and terracing. The drainage crosses under Lambert Road through a 13-foot paved tunnel constructed for oil operations that allows trucks and other vehicles to travel under East Lambert Road. South of East Lambert Road, the channel ranges from three to 12 feet in width, exhibits a sand and cobble bottom and supports mostly non-native species including Russian thistle (*Salsola tragus*, FACU), Canada horseweed (*Conyza canadensis*, FACU), summer mustard (*Hirschfeldia incana*, UPL), Spanish sunflower (*Pulicaria paludosa*, FAC), and a few small patches of mulefat. For the drainage segment south of East Lambert Road, the OHWM was indicated by the presence of an incised channel with debris wrack and shelving, changes in the character of the soil, and terracing and in some areas clear lines impressed on the banks. This segment of Drainage A is crossed by numerous active and inactive oilfield pipes, many of which are buried.

The hydrology source for this drainage does not represent “ordinary” conditions as the watershed for the drainage includes the Olinda Landfill, which includes large detention basins that discharge episodically, once the basins reach capacity, resulting in stream flows much larger than under a condition of normal runoff, where the water enters the drainage courses gradually. Such episodic discharges, combined with the highly erodible soils has caused substantial down cutting and the need for historic armoring of portions of the drainage that include the use of buried cable, broken concrete and asphaltic material derived from historic oil operations.

Drainage B

Drainage B, which is located on the portion of the site east of Valencia Avenue, accounts for 0.043-acre of non-wetland, ephemeral waters. This drainage feature originates at the northern site boundary, where a 24-inch culvert discharges to the site beneath Carbon Canyon Road. This drainage feature is not depicted as a blue-line drainage on the USGS topographic map Yorba Linda, California. This drainage feature also includes a tributary, which is described below.

Drainage B exhibits an OHWM only intermittently and generally ranges from four to ten feet in width, where an OHWM is discernible as illustrated in Figure 9, *USACE/RWQCB Jurisdictional Resources Map*. Much of the flow associated with this drainage occurs as sheet flow that moves across flat areas in the canyon bottom that are not sufficiently concentrated to form a definable channel that exhibits characteristics associated with an OHWM. The drainage sheet flows where an OHWM is lacking and traverses areas with a canopy of blue-gum eucalyptus (*Eucalyptus globulus*, UPL), Peruvian pepper

(*Schinus mole*, UPL), laurel sumac (*Malosma laurina*, UPL), and areas with summer mustard (*Hirschfeldia incana*, UPL). Sheet flows associated with Drainage B ultimately discharge to Drainage C below which the OHWM is no longer evident.

As noted for Drainage A, Drainage B has been subject to historic armoring of portions of the drainage that include the use of broken concrete and asphaltic material derived from historic oil operations.

Drainage C

Drainage C is located on the portion of the site east of Valencia Avenue, and accounts for 0.086-acre of non-wetland, ephemeral waters. This drainage feature originates in the north-central portion of the site, where a culvert discharges to a ravine. This drainage feature is not depicted as a blue-line drainage on the USGS topographic map Yorba Linda, California. Drainage C ranges from two to four feet in width and traverses an area with a canopy of laurel sumac (*Malosma laurina*, UPL). The drainage becomes indistinct at an oilfield pad and road, and there is no OHWM discernible for approximately 610 feet with the drainage again discernible on the south side of an oilfield access road. From that point the drainage extends another 190 feet beneath a canopy of eucalyptus before discharging to a storm drain at the site boundary.

Drainage D

Drainage D is a channelized concrete segment of Carbon Canyon Creek that originates at the base of Carbon Canyon Dam, extending approximately 687 feet, across the property where it enters a concrete box that carries flows downstream. The RWQCB jurisdiction for this feature totals 0.159-acre.

California Department of Fish and Wildlife

California Department of Fish and Wildlife jurisdiction is associated with the four (4) drainage features described above and as summarized in Table 6, *CDFW Jurisdictional Resources Acreages*, below followed by site-specific descriptions, and shown in Figure 10, *CDFW Jurisdictional Resources Map*.

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Table 6.
CDFW Jurisdictional Resource Acreages

Drainage Feature	Non-Riparian Streambed	Riparian	Total Acres	Linear Feet
Drainage A	0.699	0.032	0.731	2,422
Drainage B	0.048	0.031	0.079	241
Drainage C	0.086	0.0	0.086	1,149
Drainage D	0.159	0.0	0.159	687
Total	**0.992**	**0.063**	**1.055**	**4,499**

Source: GLA 2022.



Figure 9 - USACE/RWQCB Jurisdictional Resources Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet



Figure 10 - CDFW Jurisdictional Resources Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

Drainage A

Drainage A accounts for 0.699-acre of streambed plus an additional 0.032-acre of mulefat scrub. The channel originates on the portion of the site north of East Lambert Road, where a drainage ditch along the northern boundary of the Project site receives waters via offsite sheet flows and discharges to the site. This drainage is depicted as a blue-line drainage on the USGS topographic map Yorba Linda, California. For the segment north of East Lambert Road, the drainage varies from ten to twenty-two feet in width and the banks and channel support dense stands of non-native invasive castor bean (*Ricinus communis*) with a few small patches of mulefat (*Baccharis salicifolia*). The presence of a stream was indicated by an incised channel with debris wrack and shelving and terracing. The drainage crosses under Lambert through a 13-foot tunnel constructed for oil operations that allows trucks and other vehicles to travel under East Lambert Road. South of East Lambert Road, the channel ranges from six to seventeen feet in width, exhibits a sand and cobble bottom and supports mostly non-native species including Russian thistle (*Salsola tragus*), Spanish sunflower (*Pulicaria paludosa*), and a few small patches of mule fat.

Drainage B

Drainage B is located on the portion of the site east of Valencia Avenue and accounts for 0.048-acre of ephemeral waters of which includes a small patch willow accounting for 0.031-acre. This drainage feature originates at the northern site boundary, where a 24-inch culvert discharges to the site beneath Carbon Canyon Road. This drainage feature is not depicted as a blue-line drainage on the USGS topographic map Yorba Linda, California. This drainage feature also includes a tributary described below. Drainage B generally ranges from four to ten feet in width and only exhibits a bed, bank, and channel intermittently, traversing an area with a canopy of blue-gum eucalyptus (*Eucalyptus globulus*, UPL), Peruvian pepper (*Schinus molle*), laurel sumac, and areas with summer mustard (*Hirschfeldia incana*). The drainage terminates above the confluence with the Drainage C where the streambed is no longer evident.

Drainage C

The Drainage C is located on the portion of the site east of Valencia Avenue, and accounts for 0.086-acre of ephemeral waters with no riparian habitat. This drainage feature originates in the north-central portion of the site, where a culvert discharges to a ravine. This drainage feature is not depicted as a blue-line drainage on the USGS topographic map Yorba Linda, California. Drainage C ranges from two to five feet in width and traverses an area with a canopy of laurel sumac. The drainage becomes indistinct at an oilfield pad and road, and there is no OHWM discernible for approximately 610 feet with the drainage again discernible on the south side of an oilfield access road. From that point the drainage extends another 190 feet beneath a canopy of eucalyptus before discharging to a storm drain at the site boundary.

Drainage D

Drainage D is a channelized concrete segment of Carbon Canyon Creek that originates at the base of Carbon Canyon Dam, extending approximately 687 feet, across the

property where it enters a concrete box that carries flows downstream. CDFW jurisdiction for this feature totals 0.159-acre.

SENSITIVE BIOLOGICAL RESOURCES

The following discussion describes the plant and wildlife species present, or potentially present within the property boundaries, that have been afforded special recognition by federal, state, or local resource conservation agencies and organizations, principally due to the species' declining or limited population sizes, usually resulting from habitat loss. Also discussed are habitats that are unique, of relatively limited distribution, or of particular value to wildlife. Protected sensitive species are classified by state and/or federal resource management agencies, or both, as threatened or endangered, under provisions of the state and federal endangered species act. Vulnerable or "at-risk" species that are proposed for listing as threatened or endangered (and thereby for protected status) are categorized administratively as "candidates" by the USFWS. CDFW uses various terminology and classifications to describe vulnerable species. There are additional sensitive species classifications applicable in California. These are described below.

Sensitive biological resources are habitats or individual species that have special recognition by federal, state, or local conservation agencies and organizations as endangered, threatened, or rare. The CDFW, USFWS, and special groups like the CNPS maintain watch lists of such resources. For the purpose of this assessment sources used to determine the sensitive status of biological resources are:

Plants: USFWS (2019), CDFW (2019d), CNDDB (CDFW 2019a), CNPS (2019), and Skinner and Pavlik (1994),

Wildlife: California Wildlife Habitat Relationships (2008), USFWS (2019), CDFW (2019b, 2019e), and CNDDB (CDFW 2019a),

Habitats: CNDDB (CDFW 2019a).

FEDERAL PROTECTION AND CLASSIFICATIONS

The Federal Endangered Species Act of 1973 (FESA) defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range..." Threatened species are defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under provisions of Section 9(a)(1)(B) of the FESA it is unlawful to "take" any listed species. "Take" is defined as follows in Section 3(18) of the FESA: "...harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification as forms of a "take." These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species. In a case where a property owner seeks permission from a federal agency for an action that could affect a Federally listed plant and animal species, the property owner and agency are

required to consult with USFWS. Section 9(a)(2)(b) of the FESA addresses the protections afforded to listed plants. Recently, the USFWS instituted changes in the listing status of former candidate species. Former C1 (candidate) species are now referred to simply as candidate species and represent the only candidates for listing. Former C2 species (for which the USFWS had insufficient evidence to warrant listing at this time) and C3 species (either extinct, no longer a valid taxon or more abundant than was formerly believed) are no longer considered as candidate species. Therefore, these species are no longer maintained in list form by the USFWS, nor are they formally protected. However, some USFWS field offices have issued memoranda stating that former C2 species are henceforth to be considered Federal Species of Concern. This term is employed in this document, but carries no official protections. All references to Federally protected species in this report (whether listed, proposed for listing or candidate) include the most current published status or candidate category to which each species has been assigned by USFWS.

For purposes of this assessment, the following acronyms are used for federal status species:

FE	Federal Endangered
FT	Federal Threatened
FPE	Federal Proposed Endangered
FPT	Federal Proposed Threatened
FC	Federal Candidate for Listing

When a species is listed under the FESA, USFWS must designate critical habitat for the species in most cases, unless there are specific reasons for not designating critical habitat (e.g., such designation poses risks for the subject species). Critical habitat designations by USFWS are intended to guide federal agency action, and critical habitat is defined in Section 3 of the FESA as:

> (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the [FESA], on which [the USFWS believes] are found those physical or biological features
> (a) Essential to the conservation of the species and
> (b) Which may require special management considerations or protection; and
> (2) Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination [by the USFWS] that such areas are essential for the conservation of the species.

The FESA is designed to provide a certain level of protection to USFWS designated critical habitat only in those instances in which a federal agency is considering whether to grant an authorization, fund or take any other federal agency action that may destroy or adversely modify the designated critical habitat. Section 7(a)(2) of FESA requires federal agencies to consult with USFWS (or National Marine Fisheries Service (NMFS), as applicable) on federal agency actions that have the potential to destroy or adversely modify critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. The designation does not place any restrictions on a non-federal agency landowner or on State or local agencies or governments; nor does the designation restrict a non-federal

agency landowner from removing or otherwise adversely modifying land containing the critical habitat designation. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by private landowners. Where a landowner seeks or requests Federal agency funding or authorization for an activity likely to negatively impact one or more members of a listed species or critical habitat, the consultation requirements of ESA Section 7(a)(2) generally apply.

Critical habitat designations are the USFWS's method of identifying for federal agencies (to the extent known using information available at the time of such designation) those physical or biological features ("PBFs") believed essential to the conservation of the species (such as space, food, cover, and protected habitat), focusing on the principal biological or physical constituent elements (formerly designated as primary constituent elements) within an area considered essential to the conservation of the species (such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, soil type). Primary constituent elements (PCE's), now referred to as PBFs are the elements of physical or biological features which, when laid out in the appropriate quantity and spatial arrangement to provide for a species' life-history processes, the USFWS believes to be essential to the conservation of the species. Critical habitat designations are intended as a tool to be used by the USFWS in helping federal agencies comply with their obligations under Section 7 of the FESA.

Migratory birds including resident raptors and passerines are protected under the federal CDFG Code Section 3503.

The Bald Eagle and Golden Eagle Protection Act explicitly protects the bald eagle and golden eagle and imposes its own prohibition on any taking of these species. As defined in this act, take means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb. Current USFWS policy is not to refer the incidental take of bald eagles for prosecution under the Bald Eagle and Golden Eagle Protection Act (16 U.S.C. 668-668d).

STATE PROTECTION AND CLASSIFICATIONS

California's Endangered Species Act (CESA) defines an endangered species as "...a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." The State defines a threatened species as "...a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the commission as rare on or before January 1, 1985 is a threatened species." Candidate species are defined as "...a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list." Candidate species may be afforded temporary protection as though they were already listed as threatened or

endangered at the discretion of the Fish and Game Commission. Unlike FESA, CESA does not include listing provisions for invertebrate species.

Article 3, Sections 2080 through 2085, of CESA addresses the taking of threatened or endangered species by stating “No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the commission determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided...” Under CESA, “take” is defined as “...hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” Exceptions authorized by the state to allow “take” require “...permits or memorandums of understanding...” and can be authorized for “...endangered species, threatened species, or candidate species for scientific, educational, or management purposes.” Sections 1901 and 1913 of the California Fish and Game Code provide that notification is required prior to disturbance.

Additionally, some sensitive mammals and birds are protected by the State as Fully Protected Mammals or Fully Protected Birds, as described in the California Fish and Game Code, Sections 4700 and 3511, respectively. SSC (“special” animals and plants) listings include special status species, including all state and federal protected and candidate taxa. This list is primarily a working document for the CDFW's CNDDB project. Informally listed taxa are not protected per se, but warrant consideration in the preparation of biotic assessments. For some species, the CNDDB is only concerned with specific portions of the life history, such as roosts, rookeries, or nest sites.

For the purposes of this assessment, the following acronyms are used for State status species:

SE	State Endangered
ST	State Threatened
SCE	State Candidate Endangered
SCT	State Candidate Threatened
SFP	State Fully Protected
SP	State Protected
SR	State Rare
SSC	California Species of Special Concern
CWL	California Watch List

Nesting birds, including raptors, are protected under California Fish and Game Code Section 3503, which reads, “It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.” In addition, under California Fish and Game Code Section 3503.5, “it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto”. Passerines and non-passerine land birds are further protected under California Fish and Game Code 3513. As such, CDFW typically recommends surveys for nesting birds that could potentially be directly (e.g., actual removal of trees/vegetation) or

indirectly (e.g., noise disturbance) impacted by project-related activities. Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “take” by CDFW.

The CNPS is a private plant conservation organization dedicated to the monitoring and protection of sensitive species in the State. This organization has compiled an inventory comprised of the information focusing on geographic distribution and qualitative characterization of rare, threatened, or endangered vascular plant species of California (Tibor 2001). The list serves as the candidate list for listing as threatened and endangered by CDFW. The CNPS has developed six (6) categories of rarity (CRPR):

CRPR 1A	Presumed extinct in California.
CRPR 1B	Rare, threatened, or endangered in California and elsewhere.
CRPR 2A	Plants presumed extirpated in California but common elsewhere
CRPR 2B	Plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3	Plants about which we need more information – a review list.
CRPR 4	Species of limited distribution in California (i.e., naturally rare in the wild), but whose existence does not appear to be susceptible to threat.

As stated by the CNPS:

> “*Threat Rank is an extension added onto the California Rare Plant Rank and designates the level of endangerment by a 1 to 3 ranking with 1 being the most endangered and 3 being the least endangered. A Threat Rank is present for all California Rare Plant Rank 1B's, 2's, 4's, and the majority of California Rare Plant Rank 3's. California Rare Plant Rank 4 plants are seldom assigned a Threat Rank of 0.1, as they generally have large enough populations to not have significant threats to their continued existence in California; however, certain conditions exist to make the plant a species of concern and hence be assigned a California Rare Plant Rank. In addition, all California Rare Plant Rank 1A (presumed extinct in California), and some California Rare Plant Rank 3 (need more information) plants, which lack threat information, do not have a Threat Rank extension.” (CNPS 2010)*

0.1	Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2	Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3	Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

The CNDDB provides global and state rankings for species and communities based on a system developed by The Nature Conservancy to measure rarity of a species. The ranking provides a shorthand formula regarding the rarity of a species or community

and is based on the best information available from multiple sources, including state and federal listings, and other groups that recognize species as sensitive (e.g., Bureau of Land Management, Audubon Society, etc.). State and global rankings are used to prioritize conservation and protection efforts so that the rarest species/communities receive immediate attention. In both cases, the lower ranking (i.e., G1 or S1) indicates extreme rarity. Rare species are given a ranking from 1 to 3. Species with a ranking of 4 or 5 has been determined to be common. If the exact global/state ranking is undetermined, a range is generally provided. For example, a global ranking of "G1G3" indicates that a species/community global rarity is between G1 and G3. A ranking with "?" such as S4? indicates that that the ranking is considered provisional and more information is required. If the animal being considered is a subspecies of a broader species, a "T" ranking is attached to the global ranking. The following are descriptions of global and state rankings:

Global Rankings

- G1 – Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or because of some factor(s) making it especially vulnerable to extinction.
- G2 – Imperiled globally because of rarity (6-20 occurrences), or because of some other factor(s) making it very vulnerable to extinction throughout its range.
- G3 – Either very rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g., a physiographic region), or because of some other factor(s) making it vulnerable to extinction throughout its range.
- G4 – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- G5 – Common, widespread and abundant.

State Rankings

- S1 – Extremely rare; five or fewer viable occurrences in the state; or less than 1,000 individuals; or less than 1,280 acres; and may be especially vulnerable to extirpation.
- S2 – Very rare; between 6 and 20 viable occurrences; or less than 3,000 individuals, or between 1,280 and 6,400 acres and may be susceptible to becoming extirpated.
- S3 – Rare to uncommon; 21 to 100 viable occurrences; or 3,000 to 10,000 individuals, or between 6,400 and 32,000 acres; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed.
- S4 - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 - Common, widespread, and abundant in the state.

The Native Plant Protection Act (NPPA) enacted a process by which plants are listed as rare or endangered. The NPPA regulates collection, transport, and commerce in plants that are listed. The CESA follows the NPPA and covers both plants and wildlife

determined to be threatened with extinction or endangered. Plants listed as rare under the NPPA are designated as threated under the CESA.

STATE AND FEDERAL TAKE AUTHORIZATION FOR LISTED SPECIES

Federal or state authorizations of impacts to or incidental take of a listed species by a private individual or other private entity would be granted in one of the following ways:

- Section 7 of the FESA stipulates that any federal action that may affect a species listed as threatened or endangered requires a formal consultation with USFWS to ensure that the action is not likely to jeopardize the continued existence of the listed species or result in destruction or adverse modification of designated critical habitat. 16 U.S.C. 1536(a)(2).
- In 1982, the FESA was amended to give private landowners the ability to develop Habitat Conservation Plans (HCP) pursuant to Section 10(a) of the FESA. Upon development of an HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies at minimum, the following: (1) the level of impact that will result from the taking, (2) steps that will minimize and mitigate the impacts, (3) funding necessary to implement the plan, (4) alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen, and (5) such other measures that the Secretary of the Interior may require as being necessary or appropriate for the plan.
- Sections 2090-2097 of the CESA require that the state lead agency consult with CDFW on projects with potential impacts on state-listed species. These provisions also require CDFW to coordinate consultations with USFWS for actions involving Federally listed as well as State-listed species. In certain circumstances, Section 2080.1 of the California Fish and Game Code allows CDFW to adopt the federal incidental take statement or the 10(a) Permit as its own based on its findings that the federal permit adequately protects the species under state law.

SENSITIVE HABITATS

The CNDDB identifies the following ten (10) special-status vegetation alliances/communities for Yorba Linda, San Dimas, Ontario, Prado Dam, Black Star Canyon, Orange, Anaheim, La Habra, and Baldwin Park quadrangle maps:

1. California Walnut Woodland
2. Riversidean Alluvial Fan Sage Scrub
3. Southern California Arroyo Chub/Santa Ana Sucker Stream
4. Southern Coast Live Oak Riparian Forest
5. Southern Cottonwood Willow Riparian Forest
6. Southern Interior Cypress Forest
7. Southern Riparian Scrub
8. Southern Sycamore Alder Riparian Woodland
9. Southern Willow Scrub
10. Walnut Forest

The Project Site contains the following special-status vegetation alliances/communities:

1. Southern California Black Walnut Woodland

2. Blue Elderberry Stands (not listed in CNDDB for the subject quads)
3. Goodding's Black Willow Forest (not listed in CNDDB for the subject quads)
4. Coast Prickly Pear (not listed in CNDDB for the subject quads)

The location(s) for each of these habitats is provided on Figure 3, *Vegetation Communities Map* and acreages tabulated in Table 4, *Vegetation Community Acreages*.

SENSITIVE PLANTS

The following special-status plant was detected within the Project Site: Southern California black walnut, a CRPR List 4.2 taxon.

Southern California Black Walnut (*Juglans californica*)

This species is not Federal or State listed as threatened or endangered; however, it is on the California Rare Plant Rank List 4.2 meaning that the species is of limited distribution throughout its range in California. The approximate number of southern California black walnut trees documented within the Project Site is 126. These individuals are scattered throughout the northern half of the eastern Project Site in relatively disturbed areas among eucalyptus trees, pepper trees, and laurel sumac shrubs as shown in Figure 11, *Sensitive Floral Species Observation Map*.

No other special-status plants were detected within the Project Site (GLA 2022).

Table 7, *Sensitive Plant Species with Potential to Occur Onsite*, provides a list of special-status plants evaluated for the Project Site through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors: 1) species identified by the CNDDB and CNPS as occurring (either currently or historically) on or in vicinity of the Project Site, and 2) any other special-status plants that are known to occur within the vicinity of the Project Site, or for which potentially suitable habitat occurs within the Project Site.

Table 7.
Sensitive Plant Species with Potential to Occur Onsite.

Species Name Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Allen's pentachaeta *Pentachaeta aurea* ssp. *allenii*	Federal: None State: None CRPR: List 1B.1	Openings in coastal sage scrub and valley and foothill grassland. Blooming period Mar-Jun. Elevation range 75-520m.	Does not occur
Brand's star phacelia *Phacelia stellaris*	Federal: None State: None CRPR: List 1B.1	Coastal dunes and coastal sage scrub. Blooming period Mar-Jun. Elevation range 1-400m.	Does not occur
Braunton's milkvetch *Astragalus brauntonii*	Federal: FE State: None CRPR: List 1B.1	Chaparral, coastal scrub, and valley and foothill grassland in recently burns or disturbed areas. Usually occurs in sandstone with carbonate layers.	Potential to occur

Species Name Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Brewer's calandrinia *Calandrinia breweri*	Federal: None State: None CRPR: List 4.2	Chaparral, Coastal scrub. Blooming period (Jan)Mar-Jun.	Does not occur
California androsace *Androsace elongata ssp. acuta*	Federal: None State: None CRPR: List 4.2	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland. Blooming period Mar-Jun	Does not occur
California beardtongue *Penstemon californicus*	Federal: None State: None CRPR: List 1B.2	Chaparral, lower montane coniferous forest, pinyon and juniper woodland/sandy. Blooming period May-Jun (Aug). Elevation range 1170-2300m.	Does not occur
California muhly *Muhlenbergia californica*	Federal: None State: None CRPR: List 4.3	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadows and seeps. Blooming period Jun-Sep.	Does not occur
California saw-grass *Cladium californicum*	Federal: None State: None CRPR: List 2B.2	Meadows and seeps, Marshes and swamps Alkaline or Freshwater. Blooming period Jun-Sep.	Does not occur
Catalina mariposa lily *Calochortus catalinae*	Federal: None State: None CRPR: List 4.2	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. Blooming period (Feb) Mar-Jun.	Potential to occur but not detected
Chaparral nolina *Nolina cismontana*	Federal: None State: None CRPR: List 1B.2	Chaparral, coastal scrub (sandstone or gabbro).	Potential to occur but not detected
Chaparral ragwort Senecio aphanactis	Federal: None State: None CRPR: List 2B.2	Chaparral, Cismontane woodland, Coastal scrub. Blooming period Jan-Apr (May).	Does not occur
Chaparral sand verbena *Abronia villosa* var. *aurita*	Federal: None State: None CRPR: List 1B.1	Sandy soils in chaparral, coastal sage scrub.	Does not occur
Coulter's goldfields *Lasthenia glabrate ssp. coulteri*	Federal: None State: None CRPR: List 1B.1	Playas, vernal pools, marshes and swamps (coastal salt). Blooming period Feb-Jun. Elevation range 1-1220m.	Does not occur
Coulter's matilija poppy *Romneya coulteri*	Federal: None State: None CRPR: List 4.2	Chaparral, Coastal scrub. Blooming period Mar-Jul (Aug).	Potential to occur but not detected
Coulter's saltbush *Atriplex coulteri*	Federal: None State: None CRPR: List 1B.2	Coastal bluff scrub, coastal dunes, coastal sage scrub, valley and foothill grassland. Occurring on alkaline or clay soils.	Does not occur
Davidson's saltscale *Atriplex serenana var. davidsonii*	Federal: None State: None CRPR: List 1B.2	Coastal bluff scrub, Coastal scrub. Blooming period Apr-Oct.	Does not occur

Species Name Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Engelmann oak *Quercus engelmannii*	Federal: None State: None CRPR: List 4.2	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland. Blooming period Mar-Jun	Does not occur
Fish's milkwort *Polygala cornuta var. fishiae*	Federal: None State: None CRPR: List 4.3	Chaparral, Cismontane woodland, Riparian woodland. Blooming period May-Aug	Does not occur
Gambel's water cress *Nasturtium gambelii*	Federal: FE State: ST CRPR: List 1B.1	Freshwater or brackish marches and swamps. Blooming period Apr-Oct. Elevation range 5-330m.	Does not occur
Heart-leaved pitcher sage *Lepechinia cardiophylla*	Federal: None State: None CRPR: List 1B.2	Closed-cone coniferous forest, chaparral, and cismontane woodland. Occurring on gabbroic, metavolcanic, or serpentinite soils. Blooming period Apr-Jul. Elevation range 520-1370m.	Does not occur
Hubby's phacelia *Phacelia hubbyi*	Federal: None State: None CRPR: List 4.2	Chaparral, Coastal scrub, Valley and foothill grassland. Blooming period Apr-Jul	Potential to occur but not detected
Intermediate mariposa lily *Calochortus weedii* var. *intermedius*	Federal: None State: None CRPR: List 1B.2	Rocky soils in chaparral, coastal sage scrub, valley and foothill grassland.	Does not occur
Intermediate monardella *Monardella hypoleuca ssp. intermedia*	Federal: None State: None CRPR: List 1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest (sometimes). Blooming period Apr-Sep.	Does not occur
Jokerst's monardella *Monardella australis ssp. jokerstii*	Federal: None State: None CRPR: List 1B.1	Chaparral, Lower montane coniferous forest. Blooming period Jul-Sep.	Does not occur
Lewis' evening-primrose *Camissoniopsis lewisii*	Federal: None State: None CRPR: List 3	Coastal bluff scrub, Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland. Blooming period Mar-May (Jun).	Does not occur
Long-spined spineflower *Chorizanthe polygonoides* var. *longispina*	Federal: None State: None CRPR: List 1B.2	Clay soils in chaparral, coastal sage scrub, meadows and seeps, and valley and foothill grasslands. Blooming period Apr-Jul. Elevation range 30-1530m.	Does not occur
Lucky morning-glory *Calystegia felix*	Federal: None State: None CRPR: List 1B.1	Meadows and seeps (sometimes alkaline), Riparian scrub (alluvial). Blooming period Mar-Sep	Does not occur

Species Name Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Malibu baccharis *Baccharis malibuensis*	Federal: None State: None CRPR: List 1B.1	Chaparral, cismontane woodland, coastal sage scrub, riparian woodland. Blooming period August. Elevation range 150-305m.	Does not occur
Many-stemmed dudleya *Dudleya multicaulis*	Federal: None State: None CRPR: List 1B.2	Chaparral, coastal sage scrub, valley and foothill grassland. Often occurring in clay soils.	Does not occur
Mesa horkelia *Horkelia cuneata ssp. puberula*	Federal: None State: None CRPR: List 1B.1	Chaparral, cismontane woodland, and coastal scrub. Occurring on sandy or gravelly soils. Blooming period Feb-Jul (Sept). Elevation range 70-810m.	Does not occur
Ocellated Humboldt lily *Lilium humboldtii ssp. ocellatum*	Federal: None State: None CRPR: List 4.2	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland. Blooming period Mar-Jul (Aug)	Does not occur
Palmer's grapplinghook *Harpagonella palmeri*	Federal: None State: None CRPR: List 4.2	Chaparral, Coastal scrub, Valley and foothill grassland. Blooming period Mar-May.	Does not occur
Paniculate tarplant *Deinandra paniculata*	Federal: None State: None CRPR: List 4.2	Coastal scrub, Valley and foothill grassland, Vernal pools. Blooming period (Mar)Apr-Nov	Potential to occur but not detected
Parish’s brittlescale *Atriplex parishii*	Federal: None State: None CRPR: List 1B.1	Chenopod scrub, playas, vernal pools. Blooming period Jun-Oct. Elevation range 25-1900m.	Does not occur
Parry's spineflower *Chorizanthe parryi var. parryi*	Federal: None State: None CRPR: List 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. Blooming period Apr-Jun	Does not occur
Plummer’s mariposa lily *Calochortus plummerae*	Federal: None State: CSC CRPR: List 4.2	Found in coastal sage scrub and chaparral habitats. In Orange County the species is known to occur in the Chino-Puente Hills.	Does not occur
Prostrate vernal pool navarretia *Navarretia prostrata*	Federal: None State: None CRPR: List 1B.1	Coastal sage scrub, meadows and seeps, valley and foothill grassland (alkaline), vernal pools. Occurring on mesic soils. Blooming period Apr-Jul. Elevation range 15-700m.	Does not occur
Rigid fringe pod *Thysanocarpus rigidus*	Federal: None State: None CRPR: List 1B.2	Pinyon and juniper woodland. Dry rocky slopes. Blooming period Feb-May.	Does not occur
Robinson's pepper grass *Lepidium virginicum* var. *robinsonii*	Federal: None State: None CRPR: List 1B.2	Chaparral, coastal sage scrub. Blooming period Jan-Jul. Elevation range 1-885m.	Potential to occur but not detected

Species Name Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Salt spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CRPR: List 2B.2	Mesic, alkaline soils in chaparral, coastal sage scrub, lower montane coniferous forest, Mojavean desert scrub, and playas.	Does not occur
San Bernardino aster *Symphyotrichum defoliatum*	Federal: None State: None CRPR: List 1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic)/near ditches, streams, and springs. Blooming period Jul-Nov. Elevation range 2-2040m.	Does not occur
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	Federal: Candidate State: SE CRPR: List 1B.1	Coastal sage scrub, valley and foothill grassland. Occurring on sandy soils. Blooming period Apr-Jul. Elevation range 150-1220m.	Does not occur
Santa Ana River woolly star *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CRPR: List 1B.1	Alluvial fan sage scrub, chaparral. Occurring on sandy or rocky soils.	Does not occur
Slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CRPR: List 1B.1	Sandy soils in alluvial fan coastal scrub, chaparral, cismontane woodland. Blooming period Apr-Jun. Elevation range 200-760m.	Does not occur
Small-flowered morning-glory *Convolvulus simulans*	Federal: None State: None CRPR: List 4.2	Chaparral (openings), Coastal scrub, Valley and foothill grassland. Blooming period Mar-Jul	Does not occur
Smooth tarplant *Centromadia pungens ssp. laevis*	Federal: None State: None CRPR: List 1B.1	Chenopod scrub, meadows and seeps, playas, Riparian woodland, valley and foothill grassland. Blooming period Apr-Sep	Does not occur
South coast branching phacelia *Phacelia ramosissima var. austrolitoralis*	Federal: None State: None CRPR: List 3.2	Chaparral, Coastal dunes, Coastal scrub, Marshes and swamps (coastal salt). Blooming period Mar-Aug	Does not occur
Southern California black walnut *Juglans californica*	Federal: None State: None CRPR: List 4.2	Occurs in grasslands, floodplains and sage scrub/chaparral habitats. The Chino Hills are an important distributional center for this species.	126 individuals Observed on site including 0.07 Southern California black walnut grove
Southern tarplant *Centromadia parryi* ssp. *australis*	Federal: None State: None CRPR: List 1B.1	Disturbed habitats, margins of marshes and swamps, vernally mesic valley and foothill grassland, vernal pools.	Does not occur
Tecate cypress *Hesperocyparis forbesii*	Federal: None State: None CRPR: List 1B.1	Occurs in clayey or alkali substrates, usually in grasslands or in alkali meadow habitats.	Does not occur

Species Name Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Vernal barley *Hordeum intercedens*	Federal: None State: None CRPR: List 3.2	Coastal dunes, Coastal scrub, Valley and foothill grassland (saline flats and depressions), Vernal pools. Blooming period Mar-Jun	Does not occur
Western spleenwort *Asplenium vespertinum*	Federal: None State: None CRPR: List 4.2	Chaparral, Cismontane woodland, Coastal scrub. Blooming period Feb-Jun.	Does not occur
White rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: None State: None CRPR: List 2B.2	Chaparral, cismontane woodland, coastal scrub, and riparian woodland in sandy and gravelly soils. Blooming period (Jul)Aug-Nov (Dec). Elevation range 0-2100m.	Does not occur
Woolly chaparral-pea *Pickeringia montana var. tomentosa*	Federal: None State: None CRPR: List 4.3	Chaparral. Blooming period May-Aug	Does not occur

California Native Plant Society (CNPS): California Rare Plant Rank (CRPR)
CRPR 1A – plants presumed extinct in California
CRPR 1B – plants rare, threatened, or endangered in California, but more common elsewhere
CRPR 2A – plants presumed extirpated in California but common elsewhere
CRPR 2B – plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3 – plants about which we need more information, a review list
CRPR 4 – plants of limited distribution, a watch list
.1 – Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

Federal (USFWS) Protection and Classification
FE – Federally Endangered
FT – Federally Threatened
FC – Federal Candidate for Listing

State (CDFW) Protection and Classification
SE – State Endangered
ST – State Threatened

Occurrence
- Does not occur – The site does not contain habitat for the species and/or the site does not occur within the geographic range of the species.
- Absent – The site contains suitable habitat for the species, but the species has been confirmed absent through focused surveys.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present = The species was detected onsite incidentally or through focused surveys

Source: GLA 2022.



Figure 11 - Sensitive Floral Species Observations Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

SENSITIVE WILDLIFE

The following five (5) special-status animals were detected at the Project Site:

Coastal California Gnatcatcher (*Polioptila californica californica*)

Two breeding pairs of coastal California gnatcatchers (Federally threatened, State species of special concern (SSC)) were detected onsite during focused survey efforts as shown in Figure 12, *Sensitive Faunal Species Observation Map*. One (1) pair was associated with a 0.26-acre patch of California sagebrush in the central-western portion of the Project Site east of Valencia Avenue. This was the same area where a breeding pair was detected during 2017 protocol surveys. A second breeding pair was detected on a knoll approximately 750 feet northeast of the first pair in California sagebrush. During the 2017 survey a single gnatcatcher was observed in this area. The Project Site contains approximately 10.33-acres of suitable coastal scrub habitat within the close proximity to the coastal California gnatcatcher observations.

Least Bell's Vireo (*Vireo bellii pusillus*)

During protocol gnatcatcher surveys in 2018 an early-season migrant least Bell's vireos (LBV) passing through the survey area as shown in Figure 12, *Sensitive Faunal Species Observation Map*. This bird is a State- and federally listed endangered species. It occurs in dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest, which does not occur on the site. Detections were of single birds and observation locations were not repeated during the early season observations, with one exception. The exception was a repeated observation of a single bird located in a eucalyptus woodland located south of the active oil field and north of the active agricultural area. Based on the timing of the LBV observations (late May to early June) it was most likely an unpaired male. The location is vegetated with a canopy of eucalyptus trees and understory of sparse mulefat, blue elderberry, and poison oak. During crotch bumblebee surveys on April 11th, 2020 migrating LBV were detected in eucalyptus on the project site and a single LBV was detected during subsequent surveys singing in elderberry immediately adjacent to the location where LBV was observed in 2018.

Yellow Warbler (*Setophaga petechia*)

A yellow warbler (state species of special concern) was documented foraging on the Project Site near the southwest corner of the parcel east of Valencia Avenue, as shown in Figure 12, *Sensitive Faunal Species Observation Map*. This species is a migratory songbird that breeds in riparian habitats in southern California. The yellow warbler exhibits habitat requirements similar to the yellow-breasted chat and least Bell's vireo. Suitable habitat typically consists of multi-layered riparian scrub or willow woodland corridors along flowing streams.

California horned lark (*Eremophila alpestris actia*)

The California horned lark is a CDFW Watch List species. The California horned lark breeds and resides in the coastal region of California from Sonoma County southeast to the United States/Mexican border, including most of the San Joaquin Valley, and

eastward to the foothills of the Sierra Nevada (Grinnell and Miller 1944; AOU 1998). The California horned lark is a common to abundant resident in a variety of open habitats, usually where trees and large shrubs are absent (Zeiner, *et al*. 1990). Range-wide, California horned larks breed in level or gently sloping shortgrass prairie, montane meadows, "bald" hills, open coastal plains, fallow grain fields, and alkali flats (Grinnell and Miller 1944). The California horned lark was observed foraging within the grassland portions of the Project.

Cooper's Hawk (*Accipiter cooperii*)

Cooper's hawk is a CDFW Watch List species when nesting. This species occurs in riparian areas and oak woodlands, and most commonly in montane canyons. This species is also known to use urban areas, occupying mature trees associated with residential and commercial development and using utility poles as perches. Cooper's hawk was observed foraging within the Project Site and the mature Eucalyptus trees represent suitable nesting habitat.

Table 8, *Sensitive Wildlife Species with Potential to Occur Onsite,* provides a list of special-status animals evaluated for the Project Site through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors, including: 1) species identified by the CNDDB as occurring (either currently or historically) on or in vicinity of the Project Site, and 2) any other special-status animals that are known to occur within the vicinity of the Project Site, for which potentially suitable habitat occurs on the Project Site.

Table 8.
Sensitive Wildlife Species with Potential to Occur Onsite

Species Name	Status	Habitat Requirements	Potential for Occurrence
American badger *Taxidea taxus*	Federal: None State: None CDFW: SSC	Occurs drier shrub, forest, and herbaceous habitats. Needs open, uncultivated ground and friable soils for digging burrows. Preys on burrowing rodents.	Not expected to occur
American peregrine falcon *Falco peregrinus anatum*	Federal: None State: None CDFW: FP	Wetlands near cliffs, coastal areas and inland mountains.	Not expected to occur
Arroyo chub *Gila orcuttii*	Federal: None State: None CDFW: SSC	Slow-moving or backwater sections of warm to cool streams with substrates of sand or mud.	No potential to occur on site
Bald eagle *Haliaeetus leucocephalus*	Federal: None State: SE CDFW: FP	Primarily in or near seacoasts, rivers, swamps, and large lakes. Perching sites consist of large trees or snags with heavy limbs or broken tops.	No potential to occur on site
Bank swallow *Riparia riparia*	Federal: None State: ST CDFW: None	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine textured	No potential to occur on site

Species Name	Status	Habitat Requirements	Potential for Occurrence
		sandy soils near streams, rivers, lakes, or ocean in order to dig nesting holes.	
Big free-tailed bat *Nyctinomops macrotis*	Federal: None State: None CDFW: SSC	Occurs in low-lying arid areas in Southern California. Roosts in high cliffs or rocky outcrops.	Not expected to occur – not detected during focused surveys
Burrowing owl *Athene cunicularia*	Federal: None State: None CDFW: SSC	Shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial, open areas as a year-long resident. Occupies abandoned ground squirrel burrows as well as artificial structures such as culverts and underpasses.	Absent. Not observed on site during focused surveys.
California black rail *Laterallus jamaicensis coturniculus*	Federal: None State: ST CDFW: FP	Nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation.	No potential to occur on site due to lack of suitable habitat
California diplectronan caddisfly *Diplectrona californica*	Federal: None State: None CDFW: None	Larvae live in fast-flowing, cool streams.	No potential to occur on site due to lack of suitable habitat
California glossy snake *Arizona elegans occidentalis*	Federal: None State: None CDFW: SSC	Inhabits arid scrub, rocky washes, grasslands, chaparral.	Not expected to occur
California horned lark *Eremophila alpestris actia*	Federal: None State: None CDFW: WL	Occupies a variety of open habitats, usually where trees and large shrubs are absent.	Detected onsite.
Coast patch-nosed snake *Salvadora hexalepis virgultea*	Federal: None State: None CDFW: SSC	Occurs in coastal chaparral, desert scrub, washes, sandy flats, and rocky areas.	Not expected to occur
Coast horned Lizard *Phrynosoma blainvillii*	Federal: None State: None CDFW: SSC	Chaparral and coastal sage scrub	Moderate potential to occur on site. Not observed.
Coast Range newt *Taricha torosa*	Federal: None State: None CDFW: SSC	Wet forests, oak forests, chaparral, and rolling grasslands.	No potential to occur on site
Coastal cactus wren *Campylorhynchus brunneicapillus sandiegensis*	Federal: BBC State: None CDFW: SSC	Occurs almost exclusively in cactus (cholla and prickly pear) dominated coastal sage scrub.	Limited potential to occur on site. Not observed during focused surveys.
Coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: None CDFW: SSC	Low elevation coastal sage scrub and coastal bluff scrub.	Observed breeding on site.
Coastal whiptail *Aspidoscelis tigris stejnegeri*	Federal: None State: None CDFW: SSC	Open, often rocky areas with little vegetation, or sunny microhabitats within shrub or grassland associations.	Potential to occur on site. Not observed.

Species Name	Status	Habitat Requirements	Potential for Occurrence
Cooper's hawk *Accipiter cooperii*	Federal: None State: None CDFW: WL	Primarily occurs in riparian areas and oak woodlands, most commonly in montane canyons. Known to use urban areas, occupying trees among residential and commercial.	Detected onsite.
Golden eagle *Aquila chrysaetos*	Federal: BCC State: None CDFW: FP	In southern California, occupies grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nests on rock outcrops and ledges.	Not expected to occur – not observed during surveys
Grasshopper sparrow *Ammodramus savannarum*	Federal: None State: None CDFW: SSC	Occurs in dense grasslands on rolling hills, lowland plains, in valleys, and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs, and scattered shrubs. Loosely colonial when nesting.	Not expected to occur – not observed during surveys
Great blue heron *Ardea herodias*	Federal: None State: None CDFW: None	Saltwater and freshwater habitats, from open coasts, marshes, sloughs, riverbanks, and lakes to backyards. Forages in grasslands and agricultural fields. Nests in trees or high places.	Potential to occur for occasional foraging
Hoary bat *Lasiurus cinereus*	Federal: None State: None CDFW: None	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Potential to occur. Not detected during focused bat surveys
Least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE CDFW: None	Dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest.	Observed migrating through site. Low potential for breeding due to marginal habitat quality.
Long-eared owl *Asio otus*	Federal: None State: None CDFW: SSC	Riparian habitats are required by the long-eared owl, but it also uses live-oak thickets and other dense stands of trees.	Not expected to occur
Merlin *Falco columbarius*	Federal: None State: None CDFW: WL	Nest in forested openings, edges, and along rivers. Winter in open forests, grasslands, and especially coastal areas with flocks of small songbirds or shorebirds.	Not expected to occur – would only occur as wintering or migrant

Species Name	Status	Habitat Requirements	Potential for Occurrence
Northern leopard frog *Lithobates pipiens*	Federal: None State: None CDFW: SSC	Inhabits grassland, wet meadows, potholes, forests, woodland, brushlands, springs, canals, bogs, marshes, reservoirs. Generally, prefers permanent water with abundant aquatic vegetation.	No potential to occur on site
Northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	Federal: None State: None CDFW: SSC	Coastal sage scrub, sage scrub/grassland ecotones, and chaparral.	Not expected to occur
Orange-throated whiptail *Aspidoscelis hyperythra*	Federal: None State: None CDFW: SSC	Coastal sage scrub, chaparral, non-native grassland, oak woodland, and juniper woodland.	Potential to occur on site
Pallid Bat *Antrozous pallidus*	Federal: None State: None CDFW: SSC	Habitats with rocky, outcropped areas.	Potential to occur for foraging. Not detected during surveys.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: None CDFW: SSC	Rocky areas with high cliffs in pine-juniper woodlands, desert scrub, palm oasis, desert wash, and desert riparian.	Not expected to occur - not detected during surveys.
Red-diamond rattlesnake *Crotalus ruber*	Federal: None State: None CDFW: SSC	Habitats with heavy brush and rock outcrops, including coastal sage scrub and chaparral.	Potential to occur on site - not detected during surveys.
San Bernardino kangaroo rat *Dipodomys merriami parvus*	Federal: FE State: None CDFW: SSC	Typically found in Riversidean alluvial fan sage scrub and sandy loam soils, alluvial fans and floodplains, and along washes with nearby sage scrub.	Not expected to occur due to lack of suitable habitat
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	Federal: None State: None CDFW: SSC	Occupies a variety of habitats, but is most common among shortgrass habitats. Also occurs in sage scrub, but needs open habitats.	Not expected to occur – not observed during surveys
San Diego desert woodrat *Neotoma lepida intermedia*	Federal: None State: None CDFW: SSC	Occurs in a variety of shrub and desert habitats, primarily associated with rock outcrops, boulders, cacti, or areas of dense undergrowth.	Not expected to occur
San Diego fairy shrimp *Branchinecta sandiegonensis*	Federal: FE State: None CDFW: None	Seasonal vernal pools	No potential to occur on site

Species Name	Status	Habitat Requirements	Potential for Occurrence
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None CDFW: None	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	No potential to occur on site
Southern California legless lizard *Anniella stebbinsi*	Federal: None State: None CDFW: SSC	Broadleaved upland forest, chaparral, coastal dunes, coastal scrub; found in a broader range of habitats that any of the other species in the genus. Often locally abundant, specimens are found in coastal sand dunes and a variety of interior habitats, including sandy washes and alluvial fans	No potential to occur on site
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	Federal: None State: None CDFW: WL	Grass covered hillsides, coastal sage scrub, and chaparral.	Low potential to occur on site. Not detected during surveys.
Southwestern willow flycatcher (nesting) *Empidonax traillii extimus*	Federal: FE State: SE CDFW: None	Riparian woodlands along streams and rivers with mature dense thickets of trees and shrubs.	Not expected to occur
Swainson's hawk *Buteo swainsoni*	Federal: None State: ST CDFW: None	Summer in wide open spaces of the American West. Nest in grasslands, but can use sage flats and agricultural lands. Nests are placed in lone trees.	Not expected to occur
Tricolored blackbird (nesting colony) *Agelaius tricolor*	Federal: BCC State: candidate CDFW: SSC	Breeding colonies require nearby water, a suitable nesting substrate, and open-range foraging habitat of natural grassland, woodland, or agricultural cropland.	No potential to occur on site
Two-striped gartersnake *Thamnophis hammondii*	Federal: None State: None CDFW: SSC	Aquatic snake typically associated with wetland habitats such as streams, creeks, and pools.	No potential to occur on site
Western mastiff bat *Eumops perotis californicus*	Federal: None State: None CDFW: SSC	Prefers habitat edges and mosaics with trees that are protected from above and open from below with open areas for foraging. Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests.	Potential to occur on site. Not detected during surveys.

Species Name	Status	Habitat Requirements	Potential for Occurrence
Western pond turtle *Actinemys marmorata*	Federal: None State: None CDFW: SSC	Slow-moving permanent or intermittent streams, small ponds and lakes, reservoirs, abandoned gravel pits, permanent and ephemeral shallow wetlands, stock ponds, and treatment lagoons. Abundant basking sites and cover necessary, including logs, rocks, submerged vegetation, and undercut banks.	No potential to occur on site
Western yellow bat *Lasiurus xanthinus*	Federal: None State: None CDFW: SSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	Low potential to occur on site. Not detected during surveys.
Western spadefoot *Spea hammondii*	Federal: None State: None CDFW: SSC	Seasonal pools in coastal sage scrub, chaparral, and grassland habitats.	Not expected to occur due to lack of suitable habitat
Western yellow-billed cuckoo (nesting) *Coccyzus americanus occidentalis*	Federal: FT State: SE CDFW: None	Dense, wide riparian woodlands with well-developed understories.	No potential to occur on site
White tailed kite *Elanus leucurus*	Federal: None State: None CDFW: FP	Breeds in riparian trees in lower elevation areas. Known from San Diego north to San Luis Obispo Counties.	Low potential to occur on site for foraging – not observed during surveys
Yellow rail *Coturnicops noveboracensis*	Federal: None State: None CDFW: SSC	Shallow marshes, and wet meadows; in winter, drier freshwater and brackish marshes, as well as dense, deep grass, and rice fields.	No potential to occur on site
Yellow-breasted chat *Icteria virens*	Federal: None State: None CDFW: SSC	Dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories.	Potential to occur on site. Not detected during surveys.
Yellow warbler *Setophaga petechia*	Federal: BCC State: None CDFW: SSC	Dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories.	Observed foraging on site.
Yuma myotis *Myotis yumanensis*	Federal: None State: None CDFW: None	Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings or crevices.	Not expected to occur due to lack of suitable foraging habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence
Federal (USFWS) Protection and Classification FE – Federally Endangered FC – Federal Candidate for Listing **State (CDFW) Protection and Classification** SE – State Endangered SPE – State Proposed Endangered SSC – State Species of Special Concern CWL – California Watch List SFP – State Fully Protected **Western Bat Working Group (WBWG)** H – High Priority LM – Low-Medium Priority M – Medium Priority MH – Medium-High Priority **Occurrence** • Absent – The species is absent from the site, either because the site lacks suitable habitat for the species, the site is located outside of the known range of the species, or focused surveys has confirmed the absence of the species. • Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out. • Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed. • Present – The species was detected onsite incidentally or through focused surveys.			

Source: GLA 2022.

The following special status wildlife species were not detected onsite but have the potential to occur within or adjacent to the Project Site.

Coast horned lizard (*Phrynosoma blainvillii*)

The coast horned lizard is designated as a CDFW SSC, but is not Federally or State listed. This species inhabits coastal sage scrub and chaparral habitats with sandy, rocky, or shallow soils that support native harvester ants (*Pogonomyrmex* spp.).

The coast horned lizard was not observed during many hours of surveys but has limited potential to occur on site on portions of the Project Site east of Valencia Avenue within areas of coastal sage scrub.

Coastal whiptail (*Aspidoscelis tigris stejnegeri*)

The coastal western whiptail does not have a Federal or State designation, however this species is considered locally rare. The western whiptail ranges through the semi-arid and arid desert lowlands of Southern California, southern Arizona, adjacent areas of Mexico and western Baja California, Mexico (Lowe, *et al*., 1970). It is the third most common lizard in the San Gabriel Mountains after *Sceloporus occidentalis* and *Uta stansburiana* (Schoenherr, 1976). The western whiptail can be found in open, often rocky areas with little vegetation or sunny microhabitats within shrub or grassland associations (Benes, 1969). *Cnemidophorus* [*Aspidoscelis*] is commonly found on the eastern and western slopes of the San Gabriel Mountains in all habitats except yellow pine forest (Schoenherr, 1976). Schoenherr (1976) also indicates that the western

whiptail probably occurs in oak woodland (although none have been taken in this habitat type) because they have been detected in riparian areas.

The coastal whiptail is known to occur in the general vicinity of the Project Site. This species has low potential to occur on site within the proposed development area and a moderate to high potential to occur in avoided scrub areas west, north and east of the development areas.

Orange-throated Whiptail (*Aspidoscelis hyperythra*)

The orange-throated whiptail is a CDFW SSC. This lizard is known from coastal sage scrub, chaparral, and valley-foothill hardwood habitats of San Bernardino, Riverside, Los Angeles, Orange and San Diego counties. It prefers washes and other sandy areas with patches of brush and rocks. This species has a low potential to occur within the Project Site.

Red-diamond rattlesnake (*Crotalus ruber*)

The northern red-diamond rattlesnake is designated as a CDFW SSC but is not Federally or State listed. This species occurs in chaparral, woodland, grassland, and desert areas from San Bernardino County southward along both sides of the Peninsular ranges and Santa Ana mountains to Baja California. This species uses rocks, rodent burrows, and dense vegetation for cover. The northern red-diamond rattlesnake was not detected during surveys and has low potential to occur on the site.

Burrowing Owl (*Athene cunicularia)*

Focused surveys for the burrowing owl, a CDFW SSC, were conducted within all suitable habitat areas within the Project Site. Surveys were conducted in accordance with survey guidelines described in the 2012 CDFG Staff Report on Burrowing Owl Mitigation. The species depends on the presence of ground squirrels whose burrows are used for nesting and roosting. The burrowing owl prefers primarily open areas with short vegetation and bare ground. Portions of the Site west of Valencia Avenue exhibit disturbed, sparse vegetation, providing habitat relatively suitable for the species. However, the protocol surveys did not detect this species, which does not occur on the Site.

Coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*)

The coastal cactus wren is a CDFW SSC. It is a resident species in arid regions in Southern California and has restricted habitat requirements in stands of cholla and prickly pear. This species was not detected during focused surveys in 2017 or 2018 and does not occur on the site.

Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)

The southern California rufous-crowned sparrow is a CDFW Watch List species. This subspecies of the rufous-crowned sparrow is a resident species of southern California on the slopes of the Transverse and Coastal ranges from Los Angeles County south to Baja California Norte, and occurs on grass-covered hillsides, coastal sage scrub, and

chaparral. Southern California rufous-crowned sparrow was not detected during surveys in 2017 or 2018 and does not occur on the site.

White tailed kite (*Elanus leucurus*)

The white-tailed kite is designated as a California Fully Protected Species. In California, the white-tailed kite is a common to uncommon, year-long resident in coastal and valley lowlands; rarely found away from agricultural areas (Grinnell and Miller 1944). It inhabits herbaceous and open stages of most habitats mostly in cismontane California. It has extended its range and increased numbers in California in recent decades (Eisenmann 1971).

Although apparently a resident bird throughout most of its breeding range, dispersal occurs during the nonbreeding season resulting in some range expansion during the winter. It is believed to become nomadic during low abundance of California voles and the population changes in a regular and predictable fashion directly tied to changing vole numbers. The white-tailed kite inhabits low elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands. Riparian areas adjacent to open areas are used for nesting (Dunk 1995). The winter habitat is generally similar to the breeding habitat, but the proximity to nest trees is not important.

The white-tailed kite has been reported historically in the general vicinity of the Project site. The Project site including development areas provide suitable foraging habitat. The white-tailed kite may potentially nest to the west and/or east of the Project Site boundary.

Yellow-Breasted Chat (*Icteria virens*)

The yellow-breasted chat, which is a CDFW SSC, is a migratory songbird that breeds in riparian habitats in southern California. This species exhibits habitat requirements similar to the least Bell's vireo. Suitable habitat typically consists of multi-layered riparian scrub or willow woodland corridors along flowing streams. This species does not have potential to nest on site; however, it has a low potential to foraging onsite.

Special Status Bats

GLA conducted focused surveys for roosting and foraging special-status bats. Species detected acoustically foraging or flying over the site included the Mexican free-tailed bat (*Tadarida brasiliensis*) and canyon bat (*Parastrellus hesperus*). Additionally, one recording of an unidentified bat species in the 40 kilohertz frequency was detected. While the site supports numerous blue-gum eucalyptus trees, which are often used by certain bat species for roosting (within areas of exfoliating bark), roosting on site was not detected. Specifically, careful examination of the eucalyptus trees found very few large trees with areas of exfoliating bark that would be suitable for roosting.

CRITICAL HABITAT

A 141.40-acre portion of the Project Site located east of Valencia Avenue is included in Critical Habitat Unit 9 for the coastal California gnatcatcher as depicted in Figure 12, *Sensitive Faunal Species Observation Map*. The area designated as Critical Habitat

consists of active oil field that supports a predominance of non-native trees including blue gum eucalyptus and Peruvian pepper mixed with laurel sumac chaparral, and limited areas of coastal sage scrub as quantified below. The site also contains substantial areas historically devoted to oil production activities including unvegetated roads and pads. The portion of the site designated as Critical Habitat is bordered on the north by existing residential development, Valencia Avenue and former nursery lands to the west that support non-native grasses and forbs as well as residential and institutional lands to the west of Valencia Avenue. Areas to the south of the Critical habitat include active agricultural areas (some of which (11.10-acres) are included in the Critical Habitat overlay) and residential development. To the east is Carbon Canyon Regional Park and lands owned by the USACE associated with Carbon Canyon Dam which support very limited areas of coastal sage scrub habitat. Given these factors, the most suitable areas for east to west and west to east movement by the California gnatcatcher would be to the north of the Project Site within existing and proposed open space, mitigation bank, and mitigation/restoration sites as depicted Figure 13, *Regional Open Space and Proposed Mitigation Lands Map*. Specifically, areas to the east include Critical Habitat connecting with areas occupied by the California gnatcatcher which extend to the west to Chino Hills State Park and the Shell/Aera Habitat Conservation Plan (HCP) Study Management Area which connects areas of Critical Habitat to the north with areas of conserved open space in the Tonner Hills area, which in turn provide connections to areas to the west occupied by the California gnatcatcher.

The definition for Physical and Biological Features, PBFs (formerly PCEs as reflected below)[7] as provided in the 2007 Final Rule for California gnatcatcher Critical Habitat are defined as follows:

> *(2) The primary constituent elements (PCEs)*[PBFs] *of critical habitat for coastal California gnatcatcher are:(i) Dynamic and successional sage scrub habitats: Venturan coastal sage scrub, Diegan coastal sage scrub, Riversidean sage scrub, maritime succulent scrub, Riversidean alluvial fan scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub in Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties that provide space for individual and population growth, normal behavior, breeding, reproduction, nesting, dispersal and foraging; and (ii) Non-sage scrub habitats such as chaparral, grassland, riparian areas, in proximity to sage scrub habitats as described for PCE 1 above that provide space for dispersal, foraging, and nesting. (3) Critical habitat does not include manmade structures (such as buildings, aqueducts, airports, roads, and other paved areas) and the land on which they are located existing on the effective date of this rule and not containing one or more of the PCEs.*

Table 9, *Coastal California Gnatcatcher PBF's Assessment,* below provides a summary of areas within the 141.40-acre area of designated Critical Habitat, which includes a 1.40-acre triangular parcel that abuts the intersection of Valencia Avenue and Rose

[7] As noted, the designation of "Primary Constituent Elements" has been changed to "Physical and Biological Features"; in the new critical habitat regulations (81 FR 7214) however, given that the 2007 Final Rule for the California gnatcatcher uses "PCEs" such usage is noted and retained here and has also been retained in the quotation from the 2007 Final Rule.

Drive and an additional 0.06-acre offsite to the north that is just west of Valencia Avenue. The Critical Habitat overlay includes 83.98 acres that do not constitute PCEs [PBFs] and 57.42 acres with PCEs [PBFs]. Thus, of the 141.40 acres of Critical Habitat, 83.98 acres do not constitute PCEs [PBFs] (59.0-percent). For areas with PCEs 13.18-acres consist of fragmented coastal sage scrub (PCE [PBF](i)) and 24.84 acres dominated by non-native upland mustards (PCE [PBF](ii)). Thus, of the 141.40 acres of Critical Habitat, only 13.18 acres (9.3-percent) provide potential breeding habitat while 24.84 acres (17.6 percent) are comprised of non-native mustards, which provide areas for foraging and movement only, and as noted, given the location of the site, does not represent important habitat for regional east-west and west-east movement, which is concentrated to the north. Laurel sumac scrub, accounting for 16.75-acres, while native, is not suitable for breeding and is of limited value for movement and foraging. It is also important to note that of the 13.18-acres of areas with vegetation cover (coastal sage scrub alliances) consistent with PCE[PBF](i), only limited areas of CSS were observed to be occupied by the coastal California gnatcatcher, which during two 2017 and 2018 protocol surveys utilized the central portion of the area of the site east of Valencia Avenue as depicted on Figure 12, *Sensitive Faunal Species Observation Map*. Thus, areas of CSS along the northern boundary of the site, overlooking Carbon Canyon Road as well as other small, isolated patches do not appear to be utilized by the California gnatcatcher based on survey results, due to small patch size and sub-optimal structure of adjacent vegetation. Specifically, many of the patches of sagebrush scrub are embedded in a matrix of vegetation cover that the coastal California gnatcatcher would be expected to avoid such as eucalyptus and pepper groves.

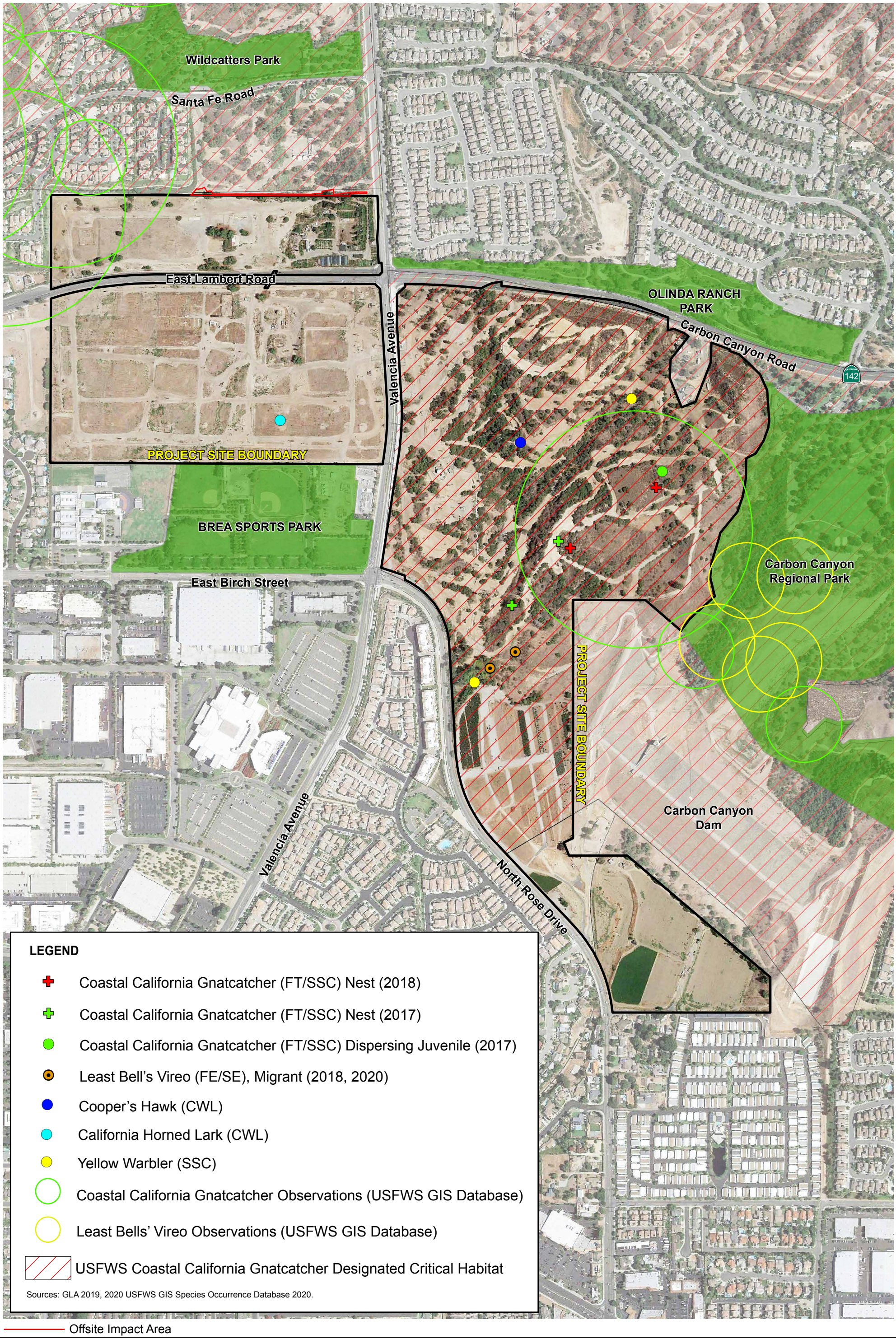

Figure 12 - Sensitive Faunal Species Observations Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

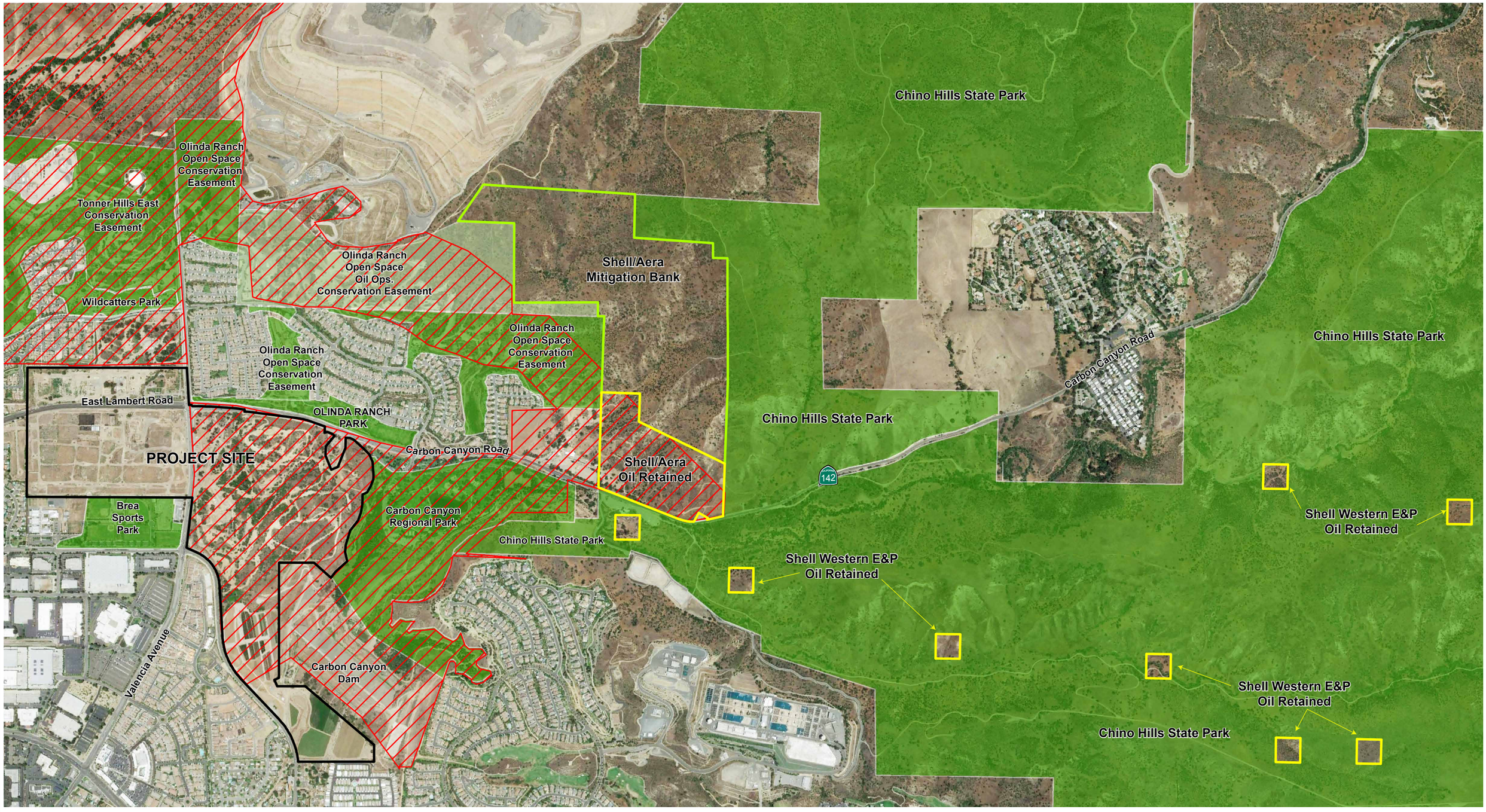

Figure 13 - Regional Open Space and Proposed Mitigation Lands Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 1,300 feet

Table 9.
Coastal California Gnatcatcher PBF's Assessment

Project Site Primary Constituent Elements within Critical Habitat	
Upland mustards	24.84
Laurel sumac scrub	16.75
California sagebrush scrub	9.85
California buckwheat scrub	2.94
Blue elderberry (savannah)	2.56
Coyote brush scrub	0.23
Coast prickly pear scrub	0.11
Annual brome grassland	0.07
California brittle bush scrub	0.05
Mule fat thickets	0.02
Subtotal	**57.42**
Project Site <u>Not</u> Primary Constituent Elements within Critical Habitat	
Oilfield Roads and Pads	46.70
Agriculture	11.10
Pepper tree grove	6.88
Eucalyptus (groves)	6.58
Pepper/Laurel sumac (groves)	3.13
Developed	2.93
Blue elderberry (individuals)	1.54
Blue elderberry (woodland)	1.37
Pepper tree	1.19
Poison hemlock patches	0.90
Castor bean thickets	0.37
Filaree fields	0.28
Russian thistle stands	0.26
Yellow star thistle fields	0.24
Bare	0.20
Giant reed thickets	0.10
California walnut (groves)	0.07
Fountain grass swards	0.06
Other ornamental	0.04
Black willow thickets	0.03
Mexican fan palm	0.01
Subtotal	**83.98**
TOTAL	**141.40**

Source: GLA 2022.

REGIONAL CONNECTIVITY/WILDLIFE MOVEMENT CORRIDORS

Overview

Wildlife corridors link areas of suitable habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals and genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallager 1989; Bennett 1990). Corridors effectively act as links between different populations of a species. A group of smaller populations (termed "demes") linked together via a system of corridors is termed a "metapopulation." The long-term health of each deme within the metapopulation is dependent upon its size and the frequency of interchange of individuals (immigration vs. emigration). The smaller the deme, the more important immigration becomes, because prolonged inbreeding with the same individuals can reduce genetic variability. Immigrant individuals that move into the deme from adjoining demes mate with individuals and supply that deme with new genes and gene combinations that increases overall genetic diversity. An increase in a population's genetic variability is generally associated with an increase in a population's health. Corridors mitigate the effects of habitat fragmentation by:

(1) allowing animals to move between remaining habitats, which allows depleted populations to be replenished and promotes genetic diversity;
(2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events (such as fires or disease) will result in population or local species extinction; and
(3) serving as travel routes for individual animals as they move within their home ranges in search of food, water, mates, and other needs (Noss 1983; Fahrig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover). A number of terms have been used in various wildlife movement studies, such as "wildlife corridor", "travel route", "habitat linkage", and "wildlife crossing" to refer to areas in which wildlife moves from one area to another. To clarify the meaning of these terms and facilitate the discussion on wildlife movement in this study, these terms are defined as follows:

Travel Route: A landscape feature (such as a ridge line, drainage, canyon, or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources (e.g., water, food, cover, den sites). The travel route is generally preferred because it provides the least amount of topographic resistance in moving from one area to another; it contains adequate food, water, and/or cover while moving between habitat areas; and provides a relatively direct link between target habitat areas.

Wildlife Corridor: A piece of habitat, usually linear in nature, that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bounded by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and facilitate movement while in the corridor. Larger, landscape-level corridors (often referred to as "habitat or landscape linkages") can provide both transitory and resident habitat for a variety of species.

Wildlife Crossing: A small, narrow area, relatively short in length and generally constricted in nature, that allows wildlife to pass under or through an obstacle or barrier that otherwise hinders or prevents movement. Crossings typically are manmade and include culverts, underpasses, drainage pipes, and tunnels to provide access across or under roads, highways, pipelines, or other physical obstacles. These are often "choke points" along a movement corridor.

Wildlife Movement Within and Adjacent to Project Site

The Project Site is located west of Carbon Canyon Regional Park, Chino Hills State Park and south of the Puente-Chino Hills wildlife corridor. The Puente-Chino Hills wildlife corridor extends from near the Whittier Narrows Recreation Area southeast through and toward Chino Hills State Park, Coal Canyon, Irvine Ranch Land Reserve and the Cleveland National Forest. During a detailed meta-analysis of corridor function for the Puente-Chino Hills wildlife corridor conducted by Conservation Biology Institute, the Project Site was not identified as a potential corridor segment (CBI 2005). Specifically, the Project Site is located immediately west of the Chino Corridor Segment 1 (Carbon Canyon Regional Park). As stated by CBI:

> "*Segment 1 is largely conserved already as Chino Hills State Park, although efforts continue to increase the size and buffering of this important reserve area. It is separated from Segment 2 by Carbon Canyon Road (Highway 142). This busy 2-lane road suffers some roadkill, especially coyote (Robertson et al. 1995), but is generally quite permeable to target species due to extensive, naturally vegetated land on both sides, lack of development over much of its length, and availability of several undercrossings*." (CBI 2005)"

The Project Site was also not identified as a habitat linkage contributing to Chino Hills State Park. As stated in the Chino Hills State Park General Plan:

> "*The habitat linkages important to the biological survival of Chino Hills State Park are: 1) Coal Canyon which links the park to the Cleveland National Forest and the Santa Ana Mountains; 2) the Sonome Canyon Area which links Chino Hills State Park to Tonner Canyon and other open space to the northwest; and 3) the Prado Basin area that links the park to the Prado Basin, and thereby to the Dairy Preserve, the Santa Ana River watershed, and open space east of State Route 71*." (Chino Hills State Park General Plan 1999)

The majority of the Project Site is characterized as an active oil operation site operated by Aera Energy LLC since the early 1900s. The Project Site is bordered to the north, south and east by high density residential development and bisected north to east by Valencia Avenue and west to east by East Lambert/Carbon Canyon Roads. The Project Site on the east side of Valencia Avenue consists of land associated with oil operations including oil fields, roads and paths, and related equipment and infrastructure (disturbed, undeveloped land occurs scattered within the oilfield operations), and active agricultural cultivation. The areas west of Valencia Avenue includes active and abandoned nursery facilities while still containing active oil operations. The Project Site is bordered to the east by Carbon Canyon Regional Park. Based on the extent of adjacent high-density residential development along the north, south and west boundaries and associated high traffic roadways bisecting and bordering the property, the Project Site does not meet the definition or is expected to serve as a wildlife movement corridor for ground dwelling species.

However, the Project Site is located partially within USFWS designated critical habitat for the federally threated coastal California gnatcatcher. As previously analyzed and presented, a total of 57.42 acres of critical habitat representing PCEs [PBFs] were documented onsite, as outlined in Table 9, *Coastal California Gnatcatcher PCE Assessment*. Specifically, 13.18 acres provide potential breeding habitat and foraging (coastal sage scrub habitat associations) while 24.91 acres are comprised of non-native mustards and annual non-native grassland, which provide areas for foraging and movement. Laurel sumac scrub, blue elderberry savannah and mule fat thickets while not suitable for breeding, do provide suitable foraging habitat and material for nest building when in close association with suitable breeding sites.

Impacts to 52.86 acres of USFWS coastal California gnatcatcher critical habitat with PCE's [PBFs] will be mitigated by preserving a total 52.86 acres of open space habitat within and immediately adjacent to the existing Puente-Chino Hills wildlife corridor. The proposed preserved lands will include 22.50 acres of in-holdings (SWEPI Retained Drill Sites) within the Chino Hills State Park and Shell/Aera oil retained lands located within the coastal California gnatcatcher critical habitat boundary and within which a minimum of 20.66 acres of coastal sage scrub restoration will occur, as shown in Figure 13, *Regional Open Space and Proposed Mitigation Lands Map*. The proposed land conservation would also provide a significant contribution to a region of open space adjacent to Carbon Canyon Road identified as a "Priority Crossing Improvement Area - A" (CBI 2005). As stated by CBI:

> "*Add wildlife fencing on either side of Carbon Canyon Road to reduce roadkill and encourage wildlife to use existing culverts, especially the concrete box culvert near the entrance to Chino Hills State Park. Adding another wildlife crossing structure, designed to accommodate all large mammals, would be even better. Given that traffic on this 2-lane road is increasing due to increasing development in the vicinity (Haas 2000), any future road upgrades should incorporate bridges or other very open wildlife crossing structures as mitigation. A variety of smaller under-crossings with funneling fences, specifically designed to accommodate smaller reptiles, amphibians, and mammals, should also be considered to improve connectivity for these species*." (CBI 2005)

The dedication of 52.86 acres of open space lands located within and adjacent to Chino Hills State park within the Puente-Chino Hills wildlife corridor, coastal California gnatcatcher critical habitat, and priority crossing improvement area would represent a significant acquisition and contribution to regional wildlife movement conservation goals. The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

REGIONAL AND REGULATORY SETTING

The following section has been based on Local, City General Plan conditions, compliance with City of Brea Municipal Codes and complying with State and Federal regulatory resources guidelines.

LOCAL

Chino Hills State Park General Plan

As stated in the Chino Hills State Park General Plan:

> **"***When evaluating the desirability of proposed land acquisitions at the park, the Department will consider the following guidelines: 1) The Department will evaluate each proposal of land dedication and accept only those dedications that are in keeping with the purposes of Chino Hills State Park. Land acquisitions will support the park's resource management goals by enhancing watershed protection and adding significant or unique resources, habitats, or features to the park. They will create buffer areas (areas between developments and park resources) and include ridgelines whenever possible, increase the size and improve the effectiveness of biocorridors, and establish park facilities outside of sensitive resource areas. Land acquisitions may also add to the park's recreational opportunities and establish links to regional trail systems. 2) The Department must exercise caution when considering land adjacent to developed areas. Difficulties arise from illegal-refuse dumping, illegal off-highway vehicle activity, the spread of exotic plant species onto parkland, and wildlife predation and harassment by domestic animals., 3) The Department will actively work towards acquisition of properties that contribute to biocorridors ensuring that key linkages will be preserved, and 4) In order to accomplish mutual goals such as resource protection, biocorridor enhancement, and providing recreational opportunities, partnerships with local and regional jurisdictions as well as state and federal agencies will be encouraged*." (Chino Hills State Park General Plan 1999)

The proposed 52.86-acres of conserved lands will be offered to the Chino Hills State Park for consideration of acquisition. The lands are expected to meet and/or exceed the standards for acquisition based on the following facts.

- 22.50 acres of proposed conservation lands are located within in-holdings (8 SWEPI Retained Drill Sites) within the Chino Hills State Park boundary.

- 35.32 acres of proposed conservation lands are located immediately west of Chino Hills State Park boundary, south of the Shell/Aera Mitigation Bank and immediately north of the Chino Hills State Park Interpretive Center.

- No residential development is located adjacent to any of the proposed conservation areas.

- The proposed conservation areas would contribute to connectivity of open space within the Puente-Chino Hills wildlife corridor and provide additional buffer habitat west of the existing Chino Hills State Park boundary.

City of Brea General Plan

Preserve Open Space Aggressively for Diverse Purposes – as a Visual and Scenic Resource, for Habitat Conservation, to Protect Watersheds, and for Recreation

Policy CR-4.1 Protect and preserve open space wherever possible.

The dedication of 52.86-acres of open space lands located within and adjacent to Chino Hills State park within the Puente-Chino Hills wildlife corridor, coastal California gnatcatcher critical habitat, and priority crossing improvement area would represent a significant acquisition and contribution to regional wildlife movement conservation goals. The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

Policy CR-4.2 Select areas for open space preservation using an evaluation system that incorporates the following selection criteria: connectivity, access/recreations, sensitive areas, natural features, subdivision pattern, and buffer zones.

The dedication of 52.86-acres of open space lands located within and adjacent to Chino Hills State park within the Puente-Chino Hills wildlife corridor, coastal California gnatcatcher critical habitat, and priority crossing improvement area would represent a significant acquisition and contribution to regional wildlife movement conservation goals. The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

Policy CR-4.3 Work aggressively with the Orange County, Los Angeles County, State, and other appropriate public agencies, private entities, and landowners to conserve, protect, and enhance open spaces and natural resources, particularly within the sphere of influence

The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

Preserve and Maintain Wildlife and Animal Movement Corridors

Policy CR-8.1 Preserve key wildlife migration corridors and habitat areas.

Based on the extent of adjacent high-density residential development along the north, south and west boundaries and associated high traffic roadways bisecting and bordering the property, the Project Site does not meet the definition or is expected to serve as a wildlife movement corridor for ground dwelling species. However, the Project Site is located partially within USFWS designated critical habitat for the federally threated coastal California gnatcatcher. A total of 52.86-acres of critical habitat representing PBFs will be impacted onsite, as outlined in Table 11, *Impacts to CAGN Critical Habitat PBF's*. The dedication of 52.86-acres of open space lands located within the Puente-Chino Hills wildlife corridor, coastal California gnatcatcher critical habitat, priority crossing improvement area, and within which 20.66-acres of coastal sage scrub establishment and/or restoration is proposed would represent a significant acquisition and contribution to regional wildlife movement conservation goals. The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

Policy CR-8.2 Provide adequate wildlife crossings where roadways have severed habitat areas.

the Project Site does not meet the definition or is expected to serve as a wildlife movement corridor for ground dwelling species and no wildlife crossings are proposed along Valencia Avenue, East Lambert or Carbon Canyon Road.

Policy CR-8.3 Cooperate with regional agencies and authorities with similar goals in protecting and enhancing wildlife and animal movement corridors.

The Wildlife Corridor Conservation Authority (WCCA), a local joint power authority organization will review the project to ensure compliance with conservation, environmental protection and maintenance of the habitat and wildlife corridor within the Puente-Chino Hills.

Policy CR-8.4 Regular monitoring of medium and large mammals is necessary to gauge the effectiveness of wildlife corridors and to identify or increases in wildlife populations.

the Project Site does not meet the definition or is expected to serve as a wildlife movement corridor for ground dwelling species and no medium or large mammal monitoring is proposed.

Preserve and Maintain Open Space, Natural Habitat, and Vegetation Communities that Support Wildlife Species and Animals.

Policy CR-9.1 Support regional and sub-regional efforts to acquire, develop, operate, and maintain an open space system extending from the Puente Hills to the Chino Hills.

The dedication of 52.86 acres of open space lands located within and adjacent to Chino Hills State park within the Puente-Chino Hills wildlife corridor, coastal California gnatcatcher critical habitat, and priority crossing improvement area would represent a significant acquisition and contribution to regional wildlife movement conservation goals. The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

Policy CR-9.2 Preserve the integrity of blue line streams and riparian habitat areas.

Impacts to USACE, RWQCB and CDFW resources would be reduced to less than significant following implementation of **BIO-MM 1** (USACE/CDFW/RWQCB).

Policy CR-9.3 Preserve and restore the habitat value of creek corridors though the preservation of native plants and the replacement of invasive, non-native plants with native plants.

Impacts to USACE, RWQCB and CDFW resources would be reduced to less than significant following implementation of **BIO-MM 1** (USACE/CDFW/RWQCB).

Policy CR-9.4 Protect sensitive plant species resources from the impacts of development.

The project does not conflict with the policies set forth in the Brea 265 Specific Plan that has been prepared for the project, which supersedes and replaces the City of Brea local policies and/or ordinances (City of Brea Hillside Residence (HR) Guidelines) following implementation of **BIO-MM1** to **BIO-MM5**.

Policy CR-9.5 Manage areas of diverse wildlife habitat as a natural resource and prevent major destruction or disruption.

The proposed 52.86-acres of conserved lands will be offered to the Chino Hills State Park for consideration, acquisition and long-term management. The lands are expected to meet and/or exceed the standards for acquisition.

Policy CR-9.6 Use specific management programs using sound ecological principles and professionally accepted methods are necessary to protect and restore sensitive animal populations and their habitats.

All proposed restoration and monitoring activities will be based on City of Brea, USFWS, CDFW and RWQCB review and approval as outlined in **BIO-MM 1** (USACE/CDFW/RWQCB).

The project does not conflict with the policies set forth in the Brea 265 Specific Plan that has been prepared for the project, which supersedes and replaces the City of Brea local policies and/or ordinances (City of Brea Hillside Residence (HR) Guidelines).

City of Brea Municipal Code (Ord. 1079, passed 11-2-04)

The City of Brea's Municipal Code identifies land use categories, development standards, and other general provisions that ensure consistency between the County and City General Plans and proposed development projects. Appendix G of the 2019 State CEQA guidelines indicate that a project may be deemed to have a significant effect on the environment if the project is likely to:

a) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The project does not conflict with the policies set forth in the Brea 265 Specific Plan that has been prepared for the project, which supersedes and replaces the City of Brea local policies and/or ordinances (City of Brea Hillside Residence (HR) Guidelines) following implementation of **BIO-MM1** to **BIO-MM5**.

FEDERAL

United States Army Corps of Engineers Jurisdictional Waters

Pursuant to Section 404 of the Clean Water Act, the USACE regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in USACE regulations at 33 CFR Part 328.3(a) as:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(2) All interstate waters including interstate wetlands;
(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:
    (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    (ii) From which fish or shell fish are or could be taken and sold in interstate or foreign commerce; or
    (iii) Which are used or could be used for industrial purpose by industries in interstate commerce...
(4) All impoundments of waters otherwise defined as waters of the United States under the definition;
(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;
(6) The territorial seas;
(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.

In the absence of wetlands, the limits of USACE jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the USACE published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the National List of Plant Species that Occur in Wetlands[8]);
- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and
- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criterion with the exception for areas with “problematic hydrophytic vegetation”, which require a minimum of 14 days of ponding to be considered a wetland.

The proposed project will impact resources regulated by the USACE and a CWA Section 404 permit will be required.

STATE

Regional Water Quality Control Board Jurisdictional Resources

The State Water Resource Control Board and each of its nine Regional Boards regulate the discharge of waste (dredged or fill material) into waters of the United States[9] and

[8] Lichvar, R. W. 2013. *The National Wetland Plant List:* 2013 wetland ratings. Phytoneuron 2013-49: 1-241.

[9] Therefore, wetlands that meet the current definition, or any historic definition, of waters of the U.S. are waters of the state. In 2000, the State Water Resources Control Board determined that all waters of the U.S. are also waters of the state by regulation, prior to any regulatory or judicial limitations on the federal definition of waters of the U.S. (California Code or Regulations title 23, section 3831(w)). This regulation has remained in effect despite subsequent changes to the federal definition. Therefore, waters of the state includes features that have been determined by the U.S. Environmental Protection Agency (U.S. EPA) or the U.S. Army Corps of Engineers (USACE) to be “waters of the U.S.” in an approved jurisdictional determination; “waters of the U.S.” identified in an aquatic resource report verified by the USACE upon which a permitting decision was based; and features that are consistent with any current or historic final judicial interpretation of “waters of the U.S.” or any current or historic federal regulation defining “waters of the U.S.” under the federal Clean Water Act.

waters of the State. Waters of the United States are defined above in Section II.A and waters of the State are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code 13050[e]).

Section 401 of the CWA requires certification for any federal permit or license authorizing impacts to waters of the U.S. (i.e., waters that are within federal jurisdiction), such as Section 404 of the CWA and Section 10 of the Safe Rivers and Harbors Act, to ensure that the impacts do not violate state water quality standards. When a project could impact waters outside of federal jurisdiction, the Regional Board has the authority under the Porter-Cologne Water Quality Control Act to issue Waste Discharge Requirements (WDRs) to ensure that impacts do not violate state water quality standards. Clean Water Act Section 401 Water Quality Certifications, WDRs, and waivers of WDRs are also referred to as orders or permits.

The State Board Wetland Definition and Procedures define an area as wetland as follows: *An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.*

The following wetlands are waters of the State:

1. *Natural wetlands;*
2. *Wetlands created by modification of a surface water of the state;*[10] *and*
3. *Artificial wetlands*[11] *that meet any of the following criteria:*

    a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the state;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not waters of the state unless they also satisfy the criteria set forth in 2, 3a, or 3b):
        i. Industrial or municipal wastewater treatment or disposal,
        ii. Settling of sediment,

[10] "Created by modification of a surface water of the state" means that the wetland that is being evaluated was created by modifying an area that was a surface water of the state at the time of such modification. It does not include a wetland that is created in a location where a water of the state had existed historically, but had already been completely eliminated at some time prior to the creation of the wetland. The wetland being evaluated does not become a water of the state due solely to a diversion of water from a different water of the state.

[11] Artificial wetlands are wetlands that result from human activity.

iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,
iv. Treatment of surface waters,
v. Agricultural crop irrigation or stock watering,
vi. Fire suppression,
vii. Industrial processing or cooling,
viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
ix. Log storage,
x. Treatment, storage, or distribution of recycled water, or
xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
xii. Fields flooded for rice growing.[12]

All artificial wetlands that are less than an acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not waters of the state. If an aquatic feature meets the wetland definition, the burden is on the applicant to demonstrate that the wetland is not a water of the state.

The proposed project will impact resources regulated by the USACE and a 401 certification with the RWQCB will be required.

California Department of Fish and Wildlife Jurisdictional Resources

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

The Fish and Game Code defines a stream (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW also defines a stream as “a body of water that flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical or biological indicators.”

It is important to note that the Fish and Game Code defines fish and wildlife to include: all wild animals, birds, plants, fish, amphibians, invertebrates, reptiles, and related

[12] Fields used for the cultivation of rice (including wild rice) that have not been abandoned due to five consecutive years of non-use for the cultivation of rice (including wild rice) that are determined to be a water of the state in accordance with these Procedures shall not have beneficial use designations applied to them through the Water Quality Control Plan for the Sacramento and San Joaquin River Basins, except as otherwise required by federal law for fields that are considered to be waters of the United States. Further, agricultural inputs legally applied to fields used for the cultivation of rice (including wild rice) shall not constitute a discharge of waste to a water of the state. Agricultural inputs that migrate to a surface water or groundwater may be considered a discharge of waste and are subject to waste discharge requirements or waivers of such requirements pursuant to the Water Board’s authority to issue or waive waste discharge requirements or take other actions as applicable.

ecological communities including the habitat upon which they depend for continued viability (FGC Division 5, Chapter 1, section 45 and Division 2, Chapter 1 section 711.2(a) respectively). Furthermore, Division 2, Chapter 5, Article 6, Section 1600 et seq. of the California Fish and Game Code does not limit jurisdiction to areas defined by specific flow events, seasonal changes in water flow, or presence/absence of vegetation types or communities.

A 1602 Streambed Alteration Agreement (SAA) will be required from the CDFW for impacts to jurisdictional resources.

ENVIRONMENTAL IMPACTS

The following sections include an analysis of the direct impacts, indirect impacts, and cumulative effects of the proposed action on sensitive and/or regulated biological resources. This analysis characterizes the project related activities that are anticipated to adversely impact the species or regulated resources, and when feasible, quantifies such impacts. Direct effects are defined as actions that may cause an immediate effect on the species or its habitat, and/or regulated resource including the effects of interrelated actions and interdependent actions. Direct impacts also include the destruction of individual plants or animals, which may also directly affect regional population numbers of a species or result in the physical isolation of populations thereby reducing genetic diversity and population stability.

Indirect effects are caused by or result from the proposed actions, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the proposed action. Indirect impacts can occur at the urban/wildland interface of projects, to biological resources located downstream from projects, and other offsite areas where the effects of the project may be experienced by plants and wildlife. Examples of indirect impacts include the effects of increases in ambient levels of noise or light; predation by domestic pets; competition with exotic plants and animals; introduction of toxics, including pesticides; and other human disturbances such as hiking, off-road vehicle use, unauthorized dumping, etc. Indirect impacts are often attributed to the subsequent day-to-day activities associated with project build-out, such as increased noise, the use of artificial light sources, and invasive ornamental plantings that may encroach into native areas. Indirect effects may be both short-term and long-term in their duration. These impacts are commonly referred to as “edge effects” and may result in a slow replacement of native plants by non-native invasive species, as well as changes in the behavioral patterns of wildlife and reduced wildlife diversity and abundance in habitats adjacent to project sites.

Cumulative impacts refer to incremental, individual environmental effects of two or more projects when considered together. These impacts taken individually may be minor but may be collectively significant. Cumulative effects include future tribal, local, or private actions that are reasonably certain to occur in the proposal vicinity considered in this report. A cumulative impact to biological resources may occur if a project has the potential to collectively degrade the quality of the environment, substantially reduce the habitat of wildlife species or cause a population to drop below self-sustaining levels,

thereby threatening to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal species.

THRESHOLD OF SIGNIFICANCE

CEQA requires evaluation of a project's impacts on biological resources and provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts. Sections below set forth these thresholds and guidelines. Furthermore, pursuant to the CEQA Guidelines Section 15380, CEQA provides protection for non-listed species that could potentially meet the criteria for state listing. For plants, CDFW recognizes that plants on Lists 1A, 1B, or 2 of the CNPS *Inventory of Rare and Endangered Plants in California* may meet the criteria for listing and should be considered under CEQA. CDFW also recommends protection of plants, which are regionally important, such as locally rare species, disjunct populations of more common plants, or plants on the CNPS Lists 3 or 4.

The environmental impacts relative to biological resources are assessed using impact significance criteria which mirror the policy statement contained in the CEQA at Section 21001 (c) of the Public Resources Code. This section reflects that the legislature has established it to be the policy of the state to:

> "*Prevent the elimination of fish and wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities*…"

The following definitions apply to the significance criteria for biological resources:

- "*Endangered*" means that the species is listed as endangered under state or federal law.

- "*Threatened*" means that the species is listed as threatened under state or federal law.

- "*Rare*" means that the species exists in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens.
- "*Region*" refers to the area within southern California that is within the range of the individual species.

- "*Sensitive habitat*" refers to habitat for plants and animals (1) which plays a special role in perpetuating species utilizing the habitat on the property, and (2) without which there would be substantial danger that the population of that species would drop below self-perpetuating levels.

- "*Substantial effect*" means significance loss or harm of a magnitude which, based on current scientific data and knowledge, (1) would cause a species or a native plant or animal community to drop below self-perpetuating levels on a statewide or regional basis or (2) would cause a species to become threatened or endangered.

Determining whether a project may have a significant effect, or impact, plays a critical role in the CEQA process. According to CEQA, Section 15064.7 (Thresholds of Significance), each public agency is encouraged to develop and adopt (by ordinance, resolution, rule, or regulation) thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. In the development of thresholds of significance for impacts to biological resources CEQA provides guidance primarily in Section 15065, Mandatory Findings of Significance, and the CEQA Guidelines, Appendix G, Environmental Checklist Form. Section 15065(a) states that a project may have a significant effect where:

> *"The project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare, or threatened species, ..."*

Impacts to biological resources may result in a significant adverse impact if one or more of the following conditions would result from implementation of the proposed project. Would the project:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS? Less than significant with mitigation.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS? Less than significant.
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? Less than significant with mitigation.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? Less than significant with mitigation.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? No Impact.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? The Project Site is not located within or adjacent to an existing or proposed Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) including the NCCP/HCP Central and Coastal Subregion of Orange County. No Impact.

Also, the determination of impacts has been made according to the federal definition of "*take*". FESA prohibits the "*taking*" of a member of an endangered or threatened wildlife species or removing, damaging, or destroying a listed plant species by any person

(including private individuals and private or government entities). FESA defines "*take*" as "*to harass, harm, pursue, hunt, shoot, would, kill, trap, capture or collect*" an endangered or threatened species, or to attempt to engage in these activities.

DIRECT IMPACTS

Vegetation Communities

A total of 255.34-acres of onsite/offsite vegetation communities (grading/fuel modification zones (FMZ) will be directly and permanently impacted as a result of project implementation as summarized in Table 10, *Vegetation Community Impacts,* and illustrated on Figure 14*, Vegetation Communities Impact Map*.

The project will impact the following special-status vegetation alliances: Black willow thickets, Coast prickly pear scrub, and blue elderberry stands.

Sensitive Vegetation Communities

California Walnut Groves

The project will not impact walnut groves through grading or fuel modification. Walnut groves have a state rarity ranking of S3. CDFW considers impacts to alliances of S3 to be significant; however, avoidance of walnut groves would reduce potential impacts to less-than-significant and mitigation would be not required

Black Willow Thickets

The project will impact 0.03-acre of black willow thickets, which are fully surrounded by a matrix of upland mustards, eucalyptus groves and non-native Mexican fan palms and thus do not exhibit functions typically associated with black willow forest. Black willow thickets have a state rarity ranking of S3; however, impacts to a single patch of black willow covering 0.03-acre surrounded by non-native vegetation would not be considered significant and would not require mitigation. Regardless, black willow thickets are located within the northern reach of Drainage B and impacts to this resource will require mitigated and compliance with CDFW 1602 Streambed Alteration Agreement (SAA) as outlined in **BIO-MM 1** (USACE/CDFW/RWQCB).

Coast Prickly Pear Scrub

the project will impact 0.12 acre of coast prickly pear scrub, which has a state rarity ranking of S3. While CDFW considers impacts to alliances with a ranking of S3 to be significant, all occurrences of coastal prickly occur in small patches that are not associated with areas of native scrub habitat and would not be considered significant. Thus, mitigation for impacts to the small patches of coast prickly pear is not necessary. An additional 0.08 acre of this alliance falls within fuel modification zones for the project; however, cactus is permissible in fuel modification zones and would not be impacted.

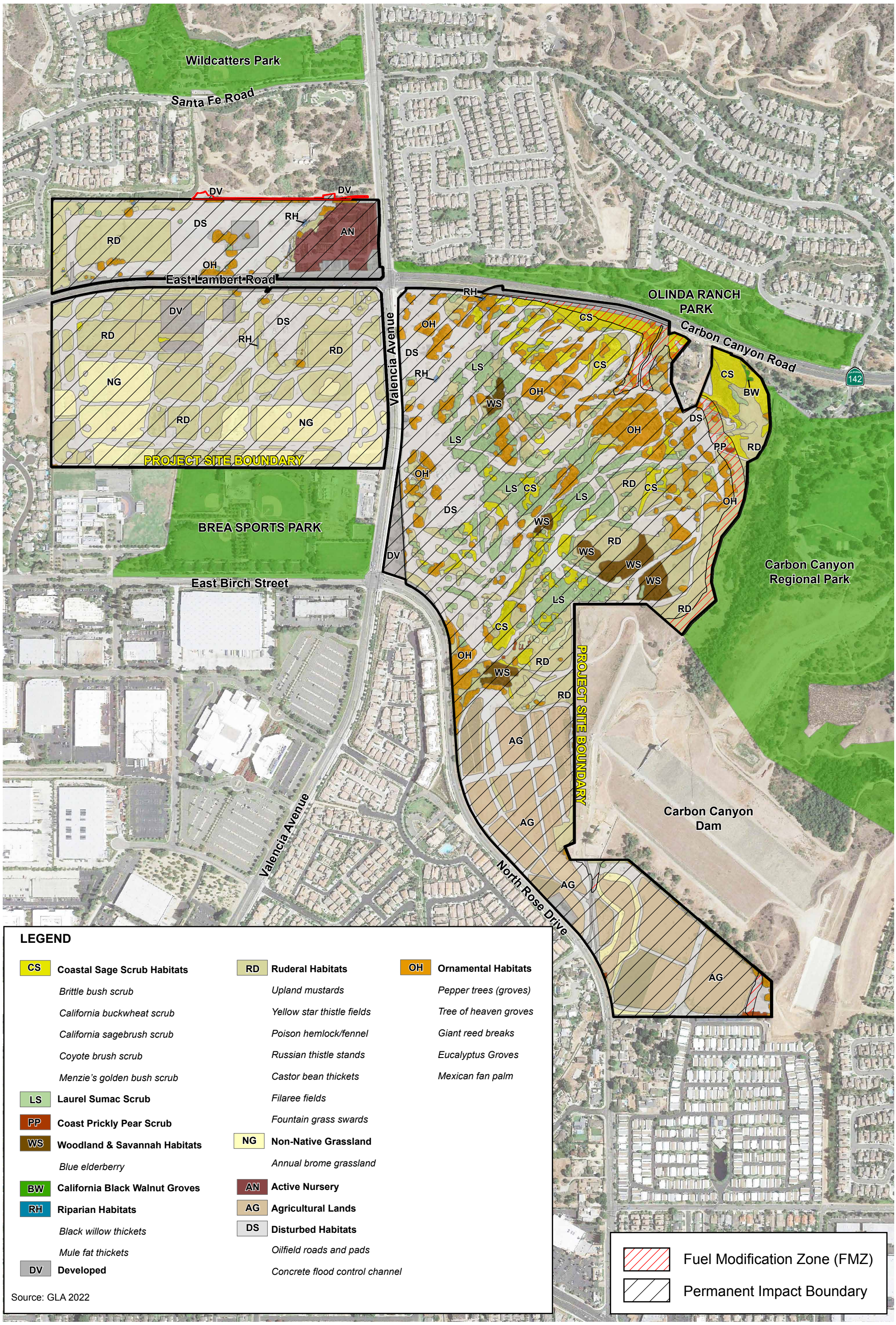

Figure 14 - Vegetation Communities Impact Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

Table 10.
Vegetation Community Impacts

Vegetation Alliances/Land Use Type	Permanent Grading Impacts onsite/offsite (ac)	Permanent FMZ Impacts (ac)	Open Space (ac)	Total Onsite/offsite (ac)
Coastal Sage Scrub Habitats				
California sagebrush scrub	7.43	0.44	1.97	9.84
California buckwheat scrub	1.04	1.03	0.87	2.94
Coyote brush scrub	0.34			0.34
Coast prickly pear scrub	0.12	0.08	0.07	0.27
Brittle bush scrub	0.05			0.05
Chaparral Habitats				
Laurel sumac scrub	16.86		0.13	16.99
Woodland & Savannah Habitats				
Blue elderberry savannah	2.56			2.56
Blue elderberry stands	1.50	0.01	0.04	1.54
Blue elderberry woodland	1.37			1.37
Walnut Grove Habitats				
Southern California black walnut groves			0.07	0.07
Riparian Habitats				
Mule fat thickets	0.11			0.11
Black Willow thickets	0.03			0.03
Non-native Grassland Habitats				
Red brome or Mediterranean grass grasslands	16.34	0.02		16.36
Ruderal Habitats				
Upland mustards	31.71	3.10	1.67	36.48
Russian thistle stands	17.83		0.17	18.01
Filaree Fields	5.10			5.10
Poison hemlock or fennel patches	0.85		0.05	0.90
Castor bean thickets	0.85			0.85
Yellow star-thistle fields	0.30			0.30
Fountain grass swards	0.06			0.06
Ornamental Habitats				
Pepper tree groves	7.46	0.35	0.24	8.05
Eucalyptus groves	6.70	0.12	0.04	6.86
Pepper tree or Laurel sumac groves	3.13			3.13
Pepper tree individuals	1.54	0.21	0.08	1.83
Giant reed breaks	0.17			0.17
Other Ornamental	0.07			0.07
Mexican fan palm	0.03			0.03
Tree of Heaven Groves	0.01			0.01
Developed/Disturbed				
Oil Field Roads and Pads	82.49	0.97	0.30	83.76
Agriculture	27.71			27.71
Developed	9.04	0.53	1.05	10.62
Active Nursery	4.61			4.61
Bare	0.67	0.27	0.43	1.37
Concrete Flood Control Channel	0.11	0.02	0.03	0.16
TOTAL	**248.19**	**7.15**	**7.21**	**262.55**

Source: GLA 2022.

Blue Elderberry Woodlands

the project will impact 1.37 acres of blue elderberry woodlands, which have a state rarity ranking of S3. CDFW considers impacts to alliances of S3 to be significant, thus, impacts to 1.37 acres of blue elderberry woodlands would be significant prior to mitigation. With mitigation, impacts would be reduced to less-than-significant. Impacts to this sensitive resource will be mitigated to a level of less than significant by implementing **BIO-MM 1** (USACE/CDFW/RWQCB).

Sensitive Plants

Southern California Black Walnut

The project will result in impacts to one special-status plant: California walnut (*Juglans californica*), which is scattered across the northern portion of the Site east of Valencia Avenue. Specifically, a total of 126 California walnuts would be impacted. California walnut is ranked as 4.2 in the CRPR which as noted in Table 3.1 above is a watch-list taxon:

> *Species that are currently thought to be limited in distribution or range whose vulnerability or susceptibility to threat is currently low. In some cases, as noted above for Rank 3 species, CNPS lacks survey data to accurately determine status in California. Many species have been placed on Rank 4 in previous editions of the "Inventory" and have been removed as survey data has indicated that the species are more common than previously thought. CNPS recommends that species currently included on this list should be monitored to ensure that future substantial declines are minimized.*

Most of the California walnuts on the site occur within disturbed areas, many of which are dominated by blue-gum eucalyptus, Peruvian pepper, and upland mustards, along with areas of laurel sumac. Impacts to individuals of southern California walnut would not be considered significant for the reasons set forth below. Except for walnuts within 0.07-acre of walnut woodland which will not be impacted, the individual walnuts are commonly associated with disturbed habitat and areas of non-native vegetation and do not the exhibit functions that are typically associated with walnut woodland. Second, as noted, the California walnut is a List 4 taxon and is still common throughout its range and the loss of 126 walnuts would not be result of a substantial effect on this species and thus not significant. Third, the California walnut is not locally rare; rather, the adjacent Chino Hills and nearby Puente and Whittier Hills support large numbers of California walnuts, much of which is dedicated open space, ensuring that the population within northern Orange County and adjacent areas of Los Angeles County are sustainable.

Sensitive Wildlife

The project will impact the following special-status animals: coastal California gnatcatcher; and exhibits potential for impacts to least Bell's vireo, yellow warbler, California horned lark, and Cooper's hawk. The project also impacts areas of California gnatcatcher Critical Habitat Unit 9 as discussed below.

Coastal California Gnatcatcher

Two breeding pairs of coastal California gnatcatchers (FT, SSC) were detected onsite during focused survey efforts as shown in Figure 12, *Sensitive Faunal Species Observation Map*. One (1) pair was associated with a patch of California sagebrush in the central-western portion of the Project Site east of Valencia Avenue. This was the same area where a breeding pair was detected during 2017 protocol surveys. A second breeding pair was detected on a knoll approximately 750 feet northeast of the first pair in California sagebrush. During the 2017 survey a single gnatcatcher was observed in this area. The Project Site contains approximately 10.33 acres of suitable coastal scrub habitat associations within the close proximity to the coastal California gnatcatcher observations.

It is important to note that there are small, isolated patches of scrub alliances, such as coyote brush scrub and cactus scrub that occur in areas completely unsuitable for the coastal California gnatcatcher that are not included in the impacts for the gnatcatcher totaling 0.18-acre. These areas are depicted as unsuitable for the coastal California gnatcatcher and impacts to these isolated fragments, which are not within the Critical Habitat overlay would not be significant.

Impact to 10.33 acres of coastal California gnatcatcher habitat including potential breeding and foraging resources would represent a significant impact. Impacts to the coastal California gnatcatcher, potential breeding/foraging habitat will be reduced to a level of less than significant by implementing **BIO-MM 2** (Coastal California Gnatcatcher HCP & Monitoring).

Least Bell's Vireo

During protocol coastal California gnatcatcher surveys in 2018 least Bell's vireo was detected within the Project Site as shown in Figure 12, *Sensitive Faunal Species Observation Map*. This bird is a State- and Federally-listed endangered species. It breeds in dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest. Detections were of single birds and observation locations were not repeated during the early season observations, with one exception. The exception was a repeated observation of a single bird located in a eucalyptus woodland located south of the active oil field and north of the active agricultural area. Based on the timing of the least Bell's vireo observations (late May to early June) it was most likely an unpaired male. The location is vegetated with a canopy of eucalyptus trees and understory of sparse mule fat, blue elderberry, and poison oak. Based on the incidental least Bell's vireo observations within the Project Site and presence of low-quality habitat onsite, potential impacts to elderberry habitats occupied by least Bell's vireo would be mitigated to a level of less than significant by implementing **BIO-MM 4** (Least Bell's Vireo HCP).

There are no Habitat Conservation Plans or Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plan associated with the site. Impacts to the federally endangered least Bell's vireo will be authorized through a Section 7 Consultation between the USACE and USFWS. The applicant is preparing a Habitat Conservation Plan and Natural Community Conservation Plan in coordination with CDFW and USFWS.

Yellow Warbler

A yellow warbler (state species of special concern) was documented foraging on the Project Site near the southwest corner of the parcel east of Valencia Avenue, as shown in Figure 12, *Sensitive Faunal Species Observation Map*. This species is a migratory songbird that breeds in riparian habitats in southern California. The yellow warbler exhibits habitat requirements similar to the yellow-breasted chat and least Bell's vireo. Suitable habitat typically consists of multi-layered riparian scrub or willow woodland corridors along flowing streams. Potential impacts to nesting habitat for this species would be mitigated to a level of less than significant by implementing **BIO-MM 5** (Regulatory Requirement CDFG Code).

California horned lark

The California horned lark is a CDFW Watch List species. The California horned lark breeds and resides in the coastal region of California from Sonoma County southeast to the United States/Mexican border, including most of the San Joaquin Valley, and eastward to the foothills of the Sierra Nevada (Grinnell and Miller 1944; AOU 1998). The California horned lark is a common to abundant resident in a variety of open habitats, usually where trees and large shrubs are absent (Zeiner, *et al*. 1990). Range-wide, California horned larks breed in level or gently sloping shortgrass prairie, montane meadows, "bald" hills, open coastal plains, fallow grain fields, and alkali flats (Grinnell and Miller 1944). The California horned lark was observed foraging within the grassland portions of the Project Site. Potential impacts to nesting habitat for this species would be mitigated to a level of less than significant by implementing **BIO-MM 5** (Regulatory Requirement CDFG Code).

Cooper's Hawk

Cooper's hawk is a CDFW Watch List species when nesting. This species occurs in riparian areas and oak woodlands, and most commonly in montane canyons. This species is also known to use urban areas, occupying mature trees associated with residential and commercial development and using utility poles as perches. Cooper's hawk was observed foraging within the Project Site and the mature Eucalyptus trees represent suitable nesting habitat. Potential impacts to nesting habitat for this species would be mitigated to a level of less than significant by implementing **BIO-MM 5** (Regulatory Requirement CDFG Code).

Coastal California Gnatcatcher Critical Habitat

The proposed Project will impact areas within Critical Habitat Unit 9, designated for the coastal California gnatcatcher by the USFWS. Impacts to designated Critical Habitat will include impacts to areas meeting the definitions for PBF1 and PBF2.

It is important to note that areas within Critical Habitat Unit 9 provide for movement/dispersal opportunities along a roughly east-to-west axis between the Chino Hills and Puente Hills. The project site and associated Critical Habitat provides limited potential for dispersal due to existing development and the major roadway intersection of Valencia Avenue and Lambert Road immediately to the northwest of the Critical Habitat. The area more suitable for CAGN dispersal within the area of designated

Critical Habitat is located to the north of the Project Site as depicted Figure 13, *Regional Open Space and Proposed Mitigation Lands Map*. As summarized in Table 11, Impacts to CAGN Critical Habitat PBF's below, the project would impact 10.33 acres of PBF1 and 42.53 acres of PBF2 (52.86-acres total), both of which would be considered significant before mitigation but would be reduced to less-than-significant with mitigation.

Impacts to the coastal California gnatcatcher critical habitat will be reduced to a level of less than significant by implementing **BIO-MM 2** (Coastal California Gnatcatcher HCP & Monitoring), and **BIO-MM 3** (**Coastal California Gnatcatcher Critical Habitat**).

Table 11.
Impacts to CAGN Critical Habitat PBF's

Vegetation Alliance	PBF1	PBF2
Annual brome grassland	--	0.07
Blue elderberry (savannah)	--	2.56
California brittle bush scrub	0.05	--
California buckwheat scrub	2.07	--
California sagebrush scrub	7.87	--
Coast prickly pear scrub	0.11	--
Coyote brush scrub	0.23	--
Laurel sumac scrub	--	16.63
Mulefat thickets	--	0.02
Upland mustards	--	23.25
Subtotal	**10.33**	**42.53**

There are no Habitat Conservation Plans or Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plan associated with the site. Impacts to the federally listed threatened coastal California gnatcatcher and associated Critical Habitat Unit 9 will be authorized through a Section 7 Consultation between the USACE and USFWS. The applicant is preparing a Habitat Conservation Plan and Natural Community Conservation Plan in coordination with CDFW and USFWS.

Nesting Birds and Raptors

The project has the potential to impact active bird and raptor nests if vegetation is removed during the nesting season generally extending from February 1st to August 31st. Impacts to nesting birds are prohibited by the California Fish and Game Code 3503. Potential impacts to nesting birds and raptors would be mitigated to a level of less than significant by implementing **BIO-MM 5** (Regulatory Requirement CDFG Code)

Wildlife Movement within Project Site

Based on the extent of adjacent high-density residential development along the north, south and west boundaries and associated high traffic roadways bisecting and

bordering the property, the Project Site does not meet the definition or is expected to serve as a wildlife movement corridor for ground dwelling species.

However, the Project Site is located partially within USFWS designated critical habitat for the federally threated coastal California gnatcatcher. As previously analyzed and presented, a total of 52.86 acres of critical habitat representing PCEs were documented onsite. Impacts to the coastal California gnatcatcher critical habitat will be reduced to a level of less than significant by implementing **BIO-MM 2** (Coastal California Gnatcatcher HCP & Monitoring), and **BIO-MM3** (Coastal California Gnatcatcher Critical Habitat).

Jurisdictional Resources

The site contains no jurisdictional wetlands as defined under Section 404 of the Clean Water Act or under definitions in the Fish and Game Code or the State Water Board's wetland procedures. As such, there would be no significant impacts on wetlands. The project would impact highly degraded non-wetland streambeds as addressed below.

The project would impact 0.602-acre of highly degraded drainage courses subject to USACE jurisdiction pursuant to Section 404 of the Clean Water Act and Section 401 of the Clean Water Act as regulated by the Regional Board as outlined in Table 12, *USACE/RWQCB Jurisdictional Resources Impacts,* and shown in Figure 15*, USACE/RWQCB Jurisdictional Resources Impact Map*. Impacts to 0.602 acre of degraded drainage course would be considered significant by the RWQCB and with mitigation the impact would be reduced to less-than significant following implementation of **BIO-MM 1** (USACE/CDFW/RWQCB).

Table 12.
USACE/RWQCB Jurisdictional Resources Impacts

Drainage Feature	Type	Acres	Linear Feet
Drainage A	Non-Wetland Channel	0.363	2,422
Drainage B	Non-Wetland Ephemeral Channel	0.043	241
Drainage C	Non-Wetland Ephemeral Channel	0.086	1,149
Drainage D	Concrete Ephemeral Channel	0.11	474
	Total	**0.602**	**4,286**

Source: GLA 2022.

The Project, as proposed, would permanently impact 1.006-acre of CDFW jurisdiction, of which 0.063 acre consists of vegetated riparian habitat, and includes 4,286 linear feet of streambed as shown in Table 13, *CDFW Jurisdictional Resources Impacts,* and shown in Figure 16*, CDFW Jurisdictional Resources Impact Map*. Of the 1.006 acres, 0.11-acre of impact consists of concrete channel associated with Drainage D or the Carbon Canyon Channel and impacts to the concrete channel would not be considered significant because there are no streambed resources associated with the concrete channel. Thus, impacts to 0.896-acre of streambed of which 0.063-acre consists of riparian habitat would be considered significant. Impacts to 0.959-acre of degraded drainage course would be considered significant by the CDFW and with mitigation the impact would be reduced to less-than significant following implementation of **BIO-MM 1** (USACE/CDFW/RWQCB).

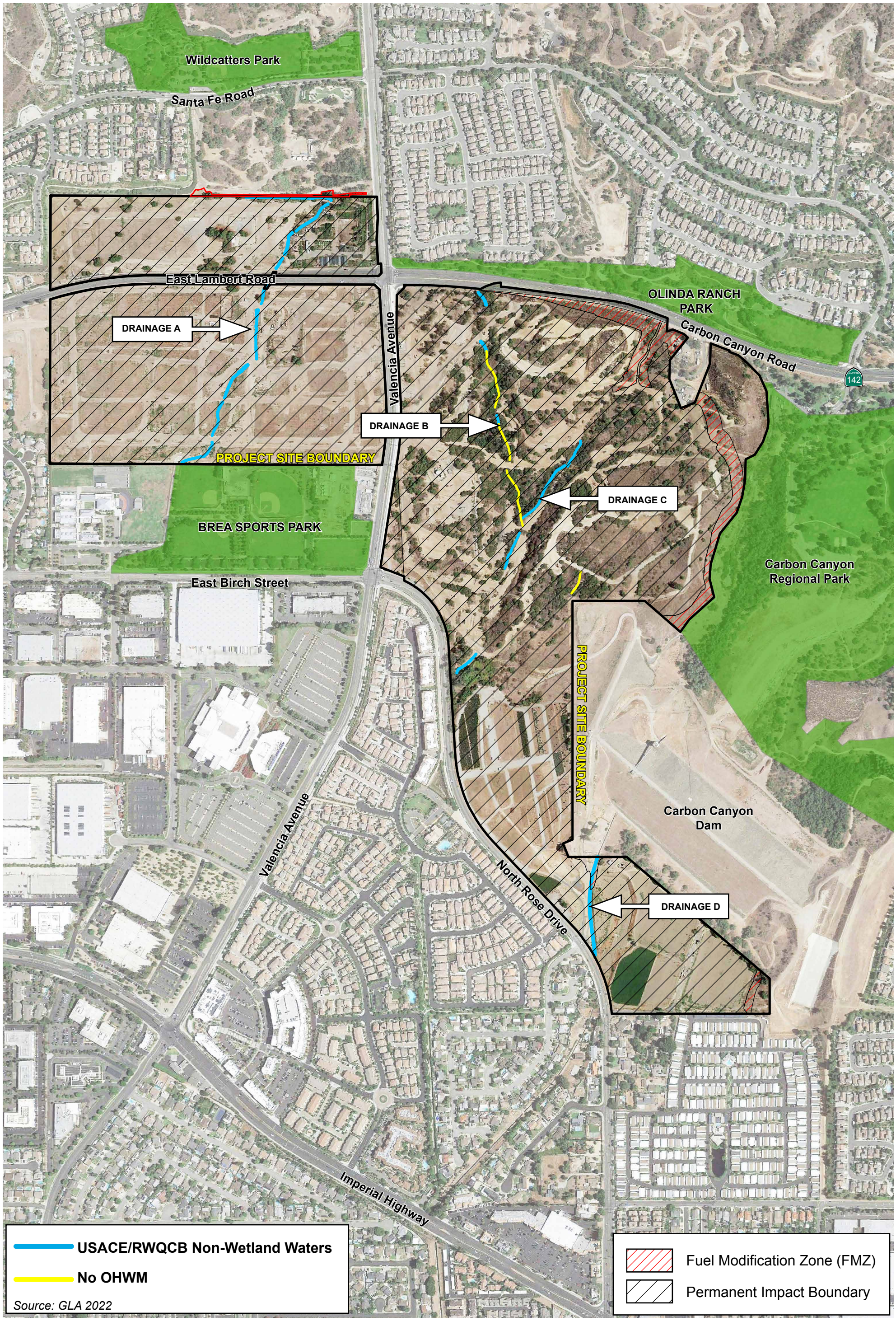

Figure 15 - USACE/RWQCB Jurisdictional Resources Impact Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

N

1 inch = 600 feet

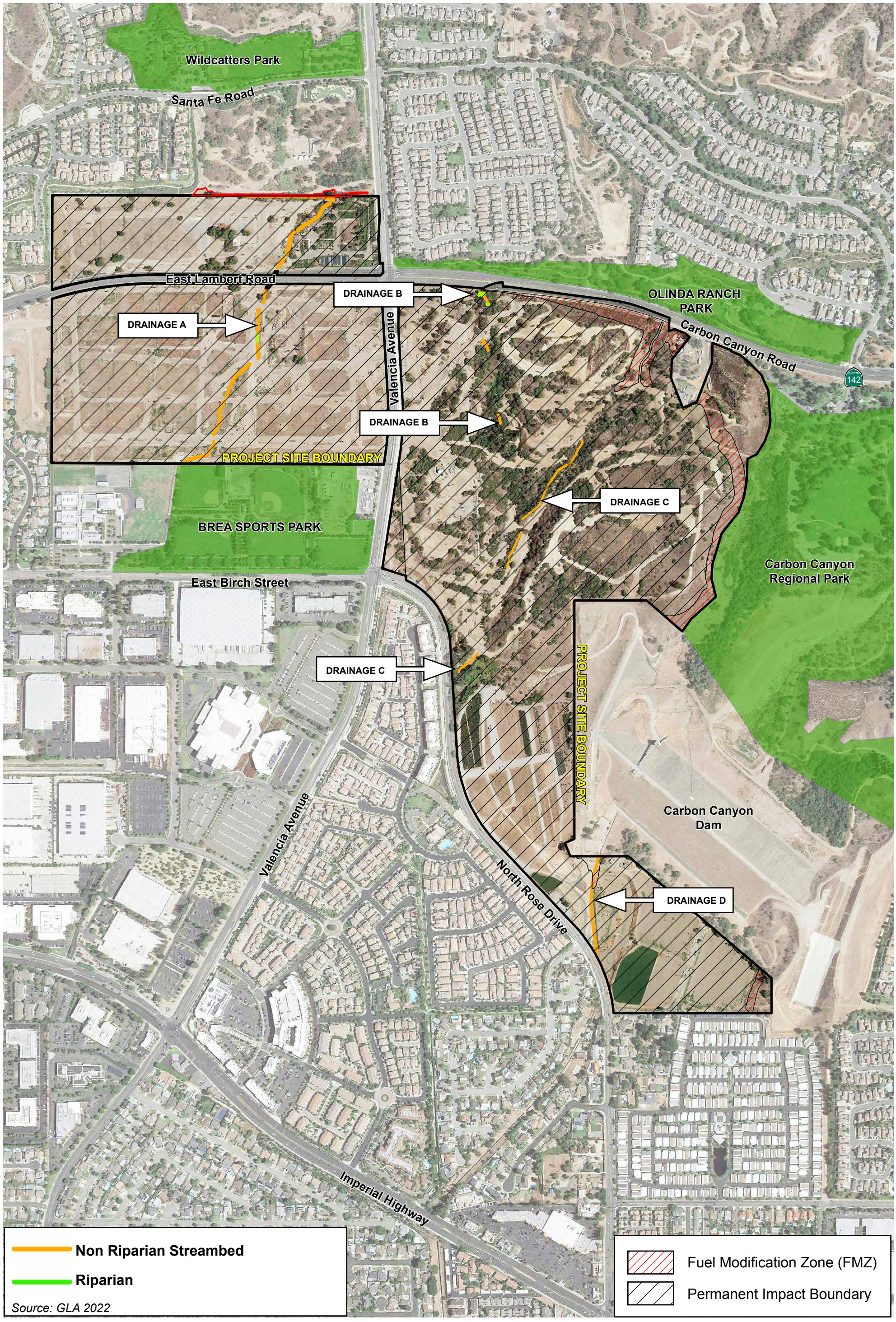

Figure 16 - CDFW Jurisdictional Resources Impact Map

Biological Resources Technical Report
Brea 265 Specific Plan

CADRE Environmental

Table 13.
CDFW Jurisdictional Resources Impacts

Drainage Feature	Non-Riparian Streambed	Riparian	Total Acres	Linear Feet
Drainage A	0.699	0.032	0.731	2,422
Drainage B	0.048	0.031	0.079	241
Drainage C	0.086	0.0	0.086	1149
Drainage D	0.11	0.0	0.11	474
Total	**0.943**	**0.063**	**1.006**	**4,286**

Source: GLA 2022.

City of Brea General Plan – Community Resources

The project does not conflict with the policies set forth in the Brea 265 Specific Plan that has been prepared for the project, which supersedes and replaces the City of Brea local policies and/or ordinances following implementation of **BIO-MM1** to **BIO-MM5**.

City of Brea Municipal Codes

The project does not conflict with the policies set forth in the Brea 265 Specific Plan that has been prepared for the project, which supersedes and replaces the City of Brea local policies and/or ordinances following implementation of **BIO-MM1** to **BIO-MM5**.

INDIRECT IMPACTS

Water Quality/Hydrology

The project will comply with all applicable water quality regulations, including obtaining and complying with those conditions established in WDRs and a National Pollutant Discharge Elimination System (NPDES) permits. Both of these permits include the treatment of all surface runoff from paved and developed areas, the implementation of applicable Best Management Practices (BMPs) during construction activities and the installation and proper maintenance of structural BMPs to ensure adequate long-term treatment of water before entering into any stream course or offsite conservation areas.

Toxics

Storm water treatment systems will be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant material, or other elements that could degrade or harm downstream biological or aquatic resources. Toxic sources within the Project Site would be limited to those commonly associated with residential, commercial, and mixed-use development, such as pesticides, insecticides, herbicides, fertilizers, and vehicle emissions. In order to mitigate for the potential effects of these toxics, the project will incorporate structural BMPs, as required in association with compliance with WDRs and the NPDES permit system, in order to reduce the level of toxins introduced into the drainage system and the surrounding areas. Water quality measures will be implemented and no significant impacts are anticipated.

Lighting

Night lighting associated with the proposed development that is adjacent to Carbon Canyon Regional Park would be directed away to reduce potential indirect impacts to wildlife species. No significant impacts are anticipated.

Noise

Because the proposed project development will not result in noise levels that exceed residential, commercial or mixed-use noise standards established for County of Orange or City of Brea, wildlife within Carbon Canyon Regional Park will not be subject to noise that exceeds these established standards. No significant impacts are anticipated. Short-term construction-related noise impacts will be reduced by the implementation of the following:

- During all Project Site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors (Carbon Canyon Regional Park) nearest the Project Site.

- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise sensitive receptors (Carbon Canyon Regional Park) nearest the Project Site during all project construction.

- The construction contractor shall limit all construction-related activities that would result in high noise levels according to the construction hours to be determined by City of Brea staff.

- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings.

The project has the potential to indirectly impact active bird and raptor nests during initial construction related vegetation removal during the nesting season generally extending from February 1st to August 31st. Potential indirect impacts to nesting birds and raptors are prohibited by the California Fish and Game Code 3503. Potential indirect impacts to nesting birds and raptors would be mitigated to a level of less than significant by implementing **BIO-MM 5** (Regulatory Requirement CDFG Code)

Invasive Species

The landscape plans for the residential, commercial and mixed development shall avoid the use of invasive species. All landscape plans must use native and/or drought-tolerant plant materials appropriate for their location and soil type, as identified in standard agricultural suitability soils test. Preferred landscaping materials shall consist of native plants identified in the city's landscape design manual. A final landscape

design will be developed and submitted to the City of Brea Director of Community Services for review and approval. No significant impacts are anticipated.

CUMULATIVE IMPACTS

The temporary direct and/or indirect impacts of the project would not result in significant cumulative impacts (CEQA Section 15310) to environmental resources within the region of the Project Site. Cumulative impacts refer to incremental effects of an individual project when assessed with the effects of past, current, and proposed projects. Although the project would result in the loss of 255.34-acres of primarily disturbed habitat types resulting from oil operations since the 1900's, cumulative impacts will be mitigated to a level of less than significant by preserving a total 52.86-acres of open space habitat within and immediately adjacent to the 14,000 acre Chino Hills State Park located within the existing Puente-Chino Hills wildlife corridor, **BIO-MM3** (Coastal California Gnatcatcher Critical Habitat).

MITIGATION MEASURES

The following biological mitigation measures address those adverse impacts determined to be potentially significant, or are relevant to the protection of biological resources to the extent practicable as part of ensuring compliance with local, federal, state and CEQA guidelines.

Impacts to USACE/CDFW/RWQCB regulatory resources (0.896-acre), sensitive vegetation (0.03-acre black willow thicket, 1.37-acre blue elderberry woodland), and LBV habitat (1.37-acre blue elderberry woodland) will collectively be mitigated thorough the reestablishing 2.74-acres of streambed and associated blue elderberry woodland (**BIO-MM 1** and **BIO-MM 4**).

BIO-MM 1 USACE/CDFW/RWQCB

The project would result in impacts to ephemeral streambed regulated under Section 404 of the Clean Water Act, Section 1602 of the Fish and Game Code, and the Waste Discharge Requirement of Porter Cologne. Because impacts to CDFW jurisdiction exceed impacts to USACE jurisdiction, mitigation is based on impacts to CDFW jurisdiction.

Prior to issuance of a grading permit, the project applicant will obtain a 404 Nationwide Permit from the USACE, 1602 SAA from CDFW, and a 401 RWQCB Certification for impacts to jurisdictional resources. During the permit/certification processes a Habitat Mitigation Monitoring Plan (HMMP) will be developed and approved by the City of Brea, USACE, CDFW and RWQCB as described below (Habitat Mitigation Monitoring Plan).

All proposed regulatory restoration activities will occur within the 52.86-acres of open space lands proposed for dedication as outlined in **BIO-MM3** (Coastal California Gnatcatcher Critical Habitat).

Specifically, the project would impact 0.943-acre of drainage channel and 0.063-acre of riparian habitat subject to Section 1602 of the California Fish and Game Code; however, 0.11 acre consists of the concrete segment of Carbon Canyon Creek downstream of Carbon Canyon Dam which contains no fish or wildlife resources and impacts to this concrete channel would not be considered significant. Thus, impacts to ephemeral drainage channel subject to Section 1602 jurisdiction requiring mitigation would total 0.833 acre of drainage channel plus 0.063 acre of riparian habitat (0.896-acre total).

Impacts to USACE and RWQCB jurisdiction under the Porter Cologne Waste Discharge Requirements totals 0.602 acre of which 0.11 acre consists of the concrete segment of Carbon Canyon Channel. Thus, the necessary mitigation for Section 1602 impacts will also address the impacts to USACE and RWQCB jurisdiction. Impact would be mitigated at a greater than 3:1 ratio:

- Establish and/or reestablish 2.74-acres of streambed and associated blue elderberry woodland, inclusive of **BIO-MM 4** (**Least Bell's Vireo HCP**), in association with stream re-establishment or rehabilitation at a location approved by CDFW and the RWQCB, either within lands owned or controlled by Aera Energy within or adjacent to Chino Hills State Park as shown in Figure 13, *Regional Open Space and Proposed Mitigation Lands Map*

Habitat Mitigation Monitoring Plan

If restoration is proposed the project applicant shall develop an HMMP for impacts to jurisdictional resources including black willow thickets (state rarity ranking of S3). The HMMP shall be prepared by a qualified Biologist and approved by the USACE, CDFW and RWQCB. The Applicant shall begin restoration activities (e.g., soil prep, seeding, planting) no later than one year after issuance of the first permit that allows for ground disturbance (e.g., grading permit). The Applicant shall be fully responsible for implementing the revegetation program until the restoration areas have met the success criteria outlined in the HMMP. The regulatory agencies shall have final authority over mitigation area sign-off. The HMMP will include at a minimum 1) project description, 2) mitigation goals, 3) description of mitigation site, 4) implementation approach, 5) maintenance/monitoring approach, 6) success criteria/contingency measures, and 7) funding mechanism.

BIO-MM 2 Coastal California Gnatcatcher HCP & Monitoring

A Habitat Conservation Plan (HCP) pursuant to Section 10(a)(1)(B) of the FESA will be developed as part of formal consultation with the USFWS for impacts to 10.33-acres of occupied and suitable coastal California gnatcatcher habitat. Upon development of the HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies at a minimum, the following: (1) the level of impact that will result from the taking, (2) steps that will minimize and mitigate the impacts, (3) funding necessary to implement the plan, (4) alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen, and (5) such other measures that the USFWS may require as being necessary or appropriate for the HCP. With implementation of the following measures including **BIO-MM3** (**Coastal California Gnatcatcher Critical Habitat**), as approved in consultation with USFWS, impacts to

coastal California gnatcatcher occupied, areas of (i) and areas of PCE (ii) project impacts would be mitigated to less than significant:

Impacts to 10.33-acres of occupied and suitable coastal California gnatcatcher habitat will be mitigated as outlined below. The following proposed establishment and/or restoration activities, approved by the USFWS, will occur offsite within the lands proposed for dedication including 52.86-acres of open space lands located within and adjacent to Chino Hills State Park as shown in Figure 13, *Regional Open Space and Proposed Mitigation Lands Map,* including:

- Coastal Sage Scrub Establishment/Restoration (2:1) 20.66-acres

- Prepare Habitat Restoration Plan that will include the following components, Location, Site Preparation Methods, Plant Palette, Planting Methods, Maintenance Requirements, Monitoring and Reporting Procedures, Performance Standards.

The Applicant shall begin coastal sage scrub restoration activities (e.g., soil prep, seeding) no later than one year after issuance of the first permit that allows for ground disturbance (e.g., grading permit).

The HCP will also include monitoring requirements to ensure nesting activities are not directly or indirectly impacted as a result of project initiation. The take of active coastal California gnatcatcher nests, which includes harassment of the bird due to grading noise and vibrations from February 15th through July 1st, is not permitted. Therefore, grading and removal of habitat during this time frame will only be permitted subject to the following conditions having been met to the satisfaction of the USFWS.

The applicant is hereby advised that, during grading, if active nests are found within 500 feet of the grading, the grading activity shall be stopped until such time as mitigation measures, to the satisfaction of the USFWS are implemented. There is no guarantee that grading will be allowed to resume during the nesting season.

Before issuance of a clearing/grading permit, if grading or clearing is to occur between February 15th and July 1st, the applicant shall provide to the City of Brea a letter from a qualified biologist retained by the applicant, with a scope of work for a coastal sage scrub habitat and coastal California gnatcatcher survey, and a report for the area to be cleared and/or graded and coastal sage scrub habitat areas within 500 feet of such area. The biologist shall coordinate with the USFWS to determine the appropriate survey methodology. The purpose of the survey is to determine if any active gnatcatcher nests are located in the area to be cleared or graded, or in coastal sage scrub habitat within 500 feet of such area. To be considered qualified, the biologist must provide the City with a copy of a valid coastal California Gnatcatcher Recovery Permit from the USFWS.

The scope of work shall explain the survey methodology for the biological survey and the proposed coastal California gnatcatcher nest monitoring activities during the clearing/grading operation. Should the report show, to the satisfaction of the USFWS, that gnatcatcher nests are not present within the area to be graded/cleared, or within coastal sage scrub habitat located within 500 feet of said area, approval may be granted

to commence clearing/grading within the coastal California gnatcatcher nesting season from February 15th through July 1st.

If coastal California gnatcatchers are nesting within the area to be graded/cleared, or within coastal sage scrub habitat located within 500 feet of said area, no grading will be allowed during this time until such time as mitigation measures, to the satisfaction of the City of Brea and the USFWS are implemented.

The biologist must attend the City's pre-construction meeting for the project and must be present onsite during all clearing/grading activities to monitor that the clearing/grading activities stay within the designated limits. During this period, the biologist shall also monitor and survey the habitat within the area to be cleared/graded and any habitat within 500 feet of said area for any evidence that a coastal California gnatcatcher nest(s) exists or is being built. Should evidence of a coastal California gnatcatcher nest(s) be discovered, the grading operation shall cease in that area and be directed away from the coastal California gnatcatcher nest(s) to a location greater than 500 feet away from the nest(s).

Upon completion of the clearing/grading activities, the applicant's biologist shall submit to the City of Brea and USFWS a biological monitoring report summarizing the observations of the biologist, including whether any coastal California gnatcatchers or evidence of active coastal California gnatcatcher nests were present during clearing and grading activities within the area and any habitat within 500 feet of said area.

BIO-MM 3 Coastal California Gnatcatcher Critical Habitat

Impacts to 52.86-acres of USFWS coastal California gnatcatcher critical habitat with PBFs 1 or PBFs 2 will be mitigated by preserving a total 52.86-acres of open space habitat within and immediately adjacent to the existing Puente-Chino Hills wildlife corridor. The proposed preserved lands will include 22.50 acres of in-holdings (SWEPI Retained Drill Sites) within the Chino Hills State Park and Shell/Aera oil retained lands located within the coastal California gnatcatcher critical habitat boundary within which a minimum of 20.66 acres of coastal sage scrub restoration will occur as outlined in **BIO-MM 2**. The proposed land conservation would also provide a significant contribution to a region of open space adjacent to Carbon Canyon Road identified as a "Priority Crossing Improvement Area - A" (CBI 2005). The fee title dedication of 52.86-acres of open space lands located within and adjacent to Chino Hills State Park within the Puente-Chino Hills wildlife corridor, coastal California gnatcatcher critical habitat, priority crossing improvement area, and within which 20.66-acres of coastal sage scrub restoration is proposed would represent a significant acquisition and contribution to regional wildlife movement conservation goals. The proposed conserved lands will be offered to the Chino Hills State Park for consideration of acquisition.

BIO-MM 4 Least Bell's Vireo HCP

A Habitat Conservation Plan (HCP) pursuant to Section 10(a)(1)(B) of the FESA will be developed as part of formal consultation with the USFWS for impacts to 1.37-acres of least Bell's vireo habitat (Blue elderberry Woodland). Upon development of the HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies at a minimum, the following: (1) the level of impact that will result from the taking, (2)

steps that will minimize and mitigate the impacts, (3) funding necessary to implement the plan, (4) alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen, and (5) such other measures that the USFWS or CDFW may require as being necessary or appropriate for the HCP.

The following proposed preservation and/or restoration activities, approved by the USFWS, will occur offsite within the lands proposed for dedication including 52.86-acres of open space lands located within and adjacent to Chino Hills State Park as shown in Figure 13, *Regional Open Space and Proposed Mitigation Lands Map,* including:

- Blue elderberry Woodland Establishment (2:1) 2.74-acres, inclusive of **BIO-MM 1** (**USACE/CDFW/RWQCB**)

- Prepare Habitat Restoration Plan that will include the following components, Location, Site Preparation Methods, Plant Palette, Planting Methods, Maintenance Requirements, Monitoring and Reporting Procedures, Performance Standards

The Applicant shall begin coastal sage scrub restoration activities (e.g., soil prep, seeding) no later than one year after issuance of the first permit that allows for ground disturbance (e.g., grading permit).

The HCP will also include monitoring requirements to ensure nesting activities are not directly or indirectly impacted as a result of project initiation. The take of active least Bell's vireo nests, which includes harassment of the bird due to grading noise and vibrations from April 14th through July 31st, is not permitted. Therefore, grading and removal of habitat during this time frame will only be permitted subject to the following conditions having been met to the satisfaction of the City of Brea and USFWS.

The applicant is hereby advised that, during grading, if active nests are found within 500 feet of the grading, the grading activity shall be stopped until such time as mitigation measures, to the satisfaction of the City of Brea and the USFWS are implemented. There is no guarantee that grading will be allowed to resume during the nesting season.

BIO-MM 5 Regulatory Requirement CDFG Code

Regulatory requirement for potential direct/indirect impacts to nesting common and sensitive bird and raptor species will require compliance with the CDFG Code Section 3503. Construction outside the nesting season (between September 1st and January 31st) do not require pre-removal nesting bird surveys. If construction is proposed between February 1st and August 31st, a qualified biologist must conduct a nesting bird survey(s) no more than fourteen (14) days prior to initiation of grading to document the presence or absence of nesting birds within or directly adjacent (100 feet) to the Project Site.

The survey(s) will focus on identifying any raptors and/or bird nests that are directly or indirectly affected by construction activities. If active nests are documented, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of a nest shall be postponed until the young birds have fledged. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging at 20-foot intervals,

and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted to the City of Brea for review and approval prior to initiation of grading in the nest-setback zone.

The qualified biologist shall serve as a construction monitor during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts on these nests occur. A final monitoring report of the findings, prepared by a qualified biologist, shall be submitted to the City of Brea documenting compliance with the CDFG Code. Any nest permanently vacated for the season would not warrant protection pursuant to the CDFG Code.

Implementation of Mitigation Measures **BIO-MM1** through **BIO-MM5** would reduce all potential significant unavoidable impacts on biological resources below a level of significance.

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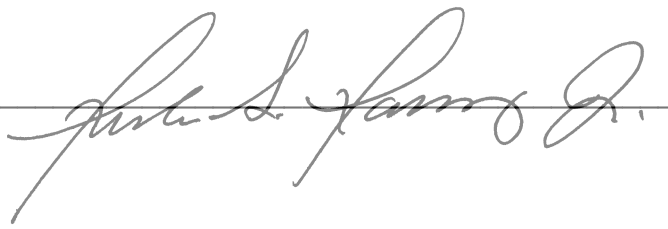
Certification "*I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge.*

Author:  Date: February 15, 2022

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APPENDIX A: FLORAL COMPENDIUM

(Source GLA 2022)

The floral compendium lists species identified on the project site. Taxonomy follows the Jepson Manual (Baldwin et al 2012) and, for sensitive species, the California Native Plant Society's Rare Plant Inventory (Tibor 2001). Common plant names are taken from Hickman (1993), Munz (1974), and Roberts et al (2004). An asterisk (*) denotes a non-native species.

Scientific Name	Common Name
MAGNOLIOPHYTA	**FLOWERING PLANTS**
DICOTYLEDONS	**DICOTS**
AMARANTHACEAE	**Amaranth Family**
Amaranthus blitoides	prostrate pigweed
ADOXACEAE	**Elderberry Family**
Sambucus nigra ssp. caerulea	blue elderberry
ANACARDIACEAE	**Sumac Family**
Malosma laurina	laurel sumac
**Schinus molle*	Peruvian pepper tree
**Schinus terebinthifolius*	Brazilian pepper tree
APIACEAE	**Carrot Family**
**Conium maculatum*	poison hemlock
**Foeniculum vulgare*	sweet fennel
ASTERACEAE	**Sunflower Family**
Artemisia californica	California sagebrush
Baccharis pilularis	coyote brush
Baccharis salicifolia	mule fat
**Centaurea melitensis*	tocalote
Conyza Canadensis	common horseweed
**Dimorphotheca sinuate*	African daisy
Encelia californica	California bush sunflower
Encelia farinosa	brittlebush
Heterotheca grandiflora	telegraph weed
Helianthus annuus	common sunflower
**Helminthotheca echoides*	bristly ox-tongue
Isocoma menziesii	Menzie's goldenbush
**Lactuca serriola*	prickly lettuce
**Pulicaria paludosa*	Spanish false fleabane
Psuedognaphalium californicum	California everlasting
**Sonchus oleraceus*	common sow-thistle

BORAGINACEAE	**Borage Family**
Amsinckia intermedia	common fiddleneck
Heliotropium curassavicum	heliotrope
BRASSICACEAE	**Mustard Family**
**Brassica nigra*	black mustard
**Hirschfeldia incana*	summer mustard
**Sisymbrium irio*	London rocket
CACTACEAE	**Cactus Family**
Opuntia littoralis	prickly pear
CHENOPODIACEAE	**Goosefoot Family**
**Chenopodium album*	lamb's quarters
**Salsola tragus*	Russian thistle
CRASSULACEAE	**Stonecrop Family**
Dudleya lanceolata	lanceleaf liveforever
EUPHORBIACEAE	**Spurge Family**
Euphorbia albomarginata	rattlesnake sandmat
Croton californicus	California croton
**Euphorbia maculata*	spotted spurge
**Ricinus communis*	castor bean
FABACEAE	**Legume Family**
**Melilotus indicus*	Annual yellow sweetclover
FAGACEAE	**Oak Family**
Quercus berberidifolia	scrub oak
GERANIACEAE	**Geranium Family**
**Erodium botrys*	broad leaf filaree
**Erodium cicutarium*	red-stemmed filaree
**Erodium moschatum*	white-stemmed filaree
JUGLANDACEAE	**Walnut Family**
Juglans californica	Southern California black walnut
LAMIACEAE	**Mint Family**
Salvia apiana	white sage
MALVACEAE	**Mallow Family**
**Malva parviflora*	cheeseweed

MYRTACEAE	**Myrtle Family**
**Eucalyptus sp.*	eucalyptus
PLATANACEAE	**Myrtle Family**
Platanus racemosa	western sycamore
POLYGONACEAE	**Buckwheat Family**
Eriogonum elongatum	longstem buckwheat
Eriogonum fasciculatum	California buckwheat
SALICACEAE	**Willow Family**
Salix goodingii	black willow
SCROPHULARIACEAE	**Figwort Family**
Mimulus auranticus	sticky monkey flower
SIMAROUBACEAE	**Quassia Family**
**Ailanthus altissima*	tree of heaven
SOLANACEAE	**Nightshade Family**
Datura wrightii	Jimsonweed
**Nicotiana glauca*	tree tobacco
Solanum americanum	white nightshade
URTICACEAE	**Nettle Family**
**Urtica urens*	dwarf nettle
VITACEAE	**Grape Family**
Vitis californica	California wild grape
MAGNOLIOPHYTA **MONOCOTYLEDONES**	**FLOWERING PLANTS** **MONOCOTS**
AREACEAE	**Palm Family**
Washingtonia filifera	California fan palm
**Washingtonia robusta*	Mexican fan palm
POACEAE	**Grass Family**
**Arundo donax*	giant reed
**Avena barbata*	slender oat
**Bromus diandrus*	ripgut brome
**Bromus madritensis* ssp. *rubens*	foxtail chess
**Hordeum murinum ssp. leporinum*	foxtail barley
**Pennisetum setaceum*	fountain grass

APPENDIX B: FAUNAL COMPENDIA

(Source GLA 2022)

Vertebrates identified in the field by sight, calls, tracks, scat, or other signs are cited according to the nomenclature of Collins (1997) for amphibians and reptiles, AOU (1998) for birds, and Jones et al. (1992) for mammals.

LEGEND

Presence of animals noted by direct sighting, call identification or observation of tracks, scat or other signs

† Denotes species not observed but expected to occur on site
* Denotes non-native species

TERRESTRIAL VERTEBRATES

REPTILES

IGUANIDAE - IGUANID LIZARDS

Sceloporus occidentalis
western fence lizard
Uta stansburiana
side-blotched lizard

COLUBRIDAE - COLUBRID SNAKES

† *Pituophis melanoleucus*
gopher snake
† *Lampropeltis getulus*
common kingsnake

BIRDS

ANATIDAE - SWANS AND GEESE

Branta canadensis
Canada goose

PHASIANIDAE - PHEASANTS & QUAILS

Callipepla californica
California quail

CATHARTIDAE - NEW WORLD VULTURES

Cathartes aura
turkey vulture

ACCIPITRIDAE - HAWKS

Accipiter cooperi
Cooper's hawk
Buteo jamaicensis
red-tailed hawk

CHARADRIIDAE - SHOREBIRDS

Charadrius vociferus
killdeer

SCOLOPACIDAE - SHOREBIRDS

Numenius phaeopus
whimbrel

APODIDAE - PIGEONS & DOVES

Zenaida macroura
mourning dove

CUCULIDAE - CUCKOOS

Geococcyx californianus
greater roadrunner

COLUMBIDAE - SWIFTS

Aeronautes saxatalis
White-throated swift

TROCHILIDAE - HUMMINGBIRDS

Calypte anna
Anna's hummingbird
Selasphorus sasin
Allen's hummingbird

PICIDAE - WOODPECKERS

Picoides nuttallii
Nuttall's woodpecker
Melanerpes formicivorus
acorn woodpecker

FALCONIDAE - FALCONS

Falco sparverius
American kestrel

TYRANNIDAE - TYRANT FLYCATCHERS

Contopus cooperi
olive-sided flycatcher
Empidonax difficilis
pacific-slope flycatcher
† *Sayornis nigricans*
black phoebe
Sayornis saya
Say's phoebe
Myiarchus cinerascens
ash-throated flycatcher
Tyrranis verticalis
Western kingbird

VIREONIDAE - VIREOS

Vireo bellii
least Bell's vireo

CORVIDAE - JAYS & CROWS

Aphelocoma californica
Western scrub-jay
Corvus brachyrhynchos
American crow
Corvus corax
common raven

HIRUNDINIDAE - SWALLOWS

Hirundo rustica
barn swallow

Hirundo pyrrhonota
cliff swallow

Stelgidopteryx serripennis
northern rough-winged swallow

AEGITHALIDAE - BUSHTITS

Psaltriparus minimus
bushtit

TROGLODYTIDAE - WRENS

Thryomanes bewickii
Bewick's wren
Troglodytes aedon
house wren

POLIOPTILIDAE - GNATCATCHERS

Polioptila caerulea
blue-gray gnatcatcher
Polioptila californica
California gnatcatcher

MUSCICAPIDAE - KINGLETS, GNATCATCHERS, THRUSHES & BABBLERS

Chamaea fasciata
wrentit

TURDIDAE - THRUSHES

Sialia mexicana
Western bluebird

MIMIDAE - THRASHERS

Toxostoma redivivum
California thrasher
Mimus polyglottos
Northern mockingbird

STURNIDAE - STARLINGS

* *Sturnus vulgaris*
European starling

MOTACILLIDAE - PIPITS

Anthus rubescens
American pipit

PTILIOGONATIDAE

Phainopepla nitens
Phainopepla

PARULIDAE - WOOD WARBLERS

Oreothlypis celata
orange crowned warbler

Geothlypis trichas
common yellowthroat
Setophaga coronata
yellow-rumped warbler
Cardellina pusilla
Wilson's warbler

EMBERIZIDAE – SPARROWS, BUNTINGS, WARBLERS, & RELATIVES

Melozone crissalis
California towhee
Pipilo maculatus
spotted towhee
Melospiza melodia
song sparrow
Zonotrichia leucophrys
white-crowned sparrow

CARDINALIDAE - TANAGERS AND CARDINALS

Pheucticus melanocephalus
black-headed grosbeak

ICTERIDAE - BLACKBIRDS AND ORIOLES

Sturnella neglecta
Western meadowlark
† *Euphagus cyanocephalus*
Brewer's blackbird
Molothrus ater
brown headed cowbird

Icterus cucullatus
hooded oriole
Icterus bullockii
Bullock's oriole

FRINGILLIDAE - FINCHES

Carpodacus mexicanus
house finch
Carduelis psaltria
lesser goldfinch

PASSERIDAE - OLD WORLD SPARROWS

*† *Passer domesticus*
house sparrow

MAMMALS

DIDELPHIDAE - NEW WORLD OPOSSUMS

†* *Didelphis virginiana*
Virginia opossum

VESPERTILIONIDAE - EVENING BATS

† *Myotis spp.*
myotis bat

GEOMYIDAE - POCKET GOPHERS

† *Thomomys bottae*
Botta's pocket gopher

MURIDAE - MICE, RATS, AND VOLES

† *Peromyscus maniculatus*
deer mouse

PROCYONIDAE - RACCOONS

† *Procyon lotor*
raccoon

CERVIDAE - DEER

Odocoileus hemionus
mule Deer

CANIDAE - CANINES

Canius latrans
coyote

LEPORIDAE - RABBITS AND HARES

Sylvilagus bachmani
brush rabbit

FELIDAE - WILD CATS

Lynx rufus
bobcat

CRICETIDAE - NEW WORLD MICE AND RATS

Neotoma fuscipes
dusky woodrat

SCIURIIDAE - SQUIRRELS

Otospermophilus beecheyi
California ground squirrel

Contact: Ruben S. Ramirez, Jr. 949-300-0212, r.ramirez@cadreenvironmental.com

Appendix E Paleontological and Cultural Resources Assessment

See Draft EIR for Analysis on Paleontological and Cultural Rsources

Appendices

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Appendix F Geotechnical Assessment

Appendices

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3030 Saturn Street, Suite 101
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December 19, 2018
Project Number 1-0250

Attention: Mr. George Basye

Subject: **EIR-LEVEL GEOTECHNICAL ASSESSMENT**
Brea Central Property, City of Brea
County of Orange, California

References: See Appendix A

Dear Mr. Basye:

In accordance with your request, Alta California Geotechnical, Inc. (Alta) is pleased to submit this geotechnical assessment in support of EIR submittals for the Brea Central Property, in the City of Brea, County of Orange, California. An initial geotechnical subsurface investigation was previously conducted onsite by Pacific Soils Engineering, Inc. (PSE, 1999) that included the excavation, logging, and sampling of bucket-auger borings and backhoe trenches. We reviewed the technical documents that are tabulated in Appendix A.

In this document, Alta first summarizes the investigative methodology and the geographic, geomorphic, and geologic setting of the Brea Central project and its environs. We then assess geological and geotechnical engineering issues applicable to EIR processing and offer potential mitigations for same. Included in the text of this report are a Site Location map (Figure 1), Geomorphic Province Map (Figure 2), Regional Geologic Map (Figure 3), Regional Fault Map (Figure 4), and Mineral Land Classification Map (Figure 5). Appendices include the reference list (Appendix A), previous subsurface investigation (Appendix B), and previous laboratory test results (Appendix C). A 200-scale Geologic Map is included as a pocket enclosure.

The project is considered feasible from a geologic and geotechnical perspective. The major geotechnical issues that could impact the development as conceived are discussed in Section 4.0 of this document and include: faulting and seismic hazards; erosion/mass wasting; slope stability; compressible/collapsible soils; expansive soils; infiltration characteristics; and corrosion. All these issues can be mitigated and alternatives for mitigation are presented in this report.

Alta appreciates the opportunity to provide you with geotechnical consulting services. If you have any questions or should you require any additional information, please contact the undersigned at (951) 509-7090.

Respectfully submitted,
ALTA CALIFORNIA GEOTECHNICAL, INC.

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Distribution: (1) Addressee

SAG: -eg-1-0250, December 19, 2018 (EIR-Level Geotechnical Assessment)

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1.0 INTRODUCTION

1.1 Background and Purpose

This report presents the results of Alta California Geotechnical, Inc's. (Alta) geotechnical assessment in support of EIR processing for the Brea Central project.

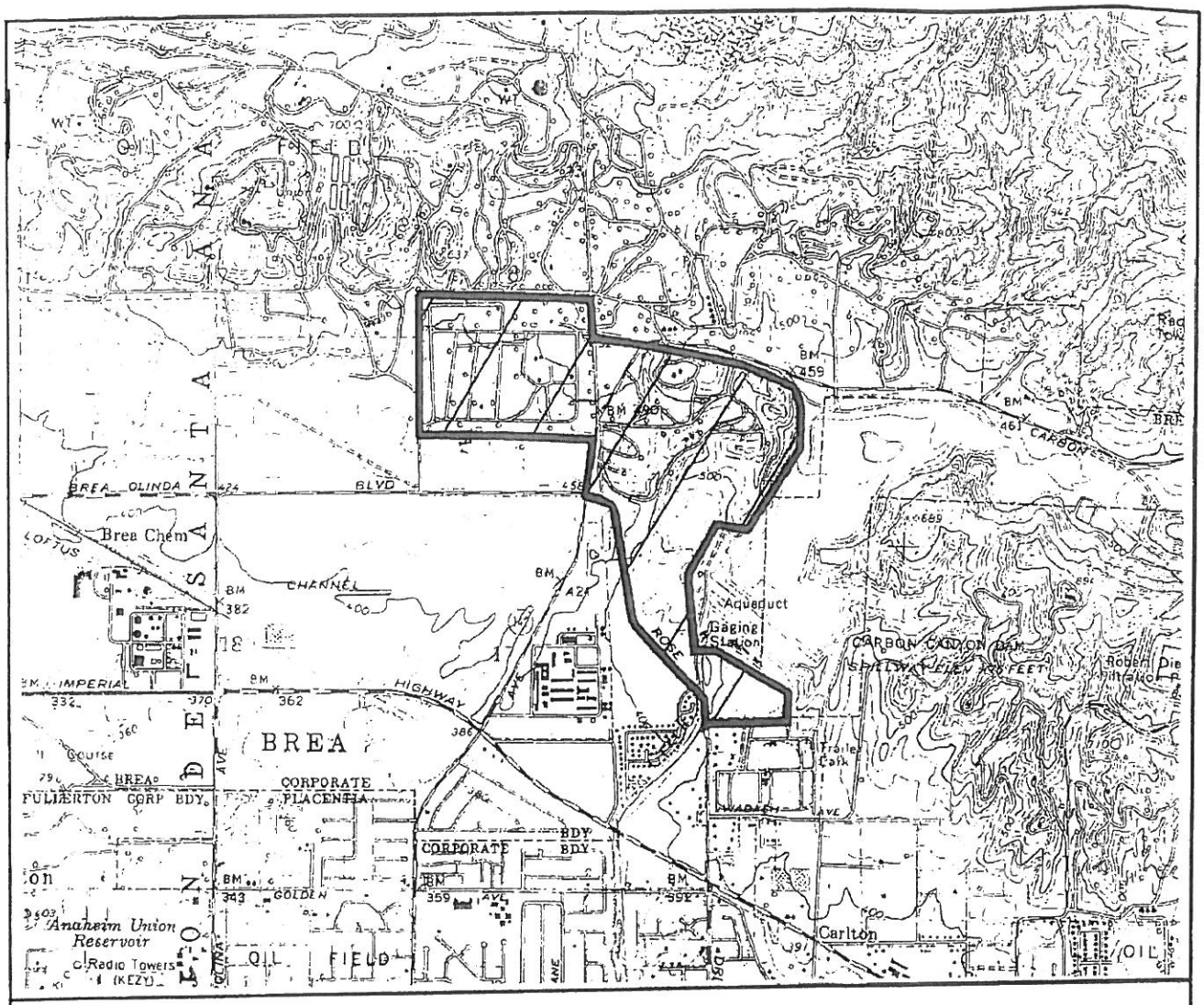
1.2 Scope of Work

Alta's scope of work consisted of the following:

- Reviewing the cited geologic literature, maps, and aerial photographs;
- Site geologic mapping;
- Compiling of previous subsurface information (PSE, 1999), including twenty-one (21) backhoe trench logs and nine (9) bucket auger boring logs (Appendix B);
- Compiling previous laboratory test results (Appendix C);
- A limited seismic evaluation;
- Evaluating the general remedial grading requirements;
- Consolidating the geologic and geotechnical data and preparation of a geologic base map;
- Preparing of this report in support of your EIR submittals, with exhibits, summarizing our findings.

1.3 Site Location and Existing Conditions

The subject site is an inverted L shape property, which, for descriptive purposes, is divided herein into eastern and western portions (Figure 1). The eastern portion of the site is bound by Valencia Avenue and Rose Drive on the western side, and Carbon Canyon Regional Park on the eastern side. The northern boundary is at Carbon Canyon Road and the southern limits are at Blake Road. The western portion of the property, known as the "100 Acres", is bound by Birch Street on the south, Lambert Road on the north, Valencia Avenue on the



SITE LOCATION MAP

SOURCE: YORBA LINDA QUAD
SCALE: 1" = 2000'

FIGURE 1

ALTA CALIFORNIA GEOTECHNICAL, INC.
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PROJECT NUMBER: 1-0250 **DATE:** 12-19-18

east and an existing housing development on the west. Access to the site is via paved and unpaved roads off of Valencia Avenue, Rose Drive and Blake Road.

Topographically the site is characterized by low-lying alluvial terraces with minimal relief on the southern portions of the site and on the western "100 Acres". The northeastern portion of the site consists of rounded hills and ridgelines of moderate height with intervening canyons and draws. A steep slope is present on the northeastern edge of the property above the Carbon Canyon stream bed. Drainage is by sheet flow to the canyons and draw areas, which drain to the south and southwest. Total relief onsite is approximately 201 feet and elevations range from 586 feet to 385 feet. The natural slopes onsite are gentle to very steep, and range from 1:1 to 5:1 (horizontal:vertical).

Vegetation onsite consists of native grasses, shrubs and trees. Vegetation varies from light to locally heavy, with the heavy vegetation and trees concentrated in the draws and canyons.

The subject site is currently being utilized for oil production and a nursery. Numerous roadways associated with oil field exploration and production exist throughout the site. The site was utilized extensively in the past for agricultural purposes. Small-scale sand and gravel quarrying has occurred onsite. The Carbon Canyon flood control dam and flood basin lies immediately offsite of the south-central portion of the site.

Several utilities cross the site within easements. A Metropolitan Water District easement crosses the far southern portion of the site to Rose Drive. A 30-inch high pressure gas line crosses the southern portion of the project below the Carbon Canyon dam, and a Mobil Oil gasoline line runs in a roughly north-south direction across the eastern portions of the site from Blake Road to Carbon Canyon Road. The Carbon Canyon Dam sewer line is present onsite within the

fill prism labeled PSE-1 at the approximate location shown on Plate 1. Numerous other utilities associated with the existing oil field production and the nursery are located onsite.

1.4 Proposed Development

Residential building pads with attendant streets and utilities are proposed for the site at this time. Cut and fill mass grading will be required in order to develop lots onsite. Specific plans and details are not presently available.

2.0 PREVIOUS INVESTIGATIVE METHODOLOGY

The Brea Central property was the subject of a preliminary geotechnical constraints study prepared by GeoSoils, Inc. (GeoSoils, 1992). No subsurface exploration was conducted as a part of that study.

Pacific Soils Engineering, Inc. (PSE) conducted a subsurface investigation in 1999 (PSE, 1999) directed towards defining the on-site geologic relationships and collecting representative samples for geotechnical testing. Personnel of PSE excavated and logged twenty-one (21) backhoe excavations. The trenches ranged from 3 to 16 feet in depth and were excavated with a Case 580E backhoe. The materials exposed on the trench walls were classified in the field using tactile and visual methods. Logs of the exploratory trenches are presented in Appendix B, and the approximate locations are shown on Plate 1.

A truck mounted bucket auger drill rig equipped with a 30-inch bucket was used to advance nine (9) borings. The borings ranged in depth from 25 to 83 feet. Logs of the exploratory borings are presented in Appendix B, and the locations are shown on Plate 1.

Samples taken during the subsurface investigation were transported to PSE's laboratory for testing and analysis. The results of the laboratory testing are presented in Appendix C of this report.

PSE observed and tested grading operations for adjacent projects that encroached on the subject project, including the Shea Homes development to the northwest, and the Brea Sports Park development (PSE, 2008). PSE also observed and tested grading and trench backfill operations for the Carbon Canyon Dam Sewer project (PSE, 2009).

3.0 GEOLOGIC CONDITIONS

3.1 Geologic and Geomorphic Setting

The subject site is located on the southwestern flank of the Puente Hills (Figure 2). The Puente Hills form the western to northwestern margin of the Los Angeles Basin, which is located in Peninsular Ranges Geomorphic Province. The Puente Hills are bracketed by the Whittier and Chino Fault Zones and have been created by uplift along these faults. Approximately 13,000 feet of Miocene aged marine clastic sedimentary rocks underlies the Puente Hills. These sediments overlie approximately 16,000 feet of Cenozoic aged rock which are underlain by Mesozoic plutonic basement rocks (Yerkes, 1972).

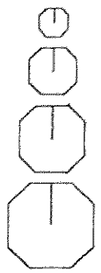
Uplift of the Puente Hills in the late Pleistocene and Holocene have created erosional geomorphic features, which have been infilled with older alluvial and terrace materials. These older alluvium and terrace deposits underlie the broad alluvial plains adjacent to the Puente Hills on which the southern and western portions of the project lie. More recent accumulations of alluvium and colluvium are present in the canyons and draws onsite.

3.2 Stratigraphy

The site is underlain by engineered artificial fills, undocumented artificial fills, landslide debris, colluvium, alluvium, older alluvium, terrace deposits, upper and lower members of the Fernando Formation, and the Puente Formation (Figure 3). The geologic units and nomenclature are modeled after Yerkes, 1972. The as-mapped distribution is shown on Plate 1. Presented below is a brief description of the geologic units mapped onsite.

RELATIONSHIPS OF EARTHQUAKE EPICENTERS TO FAULTS IN SOUTHERN CALIFORNIA

MAGNITUDE



. . . . . 5.0 TO 5.9

. . . . . 6.0 TO 6.9

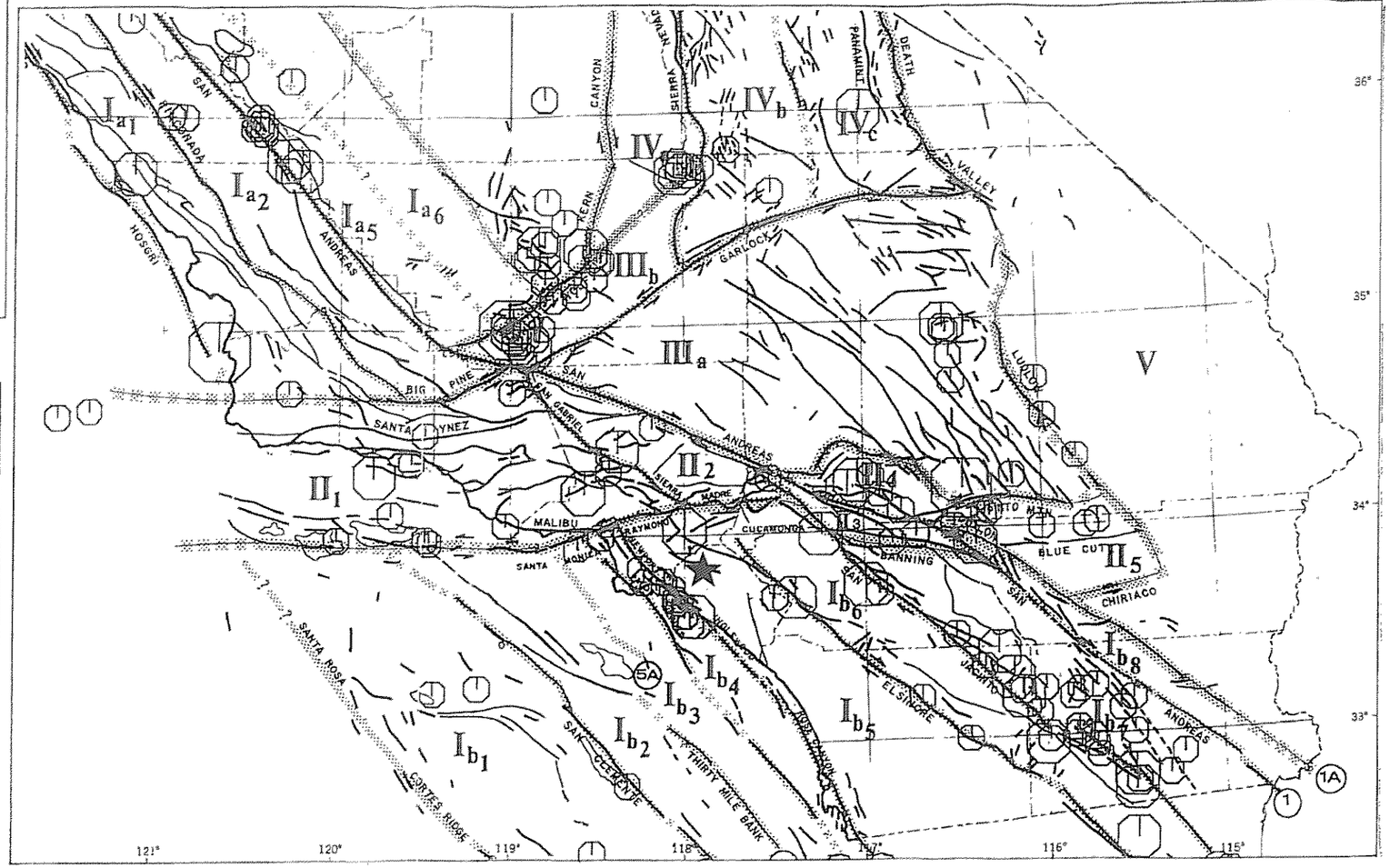
. . . . . 7.0 TO 7.9

. . . . . 8.0 OR GREATER

FAULT PATTERNS

(Defining Blocks and Subblocks)

Structural Province	Predominant Fault Trend	Blocks		Sub-block	
I	NW (San Andreas trend)	a	Coast Ranges	1	Santa Lucia
				2	Gabilan
				3	San Francisco
				4	Berkeley
				5	Diablo
				6	Great Valley
				7	Stanyford
		b	Peninsular Ranges	1	San Clemente
				2	Catalina
				3	Palos Verdes
				4	Inglewood-San Diego
				5	Santa Ana
				6	Riverside
				7	San Jacinto
				8	Indio Hills-Mecca Hills
II	E-W (transverse trend)		Transverse Ranges	1	Santa Ynez
				2	San Gabriel
				3	Banning
				4	San Bernardino
				5	Pinto Mtns.
III	NE (Garlock trend)	c	Mojave		
		b	Tehachapi		
IV	N-S (Owens Valley trend)	a	Kern Canyon		
		b	Panamint		
		c	Death Valley		
		d	Warner		
		e	East Sierra		
		f	Cascade		
		g	Gorda		
V	Multiple		Sonoran Desert		
VI	Complex		Sierra Nevada		
VII	Thrusts		Klamath		
VIII	Complex		Modoc	1	Alturas
				2	Eagle Lake
				3	Diamond Mtns.
				4	Medicine Lake



★ = Site

BOUNDARIES

(Segmented where projected, queried where very speculative)

Boundary defined by	Major Structural Block	Structural Sub-block
Quaternary fault		
Pre-Quaternary fault *		
Minor Pre-Quaternary fault * (fault not shown)		

* Pre-Quaternary faults may include a fault whose age is unknown or has not been evaluated; it may in fact, be Quaternary

0 50 100 MILES

0 50 100 KILOMETERS

AFTER JENNINGS (1985)

FIGURE 2

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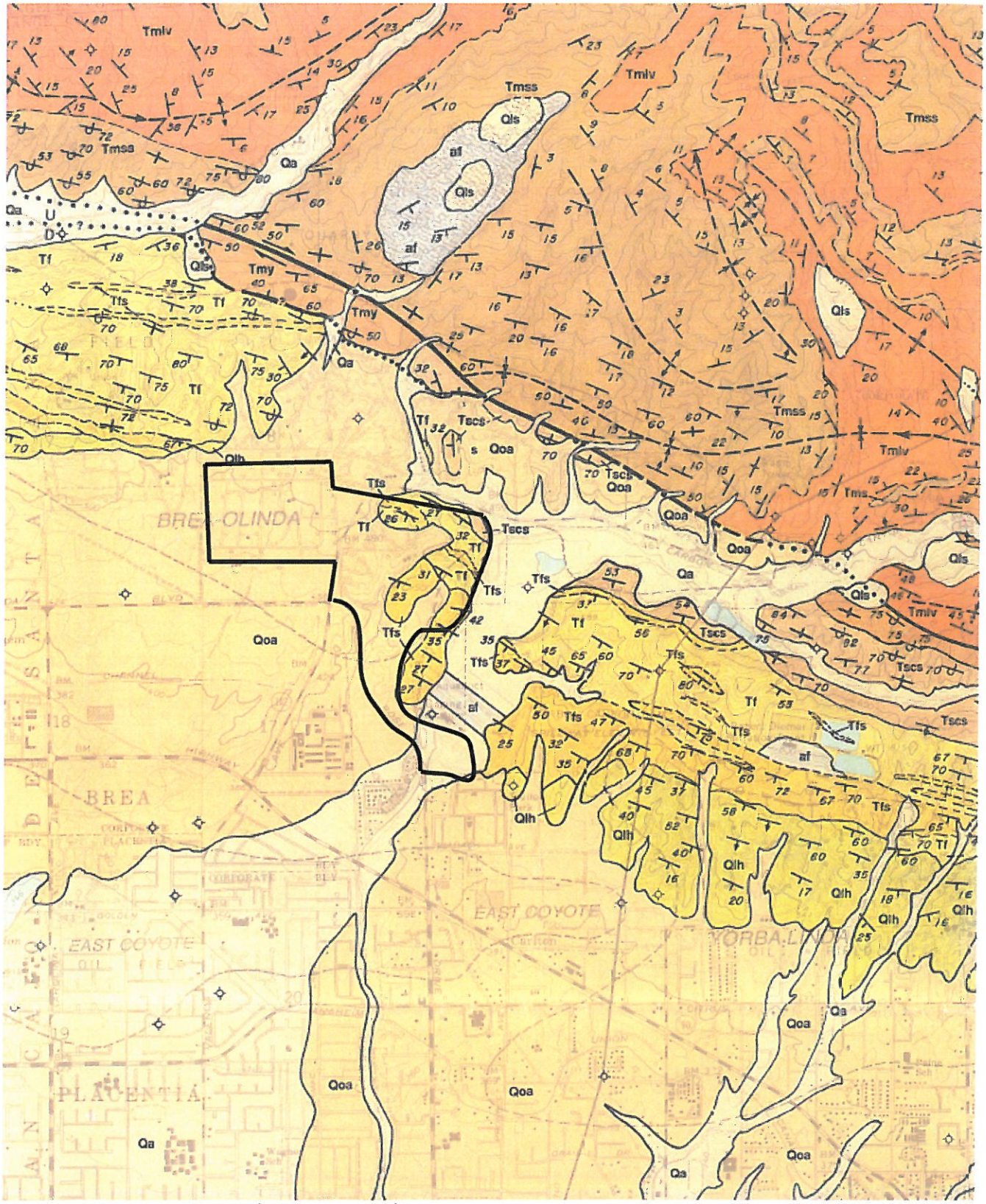

REGIONAL GEOLOGIC MAP (DIBBLEE, 2001)

FIGURE 3

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3.2.1 Puente Formation – Sycamore Canyon Member (Tpsc):

The Miocene aged Sycamore Canyon member of the Puente Formation is located on the far north side of the site. The Sycamore Canyon member onsite was not explored in the subsurface but based on observed outcrops and mapping by others it is composed of conglomerates. The rock is described in the reviewed literature as being moderately hard to hard, moist and moderately to well-cemented.

3.2.2 Fernando Formation – Lower Member (Tfl):

The Pliocene aged, Lower Member of the Fernando Formation can be found on the northeastern portion of the site. The lower member of the Fernando formation onsite is composed of siltstone and clayey siltstone with minor fine-grained sandstone beds. The rock is moderately hard to hard and slightly moist to moist.

3.2.3 Fernando Formation – Upper Member (Tfu):

The upper member of the Pliocene Fernando Formation is present on the northeasterly to easterly portions of the site. Onsite the upper member of the Fernando Formation is composed of interbedded siltstones and conglomerates. The conglomerates are made up of subrounded to rounded pebble to cobble sized clasts, which range in size from ½-inch to 6-inches in diameter. The cobbles are contained within a matrix, which is composed of coarse to very coarse sand. The conglomerate is hard, poorly to well cemented, and locally fossiliferous.

The siltstones of the upper member of the Fernando Formation are moist, moderately hard to hard with minor cemented zones. Minor fine-grained sandstone interbeds are present within the siltstones. The siltstone is generally massive with locally well-bedded zones associated with the sandstone interbeds.

3.2.4 Terrace Deposits (Qt):

Pleistocene-aged terrace deposits are located throughout the central, north central and western portions of the site. The terrace deposits are composed of sandy to clayey silts and silty sands, which are dark reddish brown, firm to stiff and dense, slightly moist to moist.

3.2.5 Older Alluvium (Qoal):

The late Pleistocene to early Holocene-aged older alluvium is present on the southeastern portion of the project. Onsite, the older alluvium is composed of silty to sandy clays and clayey to silty sands. The older alluvium is firm and medium dense to dense and stiff, slightly moist to moist, and predominantly dark reddish to yellowish brown in color.

3.2.6 Alluvium (Qal):

Recent alluvial soils are present in the draws and canyons throughout the site and within the Carbon Canyon channel area below the Carbon Canyon retention dam. The alluvium is composed of clayey to sandy silt, silty sand, and silty clay. The soils are loose and soft to firm and medium dense and dry to moist.

3.2.7 Colluvium (Qcol):

Recent colluvial soils are present on the slope flanks throughout the hillier portions of the project. The colluvium consists of silty to sandy clays, clayey slits, and silty sands in a slightly moist to moist and soft to firm condition.

3.2.8 Landslide Debris (Qls):

Two questioned landslides have been mapped on the northeast side of the site. The slides were mapped based on geomorphic expression and aerial photographic review and have not been explored previously. The

landslide debris, if it exists, is derived from the siltstone member of the Fernando Formation.

3.2.9 Undocumented Artificial Fill (Qaf):

Undocumented artificial fills are scattered over the site. The fills are associated with access road construction, oil field exploration/production, and past and present agricultural uses. The fills are derived from the surrounding soils and are dry to slightly moist and loose/soft.

3.2.10 Engineered Artificial Fill (afe1, afe2, afe3):

Engineered artificial fill was placed onsite as part of the development of the adjacent Shea Homes project, the Brea Sports Park (PSE, 2008) and the Carbon Canyon Dam Sewer project (PSE, 2009).

3.3 Geologic Structure/Tectonic Setting - Rancho Los Flores

3.3.1 Tectonic Framework:

Jennings (1985) has defined eight structural provinces within California that have been classified by predominant regional fault trends and similar fold structure (Figure 2). These provinces are in turn divided into blocks and sub-blocks that are defined by "major Quaternary faults". These blocks and sub-blocks exhibit similar structural features. Within this framework, the subject site can be classified as belonging to Structural Province I, Peninsular Range Block, Santa Ana Sub-Block.

Structural Province I is controlled by the dominant northwest trend of the San Andreas Fault and is divided into two blocks, the Coast Range Block and the Peninsular Range Block. The Peninsular Range Block, in which this site is located, is characterized by a series of parallel, northwest trending faults that exhibit right lateral dip-slip movement. These faults are terminated by the Transverse Range Block to the north and extend

southward to the Baja Peninsula. These northwest trending faults divide the Peninsular Range Block into eight sub-blocks. The Santa Ana Sub-block, one of the eight sub-blocks, is bound on the west by the Newport-Inglewood zone and on the east by the Elsinore/Whittier Fault zone. The subject site is located on the northeastern edge of the Santa Ana sub-block and lies approximately 19 miles northeasterly of the Newport-Inglewood fault zone and 2000 feet southwesterly of the Elsinore/Whittier fault zone.

3.3.2 Regionally Mapped Active Faults:

There are several large active fault systems in the region surrounding the subject site. These fault systems have been studied extensively and in a large part control the geologic structure of southern California. The prominent regional fault systems are the Whittier, Newport-Inglewood, Elsinore, San Jacinto, and San Andreas faults and Elysian Park seismic zone (Figure 4).

Whittier Fault System:

The Whittier fault system is located approximately 2000 feet northerly of the subject site. This fault is the main spur of the Elsinore fault system and extends northwesterly from Santa Ana Canyon through the Puente Hills to the Santa Monica Mountains. The Whittier fault system is a right lateral reverse fault that dips to the northeast.

Elysian Park Seismic Zone:

The Elysian Park Seismic Zone lies approximately 2 miles west to northwesterly of the project. The Elysian Park Seismic Zone is a part of the north Los Angeles Thrust Belt (Davis and Others, 1988; Hauksson, 1992 Bullard and Lettis, 1993). The belt is south-vergent and is marked

REGIONAL FAULT MAP



SOURCE: Southern California Earthquake Data Center

★ - Brea Central Property

FIGURE 4

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by blind (not reaching the earth's surface) thrust faults and associated anticlines which are expressed as the low hills that ring the north Los Angeles area.

Newport-Inglewood Fault System:

The Newport-Inglewood fault system is located approximately 19 miles southwesterly of the subject site. This fault system extends northwesterly from a point approximately 5 miles offshore of Laguna Beach to the Santa Monica Mountains. The Newport-Inglewood fault system is characterized by a series of en echelon (sub-parallel) faults. These faults exhibit considerable offset at depth with little or no evidence of surface displacement.

San Andreas Fault System:

The San Andreas fault system lies approximately 32 miles northeasterly of the subject site. In California, the San Andreas extends northwesterly from the Mexican border to Point Arena where it continues offshore before turning to the west in the vicinity of Cape Mendocino. The San Andreas is the major structural feature in California and defines a transform boundary between the Pacific and North American tectonic plates. Due to the length and complexity of this fault system, it has been divided into sections on the basis of general trend. The southern portion of the San Andreas, which extends from the Gulf of California to the Transverse Ranges, is closest to the subject site. Displacement along this section, as is characteristic of the entire length, is right lateral.

San Jacinto Fault System:

The San Jacinto Fault system lies approximately 47 miles easterly of the subject site. The San Jacinto is the major sub-member of the San Andreas

fault system and can be traced from a point northerly of the San Gabriel Mountains, where it branches out from the San Andreas, southerly to the Mexican border. The San Jacinto fault parallels the San Andreas fault over the majority of its length and, like the San Andreas, movement is primarily right lateral.

3.3.3 Site Geologic Structure:

The subject site is on the northeasterly limb of the La Habra Syncline. The La Habra Syncline is the dominant structural feature in the area of the Puente Hills in which the site is located. The La Habra Syncline is controlled by the Whittier fault zone with the northern limb exhibiting very steep to overturned bedding.

The subject site is located on this northern limb and bedding onsite generally strikes to the northwest and dips to the southwest at gentle to steep angles. In general, the dip angle of the bedding increases to the north.

Two northerly trending faults have been mapped on the northeast and southeast portions of the project. The fault on the northeast portion of the site separates the upper and lower members of the Fernando Formation. The fault on the southeast portion of the site was mapped by others and is concealed by alluvium in Carbon Canyon channel. No direct evidence for this fault was observed. Aerial photograph review of the site did not reveal any geomorphic lineaments, which would suggest holocene activity on these faults. There are no faults onsite identified within Alquist-Priolo Earthquake Fault Zones nor is there any evidence suggesting the onsite presence of active faults as defined by the State of California.

3.3.4 Groundwater:

Groundwater was encountered during PSE's subsurface investigation in Boring B-3 at 51 feet. This boring was excavated in alluvial soils within the old Carbon Canyon channel area.

3.4 Earthquake Hazards:

The subject site is located in southern California, which is a tectonically active area. The type and magnitude of seismic hazards affecting a site are dependent on the distance to the causative fault and the intensity and magnitude of the seismic event. The seismic hazard may be primary, such as surface rupture and/or ground shaking, or secondary, such as liquefaction and/or ground lurching and earthquake induced landsliding.

The State of California Seismic Hazards Zone Maps identify areas which may be subject to seismically induced landsliding and liquefaction. The Seismic Hazards Zone Map for the Yorba Linda Quadrangle has identified areas onsite which may be subject to seismically induced landslides and liquefaction. Discussed in Sections 3.4.2 and 3.4.5 below are this firm's evaluation of the site's liquefaction and seismically induced landsliding potential.

3.4.1 Seismicity:

Neither active nor potentially active faults are known to exist along or across the property. The probability of primary surface rupture or deformation at the site is, therefore, considered very low. Ground shaking hazards caused by earthquakes along active regional faults, however, do exist.

A mean random horizontal acceleration of 0.55g has been determined for the site, this acceleration hypothetically has a UBC – consistent 10 percent chance of being exceeded in 50 years (the equivalent of a 475

year average return period). Details are presented in Appendix C. A seismic coefficient of 0.15g is generally held to be appropriate for pseudostatic stability analyses in this seismic region.

3.4.2 Liquefaction:

Liquefaction is the phenomenon where the buildup of excess pore pressures, in saturated granular soils due to seismic agitation, results in a temporary "quick" or "liquefied" condition. Based on the limited subsurface investigation, liquefaction potential of the subject site is considered low due to the depth of the groundwater (51 feet) measured onsite. The State of California Seismic Hazards Zone Map for the Yorba Linda Quadrangle (Reference 12) has identified areas on the eastern portion of the project which may have a potential for liquefaction. Additional subsurface investigation will be required in the future to further evaluate liquefaction potential onsite.

3.4.3 Surface Rupture:

Surface rupture is a break in the ground surface during or as a consequence of seismic activity. The potential for surface rupture on this site is low due to the lack of active faults at the site.

3.4.4 Seiches:

A seiche is a free or standing-wave oscillation on the surface of water in an enclosed or semi-enclosed basin. The wave can be initiated by an earthquake and can vary in height from several centimeters to a few meters. The potential for a seiche impacting the property is considered very low.

3.4.5 Seismically Induced Landsliding:

The State of California Seismic Hazards Zone Map for The Yorba Linda quadrangle (Reference 11) has identified natural slopes onsite which may

be subject to seismically induced landsliding. Further subsurface investigation will be required to evaluate natural slopes onsite, however upon accomplishment of site grading in conformance with codes and the current industry standards, seismically induced landsliding should pose no danger to improvements on this project.

3.5 Mineral Deposits

Based on the information presented on Figure 5 and in the cited references (Appendix A), the following discusses The Brea Central Property with regard to its potential as a source for concrete grade aggregate deposits.

3.5.1 Aggregate

A review of CDMG Special Report 143 (Miller, 1981) places the Brea Central Property in Mineral Resource Zone (MRZ) 1 and 3 with respect to concrete-grade aggregate deposits (Figure 5). MRZ-1 is defined as: "Areas where adequate geologic information indicates that no significant construction aggregate deposits are present, or where it is judged that the likelihood exists for their presence". This zone is applied where well developed lines of reasoning, based on economic-geologic principals and adequate data, indicate that the likelihood for occurrence of significant mineral deposits is nil or slight. MRZ-3 is defined as "Areas containing construction aggregate deposits, the significance of which cannot be evaluated from available data". Further exploration work within these areas could result in the reclassification into other categories.

Neither category MRZ-1 not MRZ-3 are considered as an aggregate resource area.

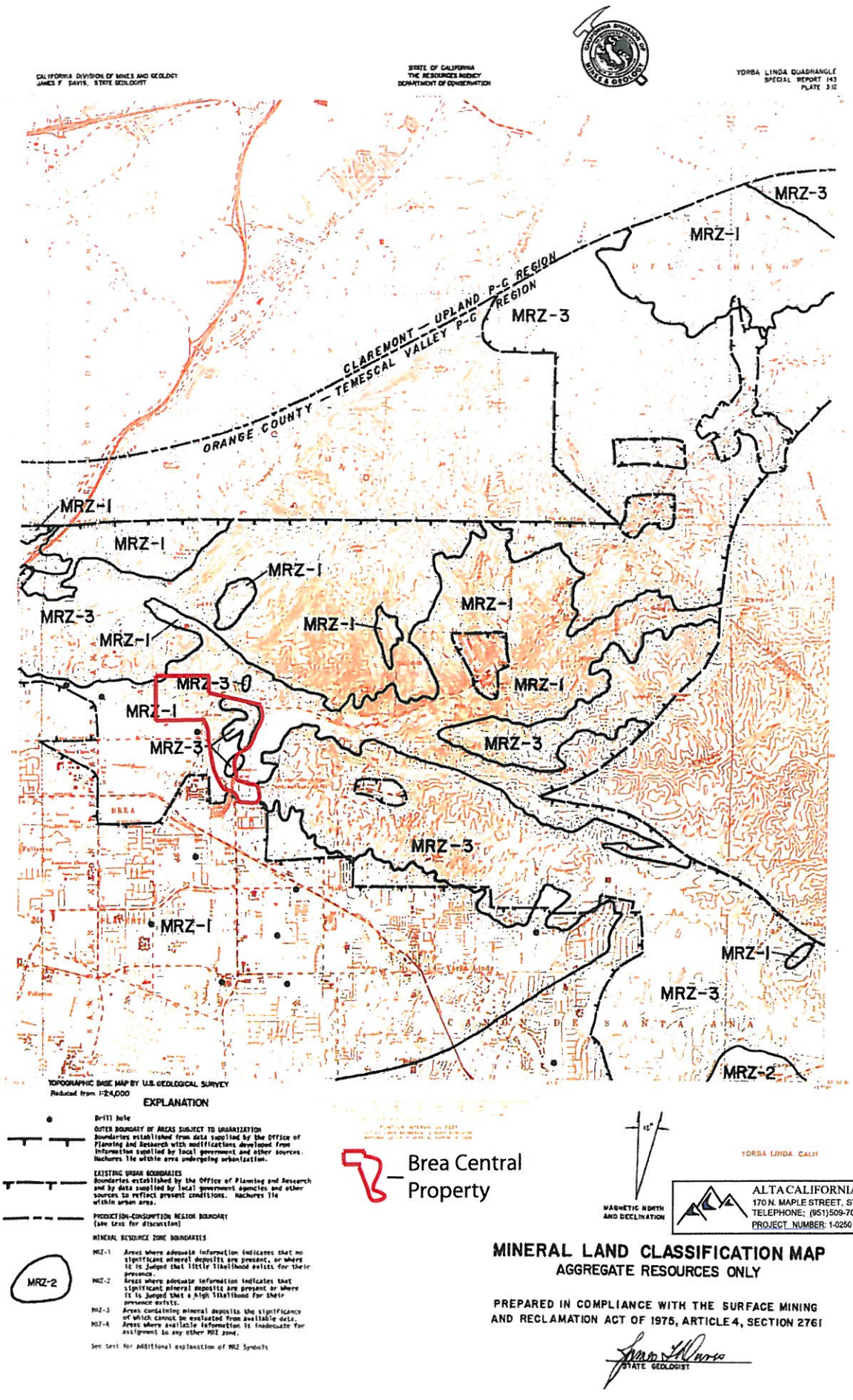

Figure 5

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MINERAL LAND CLASSIFICATION MAP
AGGREGATE RESOURCES ONLY

PREPARED IN COMPLIANCE WITH THE SURFACE MINING AND RECLAMATION ACT OF 1975, ARTICLE 4, SECTION 2761

STATE GEOLOGIST

4.0 GEOTECHNICAL ENVIRONMENTAL IMPACTS

Appendix G of the California Environmental Quality Act (CEQA) guidelines requires an evaluation of environmental conditions and the potential impacts of those conditions. That evaluation must classify the conditions as to whether there is "No Impact" or "Impact". If the condition "impacts" the site, then it needs to be classified as 1) "potentially significant"; 2) "less than significant with mitigation"; or 3) "less than significant".

The threshold for determining geotechnical impacts as outlined in Appendix G of the CEQA guidelines are described as follows:

Would the project:

a) *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*
   - i) *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*
   - ii) *Strong seismic ground shaking?*
   - iii) *Seismic-related ground failure, including liquefaction?*
   - iv) *Landslides?*

b) *Result in substantial soil erosion or the loss of topsoil?*

c) *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*

d) *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?*

e) *Have soils incapable of adequately supporting the use of septic tanks or alternate waste water disposal systems where sewers are not available for the disposal of waste water?*

Presented in the following sections is our evaluation of the potential geotechnical impacts to the site based on the above classifications.

4.1 Fault and Seismic Hazards

4.1.1 Fault Rupture Potential

There are no State-imposed Alquist-Priolo Fault-Rupture Hazard Zones mapped onsite. Two northerly trending faults have been mapped on the northeast and southeast portions of the project. The fault on the northeast portion of the site separates the upper and lower members of the Fernando Formation. The fault on the southeast portion of the site was mapped by others and is concealed by alluvium in Carbon Canyon channel. No direct evidence for this fault was observed. Aerial photograph review of the site did not reveal any geomorphic lineaments, which would suggest holocene activity on these faults. Thus, the likelihood of surface fault rupture along this fault is considered remote.

Level of Impact

The level of impact due to Fault Rupture Potential is considered to be less than significant with mitigation.

Mitigation Measures

The likelihood of active faulting onsite is considered remote at this time. If, through further investigation, the faults identified onsite are determined to be active, the typical mitigation would involve establishing a fault setback zone. A habitable structure setback measuring 50 feet from each side of the fault trace (i.e. a 100-foot wide zone) will be established. This mitigation measure is consistent with the intent of the California Alquist-Priolo Earthquake Fault Zoning Act and local building codes. It is possible that faults could be discovered during site grading. Such faults will require investigation and assessment of activity levels and, if necessary, mitigation in the form of setbacks, structural design, and/or combinations of those alternatives.

4.1.2 Seismic Ground Shaking

Southern California, in general, is a seismically active region and the proposed improvements are likely to be subjected to significant ground motion during the design life of the project. The site has been identified as "D" site class in accordance with Table 20.3-1 of ASCE 7-10. Utilizing this information, the computer program USGS Seismic Design Maps Version 3.1.0 and ASCE 7-10 criterion, the spectral response accelerations that can be utilized for the project were calculated. An average PGA of 0.80g was computed for earthquake ground motions having 2% probability of exceedance in 50 years. Such is consistent with typical residential and commercial developments. More stringent standards are typically composed on institutional structures such as schools, hospitals, and fire facilities as well as bridges. Each such facility will require specific assessment when sitings are available.

Level of Impact

The level of impact due to seismic shaking is considered to be less than significant with mitigation.

Mitigation Measures

Seismic shaking can be mitigated through the design of the structures in compliance with prevailing seismic codes outlined in California Building Code (CBC). Remedial grading to further mitigate seismic hazards may also be required. Because estimates of potential ground shaking motion could vary across a large site, site specific refinement of ground motion estimates will be required as specific plans as available. Remedial grading could include:

- *The removal and replacement, with engineered fill, of loose and/or compressible soils; and*

- *The removal and recompaction of the cut and shallow fill portions of building lots that exhibit unfavorable geologic conditions. These lots will be identified as a part of future geotechnical grading plan reviews and during construction of the improvements based on exposed geologic conditions in the field.*

4.1.3 Liquefaction and Dynamic Settlement

Liquefaction is the phenomenon where the buildup of excess pore pressures, in saturated granular soils due to seismic agitation, results in a temporary "quick" or "liquefied" condition. Based on the limited subsurface investigation, liquefaction potential of the subject site is considered low due to the depth of the groundwater (51 feet) measured onsite. The State of California Seismic Hazards Zone Map for the Yorba Linda Quadrangle (State of California, 1980) has identified areas on the eastern portion of the project which may have a potential for liquefaction. Additional subsurface investigation will be required in the future to further evaluate liquefaction potential onsite.

Level of Impact

The level of impact due to liquefaction and dynamic settlement is considered to be less than significant with mitigation.

Mitigation Measures

Mitigation measures for liquefaction/dynamic settlement potential include removal and replacement with compacted, drained fills; ground modification; and/or designing for potential settlement of liquefiable materials. While this issue is of economic significance, it is not a technical constraint to development. Adherence to State policy regarding liquefaction analyses will be required during the design and construction process, but upon implementation, can suitably mitigate this hazard.

4.1.4 Earthquake Induced Landsliding

The State of California Seismic Hazards Zone Map for The Yorba Linda quadrangle (State of California, 1980) has identified natural slopes onsite which may be subject to seismically induced landsliding. Further subsurface investigation will be required to evaluate natural slopes onsite, however upon accomplishment of site grading in conformance with codes and the current industry standards, seismically induced landsliding should pose no danger to improvements on this project.

Level of Impact

The level of impact due to earthquake induced landsliding is considered to be less than significant with mitigation.

Mitigation Measures

Areas susceptible to earthquake-induced landsliding can be mitigated utilizing common earthwork remedial grading techniques such as construction of drained shear keys, replacement with manufactured buttress fills, slope laybacks, or structural setbacks.

4.1.5 Seiches and Tsunamis

Seiches are periodic oscillations within a large enclosed body of water. Any enclosed body of water such as an artificial lake, reservoir, or tank could be susceptible to seiche oscillations. A tsunami is a large oceanic wave generated from an earthquake or undersea landsliding.

Level of Impact

The elevation and distance inland of the development precludes inundation resulting from tsunamis, and therefore, has no impact on the project. The potential for a seiche impacting the property is considered very low.

Mitigation Measures

Mitigation is not anticipated to be necessary.

4.2 Rock Excavation Characteristics

The eastern portion of the site is underlain by the Puente Formation, which may require moderate to heavy ripping to excavate. Blasting is unlikely, but locally possible. All other geologic units mapped onsite should be readily excavatable with conventional earth moving equipment and will not require blasting during the course of rough grading.

Level of Impact

While unlikely, it is possible that blasting may be required for efficient excavation in the Puente Formation. The level of impact due to the blasting of hard rock is considered to be less than significant with mitigation.

Mitigation Measures

The impacts of the use of explosives include noise, vibration, and flying debris. Those impacts can be mitigated through the use experienced blasting contractors who would submit a blasting plan to the City of Brea for approval. Additionally, numerous small charges are typically used in the blasting process and overburden is typically left-in-place to improve the effects of the detonation. This process, combined with the remote location of areas that would require blasting, can significantly reduce the impacts of noise, vibration, and flying debris.

4.3 Soil Erosion/Mass Wasting

Soil erosion or mass wasting is the process in which earthen materials are transported down slope by gravity. Large scale mass wasting is not present onsite and is not anticipated to be a hazard to the project.

Level of Impact

Due to the relatively flat nature of the site in the western and southeastern portions of the site, and the proposed site improvements and grading in the northeastern portion of the site, soil erosion or mass wasting is deemed be less than significant with mitigation. Due to the lack of soil development on the property, the loss of topsoil is considered to be less than significant.

Mitigation Measures

Control of surface drainage and diversion of flows to non-erodible devices are the principle mitigation measures typically employed and can be accomplished with compliance with design standards outlined in the CBC. Mitigation of slope surface erosion of highly granular soils can be accomplished by establishing appropriate surface drainage patterns, judicious landscaping, and, when necessary, use of surface erosion control products such as "jute mesh" or "straw waddles" in compliance with erosion control standards outlined in the California Water Code.

4.4 Slope Stability

Cut, fill and natural slope stability can be affected by several factors including geologic structure, strength of materials, and height, inclination, and orientation of design slopes. Recognition of the inter-relationships of the various combinations of slope configuration, geologic structure, and material strength characteristics can reduce costs associated with remedial grading requirements and/or design restrictions.

4.4.1 Cut Slopes

Typically, cut slopes exposing fractured or faulted bedrock, alluvium, or colluvium are surficially and/or grossly unstable and will require remediation in the form of replacement (stabilization) fills. Cut slopes that are oriented in the same direction and are steeper than the exposed

bedding planes typically require replacement with engineered buttress fills or construction at flatter (layback) angles. Conversely, cut slopes oriented contrary to the bedding direction and made in competent, unfaulted, bedrock can be stable to considerable heights. Recognition of the presence of the various geologic units and structural features including faults, synclines, anticlines and regional bedding trends can be an effective planning tool.

The bedrock onsite strikes northwesterly and dips at low to moderate angles to the southwest. In general, southerly, southwesterly, and westerly facing cut slopes may require replacement with a buttress/stabilization fill section. The cut slopes exposing an out of slope (daylighted) bedding condition will require replacement with a designed buttress slope which will be supported on a keyway with a width of approximately 1.25 time the height of slope. Cut slopes exposing faulted, fractured bedrock conditions will likely require replacement with a stabilization fill section supported on a keyway with a width of approximately ½ times the height.

Level of Impact

The level of impact due to cut slope instability is considered to be less than significant with mitigation.

Mitigation Measures

Stability of proposed cut slopes will be of minor to moderate economic importance to the proposed development. Mitigation of unstable slopes may be required and will likely include overexcavation and replacement with either drained stabilization fill or buttress fills. Stabilization fills should be utilized when cut slopes expose loose or highly erosive soils or faulted and fractured bedrock. In the case where bedding dips in the

same direction and at shallower angles than the cut slope face, particularly where lower strength beds exist, engineering analysis will be required to adequately size keyways for buttress fills. Where grading limits are not constrained, cut slope instability can be mitigated by constructing slopes at flatter angles than the underlying geologic structure. All cut slopes will require evaluation during the design process as well as during construction.

4.4.2 Fill Slopes

Based on the engineering characteristics defined by previous laboratory testing, the onsite earth materials are generally considered suitable for use as compacted fill and, when properly constructed and maintained, can be expected to perform satisfactorily in code compliant embankments and fill slopes (typically 2:1 or flatter).

Level of Impact

The level of impact due to the design and construction of fill slopes is considered to be less than significant with mitigation.

Mitigation Measures

Fill slopes should be designed at a 2:1 (horizontal to vertical) or flatter ratios. Locally steeper fill slopes can be considered but should be constructed with geosynthetics to enhance the shear strength of fill materials. Higher compaction standards (typically 93 percent) of the laboratory maximum density) should be implemented in deeper fills (>50 feet) to enhance engineering characteristics and reduce the amount of potential settlement. Subsurface drainage devices should be installed below fills to intercept and direct water that may seep from the bedrock or be introduced from the surface.

4.4.3 Natural Slope Stability

The northeastern side of the site can be characterized as moderate to locally steep hillside terrain with eroded canyons. Natural slopes in these canyon areas vary in slope ratio from approximately 1:1 to 5:1 (horizontal to vertical). From a grading design standpoint, natural slopes pose similar geotechnical constraints as design cut slopes. Therefore, the stability of natural slopes is primarily a function of the underlying bedrock structure and the slope steepness. Natural slopes, which expose daylighted bedding, or are inclined at the approximate angle of bedding, may not satisfy normal factors of safety and may be considered grossly unstable. Daylighted natural slopes which either ascend or descend from proposed development will probably require remediation in the form of buttress fills or shear keys.

A steep natural slope exists on the northeasterly portion of the site. The bedrock in this region generally dips in a favorable direction, however due to the steep nature of the slope, some form of structural setback will likely be required to protect structures from surficial slope stability issues. The structure setback will likely be in the form of a California Building Code (CBC) consistent, height of slope divided by three (H/3), not to exceed 40 feet. Future grading concepts should be developed such that natural slopes oriented in unfavorable directions are minimized.

Level of Impact

The level of impact due to natural slope stability is considered less than significant with mitigation.

Mitigation Measures

Where adverse bedding, faulted, or fractured bedrock, highly erosive soils, or other similar conditions exist on natural slopes in proximity to planned development, mitigation of the potential hazard will be required. Mitigation techniques may include structural setbacks, removal and replacement, or fill buttressing. Support of adverse bedding can be achieved by construction of drained buttress fills or elimination of adverse bedding by slope layback.

4.5 Compressible/Collapsible Soils

Based upon the data obtained from the previous subsurface investigation and laboratory testing, weathered older alluvium and terrace deposits, highly weathered bedrock, colluvium, alluvium, undocumented artificial fill, and the landslide debris are likely to be compressible.

The colluvium, alluvium, as well as portions of the older alluvium and terrace deposits are subject to hydro-collapse based on the laboratory test results presented in Appendix C. Hydro-collapse is the process in which loose dry soils undergo rapid consolidation (collapse) when wetted. Unmitigated, the presence of compressible and collapsible soils below fills and where exposed in cuts can produce significant settlements that can be manifested differentially on engineered structures.

Level of Impact

The level of impact due to collapsible soils is considered to be less than significant with mitigation.

Mitigation Measures

Typically, compressible and collapsible soils can be mitigated using a combination of overexcavation of the susceptible soils and recompaction as engineered fills. These techniques may be used in conjunction with enhanced foundation design.

Based upon Alta's review of the laboratory test data, the colluvium, portions of the alluvium, portions of the older alluvium and terrace deposits, and weathered bedrock will require removal and recompaction prior to fill placement and where exposed in cuts. The use of post-tension or mat slab foundations will likely be required for structures founded over alluvium. All undocumented fills will also require removal and recompaction.

4.6 Expansive Soils

The expansion potential of the vast majority of soils that will be encountered onsite during grading will likely range from "very low" to "high". Expansive soils can increase in volume upon the introduction of water and decrease in volume (shrink) upon drying. These volume changes can produce stresses on engineered structures than can result in cosmetic distress and even structural damage.

Level of Impact

The level of impact due to expansive soils is considered to be less than significant with mitigation.

Mitigation Measures

The presence of expansive soils is commonly and effectively mitigated by various techniques including: 1) proper design of foundations, slabs, streets, and other improvements subject to the influence of the soils; 2) overexcavation of the expansive soils/bedrock and replacement with less expansive fill soils; 3) utilizing selective grading techniques to place more highly expansive soils well below foundation elements; 4) employment of presaturation techniques to lessen expansion potential; 5) control of surface and subsurface drainages to prevent moisture variations; and 6) combinations of these various techniques.

4.7 Percolation Characteristics of Site Soils

Current development plans for the site call for a sanitary sewage system to handle waste. At this time no septic systems are planned for the site.

Level of Impact

Currently septic systems are not planned for this site, therefore the percolation characteristics of the site soils are deemed to have "No Impact" on the site development.

4.8 Corrosion

The presence of soluble sulfates in soils can be detrimental to concrete. Low resistivity and high chloride soils can have a detrimental effect on metals.

Level of Impact

The level of impact due to corrosive soils is considered to be less than significant with mitigation.

Mitigations Measures

Concrete mix designs shall be in compliance with the recommendations presented in ACI 318-14 for sulfate concentrations. During future design studies, consultation with a Corrosion Engineer can be considered in order to mitigate the potential corrosive effects on metal portions of structures and should be accomplished in compliance with CBC. Final mitigations should be based on testing of as-graded soil conditions.

5.0 FUTURE GEOTECHNICAL ANALYSIS

Prior to approval of each grading plan, a geotechnical report shall be prepared by a licensed Engineering Geologist and Geotechnical Engineer and submitted to the City for review and approval. This report shall be prepared in accordance with city standards and shall evaluate the proposed development in relation to site soils and geologic conditions. Recommendations shall be provided to specifically identify and mitigate any hazards related to faulting and seismicity, collapsible soils, expansive soils, settlement from grading operations, corrosion, and slope stability.

APPENDIX A

Cited References

APPENDIX A

Cited References

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APPENDIX B

Subsurface Investigation

(PSE, 1999)

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/4/99	GROUND ELEV.	500	BORING DESIG.	B-1
DATE FINISHED	3/4/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	500					CL	TERRACE DEPOSITS (Qt): SILTY CLAY, dark reddish-brown, slightly moist, firm				
5	495					SC	SILTY CLAYEY SAND, dark brown, slightly moist, medium dense, roots, pin sized voids				
10	490	R		10				6.9	117	42	
		B				SC					MAX DSR HY EI
						ML	SANDY SILT, reddish brown, slightly moist, stiff, few cobbles				
15	485						SANDY SILT, reddish to light brown, slightly moist, firm, pin sized voids				
20	480	R		7 for 6"		SM	CLAYEY SILTY SAND, light reddish brown, slightly moist, medium dense, pin sized voids	8.4	115	49	CON HY
25	475	B					CLAYEY SILTY SAND, light orangish tan, slightly moist, medium dense, pin sized voids, caliche stringers				
30	470	R		13		SM		6.8	113	37	CON HY
						ML	SANDY SILT, yellow to tan, slightly moist, stiff, caliche stringers, pin sized voids				
35	465										
	460										

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER
SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-1

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/4/99	GROUND ELEV.	500	BORING DESIG.	B-1
DATE FINISHED	3/4/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	460	R		12		ML	SANDY SILT, yellow to tan, slightly moist, stiff, caliche, fine to coarse grained quartz, rare cobble to pebble sized clasts of igneous/metamorphic rocks	8.0	118	51	
		B									
45	455						SANDY SILT, yellow to tan, slightly moist, stiff, pin sized voids				
50	450	R		15			SANDY SILT, yellow to tan, slightly moist, stiff, pin sized voids, caliche	6.2	113	34	
							TOTAL DEPTH = 51 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER
SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-1

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/5/99	GROUND ELEV.	395	BORING DESIG.	B-2
DATE FINISHED	3/5/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT. URATION (%)	OTHER TESTS
	395					SM	ALLUVIUM (Qal): SILTY SAND, light brown, moist, soft, tar				
5	390					CL	SILTY CLAY, brown to dark brown, wet, soft, roots, organic odor				
10	385	R		PUSH		ML	SANDY SILT, brown to dark brown, wet, soft	17.1	103	72	
15	380						SANDY SILT, light brown, moist, firm				
						ML	CLAYEY SILT, dark brown, moist, soft, caliche				
20	375	R		PUSH		ML		16.6	108	81	CON HY
		B									
25	370						CLAYEY SILT, brown, moist, firm, caliche stringers, pin sized voids				
30	365	R		2		ML	SANDY SILT, brown, moist, firm, caliche, rare pebble to gravel sized clasts of igneous and metamorphic rock	12.5	113	68	
		B									
35	360					SM	SILTY fine to coarse SAND, light brown, moist, medium dense, caliche				
	355										

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/5/99	GROUND ELEV.	395	BORING DESIG.	B-2
DATE FINISHED	3/5/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	355	R		3		SM		11.1	96	40	CON HY
		B					SILTY SAND, light brown, moist, medium dense, fine grained quartz and feldspar				
45	350										
50	345	R		4			SILTY SAND, yellow to brown, moist, medium dense, fine to medium grained quartz and feldspar, rare pebble to cobble sized clasts of igneous and metamorphic rock, clasts are well rounded	23.5	99	89	
55	340						few SILTSTONE clasts, yellow brown				
							SILTY SAND, fine grained, yellow to brown, moist, medium dense, rare pebble to cobble sized clasts of sedimentary, igneous and metamorphic rocks, clasts are well rounded				
60	335	R		12				11.7	111	62	
		B					increase in gravel				
65	330						approximately 1 foot diameter boulder, well rounded				
							SILTY SAND, fine to coarse grained, yellow brown, moist, dense, pebble to cobble sized clasts of igneous, metamorphic and sedimentary rocks, clasts are well rounded, quartz and feldspar				
70	325										
		B									
75	320					SP	pebbly fine to coarse SAND, light brown, moist, dense, pebble to cobble sized clasts of igneous, metamorphic and sedimentary (SILTSTONES) rocks, clasts are well rounded				
	315										

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/5/99	GROUND ELEV.	395	BORING DESIG.	B-2
DATE FINISHED	3/5/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	315					SP	pebbly fine to coarse SAND, light brown, moist, dense, pebble to cobble sized clasts of igneous, metamorphic and sedimentary (SILTSTONES) rocks, clasts are well rounded				
							TOTAL DEPTH = 83 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/5/99	GROUND ELEV.	405	BORING DESIG.	B-3
DATE FINISHED	3/5/99	GW DEPTH (FT)	51.00	LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	405					ML	ALLUVIUM (Qal): SANDY SILT, light tan, dry, soft, roots				
5	400						SANDY SILT, light tan, dry, soft, caliche				
10	395	R		1			SANDY SILT, light tan, dry to slightly moist, soft to firm, caliche, roots	5.0	93	17	
15	390					CL	SILTY CLAY, brown, moist, soft to firm				
20	385	R		2		SM	SILTY SAND, light brown, moist, medium dense, pebble to cobble sized clasts of igneous and metamorphic rock, fine to coarse grained quartz and feldspar	7.5	96	27	
		B									
25	380						SILTY SAND, moist, medium dense, pebble to cobble sized clasts of SILTSTONE, igneous and metamorphic rock, clasts are well rounded, fine to coarse grained quartz and feldspar				
30	375	R		4				8.8	95	31	
		B									
35	370						SILTY SAND, moist, stiff, rare pebble to cobble sized clasts of igneous, metamorphic rocks, fine to coarse grained quartz and feldspar				
							SANDY SILT, light brown, moist, firm				
	365					ML					

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-3

GEOTECHNICAL BORING LOG

PROJECT NO	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/5/99	GROUND ELEV.	405	BORING DESIG.	B-3
DATE FINISHED	3/5/99	GW DEPTH (FT)	51.00	LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	365	R		3		ML	SANDY SILT, light brown, moist, firm	10.4	98	39	
						CL	SILTY CLAY, brown, moist, firm				
45	360										
50	355	R		1			CLAYEY SILT, brown, wet, firm	27.4	92	90	
						SM	SILTY SAND, saturated, medium dense, fine to coarse grained quartz and feldspar, some pebble sized clasts				
55	350	R		5				17.1	108	83	
		B									
							TOTAL DEPTH = 59 feet WATER AT 51 feet CAVING AT 54 feet Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-3

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	485	BORING DESIG.	B-4
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	485					ML	ALLUVIUM (Qal): SANDY SILT, brown, moist, firm				
5	480										
						ML	CLAYEY SILT, light brown to dark brown, moist, firm, caliche				
10	475	R		1			changes to reddish color	14.6	114	82	
						ML	TERRACE DEPOSITS (Qt): CLAYEY SILT, reddish brown, moist, stiff, caliche, thin beds of SILTY SAND, light brown				
15	470	B									
20	465	R		2			CLAYEY SILT, reddish brown, moist, stiff, caliche	17.3	105	77	
		B									
25	460	R		3				26.1	92	84	
							TOTAL DEPTH = 26 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-4

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	480	BORING DESIG.	B-5
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	480					CL	ARTIFICIAL FILL (Qaf): SILTY CLAY, dark brown, moist, firm, concrete, lumber, pvc pipe				
						ML	ALLUVIUM (Qal): CLAYEY SILT, dark brown, moist, firm, caliche, roots				
5	475					ML	SANDY SILT, light brown, moist, firm, trace amounts of pebbles, caliche, pin sized voids				
		B				ML					MAX DSR HY EI
10	470	R		1		SM	SILTY SAND, light brown, moist, medium dense, pebble sized clasts of igneous and metamorphic rocks	6.8	100	27	
15	465	B					SILTY SAND, light brown, moist, medium dense				
						ML	SANDY SILT, dark brown, moist, firm				
20	460	R		1		ML		13.4	108	64	CON HY
						ML	CLAYEY SILT, dark brown, moist, firm				
25	455					SM	SILTY SAND, light brown, moist, medium dense, fine grained quartz, trace amount of pebble sized igneous and metamorphic rocks trace amount of organic debris				
30	450	R		2		ML	SANDY SILT, brown, moist to wet, firm, caliche, organic debris	16.0	96	58	CON HY
		B									
35	445						SANDY SILT, brown, moist to wet, firm, organic debris				
	440										

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-5

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	480	BORING DESIG.	B-5
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	440	R		1		ML	SANDY SILT, brown, moist to wet, firm	22.9	99	88	
45	435										
						ML	**TERRACE DEPOSITS (Qt):** CLAYEY SANDY SILT, dark brown, to reddish brown, moist, firm, caliche, some pebble sized clasts	13.5	109	66	
50	430	R B		4							
							TOTAL DEPTH = 51 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

GROUNDWATER
SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-5

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	465	BORING DESIG.	B-6
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	465					ML	ARTIFICIAL FILL (Qaf): CLAYEY SILT, light to dark brown, moist, firm, trace sand and pebbles				
5	460					ML	ALLUVIUM (Qal): CLAYEY SILT with trace SAND and pebbles, light to dark brown, moist, firm, caliche				
		B				ML	TERRACE DEPOSITS(Qt): CLAYEY SILT with trace SAND, dark brown to reddish brown, moist to wet, firm, caliche, roots				
10	455	R		2				26.3	94	90	
15	450						CLAYEY SILT with trace SAND, light brown to reddish brown, moist to wet, stiff, caliche				
20	445	R		3		ML	CLAYEY SANDY SILT, dark brown to reddish brown, moist, stiff, caliche	16.7	109	83	
		R		3				14.2	105	64	
25	440	B									
							TOTAL DEPTH = 26 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-6

GEOTECHNICAL BORING LOG

PROJECT NO. 500503
DATE STARTED 3/8/99
DATE FINISHED 3/8/99
DRILLER LEDEZMA
TYPE OF DRILL RIG 30" BUCKET

PROJECT NAME BREA CENTRAL
GROUND ELEV. 485
GW DEPTH (FT)
DRIVE WT. VARIES
DROP 12 in.

BORING DESIG. B-7
LOGGED BY SEC
NOTE

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	485					ML	ARTIFICIAL FILL (Qaf): SANDY SILT, brown, moist, firm, trash, debris				
5	480					ML	ALLUVIUM(Qal): CLAYEY SILT, dark brown, moist, firm, organic debris SANDY CLAYEY SILT, dark brown to reddish brown, moist, firm, trace amounts of pebbles				
		B									
						ML	TERRACE DEPOSITS (Qt): SANDY SILT, reddish brown to dark brown, moist, firm, trace amounts of pebbles				
10	475	R		2				14.1	116	85	
15	470										
		B									
20	465	R		4 for 10"		SM	SILTY SAND, reddish brown, moist, medium dense, trace amounts of pebbles	8.5	111	44	CON HY
		B									
25	460						TOTAL DEPTH = 25 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

GROUNDWATER
SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-7

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	515	BORING DESIG.	B-8
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	515					SM	ARTIFICIAL FILL (Qaf): SILTY SAND, tan, moist, medium dense				
						ML	CLAYEY SILT, brown, moist, firm, poorly layered, trash, pvc				
5	510					ML	ALLUVIUM (Qal): CLAYEY SILT, dark brown to black, moist, soft, trace SAND and pebbles				
10	505	R		PUSH				21.9	100	86	
		B				CL	SILTY CLAY, dark brown to black, moist, firm, trace amounts of SAND and pebbles, caliche, pin sized voids				
15	500						color becomes more red				
20	495	R		2		SM	TERRACE DEPOSITS(Qt): SILTY SAND, dark brown with reddish tint, moist, medium dense, trace of CLAY and pebbles, caliche	12.1	111	64	CON HY
		B									
25	490					ML	SANDY SILT, reddish brown, moist, firm, caliche nodules and stringers, some pebble sized clasts of igneous and metamorphic rocks				
30	485	R		4		ML	SANDY SILT, light brown with reddish tint, moist, stiff, caliche nodules and stringers, some pebble sized clasts of igneous and metamorphic rocks	14.2	106	65	CON HY
35	480						SANDY SILT, orangish brown to light brown, moist, firm, some trace amounts pebble sized clasts of igneous and metamorphic rocks				
	475										

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-8

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	515	BORING DESIG.	B-8
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	475	R		4		ML	SANDY SILT, orangish brown to light brown, moist, firm, some trace amounts pebble sized clasts of igneous and metamorphic rocks	11.4	113	63	
		B					TOTAL DEPTH = 42 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER
SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-8

GEOTECHNICAL BORING LOG

PROJECT NO.	500503	PROJECT NAME	BREA CENTRAL		
DATE STARTED	3/8/99	GROUND ELEV.	500	BORING DESIG.	B-9
DATE FINISHED	3/8/99	GW DEPTH (FT)		LOGGED BY	SEC
DRILLER	LEDEZMA	DRIVE WT.	VARIES	NOTE	
TYPE OF DRILL RIG	30" BUCKET	DROP	12 in.		

DEPTH (Feet)	ELEV	SAMPLE TYPE	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	500					ML	ALLUVIUM (Qal): SANDY SILT, brown, moist, soft to firm				
5	495					ML	CLAYEY SILT, dark brown, moist, soft				
						ML	SANDY SILT, light brown, moist, soft, trace amount of pebbles				
10	490	R		1		ML	CLAYEY SILT, light brown to dark brown, moist, soft, caliche, roots, pin sized voids	13.0	104	56	
		B									
15	485						color becomes more red				
						SM	TERRACE DEPOSITS (Qt)?: SILTY SAND, light brown to reddish brown, moist, loose, caliche stringers, pin sized voids, fine grained quartz and feldspar				
20	480	R		1		SM		13.9	107	65	CON HY
		B				ML	CLAYEY SANDY SILT, light brown to reddish brown, moist, firm, caliche, some trace pebbles				
25	475						CLAYEY SANDY SILT, light brown to orangish brown, moist, firm, caliche				
30	470	R		2				12.2	97	45	
							TOTAL DEPTH = 31 feet NO WATER NO CAVING Kelly Bar Wts.: 0 - 24' 3548# 24 - 47' 2577# 47 - 73' 1648# 73 - 95' 810#				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER

SEEPAGE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-9

TABLE A-1

LOG OF TEST PITS

T-1	Depth	Description
	0-3 ½ '	COLLUVIUM (Qcol): SANDY CLAY, dark reddish brown, slightly moist, firm to stiff, rootlets.
	3 ½-7''	FERNANDO FORMATION-Upper Member (Tfu): SANDSTONE, medium to coarse grained, moist, hard, massive common pebbles, upper 3' weathered, caliche.
		Total Depth 7'

T-2	Depth	Description
	0-2'	COLLUVIUM (Qcol): SANDY CLAY, brown, moist, firm, roots and rootlets, pin voids, caliche.
	2-5'	TERRACE DEPOSITS (Qt): SANDY to CLAYEY SILT, reddish brown, slightly moist to moist, firm to stiff, blocky, minor caliche and black organic staining on ped faces upper 2'.
		Total Depth 5'

T-3	Depth	Description
	0-3'	FERNANDO FORMATION-Upper Member (Tfu): SANDSTONE, coarse grained, reddish to yellow brown, moist, hard, friable, massive, rounded pebble clasts, cobbles.
		Total Depth 3'

T-4	Depth	Description
	0-4'	COLLUVIUM (Qcol): CLAYEY SILT/SILTY CLAY, brown, slightly moist, soft, roots, voids.
	4-12'	OLDER ALLUVIUM (Qoa): SILTY CLAY, with sand, dark red brown, slightly moist to moist, firm to stiff, pin voids, some hair roots, clay film on ped faces, occasional pebbles.
		@ 10' becomes stiff, decrease in size and volume of pin voids, some still present.
		Total Depth 12'

TABLE A-1

LOG OF TEST PITS

T-5	Depth	Description
	0-1'	ARTIFICIAL FILL (Qaf): SANDY SILT, brown, slightly moist, soft, oily, tar.
	1-6'	TERRACE DEPOSITS (Qt): SILT, dark red brown, slightly moist to moist, firm to stiff, some pin voids, clay film on ped faces, some sand, upper 3' weathered.
		Total Depth 6'

T-6	Depth	Description
	0-2'	COLLUVIUM (Qcol): SANDY CLAY, dark brown, moist, soft to firm, voids.
	2-11'	OLDER ALLUVIUM (Qoa): SANDY SILT/CLAY, yellow to red brown, moist, firm to stiff, pin voids, some caliche, pebbles.
		Total Depth 11'

T-7	Depth	Description
	0-4'	COLLUVIUM (Qcol): SANDY CLAY, brown, moist, soft, roots and voids, some pebbles.
		@2' SANDY SILT, brown, moist, firm, pin voids.
	4-7'	OLDER ALLUMIUM (Qoa): SANDY SILT, dark red brown, moist, firm to stiff, pin voids, pebbles.
	7-10'	FERNANDO FORMATION –Upper Member (Tfu): SILTSTONE, tan, moist, moderately hard to hard, upper 2' weathered, iron oxide stained.
		Total Depth 10'

T-8	Depth	Description
	0-1 ½'	COLLUVIUM (Qcol): SILTY SAND, brown, dry, loose, roots.
	1 ½-3'	FERNANDO FORMATION-Upper Member (Tfu): PEBBLE CONGLOMERATE, yellow to red brown, slightly moist, very hard, massive, moderately well cemented, rounded clasts, medium grained silty matrix.
		Total Depth 3'

TABLE A-1

LOG OF TEST PITS

T-9	Depth	Description
	0-5'	COLLUMIUM (Qcol): SANDY SILT, brown, slightly moist to moist, soft, roots.
	5-8'	FERNANDO FORMATION-Upper Member (Tfu): SANDSTONE, fine to medium grained, light reddish yellow, slightly moist, hard to very hard, moderately well cemented, platy, upper 2' weathered.
		Total Depth 8'

T-10	Depth	Description
	0-4'	COLLUMIUM (Qcol): SANDY CLAY, reddish brown, moist, firm, pebbles, 2-3' cut by roadway, some roots.
	4-6'	FERNANDO FORMATION-Upper Member (Tfu): SANDSTONE, fine grained, yellow, slightly moist, hard to very hard, massive, upper 1-1 ½' weathered.
		Total Depth 6'

T-11	Depth	Description
	0-6'	COLLUVIUM (Qcol): SANDY CLAY, brown, moist, soft to firm, roots, voids, some cobbles, becomes reddish brown @ 3', common cobbles and pebbles 3-6'.
	6-8'	FERNANDO FORMATION-Lower Member (Tfl): SILTSTONE, yellow, moist, hard, upper 1' weathered.

T-12	Depth	Description
	0-7'	COLLUVIUM (Qcol): SANDY CLAY, brown, slightly moist, roots, voids, some pebbles, becomes reddish brown @ 5'.
	7-8 ½'	FERNANDO FORMATION-Upper Member (Tfu): PEBBLE to COBBLE CONGLOMERATE, brown, slightly moist, hard, massive, rounded clasts, silty coarse sand matrix, weathered.
		Total Depth 8 ½'

TABLE A-1

LOG OF TEST PITS

T-13	Depth	Description
	0-7'	COLLUVIUM (Qcol): SILTY CLAY, brown, moist, soft to firm, voids, roots, some sand.
	7-8 ½'	FERNANDO FORMATION-Lower Member (Tfl): SILTSTONE, yellow, moist, hard, upper 1' weathered.
		Total Depth 8 ½'

T-14	Depth	Description
	1-7'	ALLUVIUM (Qal): SILTY SAND, tan brown, moist, loose, some pebbles.
	7-11'	CLAYEY SILT, brown, moist, soft.
	11-13'	SILTY SAND, light brown, moist, loose.
		Total Depth 13'

T-15	Depth	Description
	0-4'	COLLUVIUM (Qcol): SILTY CLAY with sand, brown, slightly moist to moist, soft to firm, voids, hair roots.
	4-7'	OLDER ALLUVIUM (Qoa): SILTY to SANDY CLAY, reddish brown, slightly moist, firm to stiff, pin voids.
	7-9'+	CLAYEY SAND, yellowish brown, moist, dense.
		Total Depth 9'

T-16	Depth	Description
	0-3'	COLLUVIUM (Qcol): SANDY CLAY, brown, slightly moist, soft, pin voids, rootlets.
	3-10'	OLDER ALLUVIUM (Qoa): SANDY CLAY, reddish brown, moist, firm to stiff, pin voids, clay film on ped faces.
		@ 7' decrease in voids.
		Total Depth 10'

TABLE A-1

LOG OF TEST PITS

T-17	Depth	Description
	0-4'	COLLUVIUM (Qcol): SANDY CLAY, brown, firm, voids.
	4-10 ½'+	OLDER ALLUVIUM (Qoa): SILTY SAND, yellow brown, moist, medium dense.
		Total Depth 10 ½' (5-6' removals)

T-18	Depth	Description
	0-9'	ALLUVIUM (Qal): SILTY SAND, yellow, moist, loose to medium dense, minor caliche stringers.
		Total Depth 9'

T-19	Depth	Description
	0-1'	ARTIFICIAL FILL (Qaf): SILTY to CLAYEY SAND, brown, slightly moist, loose, oil, rootlets.
	1-5'	COLLUVIUM (Qcol): SILTY CLAY, dark brown, slightly moist to moist, firm, common voids.
	5-10'	TERRACE DEPOSITS (Qt): SILTY CLAY, moist, firm to stiff, black organic stained, slightly petroliferous odor.

T-20	Depth	Description
	0-6'	COLLUVIUM (Qcol): SANDY SILT, brown, moist, firm, roots.
	6-11'+	TERRACE DEPOSITS (Qt): SILT with some sand, yellowish tan, moist, firm, weathered with abundant caliche and voids top 3'.
		Total Depth 11'

T-21	Depth	Description
	0-3'	COLLUVIUM (Qcol): SANDY CLAY, dark brown, moist, firm to stiff, roots, voids.
	3-6 ½'	TERRACE DEPOSITS (Qt): SANDY SILT, brown, moist, stiff, upper 2' weathered with abundant caliche, voids.
		Total Depth 6 ½'

APPENDIX C

Laboratory Analysis

(PSE, 1999)

APPENDIX C

LABORATORY ANALYSES

The results of laboratory testing performed during PSE's investigation are enclosed within this Appendix. Table C-1 presents a summary of laboratory test results.

Moisture and In-place Density

The filed moisture content and in-situ dry density were established on relatively undisturbed ring samples obtained from the borings. The moisture content was obtained in accordance with ASTM Test Method: D-2216. The in-situ dry density was computed using the net weight of the entire sample. The results of these tests are presented on the boring logs, Plates A-1 through A-9.

Classification

Soils were classified with respect to the Unified Soil Classification System (USCS) in accordance with ASTM D-2487 and D-2488.

Consolidation Tests

Consolidation tests were performed on ten relatively undisturbed soil samples in accordance with procedures outlined in ASTM D-2435. Samples were placed in a consolidometer and loads were applied incrementally in geometric progression. The sample (2.42 and 2.5-inches in diameter and 1-inch in height) was permitted to consolidate under each load increment until the slope of the characteristic linear secondary compression portion of the thickness versus log of time plot was apparent.

The percent consolidation for each load cycle was recorded as the ratio of the amount of vertical compression to the original 1-inch height. Hydroconsolidation (collapse) and expansion characteristics were also evaluated by monitoring the change in volume with saturation while the specimen was confined under constant normal stress. The consolidation test results are shown on Plates B-1 through B-10.

Direct Shear Tests

Direct shear tests were performed on two remolded samples that were saturated under a surcharge equal to the applied normal force during testing. The apparatus used is in conformance with the requirements outlined in ASTM Test Method: D-3080. The test specimens, 2.42 and 2.5-inches in diameter and 1-inch in height, were subjected to simple shear along a plane at mid-height.

The samples were sheared under various normal loads, a different specimen being used for each normal load. A strain 0.050-inches per minute was used to evaluate shear strength values.

The specimens were sheared until the shear stress reached a constant value or until the sample deformation had reached approximately 10 percent of the original diameter.

The shear stress values obtained from the tests were plotted versus applied normal pressures. The best-fitting straight lines were drawn through the plotted points to obtain the shear strength envelopes. The cohesion and angle of internal friction of the soil materials were evaluated from the shear strength envelopes. The direct shear test results are shown on Plates B-11 and B-12.

Maximum Density/Optimum Moisture

The maximum dry density and optimum moisture content of selected representative bulk samples were evaluated in accordance with ASTM D 1557-91/Method A. The results of this test are summarized in Table B-1.

Particle Size Analysis

Modified hydrometer portion ASTM D2422-72 were conducted to aid in classification of the soils. The results of the particle size analysis are presented in Table B-1.

Expansion Index Tests

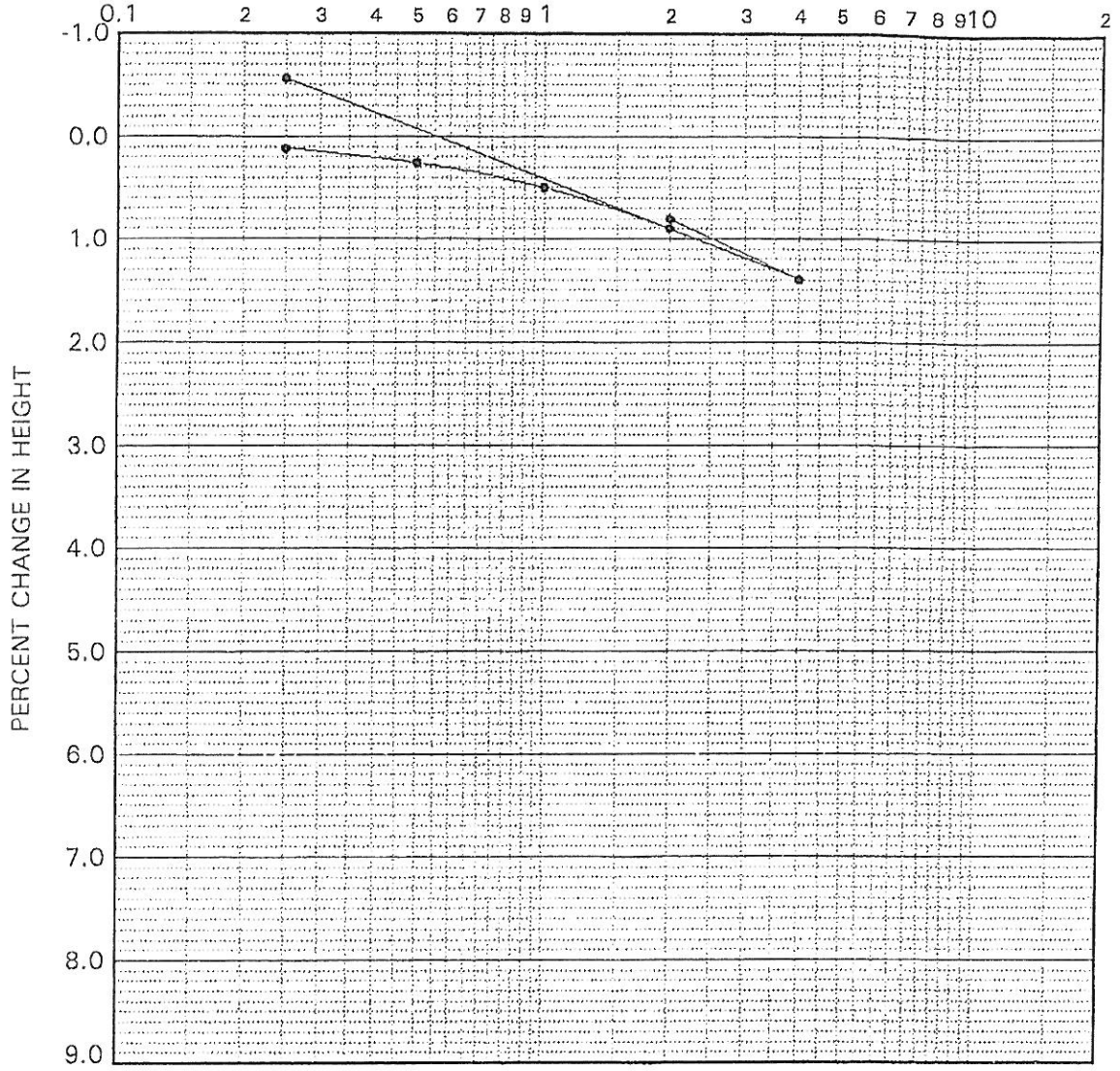
One expansion index tests was performed to evaluate the expansion potential of typical-on-site soils. Testing was carried out according to UBC. Method 18-2. The results are presented in Table B-1.

TABLE B-1

Summary of Laboratory Test Data

Boring/Pit No.	Depth	Soil Description	Group Symbol - Unified Soil Classification System	Maximum Dry Density		Grain Size Analysis					Expansion Index, UBC 18-2	Sand Equivalent	R-Value
				Maximum Density (pcf)	Optimum Moisture (%)	% + No. 4 Screen	% Coarse Sand	% Med.- Fine Sand	%Silt (0.074 to 0.005mm)	% Clay (-0.005 mm)			
5	8	Sandy Silt Qal	ML	121.5	11.4	0	0	45	30	25	50		
1	11	Clayes Sand (Qt)	SC	122.5	10.5	0	0.7	50.3	24	25	41		
2	40	Sandy Silt Qal	SM			0	0	63	24	13			
9	20	Silty Sand Qt	SM			0	0	50	28	22			
8	20	Silty Sand Qt	SM			0	0	55	25	20			
5	20	Sandy Silt Qal	ML			0	0	48	29	23			
7	20	Silty Sand Qt	SM			0	0	67	21	12			
8	30	Sandy Silt Qt	ML			0	0	47	31	22			
1	20	Silty Sand Qt	SM			0	0	58	30	12			
5	30	Sandy Silt Qal	ML			0	0	48	27	25			
1	30	Silty Sand Qt	SM			0	0	53	27	20			
2	20	Clayey Sandy Silt Qal	ML			0	1	34	35	30			

COMPRESSIVE STRESS IN TSF



boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-1	20.0	114.9	8.4		SM	Silty Sand (Qt)

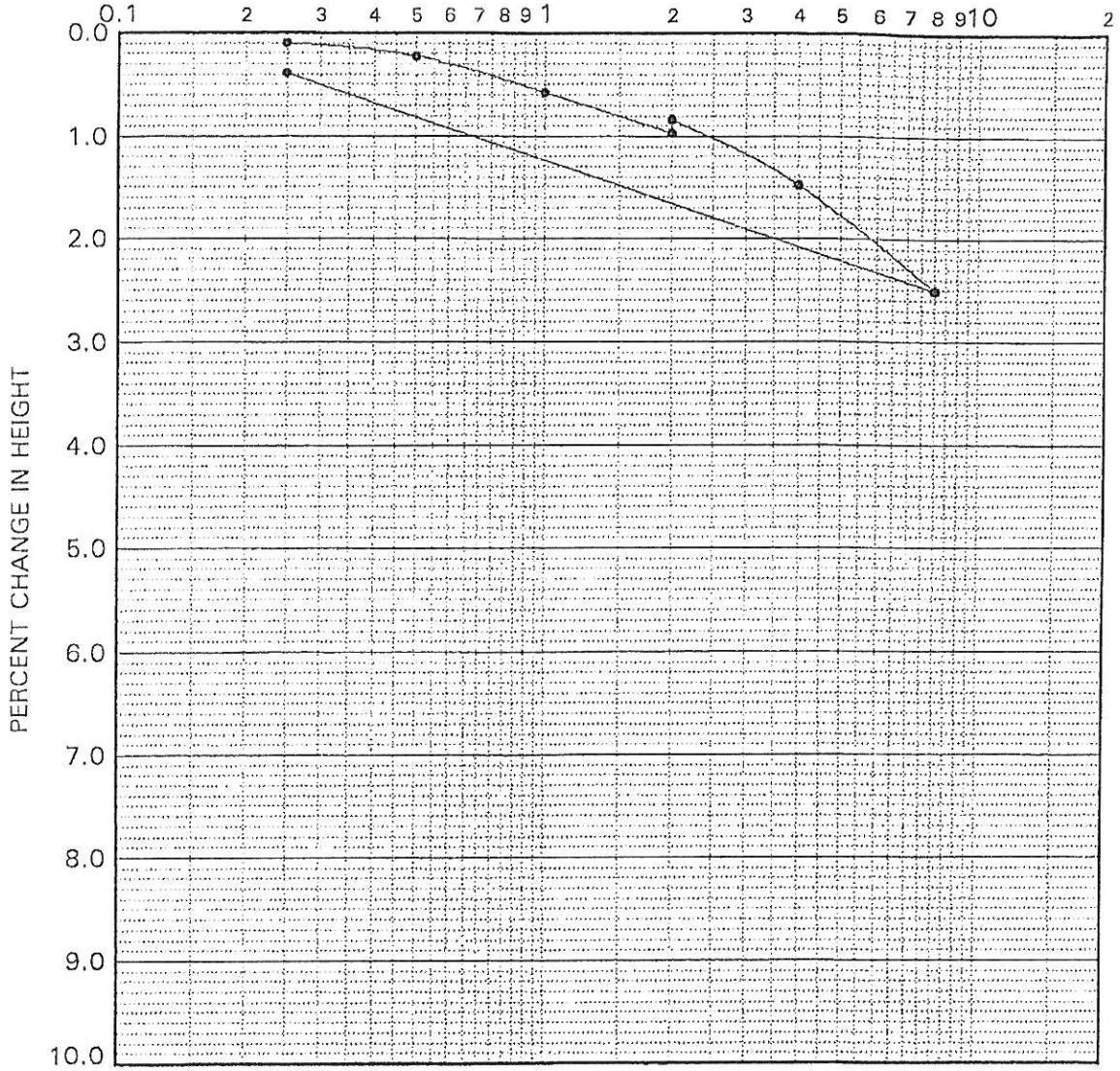
REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122

W.O. 500503 PLATE B-1

COMPRESSIVE STRESS IN TSF



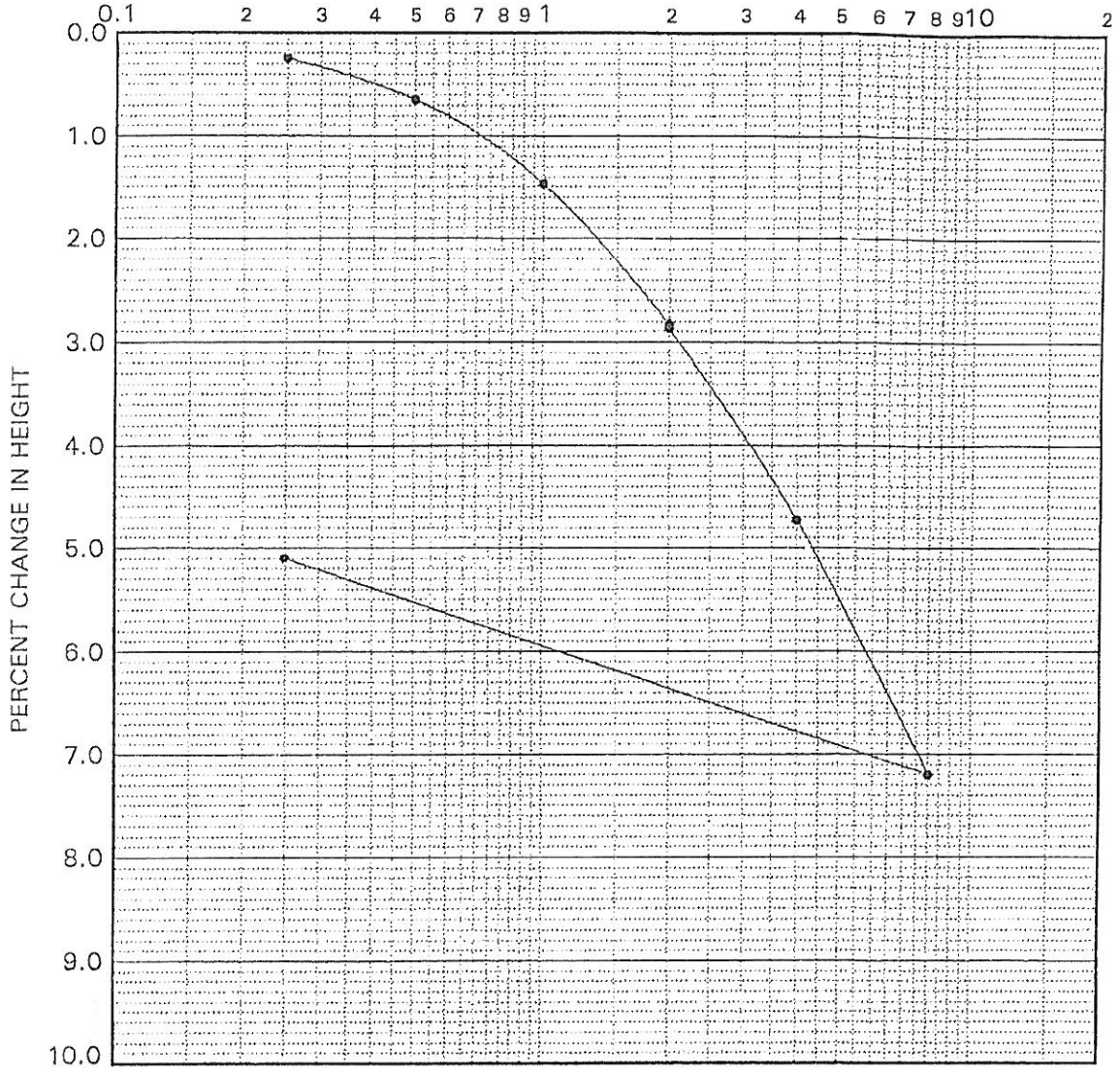
boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-1	30.0	113.1	6.8		SM	Silty Sand (Qt)

REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122
W.O. 500503 PLATE B-2

COMPRESSIVE STRESS IN TSF



boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-2	20.0	108.5	16.6		ML	Clayey Silt (Qal)

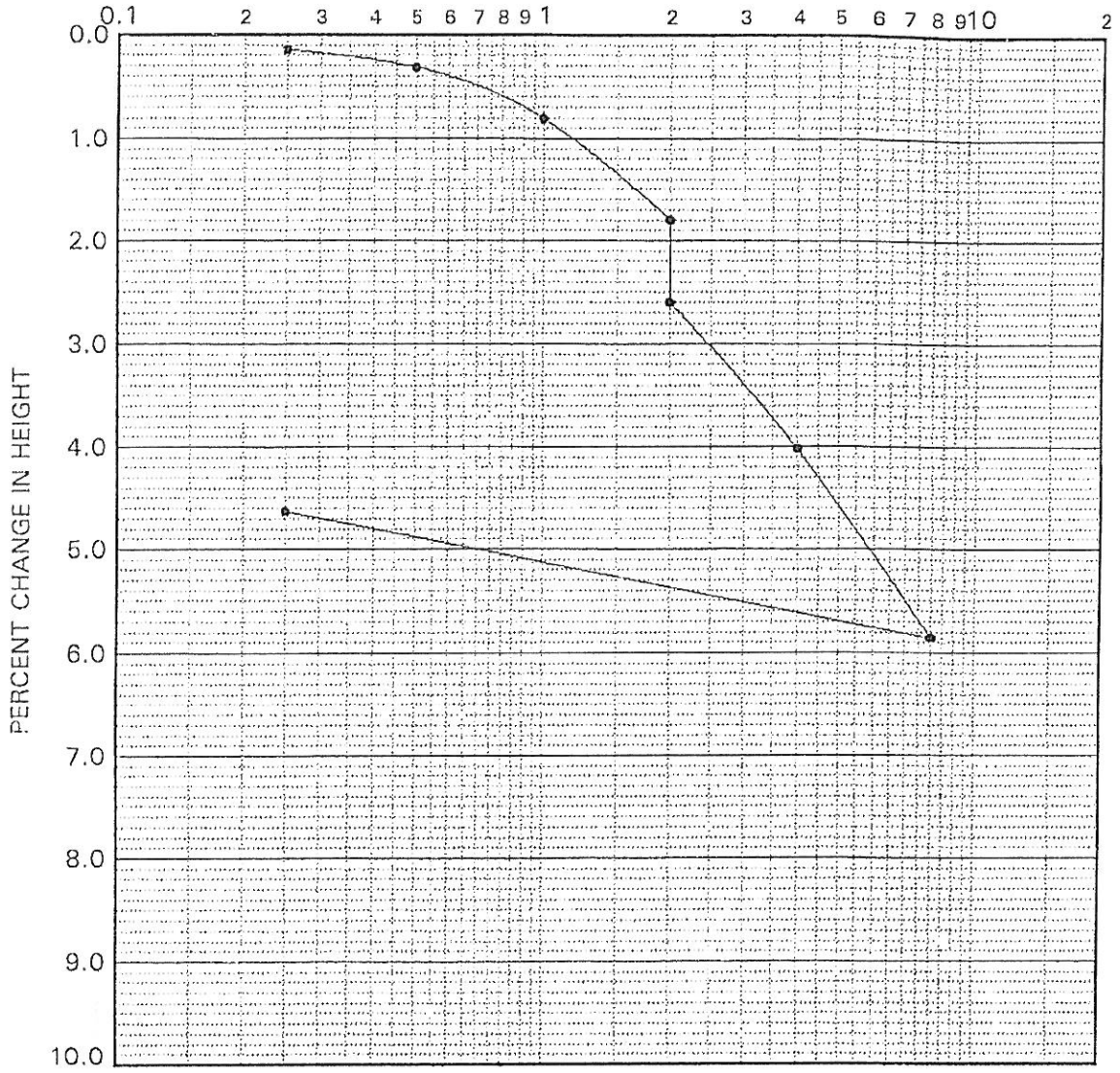
REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122

W.O. 500503 PLATE B-3

COMPRESSIVE STRESS IN TSF



boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-2	40.0	96.3	11.1		SM	Silty Sand (Qal)

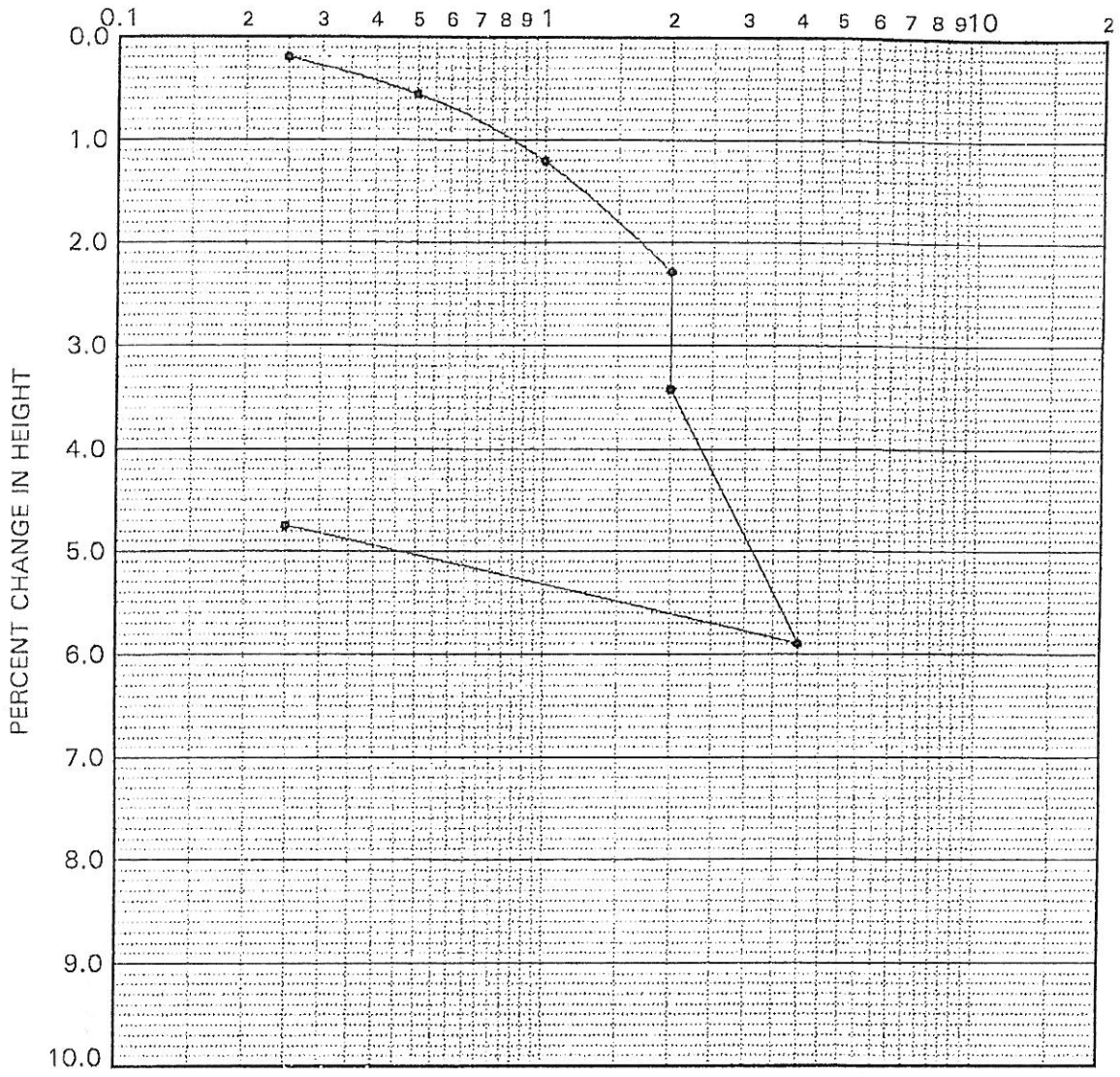
REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122

W.O. 500503 PLATE B-4

COMPRESSIVE STRESS IN TSF



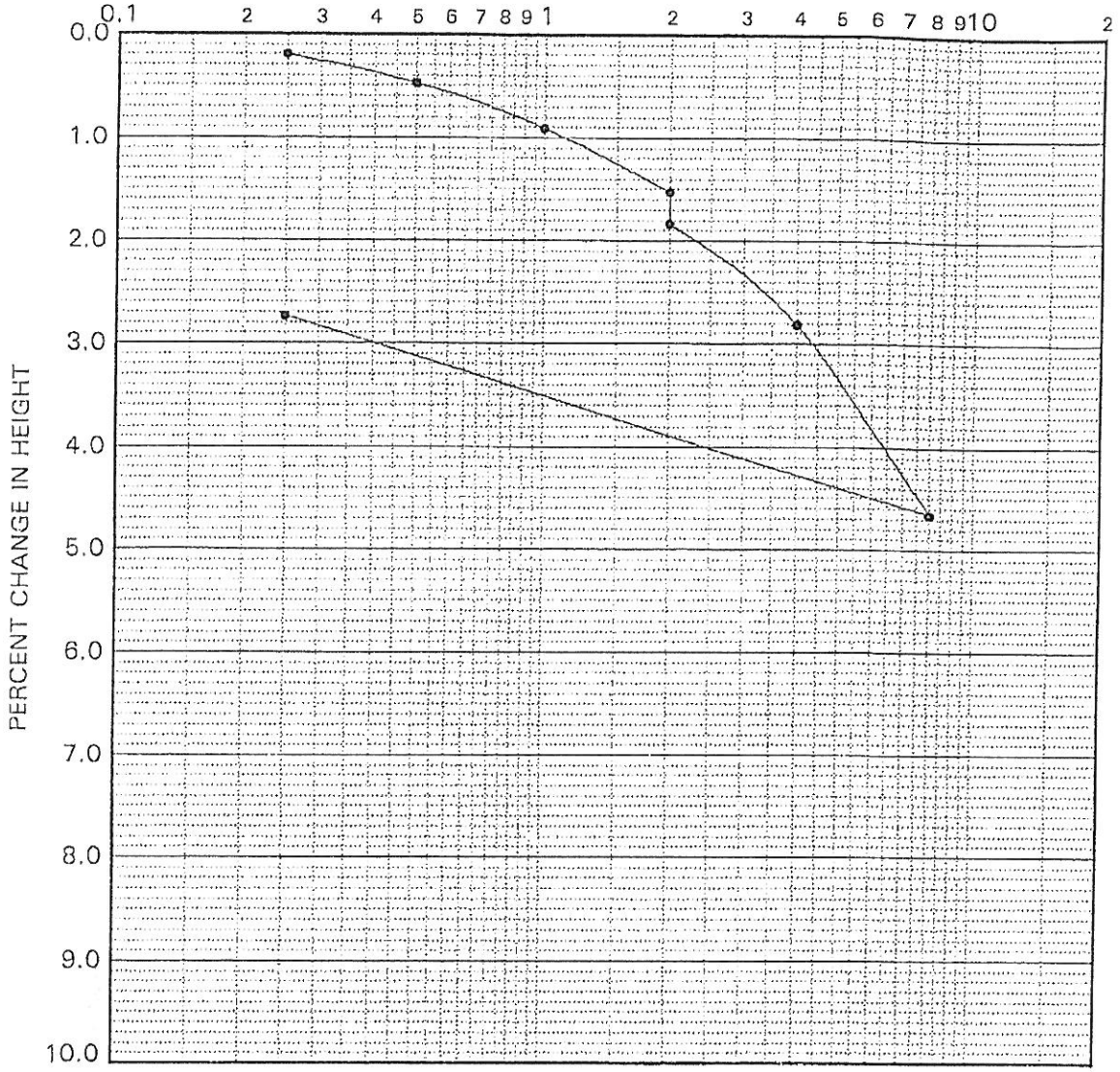
boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-5	20.0	107.7	13.4		ML	Sandy Silt (Qal)

REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122
W.O. 500503 PLATE B-5

COMPRESSIVE STRESS IN TSF



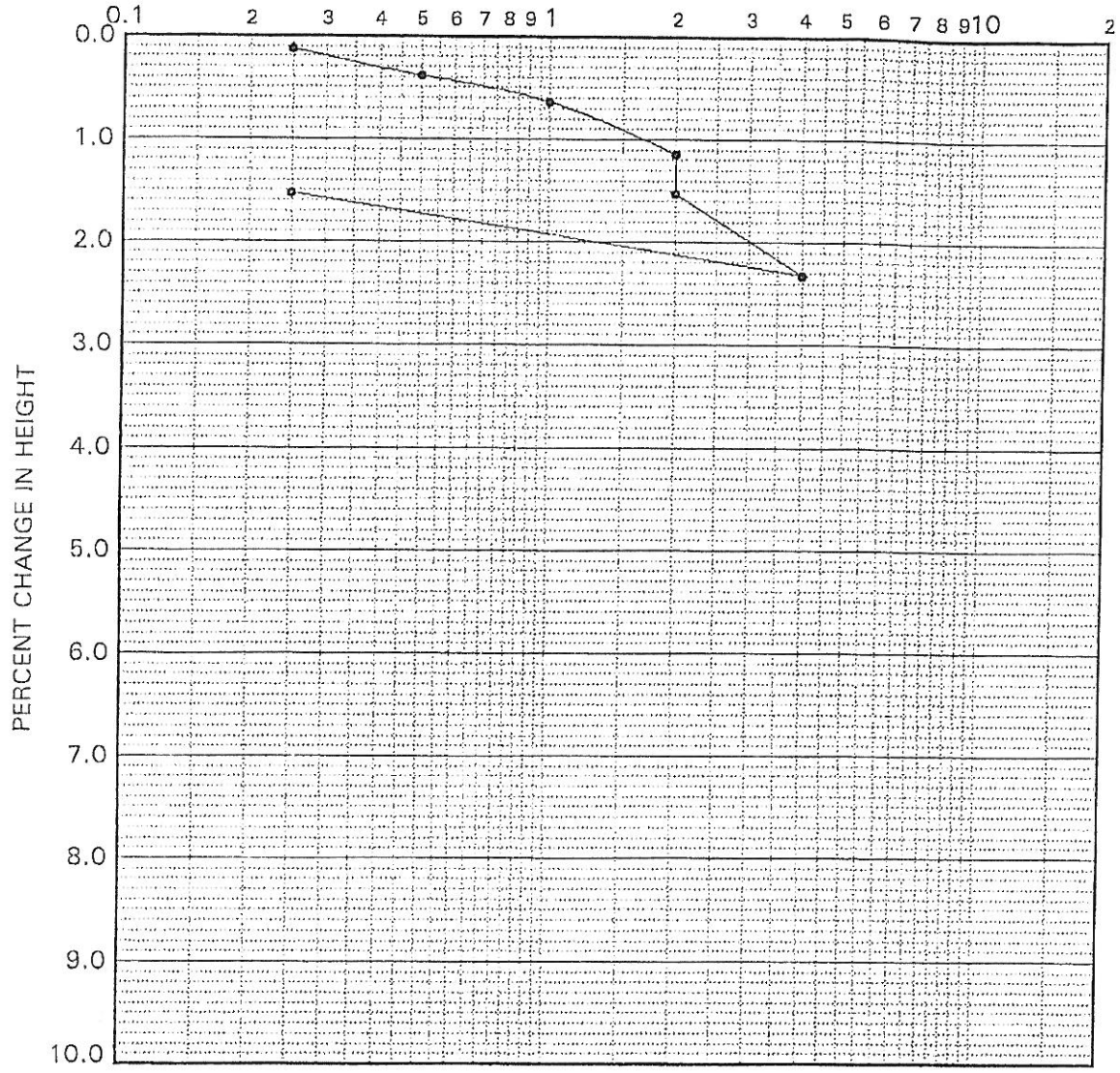
boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-5	30.0	96.4	16.0		ML	Sandy Silt (Qal)

REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122
W.O. 500503 PLATE B-6

COMPRESSIVE STRESS IN TSF



boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-7	20.0	110.6	8.5		SM	Silty Sand (Qt)

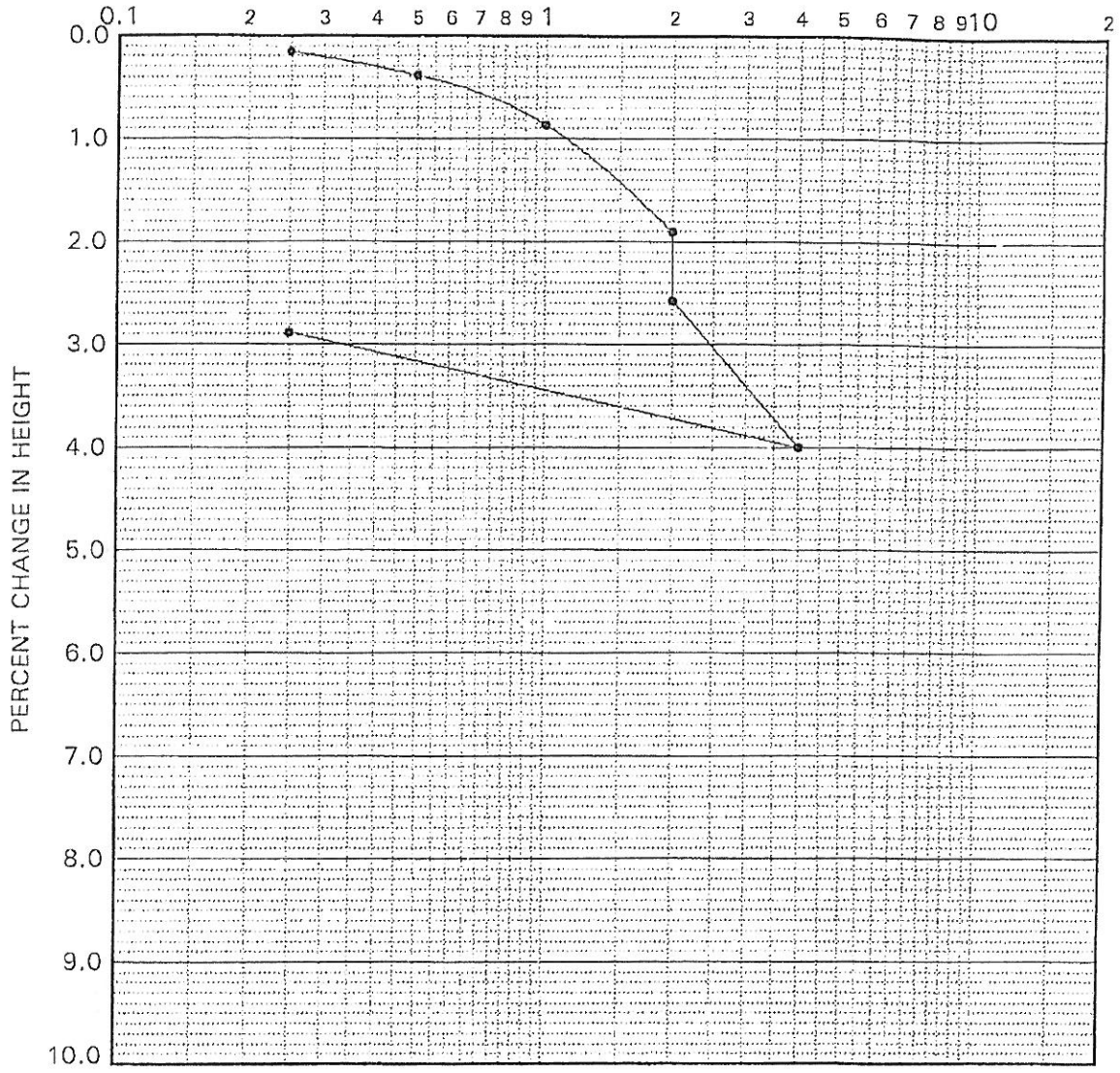
REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122

W.O. 500503 PLATE B-7

COMPRESSIVE STRESS IN TSF



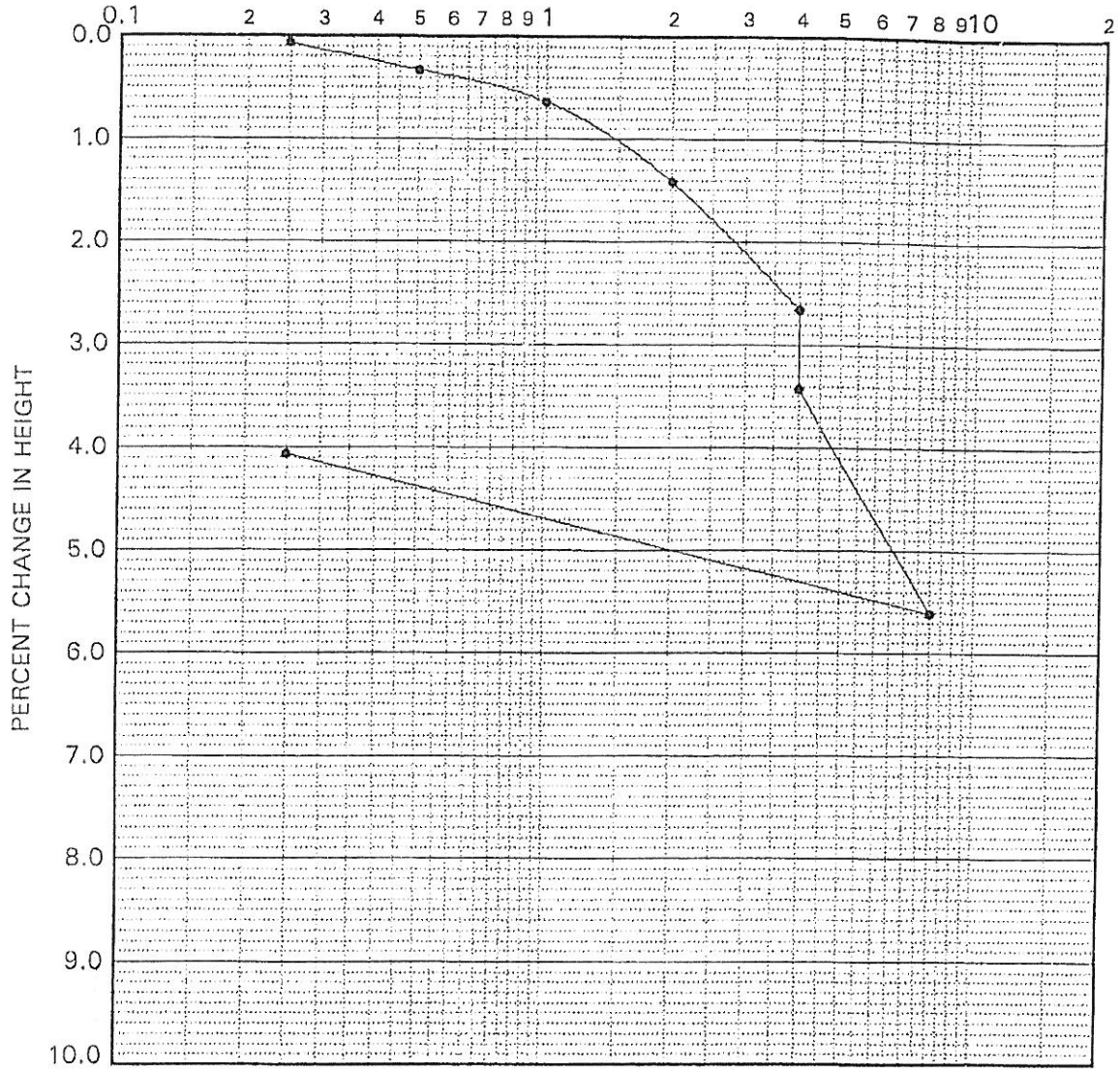
boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-8	20.0	111.4	12.1		SM	Silty Sand (Qt)

REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122
W.O. 500503 PLATE B-8

COMPRESSIVE STRESS IN TSF



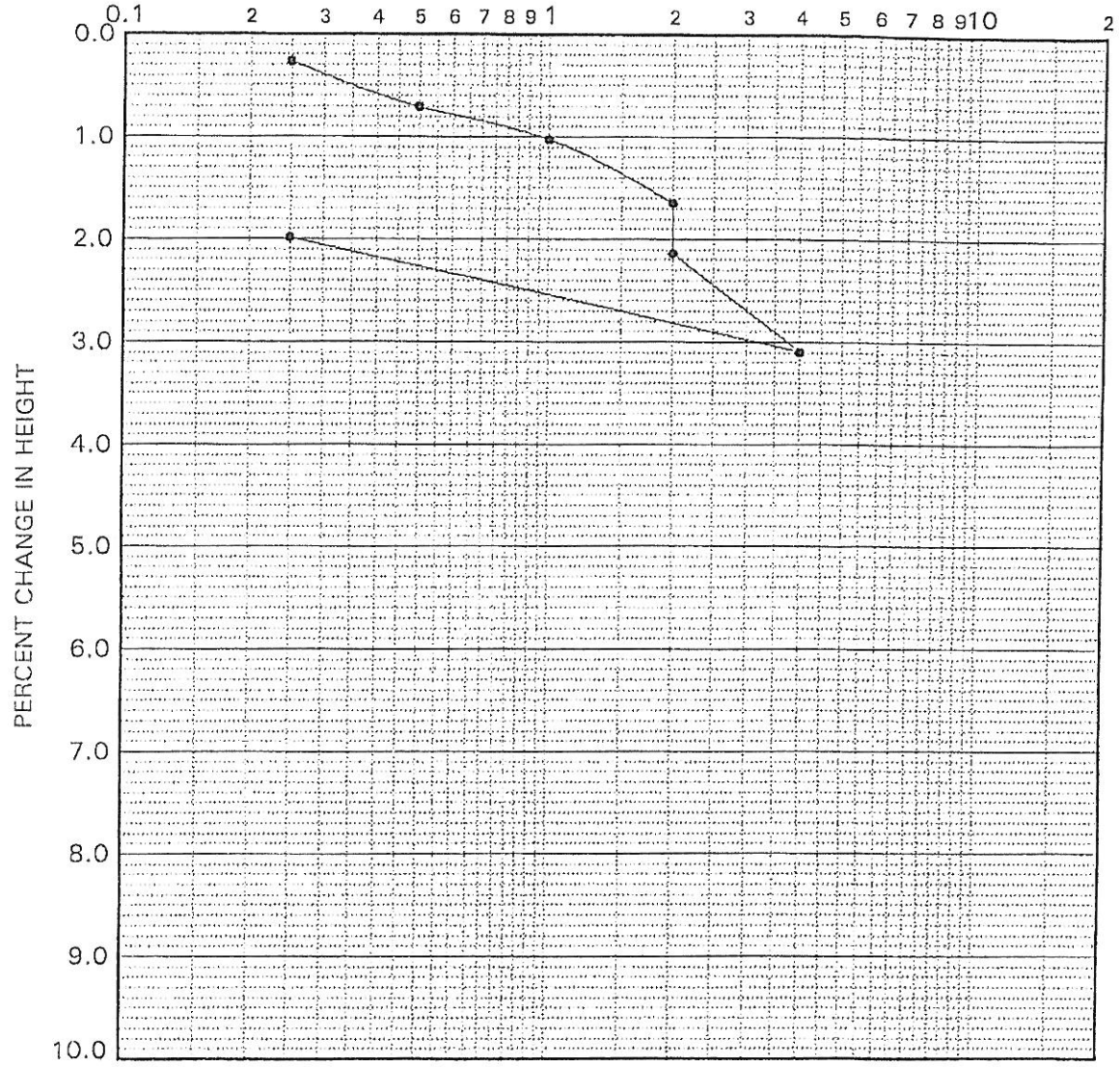
boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-8	30.0	106.1	14.2		ML	Sandy Silt (Qt)

REMARKS: WATER ADDED AT 4 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122
W.O. 500503 PLATE B-9

COMPRESSIVE STRESS IN TSF



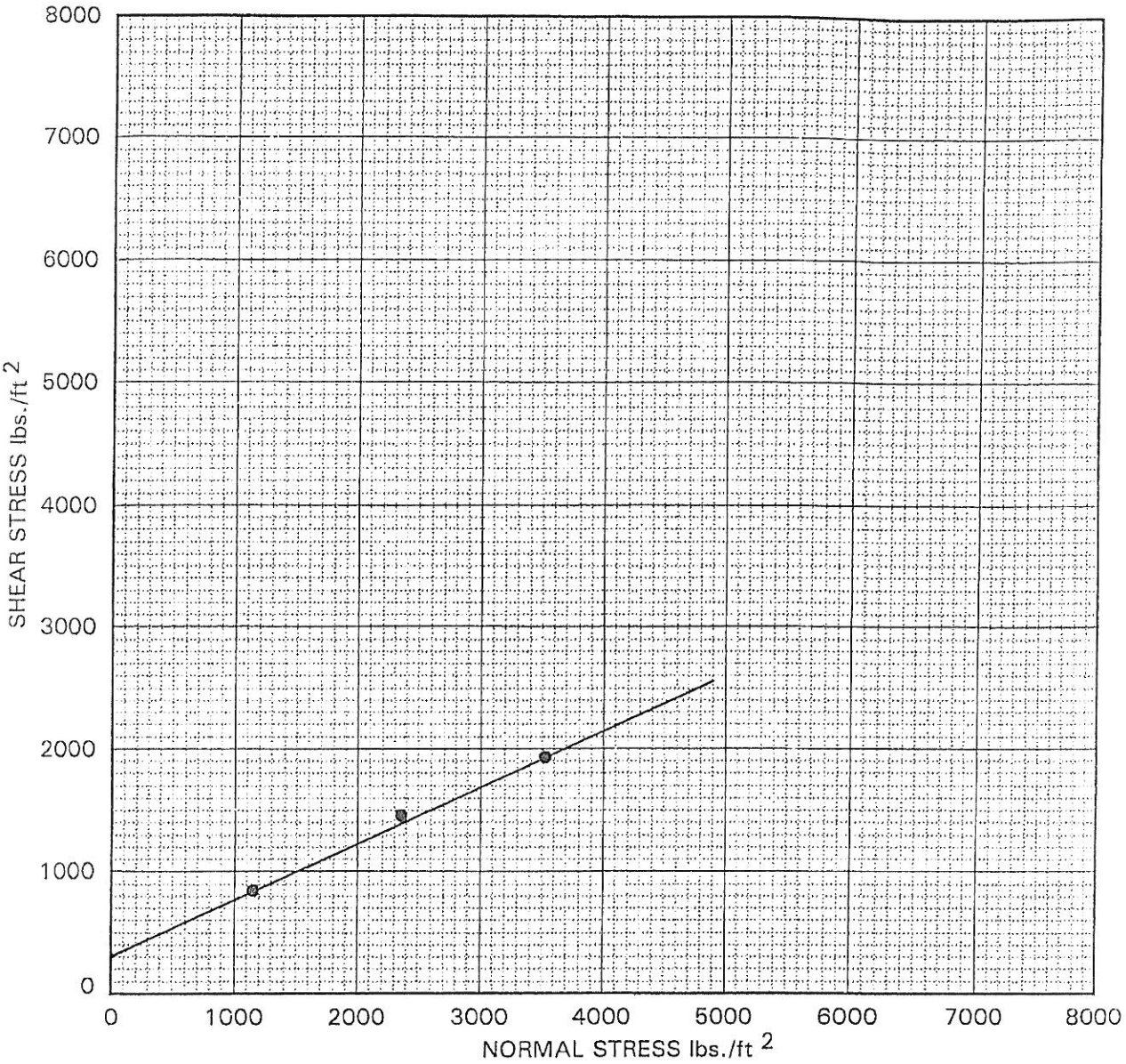
boring	depth (ft.)	dry density	in situ moist.	-200 sieve	group symbol	typical names
B-9	20.0	106.8	13.9		SM	Silty Sand (Qt)

REMARKS: WATER ADDED AT 2 TSF

CONSOLIDATION CURVE

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122
W.O. 500503 PLATE B-10

DIRECT SHEAR TEST
REMOLDED



Clayey Sand (Qt)	COHESION 300 psf.
SC	FRICTION ANGLE 25.0 degrees

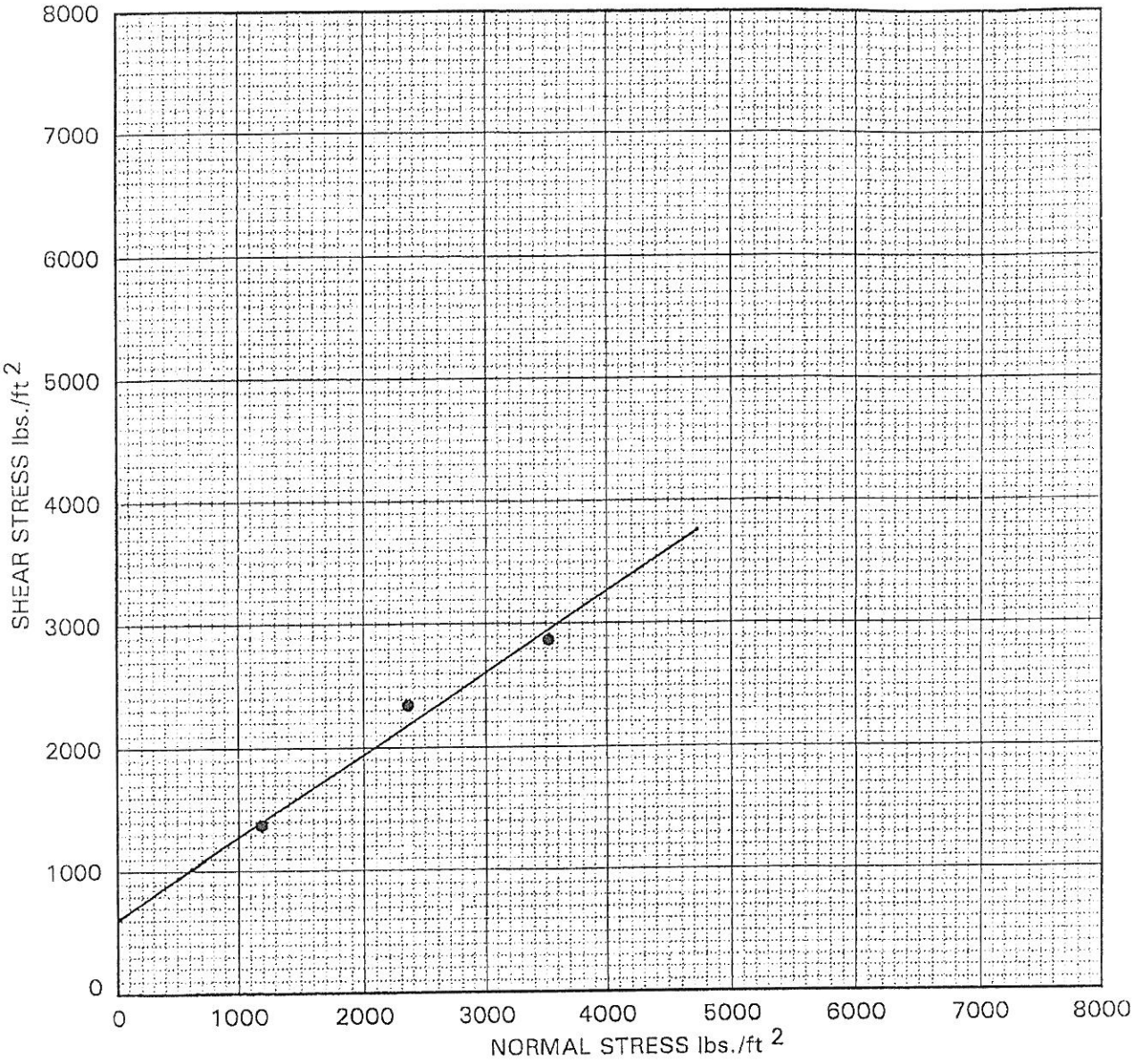
symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-1	11.00			

DIRECT SHEAR TEST

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122

W.O. 500503 PLATE B-11

DIRECT SHEAR TEST
REMOLDED



Sandy Silt (Qal)	COHESION 600 psf.
ML	FRICTION ANGLE 33.0 degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-5	8.00			

DIRECT SHEAR TEST

PACIFIC SOILS ENGINEERING, INC.
3002 DOW AVE., TUSTIN, CA 92680 714-730-2122

W.O. 500503 PLATE B-12

GRADING CONDUCTED BY SHEA HOMES. REMOVALS AND FILL PLACEMENT ON SUBJECT PROJECT WAS OBSERVED BY PACIFIC SOILS ENGINEERING, INC. AND IS CONSIDERED SUITABLE FOR THE PROPOSED DEVELOPMENT

GRADING CONDUCTED FOR BREA SPORTS PARK WAS OBSERVED BY PACIFIC SOILS ENGINEERING, INC. AND IS CONSIDERED SUITABLE FOR THE PROPOSED DEVELOPMENT

LEGEND

afe1	ARTIFICIAL FILL–ENGINEERED (PACIFIC SOILS, 2009)
afe2	ARTIFICIAL FILL–ENGINEERED (GRADED BY SHEA HOMES, OBSERVED BY PSE)
afe3	ARTIFICIAL FILL–ENGINEERED (PACIFIC SOILS, 2008)
afe4	ARTIFICIAL FILL–LAMBERT ROAD IMPROVEMENTS
Qaf	ARTIFICIAL FILL
Qcol	COLLUVIUM
Qal	ALLUVIUM
Qls	POSSIBLE LANDSLIDE
Qt	TERRACE DEPOSIT
Qoa	OLDER ALLUVIUM
Tfl	FERNANDO FORMATION
Tfu-cgl	FERNANDO FORMATION – CONGLOMERATE
Tfu-slst	FERNANDO FORMATION – SILTSTONE
	GEOLOGIC CONTACT, DOTTED WHERE BURIED
? ?	INFERRED FAULT
	SEWER LINE (TRENCH BACKFILL TESTED BY PACIFIC SOILS, 2009)
45W 25S	STRIKE AND DIP OF BEDROCK
T–1	APPROXIMATE LOCATION OF TRENCH
B–1	APPROXIMATE LOCATION OF BORING

FEET
0 100 200 400

PLATE 1

ALTA CALIFORNIA GEOTECHNICAL, INC.
170 N. MAPLE STREET, STE 108, CORONA, CA 92880
TELEPHONE: (951) 509-7090
PROJECT NUMBER: 1–0250 DATE: 12–19–18

PREPARED BY:

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TOPOGRAPHY

Appendix G Third-Party Review of Geotechnical Assessment

Appendices

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February 6, 2019 Project No. 18152-01

Mr. William Halligan
Placeworks
3 MacArthur Place, Suite 1100
Santa Ana, CA 92707

Subject: ***Third-Party Review of Alta report dated December 19, 2018 and Site Reconnaissance Visit, Proposed Brea 265 Residential Development, City of Brea, California***

Introduction

In accordance with your request, LGC Geotechnical, Inc. has prepared this third-party review of the referenced Environmental Impact Report (EIR) - level geotechnical report for the proposed approximately 265-acre Brea site located in the approximate vicinity of the intersections of E. Lambert Road and Valencia Avenue to N. Rose Drive and Blake Road, within the City of Brea, California. As part of our review, we conducted a site reconnaissance visit on January 29, 2019 and attended a tour conducted by site owners Aera Energy.

Project Overview

The proposed project site is currently an active oil field with areas of agricultural uses. The large site spans low relief open valley areas to the west, an east-central area of hillsides with significant relief, and an area of low rolling hills graduating to open valley areas to the south. The adjacent Carbon Canyon Regional Park and flood control dam abut the eastern boundary of the site.

The proposed residential development is in the early phases of design and no grading plan is available at this time. Based on the Concept Land Use Plan (AERA, 2018), the development will consist of approximately 1,100 homes. Remedial grading measures for previous surrounding developments were reportedly extended onto the subject site in order to limit future impacts to those developments during grading of the subject site. Based on verbal communications with representatives of Aera Energy, we understand the eastern edge of the hillside portion of the site development is intended to remain natural and the development set back from the steep hills where the site abuts the flood control reservoir sidewalls.

The presence of existing oil field equipment, pumps, and miles of pipelines across the site need to be considered; however, the environmental issues associated with the site are not a part of the EIR level geotechnical report (Alta, 2018), and generally not a part of this review. The report is also noted to present only a 'limited' geotechnical investigation at this time, and significant additional subsurface exploration is proposed once the project is further along in the development process.

131 Calle Iglesia, Suite 200, San Clemente, CA 92672 (949) 369-6141 www.lgcgeotechnical.com

Geologic conditions include a hillside area with relatively consistent south/southwest-dipping bedding within a portion of the La Habra syncline. Fernando Formation Upper and Lower is called out along with Puente Formation at the northeastern corner of site. A queried fault that trends north-south as depicted on the northern hillside portion of the site, appears necessary to justify the interpreted contacts between Upper and Lower members of the Fernando Formation contact. Although the Whittier Fault is located as close as 2,000 feet from the site, the queried on-site fault is not considered active. The lower elevations and areas of less topographic relief are broadly mapped as young and old alluvium, terrace deposits, and artificial fill.

Third Party Review of Reference Report dated December 19, 2018

Comment No. 1 - Review of the Geotechnical Map in comparison to the underlying topography appears to indicate some shift has occurred in the consultants' geologic contact mapping. Based on geologic contact lines such as the limits of artificial fill for the Carbon Canyon Dam, limits of alluvium, and potential location of a landslide, it appears some of the contacts have been shifted up to approximately 100 feet in plan view. The geologic contacts should be reviewed and shifted to the correct locations as necessary.

Comment No. 2 – The reference report is applicable for EIR level. As indicated by the consultant, additional subsurface exploration and site evaluation will be performed and at a minimum should include:

- Large-diameter borings should be excavated and downhole logged as part of hillside evolution.
- Infiltration testing and feasibility should be performed.
- A detailed liquefaction analysis should be performed.
- Evaluation of the edge conditions as they relate to existing improvements including roadways, structures, the flood control reservoir, etc., should be performed.

Closure

Please note: This letter is based on our review of the referenced report and limited site visit only.

Our proposed services were performed to the general standard of care of geotechnical consulting in Southern California; no other warranty is expressed or implied. This geotechnical third-party review report has been prepared for the sole use of Placeworks, its subsidiaries and affiliates may be relied upon by any of same.

The opportunity of submitting this third-party review is sincerely appreciated. Should you have any questions, please do not hesitate to contact this office.

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, PE 84840
Project Engineer

Katie Maes, CEG 2216
Project Geologist

Dennis Boratynec, GE 2770
Vice President

KTM/RLD/DJB/aca

Attachment: References

Distribution: (1) Addressee (electronic copy)

References

Aera Energy (AERA), 2018, Brea 265 Project Overview, Brea, California, dated July 16, 2018.

Alta California Geotechnical, Inc., 2018, EIR-Level Geotechnical Assessment, Brea Central Property, City of Brea, County of Orange, California, Project No. 1-0250, dated December 19, 2018.

Dibblee, T.W., 2001, Geologic Map of the Yorba Linda and Prado Dam Quadrangles, Eastern Puente Hills, Los Angeles, Orange, San Bernardino and Riverside Counties.

Historic Aerials, 2019, HistoricAerials.com: Aerial Photographs and Topographic Maps by Netronline, retrieved January 31, 2019.

Appendix H Phase I Environmental Site Assessment

Appendices

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PHASE I ENVIRONMENTAL SITE ASSESSMENT

Brea 265 Property – Valencia Avenue at Lambert Road
Brea, California

Prepared For:

Aera Energy LLC,
3030 Saturn Street, Suite 101
Brea, California 92821

Prepared By:

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, California 92653

May 5, 2017

Project No. 2077.01.01

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Brea 265 Property – Valencia Avenue at Lambert Road
Brea, California

May 5, 2017

Prepared For:

Aera Energy LLC
3030 Saturn Street, Suite 101
Brea, California 92821

Prepared By:

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, California 92653

Derrick S. Willis
Principal

Nicky E. Galloway, PE
Project Engineer

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F The EDR Historical Topographic Map Report
G The EDR-City Directory Abstract
H Environmental Professional Qualifications

1.0 SUMMARY

This report presents the results of a Phase I Environmental Site Assessment (ESA) performed by Northgate Environmental Management, Inc. (Northgate) for Aera Energy LLC (Aera) at the "Brea 265 Property" located along Valencia Avenue at the intersections of Lambert Road, Carbon Canyon Road, and Rose Drive in Brea, California (the Site). The Site is approximately 265 acres of land developed with an active oil production field, a plant nursery, and a tree farm. The Site consists of nine parcels identified as Assessor's Parcel Numbers (APNs) 320-073-07 and -09, and 322-031-01, -12, -13, -14, -19, -21, and -24 in Orange County. A Site Vicinity Map is shown on Figure 1 and a Site Plan is shown on Figure 2.

For the purpose of this report, the Site has been divided into two separate properties for ease of geographic reference in describing historic Site operations, specific locations of potential environmental concerns, and current Site conditions. The designated Site properties are shown on Figure 2. The properties are designated as:

- The "100-Acre Lease Property" consists of two parcels located west of Valencia Avenue. The two rectangular parcels are separated by Lambert Road. The parcel located north of Lambert Road is identified as 2601 Valencia Avenue and is currently developed with an active oil production field and a nursery (Greenland Nursery). The parcel located south of Lambert Road is identified as 2501-2811 Valencia Avenue and is currently developed with an active oil production field and an organic food growing company (Future Foods Farms) which utilizes a portion of the property for agricultural purposes. Oil field operations at this portion of the Site began in the 1920s, with agricultural use initiated in the 1930s. Current and historic Site features of the 100-Acre Lease Property are shown on Figure 3.
- The "165-Acre Lease Property" consists of seven contiguous parcels located east of the 100-Acre Lease Property. The property is located east of Valencia Avenue, south of Carbon Canyon Road, northeast of Rose Drive, and north of Blake Road. The northern portion of the property is currently developed as an active oil production field. The southern portion of the property, totaling approximately 43 acres, is currently occupied by a seasonal pine tree farm (Peltzer Pine Choose and Cut). Oil field operations at this portion of the Site began in 1927 with agricultural use, including orchards and tree farms, initiated in the 1950s. A "sump" area was historically present in the southern portion of the property that was reportedly utilized for oil field drainage and waste storage prior to being filled in the 1960s. Sumps are identified at the Site as unlined areas historically utilized for the storage of waste oil and oil field related waste liquids. After the sump was filled, Rose Drive was constructed across this area. Current and historic Site features of the 165-Acre Lease Property are shown on Figure 4.

Our review indicates that the Site has historically been developed and primarily operated as an oil field since the 1920s, with some agricultural uses since the 1930s. Operations at the oil fields have historically included underground storage tanks (UST) and aboveground storage tanks (ASTs) for the storage and containment of gasoline, diesel, crude oil, and other process hydrocarbons. The 100-Acre Lease Property and the northern and central portions of the 165-Acre Lease Property are still developed as operating oil fields that include 104 oil wells, a dehydration unit, a vapor recovery system, a production unit and tank farm, and a carbon filtration area. Petroleum and steam pipelines are also present throughout the Site as both aboveground and belowground features. Oil sumps were not observed during our reconnaissance but have historically been utilized across the Site for the oil field operations. Sumps are identified at the Site as unlined areas historically utilized for the storage of waste oil and oil field related waste liquids. Approximate former sump locations are shown on Figures 3 and 4 in blue for sumps identified from historic aerial photographs and in purple for sumps identified from a 1992 report prepared for the Site.

Portions of the Site are listed on a number of regulatory databases including the Leaking Underground Storage Tank (LUST), UST, Historic UST, Underground Injection Control (UIC), Emergency Response Notification System (ERNS), and Hazardous Waste Information System (HAZNET) regulatory databases under listings for Shell Service Station and Shell Western Oil. The UST database indicates that three USTs were formerly present at the 100-Acre Lease portion of the Site, including a 555-gallon gasoline UST, a 555-gallon diesel UST, and a 1,000-gallon gasoline UST. The LUST database indicates that soil was impacted by a release of diesel fuel, additives, and gasoline from one or more of the USTs at the Site. The facility received regulatory closure from the Orange County Health Care Agency (OCHCA) in August of 1991, although no impacted soil was removed, and no remediation occurred in connection with the release(s).

The Site is also listed on the UIC database related to the presence of both active and plugged underground injection wells associated with oil field waste-water disposal and other oil field operations. The Site is listed on the HAZNET database related to the storage, bulking, and transfer off-Site of approximately seven tons of unlisted product in 2012 from a Southern California Edison electrical transformer area located on the northwestern portion of the 165-Acre Lease Property.

A Phase I ESA prepared for a portion of the Site on July 20, 1992 identified potential concerns associated with the removal of two diesel USTs from the 100-Acre Lease Property. One UST was reported to have been removed in 1989. One investigative boring advanced to a depth of 190 feet below ground surface (bgs) encountered benzene up to three parts per million (ppm) in a soil collected from a depth of 90 feet bgs. Groundwater was not encountered in the boring. The apparent release received regulatory closure from the OCHCA in 1991, although no remedial actions were performed. A second diesel UST was removed in December 1990 and no evidence of a release was reported. The location of this second removed UST was not identified. The Phase I ESA also reported additional potential environmental concerns including historic oil field operations, petroleum hydrocarbon staining, possible methane and hydrogen sulfide gas in the areas around process area holding tanks and historic oil sumps. The report concluded that facilities and oil wells would require proper abandonment prior to development of the Site and recommended that a Phase II ESA be conducted.

The properties to the north of the Site, including the Olinda Alpha Landfill located further to the north, have historically been developed as oil fields. Some industrial development has been present to the south of the Site, including a current electric substation owned and operated by Southern California Edison. The remaining portions of the Site vicinity have historically been utilized as agricultural land prior to development for residential uses during the 1980s and 1990s. No hazardous materials releases have been documented in the immediate Site vicinity that appear to represent a potential threat to soil, groundwater, or soil vapor quality at the subject Site.

In summary, Northgate has performed a Phase I ESA of the Brea 265 Property located on Valencia Avenue at the intersections with Lambert Road, Carbon Canyon Road and Rose Drive in Brea, California in conformance with the scope and limitations of ASTM Practice E 1527-13 and the standards and practices of the All Appropriate Inquiry – Final Rule (40 Code of Federal Regulations Part 312). Any exceptions to, or deletions from, these practices are described in Section 2.3 of this report. Our review did not identify the presence of Recognized Environmental Conditions (RECs) in connection with the property, except for the following:

- The Site has been developed as an operating oil field since the 1920s. Some oil wells are still operational and various levels of ponded oil and staining were observed at each well, primarily in the vicinity of the well box. The historic and current operations of the oil field, including the oil wells, tank farms, and pipelines, represent a potential threat to soil, groundwater, and/or soil vapor quality at the subject Site. It should be noted that the California Division of Oil Gas and Geothermal Resources generally prohibits construction of residences directly over active or sealed and abandoned oil or gas wells.

- Multiple historic oil sumps, including a large former, unlined oil sump located in the southwestern portion of the 165-Acre Lease Property that has since been filled in and developed to include Rose Road, were present across both properties of the subject Site. These historic sumps represent a potential threat to soil, groundwater, and/or soil vapor quality at the Site.
- Given that the Site is a defined oil/gas field, the Site will be subject to the guidelines and requirements set forth in the Orange County Fire Authority's (OCFA's) *Combustible Soil Gas Hazard Mitigation* document that outlines the guidance for the investigation, remediation, and/or mitigation of potentially hazardous concentrations of combustible soil gases associated with the construction and occupancy of a building located on or within the vicinity of an oil/gas field and the OCFA specified areas.
- Petroleum and natural gas pipelines are present throughout portions of both the 100-Acre Lease and 165-Acre Lease Properties. Petroleum hydrocarbon, or other hazardous materials releases may have occurred along the pipelines

Northgate's review also identified the following Historic REC (HREC) at the Site:

- The 100-Acre Lease portion of the Site has a documented release from a leaking diesel UST that impacted soil to depths of 90 feet bgs. The facility received regulatory closure from the OCHCA on August 20, 1991. However, no remedial action was performed, and petroleum hydrocarbons remain in soil at the Site.

Our review also identified the following potential environmental concerns:

- A drainage channel traverses the 100-Acre Lease Property from north to south that is reported to originate from the Olinda Alpha Landfill to the north and potentially contain runoff from that upgradient facility. Runoff from a landfill facility could contain contaminants that could potentially impact future development of the Site.
- Given the historic use of the Site for agricultural purposes, there is a possibility that pesticides and herbicides may be present in shallow soil in some areas of the Site.
- Test results from indoor air samples collected within the local zip code area indicate that radon may constitute a potential environmental concern at the Site.
- Injection wells are present at the Site and are subject to many new regulations. Further review of specific requirements for closing out the existing injection wells may be required prior to development of the Site.

Northgate recommends that a Phase II ESA be conducted to evaluate the existing soil, groundwater, and soil vapor conditions at the Site related to these RECs and issues of potential environmental concern. The investigation should include strategic test pits and trenching as well as near surface and shallow soil testing and drilling of deep soil borings. The Phase II ESA results should be used to develop remedial cost scenarios to further understand the potential impacts associated with redevelopment of the Site.

2.0 INTRODUCTION

This report presents the results of a Phase I ESA performed by Northgate at the Brea 265 Property located in Brea, California. The Site is located to the east and west of Valencia Avenue at the intersection of Lambert Road, Carbon Canyon Dam, and Rose Drive. The Site consists of approximately 265 acres of land developed with active oil production and processing facilities and agricultural operations including a nursery, an organic food growing company, and a seasonal tree farm. The Site is identified as APNs 320-073-07 and -09, and 322-031-01, -12, -13, -14, -19, -21, and -24 in Orange County. A Site Vicinity Map is shown on Figure 1 and a Site Plan is shown on Figure 2.

2.1 Purpose

The purpose of Phase I ESA has been to identify and evaluate the presence of RECs at the Site, and to satisfy the All Appropriate Inquiry standard codified in 40 CFR Part 312. The term "RECs" as defined in ASTM *Standard Practice for Environmental Assessment: Phase I Environmental Site Assessment Process* (Designation: E 1527–13) means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The term is not intended to include *de minimus* conditions that generally do not present a material risk of harm to public health or the environment, and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

2.2 Scope of Services

Northgate has performed the ESA in general conformance with the scope and limitations of ASTM E-1527-13, *Standard Practices for Environmental Site Assessments: Phase I Environmental Site Assessment Process* and 40 CFR Part 312, *Standards and Practices for All Appropriate Inquiry – Final Rule*. This investigation was performed by Nicky Galloway, Project Engineer with oversight and review by Derrick Willis, Northgate Principal. Quality Assurance and quality control was conducted by Dennis Laduzinsky, Northgate Principal in charge of property transactions and brownfields redevelopment. The scope of work for the investigation included the following services:

- Review of readily available information regarding the history of the Site, including historic aerial photographs, maps, previous reports, and other information, and discussions with individuals familiar with the Site;
- Review of environmental lien documents obtained for the Site;

- A reconnaissance of the Site and near vicinity;
- Discussions with regulatory officials and review of regulatory agency publications and files, as applicable;
- Evaluation of RECs, development of conclusions and scope of work to evaluate potential on-Site contamination concerns; and
- Preparation of this report.

2.3 Limitations and Exceptions

2.3.1 Limitations

The purpose of an environmental assessment is to reasonably evaluate the potential for, or actual impact of, past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. No investigation is thorough enough to absolutely rule out the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not be construed as a guarantee of the absence of such materials on the Site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

Environmental conditions may exist at the Site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at un-sampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

Where the scope of services is limited to interview and/or review of readily available reports and literature, any conclusions and/or recommendations are necessarily based largely on information supplied by others, the accuracy or sufficiency of which may not be independently reviewed by Northgate.

Any opinions and/or recommendations presented apply to Site conditions existing at the time of performance of services. We are unable to report on, or accurately predict, generally

unforeseeable events that may impact the Site following performance of services, whether occurring naturally or caused by external forces. Therefore, we cannot assume responsibility for such events or their impact. We also cannot assume responsibility for changes in environmental standards, practices, or regulations.

2.3.2 Exceptions

The time intervals between some historical information sources may exceed five years due to the unavailability of such records. However, in our opinion, this data gap does not significantly impact our ability to evaluate historic land use conditions at the Site given the availability of other sources for this information.

At the time this report was prepared, no response to Northgate's request to review files had been received from the OCHCA, Environmental Division. This constitutes a data gap as defined in the ASTM Standard which could potentially impact our ability to evaluate environmental conditions at the Site. Northgate will issue an addendum to this report upon receipt of the files if information in the files changes the conclusions or recommendations provided in this report. There were no other limiting conditions.

2.4 User Reliance

This report has been prepared for the exclusive use of Aera and their subsidiaries, affiliates, partner, partnerships, and lenders in evaluating environmental conditions at the Site. Others may not rely on the information contained in this report without the express written consent of Northgate.

3.0 SITE DESCRIPTION

3.1 Site Location and Legal Description

The Site is consists of 265 acres of land covering nine non-contiguous parcels located on the east and west sides of Valencia Avenue at the intersections with Lambert Road, Carbon Canyon Road, and Rose Drive in Brea, California, identified as the Brea 265 Property. For the purpose of this report, the Brea 265 Property has been divided into two separate properties for ease of geographic reference in describing historic Site operations, specific locations of potential environmental concerns, and current Site conditions. An overall Site Vicinity Map is shown on Figure 1 and a Site Plan with the property designations is shown on Figure 2. The properties are defined as follows:

- The 100-Acre Lease Property - The 100-Acre Lease Property consists of two parcels totaling 100 acres located west of Valencia Avenue. The property is split into northern and southern sections by Lambert Road. The area north of Lambert road includes APN 320-073-07 which is identified as 2601 Valencia Avenue. The area south of Lambert road includes APN 320-073-29 which is identified as 2501-2811 Valencia Avenue. This property is developed with an active oil production field and agricultural operations including a nursery and an organic food growing business.
- The 165-Acre Lease Property - The 165-Acre Lease Property consists of seven contiguous parcels located east of Valencia Avenue, south of Carbon Canyon Road, north of Blake Road, and northeast of Rose Drive. It includes APNs 322-031-01, -12, -13, -14, -19, -21, and -24. There are no street addresses associated with the 165-Acre Lease Property.

3.2 Site Vicinity General Characteristics

The Site consists of approximately 265 acres of land developed with active oil fields and oil production facilities, and agricultural related businesses. The Site is located in an area of mixed residential and industrial development, including oil production operations.

3.3 Geology and Groundwater

3.3.1 Geology

The Site is located in the Peninsular Range geomorphic province, and within the Los Angeles physiographic basin. It is near the southern flank of the Puente Hills, which form the northeastern border of the Los Angeles Basin locally. The Puente Hills are part of the Puente Block, an elevated fault block located between the Whittier fault zone to the south and Chino

fault zone to the east and north. The Whittier fault zone is a right-lateral strike-slip fault with some reverse slip located approximately 2,500 feet northeast of the Site. Movement along the Whittier fault zone is Holocene in age (10,000 years ago to the present), and largely responsible for the uplift of the Puente Hills (SCEC, 2003).

The Puente Hills are underlain by an assemblage of approximately 16,000 feet of Cenozoic rocks overlying a Mesozoic basement of granitoid plutonic rocks that contain foliated greenshist. Exposed bedrock near the Site consists of marine clastic sedimentary rocks of the Upper Miocene Puente Formation that was laid down over thin Cretaceous age igneous basement (Yerkes, 1965).

The Puente Formation is composed of fine-grained turbidite, flysch, and ash deposits high in organic material. The high heat flow emanating through the thin basement complex facilitated conversion of the organics to petroleum. The fine-grained source sediments underwent diagenesis and cementation to become the relatively impermeable bedrock exposed in the core of the Puente Hills today. The Puente Formation is overlain by the lower and upper members of the Pliocene Age Fernando Formation.

The Fernando Formation is a marine mudstone, siltstone, and sandstone. Rocks exposed near the Site consist of marine clastic rocks of the Sycamore Canyon Member, the uppermost member of the Fernando Formation (Yerkes, 1972). The partial section of the Sycamore Canyon Member exposed south of the Whittier fault zone consists of thick-bedded, coarse-grained to pebbly sandstone that contains two zones of hard limy concretions.

Subsidence and deposition continued in the Los Angeles Basin through Pliocene times, with the margin of the basin exposed in the Puente Hills. At the end of the early Pleistocene, the marine shoreline was near the Puente Hills, and alluvial fans and terrace deposits accumulated in the area. In the Site vicinity semi-consolidated poorly sorted earthy and clayey gravel, sand, and silt were deposited in marine terraces and non-marine alluvial fans during the Late Pleistocene, and erosion of those deposits produced Quaternary to recent alluvium that blanket the lowlands.

Soils exposed at the Site are mapped as Quaternary marine terrace deposits. Localized areas of the Site contain lenses of fill placed for oil field roadways and drill pads (Morton 1981 and 2004).

3.3.2 Groundwater

The Site is located on the northern edge of the Coastal Plain of Orange County, a sub-unit of the Central Plain of the Orange County Groundwater Basin. The Orange County Groundwater Basin

is a northwest-trending elliptical syncline filled with alluvium. The syncline is bounded by the Puente Hills and Whittier Fault to the northeast, the Santa Ana Mountains and San Joaquin Hills to the southeast, and the Newport-Inglewood Fault to the southwest.

The Site is located within the Forebay area of the Orange County Groundwater Basin, in the Yorba Linda subbasin. The Yorba Linda subbasin has very little groundwater pumping due to the high total dissolved solids concentrations and low transmissivity (Warne, 1961). Groundwater from the subbasin flows southward into the main groundwater basin since the limited groundwater production is less than the natural replenishment from the Chino Hills.

The topography of the Site is gently sloping with drainage flowing primarily to the south in various natural drainages that eventually run to storm drains, channels, or seasonal streams. Near the ground surface, groundwater generally exists in zones beneath the arroyo drainages, or as discontinuous perched water zones in the sediments.

According to the Orange County Water District groundwater elevation contours in the Principal Aquifer zones map (June 2014), the principal aquifer zone is presently at approximately 280 feet bgs in the Site vicinity (Woodside, 2015). The principal aquifer zone is where most of the groundwater production occurs in the Site vicinity. At a corrective actions site located approximately one mile southeast of the Site, in March of 2006 the average depth to groundwater beneath the former Arco service station site was approximately 88 feet below ground surface, and the groundwater flow direction was to the southwest at a gradient of 0.02 feet per feet (DEC, 2006).

3.4 Current Use of the Property

The Site is primarily developed as an active oil production field. Portions of the Site are utilized for agricultural operations including a nursery, an organic food growing business, and a seasonal tree farm. The remainder of the Site is occupied by dirt roads and vacant land.

3.5 Description of Structures, Roads, Sewage, and Potable Water Sources

The Site is currently developed with approximately 104 oil wells, some of which are still operational, three oil field injection wells, a vapor recovery system, a dehydration unit, a production unit with a tank farm, and associated pipelines and manifolds. Several temporary greenhouse structures are present on the 100-Acre Lease Property for the agricultural operations. All roads throughout the Site are unpaved dirt roads. No water or sewage connections are present at the facility.

3.6 Current Uses of Adjoining Properties

The Site is bordered to the north, northwest, and northeast by mixed use residential development constructed in the 1990s and 2000s on land formerly occupied by active oil field operations. The Olinda Alpha landfill is located approximately 0.60-miles north of the Site. To the east, the Site is bordered by land associated with the Carbon Canyon Dam flood control area and the Carbon Canyon Regional Park. A school, a sports park, and an electrical substation followed by East Birch Street then industrial businesses are located to the south of the 100-Acre Lease Property. Rose Drive and Blake Road followed by residential development border the 165-Acre Lease Property to the south. The Site is bordered to the west by residential development constructed in the 1980s, which was formerly utilized for agricultural purposes and oil fields.

4.0 USER PROVIDED INFORMATION

4.1 Environmental Liens or Activity and Use Limitations

Two Preliminary Title Reports for the property, prepared for Aera Energy by First American Title Insurance Company dated March 14, 2002 and November 24, 2008, were provided for Northgate's review. These documents indicate the presence of numerous easements, agreements, rights of way, leases and licenses primarily related to oil field operations such pipelines, oil transport, construction, utilities and maintenance. However, no specific environmental liens related to current or historic environmental conditions or other related use limitations are included in the Exclusions sections of the reports. The property is not listed on the LEINs or LIENS2 regulatory databases. Copies of the title reports are provided in Appendix A.

Northgate was not provided with any information indicating that the property value of the Site has been reduced due to environmental issues.

4.2 Specialized Knowledge

Mr. Rich Knowland of Brook Street completed a questionnaire regarding Brooks Street's general knowledge of the Site. Mr. Knowland has been associated with the Site for approximately five months. He is not aware of any cleanup liens against the Site; however, he is aware that the Site has land and activity use limitations as a result of the active oil field operations. Mr. Knowland noted that he is aware of residual oil sumps, seeps, and chemical use at the Site as a result of the current and historic oil field operations. He is not aware of any cleanup activities, chemicals stored at the Site, or litigation relevant to hazardous substances at the Site. Mr. Knowland indicated that he is not aware of any assessment reports for the Site, except for reports regarding hydrogeologic conditions that were provided to Northgate for review. A copy of the questionnaire is provided in Appendix B.

4.3 Reason for Performing the Phase I ESA

The Phase I ESA was conducted to provide information on the environmental conditions of the property in support of the preparation of an environmental impact report and Site development.

5.0 RECORDS REVIEW

5.1 Standard Environmental Record Sources

To determine if the Site has documented environmental concerns, or if other sites with documented environmental concerns exist within the search radii of the Site prescribed by ASTM 1527-13 and *All Appropriate Inquiry*, Northgate reviewed a summary of regulatory agency databases prepared by Environmental Data Resources, Inc. (EDR). In addition, where appropriate, we reviewed local regulatory agency files for additional specific information regarding sites identified in the EDR report judged to be of possible concern to the subject Site. The EDR report presenting a summary of the agency databases reviewed and a map showing the location of the identified sites is provided as Appendix C (EDR, 2017a). The results of the database search and follow-up agency file review are summarized below.

Copies of information obtained from the agency file reviews for the Site are included in Appendix D. A Current and Historic Site Features Map for the 100-Acre Lease Property is shown on Figure 3 and a Current and Historic Site Features Map for the 165-Acre Lease Property is shown on Figure 4.

5.1.1 Site

The Site is listed on the LUST, UST, Historic UST, UIC, ERNS, and HAZNET regulatory databases. The LUST, UST, Historic UST, and ERNS database listings are associated with the 100-Acre Lease Property at 2701 Valencia Avenue, and historic operators Shell Service Station and Shell Western Oil. Available information indicates that three USTs were formerly present on the 100-Acre Lease Property, including a 555-gallon gasoline UST, a 555-gallon diesel UST, and a 1,000-gallon gasoline UST. The LUST database refers to soil at the Site was impacted by the release of diesel fuel, additives, and gasoline from one or more of the USTs. A previous Phase I ESA prepared for the Site (GeoSoils, 1992) indicated that soil was locally impacted beneath the tanks by benzene at depths up to 90 feet bgs. No soil excavation or other remediation was performed in connection with the release. The case received regulatory closure from the OCHCA in 1991 as contamination was explored, characterized, and left in-place as an OCHA-approved no-action alternative.

The Site is also listed on the UIC database related to the presence of both plugged and active/inactive injection wells associated with oil field waste water disposal and other oil field operations.

The Site is also listed on the HAZNET database related to the storage, bulking, and off-Site transfer of approximately seven tons of unlisted product in 2012. This listing is identified at 2843 Valencia Avenue and refers to the Southern California Edison transformers located on the northwester portion of the 165-Acre Lease Property.

The EDR database report in Appendix C includes a WMUDS/SWAT database listing for "Landfill Condensate" associated with the Olinda Alpha Landfill, located at the intersection of Valencia and Carbon Canyon Road. It should be noted that the WMUDs database tracks a variety of waste inventory management unit information; it is not presently clear whether this listing refers to waste removed from that Site or wastes that have been disposed of at that Site. Our discussion with an Orange County Waste and Recycling department representative indicated that there are no Olinda Alpha landfill operations at that location. The representative suggested that the intersection may be a connection point for a landfill condensate discharge line with the main sanitary sewer. No further information was available.

5.1.2 Off-Site Sources

The regulatory agency database search prepared by EDR indicates the presence of 81 agency-listed sites located within an approximate one-mile radius of the Site. The EDR database report containing a list of the agency databases searched is attached in Appendix C. Facilities with documented releases impacting groundwater located within 0.25 mile upgradient and/or cross-gradient of the Site, or otherwise judged to be of potential impact to soil, soil vapor, or groundwater quality at the Site, are summarized in the table on the following pages.

Property Name	Agency Database	Location Relative to Site	Potential Environmental Concern
Carbon Canyon Rd. Widening Project - Valencia Avenue and Carbon Canyon Road, Brea	ENVIROSTOR	Adjacent to the north (upgradient) of the Site	This facility was listed on the Envirostor database as of 2001 as referred to a local agency. No additional information was available. Given the apparent purpose of this project for road widening and the lack of documented impacts, this facility does not appear to represent a potential threat to soil, soil vapor, and/or groundwater quality at the subject Site.
Santa Fe Energy Company - 17001 Carbon Canyon Road, Brea	LUST, RCRA SQG, Hist. UST, SWEEPS,UST, CA FID UST, UST, EMI, Hist. CORTESSE, and ENVIROSTOR	Approximately 25 feet north and east (upgradient) of the Site	This facility was identified as an oil field property and a LUST facility with a reported release of gasoline impacting soil. A closure letter from 1996 indicated that soil excavation and removal was conducted to remediate the impacts prior to receiving regulatory closure. No additional information was available for this facility. This property was partially redeveloped in the late 1990s as a large residential complex. Given the regulatory closure of the facility and the current residential development, there is no direct evidence that this facility appears to represent a potential threat to soil, groundwater, and/or soil vapor quality at the subject Site, but little information is available.
Olinda Ranch Elementary School – 17001 East Carbon Canyon Road, Brea	ENVIROSTOR, and SCH	Approximately 25 feet north and east (upgradient) of the Site	This facility was listed on the Envirostor database as part of an oil field property that historically consisted of sumps, containment areas, wells, and pipelines. A Phase I and Phase II report was prepared for this facility in 1995. A Remedial Action Plan was prepared under the oversight of the OCHCA in 1999. After Department of Toxic Substances Control (DTSC) reviewed the facility information and recommended preparation of a Preliminary Endangerment Assessment in 2000, the decision was made not to proceed with the development of this project and no further investigations were conducted. Given that this project was not developed, and this area is known to have received regulatory closure and then subsequently redeveloped as a residential development, as described above, this facility does not appear to represent a potential threat to soil, groundwater, and/or soil vapor quality at the subject Site.

Property Name	Agency Database	Location Relative to Site	Potential Environmental Concern
3678 Pheasant Lane, Brea	Hist. Cleaners	Approximately 215 feet north and east (upgradient) of the Site	This facility is listed as an EDR historic dry-cleaning facility for the year 2008. No other regulatory listings are included for this location. Based on the regulatory information reviewed, it appears unlikely that dry cleaning was performed at this location. Therefore, this facility does not appear to represent a potential threat to soil, groundwater, and/or soil vapor quality at the subject Site.
Columbia Sterns Middle School – Lambert Road and Valencia Avenue, Brea	ENVIROSTOR, and SCH	Adjacent to the east (up to cross-gradient) of the 100 Acre Lease portion of the Site	This facility is listed on the Envirostor database as a former oil field property that would have required DTSC oversight. No reports were on file with the exception of an agreement with DTSC to investigate the property. The facility has been listed as inactive since 2002. No other information was provided. Given that the land use of this facility is the same as the subject Site and unlikely to impact the Site more than historic Site operations, this facility does not appear to represent a significant threat to soil, groundwater, and/or soil vapor quality at the subject Site.
Tonner Hills Apartment Homes/Tonner Hills SSP - Lambert Road and Valencia Avenue, Brea	NPDES UIC	Adjacent to the north and northwest (upgradient) 100-Acre Lease portion of the Site.	This facility was identified on the NPDES database in 2008 related to the construction of an apartment portion of an existing subdivision. The facility was listed on the UIC database for an undated report of a plugged flood well that appears to be related to the construction of the apartments. No other information was provided. Based on the information available and the current residential development at the facility, it does not appear to represent a threat to soil, groundwater, and/or soil vapor quality at the subject Site.
Carbon Canyon Regional Park - 4422 Carbon Canyon Road, Brea	Historic UST and HAZNET	Adjacent to the east (up to cross-gradient) of the 165-Acre Lease portion of the Site	This facility was identified on the Historic UST database for a 1,000-gallon UST containing fuel that was installed in 1977. Orange County was listed as the owner of the UST in 1988. The facility was also listed on the HAZNET database for a hazardous waste manifest of asbestos containing material. No additional information was available for this listing. Based on the information available and the current development at the facility, it does not appear to represent a threat to soil, groundwater, and/or soil vapor quality at the subject Site.

Property Name	Agency Database	Location Relative to Site	Potential Environmental Concern
Beckman Data Center - 3300 East Birch Street, Brea	UST, CA FID UST, LUST, SWEEPS UST, Hist. UST, and NPDES	Approximately 1,000 feet south (downgradient) of the Site	The facility was listed on the UST databases for two active 12,000-gallon diesel fuel USTs installed in 1980. During UST removal activities in 1985, soil impacted with diesel were encountered. The LUST listing received regulatory closure from the OCHCA in 1990 after soil excavation activities were completed. The NPDES database listing refers to construction activities in 2015. No other information was available for the facility. Given the downgradient location and the regulatory closure status of the facility, it does not appear to represent a threat to soil, groundwater, and/or soil vapor quality at the subject Site.
Brea-Olinda Sanitary Landfill	EMI	Approximately 0.50-miles north-northeast (upgradient) of the Site	This facility was identified on the EMI database for air quality releases of organic gases. No other information was provided. Given the upgradient location of this facility and the drainage path traversing north to south through the Site that is reported to have runoff from the landfill, this facility may present a potential threat to soil, groundwater, and soil vapor quality at the subject Site.

5.2 Additional Environmental Record Sources

Northgate contacted local regulatory agencies for information regarding the use or storage of hazardous materials at the Site, and reviewed files at any agency maintaining a file for the subject Site. The following agencies were contacted for information regarding the use or storage of hazardous materials at the Site:

- DTSC EnviroStor Website;
- State Water Resources Control Board (SWRCB) GeoTracker Website;
- National Pipeline Mapping System (NPMS);
- OCHCA, Environmental Health;
- Brea Fire Department;
- Orange County Fire Authority; and
- California Division of Oil, Gas, and Geothermal Resources (DOGGR).

The results of our review are described in the following sections.

5.2.1 DTSC EnviroStor Website

The Site was not listed on the EnviroStor website.

5.2.2 SWRCB GeoTracker Website

The Site was listed on the GeoTracker website for releases from gasoline and diesel USTs impacting soil at the Site. The listing identifies Shell Western Oil Products as the responsible party for the release referenced at 2701 Valencia Avenue. The release was reported in 1988 and received regulatory closure from the Orange County Local Oversight Program and the Regional Water Quality Control Board on August 20, 1991. No further information was available, and no reports or documents were available for review.

5.2.3 National Pipeline Mapping System (NPMS)

Northgate reviewed the NPMS on-line mapping system for the subject Site. Three active pipelines were identified to abut or traverse the Site. The first pipeline is owned and operated by Exxon-Mobil and is listed to contain gasoline. The pipeline originates at the intersection of Valencia Avenue and Lambert Road and extends to the west along or beneath Lambert Road. A second gasoline transmission pipeline owned and operated by Exxon-Mobil begins at the same intersection and extends to the east along or beneath Carbon Canyon Road before turning south at the eastern boundary of the Site and continuing south to the southeastern corner of the Site near Blake Road and Rose Drive. The third pipeline is owned and operated by Southern California Edison and is listed to contain natural gas. The pipeline is listed on or abutting the

Site and traverses the southern tip of the Site at Rose Drive. No accidents or incidents are identified for the pipelines at the Site or in the vicinity of the Site. The presence of these pipelines represents a potential environmental threat to the soil, groundwater, and/or soil vapor quality at the subject Site.

5.2.4 OCHCA, Environmental Health

Northgate submitted a file review request to the OCHCA. However, at the time this report was prepared, no response had been received. Upon receipt, if the review of the files changes the conclusions and recommendations provided, Northgate will issue an addendum to this report.

5.2.5 Brea Fire Department

Northgate submitted a request to the City of Brea, Fire Department using electronic mail. The agency referred Northgate to the OCHCA for records regarding the use, storage, or release of hazardous materials at the Site.

5.2.6 California Division of Oil, Gas, and Geothermal Resources

Information available on the California DOGGR web site indicates that over 100 active, closed, and abandoned oil and gas wells are located on the Site. Additional wells are located to the north, south, and west of the Site.

According to the EDR GeoCheck® - Physical Setting Source Addendum, located in the Radius report (Appendix C), over a hundred oil and gas wells are located on the Site and 745 others are located within 1-mile of the Site; generally to the north of the Site.

5.3 Other Environmental Issues

Northgate performed a reconnaissance-level evaluation of other environmental issues, as outlined in Section 13.1.5 of ASTM E1527-13.

5.3.1 Floodplain Maps

Northgate viewed an online version of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Maps #06059C0061J and #06059C0062J each with effective date of December 3, 2009. According to the FIRM, the majority of the Site is located in Flood Zone X – areas determined to be outside the 0.2% chance floodplain with the exception of a narrow channel identified as Carbon Canyon Channel that traverses the southern tip of the property. This channel is listed as Zone A with a 1% annual chance flood discharge contained in channel.

5.3.2 Radon

The California Department of Health Services (DHS) online list of indoor radon levels indicates that two samples, radon concentrations from five indoor air samples collected in zip code area 92823 were greater than 4.0 pico-curies per liter (pCi/L) (DHS, 2010). No data was included for the portion of the Site with the zip code of 92821. According to the EDR Radius Report (Appendix C), the federal Environmental Protection Agency (EPA) radon zone for Orange County is Zone 3 (indoor average level less than or equal to 4 pCi/L).

The State of California Division of Drinking Water and Environmental Management maintains a database of radon test results indicating that out of 30 samples collected in Orange County, all of the reported sample results in the living area-first floor were less than 4 pCi/L. The DHS and the EPA recommend that some form of mitigation be conducted for houses with indoor radon concentrations of 4 pCi/L or greater.

These results indicate that radon gas may constitute a potential environmental concern at the Site.

5.4 Land Use History

Information on historical land use at the Sites and adjacent area was evaluated by reviewing historic aerial photographs, maps, and other documents. A summary of our investigation findings is presented below.

5.4.1 Aerial Photographs

Northgate reviewed historic aerial photographs of the Sites from 1938, 1946, 1952, 1963, 1972, 1977, 1989, 1995, 2005, 2009, 2010, and 2012 obtained from EDR (EDR, 2017b). Copies of the aerial photographs are provided in Appendix E. A summary of our aerial photograph review is presented below.

Year: 1938	**Scale:** 1" = 1,000'	**Source:** USDA

Site Description:

100-Acre Lease Property: This property is shown as primarily developed as an oil field with multiple oil wells and dirt roads. An oil processing area is present in the central portion of the property with three sumps in the area. An additional sump is shown to the south of the oil processing area and two additional sumps are present in the southwestern corner of the property. Multiple structures are present on the northern portion of this property.

165-Acre Lease Property: This property is shown as primarily vacant land with several oil wells in the northern portion of the property. Multiple sumps are present throughout the central and southern portions of this property. A large pond or "sump" is located across the southwestern boundary of the property. A road is present in the northwestern portion of the property.

Vicinity: The area located north of the Site is shown as operating oil fields. Agricultural and vacant land is present to the east, south, and west of the Site.

Year: 1946	**Scale:** 1" = 1,000'	**Source:** USGS

Site Description:

100-Acre Lease Property: This property appears similar to the 1938 photograph except that the oil processing area is no longer present in the central portion of the property and a small orchard is now present to the west of this area. Sumps are still present in the southern portion of this property.

165-Acre Lease Property: The northern and portions of the property is shown as an operating oil field with multiple oil wells and dirt roads throughout the area. The southern portion of the Site is shown as vacant land. The pond/sump located across the southwestern boundary of the property has reduced in size.

Vicinity: The vicinity appears similar to the 1938 photograph except that oil field operations to the north of the Site appear to have expanded. Valencia Avenue is now present between the two properties.

Year: 1952	**Scale:** 1" = 1,000'	**Source:** USDA

Site Description:

100-Acre Lease Property: This property appears similar to the 1946 photograph.

165-Acre Lease Property: This property appears similar to the 1946 photograph.

Vicinity: The vicinity appears similar to the 1946 photograph.

Year: 1963	**Scale:** 1" = 1,000'	**Source:** USGS

Site Description:

100-Acre Lease Property: This property appears similar to the 1946 photograph except that a nursery is now shown on the northwestern portion of this property.

165-Acre Lease Property: This property appears similar to the 1946 photograph.

Vicinity: The vicinity appears similar to the 1946 photograph except that the Carbon Canyon Road is now partially completed to the east of the Site and the Carbon Canyon Dam is under construction east of the road. The pond/sump across the southwestern boundary of the 165-Acre Lease Property is no longer present and Rose Road is under construction in this area.

Year: 1972	**Scale:** 1" = 1,000'	**Source:** USGS

Site Description:

100-Acre Lease Property: This property appears similar to the 1963 photograph except that the nursery in the northwestern portion of this property has expanded and includes orchards areas. A tank farm is now shown in the central area of the southern portion of this property in the location of the dehydration unit. Sumps are present to the east of this area.

165-Acre Lease Property: This property appears similar to the 1963 photograph except that a tree farm is now shown in the southern portion of this property.

Vicinity: The vicinity appears similar to the 1963 photograph except that residential development has expanded in the vicinity of the Site.

Year: 1977	**Scale:** 1" = 1,000'	**Source:** Brewster

Site Description:

100-Acre Lease Property: This property appears similar to the 1972 photograph.

165-Acre Lease Property: This property appears similar to the 1972 photograph except that agricultural areas in the western portion of this property have expanded.

Vicinity: The vicinity appears similar to the 1972 photograph except that Carbon Canyon Road has been fully constructed and extends from Valencia Avenue to the east along the northern boundary of the 165-Acre Lease Property.

Year: 1989	**Scale:** 1" = 1,000'	**Source:** USDA

Site Description:

100-Acre Lease Property: This property appears similar to the 1977 photograph.

165-Acre Lease Property: This property appears similar to the 1977 photograph except that agricultural operations in the southern portion of the 165-Acre Lease Property have expanded.

Vicinity: The vicinity appears similar to the 1977 photograph except that Lambert Road has been constructed through the 100-Acre Lease Property and connects to Carbon Canyon Road at Valencia Avenue. Extensive residential development is now shown to the west. Industrial development has expanded to the south of the 165-Acre Lease Property along Birch Street.

Year: 1995	**Scale:** 1" = 500'	**Source:** USGS

Site Description:

100-Acre Lease Property: This property appears similar to the 1989 photograph.

165-Acre Lease Property: This property appears similar to the 1989 photograph.

Vicinity: The vicinity appears similar to the 1989 photograph.

Year: 2005	**Scale:** 1" = 500'	**Source:** USDA/NAIP
Site Description: 100-Acre Lease Property: This property appears similar to the 1995 photograph. 165-Acre Lease Property: This property appears similar to the 1995 photograph except that the agricultural operations appear to have reduced. Vicinity: The oil fields located to the north of the Site have been redeveloped as a large residential neighborhood. A substation is under construction to the south of the 100-Acre Lease Property.		

Year: 2009 & 2010	**Scale:** 1" = 500'	**Source:** USDA/NAIP
Site Description: 100-Acre Lease Property: This property appears similar to the 2005 photograph except that a nursery is now present in the portion of the property located north of Lambert Road. The former plants and nursery located south of Lambert Road have reduced and this area is primarily shown as vacant land. 165-Acre Lease Property: This property appears similar to the 2005 photograph. Vicinity: The vicinity appears similar to the 2005 photograph except that sports fields are now present to the south of the 100-Acre Lease property. Industrial and residential development has expanded to the south and southeast of the Site.		

Year: 2012	**Scale:** 1" = 500'	**Source:** USDA/NAIP
Site Description: 100-Acre Lease Property: This property appears similar to the 2010 photograph. 165-Acre Lease Property: This property appears similar to the 2010 photograph. Vicinity: The vicinity appears similar to the 2010 photograph except that a residential development is now shown to the north of the 100-Acre Lease Property beyond the nursery operations. The property to the southwest of the Site is shown as vacant graded land with no evidence of ponds or standing water.		

The aerial photographs show that both the 100- and 165-Acre Lease properties were developed as oil fields as early as 1938. The oil field operations included visible sumps areas observed on both properties. Sumps are identified at the Site as unlined areas historically utilized for the storage of waste oil and oil field related waste liquids. An oil processing area is shown in 1938 on the 100-Acre Lease Property that was not shown after 1946. The dehydration unit is shown in

1972 in the central portion of the 100-Acre Lease Property. The southern portion of the 165-Acre Lease Property has historically been shown as vacant and/or agricultural land.

5.4.2 Sanborn Maps

EDR has indicated that Sanborn map coverage is not available for the Site.

5.4.3 Topographic Maps

Northgate reviewed historic topographic maps for the Site obtained from EDR for the years 1896, 1898, 1901, 1902, 1925, 1928, 1935, 1942, 1949, 1950, 1964, 1972, 1981, and 2012. Copies of the topographic maps are provided in Appendix F (EDR, 2017c). Information from the topographic maps is summarized below.

Quadrangle: Anaheim		**Scale:** 1:62,500	**Series:** 15 Minute
1896-1901:	The Site is shown as vacant land. No roads or development are present through the Site or in the vicinity. A stream traverses the northeast corner of the Site. Placentia is mapped to the southwest of the Site and Olinda is mapped to the northeast of the Site. A railroad is shown to the southeast and through the northeastern corner of the Site in 1901. A road is mapped through the central portion of the Site in 1901.		
Quadrangle: Corona		**Scale:** 1:125,000	**Series:** 30 Minute
1902:	The Site and vicinity appear similar to the 1901 map.		
Quadrangle: La Brea		**Scale:** 1:24,000	**Series:** 7.5 Minute
1925-1928:	The Site and vicinity are unmapped at this time.		
Quadrangle: Olinda		**Scale:** 1:31,680	**Series:** 7.5 Minute
1935:	The northern portion of the 100-Acre Lease Property is improved with multiple structures including a row of buildings along a roadway. A smaller sump is present in the central portion of the 165-Acre Lease Property and a large pond or sump is mapped in the southwestern portion of the property and extends off-Site to the southwest. A creek traverses the southeastern corner of the 165-Acre Lease Property. Olinda Boulevard is mapped to the south of the 100-Acre Lease Property and a road in the location of the present day Valencia Avenue is now present. The Pacific Railroad is mapped to the southwest of the Site and a reservoir is mapped farther southwest.		

Quadrangle: Anaheim	**Scale:** 1:50,000 **Series:** 15 Minute
1942:	The 100-Acre Lease Property is shown as fully developed with oil wells and several roads. The northwestern portion of the 165-Acre Lease Property is also developed with oil wells. A stream is present through the central portion of this property traversing from north to south and another creek traverse the southeastern corner of the Site. The remainder of the property is shown as vacant land. Oil wells are mapped to the north of the Site. Agricultural orchards are mapped to the southwest of the 100-Acre Lease Property. Oil wells are mapped farther south of the Site beyond the railroad line. Two schools are mapped to the east of the Site.
Quadrangle: Yorba Linda	**Scale:** 1:24,000 **Series:** 7.5 Minute
1949-1950:	The Site and vicinity appear similar to the 1942 map except that the pond or sump in the southwestern portion of the 165-Acre Lease Property is now labeled as an oil sump. The oil fields to the north of the Site are now identified as the Olinda Oil Field.
1964	The Site and vicinity appear similar to 1950 except that Rose Road is now present along the southwestern perimeter of the 165-Acre Lease Property. Orchards are now mapped on the central portion of the 100-Acre Lease Property and on the southern portion of the 165-Acre Lease Property. Industrial development is now shown to the south of the Site.
1972:	The Site and vicinity appear similar to the 1964 map except the Carbon Canyon Dam with a spillway, gauging station, and aqueduct are mapped immediately east of the Site.
1981:	The Site appears similar to the 1972 map except that Lambert Road is now shown to connect to Carbon Canyon Road through the northern portion of the Site at Valencia Avenue. Large residential and industrial developments are now mapped further to the west and south of the Site.
2012:	The Site and vicinity are shown mapped without any marked characteristics. Carbon Canyon Creek is shown as a wet area to the east of the Site. Residential development is now mapped immediately to the north and west of the Site. The vicinity is shown as urban development.

The Site is shown as vacant land prior to the 1930s, at which time it was shown developed as oil fields that included several oil sump areas across both the 100- and 165-Acre Lease Properties. Agricultural use is identified at the Site starting in the 1930s. A stream channel is shown through the central portion of the 100-Acre Lease Property starting in the 1930s. The Site use remains relatively unchanged to the present.

5.4.4 City Directories

Northgate reviewed a summary of local city directory listings for the Site and vicinity (specifically Valencia Avenue), available at approximate five year intervals from 1972 to 2013, obtained from EDR. A copy of the EDR city directory search is provided in Appendix G

(EDR, 2016d). Limited address listings were available for the Site and vicinity. The Site was only identified in the directory as 2601 Valencia Avenue. Getty Oil and "Babylon AP" were listed in 1972. Bergen Nursery was listed between 1975 and 2013. Crestmont Oil and Gas was listed at the Site between 1975 and 1985. Imperial landscaping was identified in 1975 and L&J Backhoe Services was listed in 1985. Professional Growers, Inc., an apparent food growing company, was listed in 2003 and Olinda nursery was identified at the Site in 2008. No other listings were identified; however, the Site was known to be developed and occupied since the 1920s as an oil well field initially under the ownership and operation of Shell Oil Company. Listings adjacent to the Site and in the vicinity include individuals, nurseries, horse farm, oil companies, trucking and office listings.

5.5 Interviews

During the Site reconnaissance Northgate interviewed Mr. Michael Klancher of Aera who has been associated with the Site for many years. Mr. Klancher indicated that the Site has historically been occupied by oil field operations initially under the ownership and operation of Shell Oil Company, but now operated by Linn Operating Company. Mr. Klancher indicated that the Site is developed with a number of operating and idle oil wells, some injection wells, a dehydration unit, a vapor recovery system, and a production unit with a tank farm. He also reported that the drainage channel present in the central portion of the 100-Acre Lease Property has been observed to flow with liquid, even during non-rain events, that reportedly appears to be originating from the off-Site and upgradient Olinda Alpha Landfill. Mr. Klancher provided Northgate with copies of maps and reports available for the Site as discussed in Section 5.6 below.

5.6 Previous Reports

Northgate reviewed a prior Phase I ESA report covering a portion of the Site prepared by GeoSoils, Inc. (GeoSoils) on behalf of the Site owner and operator, Shell Western E&P, Inc., dated July 20, 1992. The report did not include the 100-Acre Lease Property and included a strip of land to the north of the 165-Acre Lease Property across Carbon Canyon Road that is not part of the subject Site for this ESA. The GeoSoils report identified issues associated with the oil field use on the 165-Acre Lease Property that included petroleum hydrocarbon staining, possible methane and hydrogen sulfide gas in the area around the holding tanks, and historic oil sumps. The report concluded that the Site facilities and oil wells would require abandonment prior to development and recommended that a Phase II ESA be conducted to characterize the nature and extent of potential contamination.

The GeoSoils report also identified the removal of two diesel USTs on the 100-Acre Lease Property at the northwestern corner of Valencia and Lambert Road. A release incident was reported for one of these USTs in 1989 and soils were reported to have been impacted to a depth of about 90 feet bgs. One boring advanced at the Site encountered benzene at a concentration of 3 ppm in soil samples collected at 90 feet bgs. The boring was advanced to 190 feet bgs and groundwater was not encountered. No cleanup actions were reported, and the incident received regulatory closure from the OCHCA on August 20, 1991. The second UST was removed in 1990 and a removal report dated December 10, 1990 indicated that no evidence of a release was reported during removal and testing activities.

6.0 SITE RECONNAISSANCE

Current Site conditions were observed during a reconnaissance of the Site and near vicinity by Ms. Nicky Galloway of Northgate on February 16 and 21, 2017. Site photographs from the reconnaissance are attached at the end of this report. Site features observed during the reconnaissance as well as historic Site features are depicted on Figures 3 and 4.

6.1 Methodology and Limiting Conditions

The Site reconnaissance was performed by traversing the Site by motorized vehicle and on foot and the vicinity by motorized vehicle. There were no limiting conditions.

6.2 General Site and Vicinity Conditions

6.2.1 Site

The Site is located along Valencia Avenue at the intersections of Lambert Road, Carbon Canyon Road, and Rose Drive. The Site is developed with an active oil production field, a nursery, and a tree farm. The Site has been divided into two separate properties for ease of geographic reference in describing historic Site operations as summarized in the sections below. The designated Site properties are shown on Figure 2. A summary of the historic Site operations divided by parcel, including a description of the major features, the number of historic oil wells, and a list of observations associated with each feature is provided in Table 1.

The 100-Acre Lease Property

The 100-Acre Lease Property consists of two parcels totaling 100 acres of land located west of Valencia Avenue. The property is split into northern and southern sections by Lambert Road. The northern portion of the property is a dirt-covered lot that developed with 15 oil wells dispersed throughout the area. The eastern portion of the northern lot is occupied by a nursery that includes field plants and greenhouse operations. A drainage channel traverses the center of the lot from north to south with a drainage pipe extending beneath Lambert Road to connect to the continuation of the drainage channel through the southern portion of this property. The drainage channel is reported to originate at the upgradient Olinda Alpha Landfill. A fenced enclosure is present in the central portion of the northern lot with apparent storage structures located within the enclosure. A trailer and concrete pad from an apparent former structure are present to the west of this enclosure. An abandoned process tank labeled to formerly contain crude oil was present near these structures.

The southern portion of the 100-Acre Lease Property is a dirt covered lot that is primarily developed with oil field operations. Twenty-five oil wells are present throughout this area in a nearly grid-like pattern. Staining and oil build up was observed at many of the well heads. Significant staining of the soil surface around the well was observed at oil well 126, located along the eastern perimeter of the Site. One injection well is located in the southwestern corner of the property. The drainage channel from the northern lot continues through the central portion of the property and extends from the northern perimeter to the southern property line where it connects to a concrete lined drainage structure by the adjacent sports fields and school.

A vapor recovery system is located to the west and adjacent to the drainage channel just south of Lambert Road. Vapor recovery systems are typically composed of a scrubber, a compressor, and a switch that are primarily utilized to recover vapors that formed inside completely sealed crude oil or condensate tanks. The vapors are then sucked through the scrubber where recovered liquids are trapped and returned to liquid pipeline systems or tanks and recovered vapors are pumped into the gas lines. The vapor recovery system area at the Site includes an air compressor on a concrete pad, a 150-gallon tote of combustible liquid on a platform over secondary containment, a drip tank that was partially buried in the soil, a 55-gallon drum of gear oil that was approximately one quarter full, a motor located on soil, a scrubber, and a filter. Soil staining was observed in this area, primarily in the vicinity of the motor. Secondary containment structures were also observed to be approximately half full of rain water.

An operating dehydration unit is present to the east of the vapor recovery system beyond the drainage channel. A dehydration unit is typically utilized to remove water from the natural gas stream to meet the pipeline quality standards and typically uses triethylene glycol in the process. The dehydration unit includes an electric motor and a pump located on soil, a large AST labeled as empty, a former wash tank that contained combustible gas/oil/water, a sump located within secondary containment, an empty fiberglass AST on the soil, an AST in secondary containment that was listed as out of service, two heater treaters, an air compressor, a 55-gallon drum of gear oil, and a 100-gallon tote and a 110-gallon tote on a platform over soil without secondary containment. Staining was observed in the area, primarily in the vicinity of the concrete pad for the electric motors and pumps. The secondary containment structure around the former wash tank was observed to be broken. Secondary containment structures were also observed to be approximately half full of rain water.

Process pipelines were observed to traverse the open drainage ditch. Five manifolds are also present across this portion of the Site. These manifold structures are composed of an arrangement of piping and/or valves designed to control, distribute, and monitor fluid flows, which may include controlling well operations, treatment fluids, and crude oil flows. Three

transformers owned and operated by Southern California Edison are present within a fenced enclosure in the central portion of the Site near Valencia Avenue. No staining was observed around these transformers.

The 165-Acre Lease Property

The 165-Acre Lease Property consists of seven contiguous parcels that are located east of Valencia Avenue. The property is bordered by Carbon Canyon Road on the north, Blake Road on the south, and Rose Drive on the southwest. This property is primarily covered by dirt and vegetation. The northern and central portions of this property are developed with 61 oil wells dispersed throughout the area and two injection wells. Six manifolds are also present throughout the Site. These manifold structures are composed of an arrangement of piping and/or valves designed to control, distribute, and monitor fluid flows, which may include controlling well operations, treatment fluids, and crude oil flows. Steam pipes are located throughout the property and are primarily located aboveground in the central portions of the property. Petroleum pipelines are also present throughout the property associated with the oil field operations. A fenced enclosure in the northwestern portion of the property contains Southern California Edison owned and operated transformers and electrical equipment. No staining was observed around these transformers.

The Brea Production Unit and Olinda Tank Farm is located in the central portion of this property. The unit and tank farm are operational and include a fin fan, two large ASTs for approximately 300 barrels of crude oil within secondary containment, motors within concrete containment, a compressor, and an air tank. A number of other tanks are also present in this area including two approximate 300-barrel ASTs for crude oil, two 200-gallon tanks, a 55-barrel tank containing approximately seven barrels labeled to contain clarifier water that appear to contain oil field waste water with residual quantities of oil removed during clarifier operations, a tank of "Techni Break," a 110-gallon tote of combustible liquid, and a 165-gallon AST containing approximately 110 gallons of cooling water. The tanks were all located within secondary containment; however, the secondary containment structures were primarily uncovered and many of the areas were observed to be approximately half filled with rain water. An approximate 30-gallon container of clarifier water and a 55-gallon drum of clarifier water were observed in this area and were both approximately half full and located within secondary containment. Soil staining was observed in this area, primarily in the vicinity of the motors.

A carbon filtration tank area is present to the south of the Brea Production Unit and Olinda Tank Farm. This area is surrounded by a fenced enclosure and contains four large ASTs within secondary containment. Two of the tanks are labeled as carbon filtration and the other two tanks are labeled for clay filtration. An approximate 100-gallon tank containing hydrogen peroxide

and an approximate 45-barrel tank containing oxidizer are also present in this area within secondary containment structures. The secondary containment structure for the hydrogen peroxide tank was observed to be approximately half-filled with rain water and had a green sheen on the water surface.

A pipe and storage yard is present to the southeast of the tank farm. This area is soil-covered and currently utilized for the storage of pipes and scrap material, including oil well components. A concrete pad that appears to have been associated with a former tank farm or oil operating area is located to the south of the pipe and storage yard. Partially built secondary containment structures and some associated piping were observed in this area. No staining or surface indications of a release were observed in either area, but these areas appear to have been utilized for historic oil field operations.

The southern portion of this property is primarily vacant land covered by vegetation. A seasonal tree farm that grows pine trees is present in this area. A small, temporary structure occupied by a strawberry sales company is located in the southern most portion of this property. No pesticides were currently observed in this area; however, this portion of the Site has historically been occupied by agricultural operations that may have included the use of pesticides.

6.2.2 Site Vicinity

The Site is bordered to the north, northwest, and northeast by mixed use residential development constructed in the 1990s and 2000s on land formerly occupied by active oil field operations. The Olinda Alpha landfill is located approximately 0.60-miles north of the Site. To the east, the Site is bordered by land associated with the Carbon Canyon Dam flood control area and the Carbon Canyon Regional Park. A school, a sports park, and an electrical substation followed by East Birch Street then industrial businesses are located to the south of the 100-Acre Lease Property. Rose Drive and Blake Road followed by residential development border the 165-Acre Lease Property to the south. The Site is bordered to the west by residential development constructed in the 1980s, which was formerly utilized for agricultural purposes and oil fields.

7.0 PHASE I ESA CONCLUSIONS

This report presents the results of a Phase I ESA performed for an area referred to as the Brea 265 Property, located along Valencia Avenue at the intersections with Lambert Road, Carbon Canyon Road and Rose Drive in Brea, California. The purpose of the investigation is to identify the potential presence of RECs at the Site.

A REC refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment. The following RECs were identified during the course of this assessment:

- The Site has historically been developed as an operating oil well field. Some oil wells are still operational and various levels of ponded oil and ground staining were observed at each well, primarily in the vicinity of the well box. The historic and current operations of the oil well field, including the oil wells, tank farms, and pipelines, are associated with potential releases that could significantly impact future residential development of the Site. It should be noted that the California Division of Oil Gas and Geothermal Resources generally prohibits construction of residences directly over active or sealed and abandoned oil wells.
- A number of historic oil sumps, including a large former oil pond or sump located in the southwestern portion of the 165-Acre Lease Property that has since been filled in and developed to include Rose Road, are present across both properties of the subject Site. These historic sumps represent a potential threat to soil, groundwater, and/or soil vapor quality at the Site.
- The Site is a defined oil/gas field and is subject to the guidelines and requirements set forth in the OCFA's *Combustible Soil Gas Hazard Mitigation* document that outlines the guidance for the investigation, remediation, and/or mitigation of potentially hazardous concentrations of combustible soil gases associated with the construction and occupancy of a building located on or within the vicinity of an oil/gas field and the OCFA specified areas.
- Petroleum and natural gas pipelines are listed to be present beneath the Site in portions of both the 100-Acre Lease and 165-Acre Lease Properties. These features can be associated with hazardous materials releases.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- Northgate did not identify any CRECs during the course of this assessment.

A HREC refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following HREC was identified during the course of this assessment:

- The 100-Acre Lease portion of the Site has a documented release from a leaking diesel UST that impacted soil. No remedial actions were completed; however, soil was reported to have been impacted up to depths of 90 feet bgs. The facility received regulatory closure from the OCHCA on August 20, 1991. In our opinion, residual contamination associated with this historic release could impact future residential development of the Site, even though no regulatory action is currently required.

Our review also identified the following potential environmental concerns:

- A drainage channel that traverses the 100-Acre Lease Property from north to south that is reported to originate from the Olinda Alpha Landfill located to the north, could contain runoff from the upgradient landfill facility.
- Given the historic use of the Site for agricultural purposes, there is a possibility that pesticides and herbicides may be present in shallow soil in some areas of the Site.
- Test results from indoor air samples collected within the Site zip code area indicate that radon may constitute a potential environmental concern at the Site.
- Injection wells are present at the Site and are subject to many new regulations. Further review of specific requirements for closing out the existing injection wells may be required prior to development of the Site.

Northgate recommends that a Phase II ESA be conducted to evaluate the existing soil, groundwater, and soil vapor conditions at the Site related to these RECs and issues of potential environmental concern. The investigation should include strategic test pits and trenching as well as near surface and shallow soil testing and drilling of deep soil borings. The Phase II ESA results should be used to develop remedial cost scenarios to further understand the potential impacts associated with redevelopment of the Site.

8.0 REFERENCES

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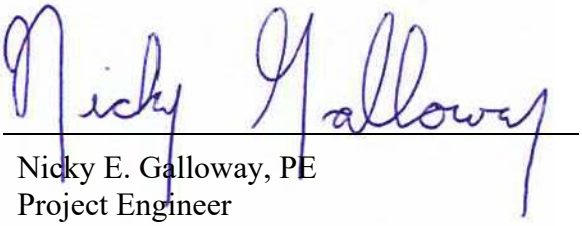
9.0 ENVIRONMENTAL PROFESSIONAL STATEMENT

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312, and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.



Nicky E. Galloway, PE
Project Engineer



Derrick S. Willis
Principal

Qualifications of the Environmental Professionals are provided in Appendix H.

TABLE

TABLE

TABLE 1: SUMMARY OF SITE FEATURES, HISTORICAL OPERATIONS, POTENTIAL ENVIRONMENTAL CONCERNS, AND RECONNAISSANCE OBSERVATIONS

PROPERTY	GENERAL INFO	OTHER GENERAL FEATURES	OBSERVATIONS FROM SITE RECONNAISSANCE IN FEBRUARY 2017								POTENTIAL ENVIRONMENTAL CONCERNS REPORTED IN 2017
			DRAINAGE CHANNEL	**OIL WELLS**	**ABANDONED TANK**	**GENERAL/OTHER**	**FORMER AGRICULTURAL USE**				
100 Acre North of Lambert	**26.65** Acres **320-073-07** APN **17** Oil Wells **0** Manifolds	Drainage Channel; and Abandoned Tank	Drainage channel present in north-south orientation; traverses entire Site. Drainage channel converts to pipe to flow beneath roadways. Reported to originate from upgradient landfill. Process/production pipes cross channel. Water present during recon.	Oil wells throughout area - somer operational and other non-operational. Oil wells are primarily electric with a concrete cellar. Some reported to have been installed as early at early 1900s. Some oil wells have more visible staining around well head/sucker rod.	Old process tank appears to have been moved and abandoned in the north-central portion of the Site and does not appear to have been formerly located in this area. Tank listed to formerly contain crude oil. Appears to have been empty. Location of process tanks from historical aerials.	Historic oil well operations. Several manifolds across Site associated with oil operations. Petroleum pipelines mapped at Site.	Currently used for agricultural operations including a nursery.				- Historic oil well operations - Petroleum pipelines - Manifolds - Drainage channel and potential impacts from dumping, leaks from pipes traversing channel, and upgradient landfill
			VAPOR RECOVERY SYSTEM	**DEHYDRATION UNIT**		**DRAINAGE CHANNEL/PIPES**	**OIL WELLS**	**GENERAL/OTHER**	**FORMER SUMPS**	**FORMER AGRICULTURAL USE**	
100 Acre South of Lambert	**65.53** Acres **320-071-29** APN **26** Oil Wells **1** Injector Well **2** Manifolds	Dehydration Unit; Vapor Recovery System; Drainage Channel/Pipes; and Manifolds	Air compressor on concrete pad, 150-gallon tote of combustible liquid on platform over secondary containment filled with rain water, drip tank about half buried by soil, 55-gallon drum of gear oil about 1/4 full, motor located on soil with visible staining, scrubber, and filter present.	Operating dehydration unit - electric motor and pump on soil (not operating), large AST listed as empty and former wash tank that contained combustible gas/oil/water within broken secondary containment structure. Sump located within secondary containment for AST. Empty fiberglass AST on soil. Out of servce AST in secondary containment partially filled by rain water. Air compressor on oncrete pad in secondary containment. Two empty		Drainage channel present in north-south orientation; traverses entire Site. Drainage channel converts to pipe to flow beneath roadways. Reported to originate from upgradient landfill. Process/production pipes cross channel. Concrete lined drainage outlet structure in south-central portion of Site at border to Brea Sports Park.Water present during recon.	Oil wells throughout area - some operational and others non-operational. Oil wells are primarily electric with a concrete cellar. Some oil wells have more visible staining around well head and sucker rod.	Historic oil well operations. Several manifolds across Site associated with oil operations. Transformers on concrete pad in fenced enclosure near entry to Site from Valencia Avenue. Petroleum pipelines mapped at Site.	10 historic sumps on site between about 1938 to 1995. Former sump areas do not currently operate as sumps and no visible ponding or waste build up was present.	Currently used for agricultural operations including a nursery.	- Staining and operations at vapor recovery system - Staining and operations at dehydration unit - Historic oil well operations - Petroleum pipelines - Manifolds - Drainage channel and potential impacts from dumping, leaks from pipes traversing channel, and upgradient landfill
			OIL WELLS	**MANIFOLDS/PIPELINES/GENERAL/OTHER**	**FORMER SUMPS**						- Historic oil well operations - Petroleum pipelines - Manifolds
165 Acre Fee 2 "North"	**55.52** Acres **322-031-01 and -24** APNs **38** Oil Wells **2** Injector Well (**1** Idle) **4** Manifolds	Manifolds; Steam Pipes; and Southern California Edison Transformer Area.	Oil wells throughout area - some operational and others non-operational. Oil wells are primarily electric with a concrete cellar. Some oil wells have more visible staining around well head and sucker rod.	Southern California Edison transformers and electrical equipment lolcated within fenced enclosures along the western portion of the Site - near Valencia Avenue. Historic oil well operations. Several manifolds across Site associated with oil operations. 55-gallon drum of unknown contents open in water. Petroleum pipelines mapped at Site.	Former sump areas do not currently operate as sumps and no visible ponding or waste build up was present.						
			BREA PRODUCTION UNIT/OLINDA TANK FARM		**CARBON FILTRATION TANK AREA**	**FORMER TANK/PIPE/STORAGE YARD**	**AGRICULTURAL AREA**	**OIL WELLS**	**GENERAL /OTHER**	**FORMER SUMPS**	
165 Acre Fee 3 "South"	**109.54** Acres **322-031-12, -13, -14, -19 and -21** APNs **23** Oil Wells **2** Manifolds	Tank Farm; Carbon Filtration Area; Former Tank Area/Pipe/Storage Yard; Manifold and Steam Pipes; and Agricultural Areas	Fin fan, 30-gallon container water clarifier (~14 gallons), 2 large tanks (about 300 barrels size) in concrete lined secondary containment for curde oil, 75 hp motor within concrete containment about half full of rain water, Two 220-gallon tanks on raised platforms over secondary containment, 55-gallon drums within secondary containment of water clairifer about 60% full, 55 barrel tank (~7 barrels) of water clarifier in secondary containment, tank of "Techhni Break" in secondary containment, compressor, air tank, 110-gallon tote of combustible liquid in secondary containment about 1/3 filled with water, 60 hp motor with visible staining at base, and 165-gallon tank of cooling water (~110 gallons).		Fenced enclosure, header 6 located within the vicinity, four large tanks in secondary containment - 2 for carbon filtration and 2 for clay filtration, hydrogen peroxide tank located in secondary containment structure partially filled with liquid with a green sheen, and tank about 45 barrels in size of oxidizer in secondary containment.	Soil covered area used for the storage of pipes and scrap material. Former tank area in vicinity with concrete pad, aboveground piping, old AST, and single concrete pad within remnants of secondary containment wall.	Open space, currently vacant land covered by soil and plants. Strawberry stand (temporary/mobile structure) on the southernmost portion of the Site. Possible historic use of pesticides in agricultural operations.	Oil wells throughout area - some operational and others non-operational. Oil wells are primarily electric with a concrete cellar. Some oil wells have more visible staining around well head and sucker rod. Oil wells located in vicinity of tank farms.	Historic oil well operations. Several manifolds across Site associated with oil operations. Concrete washout area in the southern portion of the oil field portion of the Site. Dam adjacent to Site to the east. Steam pipes traverse Site. Petroleum pipelines mapped at Site.	Former sump areas do not currently operate as sumps and no visible ponding or waste build up was present.	- Staining and operations at Brea productionunit/Olinda tank farm - Staining and operations at carbon filtration tank area - Former tank area with visible pipes/broken sercondary containment - Historic well operations - Petroleum pipelines - Manifolds - Historic pesticide use in agricultural areas

FIGURES

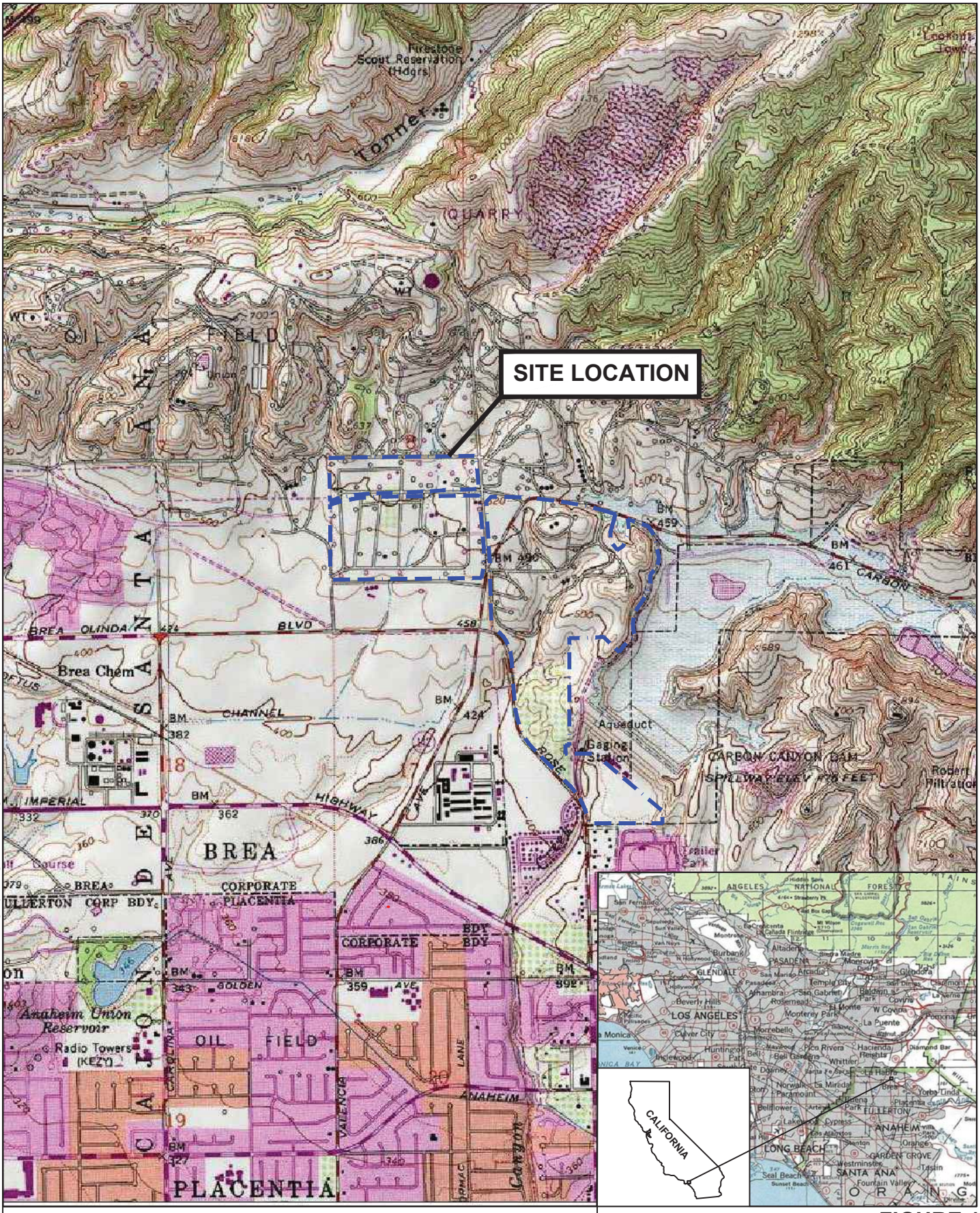


FIGURE 1
Site Vicinity Map

Phase I Environmental Site Assessment
Brea 265 Property - Valencia Avenue and Lambert Road
Brea, California

northgate environmental management, inc.

Project No. 2077.01.01S

G:\Projects\Temp\2077 - Brooks Street\2077.01 - Brea-Olinda Oilfield PIESA\Figures\Figure 1 - Site Location.dwg Layout: Figure 1 User: oleg Feb 28, 2017 - 3:53pm



0 400 800

Scale (Feet)

N

FIGURE 2
Site Plan

Phase I Environmental Site Assessment
Brea 265 Property - Valencia Avenue and Lambert Road
Brea, California

northgate environmental management, inc.

Project No. 2077.01.01S

G:\Projects\Temp\2077 - Brooks Street\2077.01 - Brea-Olinda Oilfield PIESA\Figures\Figure 2 - Site Plan.dwg Layout: 8.5x11-P User: oleg Mar 02, 2017 - 2:02pm

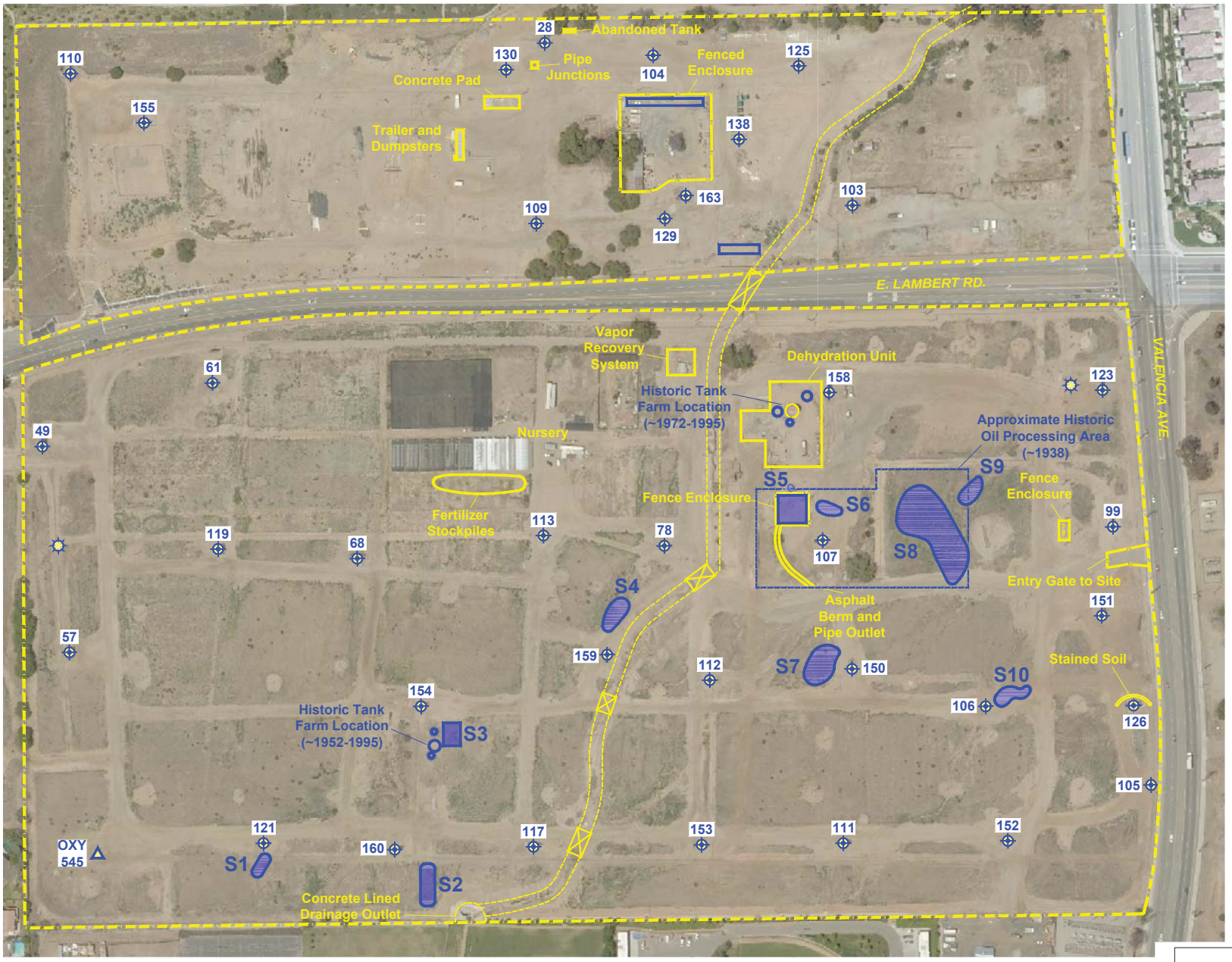


FIGURE 3
Site Features, 100-Acres

Phase I Environmental Site Assessment
Brea 265 Property - Valencia Avenue and Lambert Road
Brea, California

northgate environmental management, inc.

Project No. 2077.01.01S

G:\Projects\Temp\2077 - Brooks Street\2077.01 - Brea-Olinda Oilfield PIES\AF\figures\Figure 3 - Site Plan - 100-acres.dwg Layout: Site Features User: oleg Mar 01, 2017 - 3:39pm

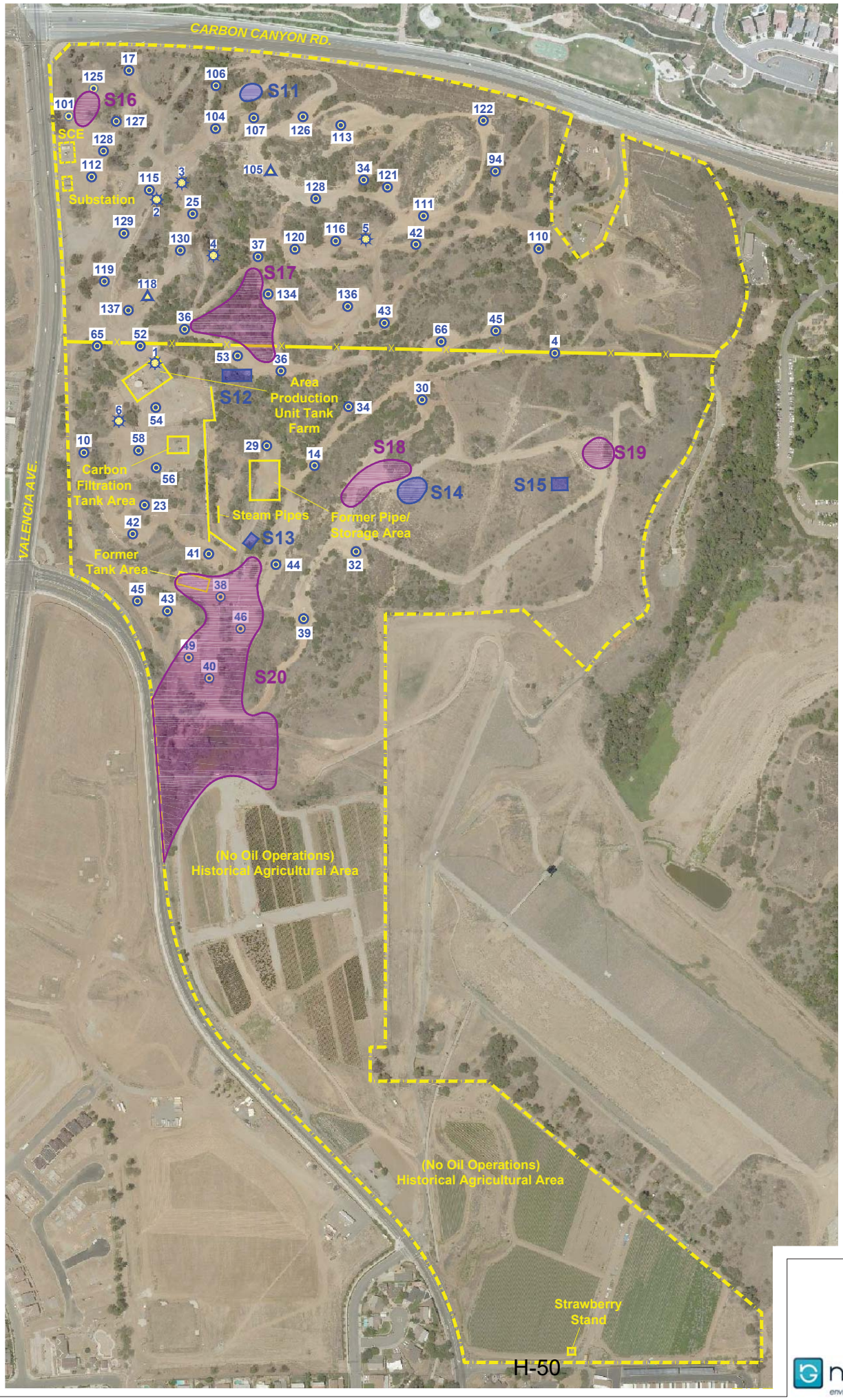


FIGURE 4
Site Features, 165-Acres

Phase I Environmental Site Assessment
Central Property - Valencia Avenue and Lambert Road
Brea, California

northgate environmental management, inc.

Project No. 2077.01.01S

G:\Projects\Temp\2077 - Brooks Street\2077.01 - Brea-Olinda Oilfield PIES\AI\Figures\Figure 4 - Site Plan - 165-acres.dwg Layout: Site Features User: dleg Mar 02, 2017 - 2:01pm

SITE PHOTOGRAPHS



1. The main entry gate located on the west side of Valencia Avenue just south of Lambert Road with access to the southern portion of the 100-Acre Parcel.



2. View of the northern portion of the 100-Acre Parcel from across Lambert Road – view facing north.



3. Typical view of the northern portion of the 100-Acre Parcel with a typical oil well.



4. Typical oil well head of oil well located on the northern portion of the 100-Acre Parcel.



5. Nursery and oil well located on the eastern side of the northern portion of the 100-Acre Parcel.



6. Drainage channel located on northern portion of 100-Acre Parcel with drainage to the southern portion of the 100-Acre Parcel via a conduit under Lambert Road.



7. Fenced enclosure with apparent storage structures present in the central area of the northern portion of the 100-Acre Parcel.



8. Trailer and concrete pad present in the central area of the northern portion of the 100-Acre Parcel.



9. Abandoned former process tank present in the north central area of the northern portion of the 100-Acre Parcel.



10. Abandoned tank identified for former crude oil contents on the northern portion of the 100-Acre Parcel.



11. Typical view of southern portion of 100-Acre Parcel with typical oil wells shown.



12. Typical oil well on the southern portion of the 100-Acre Parcel.



13. Significant staining observed around oil well 126 located on the southern portion of the 100-Acre Parcel near the entry gate from Valencia Avenue..



14. Injection well located in the southwestern corner of the southern portion of the 100-Acre Parcel.



15. Drainage channel conduit under Lambert Road from the northern portion of the 100-Acre Parcel connecting to the southern portion of the 100-Acre Parcel.



16. Typical drainage channel through the central area of the southern portion of the 100-Acre Parcel.



17. Oil well field pipelines suspended over the drainage channel in the southern portion of the 100-Acre Parcel.



18. Vapor recovery system located in the north central area of the southern portion of the 100-Acre Parcel.



19. Vapor recovery system located in the north central area of the southern portion of the 100-Acre Parcel.



20. Vapor recovery system located in the north central area of the southern portion of the 100-Acre Parcel.



21. Vapor recovery system located in the north central area of the southern portion of the 100-Acre Parcel.



22. Vapor recovery system located in the north central area of the southern portion of the 100-Acre Parcel.



23. Vapor recovery system located in the north central area of the southern portion of the 100-Acre Parcel.



24. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



25. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



26. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



27. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



28. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



29. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



30. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



31. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



32. Dehydration Unit located in the north central area of the southern portion of the 100-Acre Parcel.



33. Typical manifold located on the southern portion of the 100-Acre Parcel.



34. Transformers located in the central area of the southern portion of the 100-Acre Parcel.



35. Typical view and oil wells of the northern and central portions of the 165-Acre Parcel.



36. Typical oil well located in the northern and central portions of the 165-Acre Parcel.



37. Portable well testing trailer llocated in the northern portion of the 165-Acre Parcel.



38. Typical manifold header located in the northern and central portions of the 165-Acre Parcel.



39. Steam pipes located in the northern and central portions of the 165-Acre Parcel.



40. Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



41. Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



42. Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



43. Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



44. Header and compressor station in Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



45. Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



46. Brea Production Unit and Olinda Tank Farm located in the central area of the northern portion of the 165-Acre Parcel.



47. Carbon filtration area located in the central area of the northern portion of the 165-Acre Parcel to the south of the Brea Production Unit and Olinda Tank Farm.



48. Carbon filtration area located in the central area of the northern portion of the 165-Acre Parcel to the south of the Brea Production Unit and Olinda Tank Farm.



49. Carbon filtration area located in the central area of the northern portion of the 165-Acre Parcel to the south of the Brea Production Unit and Olinda Tank Farm.



50. Carbon filtration area located in the central area of the northern portion of the 165-Acre Parcel to the south of the Brea Production Unit and Olinda Tank Farm.



51. Former pipe storage yard located in the south central portion of the 165-Acre Parcel.



52. Former tank farm location in the south central portion of the 165-Acre Parcel.



53. Former tank farm location in the south central portion of the 165-Acre Parcel.



54. Drainage and portion of former sump S20 located in the southern portion of the 165-Acre Parcel.



55. Former agricultural area located in the southern portion of the 165-Acre Parcel.



56. Former agricultural area located in the southern portion of the 165-Acre Parcel.



57. Residential development followed by the Olinda Alpha landfill (distance hillside) to the north of the Site.



58. Carbon Canyon Dam located east of the 165-Acre Parcel.



59. Park and flood control area located east of the 165-Acre Parcel.

APPENDIX A

TITLE REPORTS

Form No. 1068-1 (Rev. 10/17/92)
Exhibit A to Preliminary Report

OR-2226118
TITLE OFFICER - RONALD J. GOMEZ

3-14-2002



Preliminary Report

First American Title Insurance Company

First American Title Insurance Company

2 First American Way, Santa Ana, California 92707
(P.O. Box 267, Santa Ana, California 92702)
(714) 800-3000

AERA ENERGY
3030 SATURN
SUITE 101
BREA,, CA 92621
ATTN: JEFF MAISCH

IN RESPONSE TO THE ABOVE REFERENCED APPLICATION FOR A POLICY OF TITLE INSURANCE, THIS COMPANY HEREBY REPORTS THAT IT IS PREPARED TO ISSUE, OR CAUSE TO BE ISSUED, AS OF THE DATE HEREOF, A POLICY OR POLICIES OF TITLE INSURANCE DESCRIBING THE LAND AND THE ESTATE OR INTEREST THEREIN HEREINAFTER SET FORTH, INSURING AGAINST LOSS WHICH MAY BE SUSTAINED BY REASON OF ANY DEFECT, LIEN OR ENCUMBRANCE NOT SHOWN OR REFERRED TO AS AN EXCEPTION BELOW OR NOT EXCLUDED FROM COVERAGE PURSUANT TO THE PRINTED SCHEDULES, CONDITIONS AND STIPULATIONS OF THE POLICY FORMS.

THE PRINTED EXCEPTIONS AND EXCLUSIONS FROM THE COVERAGE OF SAID POLICY OR POLICIES ARE SET FORTH IN EXHIBIT A ATTACHED. COPIES OF THE POLICY FORMS SHOULD BE READ. THEY ARE AVAILABLE FROM THE OFFICE WHICH ISSUED THIS REPORT.

THIS REPORT (AND ANY SUPPLEMENTS OR AMENDMENTS HERETO) IS ISSUED SOLELY FOR THE PURPOSE OF FACILITATING THE ISSUANCE OF A POLICY OF TITLE INSURANCE AND NO LIABILITY IS ASSUMED HEREBY. IF IT IS DESIRED THAT LIABILITY BE ASSUMED PRIOR TO THE ISSUANCE OF A POLICY OF TITLE INSURANCE, A BINDER OR COMMITMENT SHOULD BE REQUESTED.

PLEASE READ THE EXCEPTIONS SHOWN OR REFERRED TO BELOW AND THE EXCEPTIONS AND EXCLUSIONS SET FORTH IN EXHIBIT A OF THIS REPORT CAREFULLY. THE EXCEPTIONS AND EXCLUSIONS ARE MEANT TO PROVIDE YOU WITH NOTICE OF MATTERS WHICH ARE NOT COVERED UNDER THE TERMS OF THE TITLE INSURANCE POLICY AND SHOULD BE CAREFULLY CONSIDERED.

IT IS IMPORTANT TO NOTE THAT THIS PRELIMINARY REPORT IS NOT A WRITTEN REPRESENTATION AS TO THE CONDITION OF TITLE AND MAY NOT LIST ALL LIENS, DEFECTS, AND ENCUMBRANCES AFFECTING TITLE TO THE LAND.

DATED AS OF **MARCH 14, 2002** AT 7:30 A.M.

BY RONALD J. GOMEZ, TITLE OFFICER
DIRECT TELEPHONE NUMBER - 714-800-4822
FAX NUMBER - 714-800-4965

THE FORM OF POLICY OF TITLE INSURANCE CONTEMPLATED BY THIS REPORT IS:

AMERICAN LAND TITLE ASSOCIATION OWNERS POLICY - WITH REGIONAL EXCEPTIONS (STANDARD COVERAGE).

TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

SWEPI LP, A DELAWARE LIMITED PARTNERSHIP WHO ACQUIRED TITLE AS SHELL WESTERN E & P, INC., A DELAWARE CORPORATION, SUCCESSOR BY MERGER TO SHELL CALIFORNIA PRODUCTION INC., A DELAWARE CORPORATION.

THE ESTATE OR INTEREST IN THE LAND HEREINAFTER DESCRIBED OR REFERRED TO COVERED BY THIS REPORT IS:

A FEE.

AT THE DATE HEREOF EXCEPTIONS TO COVERAGE IN ADDITION TO THE PRINTED EXCEPTIONS AND EXCLUSIONS CONTAINED IN SAID POLICY FORM WOULD BE AS FOLLOWS:

1. GENERAL AND SPECIAL TAXES FOR THE FISCAL YEAR 2002-2003, A LIEN NOT YET DUE OR PAYABLE.

2. SECOND INSTALLMENT GENERAL AND SPECIAL TAXES FOR THE FISCAL YEAR 2001-2002, NOW A LIEN NOT YET DELINQUENT; AMOUNT $11,945.83;
CODE AREA: 78-072 AND 02-003.
A. P. NO.: 308-011-17, 322-031-01, 322-031-12, 322-031-13, 322-031-14, 322-031-19, 322-031-20, 322-031-21, AND 322-031-24.

3. THE LIEN OF SUPPLEMENTAL TAXES ASSESSED PURSUANT TO CHAPTER 3.5 COMMENCING WITH SECTION 75 OF THE CALIFORNIA REVENUE AND TAXATION CODE.

NOTE: ALTHOUGH THE ABOVE SUPPLEMENTAL TAXES MAY BE A LIEN, THE INSTALLMENTS THEREOF ARE NOT YET DUE OR PAYABLE.

THE FOLLOWING EXCEPTIONS AFFECT PARCELS A, B AND C:

4. THE RIGHT OF WAY FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF A RAILROAD, ETC., OVER A PORTION OF SAID LAND AS GRANTED TO THE SOUTHERN CALIFORNIA RAILWAY COMPANY BY DEED RECORDED NOVEMBER 6, 1899 IN BOOK 44, PAGE 374 OF DEEDS.

5. THE RIGHTS AND RIGHT OF WAY FOR PIPE LINES AND FOR TELEPHONE AND TELEGRAPH LINES OVER A PORTION OF SAID SECTION 8, AS GRANTED BY OLINDA CRUDE OIL CO. TO PACIFIC COAST OIL CO., BY DEED RECORDED JUNE 25, 1902 IN BOOK 75, PAGE 253 OF DEEDS.

6. THE RIGHT TO ERECT AND MAINTAIN STORAGE TANKS FOR OIL AND THE RIGHT OF WAY FOR PIPE LINES FOR THE TRANSPORTATION OF OIL OVER A PORTION OF SAID SECTION 8, AS CONVEYED BY OLINDA LAND COMPANY TO INDUSTRIAL OIL COMPANY, BY DEED RECORDED JANUARY 23, 1911 IN BOOK 3, PAGE 324 OF LEASES AND RE-RECORDED JANUARY 23, 1911 IN BOOK 7, PAGE 43 OF MISCELLANEOUS RECORDS.

7. THE RIGHT OF WAY FOR PIPE LINE FOR THE TRANSPORTATION OF WASTE WATER OVER A PORTION OF SAID LAND, AS GRANTED BY OLINDA LAND COMPANY, TO WASTE WATER DISPOSAL COMPANY, BY DEED RECORDED FEBRUARY 24, 1928 IN BOOK 134, PAGE 175 OF OFFICIAL RECORDS.

NOTE 1: BY INSTRUMENT RECORDED DECEMBER 15, 1959 IN BOOK 5016, PAGE 217 OF OFFICIAL RECORDS THE PORTION OF SAID EASEMENT LYING NORTHEASTERLY OF THE TERMINUS OF THAT CERTAIN COURSE DESCRIBED AS "NORTH 50 DEG. 08' 08" EAST 512.18 FEET TO A MANHOLE" WAS QUITCLAIMED TO THE OWNERS OF RECORD.

NOTE 2: ALL RIGHT, TITLE AND INTEREST OF WASTE WATER DISPOSAL COMPANY WAS ASSIGNED TO UNION OIL COMPANY OF CALIFORNIA BY AN INSTRUMENT RECORDED NOVEMBER 5, 1974 IN BOOK 11280, PAGE 1845 OF OFFICIAL RECORDS.

NOTE 3: THE RIGHTS UNDER SAID DOCUMENT WERE ASSIGNED TO SANTA FE ENERGY OPERATING PARTNERS BY A DOCUMENT ENTITLED "ASSIGNMENT OF RIGHTS OF WAY" RECORDED AUGUST 19, 1993 AS INSTRUMENT NO. 93-558730 OF OFFICIAL RECORDS.

8. A RIGHT OF WAY FOR ROAD PURPOSES OVER A PORTION OF THE WESTERLY 30 FEET OF LOTS 3 AND 4 OF SECTION 8, AS GRANTED BY OLINDA LAND COMPANY TO THE COUNTY OF ORANGE, BY DEED RECORDED JANUARY 21, 1914 IN BOOK 244, PAGE 260 OF DEEDS.

9. THE RIGHTS AND RIGHT OF WAY FOR PIPE LINES OVER A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 8, AS GRANTED BY OLINDA LAND COMPANY TO GENERAL PIPE LINE COMPANY OF CALIFORNIA, BY DEED RECORDED MAY 19, 1927 IN BOOK 41, PAGE 438 OF OFFICIAL RECORDS.

10. THE EFFECT OF MAPS FILED IN BOOK 40, PAGE 30 AND IN BOOK 51, PAGE 31 OF RECORD OF SURVEYS IN THE OFFICE OF THE COUNTY RECORDER OF ORANGE COUNTY, CALIFORNIA, PURPORTING TO SHOW THE HEREIN DESCRIBED AND OTHER LAND.

11. THE EFFECT OF MAPS PURPORTING TO SHOW THE HEREIN DESCRIBED AND OTHER LAND RECORDED IN BOOK 18, PAGE 38; IN BOOK 33, PAGE 37; AND IN BOOK 87, PAGES 47 AND 48, ALL OF RECORD OF SURVEYS.

12. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED MAY 11, 1932 IN BOOK 557, PAGE 127 OF OFFICIAL RECORDS,

IN FAVOR OF:	ORANGE COUNTY.
FOR:	ROAD AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND IN ROSE DRIVE.

13. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED OCTOBER 29, 1942 IN BOOK 1170, PAGE 31 OF OFFICIAL RECORDS,

IN FAVOR OF:	SOUTHERN CALIFORNIA EDISON COMPANY, LTD., A CORPORATION.
FOR:	POLES, TOWERS AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

14. A 10-FOOT RIGHT OF WAY FOR A 30 INCH GAS PIPE LINE ACROSS SAID LAND AND OTHER LAND, AS CONVEYED TO SOUTHERN CALIFORNIA GAS COMPANY AND SOUTHERN COUNTIES GAS COMPANY OF CALIFORNIA, AS TENANTS IN COMMON, BY INSTRUMENT RECORDED JUNE 19, 1950 IN BOOK 2029, PAGE 102 OF OFFICIAL RECORDS.

15. A LICENSE IN FAVOR OF GENERAL PETROLEUM CORPORATION, A CORPORATION, FOR A PIPELINE FOR THE TRANSPORTATION OF OIL, PETROLEUM, GASOLINE AND/OR WATER, AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 14, 1956 IN BOOK 3396, PAGE 252 OF OFFICIAL RECORDS.

16. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED FEBRUARY 26, 1958 IN BOOK 4208, PAGE 424 OF OFFICIAL RECORDS,

IN FAVOR OF:	THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, A PUBLIC CORPORATION.
FOR:	PIPE LINE AND INCIDENTAL PURPOSES.
OVER:	A STRIP OF LAND 50 FEET IN WIDTH WITHIN THE LAND, AND OTHER LANDS MORE PARTICULARLY DESCRIBED THEREIN.

17. EASEMENTS OVER PORTIONS OF SAID LAND FOR CARBON CANYON DAM AND CHANNEL FOR PUBLIC USE AND INCIDENTS THERETO, AS DESCRIBED IN THE DECLARATION OF TAKING BY UNITED STATES OF AMERICA, RECORDED JUNE 1, 1960 IN BOOK 5269, PAGE 79 OF OFFICIAL RECORDS.

18. A PERPETUAL AND ASSIGNABLE RIGHT OF WAY AND EASEMENT OVER A PORTION OF SAID LAND FOR PIPE LINES AND INCIDENTS THERETO, AS DESCRIBED IN THE ABOVE MENTIONED DECLARATION OF TAKING.

QC filed @ doc# 20368603

19. A PERPETUAL AND ASSIGNABLE EASEMENT AND RIGHT OF WAY OVER A PORTION OF SAID LAND FOR POWER LINES, COMMUNICATION LINES AND INCIDENTS THERETO, AS DESCRIBED IN THE DECLARATION OF TAKING BY THE UNITED STATES OF AMERICA, RECORDED SEPTEMBER 6, 1960 IN BOOK 5404, PAGE 438 OF OFFICIAL RECORDS.

20. A PERPETUAL EASEMENT FOR ROADWAY SLOPES AND MAINTENANCE AND INCIDENTAL PURPOSES OVER THAT PORTION OF SAID LAND ADJOINING ROSE DRIVE, AS CONVEYED TO THE COUNTY OF ORANGE BY DEED RECORDED APRIL 4, 1961 IN BOOK 5677, PAGE 3 OF OFFICIAL RECORDS.

21. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JULY 10, 1961 IN BOOK 5779, PAGE 696 OF OFFICIAL RECORDS,

IN FAVOR OF:	THE UNITED STATES OF AMERICA.
FOR:	ROADWAYS AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND AS MORE PARTICULARLY DESCRIBED THEREIN.

NOTE: SAID EASEMENT HAS BEEN MODIFIED BY AN INSTRUMENT ENTITLED "AMENDMENT TO DECLARATION OF TAKING" IN FAVOR OF THE UNITED STATES OF AMERICA WHICH RECORDED JULY 25, 1966 IN BOOK 7998, PAGE 741 OF OFFICIAL RECORDS.

22. THE TERMS, PROVISIONS, COVENANTS AND CONDITIONS AS SET FORTH IN A BOUNDARY LINE AGREEMENT DATED JANUARY 12, 1961 BETWEEN SHELL OIL COMPANY, A CORPORATION, CHANSLOR-WESTERN OIL AND DEVELOPMENT COMPANY, A CORPORATION, SOCONY MOBIL OIL COMPANY, INC., A CORPORATION AND HUMBLE OIL & REFINING COMPANY, A CORPORATION, RECORDED APRIL 25, 1961 IN BOOK 5700, PAGE 984 OF OFFICIAL RECORDS, ESTABLISHING A BOUNDARY LINE BETWEEN THE LANDS OF THE ABOVE PARTIES, REFERENCE BEING MADE TO THE RECORD FOR PARTICULARS OF SAID AGREEMENT.

23. A RIGHT OF WAY AND EASEMENT FOR PIPE LINES AND APPURTENANCES THERETO, TOGETHER WITH THE RIGHT OF INGRESS TO AND EGRESS FROM SAID EASEMENT, AS CONVEYED TO GENERAL PETROLEUM CORPORATION, BY DEED RECORDED SEPTEMBER 12, 1961 IN BOOK 5845, PAGE 30 OF OFFICIAL RECORDS.

24. AN EASEMENT FOR BOTH AERIAL AND UNDERGROUND ELECTRICAL LINES, CONSISTING OF POLE LINES, CONDUITS AND INCIDENTAL PURPOSES, AND APPURTENANCES THERETO, AS SET FORTH IN AN INSTRUMENT RECORDED JANUARY 16, 1968 IN BOOK 8493, PAGE 555 OF OFFICIAL RECORDS, OVER THAT PORTION OF SAID LAND INCLUDED WITHIN THE FOLLOWING:

A STRIP OF LAND, 12 FEET IN WIDTH, LYING WITHIN THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, S.B.M., THE CENTERLINE OF SAID STRIP DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER; THENCE, NORTH 89° 15' 30" EAST 2292.07 FEET; THENCE SOUTH 4° 18' EAST 220 FEET TO THE TRUE POINT OF BEGINNING; THENCE, SOUTHWESTERLY 39 FEET TO A POINT IN A LINE PARALLEL WITH AND DISTANT WESTERLY, MEASURED AT RIGHT ANGLES FROM THE EASTERLY LINE OF THE RANCHO JUAN CAJON DE SANTA ANA, 17 FEET; THENCE, SOUTH 89° 15' 30" WEST 45 FEET.

25. EASEMENTS TO CONSTRUCT AND MAINTAIN SLOPES, AS CONVEYED TO THE COUNTY OF ORANGE BY DEED RECORDED JULY 31, 1975 IN BOOK 11471, PAGE 256 OF OFFICIAL RECORDS, EVEN PORTIONS OF SAID LAND, UPON THE RESERVATIONS, COVENANTS AND CONDITIONS THEREIN CONTAINED.

26. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED NOVEMBER 30, 1988 AS INSTRUMENT NO. 88-623853 OF OFFICIAL RECORDS,

IN FAVOR OF:	SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION.
FOR:	THE MAINTENANCE AND OPERATION OF AN ELECTRICAL SUBSTATION AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

THE FOLLOWING EXCEPTIONS AFFECT PARCEL D:

27. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JULY 18, 1902 IN BOOK 75, PAGE 282 OF DEEDS,

IN FAVOR OF:	PACIFIC COAST OIL COMPANY, A CORPORATION.
FOR:	RIGHT OF INGRESS AND EGRESS AND INCIDENTAL PURPOSES.
OVER:	THE LAND.

NOTE 1: RECORDED APRIL 3, 1907 IN BOOK 155, PAGE 245 OF DEEDS, IS A DEED DATED NOVEMBER 23, 1906, EXECUTED BY STANDARD OIL COMPANY, A CORPORATION, FORMERLY KNOWN AS PACIFIC COAST OIL CO., TO BREA CANON OIL COMPANY, A CORPORATION, DESCRIBING SAID EXCEPTED PARCEL OF LAND, RESERVING TO SAID GRANTOR RIGHTS OF WAY FOR PIPE LINES AND RIGHT OF INGRESS AND EGRESS FROM SAID EXCEPTED LAND TO ADJOINING LANDS OF PACIFIC LAND IMPROVEMENT COMPANY.

NOTE 2: THE INTEREST OF BREA CANON OIL COMPANY WAS CONVEYED TO GENERAL PETROLEUM CORPORATION, A CORPORATION, BY DEED RECORDED FEBRUARY 21, 1929 IN BOOK 245, PAGE 317 OF OFFICIAL RECORDS. GENERAL PETROLEUM CORPORATION WAS MERGED WITH SOCONY MOBIL OIL COMPANY, INC., AS INDICATED BY A CERTIFICATE RECORDED JANUARY 11, 1960 IN BOOK 5049, PAGE 109 OF OFFICIAL RECORDS.

NOTE 3: RECORDED JUNE 30, 1966 IN BOOK 7977, PAGE 210 OF OFFICIAL RECORDS, IS A CERTIFICATE DATED JUNE 24, 1966 BY G. H. KETCHUM, ASSISTANT SECRETARY OF MOBIL OIL CORPORATION, RECITING THAT NAME OF SOCONY MOBIL COMPANY, INC., WAS CHANGED TO MOBIL OIL CORPORATION.

28. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED OCTOBER 3, 1904 IN BOOK 108, PAGE 309 OF DEEDS,

IN FAVOR OF:	BREA CANON OIL COMPANY.
FOR:	RIGHT OF WAY FOR PIPE LINES AND INCIDENTAL PURPOSES.
OVER:	THE LAND.

29. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JULY 22, 1916 IN BOOK 293, PAGE 358 OF DEEDS,

IN FAVOR OF:	STANDARD OIL COMPANY.
FOR:	RIGHT OF WAY FOR PIPE LINES AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

30. ANY EASEMENTS FOR PIPE LINES AND INCIDENTAL PURPOSES OVER A PORTION OF THE LAND, IN FAVOR OF GENERAL PETROLEUM CORPORATION OF CALIFORNIA, AS RECITED IN A NOTICE RECORDED AUGUST 25, 1928 IN BOOK 186, PAGE 490 OF OFFICIAL RECORDS.

31. UNRECORDED AGREEMENT DATED OCTOBER 24, 1931 BETWEEN CHANSLOR-CANFIELD MIDWAY OIL COMPANY, AS FIRST PARTY, AND WEST COAST REFINING COMPANY, AS SECOND PARTY, COVERING A PORTION OF THE LAND, TOGETHER WITH CERTAIN OTHER UNRECORDED AGREEMENTS WHICH MAY OR MAY NOT AFFECT THE HEREIN DESCRIBED LAND, AS DISCLOSED IN AN ASSIGNMENT DATED NOVEMBER 30, 1964, EXECUTED BY WEST COAST REFINING COMPANY, A CALIFORNIA CORPORATION, TO ESTATE OF A. HARTWELL BRADFORD, DECEASED, RECORDED DECEMBER 2, 1964 IN BOOK 7327, PAGE 788 OF OFFICIAL RECORDS, TO WHICH RECORD REFERENCE IS MADE FOR FULL PARTICULARS.

NOTE 1: RECORDED MARCH 11, 1960 IN BOOK 5142, PAGE 449 OF OFFICIAL RECORDS, IS A QUITCLAIM DEED DATED JANUARY 20, 1960, EXECUTED BY WEST COAST REFINING COMPANY, A CALIFORNIA CORPORATION, TO UNITED STATES OF AMERICA, DESCRIBING CERTAIN PIPE LINES AND ALL RIGHTS OF WAY, PERMITS AND LICENSES UNDER WHICH SAID PIPE LINES WERE INSTALLED, MAINTAINED AND OPERATED BY SAID GRANTOR.

NOTE 2: RECORDED JANUARY 19, 1966 IN BOOK 7813, PAGE 72 OF OFFICIAL RECORDS, IS AN ASSIGNMENT DATED OCTOBER 6, 1965, EXECUTED BY WEST COAST REFINING COMPANY, A CALIFORNIA CORPORATION, TO MORRIS D. SCHATZMAN, PHILIP S. MAGRUDER AND JOHN W. SCHMID, EXECUTORS OF THE WILL OF A. HARTWELL BRADFORD, DECEASED, OF ALL RIGHT, TITLE AND INTEREST IN THE ABOVE MENTIONED AGREEMENTS AND OTHER PROPERTY.

NOTE 3: RECORDED JANUARY 19, 1966 IN BOOK 7813, PAGE 845 OF OFFICIAL RECORDS, IS A CERTIFIED COPY OF AN ORDER CONFIRMING SALE RENDERED JANUARY 2, 1965 IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA, IN AND FOR THE COUNTY OF ORANGE, IN THE MATTER OF THE ESTATE OF A. HARTWELL BRADFORD, DECEASED (CASE NO. A47398), CONFIRMING SALE OF THE ABOVE MENTIONED AGREEMENTS AND OTHER PROPERTY TO UNION OIL COMPANY OF CALIFORNIA.

32. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED MAY 18, 1960 IN BOOK 5251, PAGE 23 OF OFFICIAL RECORDS,

IN FAVOR OF:	SOUTHERN CALIFORNIA EDISON COMPANY.
FOR:	POLE LINES AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

NOTE 1: RECORDED JANUARY 24, 1962 IN BOOK 5987, PAGE 230 OF OFFICIAL RECORDS, IS A DEED DATED JUNE 9, 1961, EXECUTED BY SAID COMPANY, QUITCLAIMING A PORTION OF SAID EASEMENT TO THE RECORD OWNERS.

NOTE 2: RECORDED MARCH 10, 1966 AS DOCUMENT NO. 8157 IN BOOK 7865, PAGE 75 OF OFFICIAL RECORDS, IS A DEED DATED APRIL 27, 1962, EXECUTED BY SAID COMPANY, QUITCLAIMING TO THE UNITED STATES OF AMERICA ALL RIGHTS FOR ELECTRIC LINES AND APPURTENANCES OVER A PORTION OF PARCEL 2, EXCEPT ANY PORTION WHICH MIGHT AFFECT THOSE RIGHTS OBTAINED BY THE ABOVE MENTIONED DEED RECORDED IN BOOK 5251, PAGE 23 OF OFFICIAL RECORDS.

(32, above)

33. PERPETUAL AND ASSIGNABLE RIGHTS, POWERS, PRIVILEGES AND EASEMENTS OCCASIONALLY TO OVERFLOW, FLOOD AND SUBMERGE THE LAND AND ALL STRUCTURES AND IMPROVEMENTS LOCATED THEREON IN CONNECTION WITH THE OPERATION AND MAINTENANCE OF CARBON CANYON DAM AND CHANNEL PROJECT, TOGETHER WITH ALL RIGHT, TITLE AND INTEREST IN AND TO THE STRUCTURES AND IMPROVEMENTS SITUATED ON SAID PARCELS 1 AND 2, AS ACQUIRED BY THE UNITED STATES OF AMERICA BY DECLARATION OF TAKING DATED MAY 5, 1960 IN CASE NO. 597-60 T, CIVIL, UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF CALIFORNIA, CENTRAL DIVISION, A CERTIFIED COPY OF WHICH WAS RECORDED JUNE 1, 1960 IN BOOK 5269, PAGE 79 OF OFFICIAL RECORDS, SUBJECT TO CERTAIN PROVISIONS AND RESERVATIONS THEREIN SET FORTH, TO WHICH RECORD REFERENCE IS MADE FOR FULL PARTICULARS.

Sec #17

34. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JUNE 2, 1960 IN BOOK 5270, PAGE 440 OF OFFICIAL RECORDS,

IN FAVOR OF:	THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY.
FOR:	POLE LINES, CONDUITS AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

NOTE: RECORDED NOVEMBER 6, 1961 IN BOOK 5903, PAGE 672 OF OFFICIAL RECORDS, IS A DEED DATED OCTOBER 27, 1961, EXECUTED BY SAID COMPANY, QUITCLAIMING TO CHANSLOR-WESTERN OIL AND DEVELOPMENT COMPANY, A CORPORATION, A PORTION OF SAID EASEMENT.

35. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED AUGUST 12, 1960 IN BOOK 5373, PAGE 507 OF OFFICIAL RECORDS,

IN FAVOR OF:	SHELL OIL COMPANY, A DELAWARE CORPORATION.
FOR:	PIPE LINES AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

NOTE: AN ASSIGNMENT AND QUITCLAIM DATED SEPTEMBER 29, 1960, EXECUTED BY CHANSLOR-WESTERN OIL AND DEVELOPMENT COMPANY TO UNITED STATES OF AMERICA, OF ALL RIGHT, TITLE AND INTEREST IN A CERTAIN PIPE LINE OVER A PORTION OF THE LAND, RECORDED NOVEMBER 21, 1960 IN BOOK 5518, PAGE 102 OF OFFICIAL RECORDS. THE LOCATION OF THE CENTER LINE OF SAID PIPE LINE BEING DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF LOT 2 OF BLOCK 2 OF YORBA LINDA TRACT, AS SHOWN ON A MAP RECORDED IN BOOK 5, PAGES 17 AND 18 OF MISCELLANEOUS MAPS, IN THE OFFICE OF THE RECORDER OF SAID COUNTY, SAID NORTHWEST CORNER, FOR THE PURPOSE OF THIS DESCRIPTION, BEING DESCRIBED AS NORTH 88° 51' 16" EAST, 1229.65 FEET ALONG THE MOST NORTHERLY LINE OF SAID TRACT FROM THE NORTHWEST CORNER OF LOT 1 OF BLOCK 1 OF SAID TRACT; THENCE ALONG THE NORTHERLY LINE OF SAID LOT 2, SOUTH 89° 59' 47" EAST, 443.68 FEET; THENCE LEAVING SAID NORTHERLY LINE NORTH 19° 01' 21" EAST, 688.32 FEET ALONG THE CENTER LINE OF ROSE DRIVE, 60.00 FEET WIDE, AS SHOWN ON ROAD MAP NO. 2-W, ON FILE IN THE OFFICE OF THE SURVEYOR OF SAID COUNTY; THENCE SOUTH 49° 40' 54" EAST 32.20 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; THENCE NORTH 19° 01' 21" EAST, 4039.04 FEET PARALLEL WITH THE CENTER LINE OF SAID ROSE DRIVE AND ITS NORTHEASTERLY PROLONGATION TO THE POINT OF ENDING, SAID POINT OF ENDING ALSO BEING NORTH 3° 14' 25" WEST 1489.87 FEET FROM THE CORNER COMMON TO SECTIONS 8, 9, 16 AND 17, AS SHOWN ON A MAP FILED IN BOOK 33, PAGE 37 OF RECORD OF SURVEYS IN THE OFFICE OF SAID RECORDER.

36. A BOUNDARY LINE AGREEMENT DATED JANUARY 12, 1961, BY AND BETWEEN SHELL OIL COMPANY, A DELAWARE CORPORATION, CHANSLOR-WESTERN OIL AND DEVELOPMENT COMPANY, A DELAWARE CORPORATION, SOCONY MOBIL OIL COMPANY, INC., A NEW YORK CORPORATION AND HUMBLE OIL & REFINING COMPANY, A DELAWARE CORPORATION, AS SUCCESSOR IN INTEREST TO MONTEREY OIL COMPANY, ESTABLISHING BOUNDARY LINES

Sec #22 DIVIDING THEIR RESPECTIVE PROPERTIES, RECORDED APRIL 25, 1961 IN BOOK 5700, PAGE 984 OF OFFICIAL RECORDS, TO WHICH RECORD REFERENCE IS MADE FOR FULL PARTICULARS.

NOTE: RECORDED JUNE 30, 1966 IN BOOK 7977, PAGE 210 OF OFFICIAL RECORDS, IS A CERTIFICATE DATED JUNE 24, 1966 BY G. H. KETCHUM, ASSISTANT SECRETARY OF MOBIL OIL CORPORATION, RECITING THAT NAME OF SOCONY MOBIL OIL COMPANY, INC., WAS CHANGED TO MOBIL OIL CORPORATION.

Sec #23 37. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED SEPTEMBER 12, 1961 IN BOOK 5845, PAGE 30 OF OFFICIAL RECORDS,

IN FAVOR OF:	GENERAL PETROLEUM CORPORATION, A CORPORATION.
FOR:	PIPE LINES AND INCIDENTAL PURPOSES.
OVER:	A PORTION OF THE LAND.

NOTE: RECORDED MARCH 28, 1963 IN BOOK 6485, PAGE 691 OF OFFICIAL RECORDS, IS A DEED DATED MARCH 20, 1963, EXECUTED BY SOCONY MOBIL OIL COMPANY, INC., A NEW YORK CORPORATION, SUCCESSOR BY MERGER TO GENERAL PETROLEUM CORPORATION, A CALIFORNIA CORPORATION, QUITCLAIMING ALL RIGHT, TITLE AND INTEREST IN AND TO CERTAIN PIPE LINES LOCATED ON THE LAND AND OTHER LAND, TO WHICH RECORD REFERENCE IS MADE FOR FULL PARTICULARS.

38. THE RIGHT, TITLE AND INTEREST IN AND TO THE LAND OF THE UNITED STATES OF AMERICA IN AND TO CERTAIN LICENSE AND PRESCRIPTIVE RIGHTS AND PRIVILEGES CONSISTING OF PIPE LINES, WASTE WATER LINES, AND TELEPHONE POLE LINES, AS DESCRIBED IN A QUITCLAIM DEED DATED MARCH 20, 1963 IN BOOK 6485, PAGE 691 OF OFFICIAL RECORDS, TO WHICH RECORD REFERENCE IS MADE FOR FULL PARTICULARS.

39. THE RIGHT, TITLE AND INTEREST OF THE UNITED STATES OF AMERICA BY VIRTUE OF A QUITCLAIM DEED DATED FEBRUARY 28, 1963, EXECUTED BY THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY TO THE UNITED STATES OF AMERICA OF ALL ITS RIGHT, TITLE AND INTEREST IN AND TO THE FOLLOWING:

LICENSE AGREEMENT DATED THE 15TH DAY OF MARCH, 1955, BY AND BETWEEN CHANSLOR-WESTERN OIL AND DEVELOPMENT COMPANY, A CORPORATION, FIRST PARTY, AND THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION, SECOND PARTY, AFFECTING THAT CERTAIN REAL PROPERTY SITUATED IN THE COUNTY OF ORANGE, STATE OF CALIFORNIA, AND DESCRIBED AS PORTIONS OF SECTIONS 8 AND 9, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO BASE AND MERIDIAN:

SAID DEED RECORDED APRIL 10, 1963 IN BOOK 6593, PAGE 168 OF OFFICIAL RECORDS.

40. INCIDENTS, EXCEPTIONS, RESERVATIONS AND RIGHTS CONTAINED IN THE DEED TO THE STATE OF CALIFORNIA, RECORDED DECEMBER 20, 1963 IN BOOK 6853, PAGE 373 OF OFFICIAL RECORDS.

41. QUITCLAIM DEED DATED AUGUST 9, 1966, EXECUTED BY SHELL OIL COMPANY, A CORPORATION, TO UNITED STATES OF AMERICA, OF ALL RIGHT, TITLE AND INTEREST IN AND TO CERTAIN WATER PIPE LINES OVER AND ACROSS A PORTION OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, AS THEREIN DESCRIBED, RECORDED SEPTEMBER 2, 1966 IN BOOK 8038, PAGE 941 OF OFFICIAL RECORDS.

42. A QUITCLAIM DEED AND CONVEYANCE DATED JULY 2, 1970, EXECUTED BY UNION OIL COMPANY OF CALIFORNIA, A CORPORATION, TO SHELL OIL COMPANY, A CORPORATION, OF ALL RIGHT, TITLE AND INTEREST IN AND TO A CERTAIN RIGHT OF WAY FOR A PIPE LINE OVER A PORTION OF SAID SECTIONS 8 AND 17, RECORDED JUNE 25, 1971 IN BOOK 9689, PAGE 109 OF OFFICIAL RECORDS.

See #11

43. THE EFFECT OF A MAP FILED IN BOOK 87, PAGES 47 AND 48 OF RECORD OF SURVEYS, PURPORTING TO SHOW THE HEREIN DESCRIBED AND OTHER LAND.

See #10

44. MATTERS DISCLOSED BY RECORD OF SURVEYS FILED IN BOOK 40, PAGE 30 OF RECORD OF SURVEYS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, WHICH SHOWS THE LOCATION OF SECTION AND QUARTER SECTION LINES OF SECTIONS 8, 9, 16 AND 17, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO MERIDIAN, TO BE AT VARIANCE FROM THOSE INDICATED BY THE OFFICIAL PLAT OF SAID LAND ON FILE IN THE DISTRICT LAND OFFICE.

45. THE TERMS, PROVISIONS AND CONDITIONS CONTAINED IN A DOCUMENT ENTITLED "AGREEMENT", EXECUTED BY AND BETWEEN SANTA FE ENERGY RESOURCES, INC., AND CLARK TINGEY HATCH AND QUENTA KELLIS HATCH, HUSBAND AND WIFE, RECORDED APRIL 8, 1992 AS INSTRUMENT NO. 92-222125 OF OFFICIAL RECORDS.

46. EASEMENTS, COVENANTS AND CONDITIONS CONTAINED IN THE DEED FROM SANTA FE ENERGY RESOURCES, INC., A DELAWARE CORPORATION, AS GRANTOR, TO SHELL WESTERN E & P INC., A DELAWARE CORPORATION, AS GRANTEE, RECORDED AUGUST 9, 1996 AS INSTRUMENT NO. 19960408949 OF OFFICIAL RECORDS. REFERENCE BEING MADE TO SAID DOCUMENT FOR FULL PARTICULARS.

DESCRIPTION

THE LAND REFERRED TO HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, PARTLY IN THE COUNTY OF ORANGE, AND PARTLY IN THE CITY OF BREA, AND IS DESCRIBED AS FOLLOWS:

PARCEL A:

GOVERNMENT LOT 3 AND THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO MERIDIAN, ACCORDING THE OFFICIAL PLAT FILED IN THE DISTRICT LAND OFFICE FEBRUARY 17, 1868.

EXCEPTING THEREFROM THAT PORTION OF THE LAND LYING NORTHERLY OF THE SOUTHERLY LINE OF THE LAND DESCRIBED IN PARCELS 122, 122.1 AND 122.2 OF DEED TO COUNTY OF ORANGE, RECORDED JULY 31, 1975 IN BOOK 11471, PAGE 256 OF OFFICIAL RECORDS.

PARCEL B:

PARCEL B1:

LOT 4 AND THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT FILED IN THE DISTRICT LAND OFFICE, FEBRUARY 17, 1868.

EXCEPTING THEREFROM THAT PORTION LYING EASTERLY OF THE WESTERLY LINE OF TRACT NO. 100 AS DESCRIBED IN THAT CERTAIN DECLARATION OF TAKING RECORDED JUNE 1, 1960 IN BOOK 5269, PAGE 79 OF OFFICIAL RECORDS OF ORANGE COUNTY, CALIFORNIA.

ALSO EXCEPTING THEREFROM THAT PORTION LYING SOUTHWESTERLY OF THE NORTHEASTERLY LINE OF ROSE AVENUE AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED APRIL 4, 1961 IN BOOK 5676, PAGE 994 OF SAID OFFICIAL RECORDS.

PARCEL B2:

THAT PORTION OF LOT 1 AND THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT FILED IN THE DISTRICT LAND OFFICE FEBRUARY 17, 1868, LYING NORTHERLY OF THE NORTHERLY LINE OF THE OLINDA TRACT, AS SHOWN ON A MAP RECORDED IN BOOK 31, PAGES 37 AND 38 OF MISCELLANEOUS RECORDS, OF LOS ANGELES COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION LYING EASTERLY, SOUTHERLY AND SOUTHEASTERLY OF THE WESTERLY, NORTHERLY AND NORTHWESTERLY LINES OF TRACTS NO. 100 AND 119 AS DESCRIBED IN THAT CERTAIN DECLARATION OF TAKING RECORDED JUNE 1, 1960 IN BOOK 5269, PAGE 79 OF OFFICIAL RECORDS OF ORANGE COUNTY, CALIFORNIA.

ALSO EXCEPTING THEREFROM THAT PORTION LYING SOUTHWESTERLY OF THE NORTHEASTERLY LINE OF ROSE AVENUE AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED APRIL 4, 1961 IN BOOK 5676, PAGE 994 OF SAID OFFICIAL RECORDS.

PARCEL C: (CITY OF BREA)

PARCEL C1:

THAT PORTION OF FRACTIONAL SECTION 17, TOWNSHIP 3 SOUTH, RANGE 9 WEST, OF SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND FILED IN THE DISTRICT LAND OFFICE, FEBRUARY 17, 1868, ALSO SHOWN AS SECTION 17, TOWNSHIP 3 SOUTH, RANGE 9 WEST, AS PER MAP FILED IN BOOK 33, PAGE 37 OF RECORD OF SURVEYS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT DISTANT NORTH 89 DEG. 59' 47" WEST 364.72 FEET ALONG THE NORTHERLY LINE OF LOT 1 IN BLOCK 2 OF THE YORBA LINDA TRACT, AS PER MAP RECORDED IN BOOK 5, PAGES 17 AND 18 OF MISCELLANEOUS MAPS OF SAID COUNTY; THENCE NORTH 0 DEG. 29' 53" EAST 244.38 FEET; THENCE NORTH 49 DEG. 40' 54" WEST 1300.28 FEET; THENCE WEST 400.56 FEET; THENCE NORTH 23 DEG. 20' 42" WEST 99.79 FEET; THENCE NORTH 64 DEG. 39' 18" EAST 71.92 FEET; THENCE NORTH 1000.42 FEET; THENCE SOUTH 77 DEG. 50' 44" WEST 410.02 FEET; THENCE NORTH 22 DEG. 03' 08" WEST 119.58 FEET; THENCE NORTH 65 DEG. 59' 09" WEST 69.73 FEET; THENCE NORTH 85 DEG. 14' 54" WEST 123.49 FEET; THENCE SOUTH 48 DEG. 40' 32" WEST 138.43 FEET; THENCE SOUTH 29 DEG. 16' 05" WEST 102.70 FEET; THENCE SOUTH 13 DEG. 44' 44" WEST 74.07 FEET; THENCE SOUTH 88 DEG. 00' 18" WEST 22.68 FEET TO A POINT IN THE EASTERLY LINE OF ROSE DRIVE 60.00 FEET WIDE, AS DESCRIBED IN A QUITCLAIM DEED RECORDED ON APRIL 4, 1961 IN BOOK 5676, PAGE 994 OF OFFICIAL RECORDS OF SAID COUNTY; THENCE SOUTHERLY ALONG SAID EASTERLY LINE OF ROSE DRIVE TO THE NORTHERLY LINE OF SAID LOT 1 IN BLOCK 2; THENCE EASTERLY ALONG THE NORTHERLY LINE OF THE POINT OF BEGINNING.

PARCEL C2:

THAT PORTION OF BLOCK 64 OF THE OLINDA TRACT, AS SHOWN ON A MAP RECORDED IN BOOK 31, PAGES 37 AND 38 OF MISCELLANEOUS RECORDS OF LOS ANGELES COUNTY, CALIFORNIA, LYING EASTERLY OF THE EASTERLY LINE OF ROSE AVENUE, AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED APRIL 4, 1966 IN BOOK 5676, PAGE 994 OF OFFICIAL RECORDS OF ORANGE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION LYING EASTERLY OF THE WESTERLY LINE OF TRACT NO. 119, AS DESCRIBED IN THAT CERTAIN DECLARATION OF TAKING RECORDED JUNE 1, 1960 IN BOOK 5269, PAGE 79 OF SAID OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM THAT PORTION INCLUDED WITHIN PARCEL C-1 HEREINABOVE DESCRIBED.

PARCEL D:

THAT PORTION OF THE EAST 1/2 OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT FILED IN THE DISTRICT LAND OFFICE, FEBRUARY 17, 1868, DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO SECTION 8, 9, 16 AND 17, SAID TOWNSHIP AND RANGE, ACCORDING TO THE MAP FILED IN BOOK 33, PAGE 37 OF RECORD OF SURVEYS, IN THE OFFICE OF THE COUNTY RECORDER OF ORANGE COUNTY, CALIFORNIA; THENCE ALONG THE EAST LINE OF SAID SECTION 8, NORTH 1° 20' 08" EAST 833.73 FEET; THENCE NORTH 88° 33' 38" WEST 416.85 FEET; THENCE NORTH 87° 58' 26" WEST 734.97 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH 87° 58' 26" WEST 584.44 FEET; THENCE NORTH 1° 53' 04" EAST 858.64 FEET; THENCE NORTH 72° 45' 17" EAST 41.05 FEET; THENCE SOUTH 68° 24' 00" EAST 79.78 FEET; THENCE SOUTH 50° 28' 12" EAST 74.21

FEET; THENCE SOUTH 63° 45' 39" EAST 115.87 FEET; THENCE NORTH 20° 14' 32" EAST 49.82 FEET; THENCE SOUTH 88° 29' 08" EAST 73.17 FEET; THENCE SOUTH 62° 35' 09" EAST 63.00 FEET; THENCE SOUTH 48° 20' 43" EAST 185.08 FEET; THENCE SOUTH 45° 06' 24" EAST 115.78 FEET; THENCE SOUTH 23° 51' 00" EAST 118.24 FEET; THENCE SOUTH 3° 26' 36" EAST 208.34 FEET; THENCE SOUTH 6° 39' 41" WEST 51.00 FEET; THENCE SOUTH 19° 08' 21" WEST 95.94 FEET; THENCE SOUTH 31° 42' 38" WEST 106.31 FEET; THENCE SOUTH 63° 16' 52" WEST 58.65 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 8, DISTANT 350.00 FEET NORTH 18° 40' 00" EAST FROM THE SOUTHWEST CORNER OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 8; THENCE NORTH 66° 25' 00" EAST 102.70 FEET; THENCE NORTH 19° 29' 00" EAST 292.40 FEET; THENCE NORTH 162.50 FEET; THENCE NORTH 82° 05' 00" WEST 152.80 FEET; THENCE SOUTH 36° 45' 00" WEST 213.40 FEET; THENCE SOUTH, PARALLEL WITH AND DISTANT 25.00 FEET EAST FROM THE WEST LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 8, A DISTANCE OF 130.00 FEET; THENCE SOUTH 23° 35' 00" EAST 217.50 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION INCLUDED WITHIN THE LAND DESCRIBED IN THE DEED TO THE STATE OF CALIFORNIA RECORDED DECEMBER 20, 1963 IN BOOK 6853, PAGE 373 OF OFFICIAL RECORDS OF SAID ORANGE COUNTY.

ALSO EXCEPTING THEREFROM ALL OIL, GAS, AND OTHER HYDROCARBON AND MINERAL SUBSTANCES AND GEOTHERMAL RIGHTS IN AND UNDER THE LAND, BUT WITHOUT THE RIGHT TO PENETRATE, USE OR DISTURB THE PROPERTY WITHIN 300 FEET OF THE SURFACE THEREOF, AS RESERVED BY SANTA FE ENERGY RESOURCES, INC., A DELAWARE CORPORATION IN THE GRANT DEED RECORDED AUGUST 9, 1996 AS INSTRUMENT NO. 19960408949 OF OFFICIAL RECORDS.

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WARNING

"THE MAP ATTACHED HERETO MAY OR MAY NOT BE A SURVEY OF THE LAND DEPICTED THEREON. YOU SHOULD NOT RELY UPON IT FOR ANY PURPOSE OTHER THAN ORIENTATION TO THE GENERAL LOCATION OF THE PARCEL OR PARCELS DEPICTED. FIRST AMERICAN EXPRESSLY DISCLAIMS ANY LIABILITY FOR ALLEGED LOSS OR DAMAGE WHICH MAY RESULT FROM RELIANCE UPON THIS MAP".

TB
PLATS (CC&R'S, IF ANY) ENCLOSED.

NOTE: WIRING INSTRUCTIONS FOR SUB-ESCROW DEPOSITS ARE AS FOLLOWS:

FIRST AMERICAN TRUST COMPANY 421 N. MAIN STREET SANTA ANA, CA 92701	ACCOUNT #15030 ACCOUNT NAME:	ABA #122241255 FIRST AMERICAN TITLE COMPANY

CREDIT TO FIRST AMERICAN TITLE COMPANY

OR-2226118 TITLE OFFICER - RONALD J. GOMEZ

DISREGARD IF FIRST AMERICAN IS YOUR ESCROW SETTLEMENT AGENT --

CONTACT ESCROW OFFICER FOR WIRING INSTRUCTIONS

COPY WITH PLAT (AND CC&R, IF ANY) TO:

HUNSAKER & ASSOCIATES IRVINE INC.
THREE HUGHES DRIVE
IRVINE, CALIFORNIA 92718
ATTN: DOUG STALEY

PRIVACY POLICY

WE ARE COMMITTED TO SAFEGUARDING CUSTOMER INFORMATION

IN ORDER TO BETTER SERVE YOUR NEEDS NOW AND IN THE FUTURE, WE MAY ASK YOU TO PROVIDE US WITH CERTAIN INFORMATION. WE UNDERSTAND THAT YOU MAY BE CONCERNED ABOUT WHAT WE WILL DO WITH SUCH INFORMATION-PARTICULARLY ANY PERSONAL OR FINANCIAL INFORMATION. WE AGREE THAT YOU HAVE A RIGHT TO KNOW HOW WE WILL UTILIZE THE PERSONAL INFORMATION YOU PROVIDE TO US. THEREFORE, TOGETHER WITH OUR PARENT COMPANY, THE FIRST AMERICAN CORPORATION, WE HAVE ADOPTED THIS PRIVACY POLICY TO GOVERN THE USE AND HANDLING OF YOUR PERSONAL INFORMATION.

APPLICABILITY

THIS PRIVACY POLICY GOVERNS OUR USE TO THE INFORMATION WHICH YOU PROVIDE TO US. IT DOES NOT GOVERN THE MANNER IN WHICH WE MAY USE INFORMATION WE HAVE OBTAINED FROM ANY OTHER SOURCE, SUCH AS INFORMATION OBTAINED FROM A PUBLIC RECORD OR FROM ANOTHER PERSON OR ENTITY. FIRST AMERICAN HAS ALSO ADOPTED BROADER GUIDELINES THAT GOVERN OUR USE OF PERSONAL INFORMATION REGARDLESS OF ITS SOURCE. FIRST AMERICAN CALLS THESE GUIDELINES ITS *FAIR INFORMATION VALUES*, A COPY OF WHICH CAN BE FOUND ON OUR WEBSITE AT WWW.FIRSTAM.COM.

TYPES OF INFORMATION

DEPENDING UPON WHICH OF OUR SERVICES YOU ARE UTILIZING, THE TYPES OF NONPUBLIC PERSONAL INFORMATION THAT WE MAY COLLECT INCLUDE:

- INFORMATION WE RECEIVED FROM YOU ON APPLICATIONS, FORMS AND IN OTHER COMMUNICATIONS TO US, WHETHER IN WRITING, IN PERSON, BY TELEPHONE OR ANY OTHER MEANS,
- INFORMATION ABOUT YOUR TRANSACTIONS WITH US, OUR AFFILIATED COMPANIES, OR OTHERS, AND
- INFORMATION WE RECEIVE FROM A CONSUMER REPORTING AGENCY.

USE OF INFORMATION

WE REQUEST INFORMATION FROM YOU FOR OUR OWN LEGITIMATE BUSINESS PURPOSES AND NOT FOR THE BENEFIT OF ANY NONAFFILIATED PARTY. THEREFORE, WE WILL NOT RELEASE YOUR INFORMATION TO NONAFFILIATED PARTIES EXCEPT: (1) AS NECESSARY FOR US TO PROVIDE THE PRODUCT OR SERVICE YOU HAVE REQUESTED OF US; OR (2) AS PERMITTED BY LAW. WE MAY, HOWEVER, STORE SUCH INFORMATION INDEFINITELY, INCLUDING THE PERIOD AFTER WHICH ANY CUSTOMER RELATIONSHIP HAS CEASED. SUCH INFORMATION MAY BE USED FOR ANY INTERNAL PURPOSE, SUCH AS QUALITY CONTROL EFFORTS OR CUSTOMER ANALYSIS. WE MAY ALSO PROVIDE ALL OF THE TYPES OF NONPUBLIC PERSONAL INFORMATION LISTED ABOVE TO ONE OR MORE OF OUR AFFILIATED COMPANIES. SUCH AFFILIATED COMPANIES INCLUDE FINANCIAL SERVICE PROVIDERS, SUCH AS TITLE INSURERS, PROPERTY AND CASUALTY INSURERS, AND TRUST AND INVESTMENT ADVISORY COMPANIES, OR COMPANIES INVOLVED IN REAL ESTATE SERVICES, SUCH AS APPRAISAL COMPANIES, HOME WARRANTY COMPANIES, AND ESCROW COMPANIES. FURTHERMORE, WE MAY ALSO PROVIDE ALL THE INFORMATION WE COLLECT, AS DESCRIBED ABOVE, TO COMPANIES THAT PERFORM MARKETING SERVICES ON OUR BEHALF, ON BEHALF OF OUR AFFILIATED COMPANIES, OR TO OTHER FINANCIAL INSTITUTIONS WITH WHOM WE OR OUR AFFILIATED COMPANIES HAVE JOINT MARKETING AGREEMENTS.

FORMER CUSTOMERS

EVEN IF YOU ARE NO LONGER OUR CUSTOMER, OUR PRIVACY POLICY WILL CONTINUE TO APPLY TO YOU.

CONFIDENTIALITY AND SECURITY

WE WILL USE OUR BEST EFFORTS TO ENSURE THAT NO UNAUTHORIZED PARTIES HAVE ACCESS TO ANY OF YOUR INFORMATION. WE RESTRICT ACCESS TO NONPUBLIC PERSONAL INFORMATION ABOUT YOU TO THOSE INDIVIDUALS AND ENTITIES WHO NEED TO KNOW THAT INFORMATION TO PROVIDE PRODUCTS OR SERVICES TO YOU. WE WILL USE OUR BEST EFFORTS TO TRAIN AND OVERSEE OUR EMPLOYEES AND AGENTS TO ENSURE THAT YOUR INFORMATION WILL BE HANDLED RESPONSIBLY AND IN ACCORDANCE WITH THIS PRIVACY POLICY AND FIRST AMERICAN'S *FAIR INFORMATION VALUES*. WE CURRENTLY MAINTAIN PHYSICAL, ELECTRONIC, AND PROCEDURAL SAFEGUARDS THAT COMPLY WITH FEDERAL REGULATIONS TO GUARD YOUR NONPUBLIC PERSONAL INFORMATION.

NOTICE

SECTION 12413.1 OF THE CALIFORNIA INSURANCE CODE, EFFECTIVE JANUARY 1, 1990, REQUIRES THAT ANY TITLE INSURANCE COMPANY, UNDERWRITTEN TITLE COMPANY, OR CONTROLLED ESCROW COMPANY HANDLING FUNDS IN AN ESCROW OR SUB-ESCROW CAPACITY, WAIT A SPECIFIED NUMBER OF DAYS AFTER DEPOSITING FUNDS, BEFORE RECORDING ANY DOCUMENTS IN CONNECTION WITH THE TRANSACTION OR DISBURSING FUNDS. THIS STATUTE ALLOWS FOR FUNDS DEPOSITED BY WIRE TRANSFER TO BE DISBURSED THE SAME DAY AS DEPOSIT. IN THE CASE OF CASHIER'S CHECKS OR CERTIFIED CHECKS, FUNDS MAY BE DISBURSED THE NEXT DAY AFTER DEPOSIT. IN ORDER TO AVOID UNNECESSARY DELAYS OF THREE TO SEVEN DAYS, OR MORE, PLEASE USE WIRE TRANSFER, CASHIER'S CHECKS, OR CERTIFIED CHECKS WHENEVER POSSIBLE.

IF YOU HAVE ANY QUESTIONS ABOUT THE EFFECT OF THIS NEW LAW, PLEASE CONTACT YOUR LOCAL FIRST AMERICAN OFFICE FOR MORE DETAILS.

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NOTICE

IN ACCORDANCE WITH SECTIONS 18662 AND 18668 OF THE REVENUE AND TAXATION CODE, A BUYER MAY BE REQUIRED TO WITHHOLD AN AMOUNT EQUAL TO THREE AND ONE-THIRD PERCENT OF THE SALES PRICE IN THE CASE OF THE DISPOSITION OF CALIFORNIA REAL PROPERTY INTEREST BY EITHER:

1. A SELLER WHO IS AN INDIVIDUAL WITH A LAST KNOWN STREET ADDRESS OUTSIDE OF CALIFORNIA OR WHEN THE DISBURSEMENT INSTRUCTIONS AUTHORIZE THE PROCEEDS BE SENT TO A FINANCIAL INTERMEDIARY OF THE SELLER, OR

2. A CORPORATE SELLER WHICH HAS NO PERMANENT PLACE OF BUSINESS IN CALIFORNIA

THE BUYER MAY BECOME SUBJECT TO PENALTY FOR FAILURE TO WITHHOLD AN AMOUNT EQUAL TO THE GREATER OF 10 PERCENT OF THE AMOUNT REQUIRED TO BE WITHHELD OR FIVE HUNDRED DOLLARS ($500).

HOWEVER, NOTWITHSTANDING ANY OTHER PROVISION INCLUDED IN THE CALIFORNIA STATUTES REFERENCED ABOVE, NO BUYER WILL BE REQUIRED TO WITHHOLD ANY AMOUNT OR BE SUBJECT TO PENALTY FOR FAILURE TO WITHHOLD IF:

1. THE SALES PRICE OF THE CALIFORNIA REAL PROPERTY CONVEYED DOES NOT EXCEED ONE HUNDRED THOUSAND DOLLARS ($100,000), OR

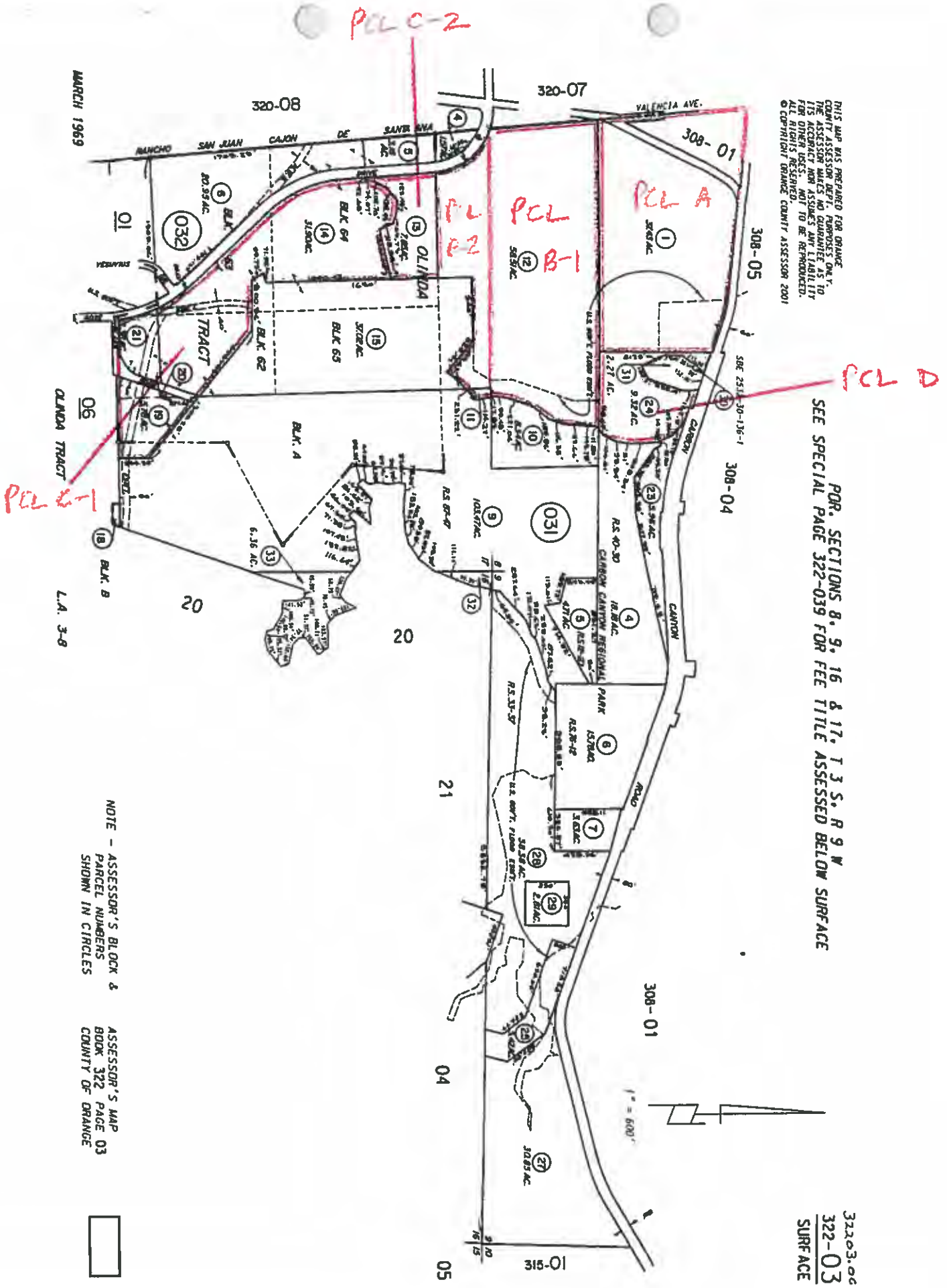
2. THE SELLER EXECUTES A WRITTEN CERTIFICATE, UNDER THE PENALTY OF PERJURY, CERTIFYING THAT THE SELLER IS A RESIDENT OF CALIFORNIA, OR IF A CORPORATION, HAS A PERMANENT PLACE OF BUSINESS IN CALIFORNIA, OR

3. THE SELLER, WHO IS AN INDIVIDUAL, EXECUTES A WRITTEN CERTIFICATE, UNDER THE PENALTY OF PERJURY, THAT THE CALIFORNIA REAL PROPERTY BEING CONVEYED IS THE SELLER'S PRINCIPAL RESIDENCE (AS DEFINED IN SECTION 1034 OF THE INTERNAL REVENUE CODE).

THE SELLER IS SUBJECT TO PENALTY FOR KNOWINGLY FILING A FRAUDULENT CERTIFICATE FOR THE PURPOSE OF AVOIDING THE WITHHOLDING REQUIREMENT.

THE CALIFORNIA STATUTES REFERENCED ABOVE INCLUDE PROVISIONS WHICH AUTHORIZE THE FRANCHISE TAX BOARD TO GRANT REDUCED WITHHOLDING AND WAIVERS FROM WITHHOLDING ON A CASE-BY-CASE BASIS.

THE PARTIES TO THIS TRANSACTION SHOULD SEEK AN ATTORNEY'S, ACCOUNTANT'S, OR OTHER TAX SPECIALIST'S OPINION CONCERNING THE EFFECT OF THIS LAW ON THIS TRANSACTION AND SHOULD NOT ACT ON ANY STATEMENTS MADE OR OMITTED BY THE ESCROW OR CLOSING OFFICER.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315-01
320-03
VALENCIA AVE.
SANTA ANA
RANCHO SAN JUAN CAJON DE
CAJON
CANYON
ROAD
TRACT
OLINDA TRACT
BLK. A
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BLK. 62
BLK. 63
BLK. 64
L.A. 3-8
20
21
04
05
031
032
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POR. SECTIONS 8, 9, 16 & 17, T 3 S, R 9 W
SEE SPECIAL PAGE 322-039 FOR FEE TITLE ASSESSED BELOW SURFACE
NOTE - ASSESSOR'S BLOCK & PARCEL NUMBERS SHOWN IN CIRCLES
ASSESSOR'S MAP BOOK 322 PAGE 03 COUNTY OF ORANGE
MARCH 1969
THIS MAP WAS PREPARED FOR ORANGE COUNTY ASSESSOR DEPT. PURPOSES ONLY. THE ASSESSOR MAKES NO GUARANTEE AS TO ITS ACCURACY AND ASSUMES ANY LIABILITY FOR OTHER USES. NOT TO BE REPRODUCED.
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ALL RIGHTS RESERVED.
322-03
SURFACE

EXHIBIT A
LIST OF PRINTED EXCEPTIONS AND EXCLUSIONS (By Policy Type)

1. CALIFORNIA LAND TITLE ASSOCIATION STANDARD COVERAGE POLICY - 1990
SCHEDULE B

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notice of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land, (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by their policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

2. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970
SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions of area of the land, or the effect of any violation of any such law, ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder, (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy, or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.

3. AMERICAN LAND TITLE ASSOCIATION OWNERS POLICY FORM B - 1970
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 2 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:

Part One

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims, reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

4. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970 WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE SCHEDULE OF EXCLUSIONS FROM COVERAGE

1 Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions or area of the land, or the effect of any violation of any such law ordinance or governmental regulation.

2 Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy

3 Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy or acquired the insured mortgage and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder; (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy (except to the extent insurance is afforded herein as to any statutory lien for labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy).

4 Unenforceability of the lien of the insured mortgage because of failure of the insured at Date of Policy or of any subsequent owner of the indebtedness to comply with applicable "doing business" laws of the state in which the land is situated.

5. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970 WITH REGIONAL EXCEPTIONS

When the American Land Title Association Lenders Policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy, the exclusions set forth in paragraph 4 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:

Part One

1 Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.

2 Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.

3 Easements, claims of easement or encumbrances which are not shown by the public records.

4 Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.

5 Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

6 Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

6. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992 WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land, (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

2 Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to the Date of Policy which would be binding on the rights of a purchaser for value without knowledge.

3 Defects, liens, encumbrances, adverse claims, or other matters:

   (a) created, suffered, assumed or agreed to by the insured claimant;

   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;

   (c) resulting in no loss or damage to the insured claimant;

   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or the extent insurance is afforded herein as to assessments for street improvements under construction or completed at date of policy); or

   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.

4 Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable "doing business" laws of the state in which the land is situated.

5 Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.

6 Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.

7 Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:

   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or

   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or

   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:

      (a) to timely record the instrument of transfer; or

      (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

7. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992 WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 6 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

8. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992 EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land, (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part, or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to the Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
      (a) to timely record the instrument of transfer; or
      (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

9. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992 WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 8 above are used and the following exceptions to coverage appear in the policy

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

Part One

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims, reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

10. AMERICAN LAND TITLE ASSOCIATION RESIDENTIAL TITLE INSURANCE POLICY - 1987 EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning
   - land use
   - land division
   - improvements on the land
   - environmental protection

   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:
   - a notice of exercising the right appears in the public records on the Policy Date
   - the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking.
3. Title Risks
   - that are created, allowed, or agreed to by you
   - that are known to you, but not to us, on the Policy Date - unless they appeared in the public records
   - that result in no loss to you
   - that first affect your title after the Policy Date - this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   - to any land outside the area specifically described and referred to in Item 3 of Schedule A, or
   - in streets, alleys, or waterways that touch your land

   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

ADDENDUM TO EXHIBIT A
LIST OF PRINTED EXCEPTIONS AND EXCLUSIONS (By Policy Type)

11. EAGLE PROTECTION OWNER'S POLICY

CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE – 1998
ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE – 1998

Covered Risks 14 (Subdivision Law Violation), 15 (Building Permit), 16 (Zoning) and 18 (Encroachment of boundary walls or fences) are Subject to Deductible Amounts and Maximum Dollar Limits of Liability

EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes ordinances, laws and regulations concerning:
   a. building
   b. zoning
   c. land use
   d. improvements on the land
   e. land division
   f. environmental protection

   This Exclusion does not apply to violations or the enforcement of these matters if notice of the violation or enforcement appears in the Public Records at the Policy Date.

   This Exclusion does not limit the coverage described in Covered Risk 14, 15, 16, 17 or 24.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at the Policy Date.
3. The right to take the Land by condemning it, unless:
   a. a notice of exercising the right appears in the Public Records at the Policy Date; or
   b. the taking happened before the Policy Date and is binding on You if You bought the Land without Knowing of the taking.
4. Risks
   a. that are created, allowed, or agreed to by You, whether or not they appear in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they appear in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date – this does not limit the coverage described in Covered Risk 7, 8.d, 22, 23, 24 or 25.
5. Failure to pay value for Your Title.
6. Lack of a right
   a. to any Land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This Exclusion does not limit the coverage described in Covered Risk 11 or 18.

12. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992 WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE WITH EAGLE PROTECTION ADDED

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any, law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the Land; (iii) a separation in ownership or a change in the dimensions or area of the Land or any parcel of which the Land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in Public Records at Date of Policy. This exclusion does not limit the coverage provided under insuring provisions 14, 15, 16 and 24 of this policy.

   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under insuring provisions 14, 15, 16 and 24 of this policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the Public Records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without Knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (this paragraph (d) does not limit the coverage provided under insuring provisions 7, 8, 16, 17, 19, 20, 21, 23, 24 and 25); or
   (e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the Land is situated.

5. Invalidity or unenforceability of the lien of the ed Mortgage, or claim thereof, which arises out of the action evidenced by the Insured Mortgage and is based upon:
   (a) usury, except as provided under insuring provision 10 of this policy; or
   (b) any consumer credit protection or truth in lending law.

6. Taxes or assessments of any taxing or assessment authority which become a lien on the Land subsequent to Date of Policy.

7. Any claim, which arises out of the transaction creating the interest of the mortgage insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (a) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (b) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or
   (c) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
      (i) to timely record the instrument of transfer; or
      (ii) of such recordation of impart notice to a purchaser for value or a judgment or lien creditor.

8. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This exclusion does not limit the coverage provided under insuring provision 7.

9. Lack of priority of the lien of the Insured Mortgage as to each and every advance made after Date of Policy, and all interest charged thereon, over liens, encumbrances and other matters affecting title, the existence of which are Known to the Insured at:
   (a) The time of the advance; or
   (b) The time a modification is made to the terms of the Insured Mortgage which changes the rate of interest charged, if the rate of interest is greater as a result of the modification than it would have been before the modification.

   This exclusion does not limit the coverage provided under insuring provision 7.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Environmental protection liens provided for by the following existing statutes, which liens will have priority over the lien of the Insured Mortgage when they arise: NONE.

13. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY – 1992 WITH EAGLE PROTECTION ADDED WITH REGIONAL EXCEPTIONS

When the American Land Title Association loan policy with EAGLE Protection Added is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 12 above are used and the following exceptions to coverage appear in the policy:

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

Part One:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims, reservations or exceptions in patents or in acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

Part Two:

1. Environmental protection liens provided for by the following existing statutes, which liens will have priority over the lien of the Insured Mortgage when they arise: NONE.

OR-9738890
TITLE OFFICER - GOMEZ

First American Title Insurance Company

114 East Fifth Street, Santa Ana, California 92701
(P.O. Box 267, Santa Ana, California 92702)
(714) 558-3211

SHELL E & P
3030 SATURN, STE. 101
BREA, CALIFORNIA 92621
ATTN: JEFFREY MAISCH

YOUR NO. CALRESOURCES LLC

IN RESPONSE TO THE ABOVE REFERENCED APPLICATION FOR A POLICY OF TITLE INSURANCE, THIS COMPANY HEREBY REPORTS THAT IT IS PREPARED TO ISSUE, OR CAUSE TO BE ISSUED, AS OF THE DATE HEREOF, A POLICY OR POLICIES OF TITLE INSURANCE DESCRIBING THE LAND AND THE ESTATE OR INTEREST THEREIN HEREINAFTER SET FORTH, INSURING AGAINST LOSS WHICH MAY BE SUSTAINED BY REASON OF ANY DEFECT, LIEN OR ENCUMBRANCE NOT SHOWN OR REFERRED TO AS AN EXCEPTION BELOW OR NOT EXCLUDED FROM COVERAGE PURSUANT TO THE PRINTED SCHEDULES, CONDITIONS AND STIPULATIONS OF THE POLICY FORMS.

THE PRINTED EXCEPTIONS AND EXCLUSIONS FROM THE COVERAGE OF THE POLICY OR POLICIES ARE SET FORTH IN EXHIBIT A ATTACHED. COPIES OF THE POLICY FORMS SHOULD BE READ. THEY ARE AVAILABLE FROM THE OFFICE WHICH ISSUED THIS REPORT.

THIS REPORT (AND ANY SUPPLEMENTS OR AMENDMENTS HERETO) IS ISSUED SOLELY FOR THE PURPOSE OF FACILITATING THE ISSUANCE OF A POLICY OF TITLE INSURANCE AND NO LIABILITY IS ASSUMED HEREBY. IF IT IS DESIRED THAT LIABILITY BE ASSUMED PRIOR TO THE ISSUANCE OF A POLICY OF TITLE INSURANCE, A BINDER OR COMMITMENT SHOULD BE REQUESTED.

PLEASE READ THE EXCEPTIONS SHOWN OR REFERRED TO BELOW AND THE EXCEPTIONS AND EXCLUSIONS SET FORTH IN EXHIBIT A OF THIS REPORT CAREFULLY. THE EXCEPTIONS AND EXCLUSIONS ARE MEANT TO PROVIDE YOU WITH NOTICE OF MATTERS WHICH ARE NOT COVERED UNDER THE TERMS OF THE TITLE INSURANCE POLICY AND SHOULD BE CAREFULLY CONSIDERED.

IT IS IMPORTANT TO NOTE THAT THIS PRELIMINARY REPORT IS NOT A WRITTEN REPRESENTATION AS TO THE CONDITION OF TITLE AND MAY NOT LIST ALL LIENS, DEFECTS, AND ENCUMBRANCES AFFECTING TITLE TO THE LAND.

DATED AS OF **DECEMBER 22, 1998** AT 7:30 A.M.

BY RONALD J. GOMEZ - TITLE OFFICER

THE FORM OF POLICY OF TITLE INSURANCE CONTEMPLATED BY THIS REPORT IS:

AMERICAN LAND TITLE ASSOCIATION OWNERS POLICY.

TITLE TO THE ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

CALRESOURCES LLC, A CALIFORNIA LIMITED LIABILITY COMPANY.

THE ESTATE OR INTEREST IN THE LAND HEREINAFTER DESCRIBED OR REFERRED TO COVERED BY THIS REPORT IS:

A FEE.

AT THE DATE HEREOF EXCEPTIONS TO COVERAGE IN ADDITION TO THE PRINTED EXCEPTIONS AND EXCLUSIONS IN THE POLICY FORM WOULD BE AS FOLLOWS:

1. SECOND INSTALLMENT GENERAL AND SPECIAL TAXES FOR THE FISCAL YEAR 1998-1999, NOW A LIEN NOT YET DELINQUENT; AMOUNT $149,320.63;
CODE AREA: 78-072.
A. P. NO.: 320-071-27 AND 320-073-04.

2. THE LIEN OF SUPPLEMENTAL TAXES ASSESSED PURSUANT TO CHAPTER 3.5 COMMENCING WITH SECTION 75 OF THE CALIFORNIA REVENUE AND TAXATION CODE.

3. THE RESERVATION FOR ROADS, RAILROADS AND DITCHES OF A STRIP OF LAND 30 FEET WIDE, ALONG, ADJOINING AND EACH SIDE OF THE TOWNSHIP AND SECTION LINES, AND THE RESERVATION FOR ROADS, RAILROADS AND DITCHES OF A STRIP OF LAND 20 FEET WIDE, ALONG, ADJOINING AND EACH SIDE OF THE QUARTER SECTION LINES, AND THE RESERVATION OF THE USE AND CONTROL OF CIENEGAS AND NATURAL STREAMS OF WATER, IF ANY, NATURALLY UPON, FLOWING ACROSS, INTO OR BY SAID TRACT, AND THE RIGHT OF WAY FOR AND TO CONSTRUCT IRRIGATION OR DRAINAGE DITCHES THROUGH SAID TRACT TO IRRIGATE OR DRAIN THE ADJACENT LAND, AS CONTAINED IN DEED FROM STEARNS RANCHO COMPANY TO CHARLES VICTOR HALL, RECORDED MARCH 18, 1906 IN BOOK 91, PAGE 192 OF DEEDS.

4. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED SEPTEMBER 27, 1906 IN BOOK 138, PAGE 266 OF DEEDS,
IN FAVOR OF: CHARLES A. MEYER, JR.
FOR: A RIGHT OF WAY 30 INCHES IN WIDTH FOR PIPE LINE FOR OIL OR GAS, WITH THE RIGHT TO ERECT, OPERATE AND MAINTAIN TELEPHONE POLES, AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND.

SAID RIGHT OF WAY WAS ASSIGNED TO FULLERTON OIL COMPANY BY ENDORSEMENT ON SAID DEED.

5. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED SEPTEMBER 27, 1912 IN BOOK 219, PAGE 349 OF DEEDS,
IN FAVOR OF: UNION OIL COMPANY OF CALIFORNIA.
FOR: RIGHT OF WAY FOR MAINTENANCE OF A PIPE LINE FOR THE TRANSPORTATION OF OIL, AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND.

6. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JANUARY 21, 1914 IN BOOK 244, PAGE 266 OF DEEDS,
IN FAVOR OF: THE COUNTY OF ORANGE.
FOR: A RIGHT OF WAY FOR ROAD PURPOSES AND INCIDENTAL PURPOSES.
OVER: THE EASTERLY PORTION OF THE LAND.

7. THE EFFECT OF MAPS PURPORTING TO SHOW THE HEREIN DESCRIBED AND OTHER LAND RECORDED IN BOOK 13, PAGE 8; AND IN BOOK 51, PAGE 31, BOTH OF RECORD OF SURVEYS.

8. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JUNE 10, 1957 IN BOOK 3936, PAGE 324 OF OFFICIAL RECORDS,
IN FAVOR OF: BREA CHEMICALS, INC.
FOR: RIGHT OF WAY FOR A ROADWAY, AND INCIDENTAL PURPOSES.
OVER: THE WESTERLY PORTION OF THE LAND AND OTHER LAND.

THE OWNER OF THE HEREIN DESCRIBED LAND DID NOT JOIN IN THE EXECUTION OF SAID DEED.

9. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED JANUARY 16, 1968 IN BOOK 8493, PAGE 555 OF OFFICIAL RECORDS,
IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY.
FOR: POLE LINES, CONDUITS AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND DESCRIBED AS FOLLOWS:

A STRIP OF LAND 12 FEET IN WIDTH, LYING WITHIN THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, SAN BERNARDINO BASE AND MERIDIAN, THE CENTERLINE OF SAID STRIP BEING DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER; THENCE, NORTH 89° 15' 30" EAST 2292.07 FEET; THENCE, SOUTH 4° 18' EAST 220 FEET TO THE TRUE POINT OF BEGINNING; THENCE, SOUTHWESTERLY 39 FEET TO A POINT IN A LINE PARALLEL WITH AND DISTANT WESTERLY, MEASURED AT RIGHT ANGLES FROM THE EASTERLY LINE OF THE RANCHO SAN JUAN CAJON DE SANTA ANA, 17 FEET; THENCE, SOUTH 89° 15' 30" WEST 45 FEET.

10. A COMMUNITY OIL AND GAS LEASE EXECUTED BY GETTY OIL COMPANY, A DELAWARE CORPORATION, AS LESSOR, AND BY CRESTMONT OIL AND GAS COMPANY, A CORPORATION, AS LESSEE, RECORDED JULY 10, 1973 IN BOOK 10792, PAGE 435 OF OFFICIAL RECORDS, TO WHICH RECORD REFERENCE IS MADE FOR FULL PARTICULARS.

NOTE 1: THE LESSEE'S INTEREST UNDER SAID OIL AND GAS LEASE HAS BEEN ASSIGNED TO SHELL WESTERN E&P INC., BY ASSIGNMENT WHICH RECORDED FEBRUARY 16, 1989 AS INSTRUMENT NO. 89-082771 OF OFFICIAL RECORDS, REFERENCE BEING HEREBY MADE TO THE RECORD THEREOF FOR FULL PARTICULARS.

NOTE 2: VARIOUS INSTRUMENTS APPEAR OF RECORD AFFECTING OR PURPORTING TO AFFECT THE LEASEHOLD INTEREST UNDER SAID LEASE, BUT THIS TITLE EVIDENCE DOES NOT COVER AN EXAMINATION OF OR INSURANCE AS TO THE EFFECT THEREOF, OR THE PRESENT OWNERSHIP OR CONDITIONS OF SAID LEASEHOLD.

11. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED APRIL 2, 1982 AS INSTRUMENT NO. 82-115963 OF OFFICIAL RECORDS,
IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY.
FOR: AERIAL AND UNDERGROUND ELECTRICAL FACILITIES, AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND.

12. THE EFFECT OF A QUITCLAIM DEED, DATED JULY 26, 1982, EXECUTED BY CRESTMONT OIL AND GAS COMPANY, A CORPORATION, WHICH PURPORTEDLY CONVEYS A PORTION OF THE LAND (LAMBERT ROAD) TO THE COUNTY OF ORANGE, RECORDED NOVEMBER 3, 1982 AS INSTRUMENT NO. 82-386175 OF OFFICIAL RECORDS.

13. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED MARCH 2, 1983 AS INSTRUMENT NO. 83-091173 OF OFFICIAL RECORDS,
IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION.
FOR: ELECTRICAL SYSTEMS AND COMMUNICATION SYSTEMS, AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND.

14. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED MAY 6, 1983 AS INSTRUMENT NO. 83-193206 OF OFFICIAL RECORDS,
IN FAVOR OF: THE COUNTY OF ORANGE.
FOR: STREET SIGNAL INSTALLATION, OPERATION AND MAINTENANCE, AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND (ADJACENT TO LAMBERT ROAD).

15. AN EASEMENT AS SET FORTH IN AN INSTRUMENT RECORDED SEPTEMBER 18, 1986 AS INSTRUMENT NOS. 86-429084 AND 86-429085, BOTH OF OFFICIAL RECORDS,
IN FAVOR OF: THE COUNTY OF ORANGE.
FOR: SLOPE PURPOSES AND INCIDENTAL PURPOSES.
OVER: A PORTION OF THE LAND (ADJACENT TO LAMBERT ROAD).

16. AN UNRECORDED LEASE, EXECUTED BY TEXACO PRODUCING INC., AS LESSOR, AND BERGEN NURSERIES, AS LESSEE, FOR THE TERM, AND UPON THE TERMS, COVENANTS AND CONDITIONS PROVIDED THEREIN, AS DISCLOSED BY A QUITCLAIM DEED RECORDED SEPTEMBER 18, 1986 AS INSTRUMENT NO. 86-429084 OF OFFICIAL RECORDS.

17. THE TERMS, PROVISIONS AND CONDITIONS CONTAINED IN A DOCUMENT ENTITLED "PIPELINE EASEMENT AND SURFACE AGREEMENT", EXECUTED BY AND BETWEEN TEXACO EXPLORATION AND PRODUCTION INC., A DELAWARE CORPORATION AND UNION OIL COMPANY OF CALIFORNIA DBA UNOCAL, A CALIFORNIA CORPORATION, RECORDED JUNE 25, 1993 AS INSTRUMENT NO. 93-0427768 OF OFFICIAL RECORDS.

18. EASEMENTS, COVENANTS AND CONDITIONS CONTAINED IN THE DEED FROM TEXACO EXPLORATION AND PRODUCTION INC., A DELAWARE CORPORATION, AS GRANTOR, TO CALRESOURCES LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, AS GRANTEE, RECORDED MARCH 28, 1996 AS INSTRUMENT NO. 19960152286 OF OFFICIAL RECORDS. REFERENCE BEING MADE TO SAID DOCUMENT FOR FULL PARTICULARS.

DESCRIPTION

THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE STATE OF CALIFORNIA, **COUNTY OF ORANGE, CITY OF BREA,** AND IS DESCRIBED AS FOLLOWS:

THE NORTH 100 ACRES OF THAT PORTION OF THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, IN THE RANCHO SAN JUAN CAJON DE SANTA ANA, AS SHOWN ON A MAP RECORDED IN BOOK 51, PAGE 7 OF MISCELLANEOUS MAPS, RECORDS OF ORANGE COUNTY, CALIFORNIA, WHICH LIES WEST OF THE EASTERN BOUNDARY OF SAID RANCHO SAN JUAN CAJON DE SANTA ANA.

* * * * * * * *

WARNING

"THE MAP ATTACHED HERETO MAY OR MAY NOT BE A SURVEY OF THE LAND DEPICTED THEREON. YOU SHOULD NOT RELY UPON IT FOR ANY PURPOSE OTHER THAN ORIENTATION TO THE GENERAL LOCATION OF THE PARCEL OR PARCELS DEPICTED. FIRST AMERICAN EXPRESSLY DISCLAIMS ANY LIABILITY FOR ALLEGED LOSS OR DAMAGE WHICH MAY RESULT FROM RELIANCE UPON THIS MAP".

* * * * * * * *

MVS
PLATS (CC&R'S, IF ANY) ENCLOSED.

NOTE: WIRING INSTRUCTIONS FOR SUB-ESCROW DEPOSITS ARE AS FOLLOWS:

FIRST AMERICAN TRUST COMPANY	ACCOUNT #15020	ABA #122241255
114 E. FIFTH STREET	ACCOUNT NAME:	FIRST AMERICAN
SANTA ANA, CA 92701		TITLE COMPANY

CREDIT TO FIRST AMERICAN TITLE COMPANY

OR-9738890 TITLE OFFICER - RONALD J. GOMEZ

DISREGARD IF FIRST AMERICAN IS YOUR ESCROW SETTLEMENT AGENT --

CONTACT ESCROW OFFICER FOR WIRING INSTRUCTIONS

COPY WITH PLAT (AND CC&R, IF ANY) TO:

HUNSAKER & ASSOCIATES IRVINE, INC.
THREE HUGHES DRIVE
IRVINE, CALIFORNIA 92718
ATTN: HOWARD FOSS

NOTICE

SECTION 12413.1 OF THE CALIFORNIA INSURANCE CODE, EFFECTIVE JANUARY 1, 1990, REQUIRES THAT ANY TITLE INSURANCE COMPANY, UNDERWRITTEN TITLE COMPANY, OR CONTROLLED ESCROW COMPANY HANDLING FUNDS IN AN ESCROW OR SUB-ESCROW CAPACITY, WAIT A SPECIFIED NUMBER OF DAYS AFTER DEPOSITING FUNDS, BEFORE RECORDING ANY DOCUMENTS IN CONNECTION WITH THE TRANSACTION OR DISBURSING FUNDS. THIS STATUTE ALLOWS FOR FUNDS DEPOSITED BY WIRE TRANSFER TO BE DISBURSED THE SAME DAY AS DEPOSIT. IN THE CASE OF CASHIER'S CHECKS OR CERTIFIED CHECKS, FUNDS MAY BE DISBURSED THE NEXT DAY AFTER DEPOSIT. IN ORDER TO AVOID UNNECESSARY DELAYS OF THREE TO SEVEN DAYS, OR MORE, PLEASE USE WIRE TRANSFER, CASHIER'S CHECKS, OR CERTIFIED CHECKS WHENEVER POSSIBLE.

IF YOU HAVE ANY QUESTIONS ABOUT THE EFFECT OF THIS NEW LAW, PLEASE CONTACT YOUR LOCAL FIRST AMERICAN OFFICE FOR MORE DETAILS.

* * * * * * * * * * * * * *

NOTICE

IN ACCORDANCE WITH SECTIONS 18662 AND 18668 OF THE REVENUE AND TAXATION CODE, A BUYER MAY BE REQUIRED TO WITHHOLD AN AMOUNT EQUAL TO THREE AND ONE-THIRD PERCENT OF THE SALES PRICE IN THE CASE OF THE DISPOSITION OF CALIFORNIA REAL PROPERTY INTEREST BY EITHER:

1. A SELLER WHO IS AN INDIVIDUAL WITH A LAST KNOWN STREET ADDRESS OUTSIDE OF CALIFORNIA OR WHEN THE DISBURSEMENT INSTRUCTIONS AUTHORIZE THE PROCEEDS BE SENT TO A FINANCIAL INTERMEDIARY OF THE SELLER, OR

2. A CORPORATE SELLER WHICH HAS NO PERMANENT PLACE OF BUSINESS IN CALIFORNIA.

THE BUYER MAY BECOME SUBJECT TO PENALTY FOR FAILURE TO WITHHOLD AN AMOUNT EQUAL TO THE GREATER OF 10 PERCENT OF THE AMOUNT REQUIRED TO BE WITHHELD OR FIVE HUNDRED DOLLARS ($500).

HOWEVER, NOTWITHSTANDING ANY OTHER PROVISION INCLUDED IN THE CALIFORNIA STATUTES REFERENCED ABOVE, NO BUYER WILL BE REQUIRED TO WITHHOLD ANY AMOUNT OR BE SUBJECT TO PENALTY FOR FAILURE TO WITHHOLD IF:

1. THE SALES PRICE OF THE CALIFORNIA REAL PROPERTY CONVEYED DOES NOT EXCEED ONE HUNDRED THOUSAND DOLLARS ($100,000), OR

2. THE SELLER EXECUTES A WRITTEN CERTIFICATE, UNDER THE PENALTY OF PERJURY, CERTIFYING THAT THE SELLER IS A RESIDENT OF CALIFORNIA, OR IF A CORPORATION, HAS A PERMANENT PLACE OF BUSINESS IN CALIFORNIA, OR

3. THE SELLER, WHO IS AN INDIVIDUAL, EXECUTES A WRITTEN CERTIFICATE, UNDER THE PENALTY OF PERJURY, THAT THE CALIFORNIA REAL PROPERTY BEING CONVEYED IS THE SELLER'S PRINCIPAL RESIDENCE (AS DEFINED IN SECTION 1034 OF THE INTERNAL REVENUE CODE).

THE SELLER IS SUBJECT TO PENALTY FOR KNOWINGLY FILING A FRAUDULENT CERTIFICATE FOR THE PURPOSE OF AVOIDING THE WITHHOLDING REQUIREMENT.

THE CALIFORNIA STATUTES REFERENCED ABOVE INCLUDE PROVISIONS WHICH AUTHORIZE THE FRANCHISE TAX BOARD TO GRANT REDUCED WITHHOLDING AND WAIVERS FROM WITHHOLDING ON A CASE-BY-CASE BASIS.

THE PARTIES TO THIS TRANSACTION SHOULD SEEK AN ATTORNEY'S, ACCOUNTANT'S, OR OTHER TAX SPECIALIST'S OPINION CONCERNING THE EFFECT OF THIS LAW ON THIS TRANSACTION AND SHOULD NOT ACT ON ANY STATEMENTS MADE OR OMITTED BY THE ESCROW OR CLOSING OFFICER.

100-Acre Fee
Nov 2008

First American Title Insurance Company

9130 Anaheim Pl., Suite 230
Rancho Cucamonga, CA 91730

Jeff Maisch
Aera Energy LLC
3030 Saturn Street, Suite 101
Brea, CA 92821

Customer Reference:	100 Acre Property
Order Number:	OSA-3170696 (29)
Title Officer:	Hugo Tello
Phone:	(909)477-5678
Fax No.:	(866)782-3439
E-Mail:	htello@firstam.com
Buyer:	
Owner:	Aera Energy LLC
Property:	Vacant Land Brea, CA

PRELIMINARY REPORT

In response to the above referenced application for a policy of title insurance, this company hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said policy or policies are set forth in Exhibit A attached. *The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties.* Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth in Exhibit A. Copies of the policy forms should be read. They are available from the office which issued this report.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of November 24, 2008 at 7:30 A.M.

The form of Policy of title insurance contemplated by this report is:

To Be Determined

A specific request should be made if another form or additional coverage is desired.

Title to said estate or interest at the date hereof is vested in:

Aera Energy LLC, a California limited liability company, formerly known as CalResources LLC, a California limited liability company

The estate or interest in the land hereinafter described or referred to covered by this Report is:

A fee.

The Land referred to herein is described as follows:

(See attached Legal Description)

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. General and special taxes and assessments for the fiscal year 2008-2009.

First Installment:	$27,751.72, PAYABLE
Penalty:	$0.00
Second Installment:	$27,751.72, PAYABLE
Penalty:	$0.00
Tax Rate Area:	53-000
A. P. No.:	320-071-29

2. General and special taxes and assessments for the fiscal year 2008-2009.

First Installment:	$11,911.97, PAYABLE
Penalty:	$0.00
Second Installment:	$11,911.97, PAYABLE
Penalty:	$0.00
Tax Rate Area:	53-000
A. P. No.:	320-073-07

3. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

4. The reservation for roads, railroads and ditches of a strip of land 30 feet wide, along, adjoining and each side of the township and section lines, and the reservation for roads, railroads and

OK (3) (12-98 PTR)

ditches of a strip of land 20 feet wide, along, adjoining and each side of the quarter section lines, and the reservation of the use and control of cienegas and natural streams of water, if any, naturally upon, flowing across, into or by said tract, and the right of way for and to construct irrigation or drainage ditches through said tract to irrigate or drain the adjacent land, as contained in deed from Stearns Rancho Company to Charles Victor Hall, recorded March 18, 1906 in Book 91, Page 192 of Deeds.

12-98 ITR Ref

(4) 5. An easement for pipeline, telephone poles and incidental purposes, recorded September 27, 1906 in Book 138 of Deeds, Page 266.
In Favor of: Charles A. Meyer, Jr.
Affects: As described therein

(5) 6. An easement for maintenance of a pipeline and incidental purposes, recorded September 27, 1912 in Book 219 of Deeds, Page 349.
In Favor of: Union Oil Company of California
Affects: As described therein

(6) 7. An easement for road and incidental purposes, recorded January 21, 1914 in Book 244 of Deeds, Page 266.
In Favor of: The County of Orange
Affects: As described therein

(7) 8. Any facts, rights, interests or claims that may exist or arise by reason of matters, if any, disclosed by those certain Record of Surveys filed in Book 13, Page 8 and Book 51, Page 31 .

(8) 9. An easement for roadway and incidental purposes, recorded June 10, 1957 in Book 3936, Page 324 of Official Records.
In Favor of: Brea Chemicals, Inc.
Affects: As described therein

(9) 10. An easement for pole lines, conduits and incidental purposes, recorded January 16, 1968 in Book 8493, Page 555 of Official Records.
In Favor of: Southern California Edison Company
Affects: As described therein

(10) 11. An oil and gas lease executed by Getty Oil Company, a Delaware corporation as lessor and Crestmont Oil and Gas Company, a corporation as lessee, recorded July 10, 1973 in Book 10792, Page 435 of Official Records.

Defects, liens, encumbrances or other matters affecting the leasehold estate, whether or not shown by the public records.

(11) 12. An easement for electrical facilities and incidental purposes, recorded April 2, 1982 as Instrument No. 82-115963 of Official Records.
In Favor of: Southern California Edison Company
Affects: As described therein

13. An easement for electrical supply and communication systems and incidental purposes, recorded March 2, 1983 as Instrument No. 83-091173 of Official Records.
In Favor of: Southern California Edison Company, a corporation
Affects: As described therein

14. The terms and provisions contained in the document entitled Right of Entry recorded May 6, 1983 as Instrument No. 83-193206 of Official Records.

15. An easement for slope and incidental purposes, recorded September 18, 1986 as Instrument No. 86-429085 of Official Records.
In Favor of: The County of Orange
Affects: As described therein

16. An easement for anchorage and incidental purposes, recorded November 4, 1988 as Instrument No. 88-568867 of Official Records.
In Favor of: Southern California Edison Company, a corporation
Affects: As described therein

17. The terms and provisions contained in the document entitled Right of Way Agreement recorded December 19, 1995 as Instrument No. 19950565134 of Official Records.

18. Any facts, rights, interests or claims that may exist or arise by reason of matters, if any, disclosed by that certain Record of Survey filed in Book 187, Pages 2-7 .

19. An easement for underground lines, conduits and incidental purposes, recorded May 10, 2000 as Instrument No. 20000245019 of Official Records.
In Favor of: Pacific Bell Telephone Company, a California corporation
Affects: As described therein

20. The terms and provisions contained in the document entitled Memorandum of Pipeline Easement Agreement recorded December 6, 2002 as Instrument No. 2002001104088 of Official Records.

21. An easement for slope construction, repair, maintenance and incidental purposes, recorded March 11, 2003 as Instrument No. 2003000262412 of Official Records.
In Favor of: County of Orange, a body corporate and politic
Affects: As described therein

Document re-recorded January 29, 2004 as Instrument No. 2004000069062 of Official Records.

22. An unrecorded lease dated February 1, 2007, executed by Aera Energy LLC as lessor and Linn Energy, LLC, Linn Energy Holdings, LLC, Linn Western Operating, Inc., and Blacksand Energy, LLC as lessee, as disclosed by a Memorandum of Oil and Gas Lease (Brea-Olinda) recorded March 20, 2007 as Instrument No. 2007000177884 of Official Records.

Defects, liens, encumbrances or other matters affecting the leasehold estate, whether or not shown by the public records.

23. Rights of parties in possession.

Prior to the issuance of any policy of title insurance, the Company will require:

24. With respect to Aera Energy LLC, a California limited liability company:
a. A copy of its operating agreement and any amendments thereto;
b. If it is a California limited liability company, that a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) be recorded in the public records;
c. If it is a foreign limited liability company, that a certified copy of its application for registration (LLC-5) be recorded in the public records;
d. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, that such document or instrument be executed in accordance with one of the following, as appropriate:
(i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such document must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;
(ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.
e. Other requirements which the Company may impose following its review of the material required herein and other information which the Company may require.

INFORMATIONAL NOTES

Note: The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than the certain dollar amount set forth in any applicable arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. If you desire to review the terms of the policy, including any arbitration clause that may be included, contact the office that issued this Commitment or Report to obtain a sample of the policy jacket for the policy that is to be issued in connection with your transaction.

The map attached, if any, may or may not be a survey of the land depicted hereon. First American expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

WIRE INSTRUCTIONS
for
First American Title Company, Demand/Draft Sub-Escrow Deposits
Orange County, California

First American Trust, FSB
5 First American Way
Santa Ana, CA 92707

ABA 122241255
Credit to First American Title Company
Account No. 3034390000

Reference Title Order Number 3170696 and Title Officer Hugo Tello

Please wire the day before recording.

LEGAL DESCRIPTION

Real property in the City of Brea, County of Orange, State of California, described as follows:

THE NORTH 100 ACRES OF THAT PORTION OF THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 3 SOUTH, RANGE 9 WEST, IN THE RANCHO SAN JUAN CAJON DE SANTA ANA, AS SHOWN ON A MAP RECORDED IN BOOK 51, PAGE 7 OF MISCELLANEOUS MAPS, RECORDS OF ORANGE COUNTY, CALIFORNIA, WHICH LIES WEST OF THE EASTERLY BOUNDARY OF SAID RANCHO SAN JUAN CAJON DE SANTA ANA.

EXCEPTING THEREFROM THAT PORTION DESCRIBED IN THE DEED TO THE COUNTY OF ORANGE RECORDED SEPTEMBER 18, 1986 AS INSTRUMENT NO. 86-429085 OF OFFICIAL RECORDS OF SAID ORANGE COUNTY. Item 15

ALSO EXCEPTING THEREFROM THAT PORTION DESCRIBED IN THE DEED TO THE COUNTY OF ORANGE RECORDED MARCH 11, 2003 AS INSTRUMENT NO. 2003000262411 OF OFFICIAL RECORDS OF SAID ORANGE COUNTY.

APN: 320-071-29 and 320-073-07

NOTICE

Section 12413.1 of the California Insurance Code, effective January 1, 1990, requires that any title insurance company, underwritten title company, or controlled escrow company handling funds in an escrow or sub-escrow capacity, wait a specified number of days after depositing funds, before recording any documents in connection with the transaction or disbursing funds. This statute allows for funds deposited by wire transfer to be disbursed the same day as deposit. In the case of cashier's checks or certified checks, funds may be disbursed the next day after deposit. In order to avoid unnecessary delays of three to seven days, or more, please use wire transfer, cashier's checks, or certified checks whenever possible.

If you have any questions about the effect of this new law, please contact your local First American Office for more details.

EXHIBIT A
LIST OF PRINTED EXCEPTIONS AND EXCLUSIONS (BY POLICY TYPE)

1. CALIFORNIA LAND TITLE ASSOCIATION STANDARD COVERAGE POLICY - 1990
SCHEDULE B

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notice of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by their policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

2. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970
SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions of area of the land, or the effect of any violation of any such law, ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder; (c) resulting in no loss or damage to the insured claimant; (d) attaching or

created subsequent to Date of Policy; or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.

3. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970 WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 2 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

4. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970 WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions or area of the land, or the effect of any violation of any such law ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant, (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy or acquired the insured mortgage and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder, (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy (except to the extent insurance is afforded herein as to any statutory lien for labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy).
4. Unenforceability of the lien of the insured mortgage because of failure of the insured at Date of Policy or of any subsequent owner of the indebtedness to comply with applicable "doing business" laws of the state in which the land is situated.

5. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970 WITH REGIONAL EXCEPTIONS

When the American Land Title Association Lenders Policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy, the exclusions set forth in paragraph 4 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

6. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy;
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or the extent insurance is afforded herein as to assessments for street improvements under construction or completed at date of policy); or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or
   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
   (a) to timely record the instrument of transfer; or
   (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

7. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 6 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

8. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
   (a) to timely record the instrument of transfer; or
   (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

9. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 8 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

10. AMERICAN LAND TITLE ASSOCIATION RESIDENTIAL
TITLE INSURANCE POLICY - 1987
EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   * land use
   * land division
   * improvements on the land
   * environmental protection

   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:

* a notice of exercising the right appears in the public records on the Policy Date
* the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking.

3. Title Risks:
* that are created, allowed, or agreed to by you
* that are known to you, but not to us, on the Policy Date - unless they appeared in the public records
* that result in no loss to you
* that first affect your title after the Policy Date - this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks

4. Failure to pay value for your title.

5. Lack of a right:
* to any land outside the area specifically described and referred to in Item 3 of Schedule A, or
* in streets, alleys, or waterways that touch your land

This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

11. EAGLE PROTECTION OWNER'S POLICY

CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE - 2008
ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE - 2008

Covered Risks 16 (Subdivision Law Violation). 18 (Building Permit). 19 (Zoning) and 21 (Encroachment of boundary walls or fences) are subject to Deductible Amounts and Maximum Dollar Limits of Liability

EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   a. building
   b. zoning
   c. land use
   d. improvements on the land
   e. land division
   f. environmental protection

   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This Exclusion does not limit the coverage described in Covered Risk 11 or 21

LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows: Covered Risk 16, 18, 19 and 21, Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A. The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

	Your Deductible Amount	Our Maximum Dollar Limit of Liability
Covered Risk 16:	1% of Policy Amount or $5,000.00 (whichever is less)	$10,000.00
Covered Risk 18:	1% of Policy Amount or $5,000.00 (whichever is less)	$25,000.00
Covered Risk 19:	1% of Policy Amount or $5,000.00 (whichever is less)	$25,000.00
Covered Risk 21:	1% of Policy Amount or $2,500.00 (whichever is less)	$5,000.00

12. THIRD GENERATION EAGLE LOAN POLICY AMERICAN LAND TITLE ASSOCIATION EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (1/01/08)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions, or location of any improvement erected on the Land; (iii) the subdivision of land; or(iv) environmental protection; or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
   (b)Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or
   (e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.

13. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 2006

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors? rights laws, that the transaction creating the lien of the Insured Mortgage, is

(a) a fraudulent conveyance or fraudulent transfer, or

(b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.

7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

14. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 2006

WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 13 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

15. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 2006

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to

   (i) the occupancy, use, or enjoyment of the Land;

   (ii) the character, dimensions, or location of any improvement erected on the Land;

   (iii) the subdivision of land; or

   (iv) environmental protection;or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.

   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters

   (a) created, suffered, assumed, or agreed to by the Insured Claimant;

   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;

   (c) resulting in no loss or damage to the Insured Claimant;

   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risks 9 and 10); or

   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors? rights laws, that the transaction vesting the Title as shown in Schedule A, is

   (a) a fraudulent conveyance or fraudulent transfer; or

   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

16. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 2006

WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 15 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

PRIVACY POLICY

We Are Committed to Safeguarding Customer Information

In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information – particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our parent company, The First American Corporation, we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability

This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its *Fair Information Values*, a copy of which can be found on our website at www.firstam.com.

Types of Information

Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

Use of Information

We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies, and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies, or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security

We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's *Fair Information Values*. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

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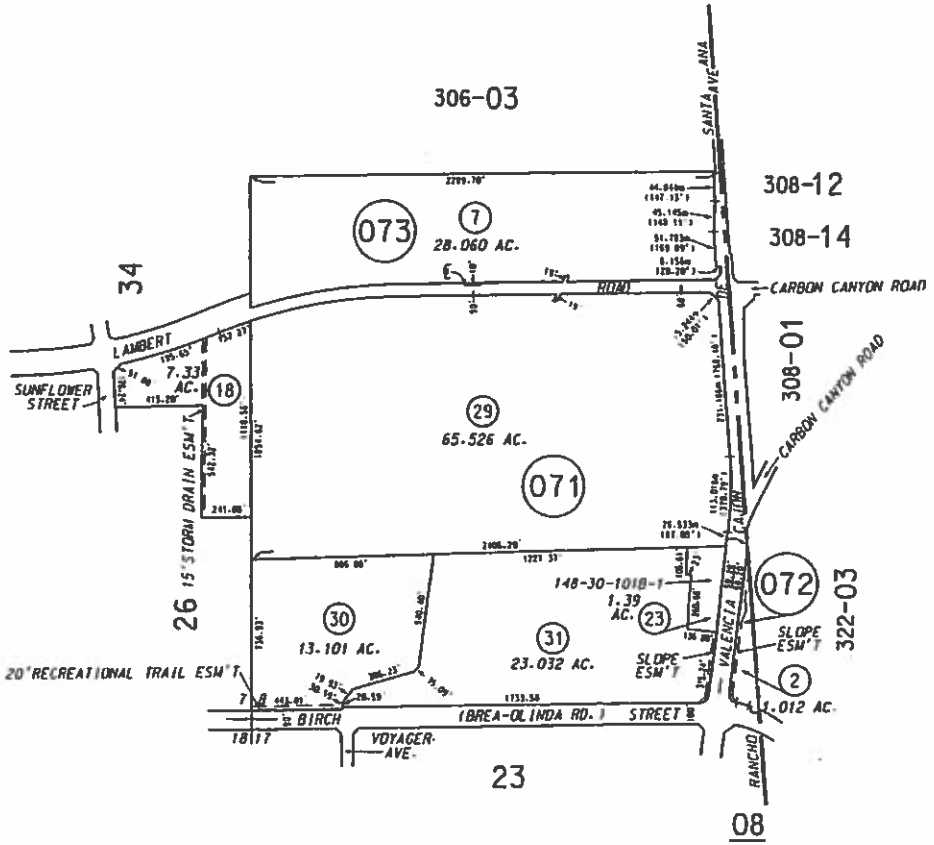
POR. SE 1/4, SEC. 7 & POR. SW 1/4, SEC 8, T 3 S, R 9 W

320-07



1" = 600'

H-130

SEP 2008

MARCH 1971

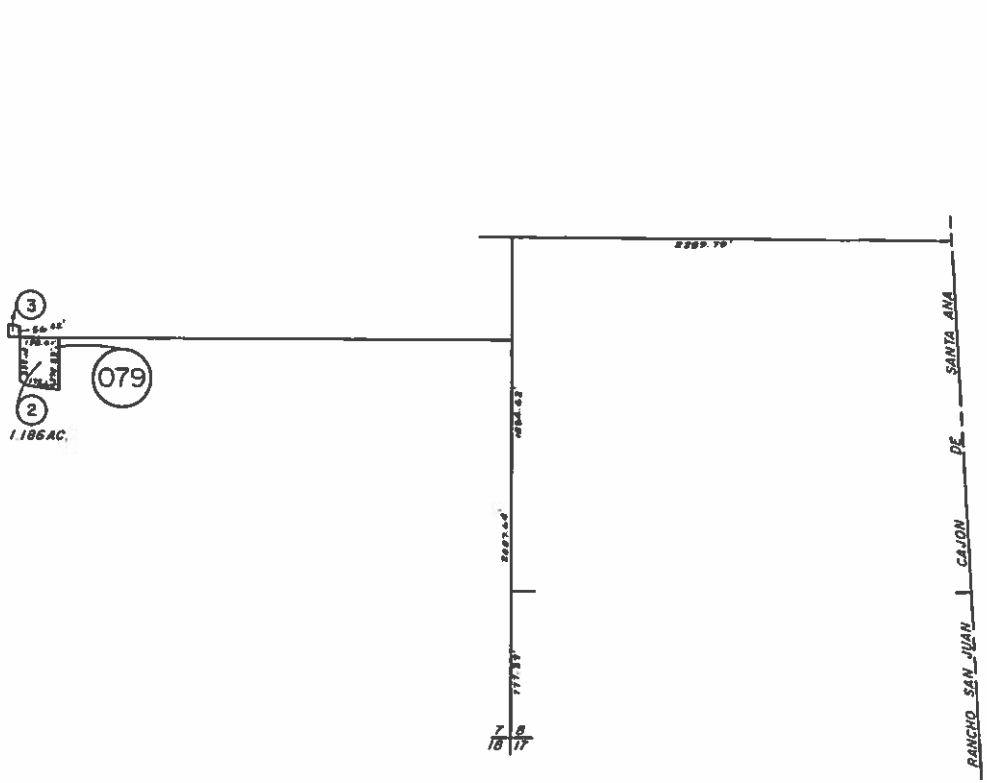
NOTE - ASSESSOR'S BLOCK & PARCEL NUMBERS SHOWN IN CIRCLES

ASSESSOR'S MAP BOOK 320 PAGE 07 COUNTY OF ORANGE

THIS MAP WAS PREPARED FOR ORANGE COUNTY ASSESSOR DEPT. PURPOSES ONLY. THE ASSESSOR MAKES NO GUARANTEE AS TO ITS ACCURACY NOR ASSUMES ANY LIABILITY FOR OTHER USES. NOT TO BE REPRODUCED. ALL RIGHTS RESERVED. ©COPYRIGHT ORANGE COUNTY ASSESSOR 1987

POR. S.E.1/4, SEC. 7, T.3S., R.9W.

320-079
SUBSURFACE



1"=600'

H-131

MARCH 1974

NOTE: ASSESSOR'S BLOCK & PARCEL NUMBERS SHOWN IN CIRCLES

ASSESSOR'S MAP
BOOK 320 PAGE 079
COUNTY OF ORANGE

APPENDIX B

PHASE I ESA QUESTIONNAIRE

northgate
environmental management, inc.

Phase I Environmental Site Assessment Questionnaire

(User Provided Information Questionnaire)

Date: 4/27/17

Your Name: Rich Knowland

Your Title: Principal

Site Name: Brea / Central

Site Location: Brea, CA - County of Los Angeles

Relationship to Site: ☐ **Owner** ☐ **Occupant** ☒ **Purchaser** ☐ **Other (please explain)**

Length of Time Associated with Site: 5 mos.

Please review and complete this questionnaire which will assist Northgate in completing our site assessment. If sufficient space in not provided, please compete your response on a separate sheet of paper and attach it to this questionnaire.

1. Are you aware of any environmental cleanup liens against the Site that are filed or recorded under federal, tribal, state or local law?

   ☐ Yes ☒ No ☐ Unknown ☐ N/A

   If Yes, please explain: _____

24411 Ridge Route Drive, Suite 130, Laguna Hills, California tel 949.716.0050 fax 949.716.0055
www.ngem.com

2. Are you aware of any activity or land use limitations, such as engineering controls (for contaminant control), land use restrictions or institutional controls, that are in place at the Site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

☒ Yes ☐ No ☐ Unknown ☐ N/A

If Yes, please explain: Active oil field

3. Do you have any specialized knowledge or experience related to the Site or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the Site or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

☐ Yes ☒ No ☐ Unknown ☐ N/A

If Yes, please explain:

4. Are you aware of commonly known or reasonably ascertainable information about the Site that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as user,

a) Do you know the past uses of the Site?

☒ Yes ☐ No ☐ Unknown ☐ N/A

If Yes, please explain: Active oil field with known residual oil sumps, seeps and chemical use

b) Do you know of specific chemicals that are present or once were present at the Site?

☐ Yes ☐ No ☒ Unknown ☐ N/A

If Yes, please explain:

c) Do you know of chemical spills that have taken place at the Site?

☒ Yes ☐ No ☐ Unknown ☐ N/A

If Yes, please explain: oil spills near wells

d) Do you know of any environmental cleanups that have taken place at the Site?

☐ Yes ☒ No ☐ Unknown ☐ N/A

If Yes, please explain: _____

e) Do you know if any fill material has been imported to the Site?

☐ Yes ☐ No ☒ Unknown ☐ N/A

If Yes, please explain: _____

5. Do you know of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the Site?

☐ Yes ☒ No ☐ Unknown ☐ N/A

If Yes, please explain: _____

6. Do you know of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the Site?

☐ Yes ☐ No ☒ Unknown ☐ N/A

If Yes, please explain: _____

7. Do you know of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products at the Site?

☐ Yes ☐ No ☒ Unknown ☐ N/A

If Yes, please explain: _____

_____

8. Based on your knowledge and experience related to the Site are there any obvious indicators that point to the presence or likely presence of contamination at the Site?

☒ Yes ☐ No ☐ Unknown ☐ N/A

If Yes, please explain: visual evidence of oil on surface.

9. Does the Site's purchase price reasonably reflect the fair market value of the property?

☐ Yes ☐ No ☒ Unknown ☐ N/A

If No, do you know the reason for lower purchase price? Is it possible that the lower purchase price is because of contamination known or believed to be present at the Site?

☐ Yes ☐ No ☒ Unknown ☐ N/A

If Yes, please explain: _____

_____

10. Have any of the following documents been prepared for the Site and, if so, can copies be provided to Northgate:

- Environmental site assessment reports ☐ Yes ☒ No ☐ Copies available
- Environmental compliance audit reports ☐ Yes ☒ No ☐ Copies available
- Environmental permits (for example, solid waste disposal permits, hazardous waste disposal permits, wastewater permits, National Pollutant Discharge Elimination System permits, underground injection permits) ☐ Yes ☐ No ☐ Copies available ✓ unknown
- Registrations for underground storage tanks (USTs) and/or above ground storage tanks (ASTs) ☐ Yes ☐ No ☐ Copies available ✓ unknown
- Registrations for underground injection systems ☐ Yes ☐ No ☐ Copies available - unknown

- Material safety data sheets ☐ Yes ☐ No ☐ Copies available - unknown
- Community right-to-know plan ☐ Yes ☐ No ☐ Copies available - unknown
- Safety plans; preparedness and prevention plans; spill prevention, countermeasure, and control plans; etc. ☐ Yes ☐ No ☐ Copies available - unknown
- Reports regarding hydrogeologic conditions on the Site or in the surrounding area
  ☒ Yes ☐ No ☒ Copies available - provided by seller
- Notices or other correspondence from any government agency relating to past or current violations of environmental laws with respect to the Site or relating to environmental liens encumbering the Site ☐ Yes ☐ No ☐ Copies available unknown
- Hazardous waste generator notices or reports ☐ Yes ☐ No ☐ Copies available unknown
- Risk assessments ☐ Yes ☐ No ☐ Copies available unknown
- Recorded Activity and Use Limitations (e.g. deed restriction, asphalt cap)
  ☐ Yes ☐ No ☐ Copies available unknown

If you know of specific chemicals or other hazardous materials (e.g., PCB associated with transformers, batteries, etc.) that are present or were once present at the property, how were they used, stored, and disposed? unknown

Do you know of aboveground or underground storage tanks on the property? If yes, what did they contain? unknown

Do you have any knowledge or experience with nearby/adjacent properties? If yes, do you have knowledge of chemicals, releases, or cleanups on these properties? unknown

How long have you owned, operated, leased, or been familiar the present and past uses of the property? 6 mos.

Northgate Environmental appreciates your assistance on this project.

APPENDIX C

THE EDR RADIUS MAP™ REPORT WITH GEOCHECK®

265-Acre Brea Property
Valencia Avenue
Brea, CA 92823

Inquiry Number: 4848184.2s
February 07, 2017

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

VALENCIA AVENUE
BREA, CA 92823

COORDINATES

Latitude (North):	33.9223550 - 33° 55' 20.47''
Longitude (West):	117.8444150 - 117° 50' 39.89''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	421946.4
UTM Y (Meters):	3753673.8
Elevation:	526 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5640946 YORBA LINDA, CA
Version Date:	2012
West Map:	5640256 LA HABRA, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140514
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
VALENCIA AVENUE
BREA, CA 92823

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	SHELL WESTERN OIL PR	2701 VALENCIA AVE	RGA LUST	Lower	1 ft.
2	LINN OPERATING, INC.		UIC	Lower	1 ft.
A3	HUNDRED ACRES LEASE/	2701 VALENCIA AVENUE	HIST UST	Lower	1 ft.
A4	SHELL #2701	2701 VALENCIA AVE	RGA LUST	Lower	1 ft.
A5	SHELL SERVICE STATIO	2701 VALENCIA AVENUE	RGA LUST	Lower	1 ft.
6	LINN OPERATING, INC.		UIC	Lower	1 ft.
B7	LINN OPERATING, INC.		UIC	Lower	1 ft.
8	PEPPER TREE CORRIDOR	3202 VALENCIA AVE	Orange Co. Industrial Site	Lower	1 ft.
B9	LINN OPERATING, INC.		UIC	Lower	1 ft.
10	LINN OPERATING, INC.		UIC	Lower	1 ft.
11	SOUTHERN CALIFORNIA	2834 VALENCIA AVE	HAZNET	Lower	1 ft.
C12	CARBON CANYON ROAD W	VALENCIA AVENUE & CA	ENVIROSTOR	Lower	1 ft.
C13	BREA-OLINDA SANITARY	VALENCIA BL/CARBON C	EMI	Higher	1 ft.
C14	COLUMBIA STEARNS MID	LAMBERT ROAD/VALENCI	ENVIROSTOR, SCH	Lower	1 ft.
15	LINN OPERATING, INC.		UIC	Higher	1 ft.
C16	LANDFILL CONDENSATE-	VALENCIA & CARBON CA	WMUDS/SWAT	Lower	1 ft.
C17	TONNER HILLS APARTME	LAMBERT RD & VALENCI	NPDES	Higher	1 ft.
A18	SHELL WESTERN OIL PR	2701 VALENCIA AVE	LUST	Lower	1 ft.
A19	HUNDRED ACRES LEASE	2701 VALENCIA AVE	UST	Lower	1 ft.
A20	SHELL WESTERN OIL PR	2701 VALENCIA	RGA LUST	Lower	1 ft.
21		N. VALENCIA AVE AND	ERNS	Lower	1 ft.
22	TONNER HILLS SSP, LL		UIC	Lower	1 ft.
D23	SANTA FE ENERGY CO O	17001 CARBON CYN RD	RCRA-SQG, ENVIROSTOR, LUST, SWEEPS UST, HIST UST,..	Lower	25, 0.005, ENE
D24	SANTA FE ENERGY CO O	17001 CARBON CANYON	UST	Lower	25, 0.005, ENE
E25	OLINDA RANCH ELEMENT	17001 EAST CARSON CA	ENVIROSTOR, SCH	Lower	68, 0.013, NNW
E26		3678 PHEASANT LN	EDR Hist Cleaner	Lower	215, 0.041, NNW
F27	CARBON CANYON REGION	4422 CARBON CANYON R	HIST UST, HAZNET	Lower	666, 0.126, East
F28	CARBON CANYON REGION	4422 CARBON CANYON R	HIST UST	Lower	666, 0.126, East
29	BREA OPERATIONS CENT	275 VALENCIA AVE	HIST UST	Lower	712, 0.135, SSW
F30	SANTA FE ENERGY RESO	17001 CARBON CNYN	HIST CORTESE	Lower	858, 0.162, East
G31	BECKMAN DATA CENTER	3300 E BIRCH ST	UST	Lower	923, 0.175, SW
G32	BECKMAN DATA CENTER	3300 E BIRCH ST	SWEEPS UST, HIST UST	Lower	923, 0.175, SW
G33	BECKMAN DATA CENTER	3300 E BIRCH ST	CA FID UST, NPDES	Lower	923, 0.175, SW
G34	BECKMAN INSTRUMENTS	3300 BIRCH ST	LUST, HIST UST, HIST CORTESE	Lower	923, 0.175, SW
35	HEALTH CARE APPAREL	3100 E BIRCH	DRYCLEANERS, EMI	Lower	1020, 0.193, WSW
36	CARBON CANYON PARK	4442 CARBON CANYON R	UST	Lower	1022, 0.194, East
37	FRED L. HARTLEY RESE	376 VALENCIA AVE	HIST UST	Lower	1138, 0.216, SSW
H38	HARBOR FABRICATING C	255 VOYAGER AV	LUST, EMI	Lower	1306, 0.247, SW
H39	PACIFIC SKYLIGHTING	255 VOYAGER AVE	UST	Lower	1306, 0.247, SW

MAPPED SITES SUMMARY

Target Property Address:
VALENCIA AVENUE
BREA, CA 92823

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
H40	PACIFIC SKYLIGHT	255 VOYAGER AVE	LUST, EMI, HIST CORTESE	Lower	1306, 0.247, SW
H41	HARBOR TRUCK BODIES	255 VOYAGER AVENUE	RCRA-LQG, RAATS, ICIS, US AIRS, FINDS, ECHO	Lower	1306, 0.247, SW
H42	ALLAN AUTOMATIC SPRI	3233 ENTERPRISE	LUST, SWEEPS UST, CA FID UST, HIST CORTESE	Lower	1414, 0.268, SW
H43	ALLAN AUTOMATIC SPRI	3233 ENTERPRISE ST	LUST, UST	Lower	1414, 0.268, SW
H44	BLAISDELL MFG	3160 ENTERPRISE ST	SLIC, Orange Co. Industrial Site	Lower	1464, 0.277, SW
45	SECURITY PACIFIC BAN	275 VALENCIA AVE	LUST, HIST CORTESE	Lower	1499, 0.284, SW
46	PENMAR GOLF COURSE	1233 ROSE AVENUE	SWF/LF	Lower	1661, 0.315, South
47	CYANAMID DISTRIBUTIO	2980 ENTERPRISE ST	SEMS-ARCHIVE, RCRA NonGen / NLR, FINDS, ECHO	Lower	1783, 0.338, WSW
I48	LA FLORESTA	376 S VALENCIA AVE	RCRA-LQG, LUST	Lower	1867, 0.354, SSW
I49	UNOCAL SCIENCE AND T	376 S VALENCIA AVE	SLIC, SWEEPS UST, HIST UST, CA FID UST, Orange Co....	Lower	1867, 0.354, SSW
J50	TOSCO - 76 # 6121	525 VALENCIA AVE	LUST, CHMIRS	Lower	2230, 0.422, SSW
J51	TOSCO - 76 STATION #	525 VALENCIA	LUST, HIST CORTESE	Lower	2230, 0.422, SSW
52	AMERICAN SUZUKI MOTO	3251 E IMPERIAL HWY	LUST, UST, SWEEPS UST, EMI, NPDES	Lower	2252, 0.427, SW
J53	UNOCAL #6121	525	HIST CORTESE	Lower	2358, 0.447, SSW
54	ARCO #6110	1201 IMPERIAL	LUST	Lower	2450, 0.464, South
K55	GSF ENERGY LLC	1942 VALENCIA AVE	SWF/LF, AST, SWEEPS UST, CA FID UST, RCRA NonGen /...	Higher	2574, 0.488, North
K56	COUNTY OF ORANGE, IW	1942 NORTH VALENCIA	SWF/LF, CHMIRS, LDS, EMI, ENF	Higher	2574, 0.488, North
57	TEXACO SERVICE STATI	3300 IMPERIAL	LUST, HIST CORTESE	Lower	2616, 0.495, SSW
58	SUNSET TROPICALS INC	3811 PROSPECT AVE	ENVIROSTOR, UST, VCP, HIST UST, DEED, Orange Co....	Lower	2631, 0.498, SSE
59	BALI OIL CO.	SOUTHWEST OF PROSPEC	ENVIROSTOR	Lower	3489, 0.661, SSE
60	UNION CHEMICALS DIV	2601 E IMPERIAL HWY	RCRA-SQG, SWEEPS UST, CA FID UST, EMI, HWP	Lower	4291, 0.813, SW
61	DIRECT FOTO	2903 SATURN STREET #	ENVIROSTOR	Lower	4334, 0.821, SW
62	VISTA DEL VERDE ELEM	VALLEY VIEW/BROOKLYN	ENVIROSTOR, SCH	Lower	4667, 0.884, SE
63	PLEGEL OIL CO EMIL	4352 ROSE DR	ENVIROSTOR, Orange Co. Industrial Site, FINDS, EMI	Lower	5096, 0.965, South

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal leaking storage tank lists

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

EXECUTIVE SUMMARY

State and tribal registered storage tank lists

FEMA UST ---- Underground Storage Tank Listing
AST ---- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---- Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP ---- Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ---- Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY ---- Recycler Database
HAULERS ---- Registered Waste Tire Haulers Listing
INDIAN ODI ---- Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ---- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---- Open Dump Inventory
IHS OPEN DUMPS ---- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---- Delisted National Clandestine Laboratory Register
HIST Cal-Sites ---- Historical Calsites Database
CDL ---- Clandestine Drug Labs
Toxic Pits ---- Toxic Pits Cleanup Act Sites
US CDL ---- National Clandestine Laboratory Register

Local Land Records

LIENS ---- Environmental Liens Listing
LIENS 2 ---- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---- Hazardous Materials Information Reporting System
CHMIRS ---- California Hazardous Material Incident Report System
LDS ---- Land Disposal Sites Listing
MCS ---- Military Cleanup Sites Listing
SPILLS 90 ---- SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---- RCRA - Non Generators / No Longer Regulated

FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
FINDS	Facility Index System/Facility Registry System
DOCKET HWC	Hazardous Waste Compliance Docket Listing
UXO	Unexploded Ordnance Sites
CA BOND EXP. PLAN	Bond Expenditure Plan
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
ENF	Enforcement Action Listing
Financial Assurance	Financial Assurance Information Listing
ICE	ICE
HWT	Registered Hazardous Waste Transporter Database
MINES	Mines Site Location Listing
MWMP	Medical Waste Management Program Listing
PEST LIC	Pesticide Regulation Licenses Listing
PROC	Certified Processors Database
Notify 65	Proposition 65 Records
WASTEWATER PITS	Oil Wastewater Pits Listing
WDS	Waste Discharge System
WIP	Well Investigation Program Case List
ABANDONED MINES	Abandoned Mines
FUELS PROGRAM	EPA Fuels Program Registered Listing
ECHO	Enforcement & Compliance History Information

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	EDR Proprietary Manufactured Gas Plants

EXECUTIVE SUMMARY

EDR Hist Auto ---------- EDR Exclusive Historic Gas Stations

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---------- Recovered Government Archive Solid Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

A review of the SEMS-ARCHIVE list, as provided by EDR, and dated 10/10/2016 has revealed that there is 1 SEMS-ARCHIVE site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
CYANAMID DISTRIBUTIO	***2980 ENTERPRISE ST***	***WSW 1/4 - 1/2 (0.338 mi.)***	***47***	***74***

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or

dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 09/12/2016 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HARBOR TRUCK BODIES	***255 VOYAGER AVENUE***	***SW 1/8 - 1/4 (0.247 mi.)***	***H41***	***55***

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 09/12/2016 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SANTA FE ENERGY CO O	***17001 CARBON CYN RD***	***ENE 0 - 1/8 (0.005 mi.)***	***D23***	***23***

Federal ERNS list

ERNS: The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.

A review of the ERNS list, as provided by EDR, and dated 09/26/2016 has revealed that there is 1 ERNS site within approximately 0.001 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
Not reported	N. VALENCIA AVE AND	0 - 1/8 (0.000 mi.)	21	22

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 10/31/2016 has revealed that there are 9 ENVIROSTOR sites within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
CARBON CANYON ROAD W Facility Id: 30160001 Status: Refer: 1248 Local Agency	VALENCIA AVENUE & CA	0 - 1/8 (0.000 mi.)	C12	13
COLUMBIA STEARNS MID Facility Id: 30130181 Status: Inactive - Needs Evaluation	***LAMBERT ROAD/VALENCI***	***0 - 1/8 (0.000 mi.)***	***C14***	***14***
SANTA FE ENERGY CO O Facility Id: 30130183 Status: Refer: 1248 Local Agency	***17001 CARBON CYN RD***	***ENE 0 - 1/8 (0.005 mi.)***	***D23***	***23***
OLINDA RANCH ELEMENT Facility Id: 30130179 Status: Inactive - Needs Evaluation	***17001 EAST CARSON CA***	***NNW 0 - 1/8 (0.013 mi.)***	***E25***	***32***
SUNSET TROPICALS INC Facility Id: 60001999 Status: Active	***3811 PROSPECT AVE***	***SSE 1/4 - 1/2 (0.498 mi.)***	***58***	***137***
BALI OIL CO. Facility Id: 30130106 Status: Refer: Other Agency	SOUTHWEST OF PROSPEC	SSE 1/2 - 1 (0.661 mi.)	59	146
DIRECT FOTO Facility Id: 71003343 Status: Refer: Local Agency	2903 SATURN STREET #	SW 1/2 - 1 (0.821 mi.)	61	152
VISTA DEL VERDE ELEM Facility Id: 30130182 Status: No Further Action	***VALLEY VIEW/BROOKLYN***	***SE 1/2 - 1 (0.884 mi.)***	***62***	***153***
PLEGEL OIL CO EMIL Facility Id: 30130190 Status: Refer: 1248 Local Agency	***4352 ROSE DR***	***S 1/2 - 1 (0.965 mi.)***	***63***	***157***

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, has revealed that there are 3 SWF/LF sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
GSF ENERGY LLC Database: SWF/LF (SWIS), Date of Government Version: 11/14/2016 Facility ID: 30-AB-0035 Operational Status: Active Regulation Status: Permitted	***1942 VALENCIA AVE***	***N 1/4 - 1/2 (0.488 mi.)***	***K55***	***104***
COUNTY OF ORANGE, IW Database: LOS ANGELES CO. LF, Date of Government Version: 10/17/2016 Site ID: 585 Status: Active	***1942 NORTH VALENCIA***	***N 1/4 - 1/2 (0.488 mi.)***	***K56***	***112***

Lower Elevation	Address	Direction / Distance	Map ID	Page
PENMAR GOLF COURSE Database: SWF/LF (SWIS), Date of Government Version: 11/14/2016	1233 ROSE AVENUE	S 1/4 - 1/2 (0.315 mi.)	46	74

Facility ID: 19-AR-5316

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

A review of the LUST list, as provided by EDR, has revealed that there are 14 LUST sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SHELL WESTERN OIL PR	2701 VALENCIA AVE	0 - 1/8 (0.000 mi.)	A18	19
Database: LUST REG 8, Date of Government Version: 02/14/2005 Database: LUST, Date of Government Version: 12/12/2016 Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016 Global Id: T0605900615 Global ID: T0605900615 Status: Completed - Case Closed Facility Id: 88UT021 Facility Status: Case Closed				
SANTA FE ENERGY CO O	***17001 CARBON CYN RD***	***ENE 0 - 1/8 (0.005 mi.)***	***D23***	***23***
Database: LUST REG 8, Date of Government Version: 02/14/2005 Database: LUST, Date of Government Version: 12/12/2016 Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016 Global Id: T0605901866 Global ID: T0605901866 Status: Completed - Case Closed Facility Id: 95UT039 Facility Status: Case Closed				
BECKMAN INSTRUMENTS	***3300 BIRCH ST***	***SW 1/8 - 1/4 (0.175 mi.)***	***G34***	***41***
Database: LUST REG 8, Date of Government Version: 02/14/2005 Database: LUST, Date of Government Version: 12/12/2016 Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016 Global Id: T0605900826 Global ID: T0605900826 Status: Completed - Case Closed Facility Id: 85UT006 Facility Status: Case Closed				
HARBOR FABRICATING C	***255 VOYAGER AV***	***SW 1/8 - 1/4 (0.247 mi.)***	***H38***	***48***
Database: LUST REG 8, Date of Government Version: 02/14/2005 Global ID: T0605900897 Facility Status: Case Closed				
PACIFIC SKYLIGHT	***255 VOYAGER AVE***	***SW 1/8 - 1/4 (0.247 mi.)***	***H40***	***52***
Database: LUST, Date of Government Version: 12/12/2016 Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016 Global Id: T0605900897 Status: Completed - Case Closed Facility Id: 90UT223				
ALLAN AUTOMATIC SPRI	***3233 ENTERPRISE***	***SW 1/4 - 1/2 (0.268 mi.)***	***H42***	***67***
Database: LUST REG 8, Date of Government Version: 02/14/2005				

Global ID: T0605901937
Facility Status: Case Closed

ALLAN AUTOMATIC SPRI ***3233 ENTERPRISE ST*** ***SW 1/4 - 1/2 (0.268 mi.)*** ***H43*** ***69***
Database: LUST, Date of Government Version: 12/12/2016
Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016
Global Id: T0605901937
Status: Completed - Case Closed
Facility Id: 95UT036

SECURITY PACIFIC BAN ***275 VALENCIA AVE*** ***SW 1/4 - 1/2 (0.284 mi.)*** ***45*** ***71***
Database: LUST REG 8, Date of Government Version: 02/14/2005
Database: LUST, Date of Government Version: 12/12/2016
Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016
Global Id: T0605901871
Global ID: T0605901871
Status: Completed - Case Closed
Facility Id: 95UT040
Facility Status: Case Closed

LA FLORESTA ***376 S VALENCIA AVE*** ***SSW 1/4 - 1/2 (0.354 mi.)*** ***I48*** ***77***
Database: LUST REG 8, Date of Government Version: 02/14/2005
Global ID: T0605901608
Facility Status: Preliminary site assessment workplan submitted

TOSCO - 76 # 6121 ***525 VALENCIA AVE*** ***SSW 1/4 - 1/2 (0.422 mi.)*** ***J50*** ***87***
Database: LUST, Date of Government Version: 12/12/2016
Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016
Global Id: T0605901409
Global Id: T0605902182
Status: Completed - Case Closed
Facility Id: 98UT046
Facility Id: 91UT083

TOSCO - 76 STATION # ***525 VALENCIA*** ***SSW 1/4 - 1/2 (0.422 mi.)*** ***J51*** ***92***
Database: LUST REG 8, Date of Government Version: 02/14/2005
Global ID: T0605901409
Global ID: T0605902182
Facility Status: Case Closed

AMERICAN SUZUKI MOTO ***3251 E IMPERIAL HWY*** ***SW 1/4 - 1/2 (0.427 mi.)*** ***52*** ***94***
Database: LUST REG 8, Date of Government Version: 02/14/2005
Database: LUST, Date of Government Version: 12/12/2016
Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016
Global Id: T0605901666
Global ID: T0605901666
Status: Completed - Case Closed
Facility Id: 93UT053
Facility Status: Case Closed

ARCO #6110 1201 IMPERIAL S 1/4 - 1/2 (0.464 mi.) 54 99
Database: LUST REG 8, Date of Government Version: 02/14/2005
Database: LUST, Date of Government Version: 12/12/2016
Database: ORANGE CO. LUST, Date of Government Version: 11/04/2016
Global Id: T0605901674
Global ID: T0605901674
Status: Completed - Case Closed
Facility Id: 93UT041
Facility Status: Pollution Characterization

TEXACO SERVICE STATI ***3300 IMPERIAL*** ***SSW 1/4 - 1/2 (0.495 mi.)*** ***57*** ***136***
Database: LUST REG 8, Date of Government Version: 02/14/2005

Global ID: T0605943716
Facility Status: Case Closed

SLIC: Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

A review of the SLIC list, as provided by EDR, has revealed that there are 2 SLIC sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
BLAISDELL MFG	***3160 ENTERPRISE ST***	***SW 1/4 - 1/2 (0.277 mi.)***	***H44***	***71***
Database: SLIC, Date of Government Version: 12/12/2016 Facility Status: Completed - Case Closed Global Id: SLT8R1124105				
UNOCAL SCIENCE AND T	***376 S VALENCIA AVE***	***SSW 1/4 - 1/2 (0.354 mi.)***	***I49***	***80***
Database: SLIC, Date of Government Version: 12/12/2016 Facility Status: Completed - Case Closed Global Id: T0605901608				

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, has revealed that there are 5 UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HUNDRED ACRES LEASE	2701 VALENCIA AVE	0 - 1/8 (0.000 mi.)	A19	22
Database: UST, Date of Government Version: 09/12/2016 Facility Id: 4805				
SANTA FE ENERGY CO O	17001 CARBON CANYON	ENE 0 - 1/8 (0.005 mi.)	D24	32
Database: UST, Date of Government Version: 09/12/2016 Facility Id: 4064				
BECKMAN DATA CENTER	3300 E BIRCH ST	SW 1/8 - 1/4 (0.175 mi.)	G31	38
Database: UST, Date of Government Version: 09/12/2016 Facility Id: 4647				
CARBON CANYON PARK	4442 CARBON CANYON R	E 1/8 - 1/4 (0.194 mi.)	36	46
Database: UST, Date of Government Version: 09/12/2016 Facility Id: 6087				
PACIFIC SKYLIGHTING	255 VOYAGER AVE	SW 1/8 - 1/4 (0.247 mi.)	H39	52
Database: UST, Date of Government Version: 09/12/2016 Facility Id: 1325				

State and tribal voluntary cleanup sites

VCP: Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

A review of the VCP list, as provided by EDR, and dated 10/31/2016 has revealed that there is 1 VCP site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SUNSET TROPICALS INC Status: Active Facility Id: 60001999	***3811 PROSPECT AVE***	***SSE 1/4 - 1/2 (0.498 mi.)***	***58***	***137***

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: The Waste Management Unit Database System is used for program tracking and inventory of waste management units. The source is the State Water Resources Control Board.

A review of the WMUDS/SWAT list, as provided by EDR, and dated 04/01/2000 has revealed that there is 1 WMUDS/SWAT site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
LANDFILL CONDENSATE-	VALENCIA & CARBON CA	0 - 1/8 (0.000 mi.)	C16	17

Local Lists of Hazardous waste / Contaminated Sites

SCH: This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category. depending on the level of threat to public health and safety or the. environment they pose.

A review of the SCH list, as provided by EDR, and dated 10/31/2016 has revealed that there are 2 SCH sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
COLUMBIA STEARNS MID Facility Id: 30130181 Status: Inactive - Needs Evaluation	***LAMBERT ROAD/VALENCI***	***0 - 1/8 (0.000 mi.)***	***C14***	***14***
OLINDA RANCH ELEMENT Facility Id: 30130179 Status: Inactive - Needs Evaluation	***17001 EAST CARSON CA***	***NNW 0 - 1/8 (0.013 mi.)***	***E25***	***32***

Local Lists of Registered Storage Tanks

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 2 SWEEPS UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SANTA FE ENERGY CO O	***17001 CARBON CYN RD***	***ENE 0 - 1/8 (0.005 mi.)***	***D23***	***23***
Status: A Tank Status: A Comp Number: 4064				
BECKMAN DATA CENTER	***3300 E BIRCH ST***	***SW 1/8 - 1/4 (0.175 mi.)***	***G32***	***38***
Status: A Tank Status: A Comp Number: 4647				

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 8 HIST UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HUNDRED ACRES LEASE/ Facility Id: 00000004744	2701 VALENCIA AVENUE	0 - 1/8 (0.000 mi.)	A3	8
SANTA FE ENERGY CO O Facility Id: 00000010697	***17001 CARBON CYN RD***	***ENE 0 - 1/8 (0.005 mi.)***	***D23***	***23***
CARBON CANYON REGION	***4422 CARBON CANYON R***	***E 1/8 - 1/4 (0.126 mi.)***	***F27***	***35***
CARBON CANYON REGION Facility Id: 00000031618	4422 CARBON CANYON R	E 1/8 - 1/4 (0.126 mi.)	F28	36
BREA OPERATIONS CENT Facility Id: 00000028382	275 VALENCIA AVE	SSW 1/8 - 1/4 (0.135 mi.)	29	37
BECKMAN DATA CENTER Facility Id: 00000016438	***3300 E BIRCH ST***	***SW 1/8 - 1/4 (0.175 mi.)***	***G32***	***38***
BECKMAN INSTRUMENTS	***3300 BIRCH ST***	***SW 1/8 - 1/4 (0.175 mi.)***	***G34***	***41***
FRED L. HARTLEY RESE Facility Id: 00000065267 Facility Id: 00000061553	376 VALENCIA AVE	SSW 1/8 - 1/4 (0.216 mi.)	37	46

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 2 CA FID UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SANTA FE ENERGY CO O	***17001 CARBON CYN RD***	***ENE 0 - 1/8 (0.005 mi.)***	***D23***	***23***

Facility Id: 30007195
Status: A

BECKMAN DATA CENTER	***3300 E BIRCH ST***	***SW 1/8 - 1/4 (0.175 mi.)***	***G33***	***39***

Facility Id: 30015440
Status: A

Local Land Records

DEED: The use of recorded land use restrictions is one of the methods the DTSC uses to protect the public from unsafe exposures to hazardous substances and wastes .

A review of the DEED list, as provided by EDR, and dated 12/06/2016 has revealed that there is 1 DEED site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SUNSET TROPICALS INC	***3811 PROSPECT AVE***	***SSE 1/4 - 1/2 (0.498 mi.)***	***58***	***137***

Status: ACTIVE
Envirostor ID: 60001999

Records of Emergency Release Reports

The Orange County Industrial Site Cleanups list comes from the Health Care Agency.

A review of the Orange Co. Industrial Site list, as provided by EDR, and dated 11/03/2016 has revealed that there is 1 Orange Co. Industrial Site site within approximately 0.001 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
PEPPER TREE CORRIDOR	3202 VALENCIA AVE	0 - 1/8 (0.000 mi.)	8	11

Current Status: CLOSED 3/26/2009
Case ID: 08IC006

Other Ascertainable Records

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the DRYCLEANERS list, as provided by EDR, and dated 09/02/2016 has revealed that there is 1 DRYCLEANERS site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HEALTH CARE APPAREL	***3100 E BIRCH***	***WSW 1/8 - 1/4 (0.193 mi.)***	***35***	***44***

EPA Id: CAL000268725

EMI: Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies

A review of the EMI list, as provided by EDR, and dated 12/31/2014 has revealed that there is 1 EMI site within approximately 0.001 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BREA-OLINDA SANITARY Facility Id: 50418	VALENCIA BL/CARBON C	0 - 1/8 (0.000 mi.)	C13	14

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency. This database begins with calendar year 1993.

A review of the HAZNET list, as provided by EDR, and dated 12/31/2015 has revealed that there is 1 HAZNET site within approximately 0.001 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SOUTHERN CALIFORNIA GEPAID: CAC002181358	2834 VALENCIA AVE	0 - 1/8 (0.000 mi.)	11	12

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there are 9 HIST CORTESE sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SANTA FE ENERGY RESO Reg Id: 083002689T	17001 CARBON CNYN	E 1/8 - 1/4 (0.162 mi.)	F30	38
BECKMAN INSTRUMENTS Reg Id: 083001045T	***3300 BIRCH ST***	***SW 1/8 - 1/4 (0.175 mi.)***	***G34***	***41***
PACIFIC SKYLIGHT Reg Id: 083001137T	***255 VOYAGER AVE***	***SW 1/8 - 1/4 (0.247 mi.)***	***H40***	***52***
ALLAN AUTOMATIC SPRI Reg Id: 083002813T	***3233 ENTERPRISE***	***SW 1/4 - 1/2 (0.268 mi.)***	***H42***	***67***
SECURITY PACIFIC BAN Reg Id: 083002697T	***275 VALENCIA AVE***	***SW 1/4 - 1/2 (0.284 mi.)***	***45***	***71***
UNOCAL SCIENCE AND T Reg Id: 083002180T	***376 S VALENCIA AVE***	***SSW 1/4 - 1/2 (0.354 mi.)***	***I49***	***80***
TOSCO - 76 STATION # Reg Id: 083000697T	***525 VALENCIA***	***SSW 1/4 - 1/2 (0.422 mi.)***	***J51***	***92***
UNOCAL #6121 Reg Id: 083001888T	525	SSW 1/4 - 1/2 (0.447 mi.)	J53	99

Reg Id: 083000725T
Reg Id: 083003217T

TEXACO SERVICE STATI	***3300 IMPERIAL***	***SSW 1/4 - 1/2 (0.495 mi.)***	***57***	***136***

Reg Id: 083000400T

HWP: Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

A review of the HWP list, as provided by EDR, and dated 11/21/2016 has revealed that there is 1 HWP site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
UNION CHEMICALS DIV	***2601 E IMPERIAL HWY***	***SW 1/2 - 1 (0.813 mi.)***	***60***	***147***

EPA Id: CAD073596124
Cleanup Status: CLOSED

NPDES: A listing of NPDES permits, including stormwater.

A review of the NPDES list, as provided by EDR, and dated 05/16/2016 has revealed that there is 1 NPDES site within approximately 0.001 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
TONNER HILLS APARTME	LAMBERT RD & VALENCI	0 - 1/8 (0.000 mi.)	C17	18

UIC: A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

A review of the UIC list, as provided by EDR, and dated 07/06/2016 has revealed that there are 7 UIC sites within approximately 0.001 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LINN OPERATING, INC. Well Status: Plugged		0 - 1/8 (0.000 mi.)	15	16

Lower Elevation	Address	Direction / Distance	Map ID	Page
LINN OPERATING, INC. Well Status: Plugged		0 - 1/8 (0.000 mi.)	2	8
LINN OPERATING, INC. Well Status: Avtive or Odle		0 - 1/8 (0.000 mi.)	6	10
LINN OPERATING, INC. Well Status: Plugged		0 - 1/8 (0.000 mi.)	B7	10
LINN OPERATING, INC. Well Status: Plugged		0 - 1/8 (0.000 mi.)	B9	11
LINN OPERATING, INC. Well Status: Avtive or Odle		0 - 1/8 (0.000 mi.)	10	12
TONNER HILLS SSP, LL		0 - 1/8 (0.000 mi.)	22	23

Well Status: Plugged

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there is 1 EDR Hist Cleaner site within approximately 0.125 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
Not reported	3678 PHEASANT LN	NNW 0 - 1/8 (0.041 mi.)	E26	35

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST: The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

A review of the RGA LUST list, as provided by EDR, has revealed that there are 4 RGA LUST sites within approximately 0.001 miles of the target property.

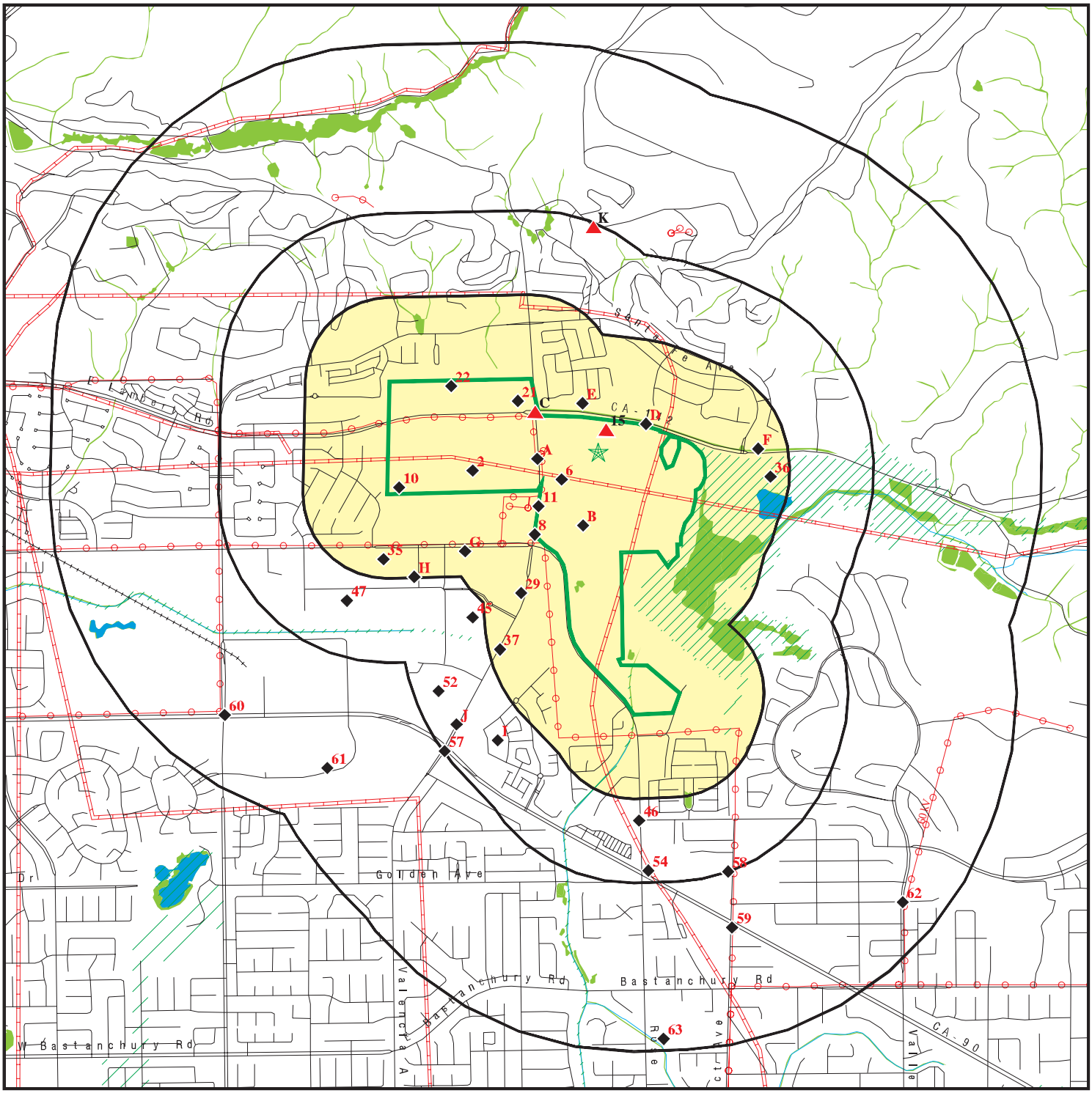
Lower Elevation	Address	Direction / Distance	Map ID	Page
SHELL WESTERN OIL PR	2701 VALENCIA AVE	0 - 1/8 (0.000 mi.)	A1	8
SHELL #2701	2701 VALENCIA AVE	0 - 1/8 (0.000 mi.)	A4	9
SHELL SERVICE STATIO	2701 VALENCIA AVENUE	0 - 1/8 (0.000 mi.)	A5	9
SHELL WESTERN OIL PR	2701 VALENCIA	0 - 1/8 (0.000 mi.)	A20	22

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 5 records.

Site Name	Database(s)
BREA OLINDA VENTURE PROPERTY	Orange Co. Industrial Site
CITY OF BREA	SLIC
BIRCH MIDDLE SCHOOL	ENVIROSTOR, SCH
NUEVO ENERGY - TENTATIVE TRACT #16	ENVIROSTOR
PLEGEL OIL COMPANY;SHAY ODOM LEASE	ENVIROSTOR

OVERVIEW MAP - 4848184.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	265-Acre Brea Property	CLIENT:	Northgate Env. Management Inc.
ADDRESS:	Valencia Avenue Brea CA 92823	CONTACT:	Nancy Leitner
LAT/LONG:	33.922355 / 117.844415	INQUIRY #:	4848184.2s
		DATE:	February 07, 2017 8:12 pm

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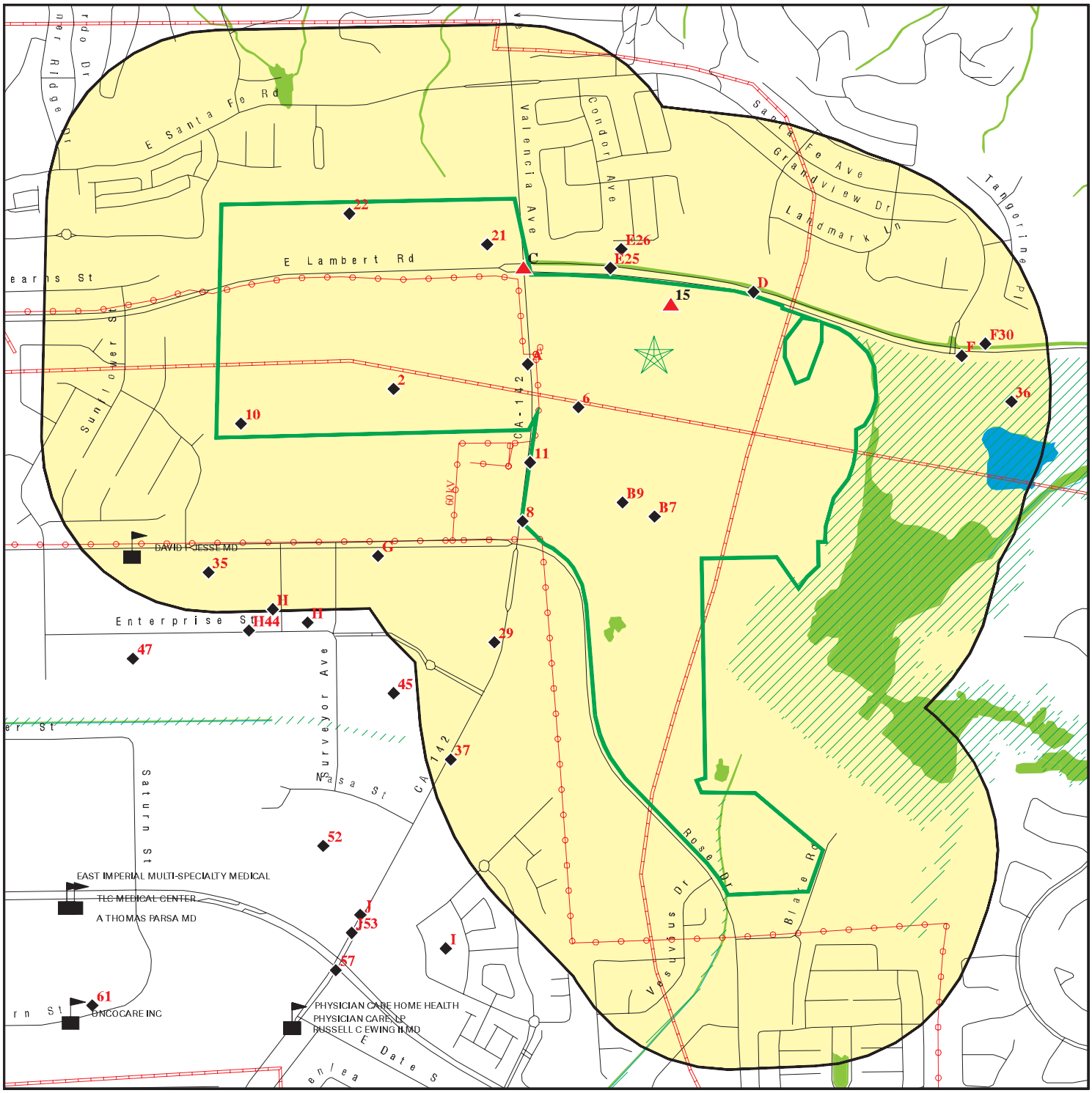
DETAIL MAP - 4848184.2S



0 1/8 1/4 1/2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	265-Acre Brea Property	CLIENT:	Northgate Env. Management Inc.
ADDRESS:	Valencia Avenue Brea CA 92823	CONTACT:	Nancy Leitner
LAT/LONG:	33.922355 / 117.844415	INQUIRY #:	4848184.2s
		DATE:	February 07, 2017 8:14 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	1	NR	NR	1
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	1	NR	NR	NR	1
RCRA-SQG	0.250		1	0	NR	NR	NR	1
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		1	NR	NR	NR	NR	1
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		4	0	1	4	NR	9
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	3	NR	NR	3
State and tribal leaking storage tank lists								
LUST	0.500		2	3	9	NR	NR	14

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
SLIC	0.500		0	0	2	NR	NR	2
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		2	3	NR	NR	NR	5
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	1	NR	NR	1
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		1	0	0	NR	NR	1
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		2	0	NR	NR	NR	2
CDL	0.001		0	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		1	1	NR	NR	NR	2
HIST UST	0.250		2	6	NR	NR	NR	8
CA FID UST	0.250		1	1	NR	NR	NR	2
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0
DEED	0.500		0	0	1	NR	NR	1
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001		0	NR	NR	NR	NR	0
Orange Co. Industrial Site	0.001		1	NR	NR	NR	NR	1
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
DRYCLEANERS	0.250		0	1	NR	NR	NR	1
EMI	0.001		1	NR	NR	NR	NR	1
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		1	NR	NR	NR	NR	1
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	3	6	NR	NR	9

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
HWP	1.000		0	0	0	1	NR	1
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.001		0	NR	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		1	NR	NR	NR	NR	1
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		7	NR	NR	NR	NR	7
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		1	NR	NR	NR	NR	1
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		4	NR	NR	NR	NR	4
- Totals --		0	33	19	24	5	0	81

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 **SHELL WESTERN OIL PROD** **RGA LUST** **S114688962**
2701 VALENCIA AVE **N/A**
< 1/8 **BREA, CA**
1 ft.

Site 1 of 7 in cluster A

Relative: RGA LUST:
Lower 2003 SHELL WESTERN OIL PROD 2701 VALENCIA AVE

Actual:
505 ft.

---

2 **LINN OPERATING, INC.** **UIC** **S118835300**
N/A

< 1/8 **ORANGE (County), CA**
1 ft.

UIC:

Relative: API Number: 05900027
Lower Confidential Well: No
Well Number: 79
Actual: Direction: Unknown
476 ft. Lease Name: 100 Acre
Field Name: Brea-Olinda
Area Name: Any Area
Section: 8
Township: 03S
Range: 09W
Base And Meridian; Part Of The PLSS: SB
GIS Source Code: gps
Latitude: 33.92162
Longitude: -117.8509
Well Type: Water Disposal
Well Status: Plugged
Operator Code: L2025
Operator Name: Linn Operating, Inc.
BLM Well: N
EPA Well: N
Location: Not reported
Dryhole: N
Well DEP: 0
Aband Status: Not reported

A3 **HUNDRED ACRES LEASE/BREA-OLIND** **HIST UST** **U001584185**
2701 VALENCIA AVENUE **N/A**
< 1/8 **BREA, CA 93302**
1 ft.

Site 2 of 7 in cluster A

Relative: HIST UST:
Lower File Number: 0002EC7D
URL: http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002EC7D.pdf
Actual: Region: STATE
505 ft. Facility ID: 00000004744
Facility Type: Other
Other Type: OIL & GAS PRODUCTION
Contact Name: GENE RICE
Telephone: 7149936090
Owner Name: OXY PETROLEUM, INC.
Owner Address: P.O. BOX 939
Owner City,St,Zip: BAKERSFIELD, CA 93302

HUNDRED ACRES LEASE/BREA-OLIND (Continued) **U001584185**

Total Tanks: 0003

Tank Num: 001
Container Num: 1
Year Installed: Not reported
Tank Capacity: 00001000
Tank Used for: PRODUCT
Type of Fuel: UNLEADED
Container Construction Thickness: Not reported
Leak Detection: Stock Inventor

Tank Num: 002
Container Num: 2
Year Installed: Not reported
Tank Capacity: 00000555
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Container Construction Thickness: Not reported
Leak Detection: Stock Inventor

Tank Num: 003
Container Num: 3
Year Installed: Not reported
Tank Capacity: 00000555
Tank Used for: PRODUCT
Type of Fuel: REGULAR
Container Construction Thickness: Not reported
Leak Detection: Stock Inventor

Click here for Geo Tracker PDF:

A4 **SHELL #2701** **RGA LUST** **S114686453**
2701 VALENCIA AVE **N/A**
< 1/8 **BREA, CA**
1 ft.

Site 3 of 7 in cluster A

Relative: RGA LUST:
Lower

2002	SHELL #2701	2701 VALENCIA AVE
2001	SHELL #2701	2701 VALENCIA AVE

Actual:
505 ft.

A5 **SHELL SERVICE STATION** **RGA LUST** **S114687964**
2701 VALENCIA AVENUE **N/A**
< 1/8 **BREA, CA**
1 ft.

Site 4 of 7 in cluster A

Relative: RGA LUST:
Lower

1998	SHELL SERVICE STATION	2701 VALENCIA AVENUE
1997	SHELL SERVICE STATION	2701 VALENCIA AVENUE
1996	SHELL SERVICE STATION	2701 VALENCIA AVENUE
1995	SHELL SERVICE STATION	2701 VALENCIA AVENUE
1994	SHELL SERVICE STATION	2701 VALENCIA AVENUE
1993	SHELL SERVICE STATION	2701 VALENCIA AVENUE
1992	SHELL SERVICE STATION	2701 VALENCIA AVENUE

Actual:
505 ft.

6 **LINN OPERATING, INC.** **UIC** **S111644245**
N/A

< 1/8
1 ft.

ORANGE (County), CA

Relative:
Lower

Actual:
478 ft.

UIC:

API Number:	05920862
Confidential Well:	No
Well Number:	118
Direction:	Directionally drilled
Lease Name:	Olinda Fee Three
Field Name:	Brea-Olinda
Area Name:	Any Area
Section:	8
Township:	03S
Range:	09W
Base And Meridian; Part Of The PLSS:	SB
GIS Source Code:	gps
Latitude:	33.92124
Longitude:	-117.8463
Well Type:	Water Flood
Well Status:	Avtive or Odle
Operator Code:	L2025
Operator Name:	Linn Operating, Inc.
BLM Well:	N
EPA Well:	N
Location:	Not reported
Dryhole:	N
Well DEP:	0
Aband Status:	Not reported

B7 **LINN OPERATING, INC.** **UIC** **S118835846**
N/A

< 1/8
1 ft.

ORANGE (County), CA

Site 1 of 2 in cluster B

Relative:
Lower

Actual:
429 ft.

UIC:

API Number:	05921283
Confidential Well:	No
Well Number:	47
Direction:	Unknown
Lease Name:	Olinda Two
Field Name:	Brea-Olinda
Area Name:	Any Area
Section:	8
Township:	03S
Range:	09W
Base And Meridian; Part Of The PLSS:	SB
GIS Source Code:	gps
Latitude:	33.91897
Longitude:	-117.8444
Well Type:	Steam Flood
Well Status:	Plugged
Operator Code:	L2025
Operator Name:	Linn Operating, Inc.
BLM Well:	N
EPA Well:	N
Location:	Not reported
Dryhole:	N

LINN OPERATING, INC. (Continued) **S118835846**

Well DEP: 0
Aband Status: Not reported

---

8 **PEPPER TREE CORRIDOR** **Orange Co. Industrial Site** **S108985768**
3202 VALENCIA AVE **N/A**
< 1/8 **BREA, CA 92821**
1 ft.

Orange Co. Industrial Site:
Relative: Case ID: 08IC006
Lower Record ID: RO0003469
Current Status: CLOSED 3/26/2009
Actual: Closure Type: Closure certification issued
462 ft. Released Chemical: WASTE (OR SLOP) OIL

B9 **LINN OPERATING, INC.** **UIC** **S118835847**
N/A

< 1/8 **ORANGE (County), CA**
1 ft.

Site 2 of 2 in cluster B

Relative: UIC:
Lower API Number: 05921284
Confidential Well: No
Actual: Well Number: 48
435 ft. Direction: Unknown
Lease Name: Olinda Two
Field Name: Brea-Olinda
Area Name: Any Area
Section: 8
Township: 03S
Range: 09W
Base And Meridian; Part Of The PLSS: SB
GIS Source Code: gps
Latitude: 33.91926
Longitude: -117.8452
Well Type: Steam Flood
Well Status: Plugged
Operator Code: L2025
Operator Name: Linn Operating, Inc.
BLM Well: N
EPA Well: N
Location: Not reported
Dryhole: N
Well DEP: 0
Aband Status: Not reported

10 **LINN OPERATING, INC.** **UIC** **S111643578**
N/A

< 1/8 **ORANGE (County), CA**
1 ft.

Relative:
Lower

Actual:
468 ft.

UIC:

API Number:	05920082
Confidential Well:	No
Well Number:	545
Direction:	Directionally drilled
Lease Name:	100 Acre
Field Name:	Brea-Olinda
Area Name:	Any Area
Section:	8
Township:	03S
Range:	09W
Base And Meridian; Part Of The PLSS:	SB
GIS Source Code:	gps
Latitude:	33.92090
Longitude:	-117.8547
Well Type:	Water Disposal
Well Status:	Avtive or Odle
Operator Code:	L2025
Operator Name:	Linn Operating, Inc.
BLM Well:	N
EPA Well:	N
Location:	Not reported
Dryhole:	N
Well DEP:	0
Aband Status:	Not reported

---

11 **SOUTHERN CALIFORNIA EDISON** **HAZNET** **S113770434**
2834 VALENCIA AVE **N/A**
< 1/8 **BREA, CA 92823**
1 ft.

Relative:
Lower

Actual:
467 ft.

HAZNET:

envid:	S113770434
Year:	2012
GEPAID:	CAC002181358
Contact:	STAN MARSH
Telephone:	6263029711
Mailing Name:	Not reported
Mailing Address:	PO BOX 800
Mailing City,St,Zip:	ROSEMEAD, CA 91770
Gen County:	Orange
TSD EPA ID:	CAD050806850
TSD County:	Los Angeles
Waste Category:	Not reported
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	6.93
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Orange

C12 **CARBON CANYON ROAD WIDENING PROJECT** **ENVIROSTOR** **S106797611**
VALENCIA AVENUE & CARBON CANYON ROAD **N/A**
< 1/8 **BREA, CA 92821**
1 ft.

Site 1 of 5 in cluster C

Relative:
Lower

Actual:
525 ft.

ENVIROSTOR:

Facility ID:	30160001
Status:	Refer: 1248 Local Agency
Status Date:	02/20/2001
Site Code:	Not reported
Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	NONE SPECIFIED
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	Referred - Not Assigned
Division Branch:	Cleanup Cypress
Assembly:	72
Senate:	Not reported
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not Applicable
Latitude:	0
Longitude:	0
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	30160001
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	SB 1248 Notification
Completed Date:	02/20/2001
Comments:	SB 1248 Orange County
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

C13 **BREA-OLINDA SANITARY LANDFILL** **EMI** **S106827313**
VALENCIA BL/CARBON CANYON RD **N/A**
< 1/8 **SANTA ANA, CA 92705**
1 ft.

Site 2 of 5 in cluster C

Relative:
Higher

Actual:
526 ft.

EMI:

Year:	1990
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

C14 **COLUMBIA STEARNS MIDDLE SCHOOL** **ENVIROSTOR** **S107736150**
LAMBERT ROAD/VALENCIA AVENUE **SCH** **N/A**
< 1/8 **BREA, CA 92821**
1 ft.

Site 3 of 5 in cluster C

Relative:
Lower

Actual:
525 ft.

ENVIROSTOR:

Facility ID:	30130181
Status:	Inactive - Needs Evaluation
Status Date:	09/23/2002
Site Code:	404219
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	22
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Shahir Haddad
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	55
Senate:	29
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.92406
Longitude:	-117.8467
APN:	NONE SPECIFIED
Past Use:	* OIL & GAS EXTRACTION
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	BREA OLINDA UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	BREA-OLINDA USD-COLUMBIA STEARNS

COLUMBIA STEARNS MIDDLE SCHOOL (Continued) **S107736150**

Alias Type: Alternate Name
Alias Name: COLUMBIA STEARNS MIDDLE SCH. (PROPOSED)
Alias Type: Alternate Name
Alias Name: 404219
Alias Type: Project Code (Site Code)
Alias Name: 30130181
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 04/20/2001
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 09/23/2002
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Facility ID: 30130181
Site Type: School Investigation
Site Type Detail: School
Site Mgmt. Req.: NONE SPECIFIED
Acres: 22
National Priorities List: NO
Cleanup Oversight Agencies: SMBRP
Lead Agency: SMBRP
Lead Agency Description: DTSC - Site Cleanup Program
Project Manager: Shahir Haddad
Supervisor: Shahir Haddad
Division Branch: Southern California Schools & Brownfields Outreach
Site Code: 404219
Assembly: 55
Senate: 29
Special Program Status: Not reported
Status: Inactive - Needs Evaluation
Status Date: 09/23/2002
Restricted Use: NO
Funding: School District
Latitude: 33.92406
Longitude: -117.8467
APN: NONE SPECIFIED
Past Use: * OIL & GAS EXTRACTION

COLUMBIA STEARNS MIDDLE SCHOOL (Continued) **S107736150**

Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	BREA OLINDA UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	BREA-OLINDA USD-COLUMBIA STEARNS
Alias Type:	Alternate Name
Alias Name:	COLUMBIA STEARNS MIDDLE SCH. (PROPOSED)
Alias Type:	Alternate Name
Alias Name:	404219
Alias Type:	Project Code (Site Code)
Alias Name:	30130181
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	04/20/2001
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	09/23/2002
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

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15 **LINN OPERATING, INC.** **UIC** **S118835691**
N/A

< 1/8
1 ft.

Relative:
Higher

Actual:
535 ft.

ORANGE (County), CA

UIC:

API Number:	05907566
Confidential Well:	No
Well Number:	11
Direction:	Unknown
Lease Name:	Olinda Fee Three
Field Name:	Brea-Olinda
Area Name:	Any Area
Section:	8
Township:	03S
Range:	09W
Base And Meridian; Part Of The PLSS:	SB
GIS Source Code:	hud
Latitude:	33.92338
Longitude:	-117.8440
Well Type:	Water Flood

LINN OPERATING, INC. (Continued) **S118835691**

Well Status:	Plugged
Operator Code:	L2025
Operator Name:	Linn Operating, Inc.
BLM Well:	N
EPA Well:	N
Location:	Not reported
Dryhole:	N
Well DEP:	0
Aband Status:	Not reported

C16 **LANDFILL CONDENSATE-OLINDA ALP** **WMUDS/SWAT** **S103443353**
VALENCIA & CARBON CANYON **N/A**
< 1/8 **BREA CA, CA**
1 ft.

Site 4 of 5 in cluster C

Relative: **Lower**

Actual: **525 ft.**

WMUDS/SWAT:

Edit Date:	Not reported
Complexity:	Not reported
Primary Waste:	MISCEL
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Base Meridian:	Not reported
NPID:	Not reported
Tonnage:	0
Regional Board ID:	Not reported
Municipal Solid Waste:	False
Superorder:	False
Open To Public:	False
Waste List:	False
Agency Type:	County
Agency Name:	ORANGE CO. IWMD
Agency Department:	Not reported
Agency Address:	320 N. FLOWER, SUITE 400
Agency City,St,Zip:	SANTA ANA CA 92703
Agency Contact:	KEVIN KONDRU
Agency Telephone:	7148344056
Land Owner Name:	Not reported
Land Owner Address:	Not reported
Land Owner City,St,Zip:	Not reported
Land Owner Contact:	Not reported
Land Owner Phone:	Not reported
Region:	8
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Description:	Not reported
Facility Telephone:	Not reported
SWAT Facility Name:	Not reported
Primary SIC:	4953
Secondary SIC:	Not reported

LANDFILL CONDENSATE-OLINDA ALP (Continued) **S103443353**

Comments:	Not reported
Last Facility Editors:	Not reported
Waste Discharge System:	True
Solid Waste Assessment Test Program:	False
Toxic Pits Cleanup Act Program:	False
Resource Conservation Recovery Act:	False
Department of Defence:	False
Solid Waste Assessment Test Program:	Not reported
Threat to Water Quality:	Not reported
Sub Chapter 15:	True
Regional Board Project Officer:	Not reported
Number of WMUDS at Facility:	0
Section Range:	Not reported
RCRA Facility:	No
Waste Discharge Requirements:	H
Self-Monitoring Rept. Frequency:	Not reported
Waste Discharge System ID:	8 302717001
Solid Waste Information ID:	Not reported

C17 **TONNER HILLS APARTMENT HOMES** **NPDES** **S109461148**
LAMBERT RD & VALENCIA AVE **N/A**
< 1/8 **BREA, CA 92821**
1 ft.

Site 5 of 5 in cluster C

Relative: **Higher**

Actual: **526 ft.**

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	347765
Order No:	Not reported
Regulatory Measure Type:	Construction
Place Id:	Not reported
WDID:	8 30C352405
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	6/24/2008
PROCESSED DATE:	7/2/2008
STATUS CODE NAME:	Active
STATUS DATE:	7/2/2008
PLACE SIZE:	4.44
PLACE SIZE UNIT:	52
FACILITY CONTACT NAME:	Steve Armanino
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	949-263-8676
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Jamboree Housing Corp
OPERATOR ADDRESS:	17701 Cowan Ste 200

TONNER HILLS APARTMENT HOMES (Continued) **S109461148**

OPERATOR CITY:	Irvine
OPERATOR STATE:	California
OPERATOR ZIP:	92614
OPERATOR CONTACT NAME:	Michael Massie
OPERATOR CONTACT TITLE:	Director of Community Development
OPERATOR CONTACT PHONE:	949-263-8676
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Tonner Hills LP
DEVELOPER ADDRESS:	17701 Cowan Ste 200
DEVELOPER CITY:	Irvine
DEVELOPER STATE:	California
DEVELOPER ZIP:	92614
DEVELOPER CONTACT NAME:	Steven Armanino
DEVELOPER CONTACT TITLE:	project Manager
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Y
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Steven Armanino
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	28-MAY-10
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

A18 **SHELL WESTERN OIL PRODUCTS** **LUST** **S106447865**
2701 VALENCIA AVE **N/A**
< 1/8 **BREA, CA 92621**
1 ft.

Site 5 of 7 in cluster A

Relative: Lower
Actual: 505 ft.

LUST:

Region:	STATE
Global Id:	T0605900615
Latitude:	33.9226646
Longitude:	-117.8475263
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	08/20/1991

SHELL WESTERN OIL PRODUCTS (Continued) **S106447865**

Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083000776T
LOC Case Number:	88UT021
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Diesel, Gasoline
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0605900615
Contact Type:	Regional Board Caseworker
Contact Name:	CARL BERNHARDT
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	cbernhardt@waterboards.ca.gov
Phone Number:	9517824495

Global Id:	T0605900615
Contact Type:	Local Agency Caseworker
Contact Name:	TAMARA ESCOBEDO
Organization Name:	ORANGE COUNTY LOP
Address:	1241 EAST DYER ROAD SUITE 120
City:	SANTA ANA
Email:	tescobedo@ochca.com
Phone Number:	7144336251

Status History:

Global Id:	T0605900615
Status:	Open - Case Begin Date
Status Date:	01/27/1988

Global Id:	T0605900615
Status:	Completed - Case Closed
Status Date:	08/20/1991

Regulatory Activities:

Global Id:	T0605900615
Action Type:	Other
Date:	01/27/1988
Action:	Leak Reported

Global Id:	T0605900615
Action Type:	Other
Date:	01/27/1988
Action:	Leak Discovery

ORANGE CO. LUST:

Region:	ORANGE
Facility Id:	88UT021
Released Substance:	Diesel fuel oil and additives, Nos.1-D, 2-D, 2-4

SHELL WESTERN OIL PRODUCTS (Continued) **S106447865**

Date Closed: 08/20/1991
Record ID: RO0001262

Region: ORANGE
Facility Id: 88UT021
Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 08/20/1991
Record ID: RO0001262

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083000776T
Local Case Num:	88UT021
Case Type:	Soil only
Substance:	12034,800661
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605900615
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	1/27/1988
Enforcement Date:	Not reported
Close Date:	8/20/1991
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9229018
Longitude:	-117.8916896
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	CAB

SHELL WESTERN OIL PRODUCTS (Continued) **S106447865**

Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

A19 **HUNDRED ACRES LEASE** **UST** **U004049952**
2701 VALENCIA AVE **N/A**
< 1/8 **BREA, CA 92823**
1 ft.

Site 6 of 7 in cluster A

Relative: **Lower**

Actual: **505 ft.**

UST:

Facility ID:	4805
Permitting Agency:	ORANGE COUNTY
Latitude:	33.92248
Longitude:	-117.84754

A20 **SHELL WESTERN OIL PRODUCTS** **RGA LUST** **S114688963**
2701 VALENCIA **N/A**
< 1/8 **BREA, CA**
1 ft.

Site 7 of 7 in cluster A

Relative: **Lower**

Actual: **505 ft.**

RGA LUST:

2012	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2011	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2010	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2009	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2008	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2007	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2006	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA
2005	SHELL WESTERN OIL PRODUCTS	2701 VALENCIA

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21 **ERNS** **97415790**
N. VALENCIA AVE AND **N/A**
< 1/8 **BREA, CA**
1 ft.

Relative: **Lower**

Actual: **521 ft.**

Click this hyperlink while viewing on your computer to access additional ERNS detail in the EDR Site Report.

22 **TONNER HILLS SSP, LLC** **UIC** **S118835862**
N/A

< 1/8 **ORANGE (County), CA**
1 ft.

Relative:
Lower

Actual:
516 ft.

UIC:

API Number:	05921630
Confidential Well:	No
Well Number:	309
Direction:	Directionally drilled
Lease Name:	Stearns
Field Name:	Brea-Olinda
Area Name:	Any Area
Section:	8
Township:	03S
Range:	09W
Base And Meridian; Part Of The PLSS:	SB
GIS Source Code:	hud
Latitude:	33.92526
Longitude:	-117.8520
Well Type:	Water Flood
Well Status:	Plugged
Operator Code:	T3280
Operator Name:	Tonner Hills SSP, LLC
BLM Well:	N
EPA Well:	N
Location:	Not reported
Dryhole:	N
Well DEP:	0
Aband Status:	Not reported

D23 **SANTA FE ENERGY CO OLINDA** **RCRA-SQG** **1000395136**
ENE **17001 CARBON CYN RD** **ENVIROSTOR** **CAD981692130**
< 1/8 **BREA, CA 92821** **LUST**
0.005 mi. **SWEEPS UST**
25 ft. **Site 1 of 2 in cluster D** **HIST UST**
CA FID UST

Relative:
Lower

Orange Co. Industrial Site
EMI

Actual:
474 ft.

RCRA-SQG:

Date form received by agency:	09/01/1996
Facility name:	SANTA FE ENERGY CO OLINDA
Facility address:	17001 CARBON CYN RD BREA, CA 92821
EPA ID:	CAD981692130
Mailing address:	4900 CA TOWER A #FOURTH HUNDRE BAKERSFIELD, CA 93309
Contact:	Not reported
Contact address:	Not reported Not reported
Contact country:	US
Contact telephone:	Not reported
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: SANTA FE ENERGY CO
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 10/08/1986
Site name: SANTA FE ENERGY CO OLINDA
Classification: Large Quantity Generator

Violation Status: No violations found

ENVIROSTOR:
Facility ID: 30130183
Status: Refer: 1248 Local Agency
Status Date: 07/30/2001
Site Code: Not reported
Site Type: Evaluation
Site Type Detailed: Evaluation
Acres: 0
NPL: NO

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Regulatory Agencies: ORANGE COUNTY
Lead Agency: ORANGE COUNTY
Program Manager: Not reported
Supervisor: Referred - Not Assigned
Division Branch: Cleanup Cypress
Assembly: 72
Senate: Not reported
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: Not Applicable
Latitude: 0
Longitude: 0
APN: NONE SPECIFIED
Past Use: NONE SPECIFIED
Potential COC: NONE SPECIFIED
Confirmed COC: NONE SPECIFIED
Potential Description: NONE SPECIFIED
Alias Name: 30130183
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: SB 1248 Notification
Completed Date: 08/02/2001
Comments: SB 1248 Orange County

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

LUST:
Region: STATE
Global Id: T0605901866
Latitude: 33.9236019
Longitude: -117.843707
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 05/16/1996
Lead Agency: ORANGE COUNTY LOP
Case Worker: TE
Local Agency: ORANGE COUNTY LOP
RB Case Number: 083002689T
LOC Case Number: 95UT039
File Location: Local Agency
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0605901866
Contact Type:	Regional Board Caseworker
Contact Name:	NANCY OLSON-MARTIN
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	nolson-martin@waterboards.ca.gov
Phone Number:	Not reported

Global Id:	T0605901866
Contact Type:	Local Agency Caseworker
Contact Name:	TAMARA ESCOBEDO
Organization Name:	ORANGE COUNTY LOP
Address:	1241 EAST DYER ROAD SUITE 120
City:	SANTA ANA
Email:	tescobedo@ochca.com
Phone Number:	7144336251

Status History:

Global Id:	T0605901866
Status:	Open - Case Begin Date
Status Date:	05/04/1995

Global Id:	T0605901866
Status:	Completed - Case Closed
Status Date:	05/16/1996

Regulatory Activities:

Global Id:	T0605901866
Action Type:	ENFORCEMENT
Date:	05/16/1996
Action:	Closure/No Further Action Letter

Global Id:	T0605901866
Action Type:	Other
Date:	05/04/1995
Action:	Leak Reported

Global Id:	T0605901866
Action Type:	REMEDIATION
Date:	04/17/1996
Action:	Excavation

Global Id:	T0605901866
Action Type:	Other
Date:	05/04/1995
Action:	Leak Discovery

ORANGE CO. LUST:

Region:	ORANGE
Facility Id:	95UT039

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 05/16/1996
Record ID: RO0001939

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083002689T
Local Case Num:	95UT039
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605901866
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	5/4/1995
Enforcement Date:	Not reported
Close Date:	5/16/1996
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9236019
Longitude:	-117.843707
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	NOM
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Priority: Not reported
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Summary: Not reported

SWEEPS UST:
Status: Active
Comp Number: 4064
Number: 9
Board Of Equalization: Not reported
Referral Date: 09-30-92
Action Date: 09-15-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-004064-000001
Tank Status: A
Capacity: 2000
Active Date: Not reported
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: 1

HIST UST:
File Number: 0002ED90
URL: http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002ED90.pdf
Region: STATE
Facility ID: 00000010697
Facility Type: Other
Other Type: CRUDE OIL PRODUCTION
Contact Name: H. M. FARREN
Telephone: 7145287433
Owner Name: SANTA FE ENERGY COMPANY
Owner Address: 10737 SHOEMAKER AVENUE
Owner City,St,Zip: SANTA FE SPRINGS, CA 90670
Total Tanks: 0001

Tank Num: 001
Container Num: 13
Year Installed: 1982
Tank Capacity: 00002000
Tank Used for: PRODUCT
Type of Fuel: UNLEADED
Container Construction Thickness: 10
Leak Detection: None

Click here for Geo Tracker PDF:

CA FID UST:
Facility ID: 30007195
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7145287433
Mail To: Not reported

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Mailing Address: SANTA FE ENERGY CO 4
Mailing Address 2: Not reported
Mailing City,St,Zip: BREA 92621
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

Orange Co. Industrial Site:
Case ID: 01IC020
Record ID: RO0000041
Current Status: CLOSED 9/30/2004
Closure Type: Closure certification issued
Released Chemical: FUEL WASTE

Case ID: 91IC056
Record ID: RO0000344
Current Status: CLOSED 7/15/2003
Closure Type: Closure certification issued
Released Chemical: WASTE (OR SLOP) OIL

EMI:
Year: 2006
County Code: 30
Air Basin: SC
Facility ID: 150400
Air District Name: SC
SIC Code: 1311
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 4.630419227801633208
Reactive Organic Gases Tons/Yr: 3.001
Carbon Monoxide Emissions Tons/Yr: .233
NOX - Oxides of Nitrogen Tons/Yr: .866
SOX - Oxides of Sulphur Tons/Yr: .004
Particulate Matter Tons/Yr: .05
Part. Matter 10 Micrometers and Smllr Tons/Yr: .0486

Year: 2007
County Code: 30
Air Basin: SC
Facility ID: 150400
Air District Name: SC
SIC Code: 1311
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 4.630419227801633208
Reactive Organic Gases Tons/Yr: 3.001
Carbon Monoxide Emissions Tons/Yr: .233
NOX - Oxides of Nitrogen Tons/Yr: .866
SOX - Oxides of Sulphur Tons/Yr: .004

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Particulate Matter Tons/Yr:	.05
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.0486
Year:	2008
County Code:	30
Air Basin:	SC
Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.698550530551708762
Reactive Organic Gases Tons/Yr:	1.641240910348198454
Carbon Monoxide Emissions Tons/Yr:	.15
NOX - Oxides of Nitrogen Tons/Yr:	.6
SOX - Oxides of Sulphur Tons/Yr:	.002805
Particulate Matter Tons/Yr:	.03
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.0295
Year:	2009
County Code:	30
Air Basin:	SC
Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	14.9569415555115
Reactive Organic Gases Tons/Yr:	9.0207160000000002
Carbon Monoxide Emissions Tons/Yr:	0.77000000000000002
NOX - Oxides of Nitrogen Tons/Yr:	2.8700000000000001
SOX - Oxides of Sulphur Tons/Yr:	0.01225
Particulate Matter Tons/Yr:	0.14999999999999999
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.14899999999999999
Year:	2010
County Code:	30
Air Basin:	SC
Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	13.451806333383701
Reactive Organic Gases Tons/Yr:	8.1208899999999993
Carbon Monoxide Emissions Tons/Yr:	1.5740000000000001
NOX - Oxides of Nitrogen Tons/Yr:	5.1196900000000003
SOX - Oxides of Sulphur Tons/Yr:	2.3859999999999999E-2
Particulate Matter Tons/Yr:	0.29537999999999998
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.29469408000000002
Year:	2011
County Code:	30
Air Basin:	SC

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	13.667886144
Reactive Organic Gases Tons/Yr:	8.24427
Carbon Monoxide Emissions Tons/Yr:	1.50771
NOX - Oxides of Nitrogen Tons/Yr:	5.41843
SOX - Oxides of Sulphur Tons/Yr:	0.02505
Particulate Matter Tons/Yr:	0.3126
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.31191552

Year:	2012
County Code:	30
Air Basin:	SC
Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	14.857127072
Reactive Organic Gases Tons/Yr:	8.97345
Carbon Monoxide Emissions Tons/Yr:	1.48391
NOX - Oxides of Nitrogen Tons/Yr:	5.33003
SOX - Oxides of Sulphur Tons/Yr:	0.02465
Particulate Matter Tons/Yr:	0.3075
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.30749952

Year:	2013
County Code:	30
Air Basin:	SC
Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6.9836270541
Reactive Organic Gases Tons/Yr:	4.15372
Carbon Monoxide Emissions Tons/Yr:	1.62849
NOX - Oxides of Nitrogen Tons/Yr:	5.00962
SOX - Oxides of Sulphur Tons/Yr:	0.02345
Particulate Matter Tons/Yr:	0.28905
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.28904724

Year:	2014
County Code:	30
Air Basin:	SC
Facility ID:	150400
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported

SANTA FE ENERGY CO OLINDA (Continued) **1000395136**

Total Organic Hydrocarbon Gases Tons/Yr:	6.3678208898
Reactive Organic Gases Tons/Yr:	3.83899
Carbon Monoxide Emissions Tons/Yr:	1.52411
NOX - Oxides of Nitrogen Tons/Yr:	5.29793
SOX - Oxides of Sulphur Tons/Yr:	0.02412
Particulate Matter Tons/Yr:	0.29974
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.2997324

D24 **SANTA FE ENERGY CO OLINDA FAC** **UST** **U003713850**
ENE **17001 CARBON CANYON RD** **N/A**
< 1/8 **BREA, CA 92823**
0.005 mi.
25 ft. **Site 2 of 2 in cluster D**

Relative:
Lower

Actual:
474 ft.

UST:

Facility ID:	4064
Permitting Agency:	ORANGE COUNTY
Latitude:	33.92307
Longitude:	-117.83997

E25 **OLINDA RANCH ELEMENTARY** **ENVIROSTOR** **S107736957**
NNW **17001 EAST CARSON CANYON ROAD** **SCH** **N/A**
< 1/8 **BREA, CA 92823**
0.013 mi.
68 ft. **Site 1 of 2 in cluster E**

Relative:
Lower

Actual:
519 ft.

ENVIROSTOR:

Facility ID:	30130179
Status:	Inactive - Needs Evaluation
Status Date:	01/24/2000
Site Code:	404053
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Shahir Haddad
Supervisor:	Mark Malinowski
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	55
Senate:	29
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.92413
Longitude:	-117.8455
APN:	NONE SPECIFIED
Past Use:	* OIL & GAS EXTRACTION
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	BREA OLINDA UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	BREA OLINDA USD-OLINDA RANCH ELEM/VCA

OLINDA RANCH ELEMENTARY (Continued) **S107736957**

Alias Type: Alternate Name
Alias Name: BREA OLINDA USD-OLINDA RNCH ELEM
Alias Type: Alternate Name
Alias Name: OLINDA RANCH ELEMENTARY SCHOOL
Alias Type: Alternate Name
Alias Name: 404020
Alias Type: Project Code (Site Code)
Alias Name: 404053
Alias Type: Project Code (Site Code)
Alias Name: 30130179
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 03/02/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 02/27/2003
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 01/24/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Inactive Status Letter
Completed Date: 02/08/2001
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 04/11/2000
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Facility ID: 30130179
Site Type: School Investigation

OLINDA RANCH ELEMENTARY (Continued) **S107736957**

Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	Not reported
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Shahir Haddad
Supervisor:	Mark Malinowski
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404053
Assembly:	55
Senate:	29
Special Program Status:	Not reported
Status:	Inactive - Needs Evaluation
Status Date:	01/24/2000
Restricted Use:	NO
Funding:	School District
Latitude:	33.92413
Longitude:	-117.8455
APN:	NONE SPECIFIED
Past Use:	* OIL & GAS EXTRACTION
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	BREA OLINDA UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	BREA OLINDA USD-OLINDA RANCH ELEM/VCA
Alias Type:	Alternate Name
Alias Name:	BREA OLINDA USD-OLINDA RNCH ELEM
Alias Type:	Alternate Name
Alias Name:	OLINDA RANCH ELEMENTARY SCHOOL
Alias Type:	Alternate Name
Alias Name:	404020
Alias Type:	Project Code (Site Code)
Alias Name:	404053
Alias Type:	Project Code (Site Code)
Alias Name:	30130179
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	03/02/2000
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	02/27/2003
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	01/24/2000
Comments:	Not reported

OLINDA RANCH ELEMENTARY (Continued) **S107736957**

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Inactive Status Letter
Completed Date:	02/08/2001
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	04/11/2000
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

E26 **EDR Hist Cleaner** **1015050134**
NNW **3678 PHEASANT LN** **N/A**
< 1/8 **BREA, CA 92823**
0.041 mi.
215 ft. **Site 2 of 2 in cluster E**

Relative:
Lower

Actual:
524 ft.

EDR Historical Cleaners:

Name:	HI POWER CARPET CLEANING
Year:	2008
Address:	3678 PHEASANT LN

F27 **CARBON CANYON REGIONAL PARK** **HIST UST** **S112953243**
East **4422 CARBON CANYON ROAD** **HAZNET** **N/A**
1/8-1/4 **BREA, CA 92621**
0.126 mi.
666 ft. **Site 1 of 3 in cluster F**

Relative:
Lower

Actual:
466 ft.

HIST UST:

File Number:	0002E820
URL:	http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002E820.pdf
Region:	Not reported
Facility ID:	Not reported
Facility Type:	Not reported
Other Type:	Not reported
Contact Name:	Not reported
Telephone:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City,St,Zip:	Not reported
Total Tanks:	Not reported
Tank Num:	Not reported
Container Num:	Not reported
Year Installed:	Not reported

CARBON CANYON REGIONAL PARK (Continued) **S112953243**

Tank Capacity:	Not reported
Tank Used for:	Not reported
Type of Fuel:	Not reported
Container Construction Thickness:	Not reported
Leak Detection:	Not reported

Click here for Geo Tracker PDF:

HAZNET:

envid:	S112953243
Year:	2006
GEPAID:	CAC002603270
Contact:	TONY NAVAREZ
Telephone:	7145677799
Mailing Name:	Not reported
Mailing Address:	1143 E FRUIT ST
Mailing City,St,Zip:	SANTA ANA, CA 927014204
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Asbestos containing waste
Disposal Method:	Transfer Station
Tons:	0.21
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Orange

F28 **CARBON CANYON REGIONAL PARK** **HIST UST** **U001576722**
East **4422 CARBON CANYON RD** **N/A**
1/8-1/4 **BREA, CA 92621**
0.126 mi.
666 ft. **Site 2 of 3 in cluster F**

Relative:
Lower

Actual:
466 ft.

HIST UST:

File Number:	Not reported
URL:	Not reported
Region:	STATE
Facility ID:	00000031618
Facility Type:	Other
Other Type:	REGIONAL PARK
Contact Name:	NEIL UNDERHILL
Telephone:	7149965252
Owner Name:	COUNTY OF ORANGE, ENVIRONMENTA
Owner Address:	10852 DOUGLASS ROAD
Owner City,St,Zip:	ANAHEIM, CA 92807
Total Tanks:	0001
Tank Num:	001
Container Num:	548-01
Year Installed:	1977
Tank Capacity:	00001000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Container Construction Thickness:	Not reported
Leak Detection:	Visual, None

29
SSW
1/8-1/4
0.135 mi.
712 ft.

BREA OPERATIONS CENTER B1-14
275 VALENCIA AVE
BREA, CA 92621

HIST UST **U001576718**
N/A

Relative:
Lower

Actual:
424 ft.

HIST UST:

File Number:	Not reported
URL:	Not reported
Region:	STATE
Facility ID:	00000028382
Facility Type:	Other
Other Type:	BANK
Contact Name:	GEORGE I. METHE
Telephone:	7149612240
Owner Name:	SECURITY PACIFIC NATIONAL BANK
Owner Address:	275 S. VALENCIA AVE.
Owner City,St,Zip:	BREA, CA 92621
Total Tanks:	0004
Tank Num:	001
Container Num:	#1
Year Installed:	1984
Tank Capacity:	00001500
Tank Used for:	PRODUCT
Type of Fuel:	DIESEL
Container Construction Thickness:	Not reported
Leak Detection:	Sensor Instrument
Tank Num:	002
Container Num:	#4
Year Installed:	1984
Tank Capacity:	00004000
Tank Used for:	WASTE
Type of Fuel:	WASTE OIL
Container Construction Thickness:	Not reported
Leak Detection:	Sensor Instrument
Tank Num:	003
Container Num:	#3
Year Installed:	1984
Tank Capacity:	00048000
Tank Used for:	PRODUCT
Type of Fuel:	DIESEL
Container Construction Thickness:	Not reported
Leak Detection:	Sensor Instrument
Tank Num:	004
Container Num:	#2
Year Installed:	1984
Tank Capacity:	00048000
Tank Used for:	PRODUCT
Type of Fuel:	DIESEL
Container Construction Thickness:	Not reported
Leak Detection:	Sensor Instrument

F30 **SANTA FE ENERGY RESOURCES** **HIST CORTESE** **S105022921**
East **17001 CARBON CNYN** **N/A**
1/8-1/4 **BREA, CA 92621**
0.162 mi.
858 ft. **Site 3 of 3 in cluster F**

Relative:
Lower

Actual:
469 ft.

HIST CORTESE:
Region: CORTESE
Facility County Code: 30
Reg By: LTNKA
Reg Id: 083002689T

G31 **BECKMAN DATA CENTER** **UST** **U003433485**
SW **3300 E BIRCH ST** **N/A**
1/8-1/4 **BREA, CA 92821**
0.175 mi.
923 ft. **Site 1 of 4 in cluster G**

Relative:
Lower

Actual:
450 ft.

UST:
Facility ID: 4647
Permitting Agency: ORANGE COUNTY
Latitude: 33.918809
Longitude: -117.849928

G32 **BECKMAN DATA CENTER** **SWEEPS UST** **U002095935**
SW **3300 E BIRCH ST** **HIST UST** **N/A**
1/8-1/4 **BREA, CA 92621**
0.175 mi.
923 ft. **Site 2 of 4 in cluster G**

Relative:
Lower

Actual:
450 ft.

SWEEPS UST:
Status: Active
Comp Number: 4647
Number: 9
Board Of Equalization: 44-016233
Referral Date: 09-30-92
Action Date: 09-15-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-004647-000001
Tank Status: A
Capacity: 12000
Active Date: Not reported
Tank Use: M.V. FUEL
STG: P
Content: DIESEL
Number Of Tanks: 2

Status: Active
Comp Number: 4647
Number: 9
Board Of Equalization: 44-016233
Referral Date: 09-30-92
Action Date: 09-15-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-004647-000002
Tank Status: A

BECKMAN DATA CENTER (Continued) **U002095935**

Capacity: 12000
Active Date: Not reported
Tank Use: M.V. FUEL
STG: P
Content: DIESEL
Number Of Tanks: Not reported

HIST UST:
File Number: Not reported
URL: Not reported
Region: STATE
Facility ID: 00000016438
Facility Type: Other
Other Type: Not reported
Contact Name: E. JENS
Telephone: 7149613300
Owner Name: BECKMAN INSTRUMENTS, INC.
Owner Address: 2500 N HARBOR BLVD.
Owner City,St,Zip: FULLERTON, CA 92634
Total Tanks: 0002

Tank Num: 001
Container Num: 1
Year Installed: 1980
Tank Capacity: 00001200
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Container Construction Thickness: Not reported
Leak Detection: Stock Inventor

Tank Num: 002
Container Num: 2
Year Installed: 1980
Tank Capacity: 00001200
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Container Construction Thickness: Not reported
Leak Detection: Stock Inventor

G33 **BECKMAN DATA CENTER** **CA FID UST** **S101619638**
SW **3300 E BIRCH ST** **NPDES** **N/A**
1/8-1/4 **BREA, CA 92621**
0.175 mi.
923 ft. **Site 3 of 4 in cluster G**

Relative:
Lower

Actual:
450 ft.

CA FID UST:
Facility ID: 30015440
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7149613434
Mail To: Not reported
Mailing Address: 2500 N HARBOR BLVD
Mailing Address 2: Not reported
Mailing City,St,Zip: BREA 92621
Contact: Not reported

BECKMAN DATA CENTER (Continued) **S101619638**

Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

NPDES:

Npdes Number:	CAS000002
Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	465564
Order No:	2009-0009-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 30C374321
Program Type:	Construction
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	10/15/2015
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Brea Industrial III LLC
Discharge Address:	500 Newport Center Drive Suite 630
Discharge City:	Newport Beach
Discharge State:	California
Discharge Zip:	92660
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported

BECKMAN DATA CENTER (Continued) **S101619638**

EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

G34 **BECKMAN INSTRUMENTS** **LUST** **S103952196**
SW **3300 BIRCH ST** **HIST UST** **N/A**
1/8-1/4 **BREA, CA 92621** **HIST CORTESE**
0.175 mi.
923 ft. **Site 4 of 4 in cluster G**

Relative:
Lower

Actual:
450 ft.

LUST:

Region:	STATE
Global Id:	T0605900826
Latitude:	33.917447
Longitude:	-117.851835
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	09/24/1990
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083001045T
LOC Case Number:	85UT006
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Diesel
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0605900826
Contact Type:	Regional Board Caseworker
Contact Name:	PATRICIA HANNON
Organization Name:	SANTA ANA RWQCB (REGION 8)

BECKMAN INSTRUMENTS (Continued) **S103952196**

Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: phannon@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0605900826
Contact Type: Local Agency Caseworker
Contact Name: TAMARA ESCOBEDO
Organization Name: ORANGE COUNTY LOP
Address: 1241 EAST DYER ROAD SUITE 120
City: SANTA ANA
Email: tescobedo@ochca.com
Phone Number: 7144336251

Status History:
Global Id: T0605900826
Status: Open - Case Begin Date
Status Date: 01/10/1985

Global Id: T0605900826
Status: Completed - Case Closed
Status Date: 09/24/1990

Regulatory Activities:
Global Id: T0605900826
Action Type: ENFORCEMENT
Date: 09/24/1990
Action: Closure/No Further Action Letter

Global Id: T0605900826
Action Type: Other
Date: 01/10/1985
Action: Leak Reported

Global Id: T0605900826
Action Type: REMEDIATION
Date: 02/20/1985
Action: Excavation

Global Id: T0605900826
Action Type: ENFORCEMENT
Date: 04/29/2008
Action: Staff Letter

Global Id: T0605900826
Action Type: Other
Date: 01/10/1985
Action: Leak Discovery

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 85UT006
Released Substance: Diesel fuel oil and additives, Nos.1-D, 2-D, 2-4
Date Closed: 09/24/1990
Record ID: RO0001355

BECKMAN INSTRUMENTS (Continued) **S103952196**

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083001045T
Local Case Num:	85UT006
Case Type:	Soil only
Substance:	Diesel
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605900826
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	1/10/1985
Enforcement Date:	Not reported
Close Date:	9/24/1990
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.917884
Longitude:	-117.8574273
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	PAH
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

BECKMAN INSTRUMENTS (Continued) **S103952196**

HIST UST:

File Number:	0002E60D
URL:	http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002E60D.pdf
Region:	Not reported
Facility ID:	Not reported
Facility Type:	Not reported
Other Type:	Not reported
Contact Name:	Not reported
Telephone:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City,St,Zip:	Not reported
Total Tanks:	Not reported
Tank Num:	Not reported
Container Num:	Not reported
Year Installed:	Not reported
Tank Capacity:	Not reported
Tank Used for:	Not reported
Type of Fuel:	Not reported
Container Construction Thickness:	Not reported
Leak Detection:	Not reported

Click here for Geo Tracker PDF:

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083001045T

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35 WSW 1/8-1/4 0.193 mi. 1020 ft.

HEALTH CARE APPAREL SER, DIV OF L&N UNF **DRYCLEANERS S106076973**
3100 E BIRCH **EMI N/A**
BREA, CA 92821

Relative: Lower

Actual: 437 ft.

DRYCLEANERS:

EPA Id:	CAL000268725
NAICS Code:	333312
NAICS Description:	Commercial Laundry, Drycleaning, and Pressing Machine Manufacturing
SIC Code:	3582
SIC Description:	Commercial Laundry, Drycleaning and Pressing Machines
Create Date:	04/07/2003
Facility Active:	No
Inactive Date:	06/30/2005
Facility Addr2:	Not reported
Owner Name:	L & N UNIFORM SUPPLY
Owner Address:	3100 E BIRCH ST
Owner Address 2:	Not reported
Owner Telephone:	7149962991
Contact Name:	LARRY LEAL PLANT MANAGER
Contact Address:	3100 E BIRCH ST
Contact Address 2:	Not reported
Contact Telephone:	7149962991
Mailing Name:	Not reported
Mailing Address 1:	3100 E BIRCH ST

HEALTH CARE APPAREL SER, DIV OF L&N UNF (Continued) **S106076973**

Mailing Address 2:	Not reported
Mailing City:	BREA
Mailing State:	CA
Mailing Zip:	92821
Owner Fax:	Not reported
Region Code:	4

EMI:

Year:	2002
County Code:	30
Air Basin:	SC
Facility ID:	96659
Air District Name:	SC
SIC Code:	7211
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	1
NOX - Oxides of Nitrogen Tons/Yr:	1
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2003
County Code:	30
Air Basin:	SC
Facility ID:	96659
Air District Name:	SC
SIC Code:	7211
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	1
NOX - Oxides of Nitrogen Tons/Yr:	1
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2004
County Code:	30
Air Basin:	SC
Facility ID:	96659
Air District Name:	SC
SIC Code:	7211
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0.0964
Reactive Organic Gases Tons/Yr:	0.04
Carbon Monoxide Emissions Tons/Yr:	0.622
NOX - Oxides of Nitrogen Tons/Yr:	0.74
SOX - Oxides of Sulphur Tons/Yr:	0.00444
Particulate Matter Tons/Yr:	0.0562

HEALTH CARE APPAREL SER, DIV OF L&N UNF (Continued) **S106076973**

Part. Matter 10 Micrometers and Smllr Tons/Yr:0.06

36
East
1/8-1/4
0.194 mi.
1022 ft.

CARBON CANYON PARK **UST** **U003783727**
4442 CARBON CANYON RD **N/A**
BREA, CA 92823

Relative:
Lower

Actual:
442 ft.

UST:

Facility ID:	6087
Permitting Agency:	ORANGE COUNTY
Latitude:	33.923691
Longitude:	-117.8356921

37
SSW
1/8-1/4
0.216 mi.
1138 ft.

FRED L. HARTLEY RESEARCH CENTE **HIST UST** **U001576727**
376 VALENCIA AVE **N/A**
BREA, CA 92621

Relative:
Lower

Actual:
405 ft.

HIST UST:

File Number:	Not reported
URL:	Not reported
Region:	STATE
Facility ID:	00000061553
Facility Type:	Other
Other Type:	PETROLEUM RESEARCH
Contact Name:	Not reported
Telephone:	7145287201
Owner Name:	UNION OIL COMPANY OF CALIFORNI
Owner Address:	461 S. BOYLSTON
Owner City,St,Zip:	LOS ANGELES, CA 90017
Total Tanks:	0006
Tank Num:	001
Container Num:	SL-1
Year Installed:	1955
Tank Capacity:	00009000
Tank Used for:	WASTE
Type of Fuel:	WASTE OIL
Container Construction Thickness:	1/4
Leak Detection:	None
Tank Num:	001
Container Num:	GY81-1
Year Installed:	1985
Tank Capacity:	00002900
Tank Used for:	WASTE
Type of Fuel:	Not reported
Container Construction Thickness:	10
Leak Detection:	Visual
Tank Num:	002
Container Num:	GY81-2
Year Installed:	1985
Tank Capacity:	00002900

FRED L. HARTLEY RESEARCH CENTE (Continued) **U001576727**

Tank Used for:	WASTE
Type of Fuel:	Not reported
Container Construction Thickness:	10
Leak Detection:	Visual
Tank Num:	002
Container Num:	K-14
Year Installed:	1980
Tank Capacity:	00002000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Container Construction Thickness:	Not reported
Leak Detection:	Stock Inventor
Tank Num:	003
Container Num:	K-15
Year Installed:	1980
Tank Capacity:	00002000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Container Construction Thickness:	Not reported
Leak Detection:	Stock Inventor
Tank Num:	004
Container Num:	K-16
Year Installed:	1980
Tank Capacity:	00002000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Container Construction Thickness:	Not reported
Leak Detection:	Stock Inventor
Tank Num:	005
Container Num:	IWS-1
Year Installed:	1950
Tank Capacity:	00008000
Tank Used for:	WASTE
Type of Fuel:	Not reported
Container Construction Thickness:	Not reported
Leak Detection:	None
Tank Num:	006
Container Num:	HB-1
Year Installed:	1950
Tank Capacity:	00000000
Tank Used for:	WASTE
Type of Fuel:	Not reported
Container Construction Thickness:	Not reported
Leak Detection:	Visual

H38 **HARBOR FABRICATING CO INC** **LUST S103646845**
SW **255 VOYAGER AV** **EMI N/A**
1/8-1/4 **BREA, CA 92621**
0.247 mi.
1306 ft. **Site 1 of 7 in cluster H**

Relative:
Lower

Actual:
423 ft.

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083001137T
Local Case Num:	90UT223
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605900897
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	9/7/1990
Enforcement Date:	Not reported
Close Date:	4/3/1991
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.917178
Longitude:	-117.8540362
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	PAH
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN

HARBOR FABRICATING CO INC (Continued) **S103646845**

Priority: Not reported
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Summary: Not reported

EMI:

Year:	1987
County Code:	30
Air Basin:	SC
Facility ID:	1726
Air District Name:	SC
SIC Code:	3799
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6
Reactive Organic Gases Tons/Yr:	6
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1990
County Code:	30
Air Basin:	SC
Facility ID:	1726
Air District Name:	SC
SIC Code:	3799
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4
Reactive Organic Gases Tons/Yr:	4
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1997
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	24
Reactive Organic Gases Tons/Yr:	17
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

HARBOR FABRICATING CO INC (Continued) **S103646845**

Year:	1998
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	20
Reactive Organic Gases Tons/Yr:	15
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1999
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	24
Reactive Organic Gases Tons/Yr:	17
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2000
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	24
Reactive Organic Gases Tons/Yr:	17
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2001
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713

HARBOR FABRICATING CO INC (Continued) **S103646845**

Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	15
Reactive Organic Gases Tons/Yr:	8
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2002
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	7
Reactive Organic Gases Tons/Yr:	7
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2003
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	7
Reactive Organic Gases Tons/Yr:	7
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2004
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	7.3317
Reactive Organic Gases Tons/Yr:	7.26
Carbon Monoxide Emissions Tons/Yr:	0

HARBOR FABRICATING CO INC (Continued) **S103646845**

NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0.588
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.41

Year:	2005
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3.7899
Reactive Organic Gases Tons/Yr:	3.75596751
Carbon Monoxide Emissions Tons/Yr:	.0786
NOX - Oxides of Nitrogen Tons/Yr:	.292
SOX - Oxides of Sulphur Tons/Yr:	.00134
Particulate Matter Tons/Yr:	.0168
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.0168

H39 **PACIFIC SKYLIGHTING INDUSTRIES** **UST** **U003713393**
SW **255 VOYAGER AVE** **N/A**
1/8-1/4 **BREA, CA 92821**
0.247 mi.
1306 ft. **Site 2 of 7 in cluster H**

Relative:
Lower

Actual:
423 ft.

UST:

Facility ID:	1325
Permitting Agency:	ORANGE COUNTY
Latitude:	33.918387
Longitude:	-117.853023

H40 **PACIFIC SKYLIGHT** **LUST** **S102434912**
SW **255 VOYAGER AVE** **EMI** **N/A**
1/8-1/4 **BREA, CA 92621** **HIST CORTESE**
0.247 mi.
1306 ft. **Site 3 of 7 in cluster H**

Relative:
Lower

Actual:
423 ft.

LUST:

Region:	STATE
Global Id:	T0605900897
Latitude:	33.917033
Longitude:	-117.854368
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	04/03/1991
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083001137T
LOC Case Number:	90UT223
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline

PACIFIC SKYLIGHT (Continued) **S102434912**

Site History: Not reported

Click here to access the California GeoTracker records for this facility:

Contact:
Global Id: T0605900897
Contact Type: Regional Board Caseworker
Contact Name: PATRICIA HANNON
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: phannon@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0605900897
Contact Type: Local Agency Caseworker
Contact Name: TAMARA ESCOBEDO
Organization Name: ORANGE COUNTY LOP
Address: 1241 EAST DYER ROAD SUITE 120
City: SANTA ANA
Email: tescobedo@ochca.com
Phone Number: 7144336251

Status History:
Global Id: T0605900897
Status: Open - Case Begin Date
Status Date: 09/07/1990

Global Id: T0605900897
Status: Completed - Case Closed
Status Date: 04/03/1991

Regulatory Activities:
Global Id: T0605900897
Action Type: Other
Date: 09/07/1990
Action: Leak Reported

Global Id: T0605900897
Action Type: REMEDIATION
Date: 10/09/1990
Action: Excavation

Global Id: T0605900897
Action Type: Other
Date: 09/07/1990
Action: Leak Discovery

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 90UT223
Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 04/03/1991
Record ID: RO0002312

PACIFIC SKYLIGHT (Continued) **S102434912**

EMI:

Year:	2006
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1.718813049339491104
Reactive Organic Gases Tons/Yr:	1.604
Carbon Monoxide Emissions Tons/Yr:	.105
NOX - Oxides of Nitrogen Tons/Yr:	.39
SOX - Oxides of Sulphur Tons/Yr:	.002
Particulate Matter Tons/Yr:	.055
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.05372

Year:	2007
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1.718813049339491104
Reactive Organic Gases Tons/Yr:	1.604
Carbon Monoxide Emissions Tons/Yr:	.105
NOX - Oxides of Nitrogen Tons/Yr:	.39
SOX - Oxides of Sulphur Tons/Yr:	.002
Particulate Matter Tons/Yr:	.055
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.05372

Year:	2008
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC
SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	.7185002443134662218
Reactive Organic Gases Tons/Yr:	.677385
Carbon Monoxide Emissions Tons/Yr:	.03
NOX - Oxides of Nitrogen Tons/Yr:	.13
SOX - Oxides of Sulphur Tons/Yr:	.000633
Particulate Matter Tons/Yr:	.0379125
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.0367125

Year:	2013
County Code:	30
Air Basin:	SC
Facility ID:	92863
Air District Name:	SC

PACIFIC SKYLIGHT (Continued) **S102434912**

SIC Code:	3713
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1.6893321101
Reactive Organic Gases Tons/Yr:	1.6583
Carbon Monoxide Emissions Tons/Yr:	0.02338
NOX - Oxides of Nitrogen Tons/Yr:	0.08684
SOX - Oxides of Sulphur Tons/Yr:	0.0004
Particulate Matter Tons/Yr:	0.00501
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.00501

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083001137T

H41 **HARBOR TRUCK BODIES INCORPORATED** **RCRA-LQG** **1000164289**
SW **255 VOYAGER AVENUE** **RAATS** **CAD059803734**
1/8-1/4 **BREA, CA 92821** **ICIS**
0.247 mi. **US AIRS**
1306 ft. **Site 4 of 7 in cluster H** **FINDS**
ECHO

Relative:
Lower

Actual:
423 ft.

RCRA-LQG:

Date form received by agency:	02/22/2016
Facility name:	HARBOR TRUCK BODIES, INC.
Facility address:	255 VOYAGER AVE. BREA, CA 92821
EPA ID:	CAD059803734
Mailing address:	VOYAGER AVE. BREA, CA 92821
Contact:	JOHN HOUNG
Contact address:	VOYAGER AVE. BREA, CA 92821
Contact country:	US
Contact telephone:	(714) 996-0411
Contact email:	JHOUNG@HARBORTRUCK.COM
EPA Region:	09
Land type:	Private
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	HARBOR TRUCK BODIES

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/1996
Owner/Op end date: Not reported

Owner/operator name: HARBOR TRUCK BODIES
Owner/operator address: VOYAGER AVE.
BREA, CA 92821
Owner/operator country: US
Owner/operator telephone: (714) 996-0411
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1996
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: 311
. Waste name: 311

. Waste code: 331
. Waste name: 331

. Waste code: 352
. Waste name: 352

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Historical Generators:
Date form received by agency: 03/01/2014
Site name: HARBOR TRUCK BODIES, INC.
Classification: Large Quantity Generator

. Waste code: 331
. Waste name: 331

. Waste code: 352
. Waste name: 352

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 02/07/2008
Site name: HARBOR TRUCK BODIES, INC.
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 07/01/1993
Site name: HARBOR TRUCK BODIES
Classification: Small Quantity Generator

Facility Has Received Notices of Violations:
Regulation violated: FR - 262.20-23.B
Area of violation: Generators - General
Date violation determined: 06/22/1990

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Date achieved compliance: 06/22/1995
Violation lead agency: EPA
Enforcement action: INITIAL 3008(A) COMPLIANCE
Enforcement action date: 08/24/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 268.7
Area of violation: LDR - General
Date violation determined: 06/22/1990
Date achieved compliance: 06/22/1995
Violation lead agency: EPA
Enforcement action: INITIAL 3008(A) COMPLIANCE
Enforcement action date: 08/24/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.50-60
Area of violation: Generators - General
Date violation determined: 06/22/1990
Date achieved compliance: 06/22/1995
Violation lead agency: EPA
Enforcement action: INITIAL 3008(A) COMPLIANCE
Enforcement action date: 08/24/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 06/22/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: LDR - General
Date achieved compliance: 06/22/1995
Evaluation lead agency: EPA

Evaluation date: 06/22/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Generators - General
Date achieved compliance: 06/22/1995
Evaluation lead agency: EPA

ICIS:
Enforcement Action ID: CASCAA000006059CB29400015
FRS ID: 110006176958
Action Name: HARBOR TRUCK BODIES INC 06059CB29400015
Facility Name: HARBOR TRUCK BODIES INC

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Facility Address:	255 VOYAGER AVE
	BREA, CA 92821
Enforcement Action Type:	Administrative Order
Facility County:	ORANGE
Program System Acronym:	AIR
Enforcement Action Forum Desc:	Administrative - Formal
EA Type Code:	SCAAAO
Facility SIC Code:	3713
Federal Facility ID:	Not reported
Latitude in Decimal Degrees:	33.91668
Longitude in Decimal Degrees:	-117.85373
Permit Type Desc:	Not reported
Program System Acronym:	CASCA00006059CB294
Facility NAICS Code:	336211
Tribal Land Code:	Not reported

Enforcement Action ID:	CASCAA000006059CB29400014
FRS ID:	110006176958
Action Name:	HARBOR TRUCK BODIES INC 06059CB29400014
Facility Name:	HARBOR TRUCK BODIES INC
Facility Address:	255 VOYAGER AVE
	BREA, CA 92821
Enforcement Action Type:	Notice of Violation
Facility County:	ORANGE
Program System Acronym:	AIR
Enforcement Action Forum Desc:	Administrative - Informal
EA Type Code:	NOV
Facility SIC Code:	3713
Federal Facility ID:	Not reported
Latitude in Decimal Degrees:	33.91668
Longitude in Decimal Degrees:	-117.85373
Permit Type Desc:	Not reported
Program System Acronym:	CASCA00006059CB294
Facility NAICS Code:	336211
Tribal Land Code:	Not reported

US AIRS MINOR:

Envid:	1000164289
Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958
D and B Number:	Not reported
Primary SIC Code:	3713
NAICS Code:	336211
Default Air Classification Code:	MIN
Facility Type of Ownership Code:	POF
Air CMS Category Code:	Not reported
HPV Status:	Not reported

US AIRS MINOR:

Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958
Air Operating Status Code:	OPR
Default Air Classification Code:	MIN
Air Program:	State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Activity Date: Not reported
Activity Status Date: 2004-10-27 00:00:00
Activity Group: Case File
Activity Type: Case File
Activity Status: Resolved

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2002-09-30 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2002-10-24 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-02-26 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-09-30 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-11-20 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2004-02-26 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2004-02-27 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2005-01-31 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2005-07-20 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2005-11-28 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2006-02-16 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2006-08-31 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2007-06-19 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-05-01 00:00:00
Activity Status Date: 2003-05-01 00:00:00
Activity Group: Enforcement Action

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Activity Type: Administrative - Formal
Activity Status: Final Order Issued

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-04-02 00:00:00
Activity Status Date: 2003-04-02 00:00:00
Activity Group: Enforcement Action
Activity Type: Administrative - Informal
Activity Status: Achieved

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: Not reported
Activity Status Date: 2004-10-27 00:00:00
Activity Group: Case File
Activity Type: Case File
Activity Status: Resolved

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2001-05-09 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2002-09-30 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Activity Date:	2002-10-24 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported
Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958
Air Operating Status Code:	OPR
Default Air Classification Code:	MIN
Air Program:	Title V Permits
Activity Date:	2003-02-26 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported
Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958
Air Operating Status Code:	OPR
Default Air Classification Code:	MIN
Air Program:	Title V Permits
Activity Date:	2003-09-30 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported
Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958
Air Operating Status Code:	OPR
Default Air Classification Code:	MIN
Air Program:	Title V Permits
Activity Date:	2003-11-20 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported
Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958
Air Operating Status Code:	OPR
Default Air Classification Code:	MIN
Air Program:	Title V Permits
Activity Date:	2004-02-26 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported
Region Code:	09
Programmatic ID:	AIR CASCA00006059CB294
Facility Registry ID:	110006176958

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2004-02-27 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2005-01-31 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2005-07-20 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2005-11-28 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2006-02-16 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2006-08-31 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2007-06-19 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2003-05-01 00:00:00
Activity Status Date: 2003-05-01 00:00:00
Activity Group: Enforcement Action
Activity Type: Administrative - Formal
Activity Status: Final Order Issued

Region Code: 09
Programmatic ID: AIR CASCA00006059CB294
Facility Registry ID: 110006176958
Air Operating Status Code: OPR
Default Air Classification Code: MIN
Air Program: Title V Permits
Activity Date: 2003-04-02 00:00:00
Activity Status Date: 2003-04-02 00:00:00
Activity Group: Enforcement Action
Activity Type: Administrative - Informal
Activity Status: Achieved

FINDS:

Registry ID: 110006176958

Environmental Interest/Information System
AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of

HARBOR TRUCK BODIES INCORPORATED (Continued) **1000164289**

Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

AIR EMISSIONS CLASSIFICATION UNKNOWN

California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZARDOUS WASTE BIENNIAL REPORTER

AIR MINOR

ECHO:

Envid:	1000164289
Registry ID:	110006176958
DFR URL:	http://echo.epa.gov/detailed_facility_report?fid=110006176958

H42 **ALLAN AUTOMATIC SPRINKLER** **LUST** **U002095883**
SW **3233 ENTERPRISE** **SWEEPS UST** **N/A**
1/4-1/2 **BREA, CA 92621** **CA FID UST**
0.268 mi. **HIST CORTESE**
1414 ft. **Site 5 of 7 in cluster H**

Relative:
Lower

Actual:
433 ft.

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083002813T
Local Case Num:	95UT036
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown

ALLAN AUTOMATIC SPRINKLER (Continued) **U002095883**

Global ID:	T0605901937
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	4/20/1995
Enforcement Date:	Not reported
Close Date:	12/6/2001
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.917044
Longitude:	-117.8538802
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	NOM
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

SWEEPS UST:

Status:	Active
Comp Number:	6294
Number:	9
Board Of Equalization:	44-016454
Referral Date:	09-30-92
Action Date:	09-15-92
Created Date:	02-29-88
Owner Tank Id:	Not reported
SWRCB Tank Id:	Not reported
Tank Status:	Not reported
Capacity:	Not reported
Active Date:	Not reported
Tank Use:	Not reported
STG:	Not reported
Content:	Not reported
Number Of Tanks:	Not reported

ALLAN AUTOMATIC SPRINKLER (Continued) **U002095883**

CA FID UST:
Facility ID: 30005030
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7149939500
Mail To: Not reported
Mailing Address: 3233 ENTERPRISE
Mailing Address 2: Not reported
Mailing City,St,Zip: BREA 92621
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

HIST CORTESE:
Region: CORTESE
Facility County Code: 30
Reg By: LTNKA
Reg Id: 083002813T

H43 **ALLAN AUTOMATIC SPRINKLER** **LUST U003783772**
SW **3233 ENTERPRISE ST** **UST N/A**
1/4-1/2 **BREA, CA 92821**
0.268 mi.
1414 ft. **Site 6 of 7 in cluster H**

Relative:
Lower

Actual:
433 ft.

LUST:
Region: STATE
Global Id: T0605901937
Latitude: 33.917055
Longitude: -117.853033
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 12/06/2001
Lead Agency: ORANGE COUNTY LOP
Case Worker: TE
Local Agency: ORANGE COUNTY LOP
RB Case Number: 083002813T
LOC Case Number: 95UT036
File Location: Local Agency
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

Contact:
Global Id: T0605901937
Contact Type: Regional Board Caseworker
Contact Name: NANCY OLSON-MARTIN
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500

ALLAN AUTOMATIC SPRINKLER (Continued) **U003783772**

City: RIVERSIDE
Email: nolson-martin@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0605901937
Contact Type: Local Agency Caseworker
Contact Name: TAMARA ESCOBEDO
Organization Name: ORANGE COUNTY LOP
Address: 1241 EAST DYER ROAD SUITE 120
City: SANTA ANA
Email: tescobedo@ochca.com
Phone Number: 7144336251

Status History:
Global Id: T0605901937
Status: Open - Case Begin Date
Status Date: 04/20/1995

Global Id: T0605901937
Status: Completed - Case Closed
Status Date: 12/06/2001

Regulatory Activities:
Global Id: T0605901937
Action Type: Other
Date: 04/20/1995
Action: Leak Reported

Global Id: T0605901937
Action Type: REMEDIATION
Date: 01/31/2001
Action: Soil Vapor Extraction (SVE)

Global Id: T0605901937
Action Type: Other
Date: 04/20/1995
Action: Leak Discovery

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 95UT036
Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 12/06/2001
Record ID: RO0001863

UST:
Facility ID: 6294
Permitting Agency: ORANGE COUNTY
Latitude: 33.9184099
Longitude: -117.851689

H44 **BLAISDELL MFG** **SLIC** **S105015197**
SW **3160 ENTERPRISE ST** **Orange Co. Industrial Site** **N/A**
1/4-1/2 **BREA, CA 92621**
0.277 mi.
1464 ft. **Site 7 of 7 in cluster H**

Relative:
Lower

Actual:
423 ft.

SLIC:

Region:	STATE
Facility Status:	**Completed - Case Closed**
Status Date:	03/17/1992
Global Id:	SLT8R1124105
Lead Agency:	ORANGE COUNTY LOP
Lead Agency Case Number:	Not reported
Latitude:	33.917541
Longitude:	-117.853213
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	Not reported
RB Case Number:	SLT8R112
File Location:	Not reported
Potential Media Affected:	Not reported
Potential Contaminants of Concern:	Not reported
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Orange Co. Industrial Site:

Case ID:	91IC055
Record ID:	RO0000343
Current Status:	CLOSED 3/17/1992
Closure Type:	Closed pre 1994, file review required to determine closure type
Released Chemical:	SOLVENTS- HALOGENATED

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45 **SECURITY PACIFIC BANK** **LUST** **S102436660**
SW **275 VALENCIA AVE** **HIST CORTESE** **N/A**
1/4-1/2 **BREA, CA 92621**
0.284 mi.
1499 ft.

Relative:
Lower

Actual:
424 ft.

LUST:

Region:	STATE
Global Id:	T0605901871
Latitude:	33.9131659
Longitude:	-117.9042918
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	09/06/1995
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083002697T
LOC Case Number:	95UT040
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Waste Oil / Motor / Hydraulic / Lubricating
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

SECURITY PACIFIC BANK (Continued) **S102436660**

Contact:
Global Id: T0605901871
Contact Type: Regional Board Caseworker
Contact Name: NANCY OLSON-MARTIN
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: nolson-martin@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0605901871
Contact Type: Local Agency Caseworker
Contact Name: TAMARA ESCOBEDO
Organization Name: ORANGE COUNTY LOP
Address: 1241 EAST DYER ROAD SUITE 120
City: SANTA ANA
Email: tescobedo@ochca.com
Phone Number: 7144336251

Status History:
Global Id: T0605901871
Status: Open - Case Begin Date
Status Date: 02/27/1995

Global Id: T0605901871
Status: Completed - Case Closed
Status Date: 09/06/1995

Regulatory Activities:
Global Id: T0605901871
Action Type: Other
Date: 02/27/1995
Action: Leak Reported

Global Id: T0605901871
Action Type: Other
Date: 02/27/1995
Action: Leak Discovery

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 95UT040
Released Substance: Waste oil/Used oil
Date Closed: 09/06/1995
Record ID: RO0001963

LUST REG 8:
Region: 8
County: Orange
Regional Board: Santa Ana Region
Facility Status: Case Closed
Case Number: 083002697T
Local Case Num: 95UT040
Case Type: Soil only

SECURITY PACIFIC BANK (Continued) **S102436660**

Substance:	Waste Oil
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605901871
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	2/27/1995
Enforcement Date:	Not reported
Close Date:	9/6/1995
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9131659
Longitude:	-117.9042918
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	NOM
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083002697T

46
South
1/4-1/2
0.315 mi.
1661 ft.

PENMAR GOLF COURSE
1233 ROSE AVENUE
VENICE (IN LOS ANGELES), CA

SWF/LF **S109821473**
N/A

Relative:
Lower

Actual:
415 ft.

SWF/LF (SWIS):

Region:	STATE
Facility ID:	19-AR-5316
Lat/Long:	34 / -118.46111
Owner Name:	Not reported
Owner Telephone:	Not reported
Owner Address:	Not reported
Owner Address2:	Not reported
Owner City,St,Zip:	Not reported
Operational Status:	Not reported
Operator:	Not reported
Operator Phone:	Not reported
Operator Address:	Not reported
Operator Address2:	Not reported
Operator City,St,Zip:	Not reported
Permit Date:	Not reported
Permit Status:	Not reported
Permitted Acreage:	Not reported
Activity:	Not reported
Regulation Status:	Not reported
Landuse Name:	Residential,Recreational,Golf Course
GIS Source:	Map
Category:	Not reported
Unit Number:	Not reported
Inspection Frequency:	Not reported
Accepted Waste:	Not reported
Closure Date:	Not reported
Closure Type:	Not reported
Disposal Acreage:	Not reported
SWIS Num:	19-AR-5316
Waste Discharge Requirement Num:	Not reported
Program Type:	Not reported
Permitted Throughput with Units:	Not reported
Actual Throughput with Units:	Not reported
Permitted Capacity with Units:	Not reported
Remaining Capacity:	Not reported
Remaining Capacity with Units:	Not reported
Lat/Long:	34 / -118.46111

47
WSW
1/4-1/2
0.338 mi.
1783 ft.

CYANAMID DISTRIBUTION CTR BREA
2980 ENTERPRISE ST
BREA, CA 92821

SEMS-ARCHIVE **1000307244**
RCRA NonGen / NLR **CAD000629758**
FINDS
ECHO

Relative:
Lower

Actual:
417 ft.

SEMS-ARCHIVE:

Site ID:	900940
EPA ID:	CAD000629758
Federal Facility:	N
NPL:	Not on the NPL
Non NPL Status:	NFRAP-Site does not qualify for the NPL based on existing information

Following information was gathered from the prior CERCLIS update completed in 10/2013:

Site ID:	0900940

CYANAMID DISTRIBUTION CTR BREA (Continued) **1000307244**

Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: NFRAP-Site does not qualify for the NPL based on existing information

CERCLIS-NFRAP Site Contact Details:
Contact Sequence ID: 13286542.00000
Person ID: 13003854.00000

Contact Sequence ID: 13292137.00000
Person ID: 13003858.00000

Contact Sequence ID: 13297995.00000
Person ID: 13004003.00000

CERCLIS-NFRAP Assessment History:
Action: DISCOVERY
Date Started: / /
Date Completed: 08/01/80
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: 03/01/85
Date Completed: 12/01/87
Priority Level: NFRAP-Site does not qualify for the NPL based on existing information

Action: ARCHIVE SITE
Date Started: / /
Date Completed: 12/01/87
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: / /
Date Completed: 12/01/87
Priority Level: NFRAP-Site does not qualify for the NPL based on existing information

RCRA NonGen / NLR:
Date form received by agency: 08/18/1980
Facility name: CYANAMID DISTRIBUTION CTR BREA
Facility address: 2980 ENTERPRISE ST
BREA, CA 92821
EPA ID: CAD000629758
Mailing address: PO BOX579 BREA
BREA, CA 92621
Contact: ENVIRONMENTAL MANAGER
Contact address: 2980 ENTERPRISE ST
BREA, CA 92621
Contact country: US
Contact telephone: (714) 993-6630
Contact email: Not reported
EPA Region: 09
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: NOT REQUIRED

CYANAMID DISTRIBUTION CTR BREA (Continued) **1000307244**

Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Violation Status: No violations found

FINDS:

Registry ID: 110006466617

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

ECHO:
Envid: 1000307244
Registry ID: 110006466617
DFR URL: http://echo.epa.gov/detailed_facility_report?fid=110006466617

I48 **LA FLORESTA** **RCRA-LQG** **1000166994**
SSW **376 S VALENCIA AVE** **LUST** **CAT080010903**
1/4-1/2 **BREA, CA 92821**
0.354 mi.
1867 ft. **Site 1 of 2 in cluster I**

Relative:
Lower

Actual:
395 ft.

RCRA-LQG:

Date form received by agency:	05/20/2009
Facility name:	LA FLORESTA
Facility address:	376 S VALENCIA AVE BREA, CA 92821
EPA ID:	CAT080010903
Mailing address:	145 S ST COLLEGE BLVD BREA, CA 92821
Contact:	JAMES MARTINEZ
Contact address:	145 S ST COLLEGE BLVD BREA, CA 92821
Contact country:	US
Contact telephone:	714-671-3534
Contact email:	JAMARTIN@CHEVRON.COM
EPA Region:	09
Land type:	Private
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	LA FLORESTA LLC
Owner/operator address:	145 S ST COLLEGE BLVD 4TH FL BREA, CA 92821
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	07/21/2003
Owner/Op end date:	Not reported

Owner/operator name:	LA FLORESTA LLC
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	07/21/2003
Owner/Op end date:	Not reported

Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED

LA FLORESTA (Continued) **1000166994**

NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: K169
. Waste name: CRUDE OIL STORAGE TANK SEDIMENT FROM PETROLEUM REFINING OPERATIONS

Historical Generators:
Date form received by agency: 03/04/1999
Site name: HARTLEY CENTER/UNOCAL CORP.
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Site name: UNOCAL SCIENCE & TECHNOLOGY
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Site name: UNOCAL SCIENCE & TECHNOLOGY
Classification: Small Quantity Generator

Date form received by agency: 03/19/1996
Site name: UNOCAL HARTLEY CENTER
Classification: Large Quantity Generator

Date form received by agency: 03/28/1994
Site name: UNOCAL FRED L HARTLEY RESEARCH CTR
Classification: Large Quantity Generator

Date form received by agency: 03/18/1992
Site name: UNOCAL SCIENCE AND TECHNOLOGY DIVISION
Classification: Large Quantity Generator

Date form received by agency: 03/20/1990
Site name: UNOCAL SCIENCE & TECHNOLOGY DIV.
Classification: Large Quantity Generator

LA FLORESTA (Continued) **1000166994**

Date form received by agency: 08/18/1980
Site name: UNOCAL SCIENCE & TECHNOLOGY
Classification: Large Quantity Generator

Facility Has Received Notices of Violations:
Regulation violated: F - 262.50-60
Area of violation: Generators - General
Date violation determined: 02/06/1990
Date achieved compliance: 04/18/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/20/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 05/25/2005
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 07/14/1994
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 02/06/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/18/1990
Evaluation lead agency: State

LUST REG 8:
Region: 8
County: Orange
Regional Board: Santa Ana Region
Facility Status: Preliminary site assessment workplan submitted
Case Number: 083002180T
Local Case Num: 92UT134
Case Type: Soil only
Substance: Diesel
Qty Leaked: Not reported
Abate Method: Not reported
Cross Street: IMPERIAL HWY
Enf Type: Not reported
Funding: Not reported
How Discovered: Not reported
How Stopped: Not reported
Leak Cause: Not reported
Leak Source: Not reported
Global ID: T0605901608

LA FLORESTA (Continued) **1000166994**

How Stopped Date:	Not reported
Enter Date:	1/6/1993
Date Confirmation of Leak Began:	6/4/1992
Date Preliminary Assessment Began:	Not reported
Discover Date:	6/4/1992
Enforcement Date:	Not reported
Close Date:	Not reported
Date Prelim Assessment Workplan Submitted:	1/1/1965
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	1/6/1993
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9088042
Longitude:	-117.852746
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	NOM
Staff Initials:	Not reported
Lead Agency:	Local Agency
Local Agency:	30000
Hydr Basin #:	COASTAL PLAIN OF ORA
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

I49 **UNOCAL SCIENCE AND TECHNOLOGY** **SLIC** **S101609631**
SSW **376 S VALENCIA AVE** **SWEEPS UST** **N/A**
1/4-1/2 **BREA, CA 92621** **HIST UST**
0.354 mi. **CA FID UST**
1867 ft. **Site 2 of 2 in cluster I** **Orange Co. Industrial Site**
EMI
Relative: **HIST CORTESE**
Lower

Actual: **395 ft.**

SLIC:

Region:	STATE
Facility Status:	**Completed - Case Closed**
Status Date:	11/08/1996
Global Id:	T0605901608
Lead Agency:	ORANGE COUNTY
Lead Agency Case Number:	96IC008
Latitude:	33.912747
Longitude:	-117.848934
Case Type:	Cleanup Program Site
Case Worker:	LL

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

Local Agency:	ORANGE COUNTY
RB Case Number:	083002180T
File Location:	Local Agency
Potential Media Affected:	Soil
Potential Contaminants of Concern:	Diesel
Site History:	industrial cleanup from a AST diesel 96ic008

Click here to access the California GeoTracker records for this facility:

SWEEPS UST:

Status:	Not reported
Comp Number:	2754
Number:	Not reported
Board Of Equalization:	44-015973
Referral Date:	Not reported
Action Date:	Not reported
Created Date:	Not reported
Owner Tank Id:	Not reported
SWRCB Tank Id:	30-000-002754-000008
Tank Status:	Not reported
Capacity:	2000
Active Date:	Not reported
Tank Use:	UNKNOWN
STG:	PRODUCT
Content:	Not reported
Number Of Tanks:	3

Status:	Not reported
Comp Number:	2754
Number:	Not reported
Board Of Equalization:	44-015973
Referral Date:	Not reported
Action Date:	Not reported
Created Date:	Not reported
Owner Tank Id:	Not reported
SWRCB Tank Id:	30-000-002754-000009
Tank Status:	Not reported
Capacity:	2000
Active Date:	Not reported
Tank Use:	UNKNOWN
STG:	PRODUCT
Content:	Not reported
Number Of Tanks:	Not reported

Status:	Not reported
Comp Number:	2754
Number:	Not reported
Board Of Equalization:	44-015973
Referral Date:	Not reported
Action Date:	Not reported
Created Date:	Not reported
Owner Tank Id:	Not reported
SWRCB Tank Id:	30-000-002754-000010
Tank Status:	Not reported
Capacity:	2000
Active Date:	Not reported
Tank Use:	UNKNOWN

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

STG: PRODUCT
Content: Not reported
Number Of Tanks: Not reported

Status: Active
Comp Number: 2754
Number: 9
Board Of Equalization: 44-015973
Referral Date: 09-30-92
Action Date: 09-15-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-002754-000007
Tank Status: A
Capacity: 5000
Active Date: Not reported
Tank Use: PETROLEUM
STG: P
Content: Not reported
Number Of Tanks: 1

HIST UST:
File Number: 0002D6FC
URL: http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002D6FC.pdf
Region: Not reported
Facility ID: Not reported
Facility Type: Not reported
Other Type: Not reported
Contact Name: Not reported
Telephone: Not reported
Owner Name: Not reported
Owner Address: Not reported
Owner City,St,Zip: Not reported
Total Tanks: Not reported

Tank Num: Not reported
Container Num: Not reported
Year Installed: Not reported
Tank Capacity: Not reported
Tank Used for: Not reported
Type of Fuel: Not reported
Container Construction Thickness: Not reported
Leak Detection: Not reported

Tank Num: Not reported
Container Num: Not reported
Year Installed: Not reported
Tank Capacity: Not reported
Tank Used for: Not reported
Type of Fuel: Not reported
Container Construction Thickness: Not reported
Leak Detection: Not reported

Click here for Geo Tracker PDF:

CA FID UST:

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

Facility ID:	30001350
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7145287201
Mail To:	Not reported
Mailing Address:	P O BOX
Mailing Address 2:	Not reported
Mailing City,St,Zip:	BREA 92621
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

Orange Co. Industrial Site:

Case ID:	02IC020
Record ID:	RO0003110
Current Status:	CLOSED 3/21/2012
Closure Type:	Closure certification issued
Released Chemical:	FUEL WASTE

Case ID:	90IC006
Record ID:	RO0000289
Current Status:	CLOSED 6/4/1990
Closure Type:	Closed pre 1994, file review required to determine closure type
Released Chemical:	FUEL WASTE

Case ID:	96IC008
Record ID:	RO0000575
Current Status:	CLOSED 11/8/1996
Closure Type:	Closure certification issued
Released Chemical:	FUEL WASTE

EMI:

Year:	1990
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	21
Reactive Organic Gases Tons/Yr:	20
Carbon Monoxide Emissions Tons/Yr:	3
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1995

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	42
Reactive Organic Gases Tons/Yr:	10
Carbon Monoxide Emissions Tons/Yr:	79
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1996
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	58
Reactive Organic Gases Tons/Yr:	8
Carbon Monoxide Emissions Tons/Yr:	6
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	4
Part. Matter 10 Micrometers and Smllr Tons/Yr:	3

Year:	1997
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	69
Reactive Organic Gases Tons/Yr:	7
Carbon Monoxide Emissions Tons/Yr:	10
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	3
Part. Matter 10 Micrometers and Smllr Tons/Yr:	3

Year:	1998
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	85
Reactive Organic Gases Tons/Yr:	8
Carbon Monoxide Emissions Tons/Yr:	10
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	3
Part. Matter 10 Micrometers and Smllr Tons/Yr:	3

Year:	1999
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	69
Reactive Organic Gases Tons/Yr:	7
Carbon Monoxide Emissions Tons/Yr:	10
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	3
Part. Matter 10 Micrometers and Smllr Tons/Yr:	3

Year:	2000
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	69
Reactive Organic Gases Tons/Yr:	7
Carbon Monoxide Emissions Tons/Yr:	10
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	3
Part. Matter 10 Micrometers and Smllr Tons/Yr:	3

Year:	2001
County Code:	30
Air Basin:	SC
Facility ID:	800258
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	1
NOX - Oxides of Nitrogen Tons/Yr:	0

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr: 0
Part. Matter 10 Micrometers and Smllr Tons/Yr: 0

Year: 2002
County Code: 30
Air Basin: SC
Facility ID: 800258
Air District Name: SC
SIC Code: 8731
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 0
Reactive Organic Gases Tons/Yr: 0
Carbon Monoxide Emissions Tons/Yr: 1
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr: 0
Part. Matter 10 Micrometers and Smllr Tons/Yr: 0

Year: 2003
County Code: 30
Air Basin: SC
Facility ID: 800258
Air District Name: SC
SIC Code: 8731
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 0
Reactive Organic Gases Tons/Yr: 0
Carbon Monoxide Emissions Tons/Yr: 1
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr: 0
Part. Matter 10 Micrometers and Smllr Tons/Yr: 0

Year: 2004
County Code: 30
Air Basin: SC
Facility ID: 800258
Air District Name: SC
SIC Code: 8731
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 0.11811
Reactive Organic Gases Tons/Yr: 0.05
Carbon Monoxide Emissions Tons/Yr: 0.6618
NOX - Oxides of Nitrogen Tons/Yr: 0.49016
SOX - Oxides of Sulphur Tons/Yr: 0.007323
Particulate Matter Tons/Yr: 0.070448
Part. Matter 10 Micrometers and Smllr Tons/Yr: 0.06

HIST CORTESE:
Region: CORTESE

UNOCAL SCIENCE AND TECHNOLOGY (Continued) **S101609631**

Facility County Code: 30
Reg By: LTNKA
Reg Id: 083002180T

J50 **TOSCO - 76 # 6121** **LUST** **S103663609**
SSW **525 VALENCIA AVE** **CHMIRS** **N/A**
1/4-1/2 **BREA, CA 92621**
0.422 mi.
2230 ft. **Site 1 of 3 in cluster J**

Relative:
Lower

Actual:
402 ft.

LUST:

Region:	STATE
Global Id:	T0605901409
Latitude:	33.9073732
Longitude:	-117.854506
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	07/17/1992
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083001888T
LOC Case Number:	91UT083
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Diesel
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0605901409
Contact Type:	Regional Board Caseworker
Contact Name:	NANCY OLSON-MARTIN
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	nolson-martin@waterboards.ca.gov
Phone Number:	Not reported

Global Id:	T0605901409
Contact Type:	Local Agency Caseworker
Contact Name:	TAMARA ESCOBEDO
Organization Name:	ORANGE COUNTY LOP
Address:	1241 EAST DYER ROAD SUITE 120
City:	SANTA ANA
Email:	tescobedo@ochca.com
Phone Number:	7144336251

Status History:

Global Id:	T0605901409
Status:	Open - Case Begin Date
Status Date:	07/01/1991

Global Id:	T0605901409
Status:	Completed - Case Closed
Status Date:	07/17/1992

TOSCO - 76 # 6121 (Continued) **S103663609**

Regulatory Activities:

Global Id:	T0605901409
Action Type:	Other
Date:	07/01/1991
Action:	Leak Reported
Global Id:	T0605901409
Action Type:	Other
Date:	07/01/1991
Action:	Leak Discovery
Region:	STATE
Global Id:	T0605902182
Latitude:	33.9073732
Longitude:	-117.854506
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	04/28/2000
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083003217T
LOC Case Number:	98UT046
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0605902182
Contact Type:	Regional Board Caseworker
Contact Name:	NANCY OLSON-MARTIN
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	nolson-martin@waterboards.ca.gov
Phone Number:	Not reported
Global Id:	T0605902182
Contact Type:	Local Agency Caseworker
Contact Name:	TAMARA ESCOBEDO
Organization Name:	ORANGE COUNTY LOP
Address:	1241 EAST DYER ROAD SUITE 120
City:	SANTA ANA
Email:	tescobedo@ochca.com
Phone Number:	7144336251

Status History:

Global Id:	T0605902182
Status:	Open - Case Begin Date
Status Date:	07/09/1998
Global Id:	T0605902182
Status:	Completed - Case Closed

TOSCO - 76 # 6121 (Continued) **S103663609**

Status Date: 04/28/2000

Regulatory Activities:
Global Id: T0605902182
Action Type: Other
Date: 07/09/1998
Action: Leak Reported

Global Id: T0605902182
Action Type: Other
Date: 07/09/1998
Action: Leak Discovery

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 98UT046
Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 04/28/2000
Record ID: RO0002191

Region: ORANGE
Facility Id: 91UT083
Released Substance: Diesel fuel oil and additives, Nos.1-D, 2-D, 2-4
Date Closed: 07/17/1992
Record ID: RO0002880

CHMIRS:
OES Incident Number: 8-3068
OES notification: 07/06/1998
OES Date: Not reported
OES Time: Not reported
Date Completed: Not reported
Property Use: Not reported
Agency Id Number: Not reported
Agency Incident Number: Not reported
Time Notified: Not reported
Time Completed: Not reported
Surrounding Area: Not reported
Estimated Temperature: Not reported
Property Management: Not reported
More Than Two Substances Involved?: Not reported
Resp Agncy Personel # Of Decontaminated: Not reported
Responding Agency Personel # Of Injuries: Not reported
Responding Agency Personel # Of Fatalities: Not reported
Others Number Of Decontaminated: Not reported
Others Number Of Injuries: Not reported
Others Number Of Fatalities: Not reported
Vehicle Make/year: Not reported
Vehicle License Number: Not reported
Vehicle State: Not reported
Vehicle Id Number: Not reported
CA DOT PUC/ICC Number: Not reported
Company Name: Not reported
Reporting Officer Name/ID: Not reported
Report Date: Not reported

TOSCO - 76 # 6121 (Continued) **S103663609**

Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	Reporting Party
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	1998
Agency:	Tosco Marketing Company
Incident Date:	7/6/199812:00:00 AM
Admin Agency:	Brea Fire Department
Amount:	Not reported
Contained:	Unknown
Site Type:	Service Station
E Date:	Not reported
Substance:	gasoline
Gallons:	0.000000
Unknown:	0
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	0
Number of Injuries:	0
Number of Fatalities:	0
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	detected soil contamination thru testing of soil at a gasoline service station
OES Incident Number:	15409
OES notification:	Not reported
OES Date:	9/4/1996
OES Time:	10:25:39 AM
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported

TOSCO - 76 # 6121 (Continued) **S103663609**

Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	YES
Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	unocal
Containment:	Not reported
What Happened:	Not reported
Type:	CHEMICAL
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	1996
Agency:	unocal
Incident Date:	0900 04Sep96
Admin Agency:	Not reported
Amount:	unk
Contained:	NO
Site Type:	Not reported
E Date:	Not reported
Substance:	hydraulic oil
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	NO
Number of Injuries:	NO
Number of Fatalities:	NO
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	employees found soil contaminated with hydraulic oil due to underground leak from hoist.

J51 **TOSCO - 76 STATION #6121** **LUST** **S101307733**
SSW **525 VALENCIA** **HIST CORTESE** **N/A**
1/4-1/2 **BREA, CA 92621**
0.422 mi.
2230 ft. **Site 2 of 3 in cluster J**

Relative:
Lower

Actual:
402 ft.

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083001888T
Local Case Num:	91UT083
Case Type:	Soil only
Substance:	Diesel
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605901409
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	7/1/1991
Enforcement Date:	Not reported
Close Date:	7/17/1992
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9073732
Longitude:	-117.854506
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	NOM
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN

TOSCO - 76 STATION #6121 (Continued) **S101307733**

Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Summary:	Not reported
Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083003217T
Local Case Num:	98UT046
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605902182
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	7/9/1998
Enforcement Date:	Not reported
Close Date:	4/28/2000
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9073732
Longitude:	-117.854506
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	NOM
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN

TOSCO - 76 STATION #6121 (Continued) **S101307733**

Priority: Not reported
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Summary: Not reported

HIST CORTESE:
Region: CORTESE
Facility County Code: 30
Reg By: LTNKA
Reg Id: 083000697T

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52 **AMERICAN SUZUKI MOTOR CORP** **LUST** **U003713860**
SW **3251 E IMPERIAL HWY** **UST** **N/A**
1/4-1/2 **BREA, CA 92821** **SWEEPS UST**
0.427 mi. **EMI**
2252 ft. **NPDES**

Relative:
Lower

Actual:
402 ft.

LUST:
Region: STATE
Global Id: T0605901666
Latitude: 33.9101462
Longitude: -117.852615
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 03/08/1994
Lead Agency: ORANGE COUNTY LOP
Case Worker: TE
Local Agency: ORANGE COUNTY LOP
RB Case Number: 083002284T
LOC Case Number: 93UT053
File Location: Local Agency
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

Contact:
Global Id: T0605901666
Contact Type: Local Agency Caseworker
Contact Name: TAMARA ESCOBEDO
Organization Name: ORANGE COUNTY LOP
Address: 1241 EAST DYER ROAD SUITE 120
City: SANTA ANA
Email: tescobedo@ochca.com
Phone Number: 7144336251

Global Id: T0605901666
Contact Type: Regional Board Caseworker
Contact Name: VALERIE JAHN-BULL
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: vjahn-bull@waterboards.ca.gov
Phone Number: 9517824903

Status History:

AMERICAN SUZUKI MOTOR CORP (Continued) **U003713860**

Global Id: T0605901666
Status: Open - Case Begin Date
Status Date: 05/28/1993

Global Id: T0605901666
Status: Completed - Case Closed
Status Date: 03/08/1994

Regulatory Activities:
Global Id: T0605901666
Action Type: Other
Date: 05/28/1993
Action: Leak Reported

Global Id: T0605901666
Action Type: ENFORCEMENT
Date: 03/08/1994
Action: Closure/No Further Action Letter

Global Id: T0605901666
Action Type: Other
Date: 05/28/1993
Action: Leak Discovery

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 93UT053
Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 03/08/1994
Record ID: RO0002261

LUST REG 8:
Region: 8
County: Orange
Regional Board: Santa Ana Region
Facility Status: Case Closed
Case Number: 083002284T
Local Case Num: 93UT053
Case Type: Soil only
Substance: Gasoline
Qty Leaked: 0
Abate Method: Not reported
Cross Street: Not reported
Enf Type: Not reported
Funding: Not reported
How Discovered: Tank Closure
How Stopped: Close Tank
Leak Cause: Unknown
Leak Source: Unknown
Global ID: T0605901666
How Stopped Date: 9/9/9999
Enter Date: Not reported
Date Confirmation of Leak Began: Not reported
Date Preliminary Assessment Began: Not reported
Discover Date: 5/28/1993

AMERICAN SUZUKI MOTOR CORP (Continued) **U003713860**

Enforcement Date:	Not reported
Close Date:	3/8/1994
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9101462
Longitude:	-117.852615
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	VJJ
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

UST:

Facility ID:	4067
Permitting Agency:	ORANGE COUNTY
Latitude:	33.9128996
Longitude:	-117.8515074

SWEEPS UST:

Status:	Active
Comp Number:	4067
Number:	9
Board Of Equalization:	44-016112
Referral Date:	09-30-92
Action Date:	09-15-92
Created Date:	02-29-88
Owner Tank Id:	Not reported
SWRCB Tank Id:	30-000-004067-000001
Tank Status:	A
Capacity:	4000
Active Date:	Not reported
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED

AMERICAN SUZUKI MOTOR CORP (Continued) **U003713860**

Number Of Tanks: 2

Status: Active
Comp Number: 4067
Number: 9
Board Of Equalization: 44-016112
Referral Date: 09-30-92
Action Date: 09-15-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-004067-000002
Tank Status: A
Capacity: 6000
Active Date: Not reported
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: Not reported

EMI:

Year: 1987
County Code: 30
Air Basin: SC
Facility ID: 9241
Air District Name: SC
SIC Code: 5511
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 0
Reactive Organic Gases Tons/Yr: 0
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr: 0
Part. Matter 10 Micrometers and Smllr Tons/Yr: 0

Year: 1990
County Code: 30
Air Basin: SC
Facility ID: 9241
Air District Name: SC
SIC Code: 5511
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 0
Reactive Organic Gases Tons/Yr: 0
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr: 0
Part. Matter 10 Micrometers and Smllr Tons/Yr: 0

NPDES:

Npdes Number: CAS000002

AMERICAN SUZUKI MOTOR CORP (Continued) **U003713860**

Facility Status:	Terminated
Agency Id:	0
Region:	8
Regulatory Measure Id:	454813
Order No:	2009-0009-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 30C372846
Program Type:	Construction
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	05/07/2015
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/21/2015
Discharge Name:	Suzuki Motor of America
Discharge Address:	3251 East Imperial Hwy
Discharge City:	Brea
Discharge State:	California
Discharge Zip:	92821
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported

AMERICAN SUZUKI MOTOR CORP (Continued) **U003713860**

CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

J53 **UNOCAL #6121** **HIST CORTESE** **S104748970**
SSW **525** **N/A**
1/4-1/2 **BREA, CA 92621**
0.447 mi.
2358 ft. **Site 3 of 3 in cluster J**

Relative:
Lower

Actual:
402 ft.

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083001888T

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083000725T

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083003217T

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54 **ARCO #6110** **LUST** **S102424305**
South **1201 IMPERIAL** **N/A**
1/4-1/2 **PLACENTIA, CA 92870**
0.464 mi.
2450 ft.

Relative:
Lower

Actual:
401 ft.

LUST:

Region:	STATE
Global Id:	T0605901674
Latitude:	33.9044233
Longitude:	-117.8420766
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	06/22/2007
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	TE

ARCO #6110 (Continued) **S102424305**

Local Agency: ORANGE COUNTY LOP
RB Case Number: 083002300T
LOC Case Number: 93UT041
File Location: Local Agency Warehouse
Potential Media Affect: Other Groundwater (uses other than drinking water)
Potential Contaminants of Concern: Gasoline
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

Contact:
Global Id: T0605901674
Contact Type: Local Agency Caseworker
Contact Name: TAMARA ESCOBEDO
Organization Name: ORANGE COUNTY LOP
Address: 1241 EAST DYER ROAD SUITE 120
City: SANTA ANA
Email: tescobedo@ochca.com
Phone Number: 7144336251

Global Id: T0605901674
Contact Type: Regional Board Caseworker
Contact Name: VALERIE JAHN-BULL
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: vjahn-bull@waterboards.ca.gov
Phone Number: 9517824903

Status History:
Global Id: T0605901674
Status: Open - Case Begin Date
Status Date: 11/25/1992

Global Id: T0605901674
Status: Open - Site Assessment
Status Date: 03/04/2003

Global Id: T0605901674
Status: Open - Verification Monitoring
Status Date: 01/21/2005

Global Id: T0605901674
Status: Completed - Case Closed
Status Date: 06/22/2007

Regulatory Activities:
Global Id: T0605901674
Action Type: Other
Date: 05/10/1993
Action: Leak Reported

Global Id: T0605901674
Action Type: REMEDIATION
Date: 11/18/1993
Action: Soil Vapor Extraction (SVE)

ARCO #6110 (Continued) **S102424305**

Global Id: T0605901674
Action Type: REMEDIATION
Date: 05/10/2006
Action: Soil Vapor Extraction (SVE)

Global Id: T0605901674
Action Type: RESPONSE
Date: 11/14/2003
Action: Soil and Water Investigation Report

Global Id: T0605901674
Action Type: RESPONSE
Date: 09/01/2003
Action: Other Workplan

Global Id: T0605901674
Action Type: RESPONSE
Date: 04/20/2004
Action: Soil and Water Investigation Workplan

Global Id: T0605901674
Action Type: RESPONSE
Date: 10/15/2004
Action: Other Workplan

Global Id: T0605901674
Action Type: RESPONSE
Date: 07/29/2005
Action: CAP/RAP - Feasibility Study Report

Global Id: T0605901674
Action Type: RESPONSE
Date: 06/26/2006
Action: CAP/RAP - Feasibility Study Report

Global Id: T0605901674
Action Type: RESPONSE
Date: 04/07/2003
Action: Soil and Water Investigation Workplan

Global Id: T0605901674
Action Type: RESPONSE
Date: 02/10/2005
Action: Soil and Water Investigation Report

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 10/19/2004
Action: Staff Letter

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 06/24/2005
Action: Staff Letter

Global Id: T0605901674
Action Type: ENFORCEMENT

ARCO #6110 (Continued) **S102424305**

Date: 08/23/2006
Action: Staff Letter

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 09/27/2004
Action: Staff Letter - #1

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 04/24/2007
Action: * NEL - #2

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 09/27/2004
Action: Staff Letter - #2

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 03/16/2004
Action: Staff Letter

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 04/24/2007
Action: * NEL - #1

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 08/01/2003
Action: Staff Letter

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 04/07/2006
Action: Staff Letter - #2

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 03/04/2003
Action: Staff Letter

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 04/07/2006
Action: Staff Letter - #1

Global Id: T0605901674
Action Type: ENFORCEMENT
Date: 06/22/2007
Action: Closure/No Further Action Letter

Global Id: T0605901674
Action Type: Other
Date: 11/25/1992
Action: Leak Discovery

ARCO #6110 (Continued) **S102424305**

ORANGE CO. LUST:

Region:	ORANGE
Facility Id:	93UT041
Released Substance:	Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed:	06/22/2007
Record ID:	RO0001946

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Pollution Characterization
Case Number:	083002300T
Local Case Num:	93UT041
Case Type:	Other ground water affected
Substance:	Gasoline
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	SEL
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	New Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605901674
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	11/25/1992
Enforcement Date:	Not reported
Close Date:	Not reported
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	3/4/2003
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	=
Soil Qualifies:	=
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9044233
Longitude:	-117.8420766
MTBE Date:	12/6/2001
Max MTBE GW:	50
MTBE Concentration:	0
Max MTBE Soil:	510
MTBE Fuel:	1
MTBE Tested:	MTBE Detected. Site tested for MTBE & MTBE detected
MTBE Class:	*
Staff:	VJJ
Staff Initials:	SK

ARCO #6110 (Continued) **S102424305**

Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	GWR
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

K55 **GSF ENERGY LLC** **SWF/LF** **1000111972**
North **1942 VALENCIA AVE** **AST** **CAD981395742**
1/4-1/2 **BREA, CA 92821** **SWEEPS UST**
0.488 mi. **CA FID UST**
2574 ft. **Site 1 of 2 in cluster K** **RCRA NonGen / NLR**
EMI
Relative: **Higher** **Financial Assurance**
WDS

Actual: **730 ft.**

SWF/LF (SWIS):

Region:	STATE
Facility ID:	30-AB-0035
Lat/Long:	33.934 / -117.841
Owner Name:	OC Waste and Recycling
Owner Telephone:	7148344000
Owner Address:	Not reported
Owner Address2:	300 N Flower Street, Suite 400
Owner City,St,Zip:	Santa Ana, CA 92703
Operational Status:	Active
Operator:	OC Waste and Recycling
Operator Phone:	7148344000
Operator Address:	Not reported
Operator Address2:	300 N Flower Street, Suite 400
Operator City,St,Zip:	Santa Ana, CA 92703
Permit Date:	06/08/2015
Permit Status:	Permitted
Permitted Acreage:	$565.00
Activity:	Solid Waste Landfill
Regulation Status:	Permitted
Landuse Name:	Open Space - Irrigated,Industrial
GIS Source:	Map
Category:	Disposal
Unit Number:	01
Inspection Frequency:	Monthly
Accepted Waste:	Agricultural,Construction/demolition,Industrial,Mixed municipal,Tires,Wood waste
Closure Date:	12/31/2021
Closure Type:	Estimated
Disposal Acreage:	$420.00
SWIS Num:	30-AB-0035
Waste Discharge Requirement Num:	III
Program Type:	BOE Reporting Disposal Facility,Composite_Lined _LF_Cell(s),Financial Assurance Responsibilities,PaleoDS,Remaining Capacity Landfill
Permitted Throughput with Units:	8000
Actual Throughput with Units:	Tons/day
Permitted Capacity with Units:	148800000
Remaining Capacity:	36589707
Remaining Capacity with Units:	Cubic Yards
Lat/Long:	33.934 / -117.841

GSF ENERGY LLC (Continued) **1000111972**

AST:

Certified Unified Program Agencies:	Not reported
Owner:	Brea Parent 2007, LLC
Total Gallons:	Not reported
CERSID:	10409398
Facility ID:	Not reported
Business Name:	Brea Generation LLC
Phone:	714-985-1781
Fax:	714-985-1783
Mailing Address:	1942 Valencia Ave
Mailing Address City:	Brea
Mailing Address State:	CA
Mailing Address Zip Code:	92823
Operator Name:	Brea Generation LLC
Operator Phone:	714-984-5222
Owner Phone:	201-447-9000
Owner Mail Address:	40 Shun Pike
Owner State:	RI
Owner Zip Code:	2919
Owner Country:	United States
Property Owner Name:	Not reported
Property Owner Phone:	Not reported
Property Owner Mailing Address:	Not reported
Property Owner City:	Not reported
Property Owner Stat :	Not reported
Property Owner Zip Code:	Not reported
Property Owner Country:	Not reported
EPAID:	CAL000145796

SWEEPS UST:

Status:	Active
Comp Number:	4085
Number:	9
Board Of Equalization:	Not reported
Referral Date:	09-30-92
Action Date:	09-15-92
Created Date:	02-29-88
Owner Tank Id:	Not reported
SWRCB Tank Id:	Not reported
Tank Status:	Not reported
Capacity:	Not reported
Active Date:	Not reported
Tank Use:	Not reported
STG:	Not reported
Content:	Not reported
Number Of Tanks:	Not reported

CA FID UST:

Facility ID:	30006062
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7149611555
Mail To:	Not reported
Mailing Address:	1215 W IMPERIAL HIGHWAY -

GSF ENERGY LLC (Continued) **1000111972**

Mailing Address 2: Not reported
Mailing City,St,Zip: BREA 92621
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

RCRA NonGen / NLR:
Date form received by agency: 11/21/2008
Facility name: GSF ENERGY LLC
Facility address: 1942 VALENCIA AVE
BREA, CA 92821
EPA ID: CAD981395742
Mailing address: 680 ANDERSEN DR
FOSTER PLAZA 10 5TH FL
PITTZBURGH, PA 15220
Contact: RENEE A VOYT
Contact address: 680 ANDERSEN DR FOSTER PLAZA 10 5TH FL
PITTZBURGH, PA 15220
Contact country: US
Contact telephone: 830-899-5867
Contact email: Not reported
EPA Region: 09
Land type: County
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: COUNTY OF ORANGE CALIFORNIA
Owner/operator address: 320 N FLOWER ST STE 400
SANTA ANA, CA 92703
Owner/operator country: Not reported
Owner/operator telephone: (714) 834-4050
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No

GSF ENERGY LLC (Continued) **1000111972**

Used oil transporter: No

Historical Generators:
Date form received by agency: 10/12/2000
Site name: GSF ENERGY, LLC.
Classification: Large Quantity Generator

Date form received by agency: 02/09/1998
Site name: GSF ENERGY LLC
Classification: Small Quantity Generator

Date form received by agency: 04/16/1997
Site name: GSF ENERGY LLC
Classification: Small Quantity Generator

Date form received by agency: 04/16/1997
Site name: GSF ENERGY LLC
Classification: Small Quantity Generator

Date form received by agency: 09/01/1996
Site name: GSF ENERGY LLC
Classification: Large Quantity Generator

Date form received by agency: 04/04/1996
Site name: GSF ENERGY INC. OLINDA LFG RECOVERY
Classification: Large Quantity Generator

Date form received by agency: 03/28/1994
Site name: GSF ENERGY INC.
Classification: Large Quantity Generator

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 07/08/1994
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State Contractor/Grantee

EMI:

Year:	2002
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3
Reactive Organic Gases Tons/Yr:	1
Carbon Monoxide Emissions Tons/Yr:	7
NOX - Oxides of Nitrogen Tons/Yr:	25
SOX - Oxides of Sulphur Tons/Yr:	6
Particulate Matter Tons/Yr:	10
Part. Matter 10 Micrometers and Smllr Tons/Yr:	10

GSF ENERGY LLC (Continued) **1000111972**

Year:	2003
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3
Reactive Organic Gases Tons/Yr:	1
Carbon Monoxide Emissions Tons/Yr:	7
NOX - Oxides of Nitrogen Tons/Yr:	25
SOX - Oxides of Sulphur Tons/Yr:	6
Particulate Matter Tons/Yr:	10
Part. Matter 10 Micrometers and Smllr Tons/Yr:	10

Year:	2004
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Y
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.5571
Reactive Organic Gases Tons/Yr:	1.28
Carbon Monoxide Emissions Tons/Yr:	7.11154
NOX - Oxides of Nitrogen Tons/Yr:	25.19542
SOX - Oxides of Sulphur Tons/Yr:	5.903934
Particulate Matter Tons/Yr:	10.113741
Part. Matter 10 Micrometers and Smllr Tons/Yr:	10.11

Year:	2005
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1.966785
Reactive Organic Gases Tons/Yr:	1.0261172085
Carbon Monoxide Emissions Tons/Yr:	18.57336
NOX - Oxides of Nitrogen Tons/Yr:	37.4886
SOX - Oxides of Sulphur Tons/Yr:	9.82984
Particulate Matter Tons/Yr:	7.15445
Part. Matter 10 Micrometers and Smllr Tons/Yr:	7.15369961

Year:	2006
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953

GSF ENERGY LLC (Continued) **1000111972**

Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	12.27828669308601622
Reactive Organic Gases Tons/Yr:	5.921
Carbon Monoxide Emissions Tons/Yr:	72.597
NOX - Oxides of Nitrogen Tons/Yr:	50.177
SOX - Oxides of Sulphur Tons/Yr:	13.185
Particulate Matter Tons/Yr:	16.13
Part. Matter 10 Micrometers and Smllr Tons/Yr:	16.13

Year:	2007
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	12.26525714338056060
Reactive Organic Gases Tons/Yr:	5.921
Carbon Monoxide Emissions Tons/Yr:	72.597
NOX - Oxides of Nitrogen Tons/Yr:	50.177
SOX - Oxides of Sulphur Tons/Yr:	13.185
Particulate Matter Tons/Yr:	16.13
Part. Matter 10 Micrometers and Smllr Tons/Yr:	16.13

Year:	2008
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	9511
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	10.02050375844235935
Reactive Organic Gases Tons/Yr:	4.83203591
Carbon Monoxide Emissions Tons/Yr:	24.383923
NOX - Oxides of Nitrogen Tons/Yr:	30.656375
SOX - Oxides of Sulphur Tons/Yr:	7.58438925
Particulate Matter Tons/Yr:	3.654979
Part. Matter 10 Micrometers and Smllr Tons/Yr:	3.6549765625

Year:	2012
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	9511
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	5.355117831
Reactive Organic Gases Tons/Yr:	2.61539
Carbon Monoxide Emissions Tons/Yr:	58.72617

GSF ENERGY LLC (Continued) **1000111972**

NOX - Oxides of Nitrogen Tons/Yr:	39.08823
SOX - Oxides of Sulphur Tons/Yr:	11.7189021
Particulate Matter Tons/Yr:	5.77242
Part. Matter 10 Micrometers and Smllr Tons/Yr:	5.77165782

Year:	2013
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.1232228267
Reactive Organic Gases Tons/Yr:	1.08091
Carbon Monoxide Emissions Tons/Yr:	11.47826
NOX - Oxides of Nitrogen Tons/Yr:	8.50272
SOX - Oxides of Sulphur Tons/Yr:	1.980510525
Particulate Matter Tons/Yr:	2.24877
Part. Matter 10 Micrometers and Smllr Tons/Yr:	2.24743956

Year:	2014
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	4953
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0.43171284256
Reactive Organic Gases Tons/Yr:	0.2765
Carbon Monoxide Emissions Tons/Yr:	3.50546
NOX - Oxides of Nitrogen Tons/Yr:	3.07282
SOX - Oxides of Sulphur Tons/Yr:	0.61001
Particulate Matter Tons/Yr:	0.67673
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.67554584

CA Financial Assurance 2:

Region:	2
SWIS_NO:	30-AB-0035
Closure Approved:	Yes
Closure Inf Coverage Date:	09/01/2014
Closure Plan Coverage:	$37,791,002.00
Closure Plan Date:	12/01/2014
PostClose Approved:	Yes
PostClose Adequacy Date:	12/01/2014
PostClose Inf Coverage:	$61,171,448.00
PostClose Inf Coverage Date:	09/01/2014
CorActCoverage:	$1,162,667.00
CorActApproved:	Yes
CorAct Mec Adequacy Date:	Not reported
CorAct Inf Coverage:	$1,442,469.00
CorActPlanCoverage:	$1,274,511.00
CorAct Plan Date:	12/18/2007
Lia Coverage:	$1,000,000.00

GSF ENERGY LLC (Continued) **1000111972**

Lia Approved:	Yes
Review:	05/01/2015
Closure Mechanism A:	ENTERPRISE FUND
Closure Mechanism B:	Not reported
Closure Coverage:	$37,439,412.00
Closure Adequacy:	Not reported
Closure Inflation Estimate:	$46,449,414.00
Post Closure Mechanism A:	PLEDGE OF REVENUE
Post Closure Established A:	04/06/1992
Post Closure Mechanism B:	Not reported
Post Closure Coverate:	$61,171,448.00
Post Closure Adequacy:	Not reported
Corrective Action Extablished A:	10/19/2004
Corrective Actiont Coverage:	$1,162,667.00
Corrective Action Approved:	Yes
Corrective Action Inflation Estimate:	$1,442,469.00
Corrective Action Inflationdate:	05/06/2014
Corrective Action Plan Estimate:	$1,274,511.00
Liability Mechanism A:	SELF-INS. & RISK MANAGEMENT
Liability Established A:	10/26/2007
Liability Mechanism B:	Not reported
CostAnniversary:	09/01/2014
ClosureEstablishedA:	11/20/1995
ClosureEstablishedB:	Not reported
ClosureDisbursement:	0
PostClosureEstablishedB:	Not reported
PostClosureDisbursement:	0
CorrectiveActionMechanismA:	ENTERPRISE FUND
CorrectiveActionMechanismB:	Not reported
CorrectiveActionExtablishedB:	Not reported
CorrectiveActiontDisbursement:	0
LiabilityEstabllishedB:	Not reported
LiabilityAdequacy:	Not reported
Contact:	County of Orange Integ Waste Mgt Dept

WDS:

Facility ID:	Santa Ana River 30I005259
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	8
Facility Telephone:	Not reported
Facility Contact:	Not reported
Agency Name:	ORANGE CO. IWMD
Agency Address:	320 N. FLOWER SUITE 400
Agency City,St,Zip:	SANTA ANA 92703
Agency Contact:	KEVIN KONDRU
Agency Telephone:	9098344114
Agency Type:	County
SIC Code:	0

GSF ENERGY LLC (Continued) **1000111972**

SIC Code 2:	Not reported
Primary Waste Type:	Not reported
Primary Waste:	Not reported
Waste Type2:	Not reported
Waste2:	Not reported
Primary Waste Type:	Not reported
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Not reported
POTW:	Not reported
Treat To Water:	Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

K56 **COUNTY OF ORANGE, IWMD OLINDA** **SWF/LF** **S106920677**
North **1942 NORTH VALENCIA AVENUE** **CHMIRS** **N/A**
1/4-1/2 **BREA, CA 92823-6807, CA 92823** **LDS**
0.488 mi. **EMI**
2574 ft. **Site 2 of 2 in cluster K** **ENF**

Relative: Higher

Actual: 730 ft.

LOS ANGELES CO. LF:

Site ID:	585
Alt. Address:	Not reported
Site Contact:	Not reported
Site Contact Phone:	(714) 834-4000
Site Email:	Not reported
Site Website:	Not reported
Site Type:	Out-of-County Facility
Site SWIS Number:	30-AB-0035
Beginning Operation Date:	Not reported
Ending Operation Date:	Not reported
Local Enforcement Agency:	Not reported
Maximun Depth Fill(Ft):	Not reported
Permitted Capacity:	Not reported
Present Use:	Not reported
Remaining Capacity(Million):	Not reported
Status:	Active
Waste Accepted:	Agricultural;Construction & Demolition;Household Trash;Industrial Non-Hazardous;Tires;
Hours of Operation:	Not reported
Disposal Area (Acre):	Not reported

Detail As Of 01/2014:

Operator Name:	County of Orange Integrated Waste Mgt. Dept.
Operator Address:	320 N Flower Street; Suite 400
Operator City/State/Zip:	Santa Ana, CA 92703
Operator Contact:	Not reported
Operator Telephone:	(714) 834-4000

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Operator Email:	Not reported
Owner Name:	Unknown
Owner Address:	Not reported
Owner City/State/Zip:	Not reported
Owner Contact:	Not reported
Owner Telephone:	Not reported
Owner Email:	Not reported

CHMIRS:

OES Incident Number:	13-3479
OES notification:	06/08/2013
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Other
Cleanup By:	Unknown
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Unknown
Other:	Not reported
Date/Time:	700
Year:	2013
Agency:	Brea Olinda Landfill
Incident Date:	6/8/2013
Admin Agency:	Brea Fire Department
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Trash Truck loaded with waste

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Quantity Released:	Unknown
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	Caller states a trash truck set the alarm off at See Booth. Dose Meter reading at surface is 220. Identity is 58% Medical 1-131, 55% Natural Th-232. Caller states the truck has been isolated
OES Incident Number:	1-0133
OES notification:	01/08/2011
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Utilities/Substation
Cleanup By:	Unknown
Containment:	Not reported
What Happened:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Type:	Not reported
Measure:	Unknown
Other:	Not reported
Date/Time:	1050
Year:	2011
Agency:	Brea Land Fill
Incident Date:	1/8/2011
Admin Agency:	Brea Fire Department
Amount:	Not reported
Contained:	Unknown
Site Type:	Not reported
E Date:	Not reported
Substance:	Radioactive Material
Quantity Released:	UNK
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	Caller states that while a customer was dropping off garbage, the radiological alarm had gone off. I-131. Reading is 2.745 m-rems
OES Incident Number:	10-5326
OES notification:	09/04/2010
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Merchant/Business,Other
Cleanup By:	Unknown
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Unknown
Other:	Not reported
Date/Time:	1335
Year:	2010
Agency:	Orange Co Waste Recycling
Incident Date:	9/4/2010
Admin Agency:	Not reported
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Radiation Alarm Sounding
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	Caller states a truck with medical waste has set-off the radiation alarm at there waste disposal site. Caller states detector shows a reading of 3.720 Mili-rem at the source and a reading of 0.310 Mili-rem at 1 foot from the source and a reading of 0.095 Mili-rem at 3 feet from the source. Caller states the truck has been isolated.
OES Incident Number:	10-1446
OES notification:	02/27/2010
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Other
Cleanup By:	None
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Unknown
Other:	Not reported
Date/Time:	1010
Year:	2010
Agency:	Brea Landfill
Incident Date:	2/27/2010
Admin Agency:	Brea Fire Department
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Unknown Waste
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Description:	Caller is reporting that there is radiological detection on a truck possibly carrying medical waste. The detection monitor states that it is 92% positive for Medical Waste (I-131). The reading right next to the truck is reading 0.550 microrems.
OES Incident Number:	4-5480
OES notification:	09/27/2014
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	None
Spill Site:	Other
Cleanup By:	No
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Type:	RADIOLOGICAL
Measure:	N/A
Other:	Not reported
Date/Time:	1047
Year:	2014
Agency:	Ops Center of Ground Central Recycling
Incident Date:	9/27/2014
Admin Agency:	Not reported
Amount:	Not reported
Contained:	Yes
Site Type:	None
E Date:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Substance:	Iodine 131,
Quantity Released:	Unknown
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	No
#2 Pipeline:	No
#3 Pipeline:	No
#1 Vessel >= 300 Tons:	No
#2 Vessel >= 300 Tons:	No
#3 Vessel >= 300 Tons:	No
Evacs:	No
Injuries:	Not reported
Fatals:	No
Comments:	Not reported
Description:	Caller states received a phone call from a driver stating he was detained at a landfill for a detected radiological reading. The truck is being held at the landfill until Kathleen Harkness of California Radiological Health Branch (714-524-1816) can provide the needed clearance paperwork. No clean-up will be needed and no waterways were impacted.
OES Incident Number:	1-4936
OES notification:	08/19/2011
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Waterway:	Not reported
Spill Site:	Other
Cleanup By:	Responsible Party
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	N/A
Other:	Not reported
Date/Time:	1030
Year:	2011
Agency:	County of Orange
Incident Date:	8/19/2011
Admin Agency:	Brea Fire Department
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Radiological Alarm
Quantity Released:	unknown
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	A truck delivering waste for disposal set off a radiological alarm when entering the facility. The Monitor reading is very low at 0860 mRem per hour and identifies it as I131 medical material. The waste is contained in the truck which has been isolated.

LDS:

Global Id:	L10004560081
Latitude:	33.934
Longitude:	-117.841
Case Type:	Land Disposal Site
Status:	Open - Operating
Status Date:	11/01/2014
Lead Agency:	SANTA ANA RWQCB (REGION 8)
Caseworker:	KDP
Local Agency:	Not reported
RB Case Number:	8 300302003
LOC Case Number:	Not reported
File Location:	Regional Board
Potential Media Affect:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

EDR Link ID: L10004560081
Potential Contaminants of Concern: Not reported
Site History: Site Information The Olinda Alpha Landfill is located in Chino Hills in an unincorporated area of Orange County, north of the City of Brea, east of the 57 (Orange) Freeway, and immediately south of the county line separating Orange and Los Angeles Counties. The areas south and west of the site have been used for the production of crude oil. Residential structures have been constructed south of the landfill as part of a residential development. The land to the north and east of the landfill site consists of open space. The Olinda Alpha Landfill is owned by the County of Orange and operated by OC Waste & Recycling as an active Class III municipal solid waste landfill. The Olinda Alpha Landfill consists of three adjacent (contiguous) waste management units: (i) the Olinda unit to the west, (ii) the Olinda Alpha unit to the east, and (iii) the central ridge unit, which links the Olinda and Olinda Alpha units. OC Waste & Recycling has been disposing waste in the Olinda unit, the Olinda Alpha unit, and the central ridge unit since 1960, 1981, and 1998, respectively. Only municipal non-hazardous solid wastes are accepted at the landfill, and the disposal of liquid wastes and hazardous wastes is prohibited. OC Waste & Recycling received revised Waste Discharge Requirements (WDRs) on 29 January 2010, which approves the lateral and vertical expansion of the Olinda Alpha Landfill and extends the planned closure date to approximately 2021. The Olinda and Olinda Alpha units are not equipped with engineered artificial liners or leachate collection and removal systems (LCRS) because these two units were constructed prior to liner requirements. On 6 June 1997, the CRWQCB adopted Order No. 97-55 to waive the composite liner requirements and to approve an alternative liner for the central ridge unit. Refuse disposal in the central ridge unit was initiated on 29 June 1998, following the installation of an LCRS in this unit. On 29 January 2010, the CRWQCB adopted Order R8-2010-0006 to waive the composite liner requirements for the 33-acre expansion area northeast of the Olinda Alpha unit. Refuse disposal in the expansion area is planned in the next few years. An active landfill gas collection and control system has been installed at the Olinda Alpha Landfill and is regularly expanded as additional refuse is disposed. Landfill gas collection and recovery operations and system maintenance are conducted by Broadrock Renewable. A portion of the landfill gas collected at the site is used to generate electrical power, and the remaining landfill gas is combusted on-site in flares. Hydrologic and Hydrogeologic Conditions The Olinda Alpha Landfill does not overlie a major groundwater basin identified by the California Department of Water Resources (CDWR) [1967], but it is part of the watershed tributary to the La Habra-Yorba Linda Groundwater Basin, which is located south of the Whittier Fault Zone. There are no known beneficial uses of the low-yield groundwater underlying the landfill site [CDWR, 1976 and CRWQCB, 2010]. A total of 28 groundwater monitoring wells and 22 groundwater extraction wells are currently installed at the Olinda Alpha Landfill and at adjacent properties. These groundwater wells were installed as part of the Solid Waste Assessment Test (SWAT) program, previous hydrogeologic investigations, and the construction of a groundwater remediation system. The groundwater monitoring wells are used for groundwater depth measurement and sampling purposes. The groundwater extraction wells are used for groundwater recovery purposes as part of the corrective action program at the site. The locations of the

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

groundwater monitoring and extraction wells are shown in. Previous geological investigations conducted at the site indicate that the mapped trace(s) of the Whittier Fault Zone intercept(s) the southwest portion of the site. The subsurface geology of the site is marine sedimentary bedrock composed predominantly of sandstone and silty sandstone interbedded with generally thin siltstone and hard clay layers (referred to as shale) of the Puente formation. The bedding in the central portion of the landfill generally dips to the southwest at angles of 15 to 25 degrees. The bedding dip becomes nearly vertical in the south portion of the landfill. The property located south of the landfill (and also south of the Whittier Fault) has historically been used for the production of oil, and was recently developed for residential use. Tar seeps, which are likely to be naturally occurring crude oil, have been reported at the surface and in the subsurface southwest of the Whittier Fault Zone, but they have not been reported at the landfill. Therefore, it appears that the Whittier Fault Zone separates two geologic formations with different subsurface conditions. Two separate groundwater-bearing zones have been identified during previous drilling operations at the site, as follows: (i) a continuous groundwater body located below the entire site, and (ii) localized, discontinuous perched water located west of the Olinda unit and in other areas at the site above the groundwater. Due to their low yields and naturally poor groundwater quality, no beneficial use has been established for these two groundwater bodies [CDWR, I967; CRWQCB, I995aand2010]. Groundwater occurs primarily in silty sand layers within the continuous groundwater below the site. These silty sand layers are separated by clay layers above and around which groundwater flows. Slug tests conducted in groundwater monitoring wells and laboratory triaxial permeability tests performed on soil samples collected from the continuous groundwater body indicate that the hydraulic conductivity ranges from I x 10-5 centimeters per second (cm/s) in the silty sand to I x 10-8 crn!s or less in the clay material [Geosyntec, 1993a]. The groundwater flows predominantly from the perimeter ridgeline toward the pre-landfill canyons in a south-southwest direction. OC Waste & Recycling has been implementing a corrective action program at the site to extract and treat groundwater and seep water impacted by volatile organic compounds (VOCs). Groundwater is pumped from eight extraction wells located at the toe of the Olinda unit (MH -1, MW -1, and EX 1-1 through EX 1-6) and seven extraction wells located at the toe of the Olinda Alpha unit (EX2-1 through EX2-7). Perched water extraction from the seven extraction wells installed in the perched water west of the Olinda unit (MW-7A, MW-7A1, MW-7A3, MW-7A4, MW-7A5, MW-7A7, and MW-7Al0) was discontinued on 26 July 2002, following approval by the CRWQCB (CR WQCB, 2002]. Seep water encountered during the grading of the Olinda Alpha unit is also collected at the site. The extracted groundwater and collected seep water are diverted to a collection tank and treated on-site by an advanced oxidation process (AOP) utilizing ultraviolet (UV) light/ozone and an activated carbon unit. GROUNDWATER MONITORING The M&RP specifies four types of groundwater monitoring programs to be implemented at the Olinda Alpha Landfill, namely: Detection Monitoring Program (DMP): The objectives of the DMP are to monitor groundwater flow direction and velocity and evaluate potential releases from the landfill to the groundwater. Corrective Action Monitoring Program (CAP): The objective of the CAP is to monitor the efficacy of corrective action (source control and groundwater extraction) at the landfill. Groundwater Extraction

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Monitoring Program (GEP): The objective of the GEP is to monitor the quality of the extracted groundwater and collected seep water at the landfill for comparison with the quality of treated groundwater. Groundwater Treatment Monitoring Program (GTP): The objectives of the GTP are to monitor the quality of the treated groundwater/seep water and evaluate the efficacy of the treatment system at the landfill. In addition to the DMP, CAP, GEP, and GTP implemented semi-annually, M&RP R8-20 10-0006 requires the implementation of a COC testing program every five years. The objective of the COC testing program is to identify and evaluate if COC will be added to the list of semi-annual groundwater monitoring parameters. The groundwater monitoring activities conducted during this semi-annual monitoring period (from April 2011 through September 2011) at the Olinda Alpha Landfill for the DMP, CAP, GEP, and GTP consisted of: (i) semi-annual groundwater depth measurements in monitoring wells; (ii) collection of semi-annual groundwater samples from the detection monitoring wells and corrective action monitoring wells for the DMP and CAP, respectively; (iii) collection of semi-annual extracted (untreated) groundwater samples, and (untreated) seep water samples for the GEP, and semi-annual treated groundwater/seep water samples for the GTP, respectively; (iv) laboratory testing of the groundwater and seep water samples; and (v) evaluation of laboratory chemical data using statistical and nonstatistical analysis methods. A description of the groundwater monitoring procedures and results is presented below. Groundwater Monitoring Network Detection Monitoring Program The groundwater monitoring well network approved by the CRWQCB for the DMP at the Olinda Alpha Landfill consists of eight detection monitoring wells (MW-3, MW-4R, MW-5R, MW-8, MW-9, MW-18, MW-19, and MW-20) installed at the locations shown in Figure 2-3 and screened in the groundwater underlying the landfill. Groundwater Monitoring Wells MW-4R and MW-5R are located upgradient of the landfill and serve as background monitoring points for the DMP. Groundwater Monitoring Wells MW-3, MW-8, MW-9, MW-18, MW-19, and MW-20 are located downgradient or cross-gradient of the landfill and serve as compliance monitoring points for the DMP. Corrective Action Monitoring Program The groundwater monitoring well network approved by the CR WQCB for the CAP at the Olinda Alpha Landfill consists of eight groundwater monitoring wells (MW-lC, MW-lD, MW-1E, MW-1F, MW-1G, MW-2C, MW-2D, and MW-2E). The eight groundwater monitoring wells that serve as corrective action monitoring points for the CAP are screened in the groundwater underlying the landfill and are located downgradient of the groundwater extraction systems at the toe of the Olinda and Olinda Alpha units.

Click here to access the California GeoTracker records for this facility:

EMI:

Year:	2001
County Code:	30
Air Basin:	SC
Facility ID:	50418
Air District Name:	SC
SIC Code:	9511
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Y
Consolidated Emission Reporting Rule:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Total Organic Hydrocarbon Gases Tons/Yr:	1
Reactive Organic Gases Tons/Yr:	1
Carbon Monoxide Emissions Tons/Yr:	10
NOX - Oxides of Nitrogen Tons/Yr:	19
SOX - Oxides of Sulphur Tons/Yr:	3
Particulate Matter Tons/Yr:	4
Part. Matter 10 Micrometers and Smllr Tons/Yr:	2

ENF:

Region:	8
Facility Id:	258979
Agency Name:	Not reported
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	Not reported
# Of Agencies:	Not reported
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Enf Action
Design Flow:	Not reported
Threat To Water Quality:	Not reported
Complexity:	Not reported
Pretreatment:	Not reported
Facility Waste Type:	Not reported
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	Not reported
Program Category1:	Not reported
Program Category2:	LNDISP
# Of Programs:	Not reported
WDID:	Not reported
Reg Measure Id:	Not reported
Reg Measure Type:	Not reported
Region:	Not reported
Order #:	Not reported
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	Not reported
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Status:	Not reported
Status Date:	Not reported
Effective Date:	Not reported
Expiration/Review Date:	Not reported
Termination Date:	Not reported
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	Not reported
Individual/General:	Not reported
Fee Code:	Not reported
Direction/Voice:	Not reported
Enforcement Id(EID):	255042
Region:	8
Order / Resolution Number:	UNKNOWN
Enforcement Action Type:	Notice to Comply
Effective Date:	10/22/2004
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Active
Title:	Enforcement - 8 300302003
Description:	Issued NTC for drainage and erosion control violations.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0

Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	2
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LFOPER
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	373097
Reg Measure Type:	WDR
Region:	8
Order #:	R8-2010-0006
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Active
Status Date:	05/21/2014
Effective Date:	01/29/2010
Expiration/Review Date:	01/01/2020
Termination Date:	Not reported
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	1/1/2020
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	50 - Land Disposal Site paying tipping fee
Direction/Voice:	Passive
Enforcement Id(EID):	373080
Region:	8
Order / Resolution Number:	Not reported
Enforcement Action Type:	Notice to Comply
Effective Date:	01/26/2010
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	01/26/2010
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	NTC 1/26/10 for OCW&R, Olinda Alpha

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Description:	NTC issued for drainage and erosion control violations.
Program:	LFOPER
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0
Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	3
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	148819
Reg Measure Type:	WDR
Region:	8
Order #:	99-033
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	02/17/2010
Effective Date:	08/20/1999
Expiration/Review Date:	08/20/2014
Termination Date:	01/29/2010
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	12 - Non Billable Land Disposal Site
Direction/Voice:	Passive
Enforcement Id(EID):	345549
Region:	8
Order / Resolution Number:	Not reported
Enforcement Action Type:	Oral Communication
Effective Date:	09/06/2006
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	09/06/2006
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Verbal communication
Description:	Minor erosion observed on slope.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0

Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	3
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	148819
Reg Measure Type:	WDR
Region:	8
Order #:	99-033
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	02/17/2010
Effective Date:	08/20/1999
Expiration/Review Date:	08/20/2014
Termination Date:	01/29/2010
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	12 - Non Billable Land Disposal Site
Direction/Voice:	Passive
Enforcement Id(EID):	245461
Region:	8
Order / Resolution Number:	UNKNOWN
Enforcement Action Type:	Notice to Comply
Effective Date:	10/30/2002
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

EPL Issuance Date:	Not reported
Status:	Active
Title:	Enforcement - 8 300302003
Description:	NTC HAS BEEN COMPLIED WITH.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0
Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	3
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	148819
Reg Measure Type:	WDR
Region:	8
Order #:	99-033
Npdes# CA#:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	02/17/2010
Effective Date:	08/20/1999
Expiration/Review Date:	08/20/2014
Termination Date:	01/29/2010
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	12 - Non Billable Land Disposal Site
Direction/Voice:	Passive
Enforcement Id(EID):	244926
Region:	8
Order / Resolution Number:	UNKNOWN
Enforcement Action Type:	13267 Letter
Effective Date:	09/17/2002
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Active
Title:	Enforcement - 8 300302003
Description:	13267 LETTER FOR RADIOACTIVE WASTE INVESTIGATION.
Program:	LNDISP
Latest Milestone Completion Date:	1/2/2003
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0

Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	3
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	148819
Reg Measure Type:	WDR
Region:	8
Order #:	99-033
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	02/17/2010
Effective Date:	08/20/1999
Expiration/Review Date:	08/20/2014
Termination Date:	01/29/2010
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	12 - Non Billable Land Disposal Site
Direction/Voice:	Passive
Enforcement Id(EID):	236208
Region:	8
Order / Resolution Number:	UNKNOWN
Enforcement Action Type:	Staff Enforcement Letter
Effective Date:	02/28/2001
Adoption/Issuance Date:	Not reported

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Achieve Date:	3/2/2001
Termination Date:	02/28/2001
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 300302003
Description:	The discharger complied with our requirments.
Program:	LNDISP
Latest Milestone Completion Date:	3/2/2001
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0
Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382
Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	3
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	148819
Reg Measure Type:	WDR

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Region:	8
Order #:	99-033
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	02/17/2010
Effective Date:	08/20/1999
Expiration/Review Date:	08/20/2014
Termination Date:	01/29/2010
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	12 - Non Billable Land Disposal Site
Direction/Voice:	Passive
Enforcement Id(EID):	223412
Region:	8
Order / Resolution Number:	91-066
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	06/24/1991
Adoption/Issuance Date:	Not reported
Achieve Date:	4/22/1994
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 300302003
Description:	TIME SCHEDULE FOR DRAINAGE IMPROVEMENTS
Program:	LNDISP
Latest Milestone Completion Date:	4/22/1994
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0

Region:	8
Facility Id:	258979
Agency Name:	Orange Cnty Waste & Recycling
Place Type:	Waste Management Unit
Place Subtype:	Land fill
Facility Type:	Solid Waste Class III - nonhazardous solid wastes
Agency Type:	County Agency
# Of Agencies:	1
Place Latitude:	33.938382

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Place Longitude:	-117.833983
SIC Code 1:	Not reported
SIC Desc 1:	Not reported
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.0001
Threat To Water Quality:	3
Complexity:	B
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 300302003
Reg Measure Id:	148819
Reg Measure Type:	WDR
Region:	8
Order #:	99-033
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	02/17/2010
Effective Date:	08/20/1999
Expiration/Review Date:	08/20/2014
Termination Date:	01/29/2010
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	12 - Non Billable Land Disposal Site
Direction/Voice:	Passive
Enforcement Id(EID):	223180
Region:	8
Order / Resolution Number:	94-03423

COUNTY OF ORANGE, IWMD OLINDA (Continued) **S106920677**

Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	04/22/1994
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 300302003
Description:	RESCINDS CAO 91-66
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0
Initial Assessed Amount:	0
Liability $ Amount:	0
Project $ Amount:	0
Liability $ Paid:	0
Project $ Completed:	0
Total $ Paid/Completed Amount:	0

---

57 **TEXACO SERVICE STATION** **LUST** **S104576328**
SSW **3300 IMPERIAL** **HIST CORTESE** **N/A**
1/4-1/2 **BREA, CA 92621**
0.495 mi.
2616 ft.

Relative:
Lower

Actual:
391 ft.

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	Not reported
Local Case Num:	87UT042
Case Type:	Undefined
Substance:	Waste Oil
Qty Leaked:	0
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Close Tank
Leak Cause:	Unknown
Leak Source:	Unknown
Global ID:	T0605943716
How Stopped Date:	9/9/9999
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	1/1/1965
Enforcement Date:	Not reported
Close Date:	8/10/1987
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported

TEXACO SERVICE STATION (Continued) **S104576328**

Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	Not reported
Longitude:	Not reported
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	TME
Staff Initials:	AD
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083000400T

58
SSE
1/4-1/2
0.498 mi.
2631 ft.

Relative:
Lower

Actual:
408 ft.

SUNSET TROPICALS INC
3811 PROSPECT AVE
YORBA LINDA, CA 92886

ENVIROSTOR **U001578025**
UST **N/A**
VCP
HIST UST
DEED
Orange Co. Industrial Site

ENVIROSTOR:

Facility ID:	60001999
Status:	Active
Status Date:	04/16/2014
Site Code:	401667
Site Type:	Voluntary Cleanup
Site Type Detailed:	Voluntary Cleanup
Acres:	10.5
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Folashade Simpson
Supervisor:	Javier Hinojosa
Division Branch:	Cleanup Chatsworth
Assembly:	55
Senate:	29
Special Program:	Voluntary Cleanup Program

SUNSET TROPICALS INC (Continued) **U001578025**

Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: Responsible Party
Latitude: 33.9
Longitude: -117.8
APN: 322-121-01, 322-121-02
Past Use: NONE
Potential COC: Tetrachloroethylene (PCE
Confirmed COC: Tetrachloroethylene (PCE
Potential Description: SV
Alias Name: 322-121-01
Alias Type: APN
Alias Name: 322-121-02
Alias Type: APN
Alias Name: 401667
Alias Type: Project Code (Site Code)
Alias Name: 60001999
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 07/21/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 07/21/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: California Land Reuse and Revitalization Agreement
Completed Date: 01/26/2016
Comments: City Ventures CLRRA Amendment signed by DTSC and finalized

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Consent Settlement - Administrative
Completed Date: 06/17/2016
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Voluntary Cleanup Agreement
Completed Date: 10/14/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Annual Oversight Cost Estimate
Completed Date: 09/07/2016
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported

SUNSET TROPICALS INC (Continued) **U001578025**

Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 07/31/2014
Comments: Reviewed historical phase I, II

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 07/31/2014
Comments: document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 07/31/2014
Comments: historical documents reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Tank Removal Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 07/31/2014
Comments: Historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Tank Removal Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Workplan
Completed Date: 12/25/2015
Comments: complete

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 09/23/2014
Comments: Not reported

SUNSET TROPICALS INC (Continued) **U001578025**

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 12/25/2015
Comments: complete

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: AB 389 Response Plan
Completed Date: 01/05/2016
Comments: complete

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Community Profile
Completed Date: 12/02/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Community Profile
Completed Date: 11/20/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Fact Sheets
Completed Date: 11/20/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Participation Plan / Community Relations Plan
Completed Date: 11/20/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Notice
Completed Date: 03/16/2016
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 08/06/2014
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 07/06/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: California Land Reuse and Revitalization Agreement

SUNSET TROPICALS INC (Continued) **U001578025**

Completed Date:	03/18/2014
Comments:	Final Signed CLRRA Agreement
Future Area Name:	PROJECT WIDE
Future Sub Area Name:	Not reported
Future Document Type:	Certification
Future Due Date:	2018
Future Area Name:	PROJECT WIDE
Future Sub Area Name:	Not reported
Future Document Type:	Remedial Action Completion Report
Future Due Date:	2017
Future Area Name:	PROJECT WIDE
Future Sub Area Name:	Not reported
Future Document Type:	5 Year Review Reports
Future Due Date:	2020
Schedule Area Name:	PROJECT WIDE
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Land Use Restriction
Schedule Due Date:	05/26/2017
Schedule Revised Date:	Not reported

UST:

Facility ID:	8551
Permitting Agency:	ORANGE COUNTY
Latitude:	33.905701
Longitude:	-117.837069

VCP:

Facility ID:	60001999
Site Type:	Voluntary Cleanup
Site Type Detail:	Voluntary Cleanup
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	10.5
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Folashade Simpson
Supervisor:	Javier Hinojosa
Division Branch:	Cleanup Chatsworth
Site Code:	401667
Assembly:	55
Senate:	29
Special Programs Code:	Voluntary Cleanup Program
Status:	Active
Status Date:	04/16/2014
Restricted Use:	NO
Funding:	Responsible Party
Lat/Long:	33.9 / -117.8
APN:	322-121-01, 322-121-02
Past Use:	NONE
Potential COC:	30022
Confirmed COC:	30022
Potential Description:	SV
Alias Name:	322-121-01
Alias Type:	APN

SUNSET TROPICALS INC (Continued) **U001578025**

Alias Name: 322-121-02
Alias Type: APN
Alias Name: 401667
Alias Type: Project Code (Site Code)
Alias Name: 60001999
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 07/21/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 07/21/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: California Land Reuse and Revitalization Agreement
Completed Date: 01/26/2016
Comments: City Ventures CLRRA Amendment signed by DTSC and finalized

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Consent Settlement - Administrative
Completed Date: 06/17/2016
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Voluntary Cleanup Agreement
Completed Date: 10/14/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Annual Oversight Cost Estimate
Completed Date: 09/07/2016
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 07/31/2014
Comments: Reviewed historical phase I, II

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported

SUNSET TROPICALS INC (Continued) **U001578025**

Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 07/31/2014
Comments: document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 07/31/2014
Comments: historical documents reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Tank Removal Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 07/31/2014
Comments: Historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Tank Removal Report
Completed Date: 07/31/2014
Comments: historical document reviewed

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Workplan
Completed Date: 12/25/2015
Comments: complete

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 09/23/2014
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Characterization Report
Completed Date: 12/25/2015
Comments: complete

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: AB 389 Response Plan
Completed Date: 01/05/2016
Comments: complete

SUNSET TROPICALS INC (Continued) **U001578025**

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Community Profile
Completed Date: 12/02/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Community Profile
Completed Date: 11/20/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Fact Sheets
Completed Date: 11/20/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Participation Plan / Community Relations Plan
Completed Date: 11/20/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Notice
Completed Date: 03/16/2016
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 08/06/2014
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 07/06/2015
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: California Land Reuse and Revitalization Agreement
Completed Date: 03/18/2014
Comments: Final Signed CLRRA Agreement

Future Area Name: PROJECT WIDE
Future Sub Area Name: Not reported
Future Document Type: Certification
Future Due Date: 2018
Future Area Name: PROJECT WIDE
Future Sub Area Name: Not reported
Future Document Type: Remedial Action Completion Report
Future Due Date: 2017
Future Area Name: PROJECT WIDE

SUNSET TROPICALS INC (Continued) **U001578025**

Future Sub Area Name: Not reported
Future Document Type: 5 Year Review Reports
Future Due Date: 2020
Schedule Area Name: PROJECT WIDE
Schedule Sub Area Name: Not reported
Schedule Document Type: Land Use Restriction
Schedule Due Date: 05/26/2017
Schedule Revised Date: Not reported

HIST UST:
File Number: 0002EEA8
URL: http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002EEA8.pdf
Region: STATE
Facility ID: 00000031308
Facility Type: Other
Other Type: FARM
Contact Name: Not reported
Telephone: 7145288060
Owner Name: SUNSET TROPICALS INC.
Owner Address: 3811 PROSPECT AVE.
Owner City,St,Zip: YORBA LINDA, CA 92686
Total Tanks: 0001

Tank Num: 001
Container Num: I
Year Installed: 1978
Tank Capacity: 00003000
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Container Construction Thickness: Not reported
Leak Detection: Visual

Click here for Geo Tracker PDF:

DEED:
Envirostor ID: 60001999
Area: PROJECT WIDE
Sub Area: Not reported
Site Type: VOLUNTARY CLEANUP
Status: ACTIVE
Agency: Not reported
Covenant Uploaded: Not reported
Deed Date(s): 12/21/2016

Orange Co. Industrial Site:
Case ID: 08IC024
Record ID: RO0003497
Current Status: CLOSED 2/3/2016
Closure Type: Closure certification issued
Released Chemical: PERCHLOROETHYLENE; TRICHLOROETHYLENE

59
SSE
1/2-1
0.661 mi.
3489 ft.

BALI OIL CO.
SOUTHWEST OF PROSPECT AND IMPERIAL HWY.
YORBA LINDA, CA 92686

ENVIROSTOR **S101481405**
N/A

Relative:
Lower

Actual:
392 ft.

ENVIROSTOR:

Facility ID:	30130106
Status:	Refer: Other Agency
Status Date:	06/04/1982
Site Code:	Not reported
Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	0
NPL:	NO
Regulatory Agencies:	NONE SPECIFIED
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	Referred - Not Assigned
Division Branch:	Cleanup Cypress
Assembly:	55
Senate:	29
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not reported
Latitude:	33.90194
Longitude:	-117.8375
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	* CONTAMINATED SOIL * UNSPECIFIED OIL CONTAINING WASTE
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	30130106
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	* Discovery
Completed Date:	09/23/1981
Comments:	FACILITY IDENTIFIED I'D FROM EMA RECORD SEARCH.-1967. REPORT REVEALED SUMP AND WASTEWATER TANK
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	02/03/2012
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

60
SW
1/2-1
0.813 mi.
4291 ft.

UNION CHEMICALS DIV UNION OIL CO
2601 E IMPERIAL HWY
BREA, CA 92821

RCRA-SQG **1000166471**
SWEEPS UST **CAD073596124**
CA FID UST
EMI
HWP

Relative:
Lower

Actual:
374 ft.

RCRA-SQG:

Date form received by agency:	09/01/1996
Facility name:	UNION CHEMICALS DIV UNION OIL CO
Facility address:	2601 E IMPERIAL HWY BREA, CA 92821
EPA ID:	CAD073596124
Mailing address:	P O BOX 1280 BREA, CA 92621
Contact:	Not reported
Contact address:	Not reported Not reported
Contact country:	US
Contact telephone:	Not reported
Contact email:	Not reported
EPA Region:	09
Land type:	Facility is not located on Indian land. Additional information is not known.
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	UNION OIL COMPANY OF CALIFORNIA CHEM DIV
Owner/operator address:	PO BOX 1280 CITY NOT REPORTED, CA 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(714) 529-2151
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Owner/operator name:	UNION OIL COMPANY OF CALIFORNIA CHEM DIV
Owner/operator address:	PO BOX 1280 BREA, CA 92621
Owner/operator country:	Not reported
Owner/operator telephone:	(714) 529-2151
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No

UNION CHEMICALS DIV UNION OIL CO (Continued) **1000166471**

Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 02/24/1992
Site name: UNOCAL CHEM. & MIN. DIV.
Classification: Large Quantity Generator

Date form received by agency: 03/26/1990
Site name: UNION CHEMICALS DIVISION BREA PLANT
Classification: Large Quantity Generator

Date form received by agency: 08/18/1980
Site name: UNION CHEMICALS DIV UNION OIL CO
Classification: Large Quantity Generator

Facility Has Received Notices of Violations:
Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 03/11/1991
Date achieved compliance: 06/28/1994
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 11/27/1984
Date achieved compliance: 03/28/1985
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: F - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 08/03/1983
Date achieved compliance: 04/30/1984
Violation lead agency: State

UNION CHEMICALS DIV UNION OIL CO (Continued) **1000166471**

Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 06/28/1994
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 03/11/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 06/28/1994
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 03/28/1985
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/28/1985
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/12/1985
Evaluation: GROUNDWATER MONITORING EVALUATION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 11/27/1984
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 03/28/1985
Evaluation lead agency: EPA

Evaluation date: 11/27/1984
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 08/03/1983
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/30/1984
Evaluation lead agency: State

UNION CHEMICALS DIV UNION OIL CO (Continued) **1000166471**

Evaluation date: 04/20/1983
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

SWEEPS UST:
Status: Active
Comp Number: 4676
Number: 9
Board Of Equalization: 44-016241
Referral Date: 09-30-92
Action Date: 04-03-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-004676-000009
Tank Status: A
Capacity: 1000
Active Date: Not reported
Tank Use: M.V. FUEL
STG: P
Content: DIESEL
Number Of Tanks: 2

Status: Active
Comp Number: 4676
Number: 9
Board Of Equalization: 44-016241
Referral Date: 09-30-92
Action Date: 04-03-92
Created Date: 02-29-88
Owner Tank Id: Not reported
SWRCB Tank Id: 30-000-004676-000010
Tank Status: A
Capacity: 2000
Active Date: Not reported
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: Not reported

CA FID UST:
Facility ID: 30001295
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7145292151
Mail To: Not reported
Mailing Address: 2601 E IMPERIAL
Mailing Address 2: Not reported
Mailing City,St,Zip: BREA 92621
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported

UNION CHEMICALS DIV UNION OIL CO (Continued) **1000166471**

Comments: Not reported
Status: Active

EMI:

Year:	1987
County Code:	30
Air Basin:	SC
Facility ID:	800142
Air District Name:	SC
SIC Code:	2869
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	84
Reactive Organic Gases Tons/Yr:	71
Carbon Monoxide Emissions Tons/Yr:	314
NOX - Oxides of Nitrogen Tons/Yr:	326
SOX - Oxides of Sulphur Tons/Yr:	3
Particulate Matter Tons/Yr:	39
Part. Matter 10 Micrometers and Smllr Tons/Yr:	35

Year:	1990
County Code:	30
Air Basin:	SC
Facility ID:	800142
Air District Name:	SC
SIC Code:	2869
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2
Reactive Organic Gases Tons/Yr:	1
Carbon Monoxide Emissions Tons/Yr:	161
NOX - Oxides of Nitrogen Tons/Yr:	48
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	39
Part. Matter 10 Micrometers and Smllr Tons/Yr:	35

HWP:

EPA Id:	CAD073596124
Cleanup Status:	CLOSED
Latitude:	33.91077
Longitude:	-117.8666
Facility Type:	Historical - Non-Operating
Facility Size:	Not reported
Team:	Not reported
Supervisor:	Not reported
Site Code:	Not reported
Assembly District:	55
Senate District:	29
Public Information Officer:	Not reported
Public Information Officer:	Not reported

Closure:

EPA Id:	CAD073596124
Facility Type:	Historical - Non-Operating
Unit Names:	CONTAIN1

UNION CHEMICALS DIV UNION OIL CO (Continued) **1000166471**

Event Description: Closure Administrative - ISSUE CLOSURE VERIFICATION
Actual Date: 01/26/2016

61
SW
1/2-1
0.821 mi.
4334 ft.

DIRECT FOTO **ENVIROSTOR** **S110493785**
2903 SATURN STREET #H **N/A**
BREA, CA 92621

Relative:
Lower

Actual:
368 ft.

ENVIROSTOR:
Facility ID: 71003343
Status: Refer: Local Agency
Status Date: 05/19/2015
Site Code: Not reported
Site Type: Tiered Permit
Site Type Detailed: Tiered Permit
Acres: 1
NPL: NO
Regulatory Agencies: NONE SPECIFIED
Lead Agency: NONE SPECIFIED
Program Manager: Not reported
Supervisor: Robert Senga
Division Branch: Cleanup Cypress
Assembly: Not reported
Senate: Not reported
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: Not reported
Latitude: 0
Longitude: 0
APN: NONE SPECIFIED
Past Use: NONE SPECIFIED
Potential COC: NONE SPECIFIED
Confirmed COC: NONE SPECIFIED
Potential Description: NONE SPECIFIED
Alias Name: CAL000130109
Alias Type: EPA Identification Number
Alias Name: 71003343
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: Not reported
Completed Sub Area Name: Not reported
Completed Document Type: Not reported
Completed Date: Not reported
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

62
SE
1/2-1
0.884 mi.
4667 ft.

VISTA DEL VERDE ELEMENTARY SCHOOL
VALLEY VIEW/BROOKLYN AVENUE
YORBA LINDA, CA 92886

ENVIROSTOR
SCH

S105628702
N/A

Relative:
Lower

Actual:
443 ft.

ENVIROSTOR:

Facility ID:	30130182
Status:	No Further Action
Status Date:	10/04/2002
Site Code:	404213
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	10
NPL:	NO
Regulatory Agencies:	DTSC
Lead Agency:	DTSC
Program Manager:	Not reported
Supervisor:	Juan Koponen
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	55
Senate:	29
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.9039
Longitude:	-117.8268
APN:	NONE SPECIFIED
Past Use:	* OIL & GAS EXTRACTION
Potential COC:	Lead Methane PCBs (unspeciated mixture, low risk, e.g. Aroclor 1016 Polynuclear aromatic hydrocarbons (PAHs
Confirmed COC:	30469-NO 30472-NO 30013-NO 30015-NO
Potential Description:	SOIL
Alias Name:	PLACENTIA-YORBA LINDA UNIFIED SCH. DIST.
Alias Type:	Alternate Name
Alias Name:	PLACENTIA-YORBA LINDA USD-VSTA DL VRDE
Alias Type:	Alternate Name
Alias Name:	VISTA DEL VERDE ELEMENTARY SCHOOL
Alias Type:	Alternate Name
Alias Name:	404213
Alias Type:	Project Code (Site Code)
Alias Name:	30130182
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Inspections/Visit (Non LUR)
Completed Date:	06/26/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	10/30/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported

VISTA DEL VERDE ELEMENTARY SCHOOL (Continued) **S105628702**

Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 09/04/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 10/04/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Report
Completed Date: 05/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 10/22/2001
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 05/24/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 10/22/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Public Participation
Completed Date: 09/24/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 06/05/2001
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

VISTA DEL VERDE ELEMENTARY SCHOOL (Continued) **S105628702**

SCH:

Facility ID:	30130182
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	10
National Priorities List:	NO
Cleanup Oversight Agencies:	DTSC
Lead Agency:	DTSC
Lead Agency Description:	* DTSC
Project Manager:	Not reported
Supervisor:	Juan Koponen
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404213
Assembly:	55
Senate:	29
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	10/04/2002
Restricted Use:	NO
Funding:	School District
Latitude:	33.9039
Longitude:	-117.8268
APN:	NONE SPECIFIED
Past Use:	* OIL & GAS EXTRACTION
Potential COC:	Lead, Methane, PCBs (unspeciated mixture, low risk, e.g. Aroclor 1016, Polynuclear aromatic hydrocarbons (PAHs
Confirmed COC:	30469-NO, 30472-NO, 30013-NO, 30015-NO
Potential Description:	SOIL
Alias Name:	PLACENTIA-YORBA LINDA UNIFIED SCH. DIST.
Alias Type:	Alternate Name
Alias Name:	PLACENTIA-YORBA LINDA USD-VSTA DL VRDE
Alias Type:	Alternate Name
Alias Name:	VISTA DEL VERDE ELEMENTARY SCHOOL
Alias Type:	Alternate Name
Alias Name:	404213
Alias Type:	Project Code (Site Code)
Alias Name:	30130182
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Inspections/Visit (Non LUR)
Completed Date:	06/26/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	10/30/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report

VISTA DEL VERDE ELEMENTARY SCHOOL (Continued) **S105628702**

Completed Date: 09/04/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 10/04/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Report
Completed Date: 05/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 10/22/2001
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 05/24/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 10/22/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Public Participation
Completed Date: 09/24/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 06/05/2001
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

63
South
1/2-1
0.965 mi.
5096 ft.

PLEGEL OIL CO EMIL & RUBY PLE
4352 ROSE DR
YORBA LINDA, CA 92886

ENVIROSTOR
Orange Co. Industrial Site
FINDS
EMI

1006825542
N/A

Relative:
Lower

Actual:
363 ft.

ENVIROSTOR:

Facility ID:	30130190
Status:	Refer: 1248 Local Agency
Status Date:	08/25/2000
Site Code:	Not reported
Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	NONE SPECIFIED
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	Referred - Not Assigned
Division Branch:	Cleanup Cypress
Assembly:	55
Senate:	29
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not Applicable
Latitude:	33.89714
Longitude:	-117.8410
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	30130190
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	SB 1248 Notification
Completed Date:	08/25/2000
Comments:	DTSC is not involved with this project.
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

Orange Co. Industrial Site:

Case ID:	00IC019
Record ID:	RO0000012
Current Status:	CLOSED 2/13/2001
Closure Type:	Closure certification issued
Released Chemical:	WASTE (OR SLOP) OIL

PLEGEL OIL CO EMIL & RUBY PLE (Continued) **1006825542**

FINDS:

Registry ID: 110013845571

Environmental Interest/Information System
AIR EMISSIONS CLASSIFICATION UNKNOWN

EMI:

Year:	1997
County Code:	30
Air Basin:	SC
Facility ID:	98887
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1998
County Code:	30
Air Basin:	SC
Facility ID:	98887
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3
Reactive Organic Gases Tons/Yr:	2
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	1999
County Code:	30
Air Basin:	SC
Facility ID:	98887
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0

PLEGEL OIL CO EMIL & RUBY PLE (Continued) **1006825542**

SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2000
County Code:	30
Air Basin:	SC
Facility ID:	98887
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2001
County Code:	30
Air Basin:	SC
Facility ID:	98887
Air District Name:	SC
SIC Code:	1311
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Count: 5 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BREA	S105628697	BIRCH MIDDLE SCHOOL	BIRCH STREET/VOYAGER AVENUE	92821	ENVIROSTOR, SCH
BREA	S108985877	CITY OF BREA	N/A IMPERIAL HIGHWAY		SLIC
BREA	S106797615	NUEVO ENERGY - TENTATIVE TRACT #16	2700 E. LAMBERT ROAD	92821	ENVIROSTOR
BREA	S106174493	BREA OLINDA VENTURE PROPERTY	UNK NE VALENCIA & CARBON CANYO	92823	Orange Co. Industrial Site
YORBA LINDA	S106797610	PLEGEL OIL COMPANY;SHAY ODOM LEASE	W OF NWC OR PROSPECT AV & NIGH	92886	ENVIROSTOR

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 09/14/2016
Date Data Arrived at EDR: 10/04/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 17

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/10/2016
Date Data Arrived at EDR: 10/20/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 78

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 01/06/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 10/10/2016
Date Data Arrived at EDR: 10/20/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 78
Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 01/06/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 100
Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 100
Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 100
Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 11/18/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/15/2016
Date Data Arrived at EDR: 11/29/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 11/29/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/15/2016
Date Data Arrived at EDR: 11/29/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 11/29/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 43

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/15/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 66

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 11/15/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 37

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/25/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/13/2015
Date Data Arrived at EDR: 10/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 118
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/09/2015
Date Data Arrived at EDR: 02/12/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 112
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 12/11/2015
Date Data Arrived at EDR: 02/19/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 105
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/05/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 35
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/24/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 02/17/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases

Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 40

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 12/15/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 12/22/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 01/26/2016
Date Data Arrived at EDR: 02/05/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 119
Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 12/03/2015
Date Data Arrived at EDR: 02/04/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 120
Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67
Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/05/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 35

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/24/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/25/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 12/27/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 02/29/2016
Date Data Arrived at EDR: 03/07/2016
Date Made Active in Reports: 05/04/2016
Number of Days to Update: 58

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 01/04/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 09/20/2016
Date Data Arrived at EDR: 09/21/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 51

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 12/20/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 08/25/2016
Date Data Arrived at EDR: 08/26/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 49

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 11/11/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/31/2016
Next Scheduled EDR Contact: 02/13/2017
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 08/31/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 17
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/29/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21
Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 08/31/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 34
Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27
Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 17
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/29/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 12/01/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 35

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 11/28/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 48

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 01/24/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 45

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 37

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 83

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 01/25/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 37

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 37

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/08/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 10/11/2016
Date Data Arrived at EDR: 11/16/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 11/11/2016
Next Scheduled EDR Contact: 02/20/2017
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/23/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 133
Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 11/22/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77
Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74
Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2016
Date Data Arrived at EDR: 08/22/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 81
Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35
Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 11/07/2016
Next Scheduled EDR Contact: 02/20/2017
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2016
Date Data Arrived at EDR: 04/28/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 127
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/27/2016
Date Data Arrived at EDR: 08/05/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 77
Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 11/17/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 11/17/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 01/29/2016
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/03/2016
Date Data Arrived at EDR: 10/05/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 16
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/06/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/01/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 77

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 11/23/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/21/2016
Date Data Arrived at EDR: 07/26/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 59

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/09/2016
Next Scheduled EDR Contact: 12/05/2016
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 04/07/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 148

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/22/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/22/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/05/2016
Date Data Arrived at EDR: 09/01/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 22

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 12/01/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 12/12/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Varies

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/15/2016
Date Data Arrived at EDR: 09/07/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 65

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/03/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 91

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 11/28/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 67

Source: Department of Defense
Telephone: 571-373-0407
Last EDR Contact: 01/20/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 09/27/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 52

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 12/28/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/27/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 79

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 09/23/2016
Date Made Active in Reports: 10/24/2016
Number of Days to Update: 31

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 12/23/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/09/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 40

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 04/25/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/21/2016
Number of Days to Update: 53

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 63

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 11/11/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 64

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 11/22/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/22/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 64

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/11/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 09/06/2016
Date Data Arrived at EDR: 09/07/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 37

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/16/2016
Date Data Arrived at EDR: 05/18/2016
Date Made Active in Reports: 06/23/2016
Number of Days to Update: 36

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 11/15/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 09/06/2016
Date Data Arrived at EDR: 09/07/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 37

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 12/26/2016
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 09/19/2016
Date Data Arrived at EDR: 09/20/2016
Date Made Active in Reports: 12/16/2016
Number of Days to Update: 87

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 12/16/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water board?s review found that more than one-third of the region?s active disposal pits are operating without permission.

Date of Government Version: 04/15/2015
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/23/2015
Number of Days to Update: 67

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Varies

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 12/22/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 06/09/2016
Date Data Arrived at EDR: 06/13/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 81

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 12/09/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/18/2016
Date Data Arrived at EDR: 09/20/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 12/20/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 73

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 11/22/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Quarterly

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/14/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 35

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/06/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 10/10/2016
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 90

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 11/10/2016
Date Data Arrived at EDR: 12/13/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 9

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 10/21/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 23

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 10/25/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 22

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 12/27/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 38

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/26/2017
Number of Days to Update: 65

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 11/01/2016
Date Data Arrived at EDR: 11/03/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 19

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/22/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 55

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 10/11/2016
Date Data Arrived at EDR: 10/14/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 35

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 01/03/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 10/25/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 22

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 11/21/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 10/24/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 22

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing

Kern County Sites and Tanks Listing.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/08/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 63

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List

A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/14/2016
Date Data Arrived at EDR: 12/16/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 6

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 09/08/2016
Date Data Arrived at EDR: 09/09/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 35

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern

San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 12/15/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: No Update Planned

HMS: Street Number List

Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 66

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities

Solid Waste Facilities in Los Angeles County.

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 10/18/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 58

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/18/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2016
Date Data Arrived at EDR: 01/26/2016
Date Made Active in Reports: 03/22/2016
Number of Days to Update: 56

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 03/29/2016
Date Data Arrived at EDR: 04/06/2016
Date Made Active in Reports: 06/13/2016
Number of Days to Update: 68
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 11/04/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 12/17/2015
Number of Days to Update: 34
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 10/04/2016
Date Data Arrived at EDR: 10/11/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 93
Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 12/09/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 41
Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 10/19/2016
Date Data Arrived at EDR: 10/25/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 79
Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 42

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/05/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 17

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 11/28/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/24/2016
Date Data Arrived at EDR: 06/27/2016
Date Made Active in Reports: 08/09/2016
Number of Days to Update: 43

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 11/21/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/28/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/08/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 44

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 11/03/2016
Date Data Arrived at EDR: 11/11/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 73

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 11/04/2016
Date Data Arrived at EDR: 11/11/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 73

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 11/03/2016
Date Data Arrived at EDR: 11/08/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 65

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 11/08/2016
Next Scheduled EDR Contact: 02/20/2017
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 38

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 10/20/2016
Date Data Arrived at EDR: 10/25/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 51

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 12/19/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 10/20/2016
Date Data Arrived at EDR: 10/25/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 77
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 12/19/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 08/22/2016
Date Data Arrived at EDR: 10/04/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 45
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 08/22/2016
Date Data Arrived at EDR: 10/04/2016
Date Made Active in Reports: 12/16/2016
Number of Days to Update: 73
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 09/06/2016
Date Data Arrived at EDR: 09/07/2016
Date Made Active in Reports: 10/19/2016
Number of Days to Update: 42
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23
Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 12/06/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 52
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 09/21/2016
Date Data Arrived at EDR: 09/22/2016
Date Made Active in Reports: 10/18/2016
Number of Days to Update: 26
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 12/15/2016
Next Scheduled EDR Contact: 04/03/2017
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 59
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/07/2016
Date Made Active in Reports: 06/22/2016
Number of Days to Update: 15
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 06/09/2016
Date Data Arrived at EDR: 06/13/2016
Date Made Active in Reports: 08/09/2016
Number of Days to Update: 57
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/09/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28
Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 59
Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22
Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 11/28/2016
Next Scheduled EDR Contact: 03/13/2017
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/10/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 75

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 59

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 11/16/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/15/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 29

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 11/21/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/21/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 1

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 12/09/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/22/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 19

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 12/09/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 09/27/2016
Date Data Arrived at EDR: 09/28/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 55

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 12/22/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 10/04/2016
Date Data Arrived at EDR: 10/06/2016
Date Made Active in Reports: 12/16/2016
Number of Days to Update: 71

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 12/22/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 35

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 12/02/2016
Next Scheduled EDR Contact: 03/20/2017
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 10/27/2016
Date Data Arrived at EDR: 10/28/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 74

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 82

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/30/2016
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/14/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 89
Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 11/28/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 29
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/14/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 55
Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 01/03/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 10/28/2016
Date Data Arrived at EDR: 11/03/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 42
Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 11/11/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 01/03/2017
Number of Days to Update: 96

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 11/02/2016
Date Made Active in Reports: 01/04/2017
Number of Days to Update: 63

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/01/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 07/22/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 123

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/12/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 11/21/2016
Next Scheduled EDR Contact: 03/06/2017
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 04/14/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 50

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 12/12/2016
Next Scheduled EDR Contact: 03/27/2017
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data

Source: PennWell Corporation

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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

265-ACRE BREA PROPERTY
VALENCIA AVENUE
BREA, CA 92823

TARGET PROPERTY COORDINATES

Latitude (North):	33.922355 - 33° 55' 20.48''
Longitude (West):	117.844415 - 117° 50' 39.89''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	421946.4
UTM Y (Meters):	3753673.8
Elevation:	526 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5640946 YORBA LINDA, CA
Version Date:	2012
West Map:	5640256 LA HABRA, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

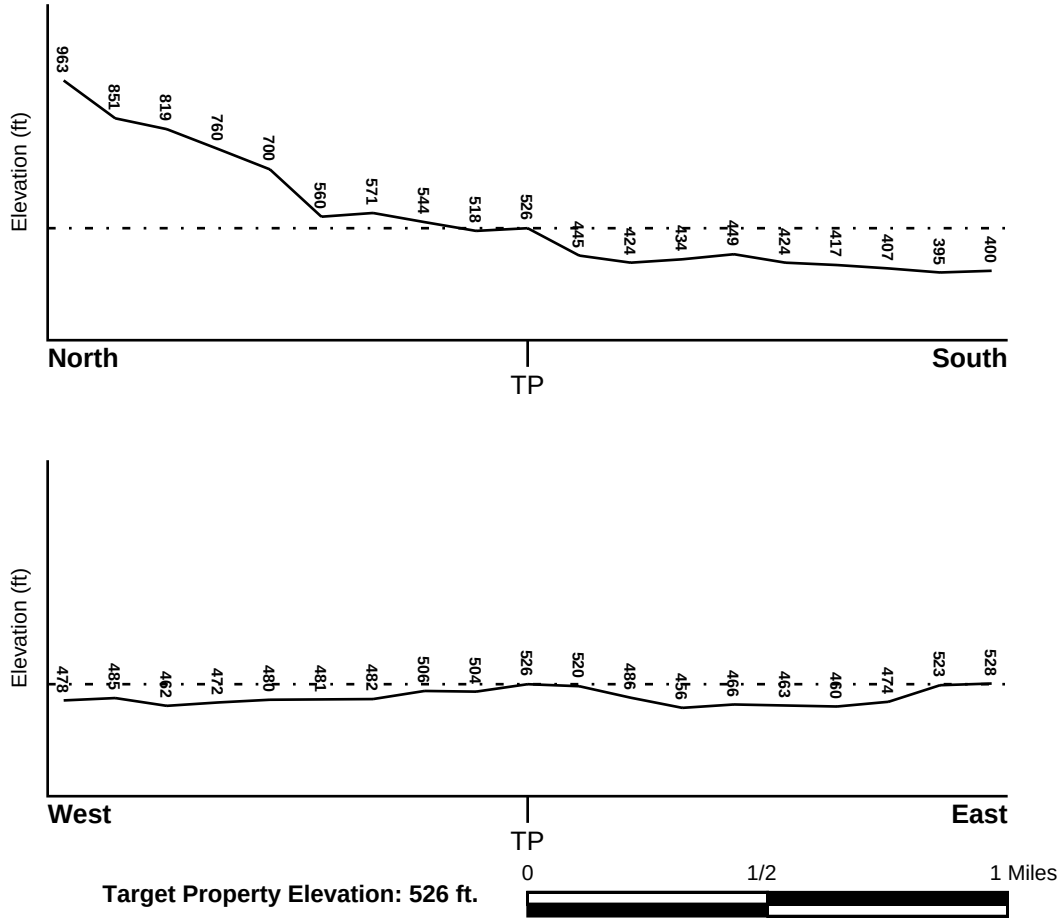
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06037C1900F	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
Not Reported	

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
YORBA LINDA	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

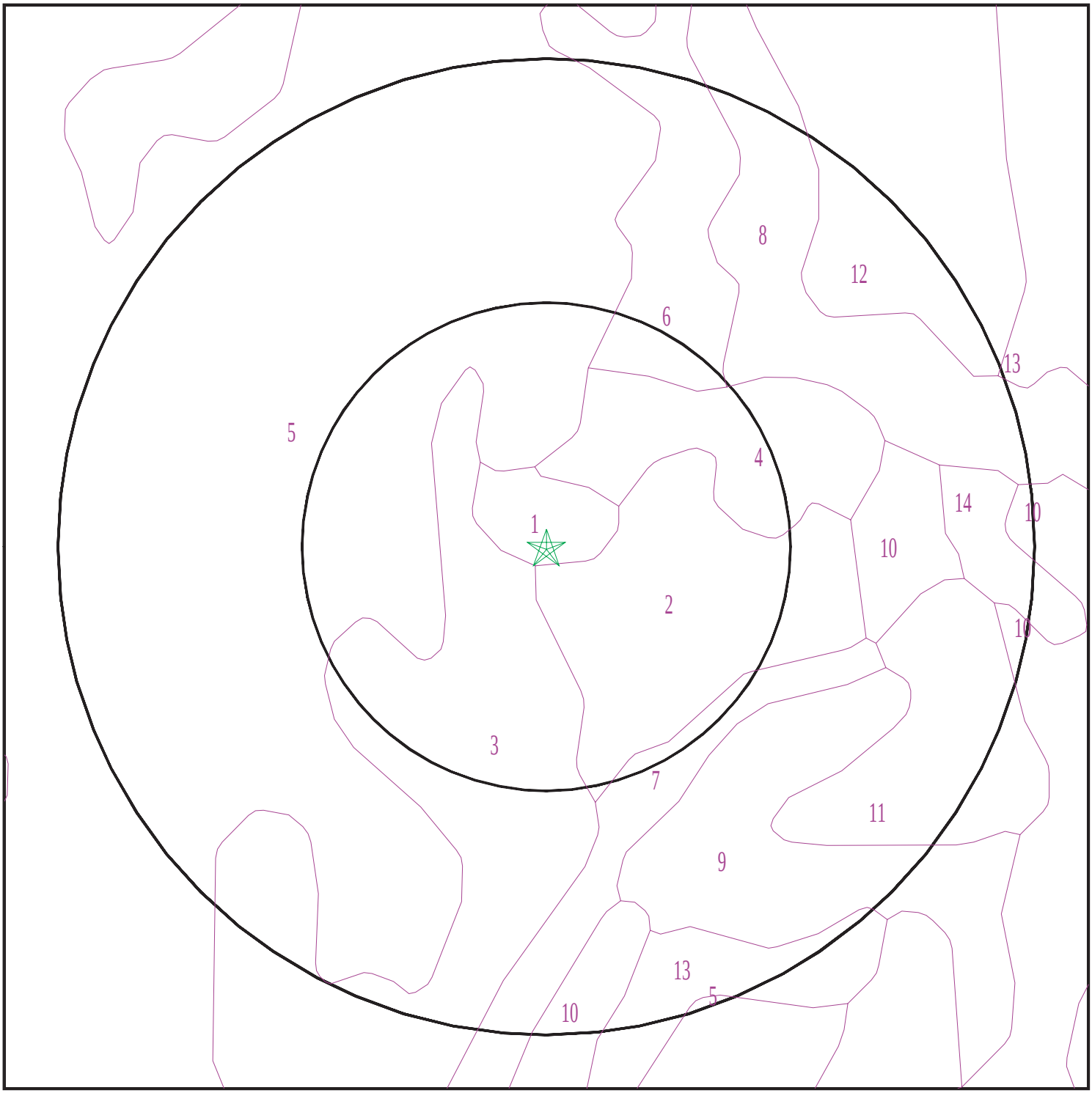
Era:	Cenozoic
System:	Tertiary
Series:	Miocene
Code:	Tm *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4848184.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	265-Acre Brea Property	CLIENT:	Northgate Env. Management Inc.
ADDRESS:	Valencia Avenue Brea CA 92823	CONTACT:	Nancy Leitner
LAT/LONG:	33.922355 / 117.844415	INQUIRY #:	4848184.2s
		DATE:	February 07, 2017 8:17 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: BALCOM

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	29 inches	clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9
2	29 inches	33 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 2

Soil Component Name: YORBA

Soil Surface Texture: gravelly sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	gravelly sandy loam	Not reported	Not reported	Max: 42 Min: 4	Max: 6.5 Min: 5.6
2	11 inches	40 inches	very gravelly sandy clay loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 5.6
3	40 inches	62 inches	very gravelly sandy loam	Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 5.1

Soil Map ID: 3

Soil Component Name: MYFORD

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 14	Max: 6 Min: 5.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	7 inches	11 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
3	11 inches	20 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
4	20 inches	64 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
5	64 inches	79 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6.5 Min: 6.1

Soil Map ID: 4

Soil Component Name: YORBA

Soil Surface Texture: very cobbly sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	very cobbly sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 4	Max: 6.5 Min: 5.6
2	11 inches	40 inches	very gravelly sandy clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Clayey Gravel	Max: 1.4 Min: 0.42	Max: 6.5 Min: 5.6
3	40 inches	62 inches	very gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 14 Min: 4	Max: 8.4 Min: 5.1

Soil Map ID: 5

Soil Component Name: MYFORD

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 14	Max: 6 Min: 5.1
2	11 inches	18 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
3	18 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
4	27 inches	70 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
5	70 inches	79 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6.5 Min: 6.1

Soil Map ID: 6

Soil Component Name: MYFORD

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 14	Max: 6 Min: 5.1
2	11 inches	18 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
3	18 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
4	27 inches	70 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
5	70 inches	79 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6.5 Min: 6.1

Soil Map ID: 7

Soil Component Name: SAN EMIGDIO

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	fine sandy loam	Not reported	Not reported	Max: 42 Min: 14	Max: 8.4 Min: 7.9
2	7 inches	61 inches	stratified gravelly loamy coarse sand to very fine sandy loam	Not reported	Not reported	Max: 42 Min: 14	Max: 8.4 Min: 7.9

Soil Map ID: 8

Soil Component Name: METZ

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
2	16 inches	62 inches	stratified sand to fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6

Soil Map ID: 9

Soil Component Name: ANAHEIM

Soil Surface Texture: loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	loam	Not reported	Not reported	Max: 14 Min: 4	Max: 7.8 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	25 inches	29 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 10

Soil Component Name: CALLEGUAS

Soil Surface Texture: clay loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 7.9
2	14 inches	18 inches	weathered bedrock	Not reported	Not reported	Max: 1.4 Min: 0	Max: Min:

Soil Map ID: 11

Soil Component Name: ALO

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	14 inches	22 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1
2	22 inches	25 inches	weathered bedrock	Not reported	Not reported	Max: 1.4 Min: 0	Max: Min:
3	0 inches	14 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1

Soil Map ID: 12

Soil Component Name: SOPER

Soil Surface Texture: loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	loam	Not reported	Not reported	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	9 inches	29 inches	gravelly clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 7.8 Min: 6.1
3	29 inches	33 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 13

Soil Component Name: MYFORD

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 14	Max: 6 Min: 5.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	11 inches	18 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
3	18 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
4	27 inches	70 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
5	70 inches	79 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6.5 Min: 6.1

Soil Map ID: 14

Soil Component Name: OMNI

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class:
Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 9 Min: 7.9
2	16 inches	59 inches	silty clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 9 Min: 7.9

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	CAOG11000198720	0 - 1/8 Mile East

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	CAOG11000198721	0 - 1/8 Mile East
A3	CAOG11000197200	0 - 1/8 Mile NW
A4	CAOG11000194514	0 - 1/8 Mile NW
A5	CAOG11000198256	0 - 1/8 Mile South
A6	CAOG11000198746	0 - 1/8 Mile SSE
A7	CAOG11000198747	0 - 1/8 Mile SSE
A8	CAOG11000198167	0 - 1/8 Mile SE
A9	CAOG11000196906	0 - 1/8 Mile ENE
A10	CAOG11000221922	0 - 1/8 Mile NNW
A11	CAOG11000196908	0 - 1/8 Mile SSW
A12	CAOG11000198716	0 - 1/8 Mile North
A13	CAOG11000198717	0 - 1/8 Mile North
A14	CAOG11000217748	0 - 1/8 Mile South
A15	CAOG11000198162	0 - 1/8 Mile NNE
A16	CAOG11000197473	0 - 1/8 Mile NNW
A17	CAOG11000198257	0 - 1/8 Mile East
A18	CAOG11000198258	0 - 1/8 Mile East
B19	CAOG11000197201	0 - 1/8 Mile West
A20	CAOG11000221637	0 - 1/8 Mile NE
A21	CAOG11000198274	0 - 1/8 Mile SSW
A22	CAOG11000198275	0 - 1/8 Mile SSW
A23	CAOG11000221920	0 - 1/8 Mile NNE
B24	CAOG11000194513	0 - 1/8 Mile NW
C25	CAOG11000197706	0 - 1/8 Mile NNW
D26	CAOG11000198742	0 - 1/8 Mile SSE
D27	CAOG11000198743	0 - 1/8 Mile SSE
B28	CAOG11000198724	0 - 1/8 Mile WSW
B29	CAOG11000198725	0 - 1/8 Mile WSW
D30	CAOG11000196909	0 - 1/8 Mile ESE
E31	CAOG11000198159	0 - 1/8 Mile East
C32	CAOG11000196912	0 - 1/8 Mile NNE
C33	CAOG11000197399	0 - 1/8 Mile NW
E34	CAOG11000197202	0 - 1/8 Mile NE
B35	CAOG11000198165	0 - 1/8 Mile West
B36	CAOG11000198166	0 - 1/8 Mile West
D37	CAOG11000221458	0 - 1/8 Mile South
D38	CAOG11000196807	0 - 1/8 Mile SSE
D39	CAOG11000196808	0 - 1/8 Mile SSE
D40	CAOG11000196910	0 - 1/8 Mile SE
F42	CAOG11000198713	0 - 1/8 Mile SSW
F41	CAOG11000198712	0 - 1/8 Mile SSW
F43	CAOG11000196907	0 - 1/8 Mile SW
B45	CAOG11000198723	1/8 - 1/4 Mile WSW
B44	CAOG11000198722	1/8 - 1/4 Mile WSW
D47	CAOG11000197341	1/8 - 1/4 Mile South
D46	CAOG11000197340	1/8 - 1/4 Mile South
F48	CAOG11000221462	1/8 - 1/4 Mile SW
G49	CAOG11000196815	1/8 - 1/4 Mile WNW
B50	CAOG11000198251	1/8 - 1/4 Mile SW
B51	CAOG11000198250	1/8 - 1/4 Mile SW
B53	CAOG11000198252	1/8 - 1/4 Mile SW
B52	CAOG11000198253	1/8 - 1/4 Mile SW
D54	CAOG11000221459	1/8 - 1/4 Mile SE
B55	CAOG11000222346	1/8 - 1/4 Mile WSW
B57	CAOG11000198273	1/8 - 1/4 Mile WNW
B56	CAOG11000198272	1/8 - 1/4 Mile WNW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
C58	CAOG11000197199	1/8 - 1/4 Mile NNW
C59	CAOG11000197195	1/8 - 1/4 Mile North
H61	CAOG11000198745	1/8 - 1/4 Mile SW
H60	CAOG11000198744	1/8 - 1/4 Mile SW
E62	CAOG11000196913	1/8 - 1/4 Mile East
I64	CAOG11000198260	1/8 - 1/4 Mile ENE
I63	CAOG11000198259	1/8 - 1/4 Mile ENE
B66	CAOG11000198161	1/8 - 1/4 Mile West
B65	CAOG11000198160	1/8 - 1/4 Mile West
D68	CAOG11000198741	1/8 - 1/4 Mile SE
D67	CAOG11000198740	1/8 - 1/4 Mile SE
G69	CAOG11000198163	1/8 - 1/4 Mile NW
G70	CAOG11000198164	1/8 - 1/4 Mile NW
C71	CAOG11000221923	1/8 - 1/4 Mile NW
G72	CAOG11000198718	1/8 - 1/4 Mile WNW
G73	CAOG11000198719	1/8 - 1/4 Mile WNW
H74	CAOG11000198254	1/8 - 1/4 Mile WSW
H75	CAOG11000198255	1/8 - 1/4 Mile WSW
J76	CAOG11000197193	1/8 - 1/4 Mile NNE
B77	CAOG11000197299	1/8 - 1/4 Mile West
J78	CAOG11000197534	1/8 - 1/4 Mile NNE
J79	CAOG11000197535	1/8 - 1/4 Mile NNE
J80	CAOG11000197698	1/8 - 1/4 Mile North
H81	CAOG11000221635	1/8 - 1/4 Mile WSW
F82	CAOG11000198710	1/8 - 1/4 Mile SW
F83	CAOG11000198711	1/8 - 1/4 Mile SW
D85	CAOG11000197326	1/8 - 1/4 Mile SSE
D84	CAOG11000197325	1/8 - 1/4 Mile SSE
C86	CAOG11000197196	1/8 - 1/4 Mile NNW
J87	CAOG11000221919	1/8 - 1/4 Mile NE
H89	CAOG11000198739	1/8 - 1/4 Mile SW
H88	CAOG11000198738	1/8 - 1/4 Mile SW
J90	CAOG11000197192	1/8 - 1/4 Mile NNE
G92	CAOG11000198715	1/8 - 1/4 Mile WNW
G91	CAOG11000198714	1/8 - 1/4 Mile WNW
J93	CAOG11000196943	1/8 - 1/4 Mile North
J94	CAOG11000197128	1/8 - 1/4 Mile North
J95	CAOG11000197127	1/8 - 1/4 Mile NNE
E96	CAOG11000221636	1/8 - 1/4 Mile ESE
K97	CAOG11000196911	1/8 - 1/4 Mile SE
K98	CAOG11000197342	1/8 - 1/4 Mile SSE
G100	CAOG11000196817	1/8 - 1/4 Mile WNW
G99	CAOG11000196816	1/8 - 1/4 Mile WNW
L101	CAOG11000197697	1/8 - 1/4 Mile NNW
G102	CAOG11000222004	1/8 - 1/4 Mile WNW
K104	CAOG11000197350	1/8 - 1/4 Mile SE
K103	CAOG11000197349	1/8 - 1/4 Mile SE
J105	CAOG11000197191	1/8 - 1/4 Mile NE
L106	CAOG11000197133	1/8 - 1/4 Mile NNW
K108	CAOG11000197790	1/8 - 1/4 Mile ESE
K107	CAOG11000197789	1/8 - 1/4 Mile ESE
F109	CAOG11000198730	1/8 - 1/4 Mile SSW
F110	CAOG11000198731	1/8 - 1/4 Mile SSW
F111	CAOG11000196813	1/8 - 1/4 Mile South
F112	CAOG11000196814	1/8 - 1/4 Mile South
J113	CAOG11000197126	1/8 - 1/4 Mile NNE

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
G114	CAOG11000197198	1/8 - 1/4 Mile NW
F115	CAOG11000197347	1/8 - 1/4 Mile SSW
F116	CAOG11000197348	1/8 - 1/4 Mile SSW
J117	CAOG11000198772	1/8 - 1/4 Mile North
J118	CAOG11000221918	1/8 - 1/4 Mile NE
H119	CAOG11000221461	1/8 - 1/4 Mile WSW
M120	CAOG11000221460	1/8 - 1/4 Mile SSE
J121	CAOG11000197652	1/8 - 1/4 Mile North
G122	CAOG11000221921	1/8 - 1/4 Mile NW
M123	CAOG11000196812	1/8 - 1/4 Mile South
N124	CAOG11000196920	1/8 - 1/4 Mile West
I125	CAOG11000197197	1/8 - 1/4 Mile ENE
L126	CAOG11000197686	1/8 - 1/4 Mile North
O127	CAOG11000196811	1/8 - 1/4 Mile SSW
N128	CAOG11000194529	1/8 - 1/4 Mile WSW
P129	CAOG11000197194	1/8 - 1/4 Mile NE
M131	CAOG11000197344	1/8 - 1/4 Mile SSE
M130	CAOG11000197343	1/8 - 1/4 Mile SSE
P132	CAOG11000222255	1/8 - 1/4 Mile NE
G134	CAOG11000196819	1/8 - 1/4 Mile WNW
G133	CAOG11000196818	1/8 - 1/4 Mile WNW
H135	CAOG11000194522	1/8 - 1/4 Mile WSW
N136	CAOG11000196930	1/8 - 1/4 Mile West
N137	CAOG11000198286	1/8 - 1/4 Mile West
N138	CAOG11000221640	1/8 - 1/4 Mile West
O139	CAOG11000198736	1/8 - 1/4 Mile South
O140	CAOG11000198737	1/8 - 1/4 Mile South
P141	CAOG11000197125	1/8 - 1/4 Mile NE
Q142	CAOG11000196947	1/8 - 1/4 Mile North
L143	CAOG11000197137	1/8 - 1/4 Mile NW
R144	CAOG11000198640	1/8 - 1/4 Mile East
J145	CAOG11000196945	1/8 - 1/4 Mile NNE
R147	CAOG11000197431	1/8 - 1/4 Mile East
R146	CAOG11000197430	1/8 - 1/4 Mile East
L148	CAOG11000197684	1/8 - 1/4 Mile NNW
O150	CAOG11000198735	1/8 - 1/4 Mile SSW
O149	CAOG11000198734	1/8 - 1/4 Mile SSW
N151	CAOG11000221643	1/8 - 1/4 Mile WNW
L152	CAOG11000221704	1/8 - 1/4 Mile NNW
K153	CAOG11000196809	1/8 - 1/4 Mile ESE
R154	CAOG11000197891	1/8 - 1/4 Mile East
R155	CAOG11000197892	1/8 - 1/4 Mile East
R157	CAOG11000198201	1/8 - 1/4 Mile East
R156	CAOG11000198200	1/8 - 1/4 Mile East
O159	CAOG11000198733	1/8 - 1/4 Mile SSW
O158	CAOG11000198732	1/8 - 1/4 Mile SSW
O160	CAOG11000198652	1/8 - 1/4 Mile SSW
S161	CAOG11000222003	1/8 - 1/4 Mile NW
S162	CAOG11000194528	1/8 - 1/4 Mile WNW
P163	CAOG11000221917	1/8 - 1/4 Mile NE
K164	CAOG11000221430	1/8 - 1/4 Mile SE
P165	CAOG11000197190	1/8 - 1/4 Mile NE
O166	CAOG11000221463	1/8 - 1/4 Mile SSW
L167	CAOG11000198642	1/8 - 1/4 Mile NNW
T169	CAOG11000198651	1/8 - 1/4 Mile South
T168	CAOG11000198650	1/8 - 1/4 Mile South

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
P170	CAOG11000197129	1/8 - 1/4 Mile ENE
U171	CAOG11000221642	1/8 - 1/4 Mile WSW
O172	CAOG11000196810	1/8 - 1/4 Mile SW
P173	CAOG11000197124	1/8 - 1/4 Mile NE
L174	CAOG11000196946	1/8 - 1/4 Mile NNW
S175	CAOG11000197142	1/8 - 1/4 Mile NW
S176	CAOG11000197607	1/8 - 1/4 Mile NW
S177	CAOG11000197608	1/8 - 1/4 Mile NW
Q178	CAOG11000222254	1/8 - 1/4 Mile NNE
O179	CAOG11000197323	1/8 - 1/4 Mile SSW
O180	CAOG11000197324	1/8 - 1/4 Mile SSW
O181	CAOG11000222132	1/8 - 1/4 Mile South
O182	CAOG11000222133	1/8 - 1/4 Mile South
U183	CAOG11000221669	1/8 - 1/4 Mile SW
Q185	CAOG11000197690	1/8 - 1/4 Mile North
Q184	CAOG11000197689	1/8 - 1/4 Mile North
S186	CAOG11000194505	1/4 - 1/2 Mile NW
S187	CAOG11000196917	1/4 - 1/2 Mile NW
O188	CAOG11000221431	1/4 - 1/2 Mile SSW
N189	CAOG11000221654	1/4 - 1/2 Mile West
T190	CAOG11000197345	1/4 - 1/2 Mile South
T191	CAOG11000197346	1/4 - 1/2 Mile South
N192	CAOG11000194589	1/4 - 1/2 Mile West
S193	CAOG11000197696	1/4 - 1/2 Mile NW
O194	CAOG11000198572	1/4 - 1/2 Mile SSW
U195	CAOG11000198287	1/4 - 1/2 Mile WSW
V196	CAOG11000196944	1/4 - 1/2 Mile NNE
W197	CAOG11000222377	1/4 - 1/2 Mile ESE
W198	CAOG11000222378	1/4 - 1/2 Mile ESE
X199	CAOG11000197687	1/4 - 1/2 Mile NNW
X200	CAOG11000197688	1/4 - 1/2 Mile NNW
T202	CAOG11000198578	1/4 - 1/2 Mile South
T201	CAOG11000198577	1/4 - 1/2 Mile South
O203	CAOG11000198573	1/4 - 1/2 Mile SSW
O204	CAOG11000198574	1/4 - 1/2 Mile SSW
U205	CAOG11000221644	1/4 - 1/2 Mile WSW
Q206	CAOG11000198639	1/4 - 1/2 Mile North
V207	CAOG11000197157	1/4 - 1/2 Mile NNE
Y208	CAOG11000197135	1/4 - 1/2 Mile ENE
W209	CAOG11000221429	1/4 - 1/2 Mile ESE
Z210	CAOG11000194520	1/4 - 1/2 Mile WNW
Y211	CAOG11000197134	1/4 - 1/2 Mile NE
S212	CAOG11000197145	1/4 - 1/2 Mile NW
U213	CAOG11000197851	1/4 - 1/2 Mile WSW
214	CAOG11000198704	1/4 - 1/2 Mile SE
X216	CAOG11000194686	1/4 - 1/2 Mile NNW
X215	CAOG11000194685	1/4 - 1/2 Mile NNW
X217	CAOG11000194687	1/4 - 1/2 Mile NNW
U218	CAOG11000197917	1/4 - 1/2 Mile WSW
U219	CAOG11000198019	1/4 - 1/2 Mile SW
S220	CAOG11000221638	1/4 - 1/2 Mile NW
W221	CAOG11000197267	1/4 - 1/2 Mile ESE
U222	CAOG11000198020	1/4 - 1/2 Mile SW
AA223	CAOG11000221432	1/4 - 1/2 Mile SSW
AA224	CAOG11000197352	1/4 - 1/2 Mile SSW
S225	CAOG11000197681	1/4 - 1/2 Mile NW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
U226	CAOG11000198047	1/4 - 1/2 Mile SW
T228	CAOG11000197843	1/4 - 1/2 Mile South
T227	CAOG11000197842	1/4 - 1/2 Mile South
U229	CAOG11000198135	1/4 - 1/2 Mile SW
X230	CAOG11000196951	1/4 - 1/2 Mile NNW
AB231	CAOG11000198550	1/4 - 1/2 Mile NW
AB232	CAOG11000196929	1/4 - 1/2 Mile NW
T234	CAOG11000197889	1/4 - 1/2 Mile South
T233	CAOG11000197888	1/4 - 1/2 Mile South
X235	CAOG11000198641	1/4 - 1/2 Mile NNW
AB236	CAOG11000221641	1/4 - 1/2 Mile NW
Z237	CAOG11000196919	1/4 - 1/2 Mile WNW
AC238	CAOG11000197650	1/4 - 1/2 Mile North
AC239	CAOG11000197651	1/4 - 1/2 Mile North
AD240	CAOG11000198041	1/4 - 1/2 Mile West
AC241	CAOG11000197693	1/4 - 1/2 Mile North
AC242	CAOG11000197694	1/4 - 1/2 Mile North
X243	CAOG11000196950	1/4 - 1/2 Mile North
X245	CAOG11000197692	1/4 - 1/2 Mile NNW
X244	CAOG11000197691	1/4 - 1/2 Mile NNW
AE246	CAOG11000198261	1/4 - 1/2 Mile SW
Z247	CAOG11000221653	1/4 - 1/2 Mile West
U248	CAOG11000221668	1/4 - 1/2 Mile WSW
AA249	CAOG11000198575	1/4 - 1/2 Mile SSW
AA250	CAOG11000198576	1/4 - 1/2 Mile SSW
AE251	CAOG11000198262	1/4 - 1/2 Mile SW
AA252	CAOG11000198646	1/4 - 1/2 Mile SSW
AA253	CAOG11000198647	1/4 - 1/2 Mile SSW
AB254	CAOG11000197216	1/4 - 1/2 Mile NW
AF255	CAOG11000196928	1/4 - 1/2 Mile WSW
AA256	CAOG11000221670	1/4 - 1/2 Mile SW
AG258	CAOG11000198649	1/4 - 1/2 Mile South
AG257	CAOG11000198648	1/4 - 1/2 Mile South
AC259	CAOG11000197156	1/4 - 1/2 Mile North
AA260	CAOG11000221671	1/4 - 1/2 Mile SW
AD261	CAOG11000196934	1/4 - 1/2 Mile West
AH262	CAOG11000197150	1/4 - 1/2 Mile NW
AE264	CAOG11000198316	1/4 - 1/2 Mile SW
AE263	CAOG11000198315	1/4 - 1/2 Mile SW
X266	CAOG11000198092	1/4 - 1/2 Mile NNW
X265	CAOG11000198091	1/4 - 1/2 Mile NNW
Z267	CAOG11000198553	1/4 - 1/2 Mile WNW
268	CAOG11000198708	1/4 - 1/2 Mile SSE
AE269	CAOG11000198244	1/4 - 1/2 Mile SW
AE270	CAOG11000198317	1/4 - 1/2 Mile SW
AE271	CAOG11000198318	1/4 - 1/2 Mile SW
AD272	CAOG11000194523	1/4 - 1/2 Mile WSW
V273	CAOG11000196953	1/4 - 1/2 Mile NE
V274	CAOG11000196954	1/4 - 1/2 Mile NE
AE275	CAOG11000196940	1/4 - 1/2 Mile SW
AE276	CAOG11000198728	1/4 - 1/2 Mile SW
AD277	CAOG11000194519	1/4 - 1/2 Mile West
AE278	CAOG11000198524	1/4 - 1/2 Mile SW
V279	CAOG11000196952	1/4 - 1/2 Mile NNE
AB280	CAOG11000196914	1/4 - 1/2 Mile NW
AH281	CAOG11000197695	1/4 - 1/2 Mile NNW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
AI282	CAOG11000221705	1/4 - 1/2 Mile ENE
AI283	CAOG11000221706	1/4 - 1/2 Mile ENE
AB284	CAOG11000197682	1/4 - 1/2 Mile WNW
AB285	CAOG11000196932	1/4 - 1/2 Mile WNW
AA286	CAOG11000221658	1/4 - 1/2 Mile SSW
AG287	CAOG11000198702	1/4 - 1/2 Mile SSW
AG288	CAOG11000198703	1/4 - 1/2 Mile SSW
AH289	CAOG11000197155	1/4 - 1/2 Mile NNW
AB290	CAOG11000197315	1/4 - 1/2 Mile NW
AG292	CAOG11000197986	1/4 - 1/2 Mile South
AG291	CAOG11000197985	1/4 - 1/2 Mile South
AJ293	CAOG11000196960	1/4 - 1/2 Mile NNW
294	CAOG11000221933	1/4 - 1/2 Mile South
295	CAOG11000221707	1/4 - 1/2 Mile ENE
AD296	CAOG11000194524	1/4 - 1/2 Mile West
AJ297	CAOG11000196961	1/4 - 1/2 Mile NNW
AH298	CAOG11000197246	1/4 - 1/2 Mile NW
AB299	CAOG11000221639	1/4 - 1/2 Mile NW
300	CAOG11000222009	1/4 - 1/2 Mile SW
AH301	CAOG11000197774	1/4 - 1/2 Mile NW
AK302	CAOG11000197313	1/4 - 1/2 Mile NW
AL303	CAOG11000221944	1/4 - 1/2 Mile SSW
AF304	CAOG11000196936	1/4 - 1/2 Mile WSW
AM305	CAOG11000196927	1/4 - 1/2 Mile West
AM306	CAOG11000197270	1/4 - 1/2 Mile WNW
AN307	CAOG11000197146	1/4 - 1/2 Mile North
AF308	CAOG11000198288	1/4 - 1/2 Mile WSW
AC309	CAOG11000197147	1/4 - 1/2 Mile North
AO310	CAOG11000196955	1/4 - 1/2 Mile NE
AJ311	CAOG11000197154	1/4 - 1/2 Mile North
AM312	CAOG11000194518	1/4 - 1/2 Mile West
AK313	CAOG11000197271	1/4 - 1/2 Mile WNW
AN314	CAOG11000197148	1/4 - 1/2 Mile North
AP315	CAOG11000197149	1/4 - 1/2 Mile NNW
AQ316	CAOG11000197683	1/4 - 1/2 Mile WNW
AI317	CAOG11000221708	1/4 - 1/2 Mile ENE
AM318	CAOG11000221650	1/4 - 1/2 Mile West
AQ319	CAOG11000198760	1/4 - 1/2 Mile WNW
AK320	CAOG11000197308	1/4 - 1/2 Mile NW
AM322	CAOG11000198555	1/4 - 1/2 Mile West
AM321	CAOG11000198554	1/4 - 1/2 Mile West
AR323	CAOG11000198095	1/4 - 1/2 Mile WSW
AR324	CAOG11000197586	1/4 - 1/2 Mile WSW
AQ325	CAOG11000195104	1/4 - 1/2 Mile WNW
AK326	CAOG11000197314	1/4 - 1/2 Mile NW
AK327	CAOG11000221935	1/4 - 1/2 Mile WNW
AR328	CAOG11000198359	1/4 - 1/2 Mile WSW
AR329	CAOG11000198360	1/4 - 1/2 Mile WSW
AR330	CAOG11000221652	1/4 - 1/2 Mile WSW
AL331	CAOG11000221657	1/4 - 1/2 Mile SSW
AO332	CAOG11000197061	1/4 - 1/2 Mile NE
AK333	CAOG11000197316	1/4 - 1/2 Mile NW
AJ334	CAOG11000196957	1/4 - 1/2 Mile NNW
AR335	CAOG11000198729	1/4 - 1/2 Mile WSW
AR336	CAOG11000222006	1/4 - 1/2 Mile WSW
AS337	CAOG11000197130	1/4 - 1/2 Mile NNE

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
AN338	CAOG11000196990	1/4 - 1/2 Mile North
AT339	CAOG11000197121	1/4 - 1/2 Mile NNE
AR340	CAOG11000222005	1/4 - 1/2 Mile WSW
AU341	CAOG11000196956	1/4 - 1/2 Mile NE
AN342	CAOG11000197296	1/4 - 1/2 Mile North
AL343	CAOG11000221932	1/4 - 1/2 Mile SSW
AN344	CAOG11000196725	1/4 - 1/2 Mile North
AT345	CAOG11000196726	1/4 - 1/2 Mile NNE
AR346	CAOG11000221651	1/4 - 1/2 Mile WSW
AK347	CAOG11000221936	1/4 - 1/2 Mile NW
AQ348	CAOG11000196915	1/4 - 1/2 Mile WNW
AM349	CAOG11000196939	1/4 - 1/2 Mile West
AV350	CAOG11000197151	1/4 - 1/2 Mile North
AS351	CAOG11000197120	1/4 - 1/2 Mile NNE
AN352	CAOG11000196729	1/4 - 1/2 Mile North
AP353	CAOG11000197219	1/4 - 1/2 Mile NNW
354	CAOG11000221659	1/4 - 1/2 Mile SW
AP355	CAOG11000197266	1/4 - 1/2 Mile NW
AO357	CAOG11000197919	1/4 - 1/2 Mile NE
AO356	CAOG11000197918	1/4 - 1/2 Mile NE
AO359	CAOG11000197132	1/4 - 1/2 Mile NE
AO358	CAOG11000197131	1/4 - 1/2 Mile NE
AO360	CAOG11000197059	1/4 - 1/2 Mile NE
AQ361	CAOG11000196933	1/4 - 1/2 Mile WNW
AM362	CAOG11000196925	1/4 - 1/2 Mile West
AO363	CAOG11000197058	1/4 - 1/2 Mile NE
AW364	CAOG11000194526	1/4 - 1/2 Mile WSW
AW365	CAOG11000196926	1/4 - 1/2 Mile West
AU366	CAOG11000222315	1/4 - 1/2 Mile ENE
AU367	CAOG11000222316	1/4 - 1/2 Mile ENE
AX368	CAOG11000196731	1/4 - 1/2 Mile North
AS369	CAOG11000197119	1/4 - 1/2 Mile NNE
AT370	CAOG11000197297	1/4 - 1/2 Mile NNE
AQ371	CAOG11000197317	1/4 - 1/2 Mile WNW
AY372	CAOG11000194517	1/4 - 1/2 Mile West
AQ374	CAOG11000198552	1/4 - 1/2 Mile WNW
AQ373	CAOG11000198551	1/4 - 1/2 Mile WNW
AS375	CAOG11000197062	1/4 - 1/2 Mile NE
AN376	CAOG11000196733	1/4 - 1/2 Mile North
AS377	CAOG11000196713	1/4 - 1/2 Mile NNE
AY378	CAOG11000196935	1/4 - 1/2 Mile WNW
AP379	CAOG11000197144	1/4 - 1/2 Mile NNW
AZ380	CAOG11000198645	1/4 - 1/2 Mile NW
AZ381	CAOG11000197310	1/4 - 1/2 Mile NW
AZ382	CAOG11000197304	1/4 - 1/2 Mile NW
AR383	CAOG11000196937	1/4 - 1/2 Mile WSW
AS384	CAOG11000196714	1/4 - 1/2 Mile NNE
AS385	CAOG11000196728	1/4 - 1/2 Mile NNE
AV386	CAOG11000196721	1/4 - 1/2 Mile North
BA387	CAOG11000197236	1/4 - 1/2 Mile ENE
AS388	CAOG11000196988	1/4 - 1/2 Mile NNE
AX389	CAOG11000196727	1/4 - 1/2 Mile North
BB390	CAOG11000194573	1/4 - 1/2 Mile NNW
AS391	CAOG11000197118	1/4 - 1/2 Mile NE
AU392	CAOG11000197060	1/4 - 1/2 Mile NE
AV393	CAOG11000196949	1/4 - 1/2 Mile NNW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
AV394	CAOG11000197152	1/4 - 1/2 Mile North
BC395	CAOG11000196916	1/4 - 1/2 Mile WNW
BB396	CAOG11000198707	1/4 - 1/2 Mile NNW
AW397	CAOG11000198319	1/4 - 1/2 Mile West
BA398	CAOG11000197234	1/4 - 1/2 Mile ENE
AW399	CAOG11000221649	1/4 - 1/2 Mile WSW
BB400	CAOG11000197153	1/4 - 1/2 Mile NNW
AX401	CAOG11000197295	1/4 - 1/2 Mile North
AS402	CAOG11000196716	1/4 - 1/2 Mile NNE
BC403	CAOG11000222625	1/4 - 1/2 Mile WNW
BD404	CAOG11000197063	1/4 - 1/2 Mile NE
BC405	CAOG11000194530	1/4 - 1/2 Mile WNW
AS406	CAOG11000196717	1/4 - 1/2 Mile NNE
BE407	CAOG11000217285	1/4 - 1/2 Mile West
BF408	CAOG11000196730	1/4 - 1/2 Mile North
AX409	CAOG11000198118	1/4 - 1/2 Mile North
BB410	CAOG11000197305	1/4 - 1/2 Mile NW
BB411	CAOG11000197218	1/4 - 1/2 Mile NNW
BF412	CAOG11000197298	1/4 - 1/2 Mile North
AY413	CAOG11000221648	1/4 - 1/2 Mile West
BC414	CAOG11000222253	1/4 - 1/2 Mile WNW
AW415	CAOG11000198556	1/4 - 1/2 Mile WSW
BD416	CAOG11000196989	1/4 - 1/2 Mile NE
BE417	CAOG11000196924	1/4 - 1/2 Mile West
BE418	CAOG11000197269	1/4 - 1/2 Mile West
419	CAOG11000222026	1/4 - 1/2 Mile ESE
BC420	CAOG11000197247	1/4 - 1/2 Mile WNW
AZ421	CAOG11000194688	1/4 - 1/2 Mile NW
BG422	CAOG11000197223	1/2 - 1 Mile ENE
BG423	CAOG11000305955	1/2 - 1 Mile NE
AX424	CAOG11000196722	1/2 - 1 Mile North
AZ425	CAOG11000222620	1/2 - 1 Mile NW
BD426	CAOG11000197064	1/2 - 1 Mile NE
BF427	CAOG11000196720	1/2 - 1 Mile North
BH428	CAOG11000194531	1/2 - 1 Mile WNW
BI429	CAOG11000198093	1/2 - 1 Mile NNW
BI430	CAOG11000198094	1/2 - 1 Mile NNW
BD431	CAOG11000196723	1/2 - 1 Mile NE
AX432	CAOG11000196715	1/2 - 1 Mile North
BI433	CAOG11000197141	1/2 - 1 Mile NNW
BJ434	CAOG11000197318	1/2 - 1 Mile NW
BI435	CAOG11000196959	1/2 - 1 Mile NNW
BF436	CAOG11000196734	1/2 - 1 Mile North
BB437	CAOG11000197321	1/2 - 1 Mile NNW
AZ438	CAOG11000197253	1/2 - 1 Mile NW
BD439	CAOG11000221419	1/2 - 1 Mile NE
BD440	CAOG11000221715	1/2 - 1 Mile NE
BC441	CAOG11000194515	1/2 - 1 Mile WNW
BF442	CAOG11000196942	1/2 - 1 Mile North
BK443	CAOG11000197122	1/2 - 1 Mile NE
BL444	CAOG11000197254	1/2 - 1 Mile NW
BA445	CAOG11000197235	1/2 - 1 Mile ENE
BG446	CAOG11000197284	1/2 - 1 Mile NE
BM447	CAOG11000197233	1/2 - 1 Mile ENE
448	CAOG11000196732	1/2 - 1 Mile North
BK449	CAOG11000197894	1/2 - 1 Mile NE

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
BK450	CAOG11000197895	1/2 - 1 Mile NE
BF451	CAOG11000221420	1/2 - 1 Mile North
BI452	CAOG11000197217	1/2 - 1 Mile NNW
BN453	CAOG11000194689	1/2 - 1 Mile West
BF454	CAOG11000196719	1/2 - 1 Mile North
BG455	CAOG11000197896	1/2 - 1 Mile ENE
BG456	CAOG11000197897	1/2 - 1 Mile ENE
BO457	CAOG11000197312	1/2 - 1 Mile NNW
BP458	CAOG11000194527	1/2 - 1 Mile West
BC459	CAOG11000221624	1/2 - 1 Mile WNW
460	CAOG11000221656	1/2 - 1 Mile SW
BO461	CAOG11000197320	1/2 - 1 Mile NNW
BN462	CAOG11000196938	1/2 - 1 Mile WSW
BP463	CAOG11000221646	1/2 - 1 Mile West
BJ464	CAOG11000197311	1/2 - 1 Mile NW
BP465	CAOG11000196923	1/2 - 1 Mile West
BN466	CAOG11000217284	1/2 - 1 Mile West
BH467	CAOG11000196931	1/2 - 1 Mile WNW
BQ468	CAOG11000198191	1/2 - 1 Mile NNE
BJ469	CAOG11000197844	1/2 - 1 Mile NW
BJ470	CAOG11000197309	1/2 - 1 Mile NW
BI471	CAOG11000197140	1/2 - 1 Mile NNW
BJ472	CAOG11000222287	1/2 - 1 Mile NW
BK473	CAOG11000196735	1/2 - 1 Mile NE
474	CAOG11000222031	1/2 - 1 Mile SE
BM475	CAOG11000197224	1/2 - 1 Mile ENE
BN476	CAOG11000221647	1/2 - 1 Mile West
BK477	CAOG11000197123	1/2 - 1 Mile NE
BJ478	CAOG11000222024	1/2 - 1 Mile NW
BK479	CAOG11000196718	1/2 - 1 Mile NE
BH480	CAOG11000194521	1/2 - 1 Mile WNW
BI481	CAOG11000196941	1/2 - 1 Mile NNW
BG482	CAOG11000197286	1/2 - 1 Mile ENE
BL483	CAOG11000197252	1/2 - 1 Mile NW
BG484	CAOG11000197285	1/2 - 1 Mile ENE
BJ485	CAOG11000198706	1/2 - 1 Mile NW
BR486	CAOG11000197429	1/2 - 1 Mile NNW
BK487	CAOG11000197240	1/2 - 1 Mile NE
BK489	CAOG11000197242	1/2 - 1 Mile NE
BK490	CAOG11000197241	1/2 - 1 Mile NE
BK488	CAOG11000197239	1/2 - 1 Mile NE
BR491	CAOG11000196724	1/2 - 1 Mile North
BK492	CAOG11000197243	1/2 - 1 Mile NE
BQ493	CAOG11000221716	1/2 - 1 Mile NE
BS494	CAOG11000217282	1/2 - 1 Mile WNW
BJ495	CAOG11000197255	1/2 - 1 Mile NW
BJ496	CAOG11000194512	1/2 - 1 Mile NW
BR497	CAOG11000197294	1/2 - 1 Mile North
BT498	CAOG11000197249	1/2 - 1 Mile NW
BR499	CAOG11000197272	1/2 - 1 Mile NNW
500	CAOG11000222022	1/2 - 1 Mile South
BL501	CAOG11000221538	1/2 - 1 Mile NW
BT502	CAOG11000217434	1/2 - 1 Mile NW
BO503	CAOG11000221928	1/2 - 1 Mile NNW
BO504	CAOG11000222025	1/2 - 1 Mile NW
BL505	CAOG11000222268	1/2 - 1 Mile NW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
BU506	CAOG11000197248	1/2 - 1 Mile NNW
BO507	CAOG11000197265	1/2 - 1 Mile NNW
BS508	CAOG11000221539	1/2 - 1 Mile WNW
BN509	CAOG11000197374	1/2 - 1 Mile West
BN510	CAOG11000197375	1/2 - 1 Mile West
BO511	CAOG11000197307	1/2 - 1 Mile NNW
BP512	CAOG11000196922	1/2 - 1 Mile West
BS513	CAOG11000198320	1/2 - 1 Mile WNW
BV514	CAOG11000194511	1/2 - 1 Mile NW
BR515	CAOG11000196958	1/2 - 1 Mile NNW
BU516	CAOG11000197138	1/2 - 1 Mile NNW
BS517	CAOG11000222507	1/2 - 1 Mile WNW
BT518	CAOG11000198705	1/2 - 1 Mile NW
BO519	CAOG11000197258	1/2 - 1 Mile NNW
BU520	CAOG11000221929	1/2 - 1 Mile NNW
BO521	CAOG11000197212	1/2 - 1 Mile NNW
BU522	CAOG11000221927	1/2 - 1 Mile NNW
BV523	CAOG11000197214	1/2 - 1 Mile NNW
BW524	CAOG11000196921	1/2 - 1 Mile West
BW525	CAOG11000194516	1/2 - 1 Mile WNW
BR526	CAOG11000196948	1/2 - 1 Mile NNW
BX527	CAOG11000197278	1/2 - 1 Mile ENE
BY528	CAOG11000197301	1/2 - 1 Mile NE
BY529	CAOG11000197281	1/2 - 1 Mile NE
BS530	CAOG11000217283	1/2 - 1 Mile WNW
BY531	CAOG11000197300	1/2 - 1 Mile NE
BZ532	CAOG11000221645	1/2 - 1 Mile West
BT533	CAOG11000197250	1/2 - 1 Mile NW
534	CAOG11000222379	1/2 - 1 Mile East
BX535	CAOG11000197231	1/2 - 1 Mile ENE
BX536	CAOG11000197232	1/2 - 1 Mile ENE
CA539	CAOG11000197276	1/2 - 1 Mile NE
CA538	CAOG11000197273	1/2 - 1 Mile NE
CA537	CAOG11000197274	1/2 - 1 Mile NE
CA540	CAOG11000197275	1/2 - 1 Mile NE
BS541	CAOG11000194525	1/2 - 1 Mile WNW
BV542	CAOG11000197256	1/2 - 1 Mile NW
BU543	CAOG11000221937	1/2 - 1 Mile NNW
BV544	CAOG11000197215	1/2 - 1 Mile NW
BY545	CAOG11000197606	1/2 - 1 Mile NE
BT546	CAOG11000221701	1/2 - 1 Mile NW
BV547	CAOG11000197319	1/2 - 1 Mile NW
BW548	CAOG11000221665	1/2 - 1 Mile West
BU549	CAOG11000197210	1/2 - 1 Mile NNW
BU550	CAOG11000197139	1/2 - 1 Mile NNW
BX551	CAOG11000197244	1/2 - 1 Mile ENE
BZ552	CAOG11000221667	1/2 - 1 Mile West
BU553	CAOG11000197213	1/2 - 1 Mile NNW
BR554	CAOG11000197277	1/2 - 1 Mile NNW
CB555	CAOG11000221930	1/2 - 1 Mile NNW
CC556	CAOG11000196918	1/2 - 1 Mile WNW
BS558	CAOG11000222621	1/2 - 1 Mile WNW
BS557	CAOG11000222622	1/2 - 1 Mile WNW
BS560	CAOG11000222623	1/2 - 1 Mile WNW
BS559	CAOG11000222624	1/2 - 1 Mile WNW
CC561	CAOG11000221663	1/2 - 1 Mile WNW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
CD562	CAOG11000217286	1/2 - 1 Mile WNW
BU563	CAOG11000221926	1/2 - 1 Mile NNW
BZ564	CAOG11000221666	1/2 - 1 Mile WSW
CE565	CAOG11000218609	1/2 - 1 Mile NW
CB566	CAOG11000197261	1/2 - 1 Mile NNW
BY567	CAOG11000197279	1/2 - 1 Mile NE
568	CAOG11000197280	1/2 - 1 Mile NE
CD570	CAOG11000222247	1/2 - 1 Mile WNW
CD569	CAOG11000222246	1/2 - 1 Mile WNW
BY571	CAOG11000197222	1/2 - 1 Mile NE
CF572	CAOG11000197230	1/2 - 1 Mile ENE
573	CAOG11000221998	1/2 - 1 Mile ESE
BX574	CAOG11000197225	1/2 - 1 Mile ENE
CG575	CAOG11000221560	1/2 - 1 Mile NW
CG576	CAOG11000197251	1/2 - 1 Mile NW
CC577	CAOG11000221699	1/2 - 1 Mile WNW
CH578	CAOG11000197209	1/2 - 1 Mile NNW
CH579	CAOG11000197136	1/2 - 1 Mile NNW
CI580	CAOG11000197238	1/2 - 1 Mile ENE
CB581	CAOG11000197260	1/2 - 1 Mile NNW
CH582	CAOG11000197211	1/2 - 1 Mile NNW
CJ583	CAOG11000220767	1/2 - 1 Mile West
CF584	CAOG11000221995	1/2 - 1 Mile ENE
CH585	CAOG11000197143	1/2 - 1 Mile NNW
CI588	CAOG11000198559	1/2 - 1 Mile ENE
CI587	CAOG11000198558	1/2 - 1 Mile ENE
CI586	CAOG11000198557	1/2 - 1 Mile ENE
CI589	CAOG11000197432	1/2 - 1 Mile ENE
CI590	CAOG11000197433	1/2 - 1 Mile ENE
CB591	CAOG11000197306	1/2 - 1 Mile NNW
CF592	CAOG11000197289	1/2 - 1 Mile ENE
CK593	CAOG11000197257	1/2 - 1 Mile NW
CI594	CAOG11000197237	1/2 - 1 Mile ENE
CB595	CAOG11000197264	1/2 - 1 Mile NNW
CI596	CAOG11000197605	1/2 - 1 Mile ENE
CJ597	CAOG11000220762	1/2 - 1 Mile West
CE598	CAOG11000222153	1/2 - 1 Mile NW
CJ599	CAOG11000220760	1/2 - 1 Mile WNW
CL600	CAOG11000222267	1/2 - 1 Mile WNW
CM602	CAOG11000221542	1/2 - 1 Mile NW
CM601	CAOG11000221541	1/2 - 1 Mile NW
CN603	CAOG11000197226	1/2 - 1 Mile ENE
604	CAOG11000197263	1/2 - 1 Mile NNW
CG605	CAOG11000221960	1/2 - 1 Mile NW
CL606	CAOG11000221576	1/2 - 1 Mile WNW
CK607	CAOG11000221544	1/2 - 1 Mile NW
CO608	CAOG11000221662	1/2 - 1 Mile WNW
CP609	CAOG11000197287	1/2 - 1 Mile East
CP610	CAOG11000197229	1/2 - 1 Mile ENE
CG611	CAOG11000221491	1/2 - 1 Mile NW
CN612	CAOG11000198560	1/2 - 1 Mile ENE
CL613	CAOG11000222160	1/2 - 1 Mile WNW
CL614	CAOG11000222161	1/2 - 1 Mile WNW
CL615	CAOG11000222164	1/2 - 1 Mile WNW
CM617	CAOG11000222270	1/2 - 1 Mile NW
CM616	CAOG11000222269	1/2 - 1 Mile NW

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
CN618	CAOG11000197685	1/2 - 1 Mile ENE
CO619	CAOG11000221543	1/2 - 1 Mile WNW
CN620	CAOG11000197228	1/2 - 1 Mile ENE
CM621	CAOG11000222522	1/2 - 1 Mile NW
CM622	CAOG11000222523	1/2 - 1 Mile NW
CQ623	CAOG11000221702	1/2 - 1 Mile NW
CK624	CAOG11000221535	1/2 - 1 Mile NW
CM625	CAOG11000222209	1/2 - 1 Mile NW
CL626	CAOG11000222163	1/2 - 1 Mile WNW
CP627	CAOG11000222010	1/2 - 1 Mile East
CO628	CAOG11000222243	1/2 - 1 Mile WNW
CQ629	CAOG11000222158	1/2 - 1 Mile WNW
CQ630	CAOG11000222159	1/2 - 1 Mile WNW
CK631	CAOG11000197259	1/2 - 1 Mile NW
CM632	CAOG11000222519	1/2 - 1 Mile NW
CM634	CAOG11000222521	1/2 - 1 Mile NW
CM633	CAOG11000222520	1/2 - 1 Mile NW
635	CAOG11000220764	1/2 - 1 Mile West
CP636	CAOG11000222017	1/2 - 1 Mile East
CR637	CAOG11000222517	1/2 - 1 Mile WNW
CR638	CAOG11000222518	1/2 - 1 Mile WNW
CP639	CAOG11000197292	1/2 - 1 Mile ENE
CR640	CAOG11000222516	1/2 - 1 Mile WNW
CS643	CAOG11000222612	1/2 - 1 Mile NW
CS642	CAOG11000222615	1/2 - 1 Mile NW
CS641	CAOG11000222614	1/2 - 1 Mile NW
CS644	CAOG11000222613	1/2 - 1 Mile NW
CS647	CAOG11000222616	1/2 - 1 Mile NW
CS648	CAOG11000222617	1/2 - 1 Mile NW
CS645	CAOG11000222618	1/2 - 1 Mile NW
CS646	CAOG11000222619	1/2 - 1 Mile NW
CQ649	CAOG11000222300	1/2 - 1 Mile NW
CS650	CAOG11000221540	1/2 - 1 Mile NW
CP651	CAOG11000197293	1/2 - 1 Mile East
CR653	CAOG11000221476	1/2 - 1 Mile WNW
CR652	CAOG11000221475	1/2 - 1 Mile WNW
CT654	CAOG11000222015	1/2 - 1 Mile East
CT655	CAOG11000222019	1/2 - 1 Mile East
656	CAOG11000221700	1/2 - 1 Mile WNW
CR658	CAOG11000222266	1/2 - 1 Mile WNW
CR657	CAOG11000222265	1/2 - 1 Mile WNW
CQ659	CAOG11000222293	1/2 - 1 Mile NW
CQ660	CAOG11000222294	1/2 - 1 Mile NW
CU661	CAOG11000221472	1/2 - 1 Mile NW
CQ663	CAOG11000222296	1/2 - 1 Mile NW
CQ662	CAOG11000222295	1/2 - 1 Mile NW
664	CAOG11000197262	1/2 - 1 Mile NNW
CS665	CAOG11000221501	1/2 - 1 Mile NW
CQ666	CAOG11000222297	1/2 - 1 Mile NW
CQ667	CAOG11000222298	1/2 - 1 Mile NW
668	CAOG11000197303	1/2 - 1 Mile ESE
CU669	CAOG11000222299	1/2 - 1 Mile NW
CT670	CAOG11000222021	1/2 - 1 Mile East
CU671	CAOG11000221577	1/2 - 1 Mile NW
CU672	CAOG11000221574	1/2 - 1 Mile NW
CU673	CAOG11000221575	1/2 - 1 Mile NW

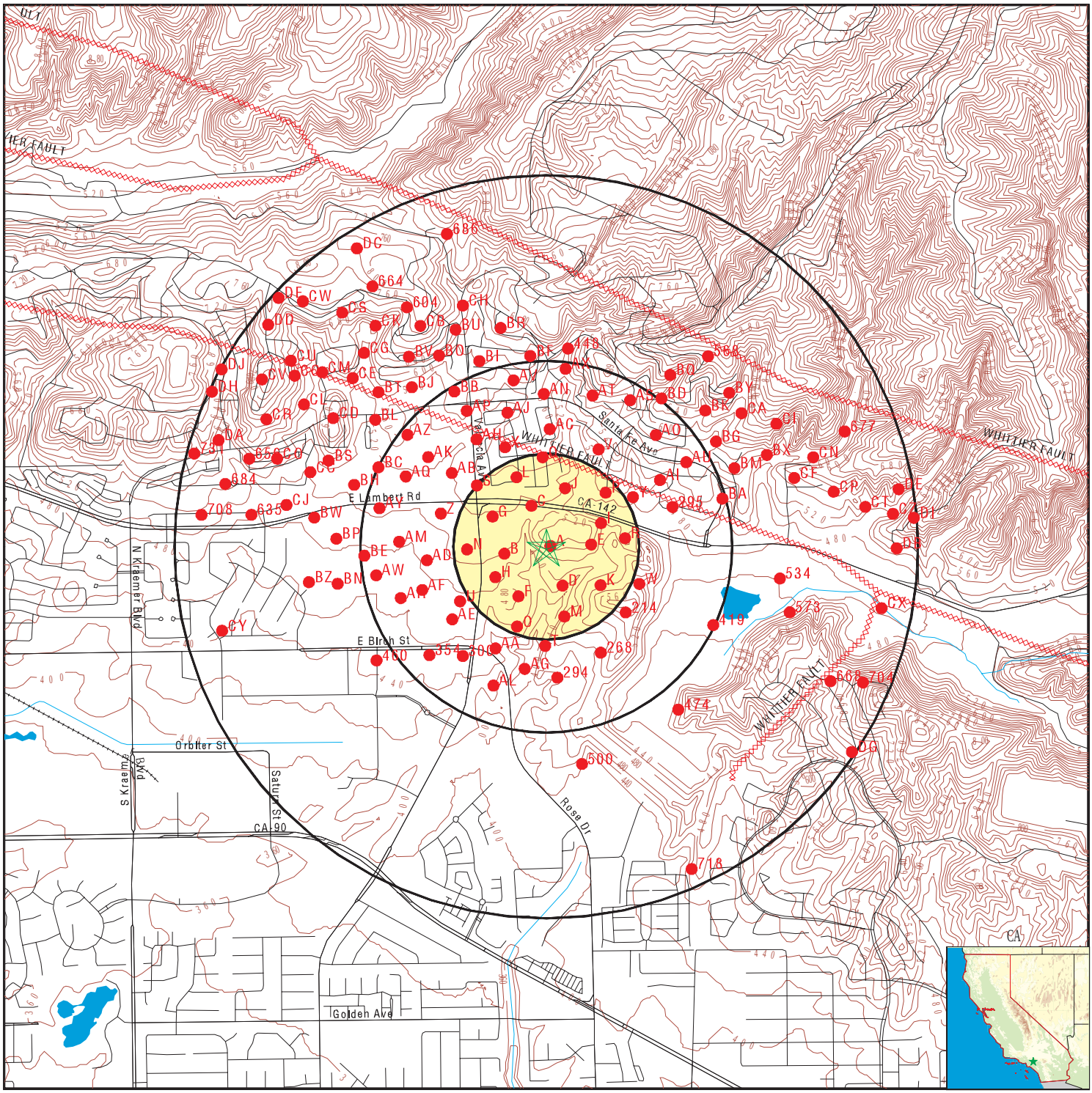
STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
CU674	CAOG11000222208	1/2 - 1 Mile NW
CU675	CAOG11000222200	1/2 - 1 Mile NW
CU676	CAOG11000222201	1/2 - 1 Mile NW
677	CAOG11000197291	1/2 - 1 Mile ENE
CT678	CAOG11000222014	1/2 - 1 Mile East
CS679	CAOG11000222244	1/2 - 1 Mile NW
CS680	CAOG11000221526	1/2 - 1 Mile NW
CT681	CAOG11000197288	1/2 - 1 Mile East
CV682	CAOG11000222659	1/2 - 1 Mile WNW
CS683	CAOG11000221548	1/2 - 1 Mile NW
684	CAOG11000220759	1/2 - 1 Mile West
CT685	CAOG11000222020	1/2 - 1 Mile East
686	CAOG11000221433	1/2 - 1 Mile NNW
CV688	CAOG11000221478	1/2 - 1 Mile WNW
CV689	CAOG11000221479	1/2 - 1 Mile WNW
CV687	CAOG11000221477	1/2 - 1 Mile WNW
CV690	CAOG11000221566	1/2 - 1 Mile WNW
CT691	CAOG11000222011	1/2 - 1 Mile East
CW692	CAOG11000221554	1/2 - 1 Mile NW
CX693	CAOG11000221999	1/2 - 1 Mile ESE
CY694	CAOG11000221676	1/2 - 1 Mile WSW
CZ695	CAOG11000222013	1/2 - 1 Mile East
CZ696	CAOG11000222018	1/2 - 1 Mile East
CY697	CAOG11000217277	1/2 - 1 Mile WSW
CV698	CAOG11000217288	1/2 - 1 Mile WNW
CT699	CAOG11000222012	1/2 - 1 Mile East
CZ700	CAOG11000222016	1/2 - 1 Mile East
CZ701	CAOG11000197290	1/2 - 1 Mile East
DA702	CAOG11000222248	1/2 - 1 Mile WNW
DB703	CAOG11000222000	1/2 - 1 Mile East
704	CAOG11000197302	1/2 - 1 Mile ESE
DA705	CAOG11000221573	1/2 - 1 Mile WNW
DA707	CAOG11000222504	1/2 - 1 Mile WNW
DA706	CAOG11000222503	1/2 - 1 Mile WNW
708	CAOG11000219512	1/2 - 1 Mile West
DC709	CAOG11000222651	1/2 - 1 Mile NNW
CZ710	CAOG11000222051	1/2 - 1 Mile East
CX711	CAOG11000222065	1/2 - 1 Mile East
CZ712	CAOG11000222041	1/2 - 1 Mile East
DD713	CAOG11000221703	1/2 - 1 Mile NW
CZ714	CAOG11000222038	1/2 - 1 Mile East
DE715	CAOG11000197227	1/2 - 1 Mile East
CW716	CAOG11000221623	1/2 - 1 Mile NW
DB717	CAOG11000222001	1/2 - 1 Mile East
718	CAOG11000220224	1/2 - 1 Mile SSE
CW719	CAOG11000221525	1/2 - 1 Mile NW
CZ720	CAOG11000222061	1/2 - 1 Mile East
DB721	CAOG11000222077	1/2 - 1 Mile East
DD724	CAOG11000221499	1/2 - 1 Mile NW
DD722	CAOG11000221497	1/2 - 1 Mile NW
DD723	CAOG11000221498	1/2 - 1 Mile NW
CZ725	CAOG11000222040	1/2 - 1 Mile East
DC726	CAOG11000222656	1/2 - 1 Mile NNW
CZ727	CAOG11000222042	1/2 - 1 Mile East
CZ728	CAOG11000222073	1/2 - 1 Mile East
DE729	CAOG11000222055	1/2 - 1 Mile East

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
DF730	CAOG11000221521	1/2 - 1 Mile NW
731	CAOG11000221967	1/2 - 1 Mile WNW
DF732	CAOG11000221520	1/2 - 1 Mile NW
DG733	CAOG11000197268	1/2 - 1 Mile ESE
DH734	CAOG11000222515	1/2 - 1 Mile WNW
DI735	CAOG11000222039	1/2 - 1 Mile East
DH736	CAOG11000221950	1/2 - 1 Mile WNW
DH737	CAOG11000221961	1/2 - 1 Mile WNW
DI738	CAOG11000222062	1/2 - 1 Mile East
DF739	CAOG11000221524	1/2 - 1 Mile NW
DJ741	CAOG11000222350	1/2 - 1 Mile WNW
DJ740	CAOG11000222349	1/2 - 1 Mile WNW
DI742	CAOG11000222045	1/2 - 1 Mile East
DG743	CAOG11000197245	1/2 - 1 Mile SE
DH744	CAOG11000221697	1/2 - 1 Mile WNW
DJ745	CAOG11000221565	1/2 - 1 Mile WNW

PHYSICAL SETTING SOURCE MAP - 4848184.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	265-Acre Brea Property	CLIENT:	Northgate Env. Management Inc.
ADDRESS:	Valencia Avenue Brea CA 92823	CONTACT:	Nancy Leitner
LAT/LONG:	33.922355 / 117.844415	INQUIRY #:	4848184.2s
		DATE:	February 07, 2017 8:16 pm

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Map ID
Direction
Distance

Database EDR ID Number

A1
East **OIL_GAS** **CAOG11000198720**
0 - 1/8 Mile

District nun:	1	Api number:	05921331
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	524.593
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	128
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198720		

A2
East **OIL_GAS** **CAOG11000198721**
0 - 1/8 Mile

District nun:	1	Api number:	05921331
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	524.593
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	128
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198721		

A3
NW **OIL_GAS** **CAOG11000197200**
0 - 1/8 Mile

District nun:	1	Api number:	05907572
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	527.081
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	22
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197200		

A4
NW
0 - 1/8 Mile

OIL_GAS **CAOG11000194514**

District nun:	1	Api number:	05900019
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	526.546
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	105
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194514		

A5
South
0 - 1/8 Mile

OIL_GAS **CAOG11000198256**

District nun:	1	Api number:	05920864
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	504.012
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	120
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198256		

A6
SSE **OIL_GAS** **CAOG11000198746**
0 - 1/8 Mile

District nun:	1	Api number:	05921351
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	490.353
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	134
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198746		

A7
SSE **OIL_GAS** **CAOG11000198747**
0 - 1/8 Mile

District nun:	1	Api number:	05921351
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	490.353
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	134
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198747		

Map ID
Direction
Distance

Database EDR ID Number

A8
SE **OIL_GAS** **CAOG11000198167**
0 - 1/8 Mile

District nun:	1	Api number:	05920799
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	492.767
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	116
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198167		

A9
ENE **OIL_GAS** **CAOG11000196906**
0 - 1/8 Mile

District nun:	1	Api number:	05907026
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	539.954
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	34
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196906		

A10
NNW **OIL_GAS** **CAOG11000221922**
0 - 1/8 Mile

District nun:	1	Api number:	05907571
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	20
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221922		

A11
SSW **OIL_GAS** **CAOG11000196908**
0 - 1/8 Mile

District nun:	1	Api number:	05907028
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	450.536
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	37
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196908		

A12
North **OIL_GAS** **CAOG11000198716**
0 - 1/8 Mile

District nun:	1	Api number:	05921329
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.198
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	126
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198716		

A13
North
0 - 1/8 Mile

OIL_GAS **CAOG11000198717**

District nun:	1	Api number:	05921329
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.198
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	126
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198717		

A14
South
0 - 1/8 Mile

OIL_GAS **CAOG11000217748**

District nun:	1	Api number:	05900946
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000217748		

Map ID
Direction
Distance

Database EDR ID Number

A15
NNE
0 - 1/8 Mile

OIL_GAS **CAOG11000198162**

District nun:	1	Api number:	05920796
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	548.853
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	113
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198162		

A16
NNW
0 - 1/8 Mile

OIL_GAS **CAOG11000197473**

District nun:	1	Api number:	05920177
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	506.088
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	107
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197473		

A17
East
0 - 1/8 Mile

OIL_GAS **CAOG11000198257**

District nun:	1	Api number:	05920865
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	528.035
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	121
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198257		

A18
East **OIL_GAS** **CAOG11000198258**
0 - 1/8 Mile

District nun:	1	Api number:	05920865
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	528.035
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	121
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198258		

B19
West **OIL_GAS** **CAOG11000197201**
0 - 1/8 Mile

District nun:	1	Api number:	05907573
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	486.644
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	25
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197201		

A20
NE **OIL_GAS** **CAOG11000221637**
0 - 1/8 Mile

District nun:	1	Api number:	05907036
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	13
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221637		

A21
SSW **OIL_GAS** **CAOG11000198274**
0 - 1/8 Mile

District nun:	1	Api number:	05920876
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	438.379
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	124
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198274		

Map ID
Direction
Distance

Database EDR ID Number

A22
SSW **OIL_GAS** **CAOG11000198275**
0 - 1/8 Mile

District nun:	1	Api number:	05920876
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	438.379
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	124
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198275		

A23
NNE **OIL_GAS** **CAOG11000221920**
0 - 1/8 Mile

District nun:	1	Api number:	05907566
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000221920		

B24
NW **OIL_GAS** **CAOG11000194513**
0 - 1/8 Mile

District nun:	1	Api number:	05900018
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	493.601
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	104
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194513		

C25
NNW **OIL_GAS** **CAOG11000197706**
0 - 1/8 Mile

District nun:	1	Api number:	05920407
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	503.493
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	109
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197706		

D26
SSE **OIL_GAS** **CAOG11000198742**
0 - 1/8 Mile

District nun:	1	Api number:	05921349
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	478.598
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	136
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198742		

D27
SSE **OIL_GAS** **CAOG11000198743**
0 - 1/8 Mile

District nun:	1	Api number:	05921349
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	478.598
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	136
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198743		

B28
WSW **OIL_GAS** **CAOG11000198724**
0 - 1/8 Mile

District nun:	1	Api number:	05921333
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	489.266
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	130
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198724		

Map ID
Direction
Distance

Database EDR ID Number

B29
WSW
0 - 1/8 Mile

OIL_GAS **CAOG11000198725**

District nun:	1	Api number:	05921333
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	489.266
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	130
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198725		

D30
ESE
0 - 1/8 Mile

OIL_GAS **CAOG11000196909**

District nun:	1	Api number:	05907030
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	501.088
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	42
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196909		

E31
East
0 - 1/8 Mile

OIL_GAS **CAOG11000198159**

District nun:	1	Api number:	05920794
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.16
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	111
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198159		

C32
NNE **OIL_GAS** **CAOG11000196912**
0 - 1/8 Mile

District nun:	1	Api number:	05907034
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	511.012
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	52
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196912		

C33
NW **OIL_GAS** **CAOG11000197399**
0 - 1/8 Mile

District nun:	1	Api number:	05920101
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	500.334
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	106
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197399		

E34
NE
0 - 1/8 Mile

OIL_GAS **CAOG11000197202**

District nun:	1	Api number:	05907575
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	554.962
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	27
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197202		

B35
West
0 - 1/8 Mile

OIL_GAS **CAOG11000198165**

District nun:	1	Api number:	05920798
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	501.783
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	115
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198165		

Map ID
Direction
Distance

Database EDR ID Number

B36
West
0 - 1/8 Mile

OIL_GAS **CAOG11000198166**

District nun:	1	Api number:	05920798
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	501.783
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	115
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198166		

D37
South
0 - 1/8 Mile

OIL_GAS **CAOG11000221458**

District nun:	1	Api number:	05906787
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221458		

D38
SSE
0 - 1/8 Mile

OIL_GAS **CAOG11000196807**

District nun:	1	Api number:	05906789
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	464.133
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196807		

D39
SSE **OIL_GAS** **CAOG11000196808**
0 - 1/8 Mile

District nun:	1	Api number:	05906789
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	464.133
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196808		

D40
SE **OIL_GAS** **CAOG11000196910**
0 - 1/8 Mile

District nun:	1	Api number:	05907031
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	467.105
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	43
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196910		

F42
SSW
0 - 1/8 Mile

OIL_GAS **CAOG11000198713**

District nun:	1	Api number:	05921327
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	438.431
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	53
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198713		

F41
SSW
0 - 1/8 Mile

OIL_GAS **CAOG11000198712**

District nun:	1	Api number:	05921327
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	438.431
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	53
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198712		

Map ID
Direction
Distance

Database EDR ID Number

F43
SW
0 - 1/8 Mile

OIL_GAS **CAOG11000196907**

District nun:	1	Api number:	05907027
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	451.497
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196907		

B45
WSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198723**

District nun:	1	Api number:	05921332
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	500.904
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	129
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198723		

B44
WSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198722**

District nun:	1	Api number:	05921332
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	500.904
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	129
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198722		

D47
South **OIL_GAS** **CAOG11000197341**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920009
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	443.339
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197341		

D46
South **OIL_GAS** **CAOG11000197340**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920009
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	443.339
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197340		

F48
SW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221462**

District nun:	1	Api number:	05906793
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221462		

G49
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196815**

District nun:	1	Api number:	05906799
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	514.775
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	102
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196815		

Map ID
Direction
Distance

Database EDR ID Number

B50
SW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198251**

District nun:	1	Api number:	05920862
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.51
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	118
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198251		

B51
SW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198250**

District nun:	1	Api number:	05920862
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.51
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	118
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198250		

B53
SW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198252**

District nun:	1	Api number:	05920862
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.51
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	118
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198252		

B52
SW **OIL_GAS** **CAOG11000198253**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920862
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.51
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	118
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198253		

D54
SE **OIL_GAS** **CAOG11000221459**
1/8 - 1/4 Mile

District nun:	1	Api number:	05906788
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221459		

B55
WSW **OIL_GAS** **CAOG11000222346**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920800
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	117
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222346		

B57
WNW **OIL_GAS** **CAOG11000198273**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920875
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	509.353
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	123
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198273		

Map ID
Direction
Distance

Database EDR ID Number

B56
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198272**

District nun:	1	Api number:	05920875
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	509.353
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	123
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198272		

C58
NNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197199**

District nun:	1	Api number:	05907569
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	512.47
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	15
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197199		

C59
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197195**

District nun:	1	Api number:	05907563
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	520.352
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	8
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197195		

H61
SW **OIL_GAS** **CAOG11000198745**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921350
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	477.76
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	137
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198745		

H60
SW **OIL_GAS** **CAOG11000198744**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921350
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	477.76
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	137
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198744		

E62
East **OIL_GAS** **CAOG11000196913**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907035
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	503.136
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	94
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196913		

I64
ENE **OIL_GAS** **CAOG11000198260**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920866
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	518.571
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	122
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198260		

Map ID
Direction
Distance

Database EDR ID Number

I63
ENE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198259**

District nun:	1	Api number:	05920866
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	518.571
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	122
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198259		

B66
West
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198161**

District nun:	1	Api number:	05920795
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	506.319
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	112
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198161		

B65
West
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198160**

District nun:	1	Api number:	05920795
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	506.319
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	112
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198160		

D68
SE **OIL_GAS** **CAOG11000198741**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921348
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	494.578
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	66
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198741		

D67
SE **OIL_GAS** **CAOG11000198740**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921348
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	494.578
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	66
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198740		

G69
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198163**

District nun:	1	Api number:	05920797
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.073
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	114
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198163		

G70
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198164**

District nun:	1	Api number:	05920797
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.073
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	114
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198164		

Map ID
Direction
Distance

Database EDR ID Number

C71
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221923**

District nun:	1	Api number:	05907574
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	26
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221923		

G72
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198718**

District nun:	1	Api number:	05921330
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	509.409
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	127
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198718		

G73
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198719**

District nun:	1	Api number:	05921330
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	509.409
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	127
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198719		

H74
WSW **OIL_GAS** **CAOG11000198254**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920863
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	493.169
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	119
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198254		

H75
WSW **OIL_GAS** **CAOG11000198255**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920863
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	493.169
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	119
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198255		

J76
NNE **OIL_GAS** **CAOG11000197193**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907561
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	515.098
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197193		

B77
West **OIL_GAS** **CAOG11000197299**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907746
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	504.999
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	29
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197299		

Map ID
Direction
Distance

Database EDR ID Number

J78
NNE **OIL_GAS** **CAOG11000197534**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920225
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.433
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	108
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197534		

J79
NNE **OIL_GAS** **CAOG11000197535**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920225
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.433
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	108
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197535		

J80
North **OIL_GAS** **CAOG11000197698**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920401
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	519.853
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	127
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197698		

H81
WSW **OIL_GAS** **CAOG11000221635**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907029
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	38
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000221635		

F82
SW **OIL_GAS** **CAOG11000198710**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921326
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	475.709
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	52
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198710		

F83
SW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198711**

District nun:	1	Api number:	05921326
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	475.709
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	52
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198711		

D85
SSE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197326**

District nun:	1	Api number:	05907855
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	424.851
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	24
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197326		

Map ID
Direction
Distance

Database EDR ID Number

D84
SSE **OIL_GAS** **CAOG11000197325**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907855
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	424.851
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	24
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197325		

C86
NNW **OIL_GAS** **CAOG11000197196**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907565
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	520.083
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197196		

J87
NE **OIL_GAS** **CAOG11000221919**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907564
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221919		

H89
SW **OIL_GAS** **CAOG11000198739**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921347
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	477.12
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	65
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198739		

H88
SW **OIL_GAS** **CAOG11000198738**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921347
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	477.12
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	65
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198738		

J90
NNE **OIL_GAS** **CAOG11000197192**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907560
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	484.376
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	5
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197192		

G92
WNW **OIL_GAS** **CAOG11000198715**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921328
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.83
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	125
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198715		

Map ID
Direction
Distance

Database EDR ID Number

G91
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198714**

District nun:	1	Api number:	05921328
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.83
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	125
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198714		

J93
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196943**

District nun:	1	Api number:	05907128
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	517.347
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	67
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196943		

J94
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197128**

District nun:	1	Api number:	05907497
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	514.418
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	26
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197128		

J95
NNE **OIL_GAS** **CAOG11000197127**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907496
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	511.832
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	25
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197127		

E96
ESE **OIL_GAS** **CAOG11000221636**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907033
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	47
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221636		

K97
SE **OIL_GAS** **CAOG11000196911**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907032
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	515.405
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	45
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196911		

K98
SSE **OIL_GAS** **CAOG11000197342**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920010
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	484.617
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	30
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197342		

Map ID
Direction
Distance

Database EDR ID Number

G100
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196817**

District nun:	1	Api number:	05906800
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	514.586
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	101
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196817		

G99
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196816**

District nun:	1	Api number:	05906800
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	514.586
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	101
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196816		

L101
NNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197697**

District nun:	1	Api number:	05920400
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	520.769
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	126
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197697		

G102
WNW **OIL_GAS** **CAOG11000222004**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907745
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	18
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222004		

K104
SE **OIL_GAS** **CAOG11000197350**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920017
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.647
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	37
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197350		

K103
SE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197349**

District nun:	1	Api number:	05920017
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.647
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	37
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197349		

J105
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197191**

District nun:	1	Api number:	05907559
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.276
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197191		

Map ID
Direction
Distance

Database EDR ID Number

L106
NNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197133**

District nun:	1	Api number:	05907501
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.374
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197133		

K108
ESE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197790**

District nun:	1	Api number:	05920470
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	501.512
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	110
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197790		

K107
ESE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197789**

District nun:	1	Api number:	05920470
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	501.512
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	110
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197789		

F109
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198730**

District nun:	1	Api number:	05921341
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	482.896
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	54
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198730		

F110
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198731**

District nun:	1	Api number:	05921341
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	482.896
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	54
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198731		

F111
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196813**

District nun:	1	Api number:	05906798
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	408.775
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	29
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196813		

F112
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196814**

District nun:	1	Api number:	05906798
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	408.775
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	29
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196814		

Map ID
Direction
Distance

Database EDR ID Number

J113
NNE **OIL_GAS** **CAOG11000197126**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907495
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	474.513
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	24
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197126		

G114
NW **OIL_GAS** **CAOG11000197198**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907568
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	536.99
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	14
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197198		

F115
SSW **OIL_GAS** **CAOG11000197347**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920016
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	481.253
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197347		

F116
SSW **OIL_GAS** **CAOG11000197348**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920016
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	481.253
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197348		

J117
North **OIL_GAS** **CAOG11000198772**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921448
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	521.8
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011197.ssf		
Leasename:	Olinda	Wellnumber:	200
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198772		

J118
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221918**

District nun:	1	Api number:	05907558
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221918		

H119
WSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221461**

District nun:	1	Api number:	05906792
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221461		

Map ID
Direction
Distance

Database EDR ID Number

M120
SSE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221460**

District nun:	1	Api number:	05906791
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221460		

J121
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197652**

District nun:	1	Api number:	05920359
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	524.462
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	115
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197652		

G122
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221921**

District nun:	1	Api number:	05907570
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	17
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221921		

M123
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196812**

District nun:	1	Api number:	05906796
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	427.887
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	14
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196812		

N124
West
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196920**

District nun:	1	Api number:	05907048
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	504.286
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	48
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196920		

I125
ENE **OIL_GAS** **CAOG11000197197**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907567
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	469.798
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197197		

L126
North **OIL_GAS** **CAOG11000197686**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920392
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.004
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	118
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197686		

Map ID
Direction
Distance

Database EDR ID Number

O127
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196811**

District nun:	1	Api number:	05906795
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	471.169
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196811		

N128
WSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000194529**

District nun:	1	Api number:	05900040
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	500.623
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	126
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194529		

P129
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197194**

District nun:	1	Api number:	05907562
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	482.606
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197194		

M131
SSE **OIL_GAS** **CAOG11000197344**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920011
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	494.155
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197344		

M130
SSE **OIL_GAS** **CAOG11000197343**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920011
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	494.155
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197343		

P132
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000222255**

District nun:	1	Api number:	05920402
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	128
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222255		

G134
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196819**

District nun:	1	Api number:	05906801
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	523.122
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	103
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196819		

Map ID
Direction
Distance

Database EDR ID Number

G133
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196818**

District nun:	1	Api number:	05906801
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	523.122
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	103
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196818		

H135
WSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000194522**

District nun:	1	Api number:	05900031
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	493.154
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	105
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194522		

N136
West
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196930**

District nun:	1	Api number:	05907070
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	508.342
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	99
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196930		

N137
West
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198286**

District nun:	1	Api number:	05920887
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	496.672
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	151
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198286		

N138
West
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221640**

District nun:	1	Api number:	05907042
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	30
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221640		

O139
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198736**

District nun:	1	Api number:	05921345
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	418.416
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	61
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198736		

O140
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198737**

District nun:	1	Api number:	05921345
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	418.416
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	61
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198737		

Map ID
Direction
Distance

Database EDR ID Number

P141
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197125**

District nun:	1	Api number:	05907494
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	478.926
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	23
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197125		

Q142
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196947**

District nun:	1	Api number:	05907133
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	532.72
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	74
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196947		

L143
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197137**

District nun:	1	Api number:	05907505
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	534.231
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	41
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197137		

R144
East
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198640**

District nun:	1	Api number:	05921275
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	479.874
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Not Reported	Wellnumber:	146
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198640		

J145
NNE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196945**

District nun:	1	Api number:	05907130
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	524.203
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	69
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196945		

R147
East
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197431**

District nun:	1	Api number:	05920141
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	467.502
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07007199.ssf		
Leasename:	Not Reported	Wellnumber:	109
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197431		

R146
East
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197430**

District nun:	1	Api number:	05920141
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	467.502
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07007199.ssf		
Leasename:	Not Reported	Wellnumber:	109
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197430		

Map ID
Direction
Distance

Database EDR ID Number

L148
NNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197684**

District nun:	1	Api number:	05920390
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	531.12
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	116
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197684		

O150
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198735**

District nun:	1	Api number:	05921343
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	470.422
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	58
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198735		

O149
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198734**

District nun:	1	Api number:	05921343
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	470.422
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	58
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198734		

N151
WNW **OIL_GAS** **CAOG11000221643**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907050
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	50
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221643		

L152
NNW **OIL_GAS** **CAOG11000221704**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907132
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	71
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221704		

K153
ESE **OIL_GAS** **CAOG11000196809**
1/8 - 1/4 Mile

District nun:	1	Api number:	05906790
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	529.765
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196809		

R154
East **OIL_GAS** **CAOG11000197891**
1/8 - 1/4 Mile

District nun:	1	Api number:	05920570
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	472.54
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Not Reported	Wellnumber:	131
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197891		

Map ID
Direction
Distance

Database EDR ID Number

R155
East
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197892**

District nun:	1	Api number:	05920570
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	472.54
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Not Reported	Wellnumber:	131
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197892		

R157
East
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198201**

District nun:	1	Api number:	05920822
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	463.449
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Not Reported	Wellnumber:	133
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198201		

R156
East
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198200**

District nun:	1	Api number:	05920822
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	463.449
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Not Reported	Wellnumber:	133
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198200		

O159
SSW **OIL_GAS** **CAOG11000198733**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921342
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	470.537
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	56
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198733		

O158
SSW **OIL_GAS** **CAOG11000198732**
1/8 - 1/4 Mile

District nun:	1	Api number:	05921342
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	470.537
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	56
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198732		

O160
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198652**

District nun:	1	Api number:	05921284
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	429.119
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	48
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000198652		

S161
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000222003**

District nun:	1	Api number:	05907744
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	16
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222003		

Map ID
Direction
Distance

Database EDR ID Number

S162
WNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000194528**

District nun:	1	Api number:	05900039
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	513.857
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	123
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194528		

P163
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221917**

District nun:	1	Api number:	05907556
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Fee Three	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221917		

K164
SE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221430**

District nun:	1	Api number:	05906734
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	8
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221430		

P165
NE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197190**

District nun:	1	Api number:	05907557
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	469.673
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Olinda Fee Three	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197190		

O166
SSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221463**

District nun:	1	Api number:	05906797
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	22
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221463		

L167
NNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198642**

District nun:	1	Api number:	05921277
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	537.509
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	SA-2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000198642		

T169
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198651**

District nun:	1	Api number:	05921283
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	414.497
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	47
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000198651		

Map ID
Direction
Distance

Database EDR ID Number

T168
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000198650**

District nun:	1	Api number:	05921283
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	414.497
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	47
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000198650		

P170
ENE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197129**

District nun:	1	Api number:	05907498
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	474.342
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	27
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197129		

U171
WSW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221642**

District nun:	1	Api number:	05907047
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	46
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221642		

O172
SW **OIL_GAS** **CAOG11000196810**
1/8 - 1/4 Mile

District nun:	1	Api number:	05906794
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	454.403
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196810		

P173
NE **OIL_GAS** **CAOG11000197124**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907493
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	496.062
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	22
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197124		

L174
NNW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000196946**

District nun:	1	Api number:	05907131
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.286
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	70
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196946		

S175
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197142**

District nun:	1	Api number:	05907510
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	533.828
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	47
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197142		

Map ID
Direction
Distance

Database EDR ID Number

S176
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197607**

District nun:	1	Api number:	05920313
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	535.491
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	113
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197607		

S177
NW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197608**

District nun:	1	Api number:	05920313
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	535.491
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	113
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197608		

Q178
NNE
1/8 - 1/4 Mile

OIL_GAS **CAOG11000222254**

District nun:	1	Api number:	05920395
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	121
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222254		

O179
SSW **OIL_GAS** **CAOG11000197323**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907854
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	440.172
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	23
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197323		

O180
SSW **OIL_GAS** **CAOG11000197324**
1/8 - 1/4 Mile

District nun:	1	Api number:	05907854
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	440.172
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	23
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197324		

O181
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000222132**

District nun:	1	Api number:	05920008
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	33
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222132		

O182
South
1/8 - 1/4 Mile

OIL_GAS **CAOG11000222133**

District nun:	1	Api number:	05920008
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	33
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222133		

Map ID
Direction
Distance

Database EDR ID Number

U183
SW
1/8 - 1/4 Mile

OIL_GAS **CAOG11000221669**

District nun:	1	Api number:	05907093
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221669		

Q185
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197690**

District nun:	1	Api number:	05920394
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	547.924
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	120
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197690		

Q184
North
1/8 - 1/4 Mile

OIL_GAS **CAOG11000197689**

District nun:	1	Api number:	05920394
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	547.924
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	120
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197689		

S186
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194505**

District nun:	1	Api number:	05900006
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	534.006
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	98
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194505		

S187
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196917**

District nun:	1	Api number:	05907044
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	531.358
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	40
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000196917		

O188
SSW **OIL_GAS** **CAOG11000221431**
1/4 - 1/2 Mile

District nun:	1	Api number:	05906735
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	13
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221431		

N189
West **OIL_GAS** **CAOG11000221654**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907067
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	88
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221654		

Map ID
Direction
Distance

Database EDR ID Number

T190
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197345**

District nun:	1	Api number:	05920012
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	483.584
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197345		

T191
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197346**

District nun:	1	Api number:	05920012
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	483.584
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197346		

N192
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194589**

District nun:	1	Api number:	05900223
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	493.154
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	106
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194589		

S193
NW **OIL_GAS** **CAOG11000197696**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920399
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	533.756
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	125
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197696		

O194
SSW **OIL_GAS** **CAOG11000198572**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921210
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	429.712
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	41
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198572		

U195
WSW **OIL_GAS** **CAOG11000198287**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920888
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	480.202
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	152
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198287		

V196
NNE **OIL_GAS** **CAOG11000196944**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907129
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	494.949
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	68
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196944		

Map ID
Direction
Distance

Database EDR ID Number

W197
ESE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222377**

District nun:	1	Api number:	05920935
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	132
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222377		

W198
ESE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222378**

District nun:	1	Api number:	05920935
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	132
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222378		

X199
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197687**

District nun:	1	Api number:	05920393
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	538.712
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	119
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197687		

X200
NNW **OIL_GAS** **CAOG11000197688**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920393
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	538.712
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	119
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197688		

T202
South **OIL_GAS** **CAOG11000198578**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921213
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	408.285
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	44
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198578		

T201
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198577**

District nun:	1	Api number:	05921213
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	408.285
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	44
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198577		

O203
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198573**

District nun:	1	Api number:	05921211
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	441.463
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	42
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198573		

Map ID
Direction
Distance

Database EDR ID Number

O204
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198574**

District nun:	1	Api number:	05921211
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	441.463
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	42
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198574		

U205
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221644**

District nun:	1	Api number:	05907051
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	51
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221644		

Q206
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198639**

District nun:	1	Api number:	05921274
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.811
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	145
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000198639		

V207
NNE **OIL_GAS** **CAOG11000197157**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907525
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	493.959
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07007199.ssf		
Leasename:	Not Reported	Wellnumber:	62
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197157		

Y208
ENE **OIL_GAS** **CAOG11000197135**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907503
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	463.912
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	34
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197135		

W209
ESE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221429**

District nun:	1	Api number:	05906733
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221429		

Z210
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194520**

District nun:	1	Api number:	05900029
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	511.079
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	100
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194520		

Map ID
Direction
Distance

Database EDR ID Number

Y211
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197134**

District nun:	1	Api number:	05907502
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	498.691
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	33
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197134		

S212
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197145**

District nun:	1	Api number:	05907513
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	541.194
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	52
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197145		

U213
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197851**

District nun:	1	Api number:	05920536
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.98
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	57
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197851		

214
SE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198704**

District nun:	1	Api number:	05921318
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	551.692
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	51
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198704		

X216
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194686**

District nun:	1	Api number:	05900418
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	539.199
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	107
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000194686		

X215
NNW **OIL_GAS** **CAOG11000194685**
1/4 - 1/2 Mile

District nun:	1	Api number:	05900418
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	539.199
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	107
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000194685		

X217
NNW **OIL_GAS** **CAOG11000194687**
1/4 - 1/2 Mile

District nun:	1	Api number:	05900418
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	539.199
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	107
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000194687		

Map ID
Direction
Distance

Database EDR ID Number

U218
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197917**

District nun:	1	Api number:	05920584
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.714
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	58
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197917		

U219
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198019**

District nun:	1	Api number:	05920671
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	480.961
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	59
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198019		

S220
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221638**

District nun:	1	Api number:	05907037
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	19
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221638		

W221
ESE **OIL_GAS** **CAOG11000197267**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907657
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	546.756
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	25
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197267		

U222
SW **OIL_GAS** **CAOG11000198020**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920672
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	479.22
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	60
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198020		

AA223
SSW **OIL_GAS** **CAOG11000221432**
1/4 - 1/2 Mile

District nun:	1	Api number:	05906736
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	17
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221432		

AA224
SSW **OIL_GAS** **CAOG11000197352**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920020
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	409.343
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	34
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197352		

Map ID
Direction
Distance

Database EDR ID Number

S225
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197681**

District nun:	1	Api number:	05920386
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	515.192
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	136
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197681		

U226
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198047**

District nun:	1	Api number:	05920698
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	472.347
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	61
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198047		

T228
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197843**

District nun:	1	Api number:	05920517
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	401.156
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	38
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197843		

T227
South **OIL_GAS** **CAOG11000197842**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920517
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	401.156
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	38
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197842		

U229
SW **OIL_GAS** **CAOG11000198135**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920769
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.14
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	63
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198135		

X230
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196951**

District nun:	1	Api number:	05907137
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	544.394
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	78
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196951		

AB231
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198550**

District nun:	1	Api number:	05921161
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	512.322
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	156
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198550		

Map ID
Direction
Distance

Database EDR ID Number

AB232
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196929**

District nun:	1	Api number:	05907069
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	513.504
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	90
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196929		

T234
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197889**

District nun:	1	Api number:	05920565
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	463.95
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	39
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197889		

T233
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197888**

District nun:	1	Api number:	05920565
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	463.95
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	39
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197888		

X235
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198641**

District nun:	1	Api number:	05921276
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	555.369
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	SA-1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PSF
Site id:	CAOG11000198641		

AB236
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221641**

District nun:	1	Api number:	05907043
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221641		

Z237
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196919**

District nun:	1	Api number:	05907046
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	513.324
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	44
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196919		

AC238
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197650**

District nun:	1	Api number:	05920358
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	549.601
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	114
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197650		

Map ID
Direction
Distance

Database EDR ID Number

AC239
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197651**

District nun:	1	Api number:	05920358
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	549.601
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	114
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197651		

AD240
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198041**

District nun:	1	Api number:	05920686
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	485.951
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	150
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198041		

AC241
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197693**

District nun:	1	Api number:	05920397
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	554.8
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	123
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197693		

AC242
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197694**

District nun:	1	Api number:	05920397
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	554.8
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	123
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197694		

X243
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196950**

District nun:	1	Api number:	05907136
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	555.416
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	77
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196950		

X245
NNW **OIL_GAS** **CAOG11000197692**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920396
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	538.376
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	122
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197692		

X244
NNW **OIL_GAS** **CAOG11000197691**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920396
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	538.376
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	122
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197691		

Map ID
Direction
Distance

Database EDR ID Number

AE246
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198261**

District nun:	1	Api number:	05920867
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	474.982
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	65
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198261		

Z247
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221653**

District nun:	1	Api number:	05907066
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	83
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221653		

U248
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221668**

District nun:	1	Api number:	05907092
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	10-A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221668		

AA249
SSW **OIL_GAS** **CAOG11000198575**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921212
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	427.055
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	43
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198575		

AA250
SSW **OIL_GAS** **CAOG11000198576**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921212
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	427.055
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	43
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198576		

AE251
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198262**

District nun:	1	Api number:	05920868
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	474.961
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	66
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198262		

AA252
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198646**

District nun:	1	Api number:	05921281
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	431.945
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	45
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198646		

Map ID
Direction
Distance

Database EDR ID Number

AA253
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198647**

District nun:	1	Api number:	05921281
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	431.945
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	45
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198647		

AB254
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197216**

District nun:	1	Api number:	05907597
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	553.772
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	13
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197216		

AF255
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196928**

District nun:	1	Api number:	05907068
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	482.102
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	89
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196928		

AA256
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221670**

District nun:	1	Api number:	05907094
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221670		

AG258
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198649**

District nun:	1	Api number:	05921282
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	398.79
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	46
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198649		

AG257
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198648**

District nun:	1	Api number:	05921282
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	398.79
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	46
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198648		

AC259
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197156**

District nun:	1	Api number:	05907524
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	503.008
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011197.ssf		
Leasename:	Not Reported	Wellnumber:	61
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197156		

Map ID
Direction
Distance

Database EDR ID Number

AA260
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221671**

District nun:	1	Api number:	05907095
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	12-A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221671		

AD261
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196934**

District nun:	1	Api number:	05907074
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	492.128
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	107
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196934		

AH262
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197150**

District nun:	1	Api number:	05907518
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	533.068
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	51
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197150		

AE264
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198316**

District nun:	1	Api number:	05920907
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	471.566
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	67
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWD
Site id:	CAOG11000198316		

AE263
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198315**

District nun:	1	Api number:	05920907
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	471.566
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	67
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWD
Site id:	CAOG11000198315		

X266
NNW **OIL_GAS** **CAOG11000198092**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920742
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	553.786
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	129
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198092		

X265
NNW **OIL_GAS** **CAOG11000198091**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920742
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	553.786
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	129
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198091		

Map ID
Direction
Distance

Database EDR ID Number

Z267
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198553**

District nun:	1	Api number:	05921163
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	502.807
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	158
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198553		

268
SSE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198708**

District nun:	1	Api number:	05921322
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	482.613
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003178.ssf		
Leasename:	Olinda Two	Wellnumber:	50
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198708		

AE269
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198244**

District nun:	1	Api number:	05920845
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	465.029
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	64
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198244		

AE270
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198317**

District nun:	1	Api number:	05920908
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	475.019
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	68
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198317		

AE271
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198318**

District nun:	1	Api number:	05920908
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	475.019
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	68
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198318		

AD272
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194523**

District nun:	1	Api number:	05900032
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	479.707
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	111
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194523		

V273
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196953**

District nun:	1	Api number:	05907139
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	579.097
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	S-80W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000196953		

Map ID
Direction
Distance

Database EDR ID Number

V274
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196954**

District nun:	1	Api number:	05907139
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	579.097
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	S-80W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000196954		

AE275
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196940**

District nun:	1	Api number:	05907103
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	462.749
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	44
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196940		

AE276
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198728**

District nun:	1	Api number:	05921337
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	474.943
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	72
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198728		

AD277
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194519**

District nun:	1	Api number:	05900028
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	485.845
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	84
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000194519		

AE278
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198524**

District nun:	1	Api number:	05921100
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	466.702
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	71
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198524		

V279
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196952**

District nun:	1	Api number:	05907138
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	541.215
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	S-79W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196952		

AB280
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196914**

District nun:	1	Api number:	05907038
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.376
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07007199.ssf		
Leasename:	100 Acre	Wellnumber:	21
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196914		

Map ID
Direction
Distance

Database EDR ID Number

AH281
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197695**

District nun:	1	Api number:	05920398
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	528.418
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	124
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197695		

AI282
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221705**

District nun:	1	Api number:	05907141
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	S-82W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000221705		

AI283
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221706**

District nun:	1	Api number:	05907141
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	S-82W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000221706		

AB284
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197682**

District nun:	1	Api number:	05920387
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	510.796
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	137
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197682		

AB285
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196932**

District nun:	1	Api number:	05907072
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	506.337
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	103
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196932		

AA286
SSW **OIL_GAS** **CAOG11000221658**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907079
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Graham & Loftus	Wellnumber:	50
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221658		

AG287
SSW **OIL_GAS** **CAOG11000198702**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921317
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	406.688
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	49
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198702		

Map ID
Direction
Distance

Database EDR ID Number

AG288
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198703**

District nun:	1	Api number:	05921317
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	406.688
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	49
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198703		

AH289
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197155**

District nun:	1	Api number:	05907523
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	541.869
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	60
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197155		

AB290
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197315**

District nun:	1	Api number:	05907788
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	524.709
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	54
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197315		

AG292
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197986**

District nun:	1	Api number:	05920644
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	401.655
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	40
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197986		

AG291
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197985**

District nun:	1	Api number:	05920644
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	401.655
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Olinda Two	Wellnumber:	40
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197985		

AJ293
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196960**

District nun:	1	Api number:	05907148
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	561.087
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	96
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000196960		

294
South
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221933**

District nun:	1	Api number:	05907625
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	16
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	16
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221933		

Map ID
Direction
Distance

Database EDR ID Number

295
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221707**

District nun:	1	Api number:	05907142
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	S-83W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221707		

AD296
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194524**

District nun:	1	Api number:	05900033
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	475.321
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	112
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194524		

AJ297
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196961**

District nun:	1	Api number:	05907149
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	535.925
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	105
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196961		

AH298
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197246**

District nun:	1	Api number:	05907626
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	525.852
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	17
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197246		

AB299
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221639**

District nun:	1	Api number:	05907039
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	23
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221639		

300
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222009**

District nun:	1	Api number:	05907753
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Graham-Loftus Oil Corp.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Graham Loftus	Wellnumber:	51
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222009		

AH301
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197774**

District nun:	1	Api number:	05920461
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	518.211
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	68
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197774		

Map ID
Direction
Distance

Database EDR ID Number

AK302
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197313**

District nun:	1	Api number:	05907786
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.94
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	52
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197313		

AL303
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221944**

District nun:	1	Api number:	05907658
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda Two	Wellnumber:	19
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221944		

AF304
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196936**

District nun:	1	Api number:	05907087
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	463.75
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Naranjal	Wellnumber:	5
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196936		

AM305
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196927**

District nun:	1	Api number:	05907063
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	479.303
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	78
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196927		

AM306
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197270**

District nun:	1	Api number:	05907663
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	488.421
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	108
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197270		

AN307
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197146**

District nun:	1	Api number:	05907514
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	562.149
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	55
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197146		

AF308
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198288**

District nun:	1	Api number:	05920889
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	469.044
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	153
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198288		

Map ID
Direction
Distance

Database EDR ID Number

AC309
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197147**

District nun:	1	Api number:	05907515
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	521.761
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	56
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197147		

AO310
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196955**

District nun:	1	Api number:	05907140
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.909
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	81
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196955		

AJ311
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197154**

District nun:	1	Api number:	05907522
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	544.116
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	59
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197154		

AM312
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194518**

District nun:	1	Api number:	05900027
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	469.794
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	79
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWD
Site id:	CAOG11000194518		

AK313
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197271**

District nun:	1	Api number:	05907664
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	513.833
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	125
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197271		

AN314
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197148**

District nun:	1	Api number:	05907516
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	545.936
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	57
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197148		

AP315
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197149**

District nun:	1	Api number:	05907517
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	544.308
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	50
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197149		

Map ID
Direction
Distance

Database EDR ID Number

AQ316
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197683**

District nun:	1	Api number:	05920388
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	510.972
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	138
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197683		

AI317
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221708**

District nun:	1	Api number:	05907143
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	84
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221708		

AM318
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221650**

District nun:	1	Api number:	05907062
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	77
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221650		

AQ319
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198760**

District nun:	1	Api number:	05921389
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	509.221
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07007199.ssf		
Leasename:	100 Acre	Wellnumber:	163
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198760		

AK320
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197308**

District nun:	1	Api number:	05907779
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	528.533
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07007199.ssf		
Leasename:	Columbia	Wellnumber:	45
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197308		

AM322
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198555**

District nun:	1	Api number:	05921164
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	472.81
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	159
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198555		

AM321
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198554**

District nun:	1	Api number:	05921164
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	472.81
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	159
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198554		

Map ID
Direction
Distance

Database EDR ID Number

AR323
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198095**

District nun:	1	Api number:	05920744
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	459.336
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	62
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198095		

AR324
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197586**

District nun:	1	Api number:	05920292
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	457.47
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	56
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197586		

AQ325
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000195104**

District nun:	1	Api number:	05900851
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	502.962
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	129
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000195104		

AK326
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197314**

District nun:	1	Api number:	05907787
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	519.847
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	53
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197314		

AK327
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221935**

District nun:	1	Api number:	05907628
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	19
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221935		

AR328
WSW **OIL_GAS** **CAOG11000198359**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920952
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	455.246
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	69
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198359		

AR329
WSW **OIL_GAS** **CAOG11000198360**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920953
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	455.824
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	70
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198360		

Map ID
Direction
Distance

Database EDR ID Number

AR330
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221652**

District nun:	1	Api number:	05907065
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	80-C
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221652		

AL331
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221657**

District nun:	1	Api number:	05907078
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Graham & Loftus	Wellnumber:	49
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221657		

AO332
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197061**

District nun:	1	Api number:	05907272
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	551.16
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197061		

AK333
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197316**

District nun:	1	Api number:	05907789
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	526.585
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	55
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197316		

AJ334
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196957**

District nun:	1	Api number:	05907145
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	531.959
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	92
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196957		

AR335
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198729**

District nun:	1	Api number:	05921338
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Thompson Energy Res, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	459.174
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Union-Naranjal	Wellnumber:	73
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198729		

AR336
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222006**

District nun:	1	Api number:	05907748
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	80-B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222006		

Map ID
Direction
Distance

Database EDR ID Number

AS337
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197130**

District nun:	1	Api number:	05907499
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	568.41
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	29
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197130		

AN338
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196990**

District nun:	1	Api number:	05907187
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	552.919
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	22B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196990		

AT339
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197121**

District nun:	1	Api number:	05907490
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	578.284
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	17
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197121		

AR340
WSW **OIL_GAS** **CAOG11000222005**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907747
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	80-A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222005		

AU341
NE **OIL_GAS** **CAOG11000196956**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907144
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	552.065
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	85
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196956		

AN342
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197296**

District nun:	1	Api number:	05907738
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	513.296
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	30B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197296		

AL343
SSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221932**

District nun:	1	Api number:	05907624
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	15
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221932		

Map ID
Direction
Distance

Database EDR ID Number

AN344
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196725**

District nun:	1	Api number:	05906691
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	547.858
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	21B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196725		

AT345
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196726**

District nun:	1	Api number:	05906692
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	557.079
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	25B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196726		

AR346
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221651**

District nun:	1	Api number:	05907064
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	80
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221651		

AK347
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221936**

District nun:	1	Api number:	05907629
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	20
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221936		

AQ348
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196915**

District nun:	1	Api number:	05907040
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	519.13
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	24
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196915		

AM349
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196939**

District nun:	1	Api number:	05907099
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	478.847
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	113
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196939		

AV350
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197151**

District nun:	1	Api number:	05907519
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.398
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	53
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197151		

Map ID
Direction
Distance

Database EDR ID Number

AS351
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197120**

District nun:	1	Api number:	05907489
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	577.448
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	S-16W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197120		

AN352
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196729**

District nun:	1	Api number:	05906695
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	563.873
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	35B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196729		

AP353
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197219**

District nun:	1	Api number:	05907600
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	559.212
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	16
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197219		

354
SW **OIL_GAS** **CAOG11000221659**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907080
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Graham & Loftus	Wellnumber:	52
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221659		

AP355
NW **OIL_GAS** **CAOG11000197266**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907656
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	556.272
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	65
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197266		

AO357
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197919**

District nun:	1	Api number:	05920585
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	554.172
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	S-5W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197919		

AO356
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197918**

District nun:	1	Api number:	05920585
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	554.172
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	S-5W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197918		

Map ID
Direction
Distance

Database EDR ID Number

AO359
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197132**

District nun:	1	Api number:	05907500
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	566.498
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	S-30W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197132		

AO358
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197131**

District nun:	1	Api number:	05907500
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	566.498
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	S-30W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197131		

AO360
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197059**

District nun:	1	Api number:	05907270
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	557.284
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	5-A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197059		

AQ361
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196933**

District nun:	1	Api number:	05907073
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	519.308
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	104
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196933		

AM362
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196925**

District nun:	1	Api number:	05907060
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	484.019
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	73
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196925		

AO363
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197058**

District nun:	1	Api number:	05907269
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	551.812
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	5
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197058		

AW364
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194526**

District nun:	1	Api number:	05900036
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	464.425
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	117
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194526		

Map ID
Direction
Distance

Database EDR ID Number

AW365
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196926**

District nun:	1	Api number:	05907061
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	476.66
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	74
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196926		

AU366
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222315**

District nun:	1	Api number:	05920573
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	S-1W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000222315		

AU367
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222316**

District nun:	1	Api number:	05920573
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	S-1W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000222316		

AX368
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196731**

District nun:	1	Api number:	05906697
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	523.432
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	38B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196731		

AS369
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197119**

District nun:	1	Api number:	05907488
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	572.253
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	15
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197119		

AT370
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197297**

District nun:	1	Api number:	05907739
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	620.979
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	31B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197297		

AQ371
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197317**

District nun:	1	Api number:	05907790
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	521.83
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	56
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197317		

Map ID
Direction
Distance

Database EDR ID Number

AY372
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194517**

District nun:	1	Api number:	05900026
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	491.571
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	72
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000194517		

AQ374
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198552**

District nun:	1	Api number:	05921162
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.389
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	157
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198552		

AQ373
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198551**

District nun:	1	Api number:	05921162
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	516.389
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	157
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198551		

AS375
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197062**

District nun:	1	Api number:	05907273
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	605.712
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197062		

AN376
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196733**

District nun:	1	Api number:	05906699
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	575.218
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	42B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196733		

AS377
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196713**

District nun:	1	Api number:	05906678
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	618.64
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	4B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196713		

AY378
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196935**

District nun:	1	Api number:	05907075
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	499.88
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	109
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196935		

Map ID
Direction
Distance

Database EDR ID Number

AP379
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197144**

District nun:	1	Api number:	05907512
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	529.61
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	49
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197144		

AZ380
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198645**

District nun:	1	Api number:	05921280
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	522.691
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	72
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198645		

AZ381
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197310**

District nun:	1	Api number:	05907783
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	533.109
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	49
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197310		

AZ382
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197304**

District nun:	1	Api number:	05907775
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	529.02
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	41
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197304		

AR383
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196937**

District nun:	1	Api number:	05907088
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	459.971
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Naranjal	Wellnumber:	6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196937		

AS384
NNE **OIL_GAS** **CAOG11000196714**
1/4 - 1/2 Mile

District nun:	1	Api number:	05906679
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	615.877
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	5B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196714		

AS385
NNE **OIL_GAS** **CAOG11000196728**
1/4 - 1/2 Mile

District nun:	1	Api number:	05906694
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	643.729
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	33B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196728		

Map ID
Direction
Distance

Database EDR ID Number

AV386
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196721**

District nun:	1	Api number:	05906686
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	579.106
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	14B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196721		

BA387
ENE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197236**

District nun:	1	Api number:	05907616
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	496.245
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	89
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197236		

AS388
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196988**

District nun:	1	Api number:	05907183
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	586.802
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	1B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196988		

AX389
North **OIL_GAS** **CAOG11000196727**
1/4 - 1/2 Mile

District nun:	1	Api number:	05906693
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	599.987
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	28B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196727		

BB390
NNW **OIL_GAS** **CAOG11000194573**
1/4 - 1/2 Mile

District nun:	1	Api number:	05900203
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	566.15
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	64
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000194573		

AS391
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197118**

District nun:	1	Api number:	05907487
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	580.937
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	14
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197118		

AU392
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197060**

District nun:	1	Api number:	05907271
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	551.087
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197060		

Map ID
Direction
Distance

Database EDR ID Number

AV393
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196949**

District nun:	1	Api number:	05907135
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	571.24
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	76
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196949		

AV394
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197152**

District nun:	1	Api number:	05907520
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	568.62
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	54
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197152		

BC395
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196916**

District nun:	1	Api number:	05907041
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	515.468
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	28
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196916		

BB396
NNW **OIL_GAS** **CAOG11000198707**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921321
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	564.739
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	75
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198707		

AW397
West **OIL_GAS** **CAOG11000198319**
1/4 - 1/2 Mile

District nun:	1	Api number:	05920909
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	467.667
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	154
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198319		

BA398
ENE **OIL_GAS** **CAOG11000197234**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907614
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	523.696
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	87
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197234		

AW399
WSW **OIL_GAS** **CAOG11000221649**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907059
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	70
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221649		

Map ID
Direction
Distance

Database EDR ID Number

BB400
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197153**

District nun:	1	Api number:	05907521
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	558.766
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	58
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197153		

AX401
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197295**

District nun:	1	Api number:	05907737
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	568.135
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	26B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197295		

AS402
NNE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196716**

District nun:	1	Api number:	05906681
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	620.968
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	7B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196716		

BC403
WNW **OIL_GAS** **CAOG11000222625**
1/4 - 1/2 Mile

District nun:	1	Api number:	05921630
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	309
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3980		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000222625		

BD404
NE **OIL_GAS** **CAOG11000197063**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907274
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	633.689
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197063		

BC405
WNW **OIL_GAS** **CAOG11000194530**
1/4 - 1/2 Mile

District nun:	1	Api number:	05900041
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	505.337
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	130
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194530		

AS406
NNE **OIL_GAS** **CAOG11000196717**
1/4 - 1/2 Mile

District nun:	1	Api number:	05906682
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	596.281
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	9B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196717		

Map ID
Direction
Distance

Database EDR ID Number

BE407
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000217285**

District nun:	1	Api number:	05900037
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Crestmont Oil & Gas Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	118
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000217285		

BF408
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196730**

District nun:	1	Api number:	05906696
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	585.445
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	36B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196730		

AX409
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198118**

District nun:	1	Api number:	05920755
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	564.52
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	45B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198118		

BB410
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197305**

District nun:	1	Api number:	05907776
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	544.045
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	42
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197305		

BB411
NNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197218**

District nun:	1	Api number:	05907599
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	567.76
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	15
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197218		

BF412
North
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197298**

District nun:	1	Api number:	05907740
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	597.9
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	41B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197298		

AY413
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000221648**

District nun:	1	Api number:	05907057
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	67
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221648		

Map ID
Direction
Distance

Database EDR ID Number

BC414
WNW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000222253**

District nun:	1	Api number:	05920389
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	141
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222253		

AW415
WSW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000198556**

District nun:	1	Api number:	05921165
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	462.571
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	160
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198556		

BD416
NE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196989**

District nun:	1	Api number:	05907184
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	599.32
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Olinda	Wellnumber:	2B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196989		

BE417
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000196924**

District nun:	1	Api number:	05907058
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	484.894
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	68
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196924		

BE418
West
1/4 - 1/2 Mile

OIL_GAS **CAOG11000197269**

District nun:	1	Api number:	05907662
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	468.973
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	69
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197269		

419
ESE **OIL_GAS** **CAOG11000222026**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907795
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Core Hole O. L. C.	Wellnumber:	C
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000222026		

BC420
WNW **OIL_GAS** **CAOG11000197247**
1/4 - 1/2 Mile

District nun:	1	Api number:	05907630
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	513.748
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	21
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197247		

Map ID
Direction
Distance

Database EDR ID Number

AZ421
NW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000194688**

District nun:	1	Api number:	05900419
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	536.326
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	57
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194688		

BG422
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197223**

District nun:	1	Api number:	05907604
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.194
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011177.ssf		
Leasename:	Not Reported	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197223		

BG423
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000305955**

District nun:	1	Api number:	05907268
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000305955		

AX424
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196722**

District nun:	1	Api number:	05906687
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	611.297
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	15B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196722		

AZ425
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222620**

District nun:	1	Api number:	05921628
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	304
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3500		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222620		

BD426
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197064**

District nun:	1	Api number:	05907275
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	648.837
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	13
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197064		

BF427
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196720**

District nun:	1	Api number:	05906685
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	604.369
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	13B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196720		

Map ID
Direction
Distance

Database EDR ID Number

BH428
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000194531**

District nun:	1	Api number:	05900042
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	503.001
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	135
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000194531		

BI429
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000198093**

District nun:	1	Api number:	05920743
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	586.074
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	164
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198093		

BI430
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000198094**

District nun:	1	Api number:	05920743
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	586.074
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	164
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198094		

BD431
NE **OIL_GAS** **CAOG11000196723**
1/2 - 1 Mile

District nun:	1	Api number:	05906689
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	640.956
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	19B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196723		

AX432
North **OIL_GAS** **CAOG11000196715**
1/2 - 1 Mile

District nun:	1	Api number:	05906680
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	567.057
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	6B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196715		

BI433
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197141**

District nun:	1	Api number:	05907509
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	586.411
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	46
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197141		

BJ434
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197318**

District nun:	1	Api number:	05907791
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	540.75
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	58
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197318		

Map ID
Direction
Distance

Database EDR ID Number

BI435
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000196959**

District nun:	1	Api number:	05907147
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	560.26
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	94
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196959		

BF436
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196734**

District nun:	1	Api number:	05906700
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	605.684
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	43B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196734		

BB437
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197321**

District nun:	1	Api number:	05907794
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	557.263
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	63
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197321		

AZ438
NW **OIL_GAS** **CAOG11000197253**
1/2 - 1 Mile

District nun:	1	Api number:	05907637
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	581.16
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	28
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197253		

BD439
NE **OIL_GAS** **CAOG11000221419**
1/2 - 1 Mile

District nun:	1	Api number:	05906677
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Olinda	Wellnumber:	3B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221419		

BD440
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000221715**

District nun:	1	Api number:	05907185
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	Not Reported		
Leasename:	Olinda	Wellnumber:	8B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221715		

BC441
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000194515**

District nun:	1	Api number:	05900021
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	501.402
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000194515		

Map ID
Direction
Distance

Database EDR ID Number

BF442
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196942**

District nun:	1	Api number:	05907127
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	602.261
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	66
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196942		

BK443
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197122**

District nun:	1	Api number:	05907491
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	634.235
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	19
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197122		

BL444
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197254**

District nun:	1	Api number:	05907638
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	539.563
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	29
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197254		

BA445
ENE **OIL_GAS** **CAOG11000197235**
1/2 - 1 Mile

District nun:	1	Api number:	05907615
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	497.962
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	88
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197235		

BG446
NE **OIL_GAS** **CAOG11000197284**
1/2 - 1 Mile

District nun:	1	Api number:	05907720
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	592.858
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197284		

BM447
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197233**

District nun:	1	Api number:	05907613
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	534.716
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	86
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197233		

448
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196732**

District nun:	1	Api number:	05906698
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	566.224
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	39B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196732		

Map ID
Direction
Distance

Database EDR ID Number

BK449
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197894**

District nun:	1	Api number:	05920572
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	616.494
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	S-3W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197894		

BK450
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197895**

District nun:	1	Api number:	05920572
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	616.494
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	S-3W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197895		

BF451
North
1/2 - 1 Mile

OIL_GAS **CAOG11000221420**

District nun:	1	Api number:	05906688
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda	Wellnumber:	16B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221420		

BI452
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197217**

District nun:	1	Api number:	05907598
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	590.995
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	14
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197217		

BN453
West
1/2 - 1 Mile

OIL_GAS **CAOG11000194689**

District nun:	1	Api number:	05900421
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	465.262
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	121
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194689		

BF454
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196719**

District nun:	1	Api number:	05906684
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	618.072
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	12B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196719		

BG455
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197896**

District nun:	1	Api number:	05920574
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.357
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	S-2W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197896		

Map ID
Direction
Distance

Database EDR ID Number

BG456
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197897**

District nun:	1	Api number:	05920574
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.357
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	S-2W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197897		

BO457
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197312**

District nun:	1	Api number:	05907785
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	578.544
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	51
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197312		

BP458
West
1/2 - 1 Mile

OIL_GAS **CAOG11000194527**

District nun:	1	Api number:	05900038
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	479.42
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	119
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194527		

BC459
WNW **OIL_GAS** **CAOG11000221624**
1/2 - 1 Mile

District nun:	1	Api number:	05906975
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221624		

460
SW **OIL_GAS** **CAOG11000221656**
1/2 - 1 Mile

District nun:	1	Api number:	05907077
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Graham & Loftus	Wellnumber:	27
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221656		

BO461
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197320**

District nun:	1	Api number:	05907793
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	577.387
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	62
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197320		

BN462
WSW
1/2 - 1 Mile

OIL_GAS **CAOG11000196938**

District nun:	1	Api number:	05907089
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	455.598
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Naranjal	Wellnumber:	7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196938		

Map ID
Direction
Distance

Database EDR ID Number

BP463
West
1/2 - 1 Mile

OIL_GAS **CAOG11000221646**

District nun:	1	Api number:	05907055
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	62
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221646		

BJ464
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197311**

District nun:	1	Api number:	05907784
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	557.914
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	50
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197311		

BP465
West
1/2 - 1 Mile

OIL_GAS **CAOG11000196923**

District nun:	1	Api number:	05907054
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	480.192
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	61
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196923		

BN466
West
1/2 - 1 Mile

OIL_GAS **CAOG11000217284**

District nun:	1	Api number:	05900025
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	65
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000217284		

BH467
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000196931**

District nun:	1	Api number:	05907071
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	499.421
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	102
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196931		

BQ468
NNE **OIL_GAS** **CAOG11000198191**
1/2 - 1 Mile

District nun:	1	Api number:	05920814
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	705.329
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	46B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198191		

BJ469
NW **OIL_GAS** **CAOG11000197844**
1/2 - 1 Mile

District nun:	1	Api number:	05920518
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	554.06
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	70
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197844		

Map ID
Direction
Distance

Database EDR ID Number

BJ470
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197309**

District nun:	1	Api number:	05907782
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	558.82
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	48
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197309		

BI471
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197140**

District nun:	1	Api number:	05907508
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	589.298
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	45
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197140		

BJ472
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222287**

District nun:	1	Api number:	05920492
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	69
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222287		

BK473
NE **OIL_GAS** **CAOG11000196735**
1/2 - 1 Mile

District nun:	1	Api number:	05906701
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	711.642
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	44B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000196735		

474
SE **OIL_GAS** **CAOG11000222031**
1/2 - 1 Mile

District nun:	1	Api number:	05907801
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Olinda Fee Four Probe Hole	Wellnumber:	82-17
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000222031		

BM475
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197224**

District nun:	1	Api number:	05907605
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	547.377
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197224		

BN476
West
1/2 - 1 Mile

OIL_GAS **CAOG11000221647**

District nun:	1	Api number:	05907056
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	63
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221647		

Map ID
Direction
Distance

Database EDR ID Number

BK477
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197123**

District nun:	1	Api number:	05907492
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	635.382
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	20
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197123		

BJ478
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222024**

District nun:	1	Api number:	05907780
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	46
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222024		

BK479
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000196718**

District nun:	1	Api number:	05906683
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	697.911
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	11B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196718		

BH480
WNW **OIL_GAS** **CAOG11000194521**
1/2 - 1 Mile

District nun:	1	Api number:	05900030
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	492.673
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	101
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000194521		

BI481
NNW **OIL_GAS** **CAOG11000196941**
1/2 - 1 Mile

District nun:	1	Api number:	05907126
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	612.981
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	65
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196941		

BG482
ENE **OIL_GAS** **CAOG11000197286**
1/2 - 1 Mile

District nun:	1	Api number:	05907723
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	607.093
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197286		

BL483
NW **OIL_GAS** **CAOG11000197252**
1/2 - 1 Mile

District nun:	1	Api number:	05907636
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	550.476
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	27
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197252		

Map ID
Direction
Distance

Database EDR ID Number

BG484
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197285**

District nun:	1	Api number:	05907721
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	605.3
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197285		

BJ485
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000198706**

District nun:	1	Api number:	05921320
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	580.941
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	74
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000198706		

BR486
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197429**

District nun:	1	Api number:	05920140
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	627.532
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	108
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197429		

BK487
NE **OIL_GAS** **CAOG11000197240**
1/2 - 1 Mile

District nun:	1	Api number:	05907619
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	645.208
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	99W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197240		

BK489
NE **OIL_GAS** **CAOG11000197242**
1/2 - 1 Mile

District nun:	1	Api number:	05907619
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	645.208
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	99W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197242		

BK490
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197241**

District nun:	1	Api number:	05907619
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	645.208
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	99W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197241		

BK488
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197239**

District nun:	1	Api number:	05907619
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	645.208
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	99W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197239		

Map ID
Direction
Distance

Database EDR ID Number

BR491
North
1/2 - 1 Mile

OIL_GAS **CAOG11000196724**

District nun:	1	Api number:	05906690
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	641.177
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	20B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196724		

BK492
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197243**

District nun:	1	Api number:	05907620
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	650.993
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	100
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197243		

BQ493
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000221716**

District nun:	1	Api number:	05907186
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda	Wellnumber:	17B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221716		

BS494
WNW **OIL_GAS** **CAOG11000217282**
1/2 - 1 Mile

District nun:	1	Api number:	05900022
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	33
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000217282		

BJ495
NW **OIL_GAS** **CAOG11000197255**
1/2 - 1 Mile

District nun:	1	Api number:	05907639
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	563.534
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	30
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197255		

BJ496
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000194512**

District nun:	1	Api number:	05900016
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	563.044
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	66
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000194512		

BR497
North
1/2 - 1 Mile

OIL_GAS **CAOG11000197294**

District nun:	1	Api number:	05907735
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	640.443
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Olinda	Wellnumber:	10B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197294		

Map ID
Direction
Distance

Database EDR ID Number

BT498
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197249**

District nun:	1	Api number:	05907632
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	544.215
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	23
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197249		

BR499
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197272**

District nun:	1	Api number:	05907665
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	595.87
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	101
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197272		

500
South
1/2 - 1 Mile

OIL_GAS **CAOG11000222022**

District nun:	1	Api number:	05907770
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	20
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000222022		

BL501
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221538**

District nun:	1	Api number:	05906894
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	147
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221538		

BT502
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000217434**

District nun:	1	Api number:	05900420
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	59
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000217434		

BO503
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221928**

District nun:	1	Api number:	05907588
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221928		

BO504
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222025**

District nun:	1	Api number:	05907781
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	47
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222025		

Map ID
Direction
Distance

Database EDR ID Number

BL505
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222268**

District nun:	1	Api number:	05920438
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	257
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222268		

BU506
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197248**

District nun:	1	Api number:	05907631
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	607.336
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	22
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197248		

BO507
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197265**

District nun:	1	Api number:	05907649
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	645.882
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	40
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197265		

BS508
WNW **OIL_GAS** **CAOG11000221539**
1/2 - 1 Mile

District nun:	1	Api number:	05906895
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	148
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221539		

BN509
West **OIL_GAS** **CAOG11000197374**
1/2 - 1 Mile

District nun:	1	Api number:	05920082
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	468.054
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	545
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWD
Site id:	CAOG11000197374		

BN510
West
1/2 - 1 Mile

OIL_GAS **CAOG11000197375**

District nun:	1	Api number:	05920082
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	468.054
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	545
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWD
Site id:	CAOG11000197375		

BO511
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197307**

District nun:	1	Api number:	05907778
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	652.284
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	44
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197307		

Map ID
Direction
Distance

Database EDR ID Number

BP512
West
1/2 - 1 Mile

OIL_GAS **CAOG11000196922**

District nun:	1	Api number:	05907052
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	467.478
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	57
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196922		

BS513
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000198320**

District nun:	1	Api number:	05920910
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	502.888
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	155
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198320		

BV514
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000194511**

District nun:	1	Api number:	05900015
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	625.269
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	61
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000194511		

BR515
NNW **OIL_GAS** **CAOG11000196958**
1/2 - 1 Mile

District nun:	1	Api number:	05907146
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	599.897
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	93
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196958		

BU516
NNW **OIL_GAS** **CAOG11000197138**
1/2 - 1 Mile

District nun:	1	Api number:	05907506
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	594.068
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	42
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197138		

BS517
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222507**

District nun:	1	Api number:	05921533
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	285
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3471		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222507		

BT518
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000198705**

District nun:	1	Api number:	05921319
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Freeport-McMoRan Oil & Gas LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	565.905
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	73
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000198705		

Map ID
Direction
Distance

Database EDR ID Number

BO519
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197258**

District nun:	1	Api number:	05907642
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	663.489
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	33
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197258		

BU520
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221929**

District nun:	1	Api number:	05907591
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221929		

BO521
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197212**

District nun:	1	Api number:	05907592
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	652.658
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	8
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197212		

BU522
NNW **OIL_GAS** **CAOG11000221927**
1/2 - 1 Mile

District nun:	1	Api number:	05907587
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221927		

BV523
NNW **OIL_GAS** **CAOG11000197214**
1/2 - 1 Mile

District nun:	1	Api number:	05907594
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	671.215
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197214		

BW524
West
1/2 - 1 Mile

OIL_GAS **CAOG11000196921**

District nun:	1	Api number:	05907049
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	480.911
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	49
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196921		

BW525
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000194516**

District nun:	1	Api number:	05900024
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	500.559
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	54
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000194516		

Map ID
Direction
Distance

Database EDR ID Number

BR526
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000196948**

District nun:	1	Api number:	05907134
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	652.242
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	75
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000196948		

BX527
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197278**

District nun:	1	Api number:	05907668
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	549.18
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	106
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000197278		

BY528
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197301**

District nun:	1	Api number:	05907768
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	727.311
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	24B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197301		

BY529
NE **OIL_GAS** **CAOG11000197281**
1/2 - 1 Mile

District nun:	1	Api number:	05907671
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	726.247
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	101B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197281		

BS530
WNW **OIL_GAS** **CAOG11000217283**
1/2 - 1 Mile

District nun:	1	Api number:	05900023
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	39
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000217283		

BY531
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197300**

District nun:	1	Api number:	05907767
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	701.4
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	18B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197300		

BZ532
West
1/2 - 1 Mile

OIL_GAS **CAOG11000221645**

District nun:	1	Api number:	05907053
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	100 Acre	Wellnumber:	59
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221645		

Map ID
Direction
Distance

Database EDR ID Number

BT533
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197250**

District nun:	1	Api number:	05907634
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	587.431
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	25
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197250		

534
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222379**

District nun:	1	Api number:	05920936
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	134
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	PDH
Site id:	CAOG11000222379		

BX535
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197231**

District nun:	1	Api number:	05907612
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	517.061
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	73W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197231		

BX536
ENE **OIL_GAS** **CAOG11000197232**
1/2 - 1 Mile

District nun:	1	Api number:	05907612
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	517.061
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	73W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197232		

CA539
NE **OIL_GAS** **CAOG11000197276**
1/2 - 1 Mile

District nun:	1	Api number:	05907666
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	636.844
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	102
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197276		

CA538
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197273**

District nun:	1	Api number:	05907666
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	636.844
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	102
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197273		

CA537
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197274**

District nun:	1	Api number:	05907666
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	636.844
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	102
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197274		

Map ID
Direction
Distance

Database EDR ID Number

CA540
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197275**

District nun:	1	Api number:	05907666
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	636.844
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	102
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000197275		

BS541
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000194525**

District nun:	1	Api number:	05900035
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	500.459
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	116
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000194525		

BV542
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197256**

District nun:	1	Api number:	05907640
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	654.101
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197256		

BU543
NNW **OIL_GAS** **CAOG11000221937**
1/2 - 1 Mile

District nun:	1	Api number:	05907633
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	24
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221937		

BV544
NW **OIL_GAS** **CAOG11000197215**
1/2 - 1 Mile

District nun:	1	Api number:	05907596
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	666.17
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197215		

BY545
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197606**

District nun:	1	Api number:	05920312
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	632.502
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	112
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197606		

BT546
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221701**

District nun:	1	Api number:	05907123
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221701		

Map ID
Direction
Distance

Database EDR ID Number

BV547
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197319**

District nun:	1	Api number:	05907792
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	617.605
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	60
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197319		

BW548
West
1/2 - 1 Mile

OIL_GAS **CAOG11000221665**

District nun:	1	Api number:	05907086
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Narnajal	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221665		

BU549
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197210**

District nun:	1	Api number:	05907589
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	650.025
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	5
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197210		

BU550
NNW **OIL_GAS** **CAOG11000197139**
1/2 - 1 Mile

District nun:	1	Api number:	05907507
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	629.614
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	43
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197139		

BX551
ENE **OIL_GAS** **CAOG11000197244**
1/2 - 1 Mile

District nun:	1	Api number:	05907621
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	682.277
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	104
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197244		

BZ552
West
1/2 - 1 Mile

OIL_GAS **CAOG11000221667**

District nun:	1	Api number:	05907091
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221667		

BU553
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197213**

District nun:	1	Api number:	05907593
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	675.101
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197213		

Map ID
Direction
Distance

Database EDR ID Number

BR554
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197277**

District nun:	1	Api number:	05907667
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	645.682
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	103
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197277		

CB555
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221930**

District nun:	1	Api number:	05907595
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221930		

CC556
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000196918**

District nun:	1	Api number:	05907045
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	504.653
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003168.ssf		
Leasename:	100 Acre	Wellnumber:	41
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000196918		

BS558
WNW **OIL_GAS** **CAOG11000222621**
1/2 - 1 Mile

District nun:	1	Api number:	05921629
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	302
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3810		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000222621		

BS557
WNW **OIL_GAS** **CAOG11000222622**
1/2 - 1 Mile

District nun:	1	Api number:	05921629
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	302
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3810		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000222622		

BS560
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222623**

District nun:	1	Api number:	05921629
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	302
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3810		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000222623		

BS559
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222624**

District nun:	1	Api number:	05921629
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	302
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3810		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000222624		

Map ID
Direction
Distance

Database EDR ID Number

CC561
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221663**

District nun:	1	Api number:	05907084
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Narnajal	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221663		

CD562
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000217286**

District nun:	1	Api number:	05900044
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	89
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000217286		

BU563
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221926**

District nun:	1	Api number:	05907586
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Columbia	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221926		

BZ564
WSW **OIL_GAS** **CAOG11000221666**
1/2 - 1 Mile

District nun:	1	Api number:	05907090
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Narnajal	Wellnumber:	8
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221666		

CE565
NW **OIL_GAS** **CAOG11000218609**
1/2 - 1 Mile

District nun:	1	Api number:	05901918
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	92
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000218609		

CB566
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197261**

District nun:	1	Api number:	05907645
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	715.678
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197261		

BY567
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197279**

District nun:	1	Api number:	05907669
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	655.53
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	102B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197279		

Map ID
Direction
Distance

Database EDR ID Number

568
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000197280**

District nun:	1	Api number:	05907670
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	785.582
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	103B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197280		

CD570
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222247**

District nun:	1	Api number:	05920370
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	244
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222247		

CD569
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222246**

District nun:	1	Api number:	05920370
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	244
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222246		

BY571
NE **OIL_GAS** **CAOG11000197222**
1/2 - 1 Mile

District nun:	1	Api number:	05907603
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	749.568
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Olinda	Wellnumber:	32B
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197222		

CF572
ENE **OIL_GAS** **CAOG11000197230**
1/2 - 1 Mile

District nun:	1	Api number:	05907611
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	540.607
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	72W
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000197230		

573
ESE **OIL_GAS** **CAOG11000221998**
1/2 - 1 Mile

District nun:	1	Api number:	05907733
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	4 A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221998		

BX574
ENE **OIL_GAS** **CAOG11000197225**
1/2 - 1 Mile

District nun:	1	Api number:	05907606
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	519.931
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	21
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197225		

Map ID
Direction
Distance

Database EDR ID Number

CG575
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221560**

District nun:	1	Api number:	05906915
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	159
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221560		

CG576
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197251**

District nun:	1	Api number:	05907635
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	631.527
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003198.ssf		
Leasename:	Columbia	Wellnumber:	26
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197251		

CC577
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221699**

District nun:	1	Api number:	05907121
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	33
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221699		

CH578
NNW **OIL_GAS** **CAOG11000197209**
1/2 - 1 Mile

District nun:	1	Api number:	05907585
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	647.463
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197209		

CH579
NNW **OIL_GAS** **CAOG11000197136**
1/2 - 1 Mile

District nun:	1	Api number:	05907504
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	5
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	633.606
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	37
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197136		

CI580
ENE **OIL_GAS** **CAOG11000197238**
1/2 - 1 Mile

District nun:	1	Api number:	05907618
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	717.852
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	98
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197238		

CB581
NNW **OIL_GAS** **CAOG11000197260**
1/2 - 1 Mile

District nun:	1	Api number:	05907644
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	714.202
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197260		

Map ID
Direction
Distance

Database EDR ID Number

CH582
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197211**

District nun:	1	Api number:	05907590
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	697.839
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197211		

CJ583
West
1/2 - 1 Mile

OIL_GAS **CAOG11000220767**

District nun:	1	Api number:	05905590
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000220767		

CF584
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000221995**

District nun:	1	Api number:	05907722
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	8
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221995		

CH585
NNW **OIL_GAS** **CAOG11000197143**
1/2 - 1 Mile

District nun:	1	Api number:	05907511
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	5
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	644.598
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011207.ssf		
Leasename:	Not Reported	Wellnumber:	48
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197143		

CI588
ENE **OIL_GAS** **CAOG11000198559**
1/2 - 1 Mile

District nun:	1	Api number:	05921169
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	712.803
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	141
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198559		

CI587
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000198558**

District nun:	1	Api number:	05921169
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	712.803
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	141
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198558		

CI586
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000198557**

District nun:	1	Api number:	05921169
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	712.803
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	141
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000198557		

Map ID
Direction
Distance

Database EDR ID Number

CI589
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197432**

District nun:	1	Api number:	05920142
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	713.072
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	110
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197432		

CI590
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197433**

District nun:	1	Api number:	05920142
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	713.072
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	110
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197433		

CB591
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197306**

District nun:	1	Api number:	05907777
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	700.907
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	43
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197306		

CF592
ENE **OIL_GAS** **CAOG11000197289**
1/2 - 1 Mile

District nun:	1	Api number:	05907726
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	517.37
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197289		

CK593
NW **OIL_GAS** **CAOG11000197257**
1/2 - 1 Mile

District nun:	1	Api number:	05907641
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	658.523
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197257		

CI594
ENE **OIL_GAS** **CAOG11000197237**
1/2 - 1 Mile

District nun:	1	Api number:	05907617
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	553.405
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	97
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197237		

CB595
NNW **OIL_GAS** **CAOG11000197264**
1/2 - 1 Mile

District nun:	1	Api number:	05907648
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	736.369
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	39
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197264		

Map ID
Direction
Distance

Database EDR ID Number

CI596
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197605**

District nun:	1	Api number:	05920311
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	544.41
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011247.ssf		
Leasename:	Not Reported	Wellnumber:	111
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197605		

CJ597
West
1/2 - 1 Mile

OIL_GAS **CAOG11000220762**

District nun:	1	Api number:	05905585
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	19
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000220762		

CE598
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222153**

District nun:	1	Api number:	05920073
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	221
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222153		

CJ599
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000220760**

District nun:	1	Api number:	05905583
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	17
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000220760		

CL600
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222267**

District nun:	1	Api number:	05920437
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	256
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222267		

CM602
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221542**

District nun:	1	Api number:	05906897
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	150
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221542		

CM601
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221541**

District nun:	1	Api number:	05906897
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	150
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221541		

Map ID
Direction
Distance

Database EDR ID Number

CN603
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197226**

District nun:	1	Api number:	05907607
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	528.478
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197226		

604
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197263**

District nun:	1	Api number:	05907647
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	720.812
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	38
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197263		

CG605
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221960**

District nun:	1	Api number:	05907683
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	39
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221960		

CL606
WNW **OIL_GAS** **CAOG11000221576**
1/2 - 1 Mile

District nun:	1	Api number:	05906928
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	173
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221576		

CK607
NW **OIL_GAS** **CAOG11000221544**
1/2 - 1 Mile

District nun:	1	Api number:	05906899
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	152
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221544		

CO608
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221662**

District nun:	1	Api number:	05907083
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Narnajal	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221662		

CP609
East
1/2 - 1 Mile

OIL_GAS **CAOG11000197287**

District nun:	1	Api number:	05907724
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	548.669
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	18
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197287		

Map ID
Direction
Distance

Database EDR ID Number

CP610
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197229**

District nun:	1	Api number:	05907610
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	586.789
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	64
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197229		

CG611
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221491**

District nun:	1	Api number:	05906848
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	91
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221491		

CN612
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000198560**

District nun:	1	Api number:	05921170
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.722
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	144
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000198560		

CL613
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222160**

District nun:	1	Api number:	05920081
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	223
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222160		

CL614
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222161**

District nun:	1	Api number:	05920081
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	223
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222161		

CL615
WNW **OIL_GAS** **CAOG11000222164**
1/2 - 1 Mile

District nun:	1	Api number:	05920107
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	225
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222164		

CM617
NW **OIL_GAS** **CAOG11000222270**
1/2 - 1 Mile

District nun:	1	Api number:	05920439
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	258
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222270		

Map ID
Direction
Distance

Database EDR ID Number

CM616
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222269**

District nun:	1	Api number:	05920439
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	258
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222269		

CN618
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197685**

District nun:	1	Api number:	05920391
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	530.263
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	117
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000197685		

CO619
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221543**

District nun:	1	Api number:	05906898
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	151
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221543		

CN620
ENE **OIL_GAS** **CAOG11000197228**
1/2 - 1 Mile

District nun:	1	Api number:	05907609
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	532.619
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	63
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197228		

CM621
NW **OIL_GAS** **CAOG11000222522**
1/2 - 1 Mile

District nun:	1	Api number:	05921541
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	292
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3458		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222522		

CM622
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222523**

District nun:	1	Api number:	05921541
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	292
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3458		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222523		

CQ623
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221702**

District nun:	1	Api number:	05907124
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	36
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221702		

Map ID
Direction
Distance

Database EDR ID Number

CK624
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221535**

District nun:	1	Api number:	05906891
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	144
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221535		

CM625
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222209**

District nun:	1	Api number:	05920277
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	232
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222209		

CL626
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222163**

District nun:	1	Api number:	05920088
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	224
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222163		

CP627
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222010**

District nun:	1	Api number:	05907754
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222010		

CO628
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222243**

District nun:	1	Api number:	05920361
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	247
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222243		

CQ629
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222158**

District nun:	1	Api number:	05920080
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	222
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222158		

CQ630
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222159**

District nun:	1	Api number:	05920080
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	222
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222159		

Map ID
Direction
Distance

Database EDR ID Number

CK631
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000197259**

District nun:	1	Api number:	05907643
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	696.42
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	34
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197259		

CM632
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222519**

District nun:	1	Api number:	05921540
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	290
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	5083		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222519		

CM634
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222521**

District nun:	1	Api number:	05921540
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	290
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	5083		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222521		

CM633
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222520**

District nun:	1	Api number:	05921540
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	290
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	5083		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222520		

635
West
1/2 - 1 Mile

OIL_GAS **CAOG11000220764**

District nun:	1	Api number:	05905587
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	22
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000220764		

CP636
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222017**

District nun:	1	Api number:	05907761
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	8
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222017		

CR637
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222517**

District nun:	1	Api number:	05921539
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	291
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3600		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000222517		

Map ID
Direction
Distance

Database EDR ID Number

CR638
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222518**

District nun:	1	Api number:	05921539
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	291
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3600		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000222518		

CP639
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197292**

District nun:	1	Api number:	05907729
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	612.654
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	39
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197292		

CR640
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222516**

District nun:	1	Api number:	05921538
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	289
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3469		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222516		

CS643
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222612**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3593		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222612		

CS642
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222615**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3593		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222615		

CS641
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222614**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3593		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222614		

CS644
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222613**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3593		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222613		

Map ID
Direction
Distance

Database EDR ID Number

CS647
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222616**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222616		

CS648
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222617**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222617		

CS645
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222618**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222618		

CS646
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222619**

District nun:	1	Api number:	05921627
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	301
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000222619		

CQ649
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222300**

District nun:	1	Api number:	05920525
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	266
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222300		

CS650
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221540**

District nun:	1	Api number:	05906896
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	149
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221540		

CP651
East
1/2 - 1 Mile

OIL_GAS **CAOG11000197293**

District nun:	1	Api number:	05907730
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	555.137
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	44
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197293		

Map ID
Direction
Distance

Database EDR ID Number

CR653
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221476**

District nun:	1	Api number:	05906835
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	77
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000221476		

CR652
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221475**

District nun:	1	Api number:	05906835
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	77
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000221475		

CT654
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222015**

District nun:	1	Api number:	05907759
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222015		

CT655
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222019**

District nun:	1	Api number:	05907763
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222019		

656
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221700**

District nun:	1	Api number:	05907122
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	34
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221700		

CR658
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222266**

District nun:	1	Api number:	05920436
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	255
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222266		

CR657
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222265**

District nun:	1	Api number:	05920436
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	255
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222265		

Map ID
Direction
Distance

Database EDR ID Number

CQ659
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222293**

District nun:	1	Api number:	05920521
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	262
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222293		

CQ660
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222294**

District nun:	1	Api number:	05920521
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	262
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222294		

CU661
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221472**

District nun:	1	Api number:	05906833
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	75
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221472		

CQ663
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222296**

District nun:	1	Api number:	05920522
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	263
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222296		

CQ662
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222295**

District nun:	1	Api number:	05920522
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	263
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222295		

664
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000197262**

District nun:	1	Api number:	05907646
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	760.788
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07003188.ssf		
Leasename:	Columbia	Wellnumber:	37
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197262		

CS665
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221501**

District nun:	1	Api number:	05906859
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	101
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221501		

Map ID
Direction
Distance

Database EDR ID Number

CQ666
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222297**

District nun:	1	Api number:	05920523
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	264
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222297		

CQ667
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222298**

District nun:	1	Api number:	05920523
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	264
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222298		

668
ESE
1/2 - 1 Mile

OIL_GAS **CAOG11000197303**

District nun:	1	Api number:	05907771
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	16
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	609.358
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	85601278.ssf		
Leasename:	Not Reported	Wellnumber:	21
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000197303		

CU669
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222299**

District nun:	1	Api number:	05920524
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	265
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222299		

CT670
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222021**

District nun:	1	Api number:	05907765
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222021		

CU671
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221577**

District nun:	1	Api number:	05906929
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	174
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221577		

CU672
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221574**

District nun:	1	Api number:	05906927
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	172
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221574		

Map ID
Direction
Distance

Database EDR ID Number

CU673
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221575**

District nun:	1	Api number:	05906927
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	172
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221575		

CU674
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222208**

District nun:	1	Api number:	05920276
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	231
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222208		

CU675
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222200**

District nun:	1	Api number:	05920235
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	235
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222200		

CU676
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222201**

District nun:	1	Api number:	05920235
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	235
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222201		

677
ENE
1/2 - 1 Mile

OIL_GAS **CAOG11000197291**

District nun:	1	Api number:	05907728
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	547.243
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	38
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000197291		

CT678
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222014**

District nun:	1	Api number:	05907758
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	5
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222014		

CS679
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000222244**

District nun:	1	Api number:	05920362
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	248
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222244		

Map ID
Direction
Distance

Database EDR ID Number

CS680
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221526**

District nun:	1	Api number:	05906884
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	137
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221526		

CT681
East
1/2 - 1 Mile

OIL_GAS **CAOG11000197288**

District nun:	1	Api number:	05907725
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	535.181
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	28
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197288		

CV682
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222659**

District nun:	1	Api number:	05921701
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	N
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	754’ KB
Locationde:	Not Reported		
Gissourcec:	sum		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	311
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	31-AUG-11
Welldeptha:	5592		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222659		

CS683
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221548**

District nun:	1	Api number:	05906903
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	122
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221548		

684
West
1/2 - 1 Mile

OIL_GAS **CAOG11000220759**

District nun:	1	Api number:	05905582
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	16
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000220759		

CT685
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222020**

District nun:	1	Api number:	05907764
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222020		

686
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221433**

District nun:	1	Api number:	05906737
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	K & J Oil Co Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	5
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Marc	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221433		

Map ID
Direction
Distance

Database EDR ID Number

CV688
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221478**

District nun:	1	Api number:	05906836
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	78
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000221478		

CV689
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221479**

District nun:	1	Api number:	05906836
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	78
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000221479		

CV687
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221477**

District nun:	1	Api number:	05906836
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	78
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AWF
Site id:	CAOG11000221477		

CV690
WNW **OIL_GAS** **CAOG11000221566**
1/2 - 1 Mile

District nun:	1	Api number:	05906921
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	166
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221566		

CT691
East **OIL_GAS** **CAOG11000222011**
1/2 - 1 Mile

District nun:	1	Api number:	05907755
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222011		

CW692
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221554**

District nun:	1	Api number:	05906909
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	8
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	128
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221554		

CX693
ESE
1/2 - 1 Mile

OIL_GAS **CAOG11000221999**

District nun:	1	Api number:	05907734
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Any Field
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	5 A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221999		

Map ID
Direction
Distance

Database EDR ID Number

CY694
WSW
1/2 - 1 Mile

OIL_GAS **CAOG11000221676**

District nun:	1	Api number:	05907101
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	42
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000221676		

CZ695
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222013**

District nun:	1	Api number:	05907757
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222013		

CZ696
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222018**

District nun:	1	Api number:	05907762
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222018		

CY697
WSW **OIL_GAS** **CAOG11000217277**
1/2 - 1 Mile

District nun:	1	Api number:	05900008
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	42-A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000217277		

CV698
WNW **OIL_GAS** **CAOG11000217288**
1/2 - 1 Mile

District nun:	1	Api number:	05900046
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	219
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000217288		

CT699
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222012**

District nun:	1	Api number:	05907756
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222012		

CZ700
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222016**

District nun:	1	Api number:	05907760
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	ExxonMobil Corporation		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222016		

Map ID
Direction
Distance

Database EDR ID Number

CZ701
East
1/2 - 1 Mile

OIL_GAS **CAOG11000197290**

District nun:	1	Api number:	05907727
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Breitburn Operating L.P.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	526.504
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000197290		

DA702
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222248**

District nun:	1	Api number:	05920371
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	249
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222248		

DB703
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222000**

District nun:	1	Api number:	05907741
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	W 3-A
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222000		

704
ESE **OIL_GAS** **CAOG11000197302**
1/2 - 1 Mile

District nun:	1	Api number:	05907769
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	16
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	729.923
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	85601278.ssf		
Leasename:	Not Reported	Wellnumber:	18
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000197302		

DA705
WNW **OIL_GAS** **CAOG11000221573**
1/2 - 1 Mile

District nun:	1	Api number:	05906926
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	171
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221573		

DA707
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222504**

District nun:	1	Api number:	05921531
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	283
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3910		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000222504		

DA706
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222503**

District nun:	1	Api number:	05921531
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	283
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	3910		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PWF
Site id:	CAOG11000222503		

Map ID
Direction
Distance

Database EDR ID Number

708
West
1/2 - 1 Mile

OIL_GAS **CAOG11000219512**

District nun:	1	Api number:	05903751
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Naranjal	Wellnumber:	21
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000219512		

DC709
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222651**

District nun:	1	Api number:	05921672
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	5
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	unk		
Comments:	Not Reported		
Leasename:	Tonner-Stearns	Wellnumber:	101
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	5585		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222651		

CZ710
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222051**

District nun:	1	Api number:	05907821
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	22
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222051		

CX711
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222065**

District nun:	1	Api number:	05907834
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	35
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222065		

CZ712
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222041**

District nun:	1	Api number:	05907811
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222041		

DD713
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221703**

District nun:	1	Api number:	05907125
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	37
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221703		

CZ714
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222038**

District nun:	1	Api number:	05907808
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222038		

Map ID
Direction
Distance

Database EDR ID Number

DE715
East
1/2 - 1 Mile

OIL_GAS **CAOG11000197227**

District nun:	1	Api number:	05907608
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	634.975
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	07011187.ssf		
Leasename:	Not Reported	Wellnumber:	40
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000197227		

CW716
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221623**

District nun:	1	Api number:	05906974
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221623		

DB717
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222001**

District nun:	1	Api number:	05907742
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	B
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	W 3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222001		

718
SSE **OIL_GAS** **CAOG11000220224**
1/2 - 1 Mile

District nun:	1	Api number:	05904801
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	J. H. Fawcett		
County name:	Orange	Fieldname:	Coyote, East
Area name:	Any Area	Section:	17
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Belton Estate	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000220224		

CW719
NW **OIL_GAS** **CAOG11000221525**
1/2 - 1 Mile

District nun:	1	Api number:	05906883
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	136
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221525		

CZ720
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222061**

District nun:	1	Api number:	05907830
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	31
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222061		

DB721
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222077**

District nun:	1	Api number:	05907846
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	103
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222077		

Map ID
Direction
Distance

Database EDR ID Number

DD724
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221499**

District nun:	1	Api number:	05906857
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	99
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Not Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000221499		

DD722
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221497**

District nun:	1	Api number:	05906857
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	99
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Not Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000221497		

DD723
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221498**

District nun:	1	Api number:	05906857
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	99
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Not Directionally drilled	Gissymbol:	AWF
Site id:	CAOG11000221498		

CZ725
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222040**

District nun:	1	Api number:	05907810
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	11
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222040		

DC726
NNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222656**

District nun:	1	Api number:	05921697
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	N
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	5
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	788’ KB
Locationde:	Fr NE cor Stearns lse 149’Sly along the Ely lse line & 182’Wly.		
Gissourcec:	sum		

Comments:	Not Reported		
Leasename:	Tonner-Stearns	Wellnumber:	103
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	31-OCT-11
Welldeptha:	4991		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	AOG
Site id:	CAOG11000222656		

CZ727
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222042**

District nun:	1	Api number:	05907812
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	13
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222042		

CZ728
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222073**

District nun:	1	Api number:	05907842
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	43
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222073		

Map ID
Direction
Distance

Database EDR ID Number

DE729
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222055**

District nun:	1	Api number:	05907825
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	26
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222055		

DF730
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221521**

District nun:	1	Api number:	05906879
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	132
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221521		

731
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221967**

District nun:	1	Api number:	05907690
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	46
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221967		

DF732
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221520**

District nun:	1	Api number:	05906878
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	131
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221520		

DG733
ESE
1/2 - 1 Mile

OIL_GAS **CAOG11000197268**

District nun:	1	Api number:	05907659
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	16
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	657.825
Locationde:	Not Reported		
Gissourcec:	gps		

Comments:	85601278.ssf		
Leasename:	Olinda Four	Wellnumber:	42-16
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000197268		

DH734
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222515**

District nun:	1	Api number:	05921537
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	288
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	4762		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Directionally drilled	Gissymbol:	POG
Site id:	CAOG11000222515		

DI735
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222039**

District nun:	1	Api number:	05907809
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222039		

Map ID
Direction
Distance

Database EDR ID Number

DH736
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221950**

District nun:	1	Api number:	05907675
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	198
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221950		

DH737
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221961**

District nun:	1	Api number:	05907684
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	40
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221961		

DI738
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222062**

District nun:	1	Api number:	05907831
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	32
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222062		

DF739
NW
1/2 - 1 Mile

OIL_GAS **CAOG11000221524**

District nun:	1	Api number:	05906882
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	135
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221524		

DJ741
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222350**

District nun:	1	Api number:	05920843
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		

Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	269
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	2737		
Abandonedd:	Not Reported	Completion:	08-NOV-12
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222350		

DJ740
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000222349**

District nun:	1	Api number:	05920843
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	269
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	2737		
Abandonedd:	Not Reported	Completion:	08-NOV-12
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000222349		

DI742
East
1/2 - 1 Mile

OIL_GAS **CAOG11000222045**

District nun:	1	Api number:	05907815
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Aera Energy LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	9
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Olinda One	Wellnumber:	16
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000222045		

Map ID
Direction
Distance

Database EDR ID Number

DG743
SE
1/2 - 1 Mile

OIL_GAS **CAOG11000197245**

District nun:	1	Api number:	05907623
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Olinda Land Co.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	16
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	599.428
Locationde:	Not Reported		
Gissourcec:	gps		
Comments:	85601278.ssf		
Leasename:	Not Reported	Wellnumber:	12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000197245		

DH744
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221697**

District nun:	1	Api number:	05907119
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Tonner Hills SSP, LLC		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	215
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000221697		

DJ745
WNW
1/2 - 1 Mile

OIL_GAS **CAOG11000221565**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

District nun:	1	Api number:	05906920
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	Linn Operating, Inc.		
County name:	Orange	Fieldname:	Brea-Olinda
Area name:	Any Area	Section:	7
Township:	03S	Range:	09W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stearns	Wellnumber:	165
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	AOG
Site id:	CAOG11000221565		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92823	5	2

Federal EPA Radon Zone for ORANGE County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for ORANGE COUNTY, CA

Number of sites tested: 30

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.763 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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APPENDIX D

AGENCY, AND OTHER RECORDS –SITE

PHASE I ENVIRONMENTAL SITE ASSESSMENT - BREA EAST SITE OLINDA TWO AND OLINDA FEE THREE OIL FIELDS, ORANGE COUNTY, CALIFORNIA

July 20, 1992

GSI Work Order No. 2356-A1-OC

Prepared for:

Shell Western E&P, Inc.
P.O. Box 11164
Bakersfield, California 93389

GeoSoils, Inc.

Geotechnical • Geologic • Environmental

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July 20, 1992

Work Order No. 2356-A1-OC

To: Shell Western E&P, Inc. (SWEPI)
P.O. Box 11164
Bakersfield, California 93389

Attention: Mr. George L. Basye
Project Manager

Subject: Phase I Environmental Site Assessment, Brea East Site, Olinda Two and Olinda Fee Three Oil Fields, Orange County, California

GeoSoils, Inc., is pleased to present the results of our Phase I Environmental Site Assessment of the subject site. This study was conducted for the purpose of assessing the potential for the presence of hazardous materials/waste contamination at the subject site.

SUMMARY

Based upon the information obtained during the course of this investigation, GeoSoils, Inc., presents the following summary of findings and conclusions.

- Current operations appear to be neat with no indications of noncompliance with regulatory requirements.
- Evidence of low-level site contamination appears to be limited to petroleum exploration and production activities. This includes past oil sump reservoirs, drill pads, above ground tank sites, piping areas, pits, sumps and other items typical of oil field production.
- Impact from surrounding government listed sites is considered remote. The closest sites with potential impact are surrounding sites with similar oil field production activities.
- Groundwater does not occur at the site and contamination of groundwater downgradient of the site is not indicated.
- Proposed residential development is considered feasible from an environmental standpoint.
- Planning of structures should consider existing wells and utility easements.

- It is recommended that Phase II site exploration be conducted in specific areas in order to characterize the nature and extent of contamination relative to oil field activities.

We sincerely appreciate this opportunity to be of service. If you have any questions pertaining to this report, please contact the undersigned at (714) 261-6891.

Sincerely,

GEOSOILS, INC.

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Orange County Office

Gene C. Carpenter, Ph.D., R.G.
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HDP/GCC/PF/agw

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this Phase I Environmental Site Assessment (ESA) is to provide background information with respect to hazardous materials and waste potential relating to past and current land use. The results of this assessment are intended to be used for project feasibility and planning of proposed residential development.

1.2 Scope of Work

The scope of work completed for this study included the following:

- Site reconnaissance conducted on June 6, 1992, and June 18, 1992, with SWEPI's Environmental Coordinator, Ms. Julie Salisbury, and GSI's Geologist, Mr. H.D. Pouncey. A follow-up visit was conducted on 7-9-92.
- Government records search on State and Federal levels, including NPL, CERCLIS, ASPIS, BEP, CORTESE, LUST, SWIS, SWAT, HWIS and SARA-III (see Appendix B).
- State regional and local agency contacts, including SWRCB/RWQCB, Orange County Health Care Agency and Division of Oil and Gas - DOG (see Appendix C).
- Review of Well Water Data provided by Orange County Water District (see Appendix D).
- Review of U.S.G.S. maps and Orange County aerial photos dating from 1938 to 1988. Stereo-pair aerial photos dating from 1928 to 1939 were also reviewed at Whittier College (see Appendix E).
- Preparation of this report presenting our findings, conclusions and recommendations.

This study does not include Phase II sampling or testing of air, soil, groundwater or materials.

2.0 SITE DESCRIPTION AND RECONNAISSANCE OBSERVATIONS

2.1 Site Location

The subject property consists of approximately 165 acres. It is located along the southwestern flank of the Chino Hills along the northeastern outskirts of Brea in Orange County, California. The site is east of Rose Drive at Valencia Avenue and Carbon Canyon Road and on the west side of Carbon Canyon Dam. The site address is unknown (being a part of 4024 Valley View, Yorba Linda, CA 92686 and 2701 Valencia Avenue, Brea 92621). The site location is shown on Figure 1.

2.2 Site Description

The site is comprised of one main south draining canyon and associated tributaries. Drainage is directed southwest and offsite under Rose Drive.

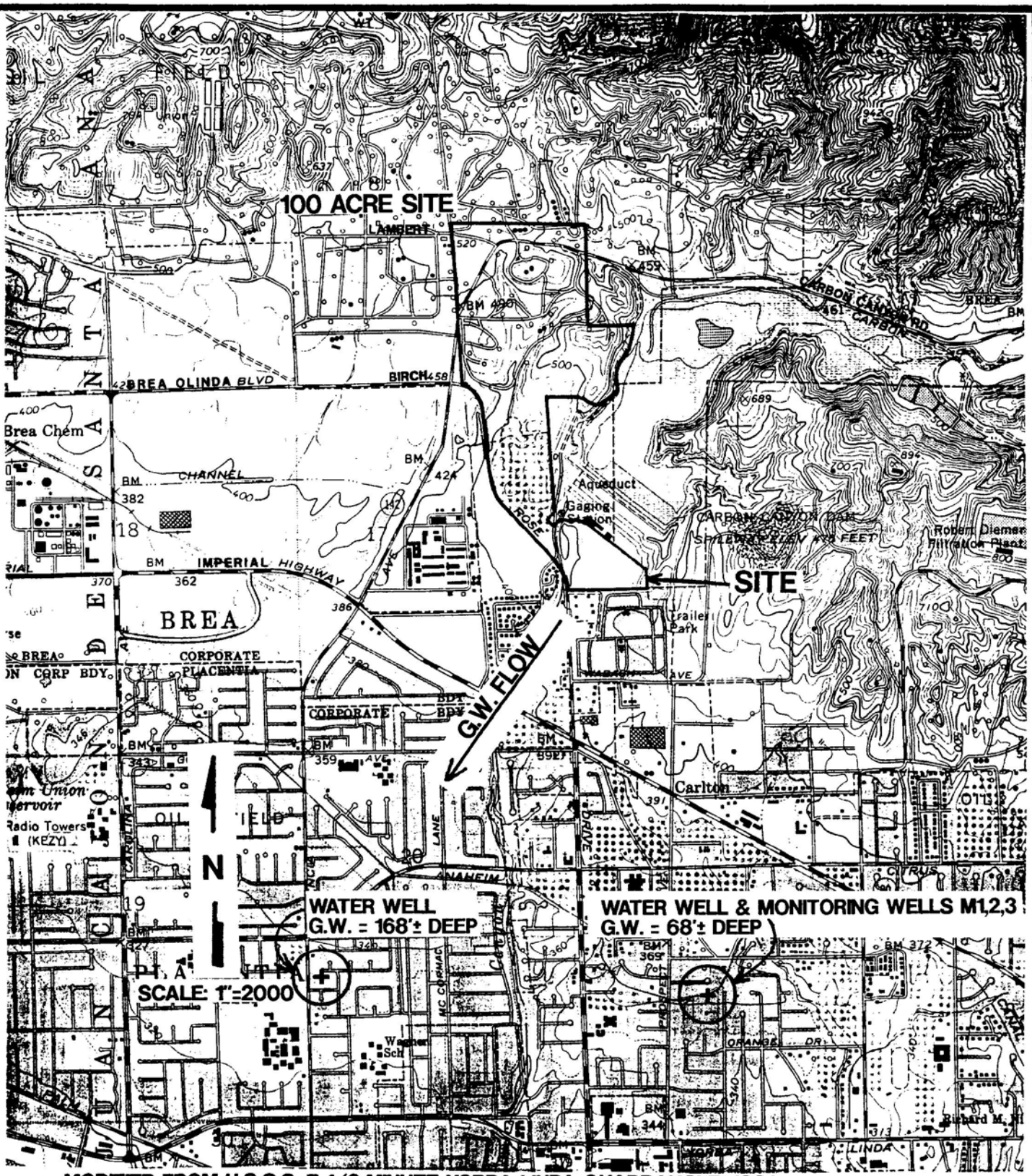
2.2.1 South of Carbon Canyon Road

The Olinda Oil Field operations include some 85± wells with an array of graded and oiled roads and drill pads. Operational facilities located at the main entrance off Valencia include a wash/holding tank and 3 steam generators that run on natural gas. These generators ran on landfill gas 10± years ago and gas from UNOCAL 4± years ago, and have been idle since the time of the last steam injection.

An array of above ground (AG) piping for steam injection and a well casing vapor recovery (CVR) system was observed. The AG steam piping is insulated for heat retention and looped for expansion. The CVR system includes 5 to 6 headers and 3 to 4 drip areas where vapors were gathered and piped offsite.

The dispersion line transports oil offsite and its easement includes incoming gas and water lines. This major pipeline easement is located at the southern end of the property.

The powerline easement is along Valencia Avenue and there is a transformer substation on site. According to SWEPI, transformers at this site have been replaced with modern transformers that do not contain Polychlorinated Biphenyls (PCBs).



MODIFIED FROM U.S.G.S. 7 1/2 MINUTE YORBA LINDA QUADRANGLE, 1981

GeoSoils, Inc.

SITE LOCATION MAP
BREA EAST

DATE 7-20-92 | W.O. NO. 2356-A1-OC

Geotechnical Engineering • Engineering Geology

FORM 89/22

FIGURE 1

A construction yard located near well 61 currently contains empty 17H drums that were utilized in the past (1988±) to store used capacitors containing PCB's. These capacitors have been hauled offsite and properly disposed of according to SWEPI.

According to SWEPI, two (2) concrete lined pits or vaults with a metal grading cover were located northwest of well 2-24 and north of well 2-30. Past use is unknown.

According to SWEPI, header manifolds may occasionally leak product and have drip areas. Notable leaks have occurred near wells 3-37 and 2-43.

According to SWEPI, an existing septic system used to serve a maintenance building located in the wash/holding tank area near the main entrance off Valencia Avenue. It is now disconnected.

The southern end of the site is situated at Carbon Canyon Dam and is used for citrus orchards and a small nursery located below the dam crest.

2.2.2 North of Carbon Canyon Road

Facilities north of Carbon Canyon Road include some 19± wells, 2 compressors and an abandoned AG tank farm that contained three tanks for petroleum product storage. The two compressors, #1 and #2, are part of the Casing Vapor Recovery System (CVR) that serve as booster pumps in shipping recovered vapors to SWEPI's Brea site and ultimately to Union Stearns Plant (UNOCAL) in Brea.

According to SWEPI, the three AG tanks were removed in April, 1990. The tanks were found to contain 20± year old drill muds. The tanks and the materials contained in them were properly disposed of. The drill muds were disposed of by Laidlaw as non-hazardous at the BKK Landfill.

This area receives storm water runoff from Santa Fe Energy located to the north. A crude oil spillage during a heavy rainfall was reported about 2 years ago.

2.3 Surrounding Features and Land Use

Land use north and west of the site is dominated by oil well production with secondary agricultural use consisting of nurseries, orchards and row crops.

A major industrial complex is located southwest of the site between Rose Drive and Valencia Avenue, less than one-quarter mile away.

The Carbon Canyon Flood Control Basin and Dam is located along the eastern perimeter of the site and a portion of the site is situated in front of the dam.

The Brea-Olinda Landfill is located approximately 1/2-mile north of the property.

The Chino Hills State Park and undeveloped land, including Telegraph Canyon, is located to the northeast.

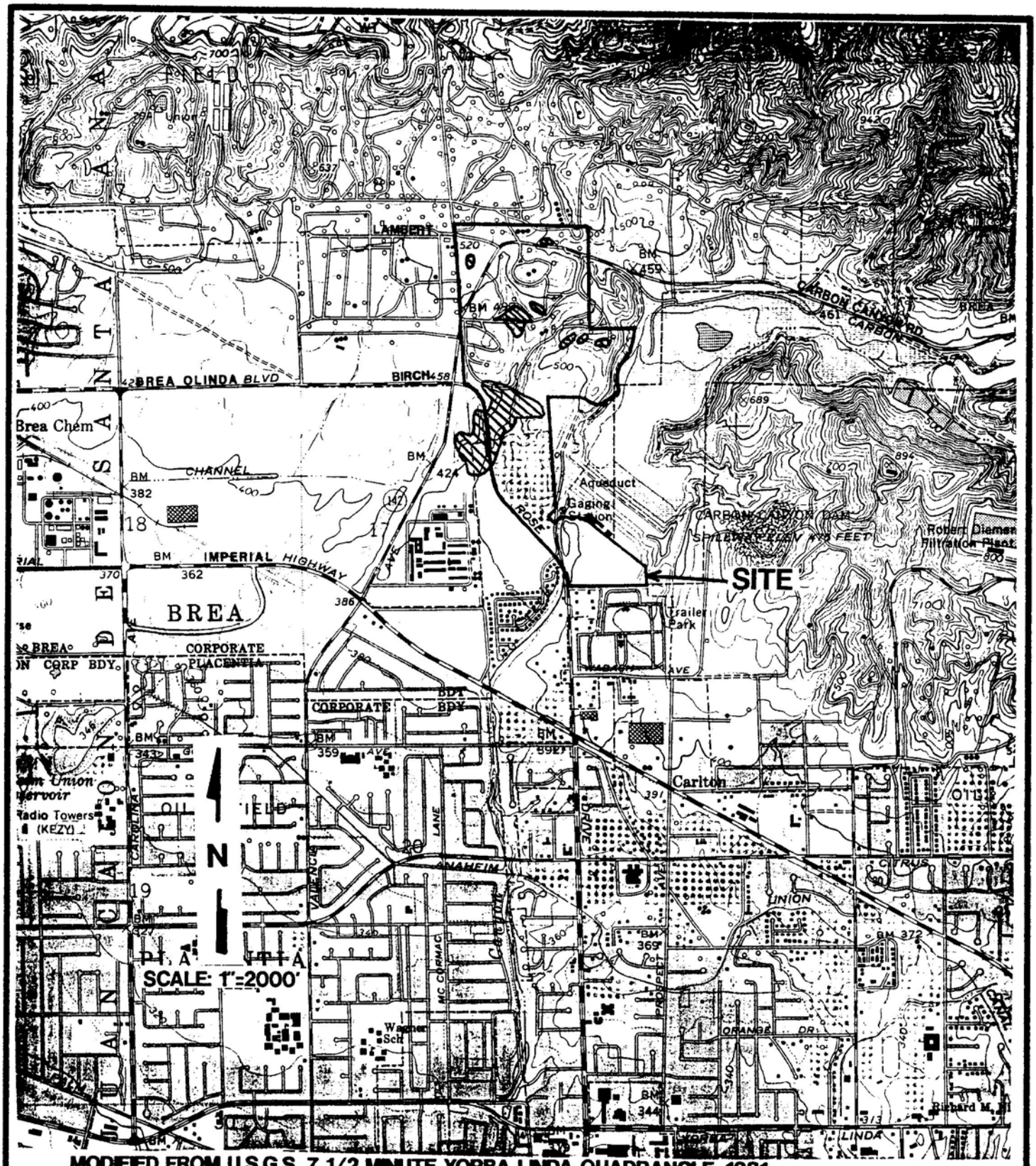
2.4 Summary of Potentially Hazardous Chemicals and/or Contamination During Site Reconnaissance

The areas of concern observed during our site reconnaissance, discussions with SWEPI personnel and aerial photo review include the following:

- Scattered petroleum hydrocarbon soil staining resulting from general operations.
- Possible methane and hydrogen sulfide gas in the area of the holding tanks, as indicated by the posted warning signs.
- Old sumps associated with drilling pads and production sites are shown in Figure 2. In addition to petroleum hydrocarbons, old sumps often contain metals such as As, Ba, Pb, Cr, etc.
- Petroleum hydrocarbon contamination in soil around AG storage tanks.
- Petroleum hydrocarbon contamination in soil in areas of former AG tanks as located by aerial photo studies and discussions with SWEPI personnel.

Records from Shell indicate tank bottom sludges are nonhazardous with respect to CAC Metals, Chlorinated Organics and PCB's, and bioassay. Analytical results and a site plan provided by SWEPI are included in Appendix A.

A tank removal indicated for this site address at 2701 Valencia (3000 Valencia in County records) was conducted offsite on the 100-acre parcel at the northwest corner of Lambert and Valencia Avenue. Three tanks were pulled (gasoline and diesel). Diesel contamination down to 80± feet deep was explored and characterized and left in-place as a County approved no-action alternative (see Orange County records, Appendix C, Case #88UTZ1). **Note that the location map in Appendix C is incorrect. The site is located at the northwest corner of Lambert and Valencia.**



MODIFIED FROM U.S.G.S. 7 1/2 MINUTE YORBA LINDA QUADRANGLE, 1981

OIL SUMP MAP

EXPLANATION

APPROXIMATE LOCATION OF OIL SUMPS IDENTIFIED ON SITE

DATE 7-20-92

W.O. NO. 2356-A1-OC

GeoSoils, Inc.

Geotechnical Engineering • Engineering Geology

H-732

FORM 89/22

FIGURE 2

3.0 LOCAL GEOLOGIC AND HYDROGEOLOGIC SETTING

3.1 Geology

The ridges consist of Tertiary strata assigned to the upper and lower members of the Fernando Formation. These strata dip southwest 20 to 30 degrees. Geologic structure trends northwest and dips southwest and includes homoclinal strata and monoclinal blocks offset by generally northwest trending faults with some antithetic faults trending northeast. The Whittier Fault Zone is located approximately 1200 feet north of the site. Oil production zones are located at depths of 2500-3500 feet within the Puente Formation and probably occur as stratigraphic and fault-related traps. A regional geologic map of the site is included in Appendix F, Miscellaneous Map Files. The canyons consist primarily of Terrace Deposits and Quaternary Alluvium.

3.2 Hydrogeology

Groundwater at the site is unknown. The site is not located within a recognized groundwater basin, but is located along the northern periphery of the Orange County Coastal Plan Aquifer. The recognized groundwater basin area encroaches onto the south half of the site near Carbon Canyon Dam. Groundwater flows to the southwest.

According to the Orange County Water District (OCWD), the closest drinking water wells are located within a mile to the south where water levels range from 68 to 168 feet deep. These wells are located at a lower surface elevation as indicated on Figure 1. Also, OCWD monitoring well cluster (M1, M2 and M3) indicates high electrical conductivity from mineral salts ranging from 945 to 1643, slightly in excess of maximum state drinking water standard of 1600 mmhos/mhos/cm. The well M3 indicated a trace of vinyl chloride and Trichlorofluoromethane (Freon 11) which are below maximum contaminant levels of 0.0005 mg/l and 0.15 mg/l, respectively.

The 1991 updated Groundwater Management Plan of Orange County does not indicate this as a baseline project for either water hardness or organics. It does indicate this general area as a potential project for future desalting plants.

Water well data and the approximate location of wells and groundwater depths are included in Appendix D and summarized on the Site Location Map, Figure 1. A groundwater summary is presented below:

GROUNDWATER SUMMARY

LOCATION	ELEVATION	GROUNDWATER DEPTH	GROUNDWATER QUALITY
Site	400-500'	No Groundwater	Not Applicable
Water well, over mile, downgradient to southwest of site	335'	168'	Meets drinking water standards
Water well and monitoring clusters M1, M2 and M3, one mile to south of site	356'	68'	Meets drinking water standards, slightly in excess of water hardness standards

Additionally, studies by others conducted on the 100-acre site across the street, at the northwest corner of Lambert and Valencia (for diesel contamination) indicate that there is no groundwater within 190 feet of the ground surface (see Appendix C).

4.0 GOVERNMENT RECORDS SEARCH

4.1 County, State and Federal Agencies

A government records search was conducted by Environmental Database Company (EDC) to identify listed contaminated properties on record within a one-mile radius of the property at Rose Drive and Valencia Avenue. The database of the search was compiled from available information from various county, state, and federal government agencies. The results of the government records search which identify the hazardous materials sites are presented in Appendix B. A brief discussion of each adjacent hazardous materials site is presented below, as based on information provided by EDC.

EPA - CERCLIS: The EDC shows 2 listings as of December, 1991. This list includes the Brea-Olinda Landfill and Cyanamid Distribution as discovery and preliminary site assessment stages. However, the CERCLIS 1-10-92 update indicates an "N" status of no further remedial action planned. A copy of this list is attached to Appendix B.

EPA - NPL: The 1991 version of this list indicates no NPL sites within the area searched.

Calsites, Cal (formerly Abandoned Site Program Information System, ASPIS): There are 8 Calsites listed in the area searched. However, "No Further Action" status has been assigned to each (see Appendix C).

Annual Workplan, AWP (formerly California Bond Expenditure Plan, BEP): No targeted cleanup sites are located within the searched areas (see Appendix C). However, 4 Orange County active cleanup sites are located in Brea. Two are miles distant to the west and two are close by. The two close by include the following:

1. Olinda Associates Properties, northeast of Carbon Canyon Road and Valencia, Brea, 92621 (Case #91IC56). This property is closest, located immediately north of the property. Discussions with Orange County personnel Steve Sharp and Mark Sutphin indicate this site is on record for crude oil contamination clean-up for land redevelopment. It is currently in the preliminary assessment stages.

2. Blaisdell Manufacturing Facility, 3160-B Enterprise Street, Brea 92621 (Case #91IC55). This site is located approximately 1/4 $\pm$ mile west of Rose Drive and Valencia Avenue. This site is also cross-referenced on HWIS.

A list of Orange County Cleanup Sites, 4 pages, is attached to Appendix C.

California - CORTESE (Hazardous Waste and Substances Sites List Pursuant to AB 3750): Based on the January 1991 edition of the Cortese list, there are 2 Cortese sites within the searched areas indicated as tank leaks. The Shell Service Station [SIC, there is no "Shell Service Station" located here] listing at 2701 Valencia Avenue is also listed under LUST and probably related to the diesel fuel site characterization.

California LUST: The LUST list dated January of 1992 indicates 6 listed sites within the area searched. All 6 sites are listed for soil only, affected (not groundwater). The Shell site at 2701 Valencia is indicated as pollution characterization stage and 4 of the other sites are signed off indicating remedial action has been completed or is unnecessary. The Unocal site at 525 Valencia is under preliminary assessment and is located downgradient from the property.

SWIS AND SWAT: The Orange County Olinda-Alpha Landfill is located in Brea, approximately 1/2-mile north of the site. Wastes received include agricultural, construction demolition, dead animals, industrial process, mixed municipal and tires. Aerial photos indicated landfill operations were in progress by 1938.

Hazardous Waste Information System (HWIS): The subject site (under site address 4024 Valley View), as well as 26 other sites, are on the HWIS list within the searched areas. The identification of a HWIS site does not confirm a release or health hazard exists; it only confirms the identification of a generator, transporter or disposer of hazardous waste as defined under California Hazardous Waste Control Law (HWCL). The sites are listed for information purposes only as required by standard procedures. The listed sites are presented in Appendix C.

SARA, TITLE III: Only 1 SARA site is located at the edge of the area searched, Union Chemicals Division at 2601 Imperial Highway. It is also cross-referenced for LUST with a No Further Action status.

County of Orange, Health Care Agency: A formal request for a review of records for 2 site addresses in regard to unauthorized releases of hazardous materials and on-going investigations pertaining to the site was completed. Records reviewed include both 2701 Valencia, Brea and 4024 Valley View, Yorba Linda. Excerpts from these records are included in Appendix C, and a review of these records is summarized below:

Site Address - 2701 Valencia, Brea, California: These records include approximately 300 ± pages regarding the LUST diesel fuel contamination offsite at the "100-acre" parcel northwest of Valencia and Carbon Canyon. The diesel contamination was discovered on February 23, 1988, subsequently investigated by various consultants (ERI, ENSR and M&E) and a No Action Alternative was approved on August 20, 1991. A copy of Orange County conditional approval and portions of M&E reports are included in Appendix C.

Site Address - 4024 Valley View, Yorba Linda, California: These records include 52 pages covering both the Yorba Linda Oil Field and this site as summarized below:

- Orange County EMA correspondence dated 4-22-86 and 4-18-86 meeting minutes of safety, environmental and other issues concerning Brea site at Carbon Canyon and Valencia. Shell agreed to conduct soil tests and County agreed to show City of Brea copies of Shell's permits (see Appendix A for tests conducted on tank bottom sludge).

- County Health Underground Tank cleanup records indicates 1,000 gallon tank was pulled on 12-10-90 near a demolished house area. Tank was over 28-years-old and pitted with 10 holes, but there was no indication of contamination. Case closed by County. -- **NOTE this is also located on the northwest corner of Lambert and Valencia site, 100-acre parcel, outside of study limits.**

A portion of these file records discussed above are included in Appendix C and tests conducted by Shell are included in Appendix A.

Orange County Fire Department (OCFD): A request for a review of records for the subject site was sent on June 12, 1992 and response received back on June 30, 1992. From 1985 to present, the OCFD has no record on file of any incidents. A copy of this response is included in Appendix C.

Orange County Water District: The site is located at a higher elevation and up-gradient of known groundwater wells and outside of the Orange County groundwater basin. Records obtained from the Orange County Water District (OCWD) indicate groundwater depths of 68 to 168 feet deep at wells located at lower elevations approximately one mile southwest and south of the property. A cluster of wells near Prospect Avenue north of Yorba Linda Boulevard indicate traces of organic compounds. However, concentrations are below Maximum Contaminant Levels (MCL's) and were not found when rechecked. Copies of OCWD well data are included in Appendix D.

Regional Water Quality Control Board (RWQCB): Region 8 of the RWQCB was contacted for information regarding the site. Based on discussions with Dennis Merklin on 7-14-92 at (714) 782-4130/4434 no information or files are on record for the subject site. Contaminated sites known in the surrounding area are consistent with the record search conducted by EDC for this study (see Appendix B). Also, a site plan showing known contaminated sites in the vicinity is included in Appendix D.

Division of Oil and Gas (DOG): The DOG maintains well maps, and Map #106 covers this site and can be purchased for $3.00 by contacting the DOG at 245 W. Broadway, Suite 475, Long Beach, CA 90802, Telephone (213) 590-5309. This map indicates 73± wells recorded on Olinda Fee Three and 50± wells recorded on Olinda Two. The DOG also has well abandonment permit requirements and limits habitable structures being placed over abandoned wells. Of the 123± wells, approximately 56± are indicated as production wells on Olinda Fee Three and 32± on Olinda Two (see Appendix F, Miscellaneous Map Files).

Division of Mines and Geology (DMG): A regional geologic map of the area is found within State DMG Publication Open File Report 84-24 (see Reference 3). A portion of this map showing the site geology is included in Appendix F.

5.0 HISTORICAL REVIEW

5.1 Map and Aerial Photo Review

The site history is complex as indicated from a series of maps and photos reviewed from 1927 to 1988. A detailed account of the site history and surrounding land development, as indicated from each specific map or photo, is presented in Appendix E and summarized below:

- In 1927, oil field operations were in progress. Facilities included a Main "Oil Sump" Reservoir and other storage sumps, AG tanks, wells and access roads. Operations appear similar from 1927 through 1939. The approximate location of oil sumps identified on site are shown on Figure 2, text, and Plate I, map pocket.

- A series of operations and increased production wells and access roads continues. AG tanks appear and disappear, "Oil Sump" storage reservoirs are gradually phased out during the 1960's.

- The major dispersion, gas and water easement pipeline was under construction in 1959, south of the main "Oil Sump" reservoir and Rose Drive was constructed across the "Oil Sump" reservoir in 1964. Agricultural use of the southern portion was also initiated in 1964. Oil field production facilities and access roads continue to increase from the 1960s± to the 1980s±. Current oil field operations are similar to 1980s with some exception (e.g., the tank farm north of Carbon Canyon Road was removed circa 1988-1992±).

- Additional surrounding developments include the Brea Olinda Landfill to the north in progress by 1938, the Carbon Canyon Flood Control Dam to the east constructed in 1964, surrounding oil field operations primarily to the north and west along with orchards and nurseries and residential developments to the south.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Current Operations

The current Shell Oil Field appears to be in compliance with Federal, State and Local Regulatory Requirements with respect to Hazardous Materials Management (HMM) with respect to current land use.

- Applicable permits or procedures for HMM include DOG, AQMD, County DHS and Local/City Requirements which appear to be in compliance.
- Applicable permits or procedures for HWD include CAL EPA RCRA/HWIS identification as a hazardous waste generator (under 4024 Valley View address).
- Oil sump reservoirs and other scattered wastes characteristic of petroleum industry operations include the use of tank bottom sludge as road base and are regulated differently (not an issue) for current land use. However, recent AQMD 1108 rules for emissions, along with SWRCB concerns, have limited current use of tank bottom sludges as road base. The tank bottom sludges tested are considered non-hazardous for current operations, but could be regulated differently per Orange County or even SWRCB/RWQCB under a change in land use in consideration of the high petroleum hydrocarbon content.
- Government records searched indicate the site is not listed as a known contaminated site.
- Government listed sites in the surrounding area include 2-CERCLIS, 8-CALSITES (ASPIS), 2-CORTESE, 6-LUST, 1-SWIS/SWAT, 26-HWIS and 1-SARA. Impact from surrounding sites, according to government records, is considered remote.
- Orange County Health Care and other agency records searched or contacted indicate no outstanding violations or records of noncompliance. A tank pull was completed offsite at the northwest corner of Lambert Road and Valencia Avenue and no contamination was discovered.
- Diesel fuel tank contamination that occurred offsite at the northwest corner of Lambert Road and Valencia Avenue was investigated and approved for "No Action" cleanup.
- A current active cleanup site is located upgradient of the property at the northeast corner of Carbon Canyon Road and Valencia Avenue and could impact the site.
- Groundwater contamination at the site is not indicated from OCWD records as groundwater is not anticipated. High mineral salt content occurs in water wells a mile or more away from the site and a trace of vinyl chloride and trichlorofluoromethane (Freon 11) occurred once. The OCWD does not have a current on-going active cleanup of this water well area, but considers desalinization a potential future project south of the site. The SWRCB/RWQCB has records of surrounding site cleanups, but no record of noncompliance or groundwater contamination for the SWEPI operations or immediate site vicinity.

- History based on map and aerial photo review is complex and includes scattered sites (e.g., drill pads, tank sites, piping areas, pits, sumps, etc.) within the project that should be investigated for contamination and cleanup with the planned change in land use. The largest of these areas are expected to be the "Oil Sump" reservoirs used during past operations. Figure 2 shows the general location of the major sump areas.

6.2 Proposed Development

Proposed residential development is considered feasible from an environmental standpoint. However, the proposed change in land use would impact a change in compliance standards with respect to Hazardous Waste Management (HWM). Pertinent impacts include the following:

- Relocation of facilities can result in new permit requirements for HMM and new compliance standards for continued operation in addition to current compliance (Shell is aware of this).

- Facilities and well abandonment in conjunction with planned grading would require remediation of localized low level oil field contaminated soil. This is anticipated to be encountered in relatively large quantities such that the majority would require on-site proven remediation techniques in addition to localized clean-ups, recycling (asphalt, scrap iron, etc.) and offsite hauls (solvents, PCB's, metals, asbestos, etc.).

  The governing oversight agency is anticipated to be Orange County Health Care Agency in conjunction with City of Yorba Linda and, although not expected, could result in an oversight by others (e.g., SWRCB/RWQCB for tanks and groundwater, Cal EPA, AQMD, DTSC, DOG for well abandonment, etc. .).

6.3 Recommendations

Planning of structures is impacted by existing wells and should comply with well abandonment procedures in accordance with DOG requirements. Habitable structures should not be planned over abandoned wells. Venting systems should be considered in accordance with DOG requirements.

Utility easements on site are primarily associated with the well field operations and include water, steam, gas and electricity. A major pipeline easement is located to the immediate south and west along Valencia Avenue and includes SWEPI dispersion lines. These and other utilities may impact planning and development.

A Phase II site characterization study should be conducted in order to characterize the nature and extent of potential contamination. The focus of this study should be aimed at evaluating the extent and nature of potentially contaminated soils. This work should include drilling, trenching and laboratory testing. Areas first explored should include known past "oil sump" reservoirs and tank farms.

Remediation of contaminated soils, disposal and abandonment procedures during grading and site development should be monitored and documented by the environmental consultant and reported for review by the controlling project oversight authority.

7.0 LIMITATIONS

This Environmental Site Assessment (ESA) report was prepared in accordance with current standards of technical practice for determining the potential for contamination.

Findings and conclusions with respect to hazardous waste potential are limited as being based on the scope of work performed.

GeoSoils, Inc. cannot be responsible for conditions or consequences arising from relevant facts that were concealed, withheld or not fully disclosed at the time the work was performed. The ESA is not, and should not be construed as, a warranty or guarantee about the presence or absence of environmental contaminants which may affect the subject site. Facts, conditions and acceptable risk factors change with time; accordingly this report should be reviewed within this context.

This ESA report has been prepared for the exclusive use of Shell Western E&P, Inc. for this specific project and should not be used by other parties without the written consent of GeoSoils, Inc.

8.0 REFERENCES

Division of Oil and Gas, Map 106, Brea-Olinda and East Coyote, 245 W. Broadway, Suite 475, Long Beach, CA 90802, (213) 590-5309.

GeoSoils, Inc., 1992, Preliminary Geotechnical Constraints, Brea East Property, Orange County, California, (W.O. 2356-A1-OC), dated June 30, 1992.

Orange County Water District (O.C.W.D.), 1991, Engineers Report on Groundwater Conditions, Water Supply and Basin Utilization in the Orange County Water District for 1989-90 Period. Corrected copy dated March 14, 1991, 28 p., figures.

___, 1990, '91 Update, Groundwater Management Plan, Orange County Water District, 31 pages, 13 Pages, 1991 Update.

Tan, S.S., Miller, R.V. and Evans, J.R., 1984, Environmental Geology of Parts of the La Habra, Yorba Linda and Prado Dam Quadrangles, Orange County, California: California Division of Mines O.F.R. 84-24.

APPENDIX A

TEST DATA AND SITE PLAN

PROVIDED BY SHELL

5 Pages

CROSBY
LABORATORIES
INCORPORATED

Analytical Report

5200 E. Hunter Street, Suite B Anaheim, California 92807 • 714-777-1425 • 1-800-3 CROSBY • FAX 714-777-3926

ENVIRONMENTAL • CHEMICAL • MICROBIOLOGICAL • TESTING SERVICES

CLIENT: SHELL WESTERN E&P INC.
ATTN: MS. JULIE SALISBURY
SAMPLE ID: OLINDA OIL
MATRIX: CRUDE OIL SLUDGE

LAB #:	AA14146	**COLLECTED:**	07/06/90
PROJECT #:	NONE	**RECEIVED:**	07/06/90
PROJECT NAME:	BREA/OLINDA UNIT	**PREPARED:**	07/19/90
SPL. PREP. METH.:	EPA-3540	**ANALYZED:**	07/20/90
GC FILENAME:	SHL14146	**REPORTED:**	07/23/90

CAC METALS	T.T.L.C. (mg/kg)
Antimony, (EPA 6010)	ND < 5.00
Arsenic, (EPA 7061)	ND < 0.05
Barium, (EPA 6010)	ND < 1.00
Beryllium, (EPA 6010)	ND < 1.00
Cadmium, (EPA 6010)	ND < 0.05
Chromium,Total (EPA 6010)	ND < 0.50
Cobalt, (EPA 6010)	ND < 0.50
Copper, (EPA 6010)	ND < 0.50
Lead, (EPA 6010)	ND < 0.50
Mercury, (EPA 7470)	ND < 0.05
Molybdenum, (EPA 6010)	ND < 1.00
Nickel, (EPA 6010)	ND < 0.50
Selenium, (EPA 7741)	ND < 0.05
Silver, (EPA 6010)	ND < 1.00
Thallium, (EPA 7840)	ND < 1.00
Vanadium, (EPA 6010)	ND < 1.00
Zinc, (EPA 6010)	ND < 0.50

pH, EPA-9045	N/A
Flash Point, EPA-1010	212 F
Total Recoverable Petroleum Hydrocarbons, EPA 418.1	840,000 mg/kg
Density	0.95 g/ml
Cyanide, EPA-9010	ND < 10 mg/kg
Sulfide, EPA-9030	ND < 10 mg/kg

N/A = Not Applicable

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CROSBY
LABORATORIES
INCORPORATED

Analytical Report

5200 E. Hunter Street, Suite B Anaheim, California 92807 • 714-777-1425 • 1-800-3 CROSBY • FAX 714-777-3926

ENVIRONMENTAL • CHEMICAL • MICROBIOLOGICAL • TESTING SERVICES

CLIENT: SHELL WESTERN E&P INC.
ATTN: MS. JULIE SALISBURY
SAMPLE ID: OLINDA OIL
MATRIX: OILY SLUDGE

LAB #:	AA14146	**COLLECTED:**	07/06/90
PROJECT #:	NONE	**RECEIVED:**	07/06/90
PROJECT NAME:	BREA/OLINDA UNIT	**PREPARED:**	07/19/90
SPL. PREP. METH.:	EPA-3540	**ANALYZED:**	07/20/90
GC FILENAME:	SHL14146	**REPORTED:**	06/23/90

ORGANOCHLORINE PESTICIDES, EPA8080	RESULTS (µg/kg)
Aldrin	ND<5
gamma-BHC	ND<5
Chlordane	ND<5
4,4'-DDD	ND<5
4,4'-DDE	ND<5
4,4'-DDT	ND<5
Dieldrin	ND<5
Endrin	ND<5
Toxaphene	ND<25
Heptachlor	ND<5
Heptachlor Epoxide	ND<5
Methoxychlor	ND<25
beta-BHC	ND<5
alpha-BHC	ND<5
delta-BHC	ND<5
Endosulfan I	ND<5
Endosulfan II	ND<5
Endosulfan Sulfate	ND<5
PCB 1232	ND<25
PCB 1242	ND<25
PCB 1254	ND<25
PCB 1260	ND<25
PCB 1221	ND<25
PCB 1248	ND<25
PCB 1016	ND<25

ND denotes Not Detected at the indicated detection limit.

Cynthia Selassie
Cynthia Selassie, PhD
Laboratory Director

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ENVIRONMENTAL • CHEMICAL • MICROBIOLOGICAL • TESTING SERVICES

CLIENT: SHELL WESTERN E&P, INC.
ATTN: MS. JULIE SALISBURY
SAMPLE ID: OLINDA
MATRIX: SOLID

LAB #:	AA15410	**COLLECTED:**	02/14/91
PROJECT #:	NONE	**RECEIVED:**	02/14/91
PROJECT NAME:	NONE	**PREPARED:**	03/04/91
SPL. PREP. METH.:	EXTRACTION	**ANALYZED:**	03/04/91
GC FILENAME:	SHL15410	**REPORTED:**	03/28/91

ORGANOCHLORINE PESTICIDES, EPA8080	RESULTS (µg/kg)
PCB-1016	ND < 25
PCB-1221	ND < 50
PCB-1232	ND < 25
PCB-1242	ND < 25
PCB-1248	ND < 25
PCB-1254	ND < 100
PCB-1260	ND < 25

ND denotes Not Detected at the indicated detection limit.

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Analytical Report

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ENVIRONMENTAL • CHEMICAL • MICROBIOLOGICAL • TESTING SERVICES

CLIENT:	SHELL WESTERN E&P, INC.
ATTN:	MS. JULIE SALISBURY
SAMPLE ID:	OLINDA
MATRIX:	LIQUID

LAB #:	AA15410	**COLLECTED:**	02/14/91
PROJECT #:	NONE	**RECEIVED:**	02/14/91
PROJECT NAME:	NONE	**ANALYZED:**	04/01/91
SPL. PREP METH:	BIOASSAY	**REPORTED:**	04/01/91

96-HOUR ACUTE AQUATIC TOXICITY	**SUVIVORSHIP %**
250 mg/l	90
500 mg/l	100
750 mg/l	100

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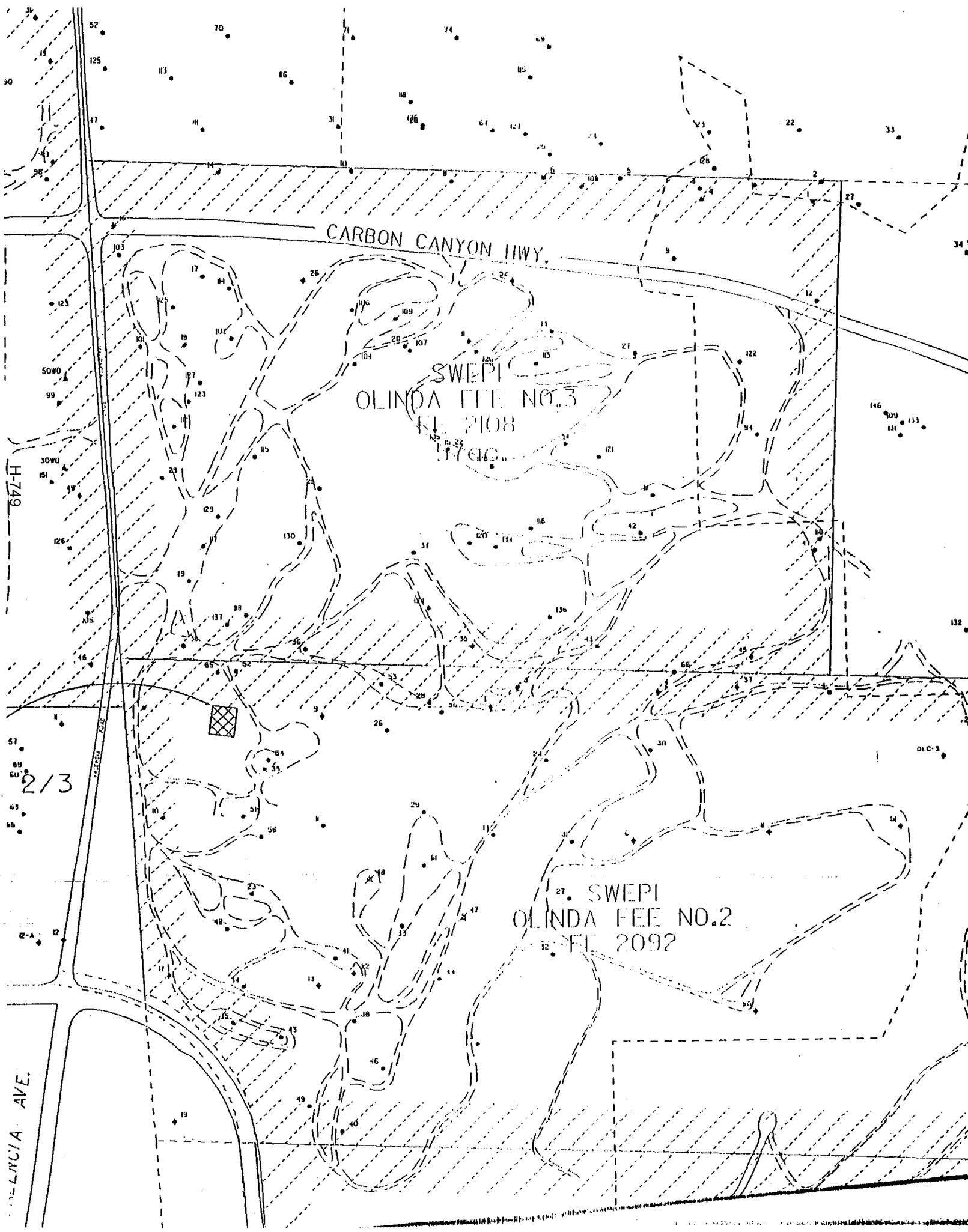

CARBON CANYON HWY.
SWEPI
OLINDA FEE NO.3
FL 2108
SWEPI
OLINDA FEE NO.2
FL 2092
H-249
2/3
VALENCIA AVE.

APPENDIX B

GOVERNMENT RECORDS SEARCH

FEDERAL AND STATE

EDC Report, 4 Pages Text and 15 Pages Data

OC Clean-up Sites, 4 Pages

Environmental Database Company

Phase I Environmental Site Assessment
Federal/State Government Environmental Data Search

SWEP1 - BREA EAST
Valencia Avenue and Rose Drive
Brea, California

For

GeoSoils, Inc.
1446 East Chestnut Avenue
Santa Ana, California 92701

EDC Job No. 110-6
June 12, 1992

1133 N. Chester Avenue, Pasadena, CA 91104 • Tel: (818) 798-8010 • Fax: (818) 398-8650

To: Mr. Skip Pouncey/GeoSoils, Inc.

From: Environmental Database Company

Date: June 12, 1992

SUMMARY REPORT

At your request, Environmental Database Company (EDC) submits this report summarizing the compilation of Federal and State government environmental data. The data search covers the area within a one-mile radius of the subject property which is located at:

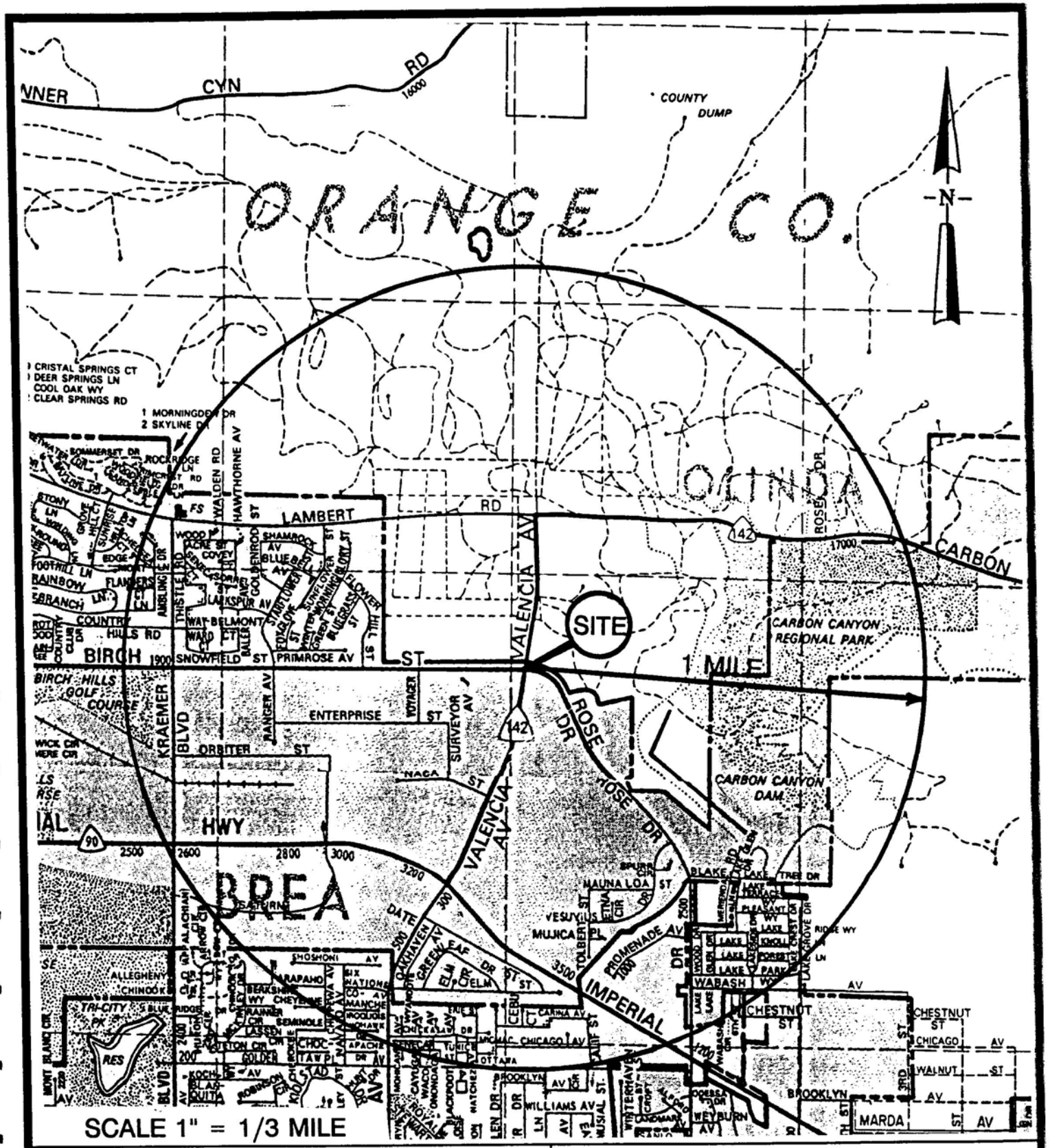
SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

The location of the site and the area searched is shown on Site Map, Figure 1. The data contained in this report is the result of a search of the following lists:

1. National Priorities List (NPL)
2. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
3. CalSites (CAL)
4. Annual Workplan (AWP)
5. Hazardous Waste and Substances Sites List (CORTESE)
6. Leaking Underground Storage Tanks (LUST)
7. Solid Waste Information System (SWIS)
8. Solid Waste Assessment Test Program (SWAT)
9. Hazardous Waste Information System (HWIS)
10. Superfund Amendments and Reauthorization Act (SARA), Title III, the Emergency Planning and Community Right-to-Know Act, Section 313.

Different site names, if any, are considered as different sites even they may be listed at the same address. Any individual site may be reported in one or more lists. In total, there are 37 sites identified including 0 NPL, 2 CERCLIS, 8 CAL, 0 AWP, 2 CORTESE, 6 LUST, 1 SWIS, 1 SWAT, 26 HWIS, and 1 SARA sites. The results of this search are presented in the summary table.

Brief description and results of search of each list are attached in appendix for your reference. EDC is aware of additional government environmental data that have not been included in this report and EDC does not guarantee the adequacy of government environmental data. You should recognize that government agencies do not list all sites of environmental contamination. Therefore, this report should not be used as a substitute for a complete Phase I Environmental Site Assessment.



SITE MAP	SWEP1 - BREA EAST Valencia Avenue & Rose Drive Brea, California	
ENVIRONMENTAL DATABASE COMPANY	JOB NO. 110-6	FIGURE 1

SUMMARY TABLE

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
BREA, California

ID	SITE	ADDRESS	CITY	ZIP	NPL	CERCLIS	CAL	AWP	CORTESE	LUST	SWAT	SWIS	HWIS	SARA
1	SOUTHERN CALIFORNIA GAS CO	2191 BIRCH ST E	BREA							*				
2	1X PAUL MUNROE ENERTECH	2950 BIRCH ST E	BREA	92621									*	
3	BECKMAN INSTRUMENTS	3300 BIRCH ST E	BREA	92635					*	*			*	
4	UNION NARANJAL WELL #72 & 73 BREA	BIRCH & VALENCIA	BREA	92621									*	
5	MOBIL OIL CORP, OLINDA LEASE	CARBON CANYON RD	YORBA LINDA	92686									*	
6	ORANGE COUNTY-OLINDA-ALPHA LANDFILL	CARBON CANYON RD 1/2 MI NE OF VALENCIA AVE	BREA	92621			*				*	*	*	
7	SANTA FE ENERGY CO/OLINDA	17001 CARBON CYN RD	BREA	92621									*	
8	CYANAMID DISTRIBUTION CTR BREA	2980 ENTERPRISE ST	BREA	92621		*	*						*	
9	MICRONICS INTL INC	3001 ENTERPRISE ST	BREA	92621									*	
10	1X BECHMAN INSTRUMENTS	3080 ENTERPRISE ST	BREA	92634									*	
11	BIAISDELL MFG INC	3160 ENTERPRISE ST	BREA	92621									*	
12	ISLES INDUSTRIES INC	3200 ENTERPRISE ST	BREA	92612									*	
13	WEBER AIRCRAFT/INTERIORS DIV	3200 ENTERPRISE ST	BREA	92621									*	
14	TANGUAY OIL CO.	326 GREENLEAF AV N	YORBA LINDA	92686			*							
15	UNION CHEMICALS DIVISION	2601 IMPERIAL HWY E	BREA	92621			*						*	*
16	COAST BUSINESS CENTER	2700 IMPERIAL HWY E	BREA	92621									*	
17	IMPERIAL SATURN BUSINESS PARK	2929 IMPERIAL HWY E	BREA	92621									*	
18	BREA DATSUN	3000 IMPERIAL HWY E	BREA	92621									*	

ID	SITE	ADDRESS	CITY	ZIP	NPL	CERCLIS	CAL	AWP	CORTESE	LUST	SWAT	SWIS	HWIS	SARA
19	C N A INSURANCE	3230 IMPERIAL HWY E	BREA	92621									*	
20	US SUZUKI MOTOR CORP	3251 IMPERIAL HWY E	BREA	92621									*	
21	TEXACO SERVICE STATION	3300 IMPERIAL HWY E	BREA	92621						*				
22	1X TEXACO #61-106-0464	3303 IMPERIAL HWY	BREA	91608									*	
23	INDUSTRIAL PARK #1	IMPERIAL AND VALENCIA	BREA	92621			*							
24	H & H CLEANERS	151 KRAEMER	BREA	92621									*	
25	BECKMAN INSTRUMENTS INC	200 KRAEMER S	BREA	92621									*	
26	BREA CHEMICALS, INC	KRAEMER AND IMPERIAL HIGHWAY (NW OF)	BREA	92621			*							
27	SUNSTRAND AVIATION OPERATORS	2650 ORBITER ST	BREA	92621									*	
28	1X MERCHANT'S REFRIGERATING CO	2750 ORBITER ST	BREA	92621									*	
29	HARTE-HANKS COMMUNICATIONS	2830 ORBITER ST	BREA	92621									*	
30	WESTERN WELL PULLING	ROSE DR	YORBA LINDA	92686			*							
31	PLACENTIA-LINDA COMM HOSP	1301 ROSE DR	PLACENTIA	92679									*	
32	CANFIELD CHANSLOR-MIDWAY OIL CO.	2392 ROSE DR	PLACENTIA	92670			*							
33	UNOCAL SERVICE STATION #6121	525 VALENCIA AV	BREA							*				
34	PLACENTIA USD EL DORADO HIGH SCH	1651 VALENCIA AV N	PLACENTIA	92670									*	
35	SHELL SERVICE STATION	2701 VALENCIA AV	BREA	92621					*	*				
36	BREA-OLINDA CANYON DUMP	VALENCIA AV	BREA	92621		*								
37	PACIFIC SKYLIGHT	255 VOYAGER AV	BREA							*				

APPENDIX

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

NATIONAL PRIORITIES LIST (NPL)

The National Priorities List (NPL) is a federal database of uncontrolled hazardous waste sites that warrant further investigation to determine if long-term "remedial action" is necessary. Sites on the NPL are eligible for priority remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA).

A NPL site must :

I. Meet or surpass a predetermined hazardous ranking system score, or

II. Be chosen as a state's top-priority site, or

III. Meet all three of the following criteria:

1. The US Department of Health and Human Services issues a health advisory recommending removing people form the site,

2. EPA determines the site poses a significant threat to public health, and

3. EPA anticipates it will be more cost-effective than removal action.

As of 1991, no NPL site is located within the area searched.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY SYSTEM (CERCLIS)

The federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), (or called the Superfund Act), protects the victims and the environment in the event of a hazardous material spill. This act primarily addresses cleanup of designated Superfund hazardous waste sites. A list of known hazardous waste sites that are under consideration for the Superfund list is complied by the EPA and is known as the CERCLIS database.

As of December 1991, two (2) CERCLIS sites are located within the area searched. The keys of the operable unit and event type codes are presented at the end of this section.

ID	SITE	ADDRESS	ZIP	CERCLIS ID	OP UNIT ID	TYPE	LEAD
8	CYANAMID DISTRIBUTION CTR BREA	2980 ENTERPRISE ST BREA	92621	CAD000629758	00	DS1	EPA (FUND)
8	CYANAMID DISTRIBUTION CTR BREA	2980 ENTERPRISE ST BREA	92621	CAD000629758	00	PA1	STATE (FUND)
8	CYANAMID DISTRIBUTION CTR BREA	2980 ENTERPRISE ST BREA	92621	CAD000629758	00	PA2	EPA (FUND)
36	BREA-OLINDA CANYON DUMP	VALENCIA AV BREA	92621	CAD980735948	00	DS1	EPA (FUND)
36	BREA-OLINDA CANYON DUMP	VALENCIA AV BREA	92621	CAD980735948	00	PA2	EPA (FUND)
36	BREA-OLINDA CANYON DUMP	VALENCIA AV BREA	92621	CAD980735948	00	PA1	EPA (FUND)

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY SYSTEM (CERCLIS)

EVENT TYPE CODES

AA	RCRA Facility Assessment	Pre-remedial
AR	Administrative Record	Generic Events
AS	Aerial Survey	Generic Events
CO	Combined RI/FS	Remedial
CR	Community Relations	Remedial
DA	Design Assistance	Remedial
DS	Discovery	Pre-remedial
ED	Endangerment Assessment	Generic Events
EO	Enforcement Decision Document	Remedial
ER	Expedited Response Action	Remedial
ES	Listing Site Inspection	Pre-remedial
FP	Forward Planning (H)	Remedial
FS	Feasibility Study	Remedial
GS	Geographical Support/Map	Generic Events
HA	Health Assessment	Generic Events
HR	Hazard Ranking/NPL Listing	Pre-remedial
IM	Initial Remedial Measure (H)	Remedial
IR	Immediate Removal (H)	Removal
LR	Long-Term Response	Remedial
MA	Management Assistance	Generic Events
ND	NPL Deletion	Remedial
NF	Final Listing On NPL	Pre-remedial
NR	Proposed For NPL	Pre-remedial
OF	Operational & Functional	Remedial
OH	Other Event	Generic Events
OM	Operations & Maintenance	Remedial
OS	Oversight Of State	Generic Events
PA	Preliminary Assessment	Pre-remedial
PD	Deletion Package Comments	Remedial
PR	Planned Removal (H)	Removal
RA	Remedial Action	Remedial
RC	Removal Community Relations	Removal
RD	Remedial Design	Remedial
RI	Remedial Investigation	Remedial
RM	RA Master Plan (H)	Remedial
RO	Record Of Decision	Remedial
RS	Removal Investigation At NPL Sites	Removal
RV	Removal Action	Removal
SE	Site Access	Pre-remedial
SI	Screening Site Inspection	Pre-remedial
TA	Technical Assistance	Generic Events
TG	Technical Assistance Grants	Remedial
TO	Topographical Mapping	Generic Events
TS	Treatability Studies	Remedial
UR	Underground Storage Tank Removal	Removal
WP	RI/FS Workplan Approved By Headquarters	Remedial

Number (1,2,3,4,5,6,7,8 or 9) following the code identifies multiple occurrences of the event type at the same operable unit at the same site.

OPERABLE-UNIT-ID CODES

00	Events (e.g. DS, PA, SI, NPL listing and deletion types, and removal event types) that apply to the entire site.
01	Remedial events that apply to the entire site.
02	Events occurring at further subdivisions of the site.

CALSITES (CAL)

On July 17, 1991, the California Environmental Protection Agency officially came into existence and the Toxic Substances Control Program became the Department of Toxic Substances Control (DTSC) under that agency. Since then, the DTSC CalSites database has replaced the previous Abandoned Sites Program Information System (ASPIS) database. Information in CalSites is preliminary in nature, and most sites need additional work to determine if contamination exists.

As of October 1991, eight (8) CAL sites are located within the area searched. The keys of status codes are presented at the end of this section.

ID	SITE	ADDRESS	CITY	ZIP	ASPIS ID	STATUS	YEAR
6	ORANGE COUNTY-OLINDA-ALPHA LANDFILL	CARBON CANYON RD 1 MI NE OF VALENCIA AVE	BREA	92621	30490029	NFA	82
8	CYANAMID DISTRIBUTION CTR BREA	2980 ENTERPRISE ST	BREA	92621	30280531	NFA	84
14	TANGUAY OIL CO.	326 GREENLEAF AV N	YORBA LINDA	92686	30130017	NFA	82
15	UNION CHEMICALS DIVISION	2601 IMPERIAL HWY E	BREA	92621	30280016	NFA	82
23	INDUSTRIAL PARK #1	IMPERIAL AND VALENCIA	BREA	92621	30890009	NFA	82
26	BREA CHEMICALS, INC	KRAEMER AND IMPERIAL HIGHWAY (NW OF)	BREA	92621	30280012	NFA	82
30	WESTERN WELL PULLING	ROSE DR	YORBA LINDA	92686	30130009	SSR	82
32	CANFIELD CHANSLOR-MIDWAY OIL CO.	2392 ROSE DR	PLACE NTIA	92670	30130132	NFA	82

CALSITES (CAL)

STATUS CODE

* NFA - No further action.
* SSR - Site Screen Required.
* PEARL - Preliminary Endangerment Assessment required, low priority.
* PEARM - Preliminary Endangerment Assessment required, medium priority.
* PEARH - Preliminary Endangerment Assessment required, high priority.
* CNTY - County lead site.
* EPA - EPA lead sites.
* RCRA - Resource Conservation and Recovery Act lead.
* RWQCB - Regional Water Quality Control Board Lead.
* OAL - Other agency lead.
* HRR - Hazard Ranking Required.
* PRP - Potential Responsible Party Search Required.
* BKLG - Backlog, Potential AWP Site.
* AWP - Annual Workplan.
* COM - Certified Operation and Maintenance.
* CERT - Certified/Remediated.
* DLIST - Delisted from AWP.
* REFRC - Referred to RCRA.
* REFRW - Referred to the RWQCB.

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ANNUAL WORKPLAN (AWP)

On July 17, 1991, the California Environmental Protection Agency officially came into existence and the Toxic Substances Control Program became the Department of Toxic Substances Control (DTSC) under that agency. Since then, the DTSC Annual Workplan (AWP) has replaced previous Bond Expenditure Plan (BEP). The DTSC AWP lists hazardous substances sites known to DTSC.

As of September 1991, no AWP site is located within the area searched.

HAZARDOUS WASTE AND SUBSTANCES SITES LIST (CORTESE)

The State Office of Planning and Research is required by state law to annually publish a listing of potential and confirmed hazardous waste sites throughout the California. These sites are included in the "Hazardous Waste and Substances Sites List Pursuant to AB 3750," (Cortese List). Data for the list are received from the Department of Toxic Substances Control (DTSC), the State Water Resources Control Board (SWRCB), the nine Regional Water Quality Control Board (WQCB) and the California Waste Management Board (CWMB).

As of January 1991, two (2) CORTESE sites are located within the area searched.

ID	SITE	ADDRESS	CITY	ZIP	SOURCE	PROBLEM
3	BECKMAN INSTRUMENTS	3300 BIRCH ST E	BREA	92635	WRCB	TANK LEAK
35	SHELL SERVICE STATION	2701 VALENCIA AV	BREA	92621	WRCB	TANK LEAK

LEAKING UNDERGROUND STORAGE TANKS (LUST)

California legislation (Assembly Bill 2013, Cortese) requires that a underground storage tank (UST) inventory must be maintained by the State Water Resource Control Board (SWRCB). Individual tank owners were to notify the SWRCB by July 1, 1984 of known in-use or abandoned tanks. Owners of new USTs must notify the SWRCB within 30 days of installation.

The SWRCB "Report on Releases of Hazardous Substances From Underground Storage Tanks" (LUST List) includes all reported leaks from underground storage tanks. Additional sources of information are provided by the nine local offices of the SWRCB in California.

As of January 1992, six (6) LUST sites are located within the area searched. The keys of substance, case type and status codes are presented at end of this section.

ID	SITE	ADDRESS	CITY	ZIP	SUBSTANCE	CASE	STATUS
1	SOUTHERN CALIFORNIA GAS CO	2191 BIRCH ST E	BREA		8006619	S	9
3	BECKMAN INSTRUMENTS	3300 BIRCH ST E	BREA	92635	12034	S	9
21	TEXACO SERVICE STATION	3300 IMPERIAL HWY E	BREA	92621	12035	S	9
33	UNOCAL SERVICE STATION #6121	525 VALENCIA AV	BREA		12034	S	3A
35	SHELL SERVICE STATION	2701 VALENCIA AV	BREA	92621	12034	S	5C
37	PACIFIC SKYLIGHT	255 VOYAGER AV	BREA		8006619	S	9

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Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

LEAKING UNDERGROUND STORAGE TANKS (LUST)

CASE TYPE CODES

D One or more domestic or municipal supply wells have been contaminated.

G Ground water has been affected.

S Only soil has been affected.

U The type of resources affected or extent of the resources affected are not known.

STATUS CODES

0 No action taken by responsible party after initial report of leak.

1 Leak suspected at site but has not been confirmed.

3A Preliminary site assessment workplan submitted.

3B Preliminary site assessment underway.

5C Pollution characterization.

5R Remediation plan developed.

7 Remedial action (cleanup) in progress.

8 Post remedial action monitoring in progress.

9 Signed off, remedial action completed or deemed unnecessary.

SUBSTANCE CODES

MOTOR OIL = 08
BOILER FUEL = 09
#6 FUEL OIL = 10
HEATER FUEL = 12
SOLVENTS = 13
HYDRAULIC OIL = 14
WASTE WATER = 32
MINERAL SPIRITS = 41
PAINT THINNER = 49
OIL\GREASE WASTE = 51
DRY CLEANING SOLVENT = 52
WATER\WASTE OIL MIX = 61
LUBRICATING OIL = 71
HYDROCARBONS = 76
COOLANT = 77
ALIPHATIC HYDROCARBONS = 78
TRANSMISSION FLUID = 80
LACQUER THINNER = 84
NAPTHA DISTILLATE = 101
V,M&P NAPTHA = 116

CUTTING OIL = 122
#5 FUEL OIL = 127
CHLORINATED HYDROCARBONS = 142
FREON = 171
ALCOHOL = 172
UNLEADED GASOLINE = 12031
REGULAR GASOLINE = 12032
PREMIUM GASOLINE = 12033
DIESEL = 12034
WASTE OIL = 12035
MISC. VEHICLE FUEL = 12036
CYANIDES, SALTS = 57125
ETHYL ALCOLHOL = 64175
ACETIC ACID = 64197
METHYL ALCOLHOL = 67561
ISOPROPYL ALCOLHOL = 67630
ACETONE = 67641
BENZENE = 71432
METHYLENE CHLORIDE = 75092
METHYL ETHYL KETONES = 78933

TCE = 79016
PSEUDODOCUMENE = 95636
XYLENE = 106423
ETHYLENE DICHLORIDE = 107062
TOLUENE = 108883
TETRAHYDROFURAN = 109999
PERCHLORETHYLENE = 127184
DINITROTOLUENES = 610399
NICKEL OXIDE = 1313991
PCB = 1336363
LEAD = 7439921
NICKEL = 7440020
COPPER = 7440508
CRUDE OIL (HAZ.) = 8002059
GASOLINE = 8006619
COAL TAR = 8007452
KEROSENE = 8008206
STOODARD SOLVENTS = 8052413
ASPHALT = 8052424
POLYESTER RESIN = 25037665

SOLID WASTE INFORMATION SYSTEM (SWIS)

The California Waste Management Board maintains a list from Solid Waste Information System (SWIS) pursuant to the Solid Waste Management and Resource Recovery Act. This list contains an inventory of active, inactive, and closed solid waste disposal and transfer facilities.

As of October 1991, one (1) SWIS site is located within the area searched.

ID	SITE	ADDRESS	CITY	ZIP	SWIS ID
6	ORANGE COUNTY-OLINDA-ALPHA LANDFILL	CARBON CANYON RD 1/2 MI NE OF VALENCIA AV	BREA	92621	30-AB-0035

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

COUNTY: ORANGE

FACILITY DATA
==========
SWIS: 30-AB-0035 CATEGORY: LANDFILL
NAME: OLINDA ALPHA SANITARY LANDFILL
LOCATION: 1/2 MI NE VALENCIA AVE & CARBON CYN RD
PLACE: BREA, CA
SECTION: 4 TOWNSHIP: 3-S RANGE: 9-W B&M: SAN BERNARDINO

OPERATOR DATA
==========
NAME: MR FRANK BOWERMAN
TITLE: DIRECTOR & CHIEF ENGINEER
PHONE: 714/568-4160
COMPANY: ORANGE COUNTY WASTE MANAGEMENT PROGRAM
ADDRESS: 1200 NORTH MAIN STREET, SUITE 206
PLACE: SANTA ANA, CA 92701

LAND OWNER DATA
==========
NAME: MR FRANK BOWERMAN
TITLE: DIRECTOR & CHIEF ENGINEER
PHONE: 714/568-4160
COMPANY: ORANGE COUNTY WASTE MANAGEMENT PROGRAM
ADDRESS: 1200 NORTH MAIN STREET, SUITE 206
PLACE: SANTA ANA, CA 92701

FACILITY CHARACTERISTICS
==========

PERMIT STATUS: PERMITTED

OPERATIONAL STATUS: ACTIVE

OPERATOR TYPE: COUNTY

LAND OWNER TYPE: COUNTY

TYPES WASTES RECEIVED:
AGRICULTURAL
CONSTRUCTION/DEMO
DEAD ANIMALS
INDUSTRIAL PROCESS
MIXED MUNICIPAL
TIRES

TONS-PER-DAY: 4669

PERMIT DATE: 04/06/1981

CLOSURE YEAR: 1994

11

SOLID WASTE ASSESSMENT TEST PROGRAM (SWAT)

The owners/operators of solid waste disposal sites in California are required by law to test and study the extent of air and ground water contamination at such facilities. This program is known as the Solid Waste Assessment Test Program (SWAT). Once the SWAT studies are completed, they will be evaluated by the local air districts and the Regional Water Quality Control Boards. These agencies, plus the California Waste Management Board (CWMB) and the Department of Toxic Substances Control (DTSC) will be required to determine appropriate remedial actions and will work with the facilities to resolve identified problems.

As of 1991, one (1) SWAT site is located within the area searched.

ID	SITE	ADDRESS	CITY	ZIP	SWAT ID
6	ORANGE COUNTY-OLINDA-ALPHA LANDFILL	CARBON CANYON RD 1 MI NE OF VALENCIA AVE	BREA	92621	8 300302002-01

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

HAZARDOUS WASTE INFORMATION SYSTEM (HWIS)

The California Department of Toxic Substances Control (DTSC) has developed and maintained lists of hazardous waste generators and hazardous waste treatment, storage and disposal facilities in the State of California. In addition, all counties are required by law to prepare and submit hazardous waste management plan. To assist the counties, DTSC maintains lists containing generation and disposal data within each county. This information has been assembled by DTSC from manifest reports required from hazardous waste generators.

Twenty-six (26) HWIS sites in the 1991 list are located within the area searched.

ID	SITE	ADDRESS	CITY	ZIP	HWIS ID
2	1X PAUL MUNROE ENERTECH	2950 BIRCH ST E	BREA	92621	CAC000145885
3	BECKMAN INSTRUMENTS	3300 BIRCH ST E	BREA	92635	CAX000204453
4	UNION NARANJAL WELL #72 & 73 BREA	BIRCH & VALENCIA	BREA	92621	CAD981164437
5	MOBIL OIL CORP, OLINDA LEASE	CARBON CANYON RD	YORBA LINDA	92686	CAD000628461
6	ORANGE COUNTY-OLINDA-ALPHA LANDFILL	CARBON CANYON RD 1 MI NE OF VALENCIA AVE	BREA	92621	CAD981678964
7	SANTA FE ENERGY CO/OLINDA	17001 CARBON CYN RD	BREA	92621	CAD981692130
8	CYANAMID DISTRIBUTION CTR BREA	2980 ENTERPRISE ST	BREA	92621	CAD000629758
9	MICRONICS INTL INC	3001 ENTERPRISE ST	BREA	92621	CAD981390867
9	MICRONICS INTL INC	3001 ENTERPRISE ST	BREA	92621	CAX000142521
10	1X BECHMAN INSTRUMENTS	3080 ENTERPRISE ST	BREA	92634	CAC000099325
11	BIAISDELL MFG INC	3160 ENTERPRISE ST	BREA	92621	CAD982356875
12	ISLES INDUSTRIES INC	3200 ENTERPRISE ST	BREA	92612	CAX000221218
12	ISLES INDUSTRIES INC	3200 ENTERPRISE ST	BREA	92612	CAD008259749
13	WEBER AIRCRAFT/INTERIORS DIV	3200 ENTERPRISE ST	BREA	92621	CAD982374753
15	UNION CHEMICALS DIVISION	2601 IMPERIAL HWY E	BREA	92621	CAD073596124
16	COAST BUSINESS CENTER	2700 IMPERIAL HWY E	BREA	92621	CAD981651193
17	IMPERIAL SATURN BUSINESS PARK	2929 IMPERIAL HWY E	BREA	92621	CAD981651250
18	BREA DATSUN	3000 IMPERIAL HWY E	BREA	92621	CAD981966906
19	C N A INSURANCE	3230 IMPERIAL HWY E	BREA	92621	CAX000225953

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

ID	SITE	ADDRESS	CITY	ZIP	HWIS_ID
20	US SUZUKI MOTOR CORP	3251 IMPERIAL HWY E	BREA	92621	CAD981687288
22	1X TEXACO #61-106-0464	3303 IMPERIAL HWY	BREA	91608	CAD000322768
24	H & H CLEANERS	151 KRAEMER	BREA	92621	CAD981640733
25	BECKMAN INSTRUMENTS INC	200 KRAEMER S	BREA	92621	CAT080030661
27	SUNSTRAND AVIATION OPERATORS	2650 ORBITER ST	BREA	92621	CAX000085571
27	SUNSTRAND AVIATION OPERATORS	2650 ORBITER ST	BREA	92621	CAD981371370
28	1X MERCHANT'S REFRIGERATING CO	2750 ORBITER ST	BREA	92621	CAD982016313
29	HARTE-HANKS COMMUNICATIONS	2830 ORBITER ST	BREA	92621	CAX000244194
29	HARTE-HANKS COMMUNICATIONS	2830 ORBITER ST	BREA	92621	CAX000090548
29	HARTE-HANKS COMMUNICATIONS	2830 ORBITER ST	BREA	92621	CAD981453137
31	PLACENTIA-LINDA COMM HOSP	1301 ROSE DR	PLACENTIA	92679	CAD981577141
34	PLACENTIA USD EL DORADO HIGH SCH	1651 VALENCIA AV N	PLACENTIA	92670	CAD982044182

SWEP1 - BREA EAST
Valencia Avenue & Rose Drive
Brea, California

EDC Job No. 110-6

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III, EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

In October of 1986, Congress enacted the Superfund Amendments and Reauthorization Act (SARA), Title III, the Emergency Planning and Community Right-to-Know Act, substantially increases the role of the community in managing hazardous materials. As a result, owners/operators of selected facilities are required to inform government officials and the public about releases of toxic chemicals into the environment. Under Subtitle B, facility owner/operator reporting requirements are specified in Section 313.

As of 1991, one (1) SARA site is located within the area searched.

ID	SITE	ADDRESS	CITY	ZIP	SARA_ID
15	UNION CHEMICALS DIVISION	2601 IMPERIAL HWY E	BREA	92621	300666

15

Active Industrial Cleanups 12/9/91 Gary Zimmerman

86IC 2	Orange Coast Plating, 2515 S. Birch, Santa Ana, 92707
87IC22	Sargent Welsh, 1617 E. Ball Road, Anaheim, 92805
87IC23	Kwikset, 516 E. Santa Ana, Anaheim, 92805
87IC26	Stephan Chemical, 1208 N. Patt Street, Anaheim, 92801
88IC54	Gulton (Prout Prop.), 2414 Fender Avenue, Fullerton 92631
88IC62	Unocal, Alta Vista Storm Drain (Reopen)
88IC75	Santa Fe Railroad, (Behind 8331 Artesia), Buena Park, 90621
88IC84	Unocal, (Thompson-Stern), Van Buren @ Buena Vista, Placentia, 92670
89IC 1	Southern Pacific Transportation Co., 200 S. Adams, Anaheim, 92802
89IC10	Unocal (Field GL-31), Placentia @ Rolling Hills, Fullerton, 92635
89IC16	Unocal (Naranjal II West), Northwood @ Berry, Brea, 92621
89IC22	McDonnell Douglas, 5301 Bolsa, Room 113, Huntington Beach, 92647
89IC40	Unocal (Hartwell-Stern), Van Buren @ Pine, Placentia, 92670
89IC51	Anaheim Plating, 928 E. South St., Anaheim, 92805
90IC10	Universal Circuits, 1800 Newport Circle, Santa Ana, 92705
90IC15	CTI, 1623 Minnie, Santa Ana
91IC 6	Unocal (Richfield Site), 6071 Jefferson St., Placentia, 92670
91IC17	Harbor Pallett/So. Pacific, 1516 W. Embassy, Anaheim, 92802
91IC24	Placentia Park, Pine and Rose (Unocal), Placentia
91IC52	Unocal - Northwest Unit 10, Bastanchury Rd., Fullerton, 92635



Active Industrial Cleanups 12/9/91 Mark Sutphin

87IC34	Property, 7471 Slater, Huntington Beach
88IC42	Village Paint Shop, 1734 W. First, Santa Ana
88IC59	MCAS, Tustin Base Site Study
88IC66	Great Western Bank, 17461 Derian, Irvine
88IC81	Kirkhill Rubber Company, 300 E. Cypress St., Brea
88IC94	Neville Chemical Co., 2201 E. Cerritos Ave., Anaheim
88IC95	Micromotors, Inc., 151 E. Columbine Ave., Santa Ana
89IC11	Disneyland Muck Pit, 1313 S. Harbor Blvd., Anaheim
90IC48	Dyer Business Park, 3025 Kilson Dr., Santa Ana, 92707
91IC16	K-S-H, Inc., 1221 E. Edinger, Tustin, 92680
91IC18	City of Garden Grove Economic Development, 13192 to 13206 Century Blvd., Garden Grove
91IC21	Tustin Garage, 560 El Camino Real, Tustin 92680
91IC27	Postal Vehicle Maintenance Facility, 701 N. Loana St., Anaheim, 92805
91IC29	Pacific Bell, 1452 and 1472 Edinger Ave., Tustin 92680
91IC40	Airport Coach, 851 E. Cerritos, Anaheim, 92805
91IC47	GTE, 6774 Westminster Ave., Westminster, 92683
91IC49	Juice Tree Facility, 12151 Monarch St., Garden Grove, 92641
91IC51	Durham Metal Processing, 936 N. Parker St., Orange, 92667
91IC54	Facility, 800-840 Eckhoff St., Orange, 92663
91IC56	Olinda Associates Properties, NE of Carbon Canyon Rd. and Valencia, Brea, 92621

2

Active Industrial Cleanups 12/9/91 David Dixon

87IC15	Griffin Electronics, 2115 S. Hathaway St., Santa Ana
87IC16	Newport Plating, 2810 Villa Park, Newport Beach
87IC25	Industrial Asphalt, 1401 E. Warner Ave., Santa Ana
87IC32	Electrolurgy, 1121 Dureyea Ave., Irvine
88IC38	Xerox, 2200 E. McFadden, Santa Ana
88IC63	Northrop Group, 500 Orangethorpe, Anaheim
88IC80	Delco Remy, 1201 N. Magnolia, Anaheim
88IC83	AMS Rentals, 1025 N. Batavia, Orange
88IC90	Talmantz Aviation, 19461 Airport Way South, Santa Ana
89IC 2	S & S Polishing & Plating, 1503 N. Miller St., Anaheim
89IC12	Cedko Electronics, 3002 Oak St., Santa Ana
89IC26	Silicon General, 11861 Western, Garden Grove
89IC31	Diceon Electronics, 18522 Von Karmen, Irvine
89IC37	Shell Western E & P Inc., Mesa Area/Huntington Beach Field
90IC46	Alcoa Composites, Astech Division, 3030 S. Redhill Ave., Santa Ana 92707
90IC52	Europa Wheels, 1224 E. Pomona St., Santa Ana, 92707
90IC53	Midway Industries, 15116 Adams, Midway City
91IC 3	Property, 500 W. Collins, Orange 92667
91IC 8	Cal Compack Foods, 4906 W. 1st Street, Santa Ana
91IC10	Gas Plant Area/HB Field (SWEPI), 20101 Golden West, HB
91IC12	Hughes, 651 N. Gilbert, Fullerton
91IC25	W.C. Richards, 1116 N. Olive Street, Anaheim, 92805
91IC30	Property, 6699 Westminster Blvd., Westminster
91IC31	McGaw Inc., 2525 McGaw, Irvine
91IC35	Rice Auto Parts, 905 E. 2nd St., Santa Ana
91IC43	Los Alamitos Armed Forces Reserve, Los Alamitos
91IC45	Irvine Retail Property Co., SE Corner Barranca Pkwy. & Jamboree Blvd., Irvine, 92714
91IC46	Faccoy Property/Santa Ana Salvage, 1038 Custer St., Santa Ana
91IC50	Huntington Beach Company, 18736 Goldenwest, Huntington Beach, 92648
91IC53	Pan Western, Ltd., 19531 Campus Dr., Santa Ana, 92702
91IC55	Blaisdell Manufacturing Facility, 3160-B Enterprise St., Brea, 92621

Active Industrial Cleanups 12/9/91 Kevin Baitx

86IC 3	Pick Your Parts Auto Salvage, 10181 Beach Blvd., Stanton
88IC39	Olive Court Cleaners (Plaza), 1514 E. Lincoln, Orange
88IC46	Fowler Woodcraft, 1041 E. Sixth St., Santa Ana
88IC50	Venus Labs, 15571 Commerce Lane, Huntington Beach
88IC82	Porter Plating, 510 S. Rose, Anaheim
88IC92	BFM Energy Products Corp., 2040 E. Dyer Rd., Santa Ana
89IC15	Heinz Investments, (Cal Cleaners), 3420 & 3430 W. Fordam Ave., Santa Ana
89IC24	Mesa Consolidated Water District, 1965 Placentia, Costa Mesa
89IC30	Action Boats/Cal Trans, 21622 PCH, Huntington Beach
89IC33	American Circuit Boards, 654 Young St., Santa Ana
89IC44	Sand Dollar Development (Coyle Lease), Van Buren @ Buena Vista
89IC52	Emerson Electric, 3300 S. Standard St., Santa Ana
89IC55	So. Calif. Gas Co., 301 E. Columbia Ave., Santa Ana
90IC 4	ITT Cannon, 666 E. Dyer Rd., Santa Ana
90IC 7	Weiser Lock, 5555 McFadden, Huntington Beach
90IC 8	Statueland, 13960 Harbor Blvd., Garden Grove
90IC 9	Aluminum Precision Products, 2921 S. Susan St., Santa Ana, 92704
90IC17	Petrolite, 200 S. Puente, Brea
90IC21	Irvine Co., Ag. Div., 9000 Irvine Ctr. Dr., Irvine, 92718
90IC23	Treasure Farms, Orange Groves #200, 220, 227, Irvine
90IC25	Gatron Industries, Intersection Newport Blvd. & Old Irvine Blvd., Tustin, 92680
90IC33	Shell Oil Field, PCH and Golden West, Huntington Beach
90IC38	Goldstate Auto Center, 8541 Garden Grove Blvd., Garden Grove, 92644
90IC39	Joe MacPherson Toyota, 44 Auto Center Drive, Tustin, 92680
90IC40	Sheldahl, 2302 Barranca, Irvine, 92714
90IC42	Colonial Engineering, 402 W. Central, Santa Ana, 92707
91IC 1	Treasure Farms, 13042 S.W. Myford Rd., Irvine, 92720
91IC20	Harbor One Stop, 1100 N. Harbor Blvd., Santa Ana, 92703
91IC34	Millard Roofing, 1331 N. Custer St., Santa Ana
91IC36	C.N.G. Services, 952 N. Enterprise, Orange
91IC39	El Santana Apts., 1345 Fruit St., Santa Ana, 92701
91IC42	Cal Trans Property, 1345 Fruit St., Santa Ana, 92701
91IC44	Kon Tiki Cleaners, 4065 Ball Rd., Cypress, 90630
91IC48	Chevron Inc., 24081 El Toro Rd., Laguna Hills, 92653

WJD:cr

APPENDIX C

ORANGE COUNTY HEALTH CARE AGENCY RECORDS

2701 Valencia, Pages 1-4
4024 Valley View, Pages 5-18

ORANGE COUNTY FIRE DEPARTMENT RECORDS

Pages 19 and 20

COUNTY OF ORANGE

TOM URAM
DIRECTOR

L. REX EHLING, M.D.
HEALTH OFFICER

ENVIRONMENTAL HEALTH DIVISION
ROBERT E. MERRYMAN, REHS MPH
DEPUTY DIRECTOR

MAILING ADDRESS: P.O. BOX 355
SANTA ANA, CA 92702

HEALTH CARE AGENCY
PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH DIVISION
2009 E. EDINGER AVENUE
SANTA ANA, CALIFORNIA 92705
(714) 667-3700

August 20, 1991

J.A. Ruhl
Shell Western E & P Inc.
P.O. Box 11164
Bakersfield, CA 93389

Subject: Remedial Action At 100 Acre Lease, Yorba Linda Field, 2701 Valencia, Brea - O.C.H.C.A. Case #88UT21

Dear Mr. Ruhl:

This letter confirms the completion of site investigation and remedial action at the above site. With the provision that the information provided to this Agency was accurate and representative of existing conditions, it is the position of this office that no further action is required at this time.

Please be advised that this letter does not relieve you of any liability under the California Health and Safety Code or Water Code for past, present, or future operations at the site. Nor does it relieve you of any liability to clean up existing, additional or previously unidentified conditions at the site which cause or threaten to pose a threat to water quality or public health.

Additionally, be advised that changes in the present or proposed use of the site may require further site characterization and mitigation activity. It is the property owner's responsibility to notify this Agency of any changes in report content, future contamination findings, or site usage.

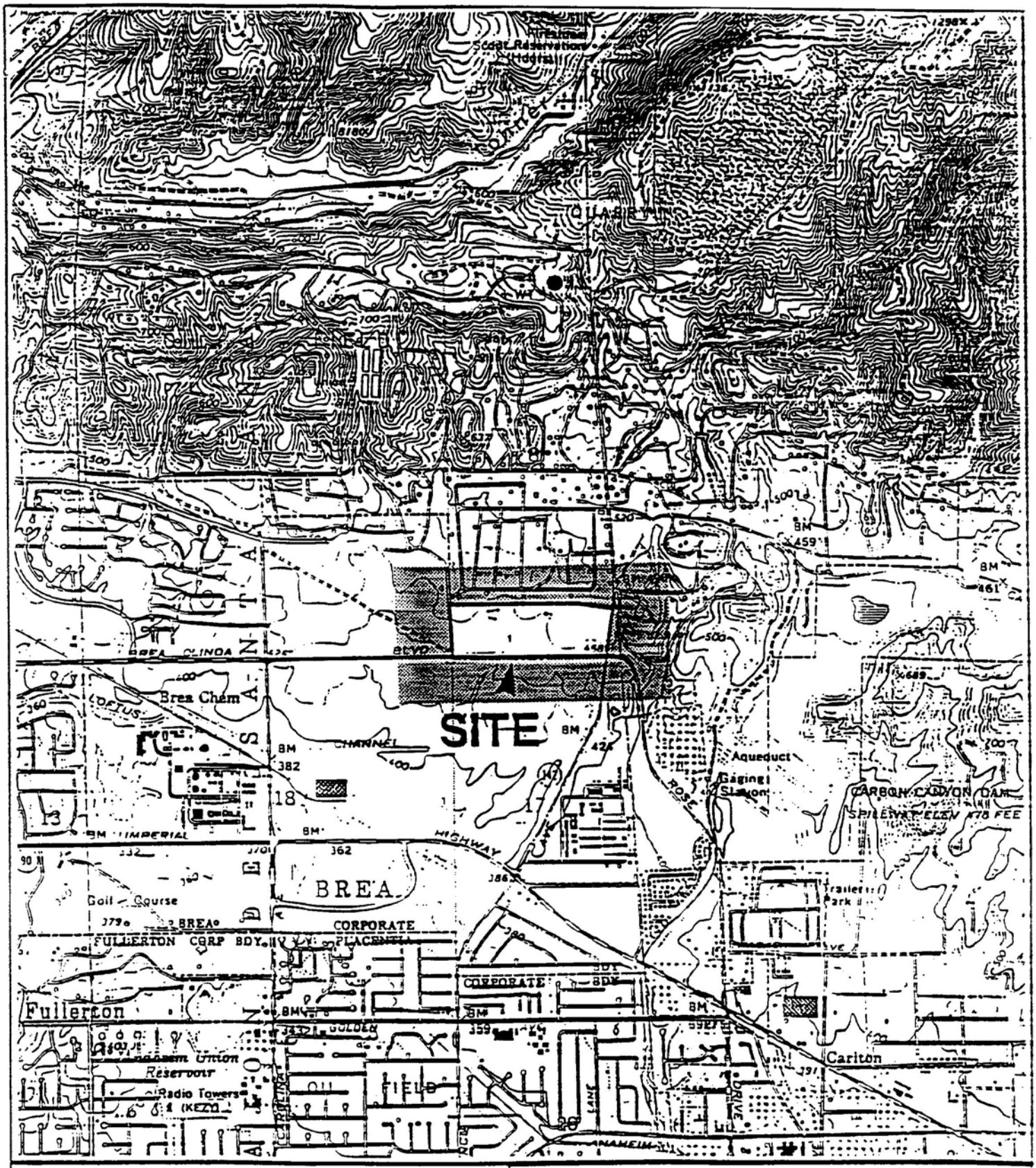
If you have any questions regarding this matter, please contact Luis Lodrigueza at (714) 667-3717.

Very truly yours,

William J. Diekmann, REHS, MS
Program Manager
Hazardous Materials Management Section
Environmental Health Division

WJD:LL:md

cc: Ken Williams, Santa Ana Regional Water Quality Control Board
Brea Fire Department
Larry Honeybourne, Environmental Health, Water Quality Section



REFERENCE: USGS 7.5 MINUTE SERIES
YORBA LINDA QUADRANGLE 1981

Metcalf & Eddy

FIGURE 1-1

SCALE

0 ½ ½ 1 MILE

N

SITE LOCATION MAP
SHELL WESTERN E & P
NORTH ORANGE COUNTY, CALIFORNIA

NOTE: SITE LOCATION MAP IS INCORRECT

2

Site Inspection 8-19-91
(Harry Brown - Shell WEPI Field Person At Site)

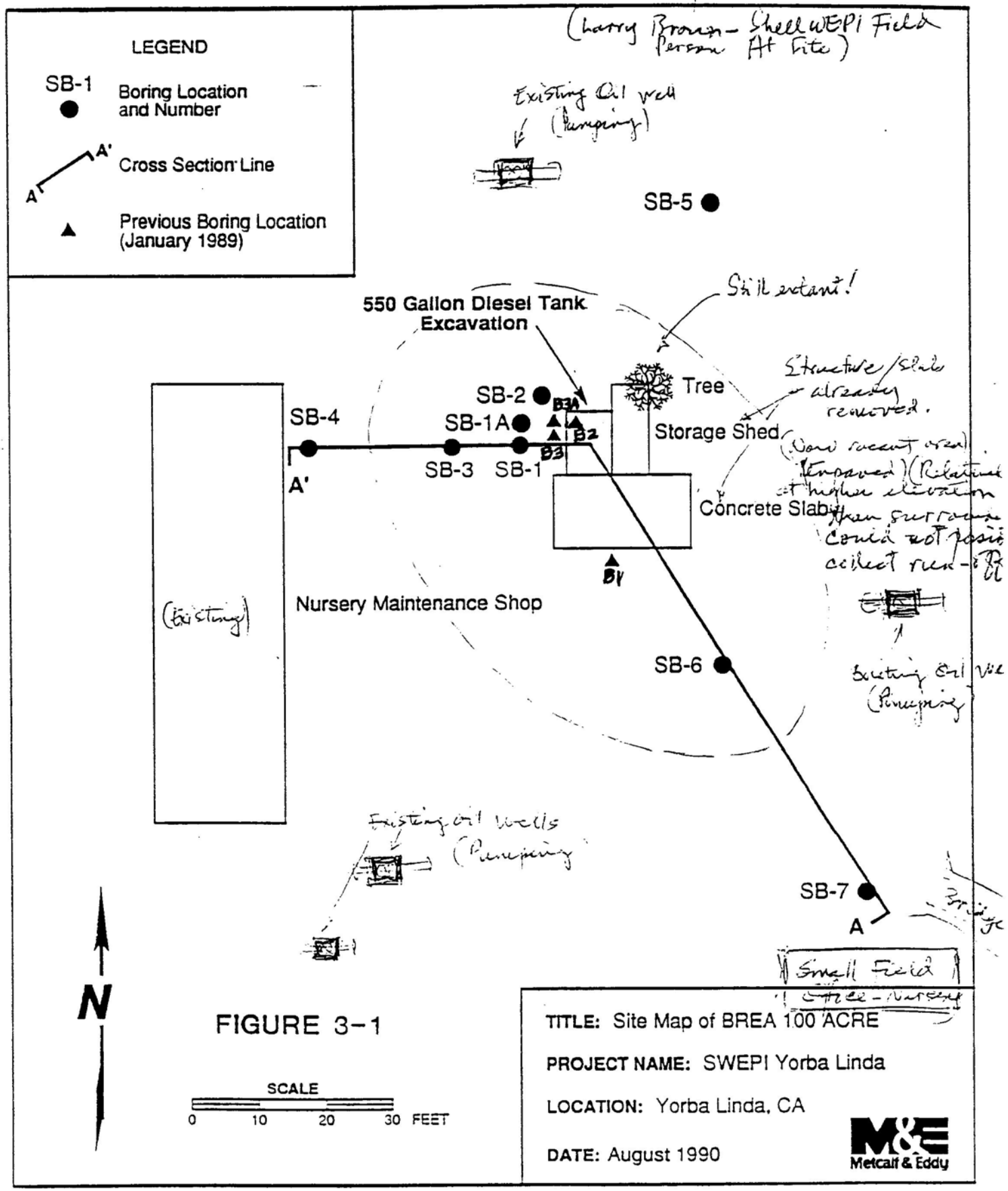


FIGURE 3-1

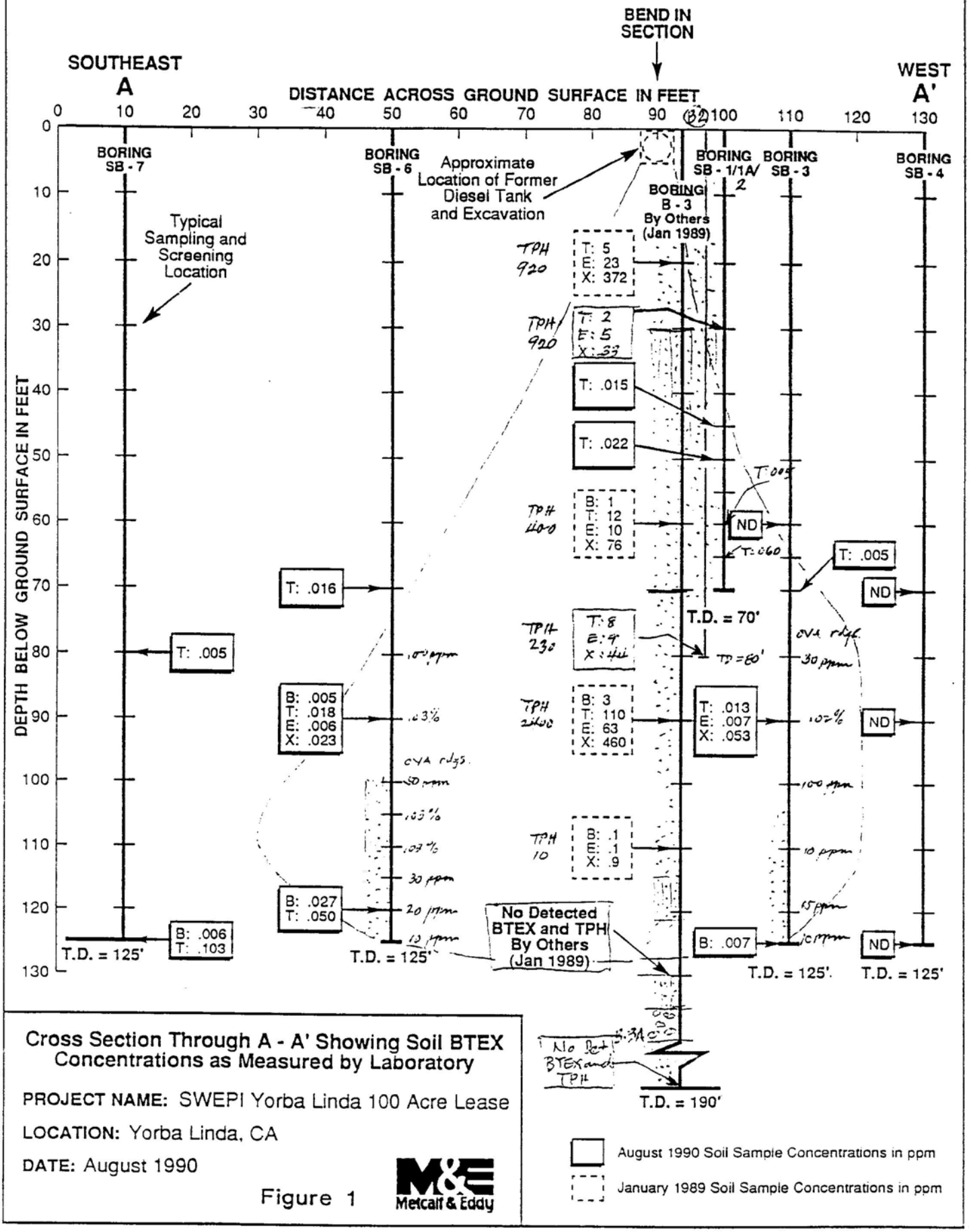
TITLE: Site Map of BREA 100 ACRE

PROJECT NAME: SWEPI Yorba Linda

LOCATION: Yorba Linda, CA

DATE: August 1990

Metcalf & Eddy



Cross Section Through A - A' Showing Soil BTEX Concentrations as Measured by Laboratory

PROJECT NAME: SWEPI Yorba Linda 100 Acre Lease

LOCATION: Yorba Linda, CA

DATE: August 1990

Figure 1

Metcalf & Eddy

Case ID# 88-21 Date 7-31-91

Case Summary and Closure Rationale

D.B.A.: Shell Western E & P Inc. R.P.: Don Knuppe

Site Address: 2701 Valencia Avenue, BREA

Current Land Use: Industrial Adjacent Land Use: Industrial

Future Land Use: No known change

UST Information (Number, Size, Material Stored, etc.): One 500-gal diesel steel tank

Contaminant	Highest Conc. Soil (ppm) Initial	Final B-3 (84)	Final SB-3 (90)	Highest Conc. Groundwater (ppb) Initial	Final
1. TPH	2400	2400	N.D.		
2. Benzene	3	3	N.D.	Not	Applicable
3. Toluene	110	110	0.060		
4. E-benzene	63	63	N.D		
5. Xylenes	460	460	0.016		
6.					

Depth of Highest Benzene Conc. Remaining: 90 (ft) 3 (ppm)

Deepest Depth of Benzene Remaining: 90 (ft) 3 (ppm)

Depth to Groundwater: >190 Ft. (estimated ✓ measured)

Soil Types: Silty Sand with interbedded sandy clay @ 122-130 ft depth.

Near- Forebay ✓ Pressure ___ Intrusion ___ Tidal ___ Hills ___ Near OCWD recharge ___

Case Summary (Cleanup Efforts and Closure Rationale):

All efforts directed at justifying leaving contamination in place: no cleanup done at site.

Site sufficiently characterized from 12 existing soil borings (40 to 190 feet depth bgs). Contaminant plume conical in shape with base at 125 ft. depth. Maximum contamination (TPH 2400; B-3, T 110 ppm) at 90 ft. depth; trace levels (B 0.03) to 0.1 ppm) to 125 ft max; no contamination beyond 130 ft. depth.

Closure Rationale

1. Groundwater not impacted. Low-level soil contamination
2. At least 68 feet of "clean" zone between impacted soil (@ 90 ft bgs) and nearest water (190 ft).
3. An 8-foot "sandy-clay" layer (@ 122-130 ft. depth) tends to hinder downward contaminant migration.
4. GR Analysis shows benzene at 90 ft depth is acceptable to be left in place
5. Following sampling, compared to results taken in 1984, microbial anaerobic natural / biodegradation; 1990 contaminant levels not detected samples showed N.D. TPH and maximum values of B at .027 ppm T at .014 ppm, E at .101 ppm and X at .02 ppm.
6. Closest water well 1/2 to 3 miles away (in Yorba Linda)
7. Hazardous Materials Site Review Committee approved closure for site, noted unacceptable soil contamination, but agreed to closure based on [illegible]

Specialist: L. Conkling

REV:09/13/90 H-78 Page 1 FORM #73

4a

COUNTY OF ORANGE

RECEIVED
JUL 3 2 1992
Ans'd.....

TOM URAM
DIRECTOR

CAROL D. KISER
DIRECTOR OF ADMINISTRATION

HEALTH CARE AGENCY
CUSTODIAN OF RECORDS
515 N. SYCAMORE AVENUE, SUITE 120
SANTA ANA, CALIFORNIA 92701
FAX (714) 835-9312
(714) 834-3446

RECEIVED
JUL 2 3 1992
Ans'd. √ N.D.P
5 pages
ATTACHED

Re: 4024 VALLEY VIEW
YORBA LINDA, CA.

The Undersigned declares:

1. I am the duly authorized Custodian of Records delivered herewith and have the authority to certify these records as to their authenticity.

2. The copies of records accompanying this declaration are true copies of all of the records described in your request in this action to the extent I have them.

3. The records were prepared in the ordinary course of the business concerned at or near the time of the act, condition, or event which they depict.

4. The Health care Agency may not be the only source of record. Please check with the Fire Department, the Water Quality Control Board and/or the State Department of Health Services.

I declare under penalty of perjury that the foregoing is true and correct. Executed at Santa Ana California on July 7, 1992

Jean-Marie Legacy

Jean-Marie Legacy
Custodian of Records
Health Care Agency
County of Orange

UNDERGROUND STORAGE INSPECTION REPORT
Orange County Health Care Agency

DBA: Shell Oil Lease

ADDRESS: _____

: _____

FILE NO: _____ ACCOUNT NO: _____ UST PERMIT NO: _____

VIOLATION DESCRIPTIONS

FACILITY

___ 105 OPERATING UNDERGROUND STORAGE TANKS (UST) WITHOUT A PERMIT - SECTION 25284(a), HS
___ 115 FAILURE TO REPORT THE CHANGE IN OWNERSHIP WITHIN 30 DAYS - SECTION 2712(f), CCR
___ 135 FAILURE TO ENTER INTO A WRITTEN CONTRACT BETWEEN OWNERS AND OPERATORS TO MONITOR THE UST - SECTION 2610(b), CCR
___ 140 METERS NOT INSPECTED BY THE COUNTY DEPARTMENT OF WEIGHTS AND MEASURES OR A DEVICE REPAIRMAN - SECTION 2644(b), CCR
___ 145 FAILURE TO MONITOR THE TANKS USING THE METHOD SPECIFIED ON THE PERMIT - SECTION 25293, HS
___ 150 FAILURE TO MAINTAIN THE WRITTEN RECORDS OF ALL MONITORING PERFORMED ON SITE - SECTION 2712(c), CCR
___ 160 FAILURE TO SECURE THE MONITORING WELLS - SECTION 2648(j), CCR
___ 170 FAILURE TO CORRECT PREVIOUS VIOLATIONS WITHIN 30 DAYS - SECTION 2712(h), CCR
___ 190 FAILURE TO SUBMIT INVENTORY RECONCILIATION QUARTERLY REPORT - SECTION 2644(e) CCR.
___ 196 FAILURE TO SUBMIT A "PERMIT TO OPERATE" APPLICATION FOR THE USTS AT THE SITE - SECTION 25286 HS
___ 197 FAILURE TO IMPLEMENT/SELECT/DEVELOP AN APPROVED MONITORING SYSTEM/PLAN - SECTION 2640 & 2711 CCR
___ 198 FAILURE TO OBTAIN/SHOW EVIDENCE OF FINANCIAL RESPONSIBILITY - SECTION 25292.2 (a) HS

TANK

___ 120 FAILURE TO REPORT THE CHANGES IN THE USAGE OF UST WITHIN 30 DAYS - SECTION 2712(a), CCR
___ 125 FAILURE TO REPORT UNAUTHORIZED RELEASE - SECTION 2650(b), CCR
___ 130 FAILURE TO DEVELOP A RESPONSE PLAN TO REMOVE THE UNAUTHORIZED RELEASE FROM THE SECONDARY CONTAINER - SECTION 2632(d)(2), CCR
___ 155 FAILURE TO MONITOR VISUALLY AT REQUIRED FREQUENCY - SECTION 2642(c), CCR
___ 165 CONTINUOUS MONITORING DEVICES INOPERABLE - SECTION 2632(c)(2)(A) CCR
___ 180 FAILURE TO ANNUALLY TEST PIPELINE LEAK DETECTORS - SECTION 25292 HS
___ 185 FAILURE TO SUBMIT TANK INTEGRITY TEST RESULTS WITHIN 30 DAYS OF TEST COMPLETION - SECTION 2643(e), CCR
___ 195 FAILURE TO FOLLOW THE PROCEDURE IN SECTION 2644(f) WHEN INVENTORY RECONCILIATION EXCEEDS THE ALLOWABLE VARIATION.
___ 270 FAILURE TO REPORT CHANGES IN MONITORING ALTERNATIVE PROCEDURES WITHIN 30 DAYS - SECTION 2712(a) CCR.
___ 275 FAILURE TO CLOSE UST PROPERLY - SECTION 2670-72, CCR
___ 280 FAILURE TO REPAIR UST PROPERLY - SECTION 2660-63, CCR
___ 286 FAILURE TO ANNUALLY PERFORM TANK INTEGRITY TEST OF TANKS/PIPELINES - SECTION 25292 H & S
___ 287 PRESSURIZED LINE LEAK DETECTORS ARE NOT DESIGNED TO RESIST UNAUTHORIZED TAMPERING - SECTION 25292 HS
___ 288 UNDERGROUND TANK(S) NOT SECURED TO PREVENT UNAUTHORIZED INPUTS OR WITHDRAWALS - SECTION 2641(c)(B)(i) CCR
___ 290 OTHER

On site OC. Fire Tony Riniti OK'd removal of tank. 1 - ~~tar~~ steel tank aprox 550-1000 gal and all associated piping removed. Tank was uncovered while tearing down an old building appx on gas tic. Nobody remembers a tank there for the last 28 years.

I DECLARE THAT I HAVE EXAMINED AND RECEIVED A COPY OF THIS 2 PAGE INSPECTION REPORT.

PRINT NAME & TITLE: _____

7

Orange County Health Care Agency

Environmental Health Division, Hazardous Materials Management Section
Mailing Address: P.O. Box 355, Santa Ana, CA 92702
Office: 2009 E. Edinger, Santa Ana, CA 92705
Telephone: (714) 667-3700

HAZARDOUS WASTE & UNDERGROUND STORAGE TANK INSPECTION REPORT

NO: 007635 ACCOUNT NO: 11979-1 UST PERMIT NO: _____

ILITY: Shell Oil Lease PERMIT: _____

EET: ~3000 Lambert Rd MAP COORDINATES: 3-A5

Y [ ] Brea NW ZIP: 92621 DISTRICT: 1

ST CROSS STREET: corner of Valencia & Lambert "1000 acre lease" Shell TSD FACILITY? _____

BA? ___ NEW BUSINESS? ___ NEW ADDRESS? ___ NEW OWNER? ___ PUBLIC AGENCY? ___

INFO: _____

SPECTION TYPE: _____ NO OF UST ON SITE: 1 → 0 UST INSPECTION TYPE: 7

BER OF EMPLOYEES: _____ UST COMPLIANCE CODE: _____

DATE HW INSPECTED: _____ LAST DATE UST INSPECTED: _____

EMPT CODE: _____ UST EXEMPT CODE: _____

STATUS CODE: _____ UST STATUS CODE: _____

ESS OWNER: _____ PHONE: (___) _____

K OPERATOR: _____ PHONE: (___) _____

T CT: _____ PHONE: (___) _____

BILLING (NAME & MAILING ADDRESS):

_____

_____

_____

_____

NE: (___) _____

UST BILLING (NAME & MAILING ADDRESS):

_____

_____

_____

_____

PHONE: (___) _____

PERTY OWNER (NAME & MAILING ADDRESS):

_____

_____

_____

_____

NE: (___) _____

TANK OWNER (NAME & MAILING ADDRESS):

Shell Oil
4024 Valley View
Yorba Linda, CA 92686

PHONE: (714) 529-2571

RGENCY CONTACTS

: _____ PHONE: (___) _____

H: _____ PHONE: (___) _____

ICR: _____

PECTOR #: 232 NAME: Bre Dewey DATE: 12/10/90

PRESENT: _____

(6)

COUNTY OF ORANGE

HEALTH CARE AGENCY
PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH DIVISION
2009 E. EDINGER AVENUE
SANTA ANA, CALIFORNIA 92705
(714) 667-3700

historical FMA

TOM URAM
DIRECTOR

L. REX EHLING, M.D.
HEALTH OFFICER

ENVIRONMENTAL HEALTH DIVISION
ROBERT E. MERRYMAN, REHS MPH
DEPUTY DIRECTOR

MAILING ADDRESS: P.O. BOX 355
SANTA ANA, CA 92702

FACILITY MODIFICATION APPLICATION (INSTALLATION/REMOVAL/REPAIR)

(COMPLETE PAGES 1 & 2)

DATE: 12-10-90

FACILITY INFORMATION

NAME: Shell Oil Lease

STREET ADDRESS:

CITY:

TOTAL NUMBER OF TANKS (AFTER INSTALLATION/REMOVAL) AT THIS LOCATION: 1 → 0

TYPE OF BUSINESS:

___ GASOLINE STATION ___ FARM

___ GOVERNMENT ___ OTHER

OWNER

NAME (CORP., INDIVIDUAL, PUBLIC AGENCY): Shell Oil

STREET ADDRESS: 4024 Valley View

CITY: Yorba Linda, CA

STATE: ZIP: 92686

TELEPHONE NO.: (213) 529-2511

BILLING ADDRESS INFORMATION

BILL TO NAME:

BILL TO ADDRESS:

CITY:

STATE: ZIP:

TELEPHONE NO.:

TYPE OF CONSTRUCTION

INDICATE NO. OF TANK(S):

___ INSTALLATION(S) (COMPLETE PAGE 2)

___ REPAIR(S)/RELINE(S)

___ CLOSURE(S)/REMOVAL(S)

___ SYSTEM MODIFICATION (E.G., REPIPE)

___ OTHER (SPECIFY)

24 HOUR EMERGENCY CONTACT PERSON

DAYS:
NAME TELEPHONE

NIGHTS:
NAME TELEPHONE

APPLICANT

NAME:
PLEASE PRINT

SIGNATURE:

COMPANY NAME:

TELEPHONE NO.:

FACILITY OPERATOR (CONTACT PERSON)

NAME: Shell Oil

BUSINESS TELEPHONE NO.: 213 529-2511

NOTE: NEW INSTALLATIONS, CLOSURES REPAIRS AND SYSTEM MODIFICATIONS OF UNDERGROUND STORAGE TANKS REQUIRE THE SUBMITTAL OF (4) SETS OF PLANS TO THIS DIVISION. THESE PLANS MUST BE APPROVED PRIOR TO THE INITIATION OF ANY CONSTRUCTION OR MODIFICATION.

OFFICE USE ONLY

FACILITY PERMIT NO.: 11979 PLAN APPROVAL DATE: ___ BY: ___ NO.: ___

PLAN CHECK NO.: ___ FEES: ___ FINAL FIELD INSPECTION DATE: ___

NO. OF TANKS TO BE ADDED TO BILLING: ___ NUMBER OF TANKS TO RECEIVE A SURCHARGE BILL: ___

FMS:FMA

TANK INFORMATION

			TANK I.D.	#1/001	#2	#3	#4
MATERIALS STORED	CAS NO. OR WASTE I.D.	CURRENTLY					
		PROPOSED					
		PREVIOUSLY		96			
	FUEL TYPE (IF TRADE SECRET, PLEASE STATE)						
CONTAINER	TYPE (TANK, SUMP, OTHERS)			1			
	DOUBLE WALL/SINGLE WALL			2			
	UL NUMBER			99			
	YEAR INSTALLED			99			
	VAULTED/NOT VAULTED			3			
	PRIMARY	MANUFACTURER		99			
		CAPACITY (GALLON)		1000			
		CONSTRUCTION MATERIAL		1			
		THICKNESS (UNITS)		99			
		INTERIOR LINING		99			
	SECONDARY	MANUFACTURER		97			
		CAPACITY (GALLON)		↓			
		CONSTRUCTION MATERIAL					
		THICKNESS (UNITS)		V			
	CORROSION PROTECTION			99			
	TYPE OF LEAK DETECTION (LIQUID, VAPOR, ETC.)			96			
	MANUFACTURER OF LEAK DETECTOR			97			
PIPING	LOCATION (UNDER/ABOVE GROUND)			1			
	SUCTION/PRESSURE GRAVITY/UNKNOWN			99			
	PRIMARY	CONSTRUCTION MATERIAL		1			
		MANUFACTURER		99			
	SECONDARY	CONSTRUCTION MATERIAL		97			
		MANUFACTURER		97			
	TYPE OF LEAK DETECTION (LIQUID, VAPOR, ETC.)			96			
	MANUFACTURER OF LEAK DETECTOR			97			
OVERFILL PROTECTION (TYPE)				99			
SPILL CONTAINMENT				99			

ATTACH A DIAGRAM (8 1/2" X 11") INCLUDE THE LOCATIONS OF THE UNDERGROUND STORAGE TANK(S), PIPING, AUXILIARY EQUIPMENT, BUILDINGS AND OTHER LANDMARKS.

OFFICE USE ONLY

9

MONITORING SYSTEM/ALTERNATIVE	96			

04 04 88

CHECKLIST FOR TANK REMOVAL FIELD NOTES

	Yes/No/Comments/Readings
Is area secure from public access?	yes
Status of removal at time of arrival (triple rinsing/tank removed)	excavated
Fire Department personnel on-site?	O.C Tony Rinaldi
Contractor on-site?	Excel Environmental
Consultant on-site?	Excel "
Instrument readings of ambient air (perimeter, 5 ft. from excavation, at excavation)	0 0 0
Are odors present? (strong, slight, etc.)	no
Direction of prevailing wind?	S.
Condition of tank(s) (rusting/pitting/holes/corrosion, etc.)	large holes
Number of tanks being removed	1
Size of tank(s)	~550-1000
Construction material of tank(s)	steel
Product(s) previously stored in tank(s)	probably diesel or gas
Condition of excavation (staining, etc.)	no staining
Is free product noted in excavation?	no
Is groundwater noted in excavation?	no
Native soil type	loam
Depth to groundwater?	unk
Was piping removed?	yes
Location of samples (Chain of custody completed?)	yes
Instrument readings of excavation area	0 ppm
Instrument readings of spoils	0 ppm
Intended re-use or means of disposal of tank(s)	AMR
Prop 65 notification been completed?	NO
Approximate dimensions of the excavation	20' x 10'
Was tank(s) triple rinsed? (manifest)	no-was empty & LEL without rinsing
Upon departure, is area or will area be secured (fencing, spoils covered)	yes
Proximity to residential area (on-plot sketch)	0 10

None

005648

UNDERGROUND TANK CLEANUP FORM

Shell Oil Lease — 3000 Lambert rd — Brea — 92621 ~~92686~~
Facility Name — Address

P# 90PC520 — TI # _____ — LUST # _____ — IR # _____

Inspector: Bri Dewey — Date: 12/10/90 — Time: _____

Lambert & Vallencia area. "100 acre lease"
Cross Streets — Site Telephone Number

Shell oil — 4024 Valley View Yorba Linda, CA 92686
Owner — Address

Shell oil — (213) 529-2511
Contact Person — Telephone Number

same
Operator (if different than owner) — Telephone Number

Exal Environmental — Don Ortman — (213) 634-8121
Consultant or Contractor Company — Contact Name — Telephone Number

	Size	Const. Mat.	Mat. Stored		Size	Const. Mat.	Mat. Stored
Tank #1:	1000	steel	Diesel?	Tank #4:			
Tank #2:				Tank #5:			
Tank #3:				Tank #6:			

Depth to Groundwater: unk — Fate of Piping : _____

Proposition 65 Required? _____ — Prop. 65 Form Submitted on: _____

Fire Dept. Personnel on Site: OC-fire Tony Biniti

Ambient Air Readings on Field Instrument: _____

Other Information: Tank was found after demolishing a house. The tank was ~ 1 ft. below grade - may have been diesel backup generator. Nobody can remember there being a tank there for the past 28 years.

Tank was pitted through with >10 holes some ~ 10"x10"

soil appears to be sandy loam - no apparent staining in pit

Upon on gas tec of samples.

6/13/90 — Page 1 — Form #1

NOTE: Page 46-49 from Prior Search

H-788

(11) (46)

FIELD ACTIVITY DESCRIPTION

Shell oil Lease
Facility Name — Address

PC # 90PC520 TI # _____ LUST # _____ IR # _____

Inspector: Bre Dewey Date: 12/10/90 Time: _____

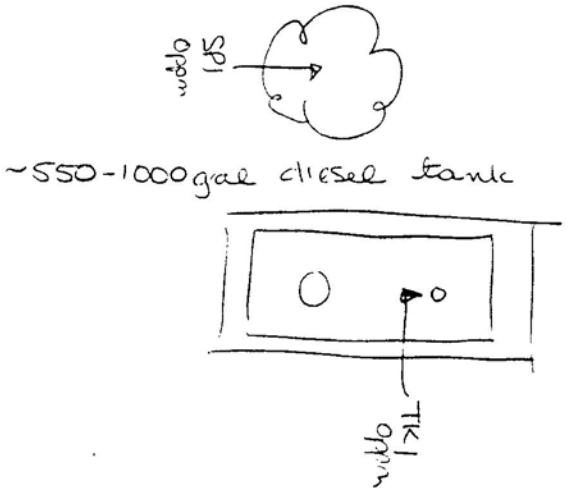
Field Activity:

tank to AMR

Lab SCS Bonsbeach

No manifest for rinsate tank had 0 LEL when it was uncovered and was empty

2 samples taken this date



Valencia

▲ = Sample

JASON LEW

COUNTY OF ORANGE

TOM URAM
DIRECTOR

L. REX EHLING, M.D.
HEALTH OFFICER

ENVIRONMENTAL HEALTH DIVISION
ROBERT E. MERRYMAN, REHS MPH
DEPUTY DIRECTOR

MAILING ADDRESS: P.O. BOX 35
SANTA ANA, CA 9270

HEALTH CARE AGENCY
PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH DIVISION
2009 E. EDINGER AVENUE
SANTA ANA, CALIFORNIA 92705
(714) 667-3700

FACILITY MODIFICATION APPLICATION
INSTALLATION/REMOVAL/REPAIR)
(COMPLETE PAGES 1 & 2)

DATE: 11/16/90

FACILITY INFORMATION

NAME: SHELL OIL LEASE/NW CORNER of Valencia & Lambert

STREET ADDRESS: ~~4024 VALLEY VIEW~~ 3200 Lambert

CITY: ~~YORBA LINDA CA 92686~~ Brea

TOTAL NUMBER OF TANKS (AFTER INSTALLATION/REMOVAL) AT THIS LOCATION: 0

TYPE OF BUSINESS:

___ GASOLINE STATION ___ FARM

___ GOVERNMENT ___ OTHER

TANK OWNER

NAME (CORP., INDIVIDUAL, PUBLIC AGENCY):

SHELL OIL

STREET ADDRESS: 4024 VALLEY VIEW

CITY: YORBA LINDA

STATE: CA ZIP: 92686

TELEPHONE NO.: (213) 529-2511

BILLING ADDRESS INFORMATION

BILL TO NAME: EXCEL ENVIRONMENTAL

BILL TO ADDRESS: 15725 TEXACO AVE

CITY: PARAMOUNT

STATE: CA ZIP: 90723

TELELPHONE NO.: (213) 529-2511

TYPE OF CONSTRUCTION

INDICATE NO. OF TANK(S):

___ INSTALLATION(S) (COMPLETE PAGE 2)

___ REPAIR(S)/RELINE(S)

1 CLOSURE(S)/REMOVAL(S)

___ SYSTEM MODIFICATION (E.G., REPIPE)

___ OTHER (SPECIFY) ___

24 HOUR ENERGENCY CONTACT PERSON

DAYS: WALTER J. WOJAK (213)529-2511
NAME TELEPHONE

NIGHTS: WALTER J. WOJAK (213)529-2511
NAME TELEPHONE

APPLICANT

NAME: WALTER J. WOJAK
PLEASE PRINT

SIGNATURE: Walter J Wojak

COMPANY NAME: EXCEL ENVIRONMENTAL

TELEPHONE NO.: (213) 529-2511

FACILITY OPERATOR (CONTACT PERSON)

NAME: SHELL OIL

BUSINESS TELEPHONE NO.: (213)529-2511

NOTE: NEW INSTALLATIONS, CLOSURES REPAIRS AND SYSTEM MODIFICATIONS OF UNDERGROUND STORAGE TANKS REQUIRE THE SUBMITTAL OF (4) SETS OF PLANS TO THIS DIVISION. THESE PLANS MUST BE APPROVED PRIOR TO THE INITIATION OF ANY CONSTRUCTION OR MODIFICATION.

OFFICE USE ONLY

FACILITY PERMIT NO.: ___ PLAN APPROVAL DATE: 11-19-90 BY: Mike McCall NO.: ___

PLAN CHECK NO.: 90-520 FEES: $156 FINAL FIELD INSPECTION DATE: ___

NUMBER OF TANKS TO BE ADDED TO BILLING: ___ NUMBER OF TANKS TO RECEIVE A SURCHARGE BILL: ___

FORMS:FMA Ck#1194 SB

13 (98)

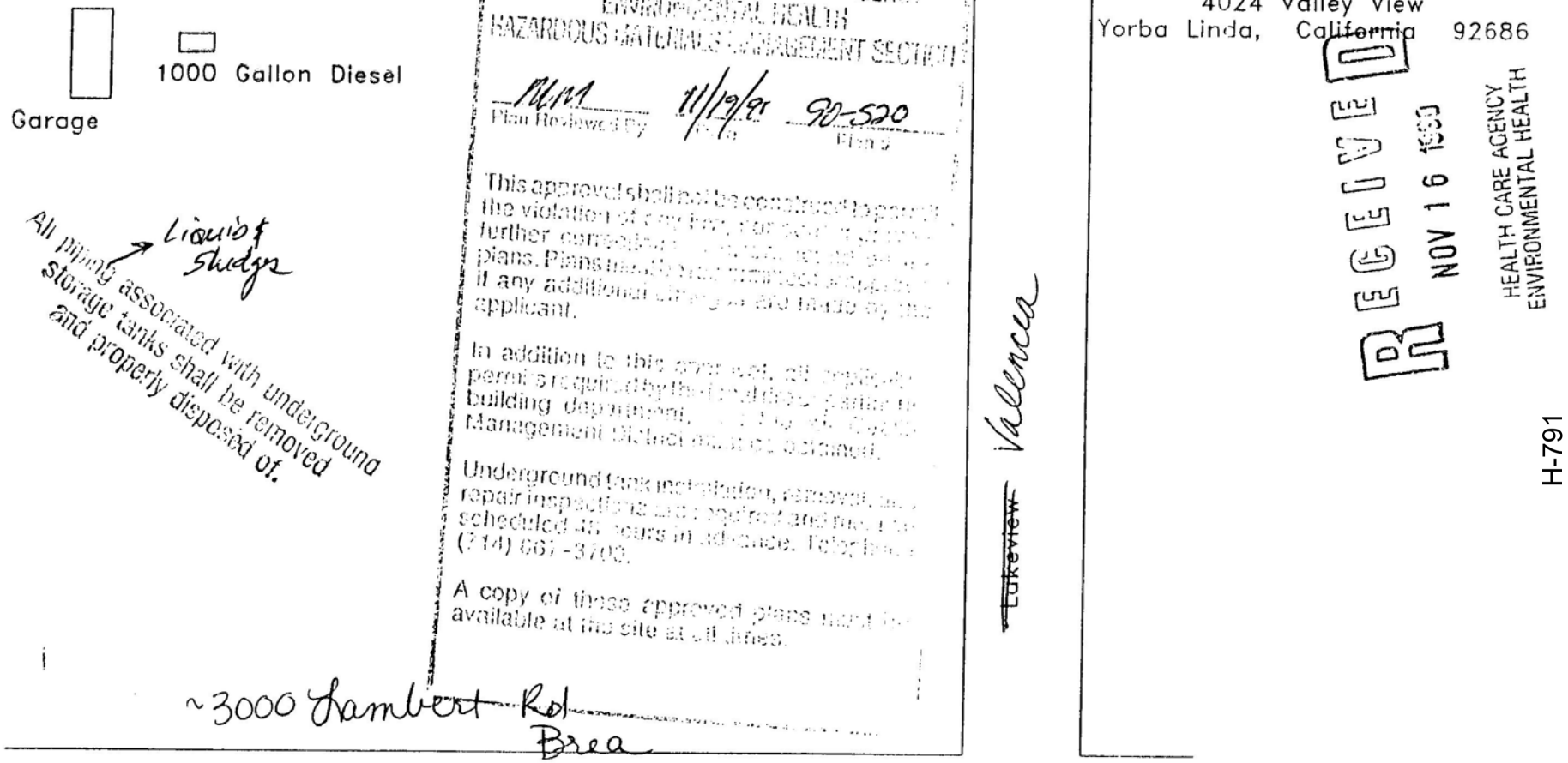


Figure 1

Shell Oil Lease
4024 Valley View
Yorba Linda, California 92686

RECEIVED
NOV 16 1990
HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH

H-791

Project:J0000053
Date: November 15, 1990
Drawing Number: J053

ENVIRONMENTAL
AND
GENERAL ENGINEERING

15725 Texaco Avenue, Paramount, CA 90723
(213)529-2511 (213) 529-2092



462

CIVIC CULTURAL CENTER
No. 1 Civic Center Circle
Brea, California 92621
(714) 990-7600

CITY COUNCIL

CLARICE A. BLAMER
MAYOR

JOHN SUTTON
MAYOR PRO TEM

NORMA ARIAS HICKS
COUNCILWOMAN

GENE LEYTON
COUNCILMAN

CARREY NELSON
COUNCILMAN

April 22, 1986

Murray Storm, Director
County of Orange
Environmental Management Agency
P.O. Box 4048
Santa Ana, California 92720

SUBJECT: SHELL OIL PROPERTY - SOUTHEAST CORNER CARBON CANYON ROAD AND VALENCIA AVENUE

Dear Mr. Storm:

I want to thank you for your attention to our concerns, as well as having members of your staff from the enforcement section, in attendance at the meeting in the City of Brea on April 8, 1986. I have attached copies of the minutes of that meeting as information for you. We do have an additional request for information and/or suggestions about coordination of activities.

We would appreciate continued enforcement and inspections of all oil well operations in our jurisdiction, such that we may advise our constituents that the County is enforcing its codes and ordinances in a proper and professional manner.

To be more specific, we would like to know the specific zoning and applicable regulations for the above referenced property. Further, we would request that, before sump holes are filled in the future, that the inspections take place in accordance with your referenced oil production code. Further, due to our concerns relative to what happened on the above referenced property, and since your inspectors could not at that meeting guarantee that the sump holes were appropriately pumped and/or filled accordingly, we are going to request that Shell Oil Company perform certain soils tests by an independent company.

NOTE on Page 16-19 From Diane Search 15

We also noted that there is a possibility that the County regulations relative to oil drilling and production may now need some amending, especially in the area dealing with safety issues involving the public, i.e. open sump holes. We will be happy to work with you on any possible code revisions or amendments and would appreciate any response you may have to this matter.

Again, I want to thank you and your staff for their helpfulness in this matter. We look forward to future meetings with you and your staff, to ensure that the sphere of influence in Brea is kept in accordance with the County standards.

Sincerely,

Norma Hicks

Norma A. Hicks
Councilwoman

NAH:WRK:alv.75

Attachment

cc: Supervisor Bruce Nestande
Lynn Fishell - Aide to Supervisor Nestande
Tom Eichron - Aide to Supervisor Nestande
Clarence Moore - Orange County EMA/Building Inspector
R.E. Elmes - Orange County EMA/Building Inspector
John Stoffel - Orange County Sanitarian
Catherine Bish - Orange County Sanitarian
Mayor and City Council
Ed Wohlenberg - City Manager
William R. Kelly - Director of Development Services
Bud Moody - Battalion Chief
Richard Mitchell - Building and Safety Manager
Roger Gary - Code Enforcement Officer

16 HT

MINUTES

MEETING APRIL 8, 1986 RELATIVE TO SHELL OIL PRODUCTION PROCESS

Attendance:

City of Brea

Norma Hicks, Councilwoman
Bill Kelly, Director of Development Services
Bud Moody, Fire Marshall
Richard Mitchell, Building and Safety Manager
Roger Gary, Code Enforcement Officer

County of Orange

C.L. Moore, Orange County EMA/Building Inspector
R.E. Elmes, Orange County Building Inspector
John Stoffel, County Sanitarian
Catherine Bish, County Sanitarian
Lynn Fischell, Aid to Supervisor Nestande
Tom Eichron, Aid to Supervisor Nestande

Shell Oil Company

Bruce Kerr, Production Supervisor

Meeting Discussion

Councilwoman Hicks opened the meeting with an explanation of the City of Brea's concerns as follows:

1. Safety Issues - Need for fencing, closure of open pits and related matters.

2. Future Land Use Issues - What will the results be of building on top of sumps, holes or other oil production processes.

3. Environmental Effects - i.e. dead trees in area, contamination of ground water, etc.

4. Ordinance Amendments - Possible need to amend the existing County code so as to better fit the needs of the general public.

5. Enforcement - Is it being done and in what manner?

6. Notice - County needs to notify the City of Brea as to activities in its sphere of influence.

7. Grading Concerns - What department handles it?

8. Transmittal of Information - Need County to send appropriate ordinances for us to review of the "O" district.

The following is a summary of discussion:

County

Relative to drilling operations, the drilling mud is to be removed, but can be placed into temporary sumps or storage tanks, provided the sumps or storage areas are filled within 30 days. Any permanent sump holes, need the County Building Official's approval and must be fenced. The mud is not allowed to be left in the sump holes.

Wells can be closer than so stated within the the ordinance, provided that certain safety conditions are met, i.e. guy lines, safety regulations, security guards, etc.

Before the County can determine what the actual material is in the ground, a soils analysis will need to be done.

Shell usually submits information to the County, as to assurances that the material is not in violation of any federal, state, county or local codes.

Shell Oil Company

Bruce Kerr stated that water is added as a lubricant when drilling, acting as a sealant against sand and dirt cave-ins, as well as stopping the binding of the drill bits as they go into the ground. Two forms of mud are used at the site; first, cuttings from the drillings that come up, go into a shaker pit and then are recirculated, or second, closed containers are brought in with the lubricant, from which the material is recycled and reused.

Mr. Kerr advised that they have just completed 18 wells in the subject area. In the audio visual tape, he stated the seepage was from drilling mud pushed over the side. Mr. Kerr indicated it was just spilled over the top and was not a usual operation. These wells have been operated since 1920 and are carefully monitored. He stated that some dirt is brought in occasionally for grading, but that all grading is in conformance with the County regulations for oil drilling. He further indicated that grading is exempt from the County code, unless building pads or permanent drilling rigs are required. He also advised that the sumps or pits may be located anywhere on the property and that each well is inspected once a year by the County with Shell people.

Additional Discussion

Discussion ensued relative to other matters, as well; that is, Councilwoman Hicks' concern over trucks appearing at night on the subject property with the alleged potential that they are dumping toxic waste or other illegal materials. She also expressed a concern about the trees dying on the south side of Carbon Canyon Road adjacent to the Shell Oil property. Additional concerns were expressed relative to when the County does the actual inspections, with the County indicating, they inspect upon issuance of permit and several times during the process. The County did not confirm that they made any inspections of the subject sump holes before they were filled. The County further indicated that they do not have specific soils tests available at this time for the subject property.

COUNTY OF ORANGE

ORANGE COUNTY FIRE DEPARTMENT
180 SOUTH WATER STREET
P.O. BOX 86, ORANGE, CALIFORNIA 92666-0086
(714) 744-0400

RECEIVED
JUL 2 - 1992
Ans'd.....

LARRY J. HOLMS
DIRECTOR OF FIRE SERVICES

SERVING THE UNINCORPORATED AREAS
OF ORANGE COUNTY AND THE CITIES OF:

CYPRESS
DANA POINT
IRVINE
LAGUNA NIGUEL
LA PALMA
LOS ALAMITOS
MISSION VIEJO
PLACENTIA
SAN JUAN CAPISTRANO
SEAL BEACH
STANTON
TUSTIN
VILLA PARK
YORBA LINDA

June 30, 1992

Anna M Scott
GeoSoils, Inc.
1446 East Chestnut Ave
Santa Ana, CA 92701

Ms. Scott:

In response to your request for information concerning any incidents at the attached locations, we checked from 1985 to the present and found no record of any incidents.

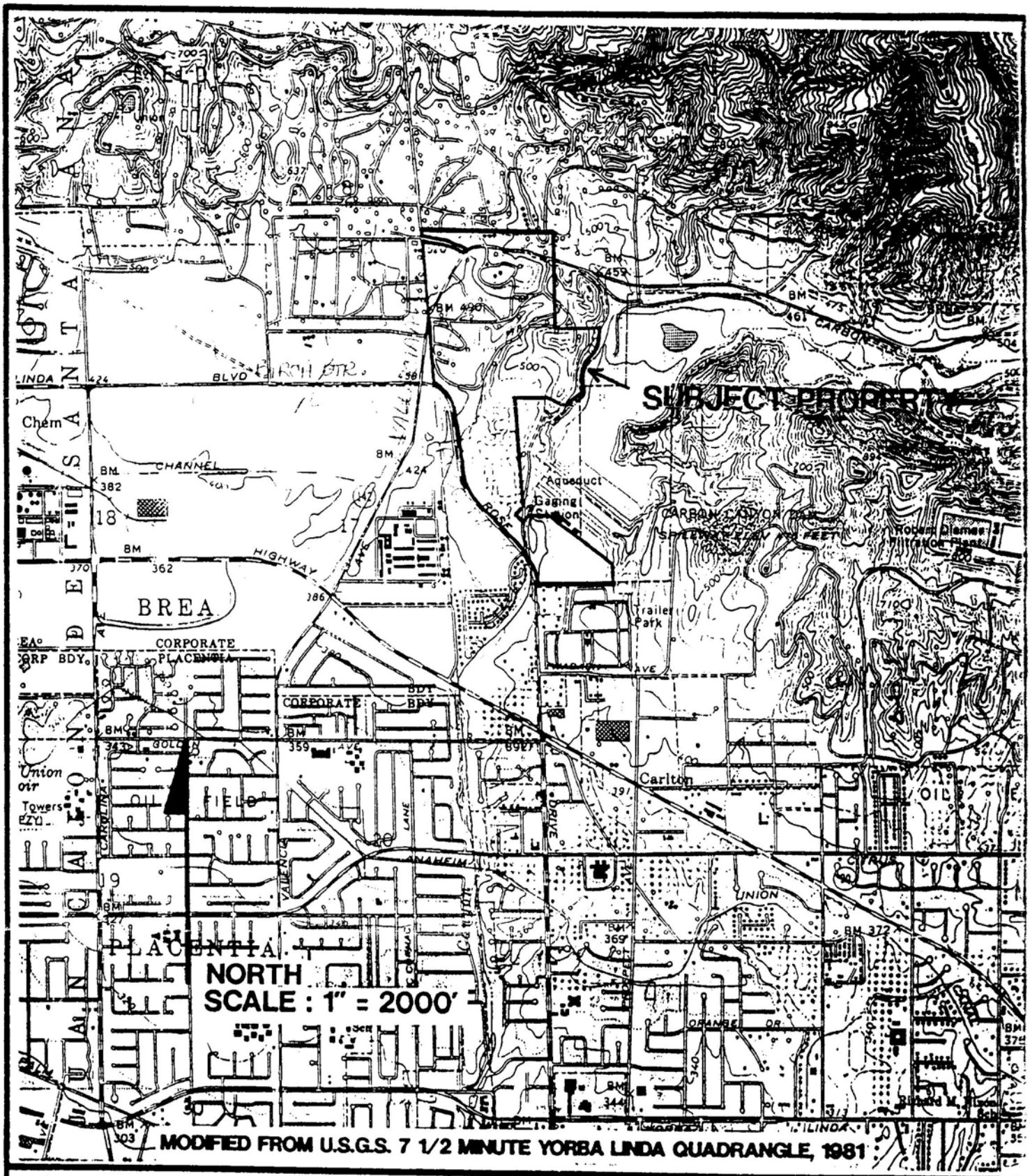
If I can be of any further assistance, please let me know.

Sincerely,

Luci Mello

Luci Mello
OCFIRS SECTION
(714) 744-6618

RESIDENTIAL SPRINKLERS AND SMOKE DETECTORS SAVE LIVES



GeoSoils, Inc.

SITE LOCATION MAP
- BREA EAST -

DATE 5/19/92	W.O. NO 2356-A1-OC	BY GSI

Soil Mechanics • Geology • Foundation Engineering

APPENDIX D

ORANGE COUNTY WATER DISTRICT RECORDS

Pages 1 through 24

WELLS AND GROUNDWATER DEPTH MAP

Page 25

REGIONAL WATER QUALITY CONTROL BOARD

Pages 26 and 27

ORANGE COUNTY WATER DISTRICT
10500 Ellis Avenue
Post Office Box 8300
Fountain Valley, CA 92728-8300
Telecopier: (714) 963-7472

TRANSMITTAL

TO: Skip Pouncey
Geo Soils, Inc.
1446 Chestnut
Santa Ana, Ca. 92701

#410 Date JUNE 17, 19 92 No. 8011
Received Of GEO SOILS, INC.
Address 1446 E. CHESTNUT
SANTA ANA, CA. 92701 $ TEN.00
For VALENCIA / ROSE
HOW PAID Check 2844 BALANCE DUE
By G. Stiffen OCWD
REDIFORM ® 81. 826 carbonless

THE FOLLOWING ITEMS ARE:

_X_ ENCLOSED

___ REQUESTED

___ SENT SEPARATELY VIA _____

DATE: June 17, 1992

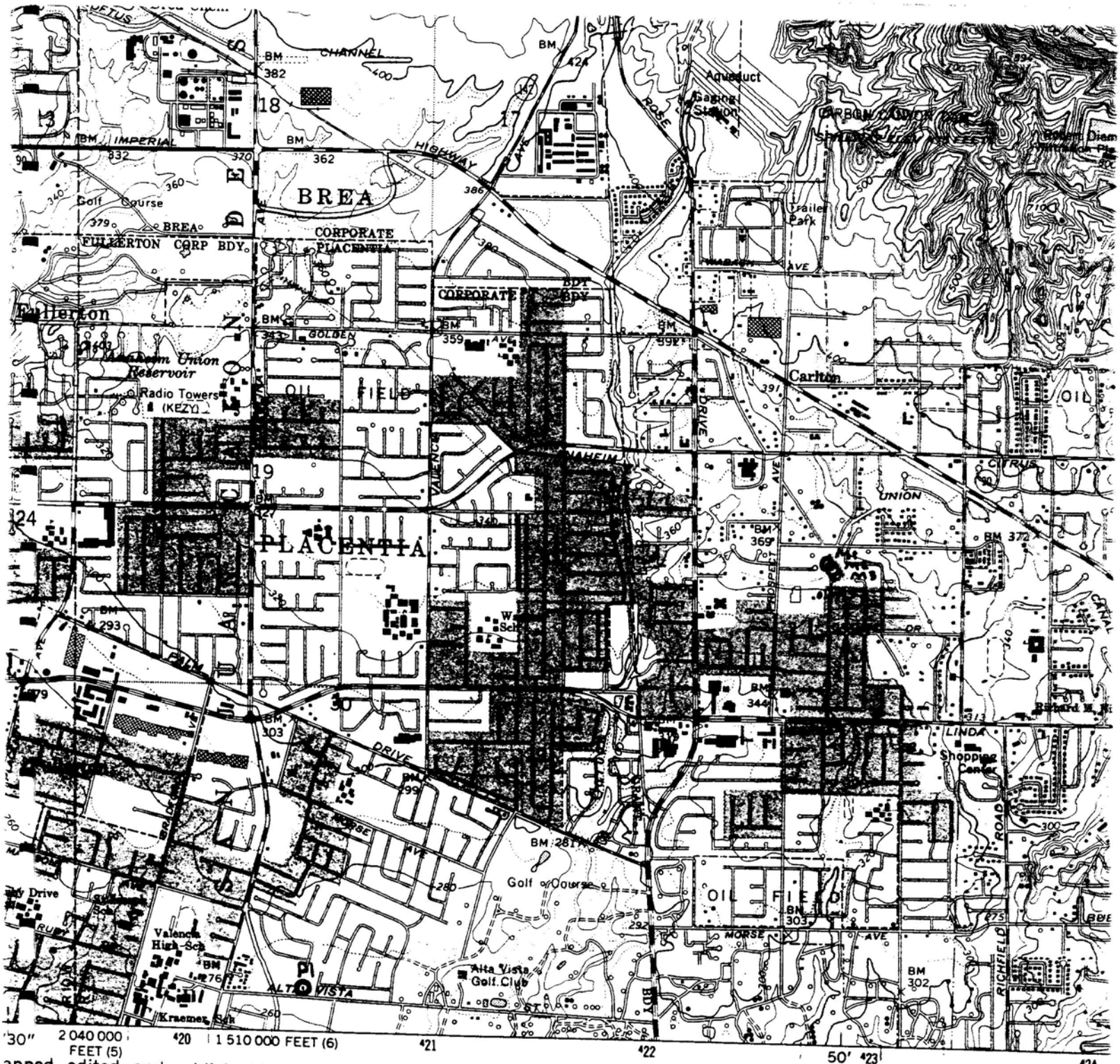
SUBMITTED BY: Stacy Drinkwine

SUBJECT: Well information for Brea at Valencia and Rose Drive.

No.OF COPIES	DESCRIPTION
1	well location map
2	well location cards
14	VOC Analysis
3	Inorganic Data
2	water levels
1	1991 contour map
1	Groundwater Management Plan (see references)
1	Engineer's Report (See references)

THE ABOVE ITEMS ARE SUBMITTED:

___ AT YOUR REQUEST ___ FOR YOUR ACTION
_X_ FOR YOUR FILES ___ FOR YOUR SIGNATURE
___ FOR YOUR REVIEW ___ FOR YOUR INFORMATION



apped, edited, and published by the Geological Survey

nt by USGS, NOS/NOAA, Los Angeles County, and Orange County

po aphy by photogrammetric methods from aerial otographs taken 1963. Field checked 1964

lyc ic projection. 10,000-foot grid ticks based on lif ia coordinate system, zones 6, 7 and 5)0(eter Universal Transverse Mercator grid ticks, ne 11, shown in blue. 1927 North American Datum place on the predicted North American Datum 1983 ve the projection lines 1 meter north and 84 meters st i shown by dashed corner ticks

d t t indicates areas in which only landmark buildings are shown

ea covered by dashed light-blue pattern is oject to controlled inundation

er mitted, land lines are not shown because of insufficient data tte land lines established by private surveys

e red dashed lines indicate selected fence and field lines where erally visible on aerial photographs. This information is unchecked

GN MN
0°27' 8 MILS
14° 249 MILS

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1000 0

DC NA

THIS MAP C
FOR SALE BY U. S. GEOLOGI
A FOLDER DESCRIBIN

7

SWN: 3S/9W-21M1 5, 28
WPFN: 76-05-2-B
OID: WELL #2 #1 50
OWNER: Santa Fe Energy Company
USE: Dom, Ind.
ADDRESS: 17001 East Carbon Canyon Road
Brea, CA 92621
MIKE DELUKA
PHONE: ~~Mr. Farren~~ (714) 528-7433

DRILLED BY: Petroleum Development Company
DATE DRILLED: 1900
ADDRESS:
LOG ON FILE: No

EXACT WELL LOCATION: South side El Cajon Ave.; 750' E/o Prospect Avenue

DEPTH: 274' DIA: 10"
SPECIFIC DEPTH OF PERFORATIONS:
(74-274)
KIND OF PUMP: Pomona Turbine
METER NO.: HP: 3
FREQ. OF SAMPLING:
GR OR RP ELEVATION:

REMARKS: 2" discharge
3/9-21M1
OCWD E-23

8

SWN: 3S/9W-21M2 5, 26
WPFN: 76-05-2-A
OID: WELL #1 50 #2
OWNER: Santa Fe Energy Company
USE: Dom, Ind. #1
ADDRESS: 17001 East Carbon Canyon Road
Brea, CA 92621
PHONE: 528-7433 MIKE DELUKA

DRILLED BY: Petroleum Development Avenue
DATE DRILLED: Before 1901
ADDRESS:
LOG ON FILE: No

EXACT WELL LOCATION: S side El Cojon Avenue; 750' E/o Prospect Avenue.
WELLS ARE IN YORBA LINDA

DEPTH: 294' DIA: 8"
SPECIFIC DEPTH OF PERFORATIONS:
KIND OF PUMP: Berkley Jet-Pump (elec.)
METER NO.: HP: 1.5
FREQ. OF SAMPLING:
GR OR RP ELEVATION:

REMARKS: 1-1/2" discharge
3/9-21M2

(3)

9

SWN: 3S/9W-21M3
WPFN: 76-05-2-C
OID: WELL #3
USE: Dom., Ind.

OWNER: Santa Fe Energy Co.
ADDRESS: 17001 E. Carbon Canyon Rd.
Brea, CA 92621
PHONE:

DRILLED BY: Petroleum Development Co.
DATE DRILLED: Prior to 1902
ADDRESS:
LOG ON FILE: No

EXACT WELL LOCATION: South side El Cajon Ave., 750' E/o Prospect Ave.

DEPTH: 205' DIA: 8•1/4"
SPECIFIC DEPTH OF PERFORATIONS:
KIND OF PUMP:
METER NO.: HP: 3
FREQ. OF SAMPLING:
GR OR RP ELEVATION:

REMARKS: 2" discharge

3/9-21M3

OCWD E-13

6

SWN: 3S/9W-30P 1 6.18
WPFN: 75-21-16A
OID: Sparling 8643
USE: IRR ONLY

ALTA VISTA GOLF COURSE
OWNER: Irvin C. Chapman
ADDRESS: c/o MD Johnson Trust
777 Alta Vista, Placentia, CA 92670
PHONE: 675-7173
528-1185 - GOLF COURSE

524-2022 (10-22-86) 524-1591 13711 MARIN

DRILLED BY:
DATE DRILLED:
ADDRESS:
LOG ON FILE: No

EXACT WELL LOCATION: N side of Alta Vista, E/o Kraemer 200'; 50' W/o Jasmine

DEPTH: 438' DIA:
SPECIFIC DEPTH OF PERFORATIONS:
KIND OF PUMP: SPARLING #38089
METER NO.: 8643 (C&S) HP: 75
FREQ. OF SAMPLING:
GR OR RP ELEVATION:

REMARKS: HOT! IN VAULT (ASK FOR HERNADOR THE MECHANIC TO ASSIST YOU) A.M.'s ARE COOLER.
METER READING 9-2-88 667636

(4)

OCWD GC ANALYSIS FOR VOLATILE ORGANICS

3S/9W-21M1
STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTE FE WELL NO.
YORBA LINDA

DATE SAMPLED	4-26-90	4-26-90							
DATE ANALYZED	4-26-90	4-26-90							
SAMPLED BY	SD	SD							
EPA METHOD USED FOR ANALYSIS	601/602	601/602							
CONSTITUENTS (µg/L)									
Chloromethane	—	—							
Bromomethane	—	—							
Vinyl Chloride	—	—							
Chloroethane	—	—							
Methylene Chloride	—	—							
1,1 Dichloroethylene (DCE)	—	—							
1,1 Dichloroethane	—	—							
Chloroform	—	—							
Carbon Tetrachloride	—	—							
1,2-Dichloropropane	—	—							
Trichloroethylene (TCE)	—	—							
1,1,2- Trichloroethane	—	—							
Dibromochloromethane	—	—							
Tetrachloroethylene (PCE)	—	—							
Chlorobenzene	—	—							
1,2 Dichlorobenzene	—	—							
1,3 Dichlorobenzene	—	—							
1,4 Dichlorobenzene	—	—							
Trichlorofluoromethane	—	—							
t- 1,2- Dichloroethylene	—	—							
1,2 Dichloroethane	—	—							
1,1,1 Trichloroethane (TCA)	—	—							
Bromodichloromethane	—	—							
t- 1,3-Dichloropropene	—	—							
c- 1,3-Dichloropropene	—	—							
Benzene	—	—							
Bromoform	—	—							
1,1,2,2-Tetrachloroethane	—	—							
Toluene	—	—							
Ethylbenzene	—	—							
FREON 113	—	—							
EC @ 25°C (µmho/cm)	—	—							
TOC (mg/L)	—	—							

FIELD REMARKS: SD = Stacy Drinkwine
4/24/90 - Sample obtainable only from spigot East of pump base.

0.5 µg/L as reportable detection limit on all constituents listed on this page
TR - Trace constituent was seen but below reportable detection limit
N.D. - Not Detected
N.A. - Not Analyzed

OCWD GC ANALYSIS FOR VOLATILE ORGANICS

3S/9W-21M1
STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTA FE WELL NO.1
YORBA LINDA

DATE SAMPLED	4-26-90	4/26/90									
DATE ANALYZED	4-26-90	4/26/90									
SAMPLED BY	SD	SD									
EPA METHOD USED FOR ANALYSIS	601/602	601/602									
CONSTITUENTS (µg/L)											
Dichlorodifluoromethane											
2,2-Dichloropropane											
c-1,2-Dichloroethylene											
Bromochloromethane											
1,1-Dichloropropene											
Dibromomethane											
1,3- Dichloropropane											
1,2-Dibromoethane											
1,1,1,2-Tetrachloroethane											
m-xylene											
p-xylene											
o-xylene											
Styrene											
Isopropylbenzene											
1,2,3- Trichloropropane											
n-Propylbenzene											
Bromobenzene											
1,3,5-Trimethylbenzene											
2- Chlorotoluene											
4- Chlorotoluene											
tert-Butylbenzene											
1,2,4-Trimethylbenzene											
sec-Butylbenzene											
p-Isopropyltoluene											
n-Butylbenzene											
1,2-Dibromo-3-Chloropropane											
1,2,4-Trichlorobenzene											
Hexachlorobutadiene											
Naphthalene											
1,2,3-Trichlorobenzene											
EC @ 25°C (µmho/cm)											
TOC (mg/L)											

FIELD REMARKS:

µg/L as reportable detection limit on all constituents listed on this page
TR - Trace constituent was seen but below reportable detection limit
N.D. - Not Detected
N.A. - Not Analyzed

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Lab-21 (10-88)

OCWD GC ANALYSIS
LABORATORY REMARKS

3S/9W-21M1

STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTA FE
YORBA LINDA
WELL NO.1

ANALYST	DATE	COMMENTS
SF	4-26-90	601/602 – * Duplicate of Same Sampling

Lab-21 (10-88)

3S/9W-21M1
State Well Number

Other Sample Site Information:
YORBA LINDA
SANTA FE #1

OCWD GC ANALYSIS
FOR VOLATILE ORGANICS

Date Sampled	4-29-86	8-27-87	9-2-88				
Date Analyzed	4-29-86	8-28-87	9-6-88				
Sampled By	RS	SD	RS				
Constituent (ug/l)							
Methylene Chloride	-	-	-				
1,1-Dichloroethylene (DCE)	-	-	-				
1,1-Dichloroethane	-	-	-				
Chloroform	-	-	-				
Carbon Tetrachloride	-	-	-				
1,2-Dichloropropane	-	-	-				
Trichloroethylene (TCE)	-	-	-				
1,1,2-Trichloroethane	-	-	-				
Dibromochloromethane	-	-	-				
Tetrachloroethylene (PCE)	-	-	-				
Chlorobenzene	-	-	-				
Trichlorofluoromethane	-	-	-				
t-1,2-Dichloroethylene	-	-	-				
1,2-Dichloroethane	-	-	-				
1,1,1-Trichloroethane	-	-	-				
Bromodichloromethane	-	-	-				
t-1,3-Dichloropropene	-	-	-				
c-1,3-Dichloropropene	-	-	-				
Benzene	-	-	-				
Bromoform	-	-	-				
1,1,2,2-Tetrachloroethane	-	-	-				
Toluene	-	-	-				
Ethylbenzene	-	-	-				
EC @ 25° (umho/cm)	964	959	982				
TOC (mg/l)		0.7	0.9				

Remarks: RS-RICK SAMUEL SD-STACY PRINCWINE
SAMPLE OBTAINABLE ONLY FROM WELL

0.5 µg/L as reportable detection limit on all constituents except DCE.
0.2 µg/L as reportable detection limit on DCE.

LAB:GCform:REV 2/3/86

OCWD GC ANALYSIS FOR VOLATILE ORGANICS

3S/9W-21M2
STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTE FE WELL NO.2
YORBA LINDA

DATE SAMPLED	4/26/90					
DATE ANALYZED	4-26-90					
SAMPLED BY	SD					
EPA METHOD USED FOR ANALYSIS	601/602					
CONSTITUENTS (ug/L)						
Chloromethane	—					
Bromomethane	—					
Vinyl Chloride	—					
Chloroethane	—					
Methylene Chloride	—					
1,1 Dichloroethylene (DCE)	—					
1,1 Dichloroethane	—					
Chloroform	—					
Carbon Tetrachloride	—					
1,2-Dichloropropane	—					
Trichloroethylene (TCE)	—					
1,1,2- Trichloroethane	—					
Dibromochloromethane	—					
Tetrachloroethylene (PCE)	—					
Chlorobenzene	—					
1,2 Dichlorobenzene	—					
1,3 Dichlorobenzene	—					
1,4 Dichlorobenzene	—					
Trichlorofluoromethane	—					
t- 1,2- Dichloroethylene	—					
1,2 Dichloroethane	—					
1,1,1 Trichloroethane (TCA)	—					
Bromodichloromethane	—					
t- 1,3-Dichloropropene	—					
c- 1,3-Dichloropropene	—					
Benzene	—					
Bromoform	—					
1,1,2,2-Tetrachloroethane	—					
Toluene	—					
Ethylbenzene	—					
FREON 113	—					
EC @ 25°C (umho/cm)	—					
TOC (mg/L)	—					

FIELD REMARKS: SD = Stacey Drinkaine
4-24-90 Sample obtainable only from spigot 1' East of well

0.5 ug/L as reportable detection limit on all constituents listed on this page
TR - Trace constituent was seen but below reportable detection limit
N.D. - Not Detected
N.A. - Not Analyzed

OCWD GC ANALYSIS FOR VOLATILE ORGANICS

3S/9W-21M2
STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTA FE WELL NO.2
YORBA LINDA

DATE SAMPLED	4-26-90								
DATE ANALYZED	4-26-90								
SAMPLED BY	SD								
EPA METHOD USED FOR ANALYSIS	601/602								
CONSTITUENTS (ug/L)									
Dichlorodifluoromethane									
2,2-Dichloropropane									
c-1,2-Dichloroethylene									
Bromochloromethane									
1,1-Dichloropropene									
Dibromomethane									
1,3- Dichloropropane									
1,2-Dibromoethane									
1,1,1,2-Tetrachloroethane									
m-xylene									
p-xylene									
o-xylene									
Styrene									
Isopropylbenzene									
1,2,3- Trichloropropane									
n-Propylbenzene									
Bromobenzene									
1,3,5-Trimethylbenzene									
2- Chlorotoluene									
4- Chlorotoluene									
tert-Butylbenzene									
1,2,4-Trimethylbenzene									
sec-Butylbenzene									
p-Isopropyltoluene									
n-Butylbenzene									
1,2-Dibromo-3-Chloropropane									
1,2,4-Trichlorobenzene									
Hexachlorobutadiene									
Napnthalene									
1,2,3-Trichlorobenzene									
EC @ 25°C (umho/cm)									
TOC (mg/L)									

FIELD REMARKS:

ug/L as reportable detection limit on all constituents listed on this page
TR - Trace constituent was seen but below reportable detection limit
N.D. - Not Detected
N.A. - Not Analyzed

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Lab-21 (10-88)

OCWD GC ANALYSIS
LABORATORY REMARKS

3S/9W-21M2

STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTA FE
YORBA LINDA
WELL NO.2

ANALYST	DATE	COMMENTS
JF	4-26-90	601/602 —

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3S/9W-21M2
State Well Number

Other Sample Site Information:

YORBA LINDA
SANTA FE #2

OCWD GC ANALYSIS
FOR VOLATILE ORGANICS

Date Sampled	4-29-86	8-27-87	8-24-88	8-24-88			
Date Analyzed	4-29-86	8-28-87	8-25-88	8-25-88			
Sampled By	RS	SD	RS	RS			
Constituent (µg/l)				*			
Methylene Chloride	-	-	-	-			
1,1-Dichloroethylene (DCE)	-	-	-	-			
1,1-Dichloroethane	-	-	-	-			
Chloroform	-	-	-	-			
Carbon Tetrachloride	-	-	-	-			
1,2-Dichloropropane	-	-	-	-			
Trichloroethylene (TCE)	-	-	-	-			
1,1,2-Trichloroethane	-	-	-	-			
Dibromochloromethane	-	-	-	-			
Tetrachloroethylene (PCE)	-	-	-	-			
Chlorobenzene	-	-	-	-			
Trichlorofluoromethane	-	-	-	-			
t-1,2-Dichloroethylene	-	-	-	-			
1,2-Dichloroethane	-	-	-	-			
1,1,1-Trichloroethane	-	-	-	-			
Bromodichloromethane	-	-	-	-			
t-1,3-Dichloropropene	-	-	-	-			
c-1,3-Dichloropropene	-	-	-	-			
Benzene	-	-	-	-			
Bromoform	-	-	-	-			
1,1,2,2-Tetrachloroethane	-	-	-	-			
Toluene	-	-	-	-			
Ethylbenzene	-	-	-	-			
EC @ 25° (µmho/cm)	975	959	945	-			
TOC (mg/l)		0.6	0.6	-			

Remarks: RS-RICK SAMUEL SD-STACY DRINKWINE * recheck of same sampling
SAMPLE OBTAINABLE ONLY FROM WELL.

0.5 µg/L as reportable detection limit on all constituents except DCE.
0.2 µg/L as reportable detection limit on DCE.

LAB:GCform:REV 2/3/86

OCWD LAB-21

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RETAIN NOV / 1988

OCWD GC ANALYSIS FOR VOLATILE ORGANICS

3S/9W-21M3
STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTE FE WELL NO.3
YORBA LINDA

DATE SAMPLED	4-26-90	4-26-90					
DATE ANALYZED	4-26-90	4-26-90					
SAMPLED BY	SD	SD					
EPA METHOD USED FOR ANALYSIS	601/602	601/602					
CONSTITUENTS (ug/L)		*					
Chloromethane	—	—					
Bromomethane	—	—					
Vinyl Chloride	—	—					
Chloroethane	—	—					
Methylene Chloride	—	—					
1,1 Dichloroethylene (DCE)	—	—					
1,1 Dichloroethane	—	—					
Chloroform	—	—					
Carbon Tetrachloride	—	—					
1,2-Dichloropropane	—	—					
Trichloroethylene (TCE)	—	—					
1,1,2- Trichloroethane	—	—					
Dibromochloromethane	—	—					
Tetrachloroethylene (PCE)	—	—					
Chlorobenzene	—	—					
1,2 Dichlorobenzene	—	—					
1,3 Dichlorobenzene	—	—					
1,4 Dichlorobenzene	—	—					
Trichlorofluoromethane	—	—					
t- 1,2- Dichloroethylene	—	—					
1,2 Dichloroethane	—	—					
1,1,1 Trichloroethane (TCA)	—	—					
Bromodichloromethane	—	—					
t- 1,3-Dichloropropene	—	—					
c- 1,3-Dichloropropene	—	—					
Benzene	—	—					
Bromoform	—	—					
1,1,2,2-Tetrachloroethane	—	—					
Toluene	—	—					
Ethylbenzene	—	—					
FREON 113	—	—					
EC @ 25°C (umho/cm)	—	—					
TOC (mg/L)	—	—					

FIELD REMARKS: SD - Stacey Drinkwine
4-26-90 Sample obtained grey from spigot 1' Down stream from well

0.5 ug/L as reportable detection limit on all constituents listed on this page
TR - Trace constituent was seen but below reportable detection limit
N.D. - Not Detected
N.A. - Not Analyzed

OCWD GC ANALYSIS FOR VOLATILE ORGANICS

3S/9W-21M3
STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTA FE WELL NO.3
YORBA LINDA

DATE SAMPLED	4-26-90	4-26-90								
DATE ANALYZED	4-27-90	4-27-90								
SAMPLED BY	SV	SV								
EPA METHOD USED FOR ANALYSIS	601/602	601/602								
CONSTITUENTS (ug/L)										
Dichlorodifluoromethane										
2,2-Dichloropropane										
c-1,2-Dichloroethylene										
Bromochloromethane										
1,1-Dichloropropene										
Dibromomethane										
1,3- Dichloropropane										
1,2-Dibromoethane										
1,1,1,2-Tetrachloroethane										
m-xylene										
p-xylene										
o-xylene										
Styrene										
Isopropylbenzene										
1,2,3- Trichloropropane										
n-Propylbenzene										
Bromobenzene										
1,3,5-Trimethylbenzene										
2- Chlorotoluene										
4- Chlorotoluene										
tert-Butylbenzene										
1,2,4-Trimethylbenzene										
sec-Butylbenzene										
p-Isopropyltoluene										
n-Butylbenzene										
1,2-Dibromo-3-Chloropropane										
1,2,4-Trichlorobenzene										
Hexachlorobutadiene										
Naphthalene										
1,2,3-Trichlorobenzene										
EC @ 25°C (umho/cm)										
TOC (mg/L)										

FIELD REMARKS:

ug/L as reportable detection limit on all constituents listed on this page
TR - Trace constituent was seen but below reportable detection limit
N.D. - Not Detected
N.A. - Not Analyzed

OCWD GC ANALYSIS
LABORATORY REMARKS

3S/9W-21M3

STATE WELL NUMBER

SAMPLE SITE INFORMATION:
SANTA FE
YORBA LINDA
WELL NO.3

ANALYST	DATE	COMMENTS
SF	4-26-90	601/602 — * Duplicate of same sampling

Lab-21 (10-88) 15

35/9W-21M3
State Well Number

Other Sample Site Information:

YORBA LINDA
SANTA FE #3

OCWD GC ANALYSIS
FOR VOLATILE ORGANICS

Date Sampled	4-29-86	8-27-87	8-24-88	8-24-88			
Date Analyzed	4-29-86	8-28-87	8-25-88	8-29-88			
Sampled By	RS	SD	RS	RS			
Constituent (µg/l)				*			
Methylene Chloride	-	-	-	-			
1,1-Dichloroethylene (DCE)	-	-	-	-			
1,1-Dichloroethane	-	-	-	-			
Chloroform	-	-	-	-			
Carbon Tetrachloride	-	-	-	-			
1,2-Dichloropropane	-	-	-	-			
Trichloroethylene (TCE)	-	-	-	-			
1,1,2-Trichloroethane	-	-	-	-			
Dibromochloromethane	-	-	-	-			
Tetrachloroethylene (PCE)	-	-	-	-			
Chlorobenzene	-	-	-	-			
Vinyl Chloride	.	.	TRACE	-			
Trichlorofluoromethane	-	-	TRACE	-			
t-1,2-Dichloroethylene	-	-	-	-			
1,2-Dichloroethane	-	-	-	-			
1,1,1-Trichloroethane	-	-	-	-			
Bromodichloromethane	-	-	-	-			
t-1,3-Dichloropropene	-	-	-	-			
c-1,3-Dichloropropene	-	-	-	-			
Benzene	-	-	-	-			
Bromoform	-	-	-	-			
1,1,2,2-Tetrachloroethane	-	-	-	-			
Toluene	-	-	-	-			
Ethylbenzene	-	-	-	-			
EC @ 25° (µmho/cm)	1643	1510	1441	-			
TOC (mg/l)		1.1	1.0	-			

Remarks: RS - RICK SAMUEL SD - STACY DRINKWINE *recheck of same sampling
SAMPLE OBTAINABLE ONLY FROM WELL
8-25-88 Unknown peak on PID at r.t. of 7.431. For TCE= HALL/PID : 17.504/17.442.
8-29-88 Unknown peak on PID at r.t. of 7.462. For TCE= HALL/PID : 17.521/17.458

0.5 µg/L as reportable detection limit on all constituents except DCE.
0.2 µg/L as reportable detection limit on DCE.

LAB:GCform:REV 2/3/86
OCWD LAB-21

35/9W-21M4
State Well Number

Other Sample Site Information:
YORBA LINDA
SANTA FE #4

OCWD GC ANALYSIS
FOR VOLATILE ORGANICS

Date Sampled	4-29-86	8-27-87					
Date Analyzed	4-29-86	8-28-87					
Sampled By	RS	SD					
Constituent (µg/l)							
Methylene Chloride	-	-					
1,1-Dichloroethylene (DCE)	-	-					
1,1-Dichloroethane	-	-					
Chloroform	-	-					
Carbon Tetrachloride	-	-					
1,2-Dichloropropane	-	-					
Trichloroethylene (TCE)	-	-					
1,1,2-Trichloroethane	-	-					
Dibromochloromethane	-	-					
Tetrachloroethylene (PCE)	-	-					
Chlorobenzene	-	-					
Trichlorofluoromethane	-	-					
t-1,2-Dichloroethylene	-	-					
1,2-Dichloroethane	-	-					
1,1,1-Trichloroethane	-	-					
Bromodichloromethane	-	-					
t-1,3-Dichloropropene	-	-					
c-1,3-Dichloropropene	-	-					
Benzene	-	-					
Bromoform	-	-					
1,1,2,2-Tetrachloroethane	-	-					
Toluene	-	-					
Ethylbenzene	-	-					
EC @ 25° (µmho/cm)	1369	1683					
TOC (mg/l)		1.6					

Remarks: RS-RICK SAMUEL SD-STACY DRINKWINE
SAMPLE OBTAINABLE ONLY FROM WELL

0.5 µg/L as reportable detection limit on all constituents except DCE.
0.2 µg/L as reportable detection limit on DCE.

LAB:GCform:REV 2/3/86

35/9W-30P1
State Well Number

Other Sample Site Information:

ALTA VISTA GOLF COURSE PLACENTIA

OCWD GC ANALYSIS
FOR VOLATILE ORGANICS

Date Sampled	4-29-86	9-29-87	9-29-87	9-2-88	9-2-88		
Date Analyzed	4-29-86	9-30-87	9-30-87	9-6-88	9-6-88		
Sampled By	RS	RS	RS	RS	RS		
Constituent (µg/l)			*		*		
Methylene Chloride	-	-	-	-	-		
1,1-Dichloroethylene (DCE)	-	-	-	-	-		
1,1-Dichloroethane	-	-	-	-	-		
Chloroform	-	-	-	-	-		
Carbon Tetrachloride	-	-	-	-	-		
1,2-Dichloropropane	-	-	-	-	-		
Trichloroethylene (TCE)	-	-	-	-	-		
1,1,2-Trichloroethane	-	-	-	-	-		
Dibromochloromethane	-	-	-	-	-		
Tetrachloroethylene (PCE)	-	-	-	-	-		
Chlorobenzene	-	-	-	-	-		
Trichlorofluoromethane	-	-	-	-	-		
t-1,2-Dichloroethylene	-	-	-	-	-		
1,2-Dichloroethane	-	-	-	-	-		
1,1,1-Trichloroethane	-	-	-	-	-		
Bromodichloromethane	-	-	-	-	-		
t-1,3-Dichloropropene	-	-	-	-	-		
c-1,3-Dichloropropene	-	-	-	-	-		
Benzene	-	-	-	-	-		
Bromoform	-	-	-	-	-		
1,1,2,2-Tetrachloroethane	-	-	-	-	-		
Toluene	-	-	-	-	-		
Ethylbenzene	-	-	-	-	-		
EC @ 25° (µmho/cm)	986	998	-	934	-		
TOC (mg/l)		1.1		0.8	-		

Remarks: RS-RICK SAMUEL
* recheck of same sampling

0.5 µg/L as reportable detection limit on all constituents except DCE.
0.2 µg/L as reportable detection limit on DCE.

LAB:GCform:REV 2/3/86

OCWD LAB-21 18

FILMED

WATER ANALYSIS DATA--OCWD

Date Collected/Hour		04/26/90	1315	Sample location and description:	
Date Received/Hour		04/26/90			
EC @25°C (µmho/cm)		940			
TDS (mg/L)		534		SANTA FE WELL #1	
pH/Temperature (°C)		7.7			
CONSTITUENTS		mg/L(ppm)	µg/L(ppb)	YORBA LINDA 3S/09W-21M2	meq/L
Na+		175			(7.612)
K+		2.7			(0.069)
Mg^{+2}		16		Sampled by:	(1.317)
Ca^{+2}		31			(1.547)
Fe	>SMCL		1700	STACY DRINKWINE	(0.091)
Mn	>SMCL		82		(0.006)
Ag			<0.1		
Al			51	Report to:	(0.006)
As			<5.0		
Ba			50	STACY DRINKWINE	(0.001)
Cd			<0.1		
Cr			24		(0.001)
Cu			<1.0	Prepared by:	
Hg			<0.5		
Pb			<1.0	L. LAGOS	
Se			<5.0		
Zn			850	Reviewed by:	(0.026)
NH3-N					
Org-N					
TKN					
Total Cations, meq/L				Remarks:	(10.676)
OH- as CaCO3		<1.0			
$CO3^{-2}$ as CaCO3		<1.0			
HCO3- as CaCO3		343			(6.855)
Tot. Alk. as CaCO3		343			(6.855)
Hardness as CaCO3		143	(calc.)		
Carbonate Hardness		143			
Non-Carbonate Hrd.					
F-					
Cl-		67			(1.890)
NO2--N					
Br-					
NO3--N		<0.1		NO3=<0.4	
PO4-3-P					
$SO4^{-2}$		83			(1.728)
S^{-2}					
B					
SiO2					
Total Anions, meq/L					(10.473)
EC x 0.01					(9.40)
% Difference, Cations - Anions				+	-1.92%
COD				Hardness as CaCO3	
TOC		0.7		(titration):	
MBAS (Surfactants)					
Suspended Solids					
Set. Solids (mL/L)					
Turbidity (NTU)					
Color (Clr. Units)		6			
Odor(TON)					

WATER ANALYSIS DATA--OCWD

Date Collected/Hour		04/26/90	1300	Sample location and description:	
Date Received/Hour		04/26/90			
EC @25°C (µmho/cm)		989			
TDS (mg/L)		576		SANTA FE	
pH/Temperature (°C)	—	7.6		WELL #2	
CONSTITUENTS		mg/L(ppm)	µg/L(ppb)	YORBA LINDA 3S/09W-21M1	meq/L
Na+		169			(7.351)
K+		2.3			(0.059)
Mg+²		20		Sampled by:	(1.646)
Ca+²		38			(1.896)
Fe			240	STACY DRINKWINE	(0.013)
Mn	>SMCL		120		(0.009)
Ag			<0.1		
Al			14	Report to:	(0.002)
As			<5.0		
Ba			52	STACY DRINKWINE	(0.001)
Cd			<0.1		
Cr			1.5		(0.000)
Cu			<1.0	Prepared by:	
Hg			<0.5		
Pb			<1.0	L. LAGOS	
Se			<5.0		
Zn			<50	Reviewed by:	
NH3-N				Jeremy Dawes	
Org-N					
TKN					
Total Cations, meq/L				Remarks:	(10.976)
OH- as CaCO3		<1.0			
CO3-² as CaCO3		<1.0			
HCO3- as CaCO3		330			(6.595)
Tot. Alk. as CaCO3		330			(6.595)
Hardness as CaCO3		177	(calc.)		
Carbonate Hardness		177			
Non-Carbonate Hrd.					
F-					
Cl-		88			(2.482)
NO2--N					
Br-					
NO3--N		2.7		NO3= 12.0	(0.193)
PO4-3-P					
SO4-²		85			(1.770)
S-²					
B					
SiO2					
Total Anions, meq/L					(11.040)
EC x 0.01					(9.89)
% Difference, Cations - Anions				-	-0.58%
COD				Hardness as CaCO3	
TOC		0.8		(titration):	
MBAS (Surfactants)					
Suspended Solids					
Set. Solids (mL/L)					
Turbidity (NTU)					
Color (Clr. Units)		18	>SMCL		
Odor(TON)					

WATER ANALYSIS DATA--OCWD

Date Collected/Hour		04/26/90	1325	Sample location and description:	
Date Received/Hour		04/26/90			
EC @25°C (µmho/cm)		1490			
TDS (mg/L)		966		SANTA FE	
pH/Temperature (°C)		7.4		WELL #3	
CONSTITUENTS		mg/L(ppm)	µg/L(ppb)	YORBA LINDA 3S/09W-21M3	meq/L
Na+		76			(3.306)
K+		1.4			(0.036)
Mg+²		38		Sampled by:	(3.128)
Ca+²		180			(8.982)
Fe	>SMCL		4800	STACY DRINKWINE	(0.258)
Mn			12		(0.001)
Ag			<0.1		
Al			24	Report to:	(0.003)
As			<5.0		
Ba			130	STACY DRINKWINE	(0.002)
Cd			<0.1		
Cr			10		(0.001)
Cu			<1.0	Prepared by:	
Hg			<0.5		
Pb			<1.0	L. LAGOS	
Se			<5.0		
Zn			520	Reviewed by:	(0.016)
NH3-N				Jeremy Daws	
Org-N					
TKN					
Total Cations, meq/L				Remarks:	(15.731)
OH- as CaCO3		<1.0			
CO3-² as CaCO3		<1.0			
HCO3- as CaCO3		258			(5.156)
Tot. Alk. as CaCO3		258			(5.156)
Hardness as CaCO3		606	(calc.)		
Carbonate Hardness		258			
Non-Carbonate Hrd.		348			
F-					
Cl-		202			(5.698)
NO2--N					
Br-					
NO3--N	>MCL	19		NO3= 84.1	(1.356)
PO4-3-P					
SO4-²		172			(3.581)
S-²					
B					
SiO2					
Total Anions, meq/L					(15.791)
EC x 0.01					(14.90)
% Difference, Cations - Anions					-0.38%
COD				Hardness as CaCO3 (titration):	
TOC		1.1			
MBAS (Surfactants)					
Suspended Solids					
Set. Solids (mL/L)					
Turbidity (NTU)					
Color (Clr. Units)		4			
Odor(TON)					

[redacted] DEPTH 311 FT. ALTITUDE OF LSD [redacted] FT. MEASURED BY [redacted]
1978. RECORDS AVAILABLE 1969 TO CURRENT YEAR.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

DATE	WATER LEVEL	MS	DATE	WATER LEVEL	MS	DATE	WATER LEVEL	MS	DATE	WATER LEVEL	MS
NOV 03, 1981	162.73	S	FEB 09, 1983	160.46	S	MAY 23, 1984	153.62	S	AUG 22, 1985	154.78	S
JAN 25, 1982	160.16	S	MAY 10, 1983	156.60	S	SEP 07, 1984	155.23	S	NOV 04, 1985	154.34	S
APR 28, 1982	158.87	S	AUG 24, 1983	157.35	S	NOV 02, 1984	154.83	S	FEB 11, 1986		
JUL 28, 1982	159.14	S	NOV 04, 1983	157.22	S	FEB 13, 1985	153.45	S	MAY 05, 1986		
NOV 03, 1982	160.30	S	FEB 21, 1984	153.99	S	MAY 07, 1985	152.91	S	SEPT 04, 1986		
									OCT. 31, 1986	154.80	S
									FEB 17 1987	154.90	S
									MAY 07, 1987	191.40	S
									AUG 10, 1987	198.70	S
									OCT 31, 1989	162.40	
									FEB 1991	167.60	

Property lo

HIGHEST 148.20 APR 27, 1970 LOWEST 182.90 NOV 01, 1977

LOCAL NUMBER 003S009W21M05S

SITE NUMBER 333339117500701

1,6 ABOUT 0.4 MI NORTH OF YORBA LINDA BLVD AND 500 FT EAST OF PROSPECT AVE IN YORBA LINDA. DOMESTIC WATER-TABLE WELL. DIAM 6 IN, DEPTH 300 FT, PERFORATED 117-137 FT. ALTITUDE OF LSD 356 FT. MEASURED BY USGS STARTING AUGUST 1978. RECORDS AVAILABLE 1974 TO CURRENT YEAR.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

DATE	WATER LEVEL	MS	DATE	WATER LEVEL	MS	DATE	WATER LEVEL	MS	DATE	WATER LEVEL	MS
OCT 24, 1974	72.70		AUG 01, 1979	69.98	S	APR 28, 1982	66.88	S	NOV 02, 1984	66.00	S
JAN 06, 1975	70.80		NOV 13, 1979	~~0.00~~	P	JUL 28, 1982	67.04	S	FEB 13, 1985	65.94	S
APR 28, 1975	72.30		FEB 06, 1980	69.49	S	NOV 03, 1982	67.24	S	MAY 07, 1985	66.15	S
OCT 28, 1975	70.80		JUN 11, 1980	68.90	SR	FEB 09, 1983	67.09	S	AUG 22, 1985	66.56	S
MAR 10, 1976	73.80		AUG 25, 1980	69.13	S	MAY 10, 1983	65.99	S	NOV 04, 1985	66.62	S
MAY 27, 1976	64.10		OCT 29, 1980	67.18	S	AUG 24, 1983	65.50	S	FEB 11, 1986	67.05	S
OCT 27, 1976	74.30		FEB 04, 1981	66.79	S	NOV 04, 1983	65.43	S	MAY 05, 1986	66.56	S
MAR 10, 1977	74.67		MAY 07, 1981	66.75	S	FEB 21, 1984	65.19	S	SEP 04, 1986	66.36	S
AUG 29, 1978	72.40		NOV 03, 1981	67.73	S	MAY 23, 1984	65.40	S	OCT 31, 1986	66.30	S
APR 30, 1979	70.31		JAN 25, 1982	67.27	S	SEP 07, 1984	65.78	S	FEB 19 1987	68.8	
									MAY 11, 1987	69.80	S
									AUG 06, 1987	75.10	S
									OCT 31, 1989	67.9	

HIGHEST ~~64.10 May 27, 1976~~ ~~0.00 NOV 13, 1979~~ LOWEST 74.67 MAR 10, 1977

22

ORANGE COUNTY WATER DISTRICT
WATER LEVEL INFORMATION

Station ID 433 Station Name W-432 SWN 35/9W-21M05
Monitoring Program ID 40 Name: Key Well
RP Elevation (Feet MSL) 368'
RP Description

Sampling Method ID	1	Name	ELECT	Depth Held	
Date	05/04/92	Time	12 : 30	Depth Cut	
RP to WL	72.4			RP to GS	
WL Elevation				Measured By	[illegible]
WL Units ID	2	Name	FEET	Entered By	LM
WL Status ID	2	Name	STATIC	Entered Date	5/20/92
Notes:				Checked By	[illegible]
				Checked Date	10/11/92

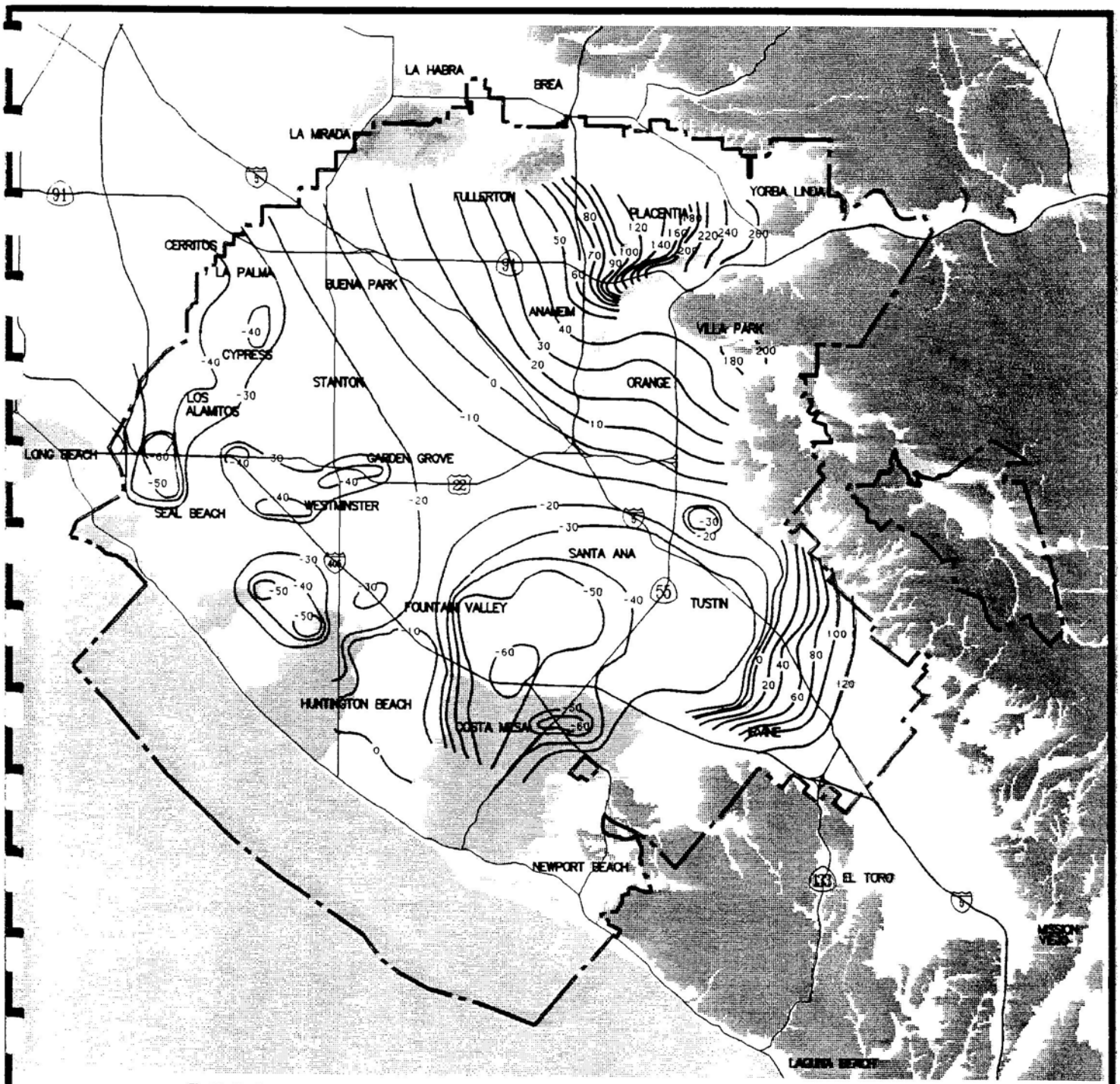
Sampling Method ID	1	Name	ELEC	Depth Held	
Date	06/01/92	Time	15 : 15	Depth Cut	
RP to WL	72.3			RP to GS	
WL Elevation				Measured By	[illegible]
WL Units ID	2	Name	FEET	Entered By	
WL Status ID	2	Name	STATIC	Entered Date	/ /
Notes:				Checked By	
				Checked Date	/ /

Sampling Method ID		Name		Depth Held	
Date	/ /	Time	:	Depth Cut	
RP to WL				RP to GS	
WL Elevation				Measured By	
WL Units ID		Name		Entered By	
WL Status ID		Name		Entered Date	/ /
Notes:				Checked By	
				Checked Date	/ /

Sampling Method ID		Name		Depth Held	
Date	/ /	Time	:	Depth Cut	
RP to WL				RP to GS	
WL Elevation				Measured By	
WL Units ID		Name		Entered By	
WL Status ID		Name		Entered Date	/ /
Notes:				Checked By	
				Checked Date	/ /

Sampling Method ID		Name		Depth Held	
Date	/ /	Time	:	Depth Cut	
RP to WL				RP to GS	
WL Elevation				Measured By	
WL Units ID		Name		Entered By	
WL Status ID		Name		Entered Date	/ /
Notes:				Checked By	
				Checked Date	/ /

12/02/91



EXPLANATION

GROUNDWATER ELEVATION CONTOURS IN FEET ABOVE MEAN SEA LEVEL

OCWD BOUNDARY

IMPERMEABLE FORMATIONS

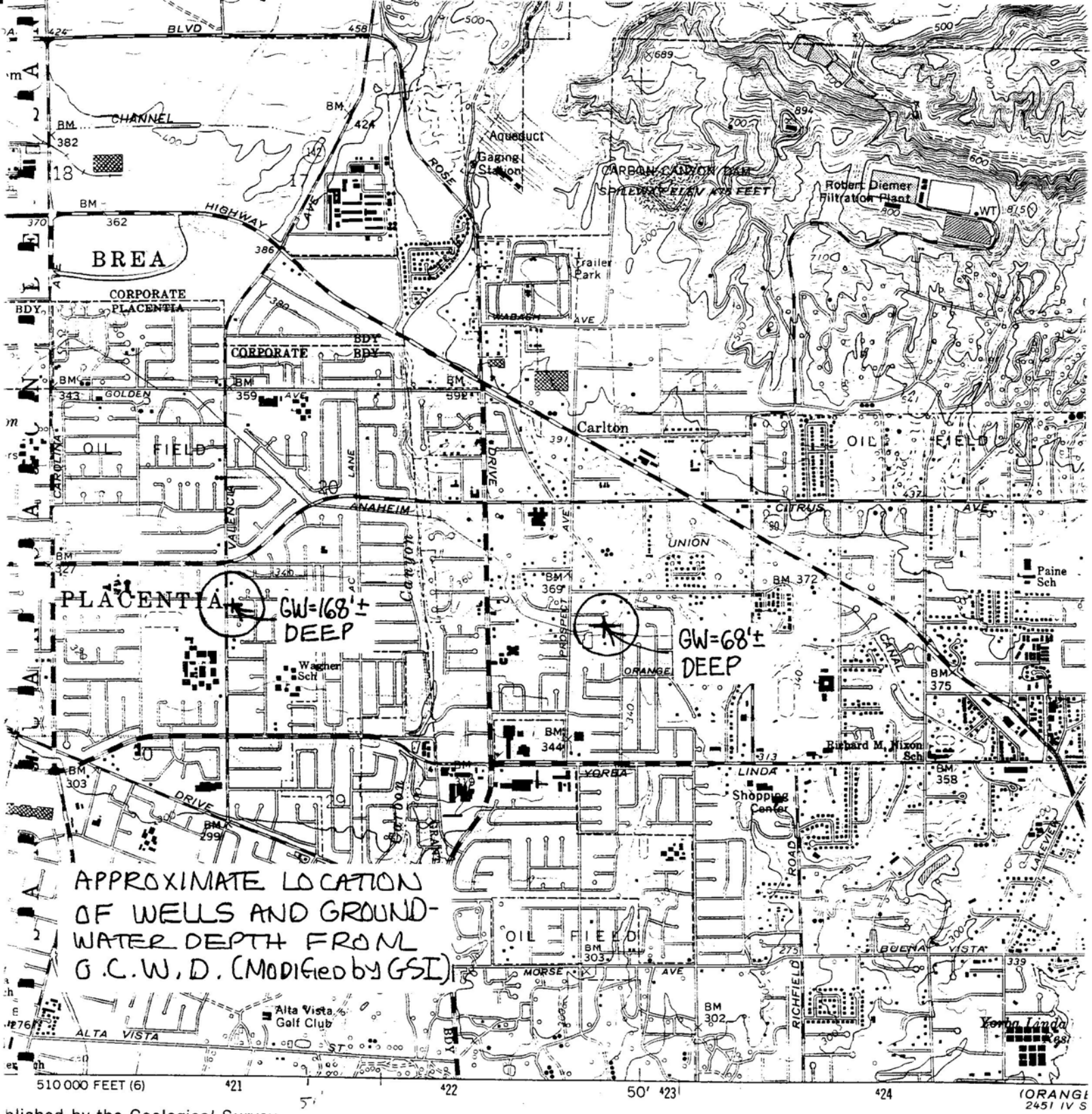
MESAS

Scale

0 1 2 3 4 5 6 7 8 9 10 kilometers

0 1 2 3 4 5 6 miles

November 1991
Groundwater Contour Map



blished by the Geological Survey
L Angeles County, and Orange County
ic ethods from aerial
eld checked 1964
0-foot grid ticks based on
zo s 6, 7 and 5
rs Mercator grid ticks,
27 orth American Datum
th American Datum 1983
eter north and 84 meters
er cks
ic nly landmark buildings are shown
blue pattern is
on
n shown because of insufficient data
by rivate surveys
s ected fence and field lines where
tographs. This information is unchecked

GN MN
0°27' 8 MILS
14° 249 MILS
UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24

1000 0 1000 2000 3000

CONTOUR INTERVA
DOTTED LINES REPRESENT
NATIONAL GEODETIC VERTICA

THIS MAP COMPLIES WITH NATIONAL
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, CO
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND



AREA	SITE	REGULATORY AGENCY LIST
1	SHELL WESTERN E & P PROPERTY 2761 VALENCIA AVENUE	RWQCB UST LIST
2	BECKMAN INSTRUMENTS, INC. 3300 BIRCH STREET	RWQCB UST LIST, AND CORTESE LIST
3	SOUTHERN CALIFORNIA GAS COMPANY 2191 EAST BIRCH STREET	RWQCB UST LIST
4	TEXACO SERVICE STATION 3300 EAST IMPERIAL HIGHWAY	RWQCB UST LIST, AND CORTESE LIST
5	BREA CHEMICALS, INC. NORTHWEST OF KRAEMER BOULEVARD AND IMPERIAL HIGHWAY	DHS ASPIS LIST
6	UNION CHEMICALS DIVISION 2001 EAST IMPERIAL HIGHWAY	DHS ASPIS LIST
7	CYNAMID DISTRIBUTION CENTER 7660 ENTERPRISE	DHS ASPIS LIST
8	INDUSTRIAL PARK NO. 1 IMPERIAL HIGHWAY AND VALENCIA AVENUE	DHS ASPIS LIST
9	ORANGE COUNTY OLINDA LANDFILL	RWQCB SWAT LIST
10	ORANGE COUNTY OLINDA-ALPHA LANDFILL	RWQCB SWAT LIST

ONLY FILES IN OFFICE

0 2,000 4,000 FEET

SCALE

REFERENCE: 7.5 MINUTE U.S.G.S. TOPOGRAPHIC MAP OF YORBA LINDA, CALIFORNIA DATED 1964 AND PHOTOREVISED 1981.

FIGURE 5.1

FACILITIES WITH KNOWN CONTAMINATION

FORMER UNOCAL PROPERTY
SATURN BUSINESS PARK
BREA, CALIFORNIA

ENVIRONMENTAL SOLUTIONS, INC.

ATE OF CALIFORNIA
PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
ANTA ANA REGION
)10 IOWA AVENUE, SUITE 100
RIVERSIDE, CA 92507-2409
PHONE: (714) 782-4130

TELECOPY TRANSMITTAL MEMO

DATE: July 17, 1992

TO: H. D. "SKIP" POUNCEY

FROM: DENNIS MERKLIN

SECTION: GROUNDWATER INVESTIGATION

TELECOPIER NUMBER: (714) [redacted]-647-0745

SUBJECT: ACTIVE SITE UNDER INVESTIGATION NEAR YOUR SITE BEING INVESTIGATED

NUMBER OF PAGES, INCLUDING TRANSMITTAL MEMO: 2

COMMENTS: As I said, the other agencies may have files on these projects. The only ones we have files on are the 2 landfills (#'s 9 & 10 on list plus this Saturn Bus Park Project from which this page came from. KAMRON SAREMI is the project staff person. Hope this helps.

If there are any problems receiving this telecopy, or if all pages are not received, please contact the sender at (714) 782-4130.

APPENDIX E

MAP AND AERIAL PHOTO REFERENCE

AND SUMMARY

3 Pages

APPENDIX E

MAP AND AERIAL PHOTO REFERENCE AND SUMMARY

Whittier College, Fairchild Collection

Date	Map/Photo I.D., Summary	Scale
08/1927	**C - 113, 857-858** -- Oil field operations in progress, main "oil sump" reservoir present filling entire canyon, 2 AG tanks on central ridge top, very similar to 1938	1" = 1500"±
06-23-28	**C - 237, F-25, F-26** -- Similar	1" = 800' ±
04-14-33	**C - 2580 22,23** -- Similar	1" = 1200'±
10-24-34	**C - 3115 95,96,97** -- Similar	1" = 600' ±
08-16-36	**C - 4131 48, 49** -- Similar	1" = 1600'±
10/1939	**C - 5925 126, 127 or 134, 135** -- Similar	1" = 2000'±

Orange County Archives, Santa Ana, California

07-11-38	**Agricultural Adjustment Administration AXK 65-70** -- Main oil sump reservoir in swale area filled w/ oil, 3 additional sumps upcanyon and 1 sump in triangle area -- Unnamed sump on 500 ft ridge, 2 sumps to north offsite -- 2 AG tanks in swale area -- 2 AG tanks north of Carbon Canyon Rd, 2 south of Carbon Canyon Road -- Oil field production and access road minor -- Ranch (?) with trees, buildings, possible A.G. tanks @ NE & SE corner of Brea-Olinda and Valencia -- Many AG Tanks in surrounding areas, especially to north of Brea Olinda Blvd. -- Surrounding oil operations to the north and west especially north of Brea-Olinda Blvd., primarily agriculture to the south -- Carbon Canyon drainage natural -- Industrial (?)/Agricultural complex along east property line in Carbon Canyon -- Grading of Brea-Olinda Landfill in Progress	1" = 600' ±
1949	**USGS 7½ Minute Yorba Linda Quadrangle** -- Main "Oil sump" indicated -- 2 AG tanks on central ridgetop, south of Carbon Canyon Road -- Minor access roads and oil field production, 12± wells north of Carbon Canyon Road, 26± wells to the south of Carbon Canyon Road -- Carbon Canyon drainage natural	1" = 2000'±

Orange County Archives, Santa Ana, California, Continued

Date	Map/Photo I.D., Summary	Scale
07-15-55	**Fairchild Aerial Surveys** **Flight 21960 frame, 4-150** -- Main oil sump reservoir in swale and triangle areas contain dark tailings -- Oil sump on 500 ridge looks dry -- Only 1 AG tank in swale area is visible -- 2 AG tanks on central ridgetop, still present -- 2 AG tanks north of Carbon Canyon Road still present -- Minor access roads and oil field production, similar to 1938/49 -- Ranch (?) @ Brea-Olinda and Valencia, NE & SE corner still present -- Grading on northeast ridgetop offsite initiated -- Carbon Canyon drainage natural; no dam -- Industrial (?)/agricultural complex along east property line in Carbon Canyon, gone -- Industrial complex emerges south of property between Rose and Valencia alignment	1" = 550'±
3-25-59	**Aerial Mapping Company, Flight 261,** **3-16-133 & 3-16-135** -- Main oil sump reservoir and triangle, contain lighter color tailings, becoming progressively masked over -- Major pipeline easement recently constructed; cuts off south end of oil sump reservoir -- 2 AG tanks in swale area, still present -- 2 AG tanks on central ridgetop, still present -- 2 AG tanks north of Carbon Canyon Road, still present -- Oil field access roads, exploration and production, increased progress -- Ranch (?) @ Brea-Olinda and Valencia, NE & SE corner still present. -- Grading on northeast ridgetop offsite, in progress -- Carbon Canyon Drainage Natural, no dam	1" = 500'±
1964	**Orange County Archives (3 SE)** -- Oil sumps in reservoir and triangle becoming progressively more masked over -- Rose Drive constructed, cuts through head of main oil sump reservoir, Ranch (?) is gone. -- 2 AG tanks in swale area, still present -- 2 AG tanks on central ridgetop, still present -- 2 AG tanks north of Carbon Canyon Road, still present -- Oil field access roads, exploration and production in progress -- Agricultural use of southern portion, east of Rose Drive initiated w/ row crops -- Carbon Canyon Dam under construction, park site	1" = 400'±

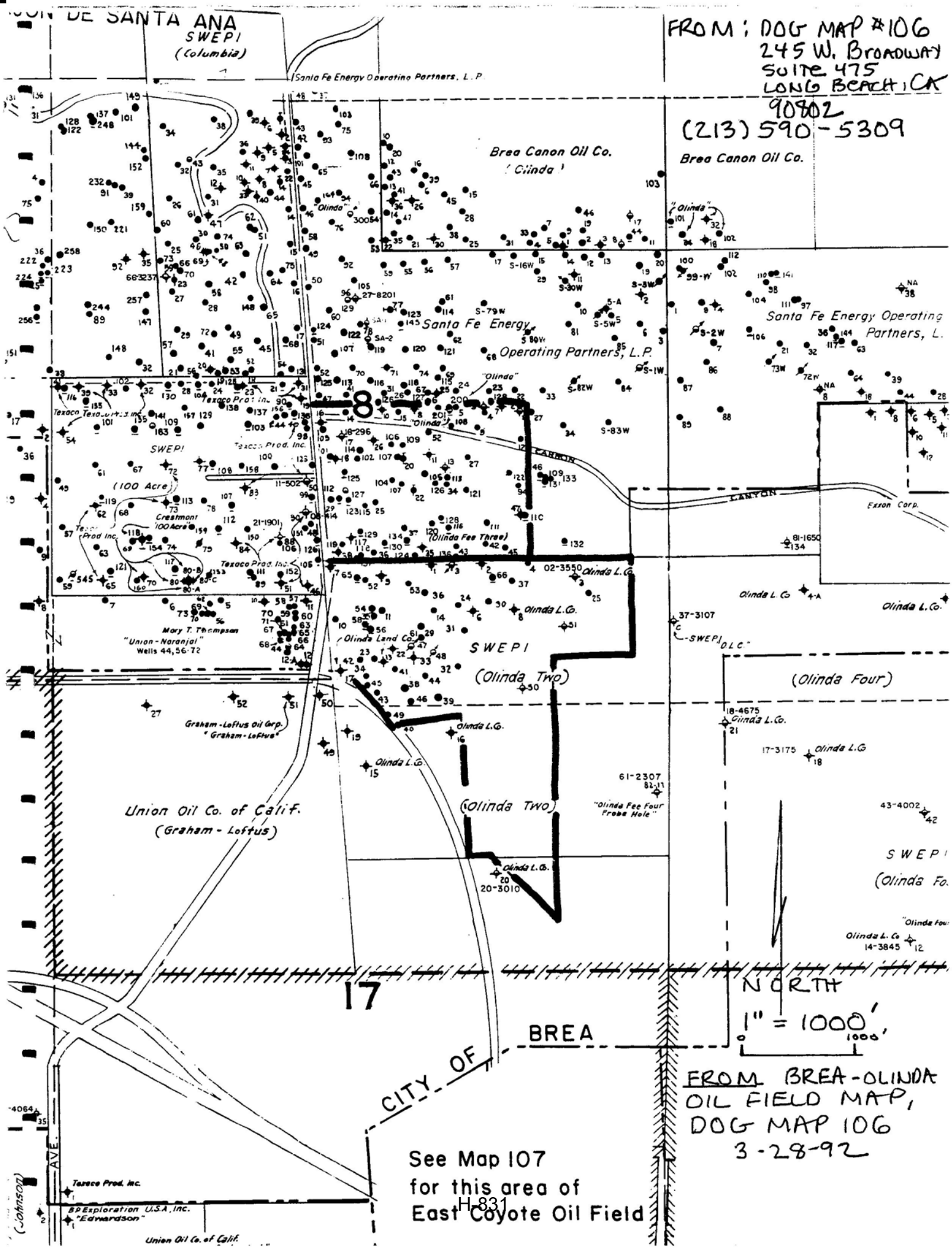
Orange County Archives, Santa Ana, California, Continued

Date	Map/Photo I.D., Summary	Scale
7-22-70	**E.L. Pearson & Associates, Flight 3-11 & 3-13** -- All oil sump areas are barely visible, becoming overgrown with vegetation -- 2 AG tanks in swale area, still present -- 1 AG tank on central ridgetop, now present -- 4 AG tanks north of Carbon Canyon Road -- Currently existing AG tank farm area first appears -- Increased oil field production and access roads -- Ranch (?) is gone, AG structures, tanks (?) still present SE corner of Valencia and Rose Drive -- Southern portion, east of Rose w/ orchards	1" = 500'±
March 1975	**Redi Zoning and Aerial Index Map Orange County** -- Sump areas barely visible; over-grown w/ vegetation -- No AG tanks on central ridgetop -- Valencia Ave. realignment near completion -- Park grading and construction in progress	1" = 800'±
May 1977	**Redi Zoning and Aerial Index Map of Orange County, Page 3** -- Sump areas no longer visible, completely masked or overgrown with vegetation -- No AG tanks in swale area -- Orchards and Oil Production Fields Similar to today, with the exception of central portion at Brea Olinda Blvd. less developed -- Valencia Ave realignment completed	1" = 800'±
1988	**Thomas Brothers - Aerial Atlas Orange County (Pg. 3 & 7)** -- Nursery SW of Rose (present since 1975 ±) expanded 1988 - present, further masking oil reservoir -- Oil Production Field, Orchards and surrounding land use similar today, Carbon Canyon Dam, Brea - Olinda Landfill, etc. -- Houses to south, orchards-nurseries & oilfield operations to west and north w/ AG tanks, park along east	1" = 800'±

APPENDIX F

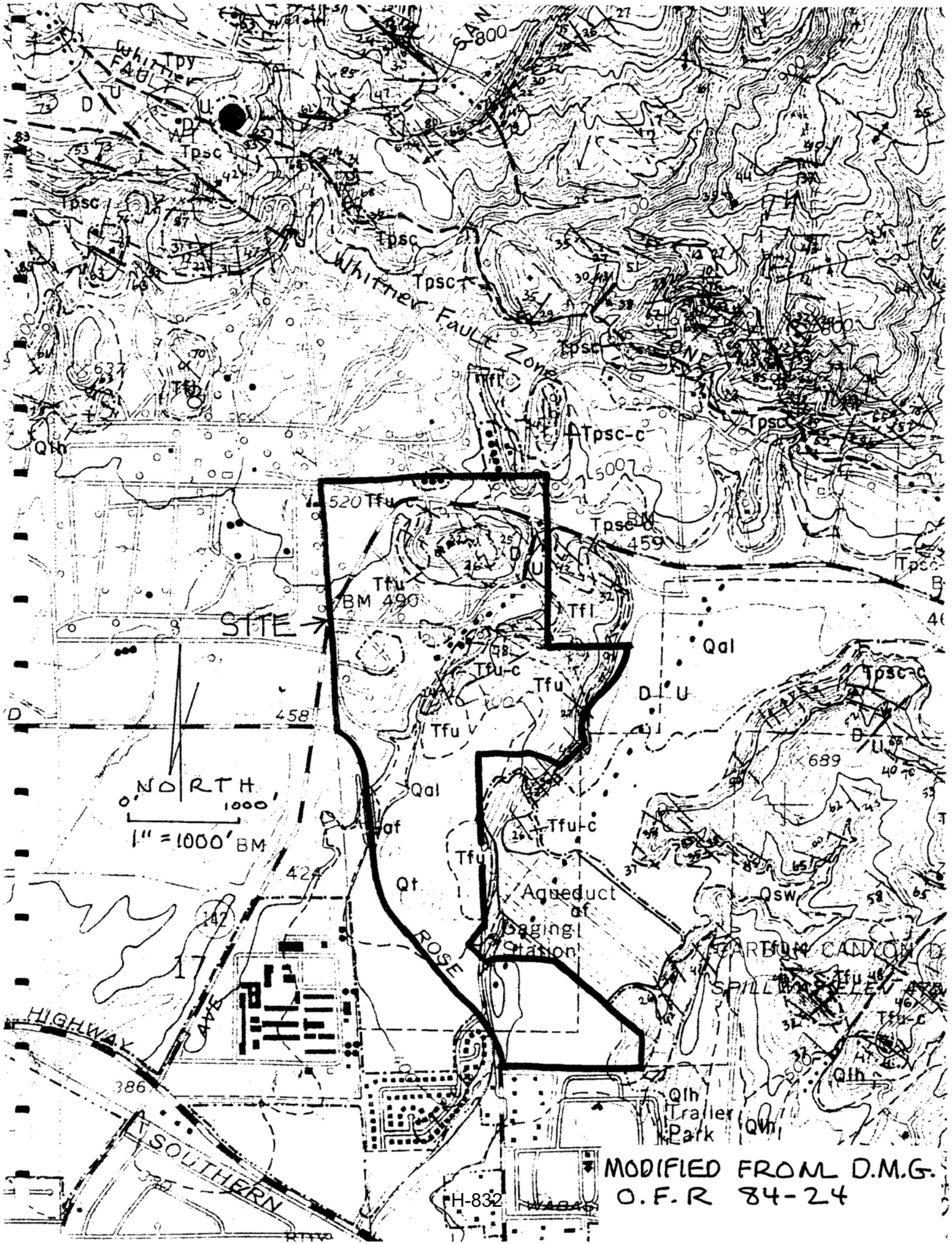
MISCELLANEOUS MAP FILES

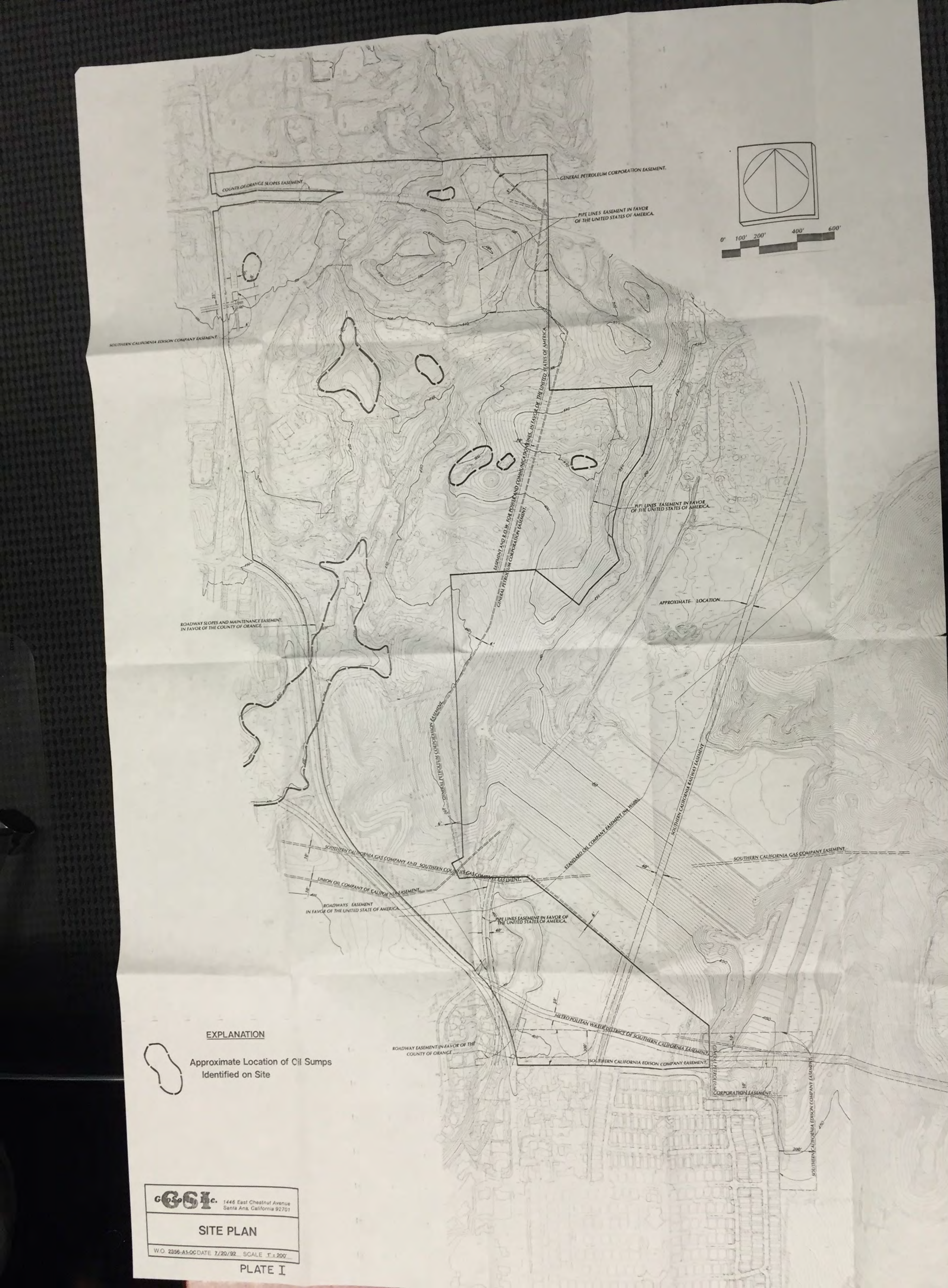
DOG AND DMG, 2 PAGES



FROM: DOG MAP #106
245 W. BROADWAY
SUITE 475
LONG BEACH, CA
90802
(213) 590-5309

FROM BREA-OLINDA
OIL FIELD MAP,
DOG MAP 106
3-28-92


Whittier Fault
Whittier Fault Zone
Tpy
Tpsc
Tpsc-c
Tfu
Tfu-c
Tfl
Qal
Qaf
Qt
Qsw
Qlh
Qlh Trailer Park
SITE
BM 490
BM 459
520
500
458
424
689
NORTH
1000'
1" = 1000' BM
Aqueduct of Staging Station
ROSE
CANYON
SPILLWAY
HIGHWAY
SOUTHERN
MODIFIED FROM D.M.G. O.F.R 84-24



EXPLANATION

Approximate Location of Oil Sumps Identified on Site

GGI Inc. 1446 East Chestnut Avenue Santa Ana, California 92701

SITE PLAN

W.O. 2356-A1-OC DATE 7/20/92 SCALE 1" = 200'

PLATE I

APPENDIX E

THE EDR AERIAL PHOTO DECADE PACKAGE

265-Acre Brea Property
Valencia Avenue
Brea, CA 92823

Inquiry Number: 4848184.9
February 10, 2017

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

02/10/17

Site Name:

265-Acre Brea Property
Valencia Avenue
Brea, CA 92823
EDR Inquiry # 4848184.9

Client Name:

Northgate Env. Management Inc.
428 13th Street 4th floor
Oakland, CA 94612-0000
Contact: Nancy Leitner

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
1995	1"=500'	Acquisition Date: October 03, 1995	USGS/DOQQ
1989	1"=1000'	Flight Date: January 01, 1989	USDA
1977	1"=1000'	Flight Date: January 01, 1977	Brewster Pacific
1972	1"=1000'	Flight Date: January 01, 1972	USGS
1963	1"=1000'	Flight Date: January 01, 1963	USGS
1952	1"=1000'	Flight Date: January 01, 1952	USDA
1946	1"=1000'	Flight Date: January 01, 1946	USGS
1938	1"=1000'	Flight Date: January 01, 1938	USDA

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INQUIRY #: 4848184.9
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 4848184.9
YEAR: 2012
= 500'
N
EDR

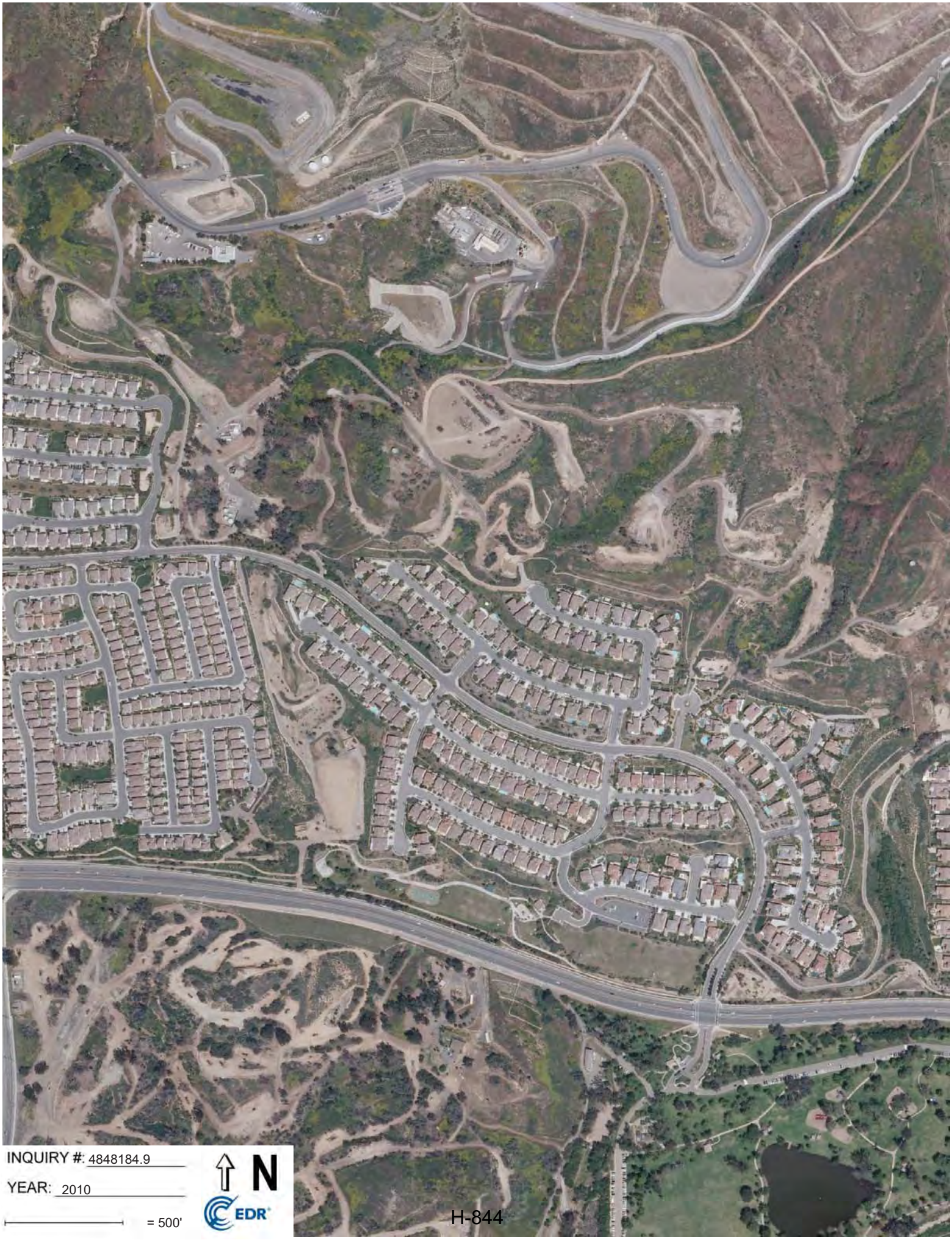

INQUIRY #: 4848184.9
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 4848184.9
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 4848184.9
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4848184.9
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4848184.9
YEAR: 2010
= 500'
N
EDR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YEAR: 2010
= 500'
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EDR


INQUIRY #: 4848184.9
YEAR: 2009
= 500'
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EDR



H-846


INQUIRY #: 4848184.9
YEAR: 2009
= 500'
N
EDR



H-848


INQUIRY #: 4848184.9
YEAR: 2005
= 500'
N
EDR



H-850


INQUIRY #: 4848184.9
YEAR: 2005
= 500'
N
EDR



INQUIRY #: 4848184.9

YEAR: 2005

= 500'

N

EDR



INQUIRY #: 4848184.9

YEAR: 1995

= 500'

N

EDR

H-853


INQUIRY #: 4848184.9
YEAR: 1995
= 500'
N
EDR


INQUIRY #: 4848184.9
YEAR: 1995
= 500'
N
EDR



INQUIRY #: 4848184.9

YEAR: 1995

= 500'

N

EDR


INQUIRY #: 4848184.9
YEAR: 1989
= 1000'
N
EDR


INQUIRY #: 4848184.9
YEAR: 1977
= 1000'
N
EDR


INQUIRY #: 4848184.9
YEAR: 1972
= 1000'
N
EDR


INQUIRY #: 4848184.9
YEAR: 1963
= 1000'
N
EDR
H-860



INQUIRY #: 4848184.9

YEAR: 1952

= 1000'

N

EDR

H-861


INQUIRY #: 4848184.9
YEAR: 1946
= 1000'
N
EDR


INQUIRY #: 4848184.9
YEAR: 1938
= 1000'
N
EDR

APPENDIX F

THE EDR HISTORICAL TOPOGRAPHIC MAP REPORT

265-Acre Brea Property
Valencia Avenue
Brea, CA 92823

Inquiry Number: 4848184.4
February 07, 2017

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

02/07/17

Site Name:

265-Acre Brea Property
Valencia Avenue
Brea, CA 92823
EDR Inquiry # 4848184.4

Client Name:

Northgate Env. Management Inc.
428 13th Street 4th floor
Oakland, CA 94612-0000
Contact: Nancy Leitner

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Northgate Env. Management Inc. were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA
Project: 2077.01

Coordinates:

Latitude:	33.922355 33° 55' 20" North
Longitude:	-117.844415 -117° 50' 40" West
UTM Zone:	Zone 11 North
UTM X Meters:	421948.15
UTM Y Meters:	3753867.90
Elevation:	522.42' above sea level

Maps Provided:

2012	1928
1981	1925
1972	1902
1964	1901
1950	1898
1949	1896
1942	
1935	

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets



Yorba Linda

7.5-minute, 24000

1981 Source Sheets



Yorba Linda

7.5-minute, 24000
Aerial Photo Revised 1979

1972 Source Sheets



Yorba Linda

7.5-minute, 24000
Aerial Photo Revised 1972

1964 Source Sheets



Yorba Linda

7.5-minute, 24000
Aerial Photo Revised 1963

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1950 Source Sheets



Yorba Linda

7.5-minute, 24000
Aerial Photo Revised 1946

1949 Source Sheets



Yorba Linda

7.5-minute, 24000
Aerial Photo Revised 1946

1942 Source Sheets



ANAHEIM

15-minute, 50000

1935 Source Sheets



OLINDA

7.5-minute, 31680

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1928 Source Sheets



La Brea

7.5-minute, 24000

1925 Source Sheets



La Brea

7.5-minute, 24000

1902 Source Sheets



Corona

30-minute, 125000

1901 Source Sheets



Anaheim

15-minute, 62500

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

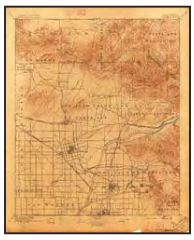
1898 Source Sheets



Anaheim

15-minute, 62500

1896 Source Sheets

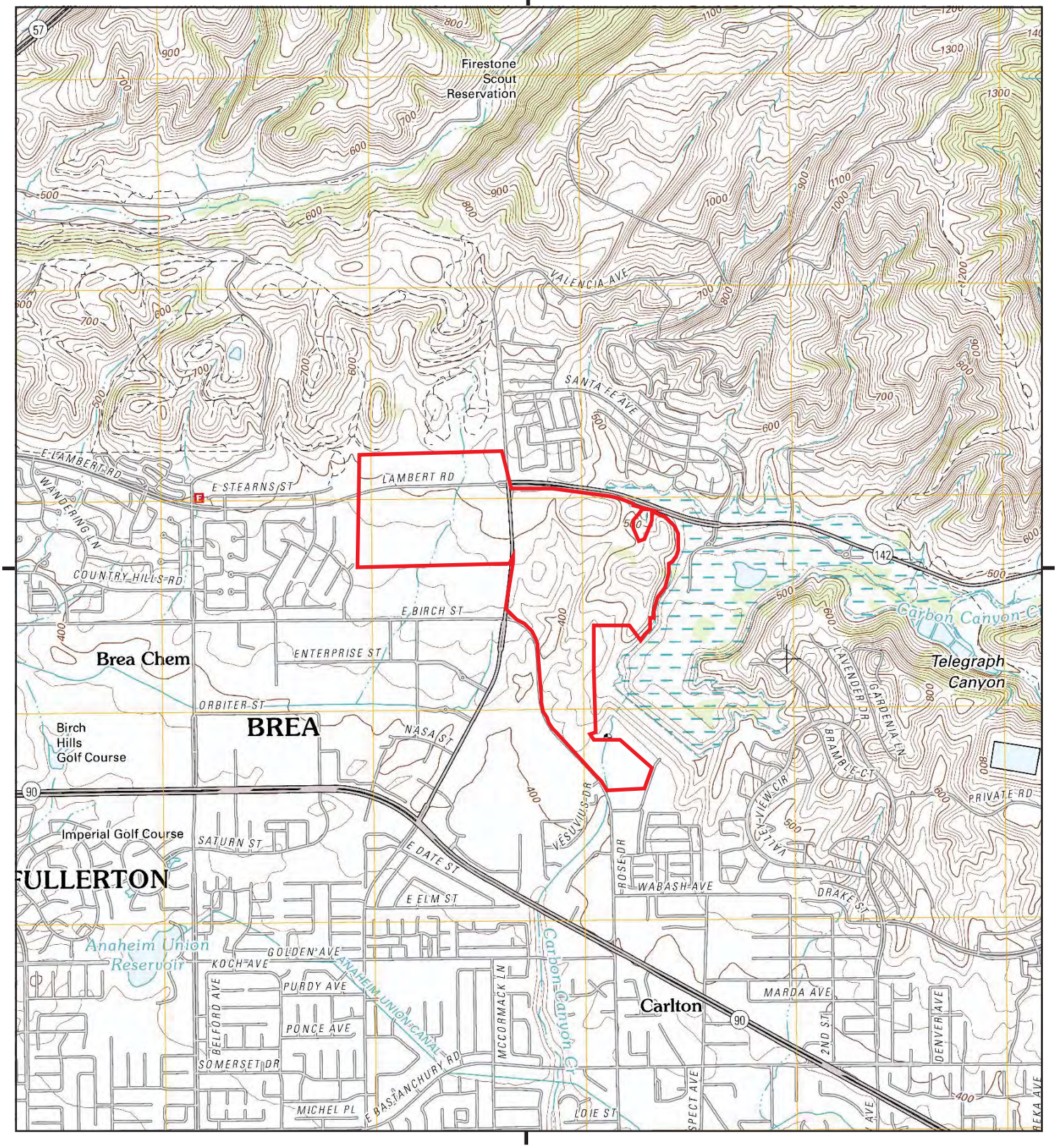


Anaheim

15-minute, 62500

Historical Topo Map

2012



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

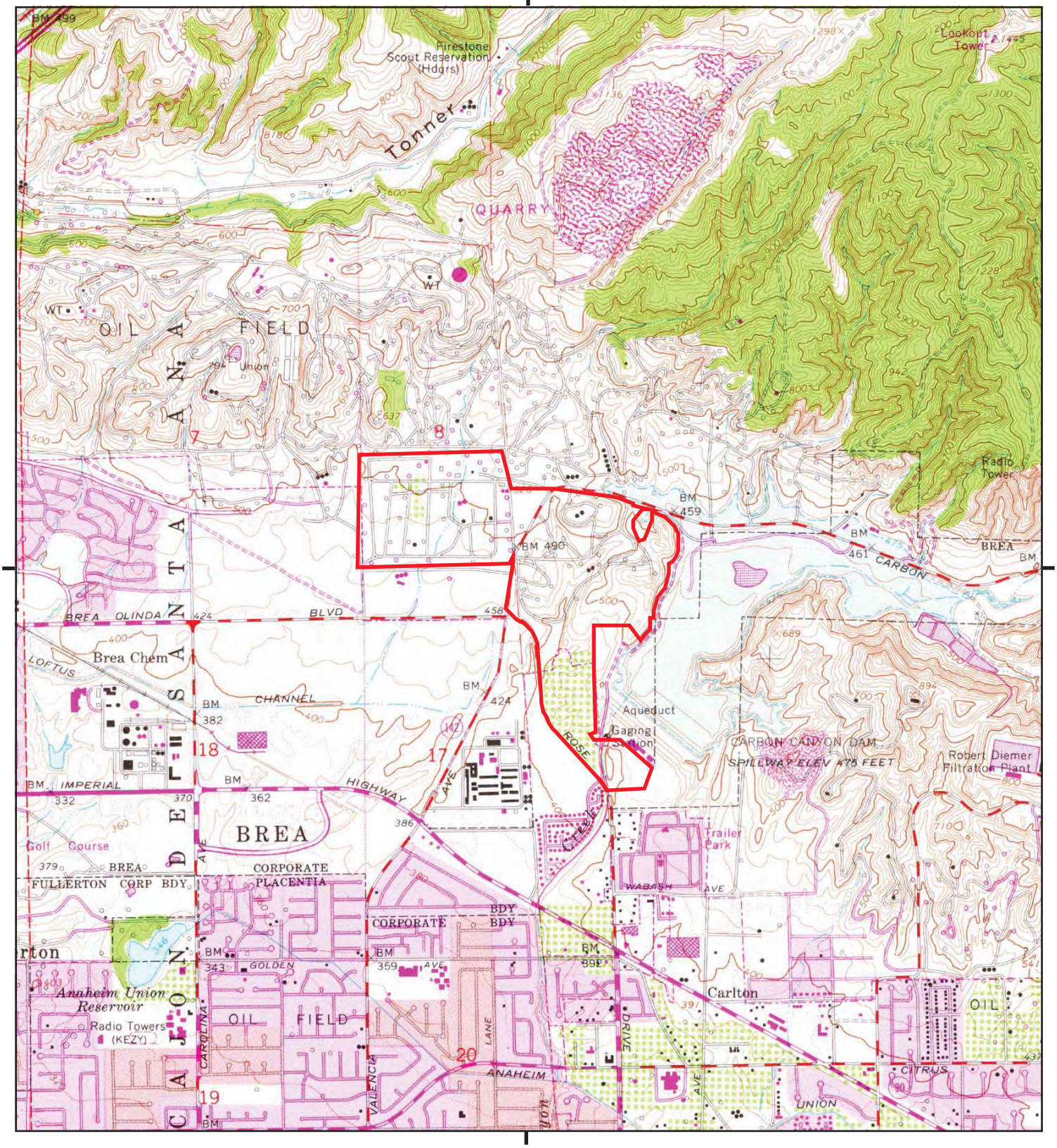
NW N NE
W E
SW S SE

TP, Yorba Linda, 2012, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-871



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

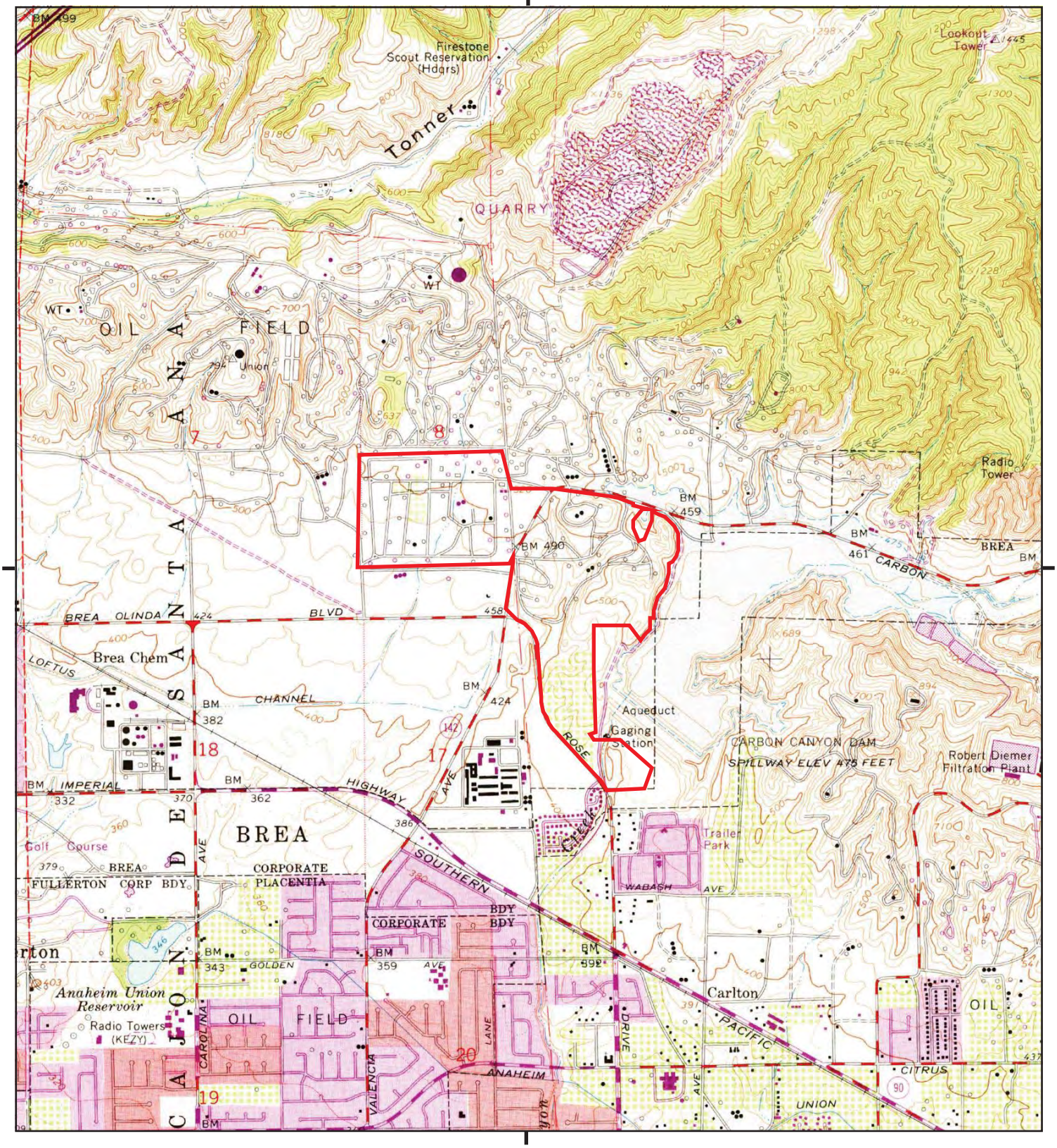
NW N NE
W E
SW S SE

TP, Yorba Linda, 1981, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-872



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

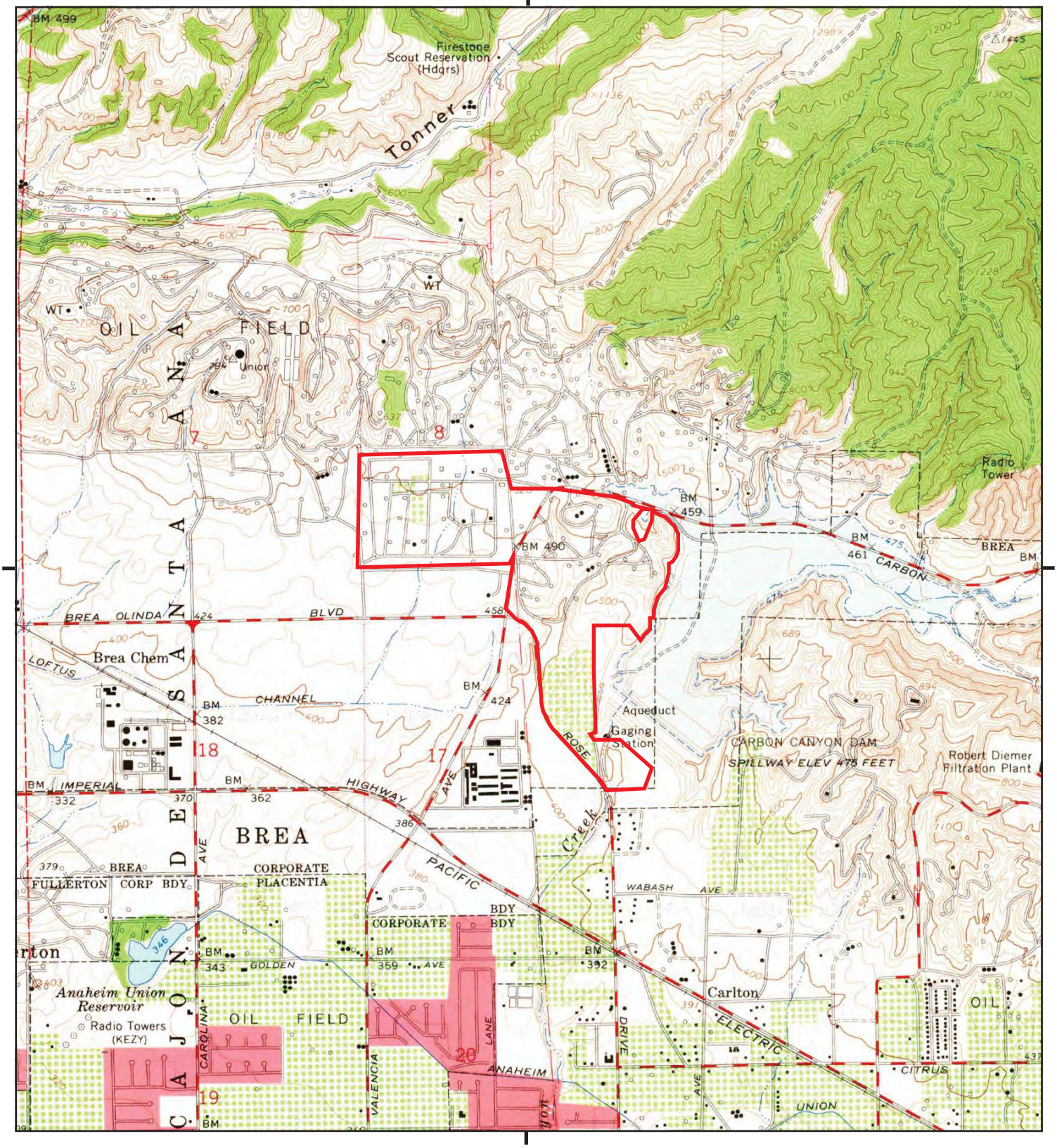
NW N NE
W E
SW S SE

TP, Yorba Linda, 1972, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-873



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

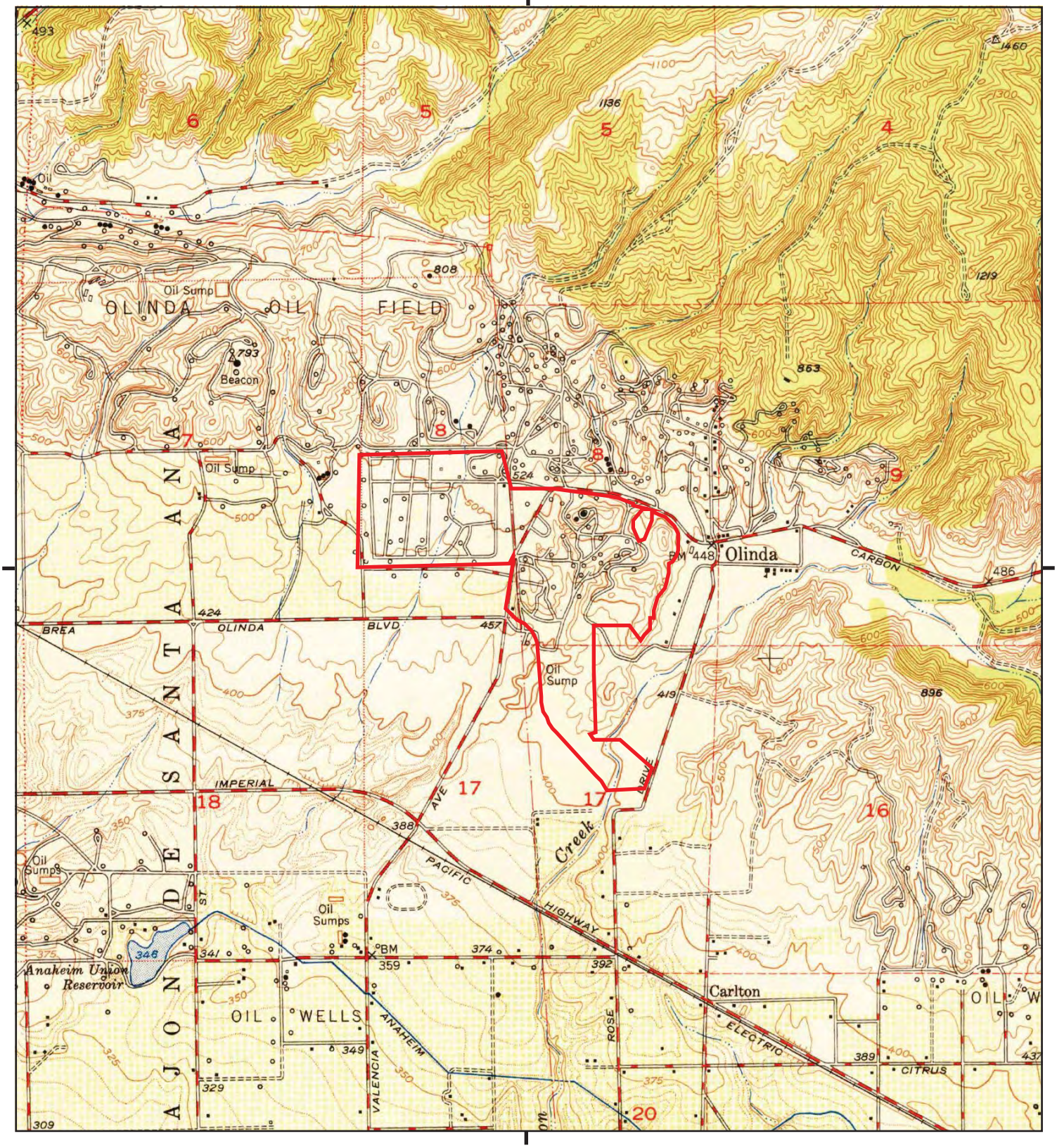
NW N NE
W E
SW S SE

TP, Yorba Linda, 1964, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-874



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

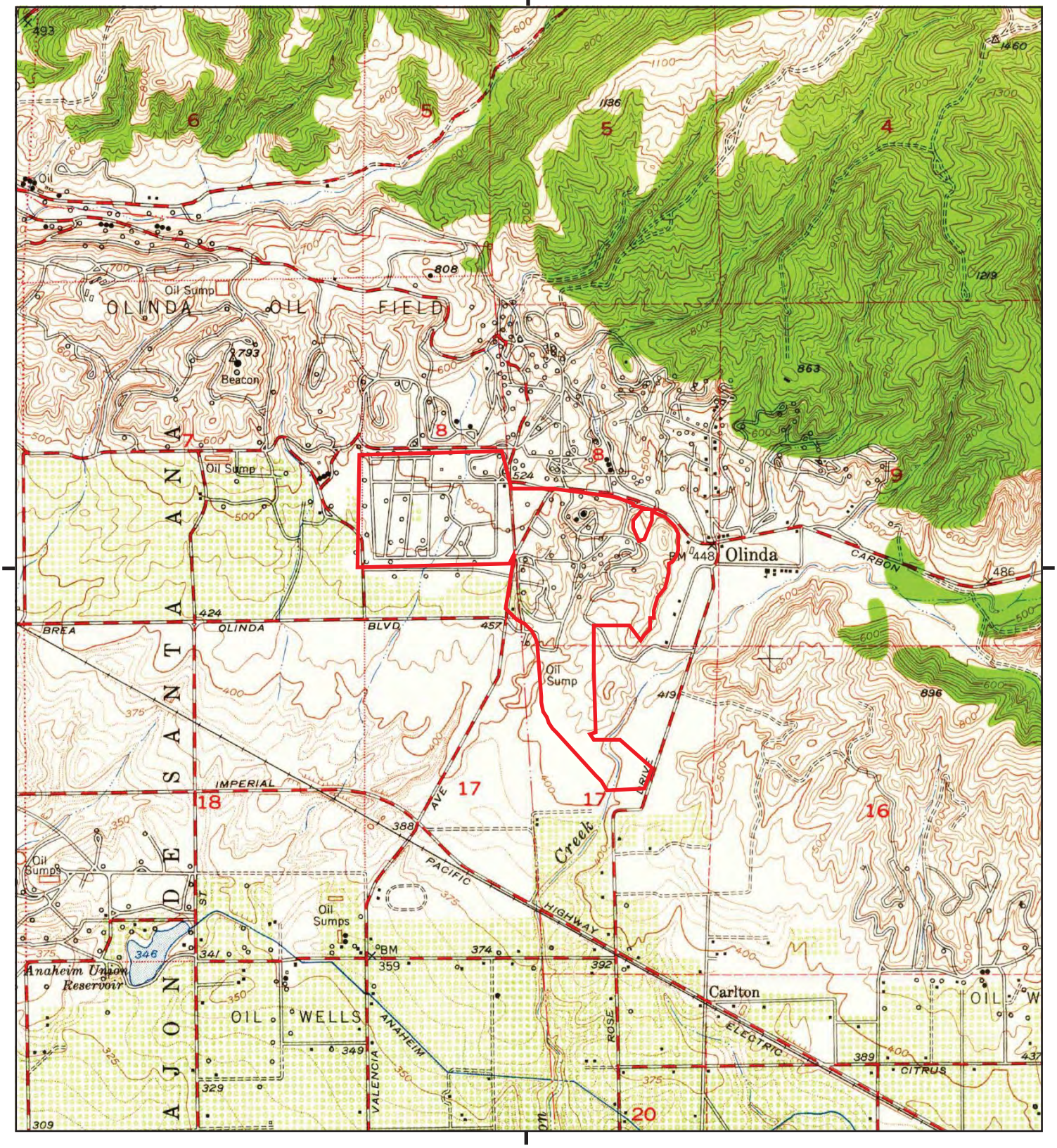
NW N NE
W E
SW S SE

TP, Yorba Linda, 1950, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-875



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

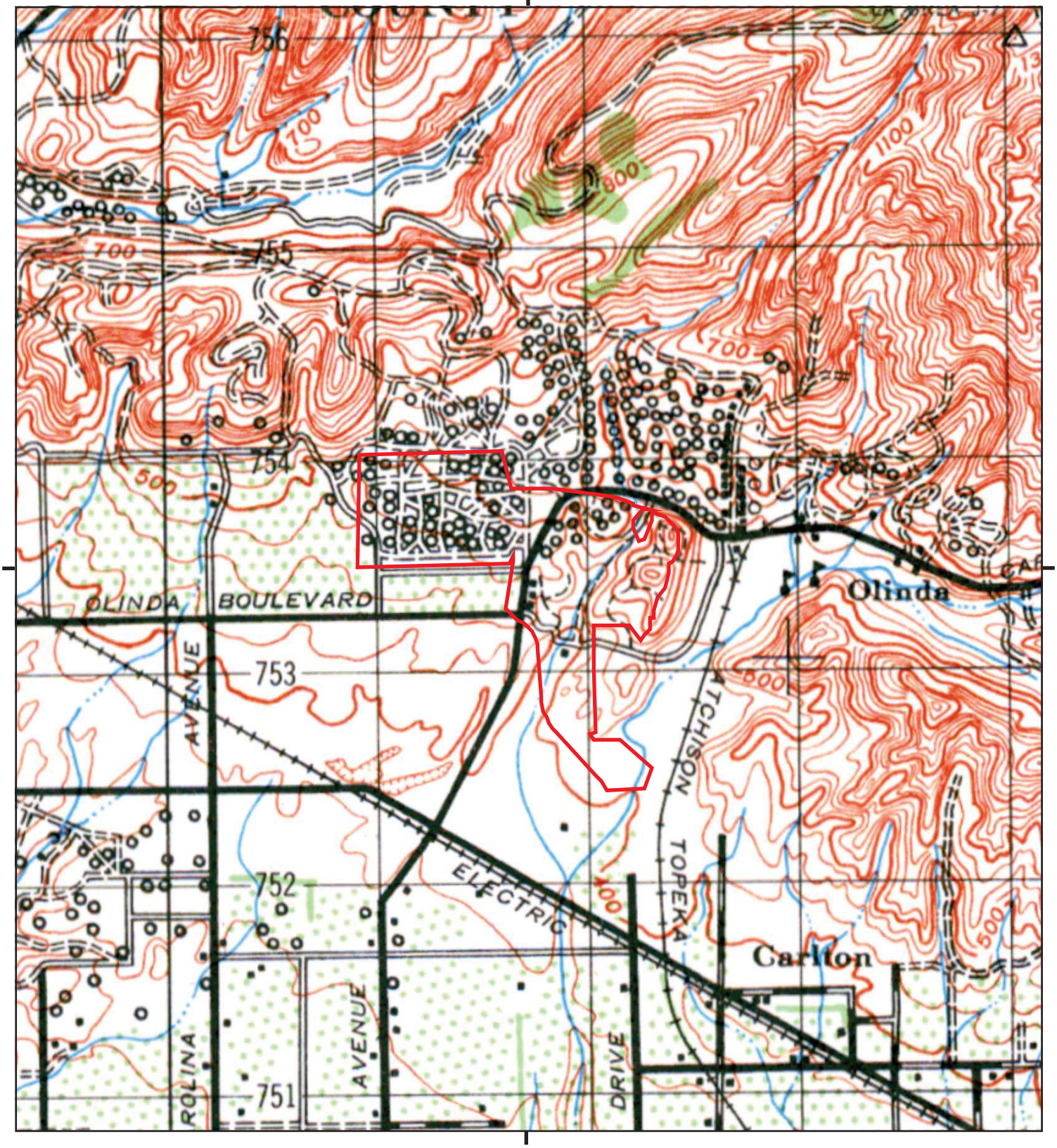
NW N NE
W E
SW S SE

TP, Yorba Linda, 1949, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-876



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

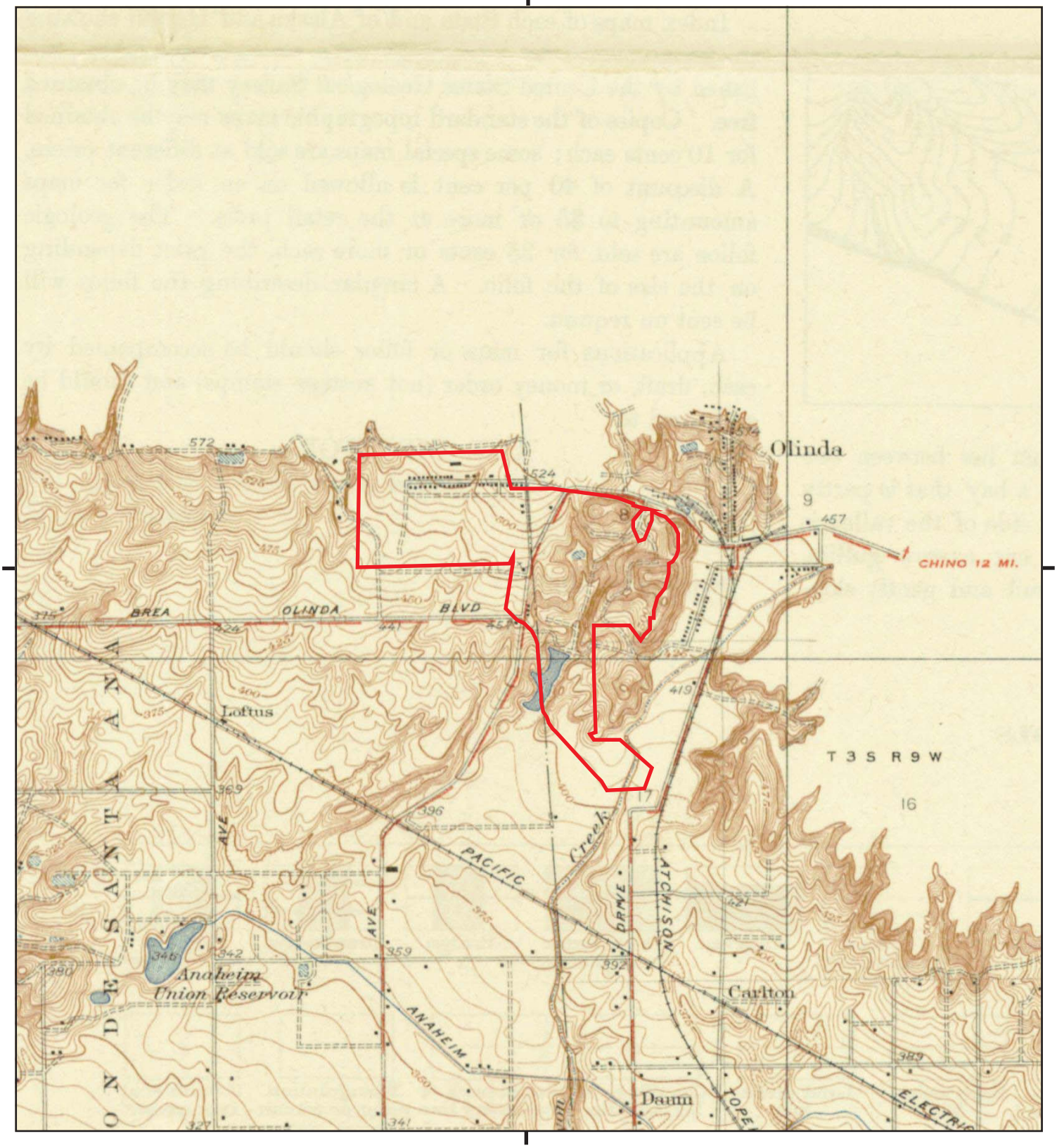
NW N NE
W E
SW S SE

TP, ANAHEIM, 1942, 15-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-877



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

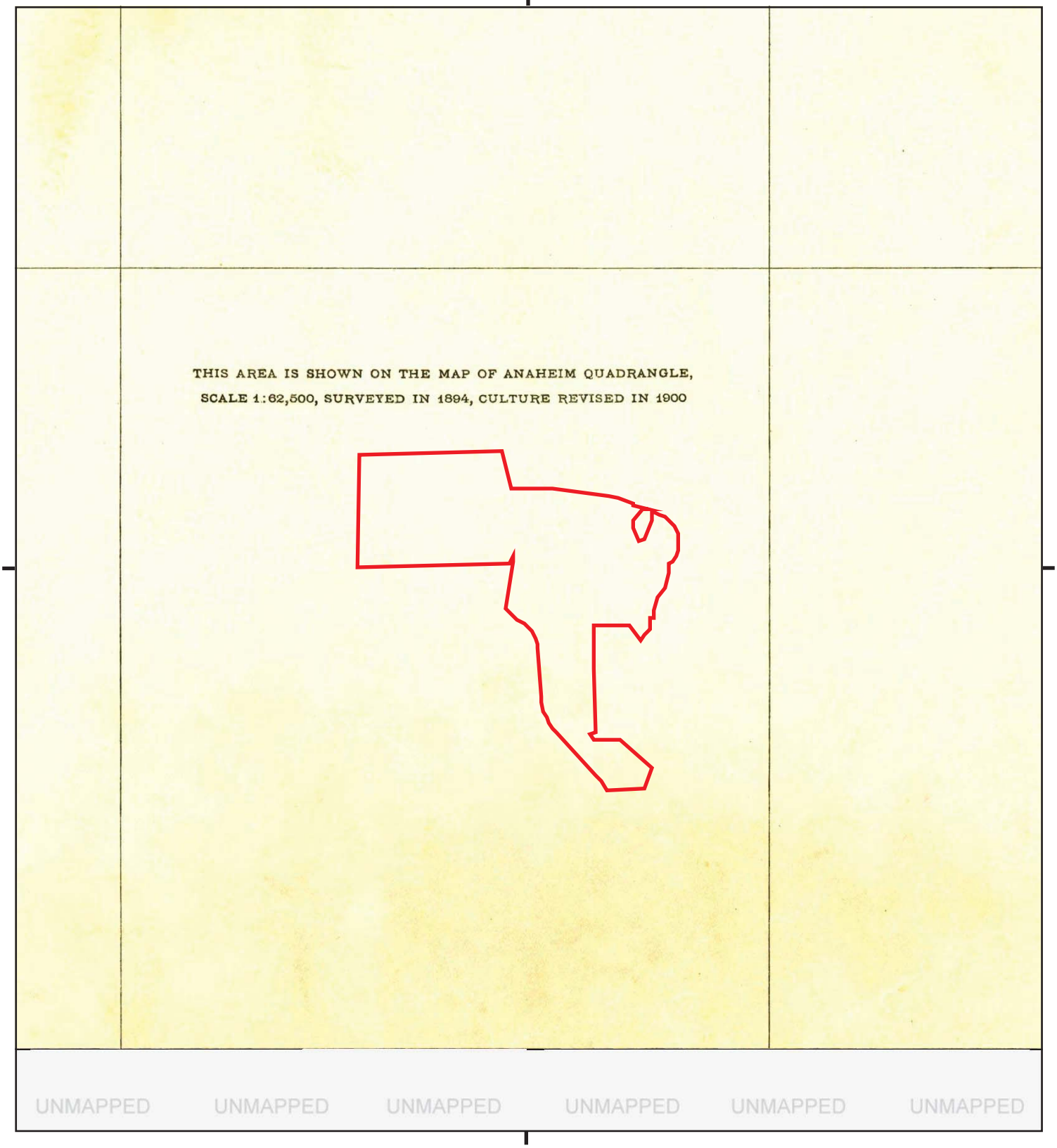
NW N NE
W E
SW S SE

TP, OLINDA, 1935, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-878



UNMAPPED UNMAPPED UNMAPPED UNMAPPED UNMAPPED UNMAPPED

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

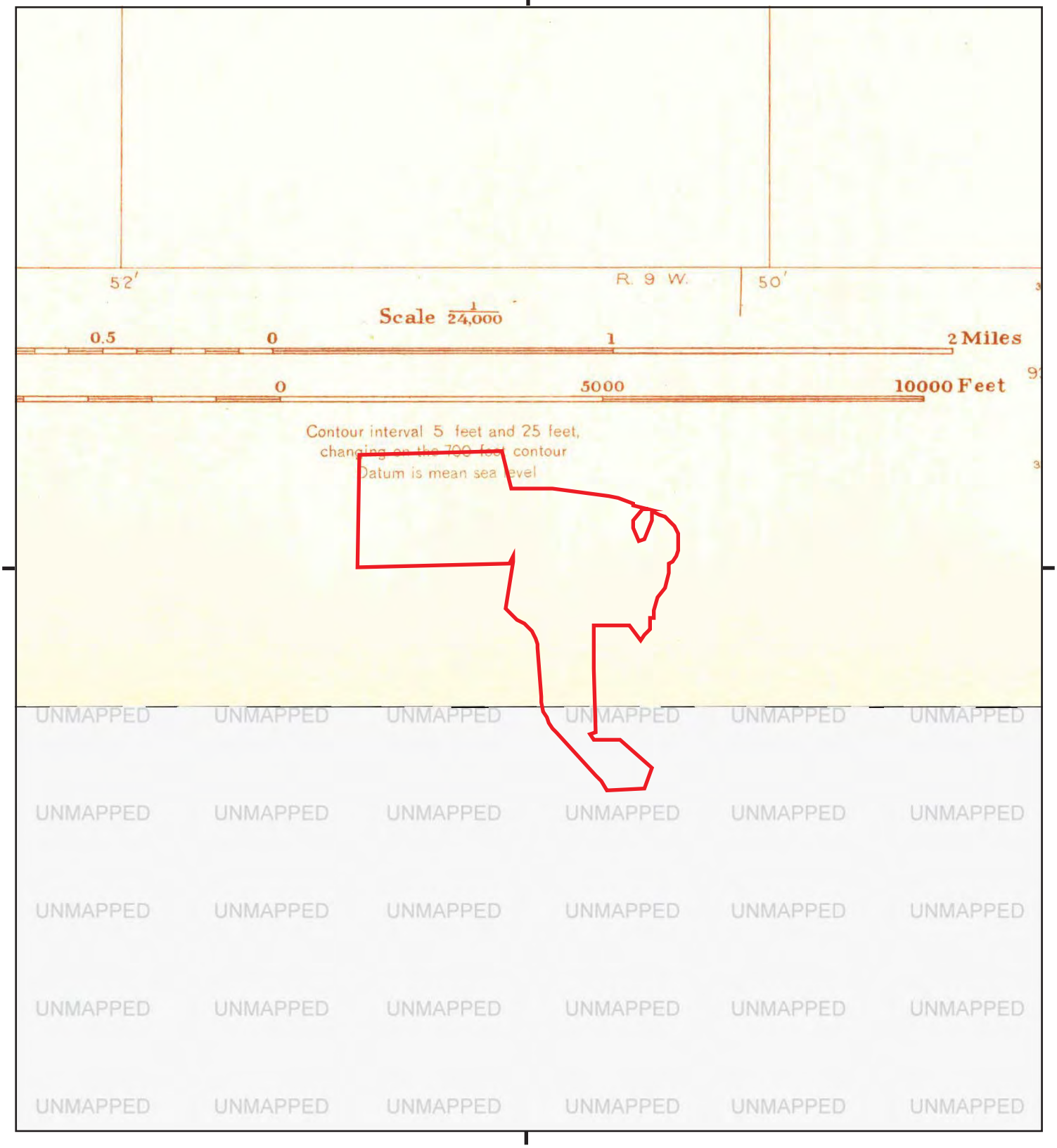
NW N NE
W E
SW S SE

TP, La Brea, 1928, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-879



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

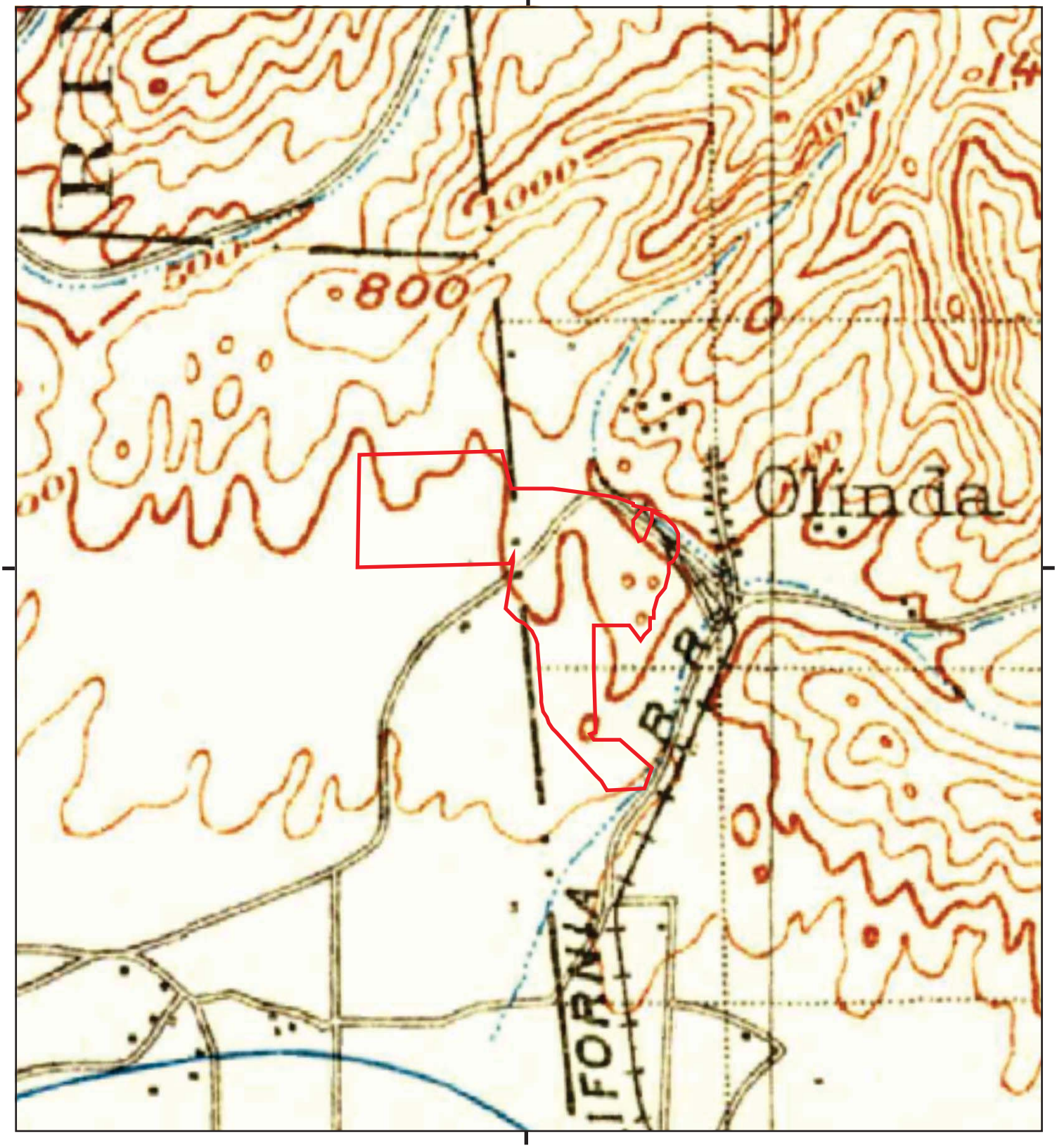
NW N NE
W E
SW S SE

TP, La Brea, 1925, 7.5-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-880



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

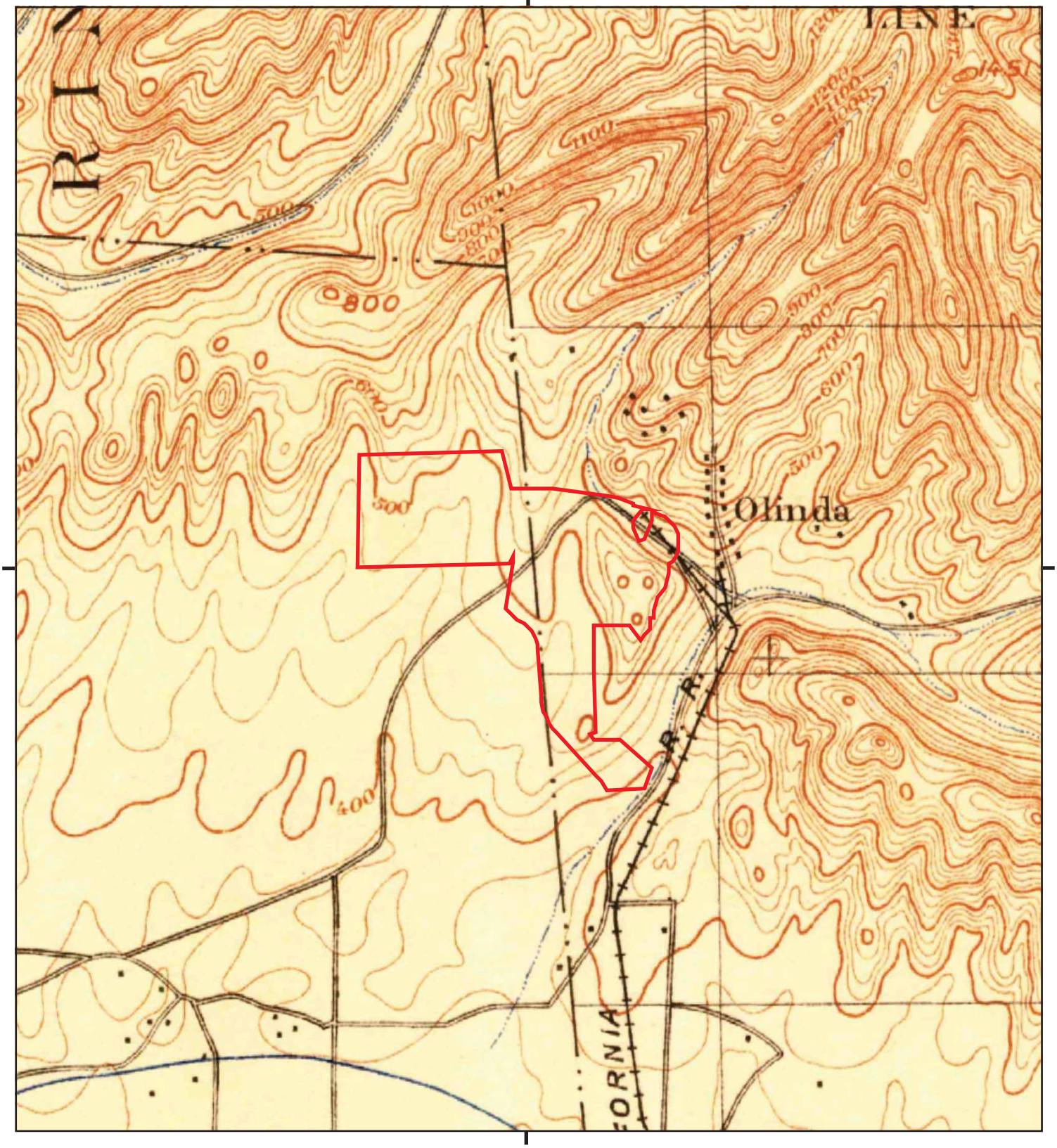
NW N NE
W E
SW S SE

TP, Corona, 1902, 30-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-881



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

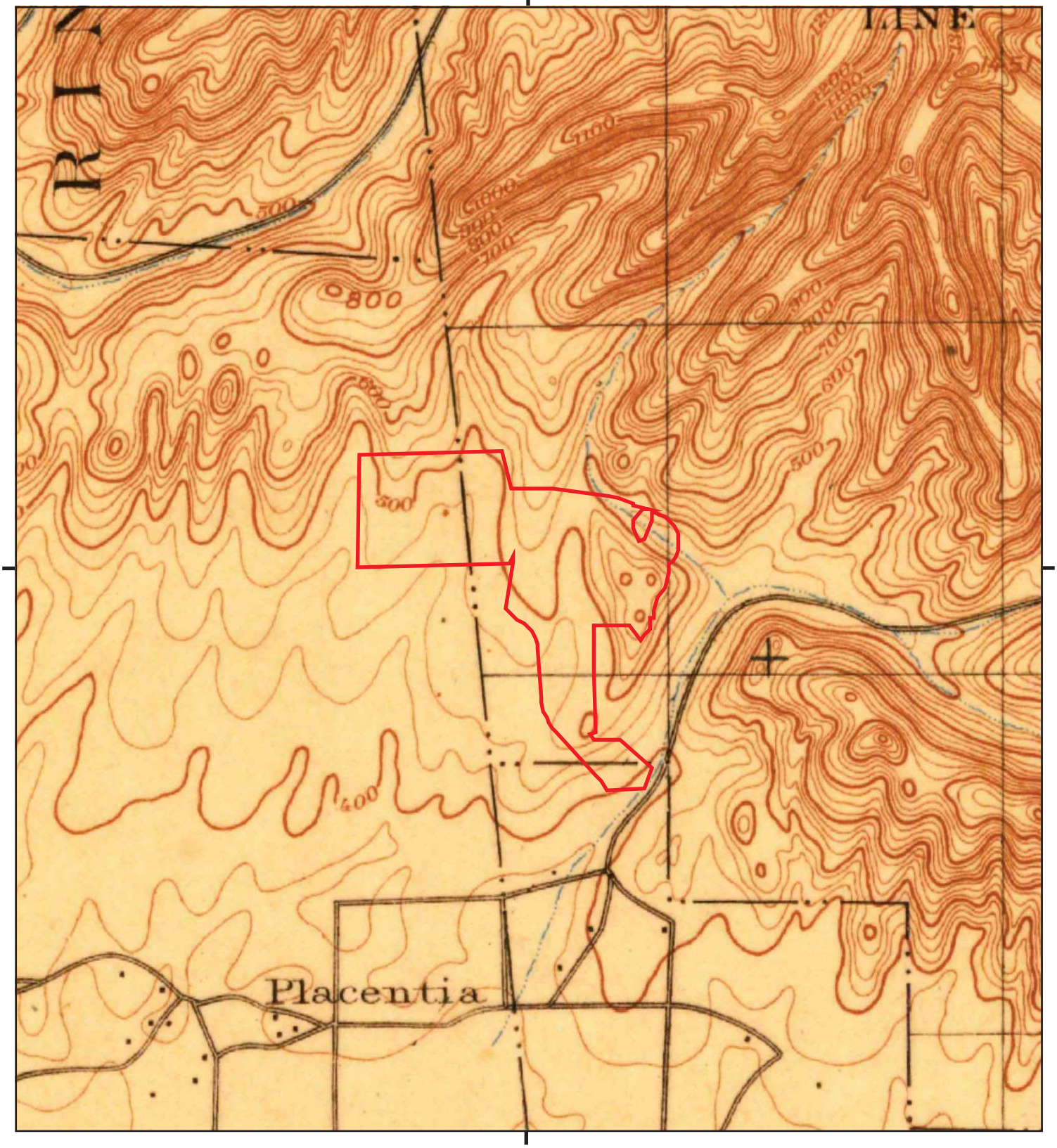
NW N NE
W E
SW S SE

TP, Anaheim, 1901, 15-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-882



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

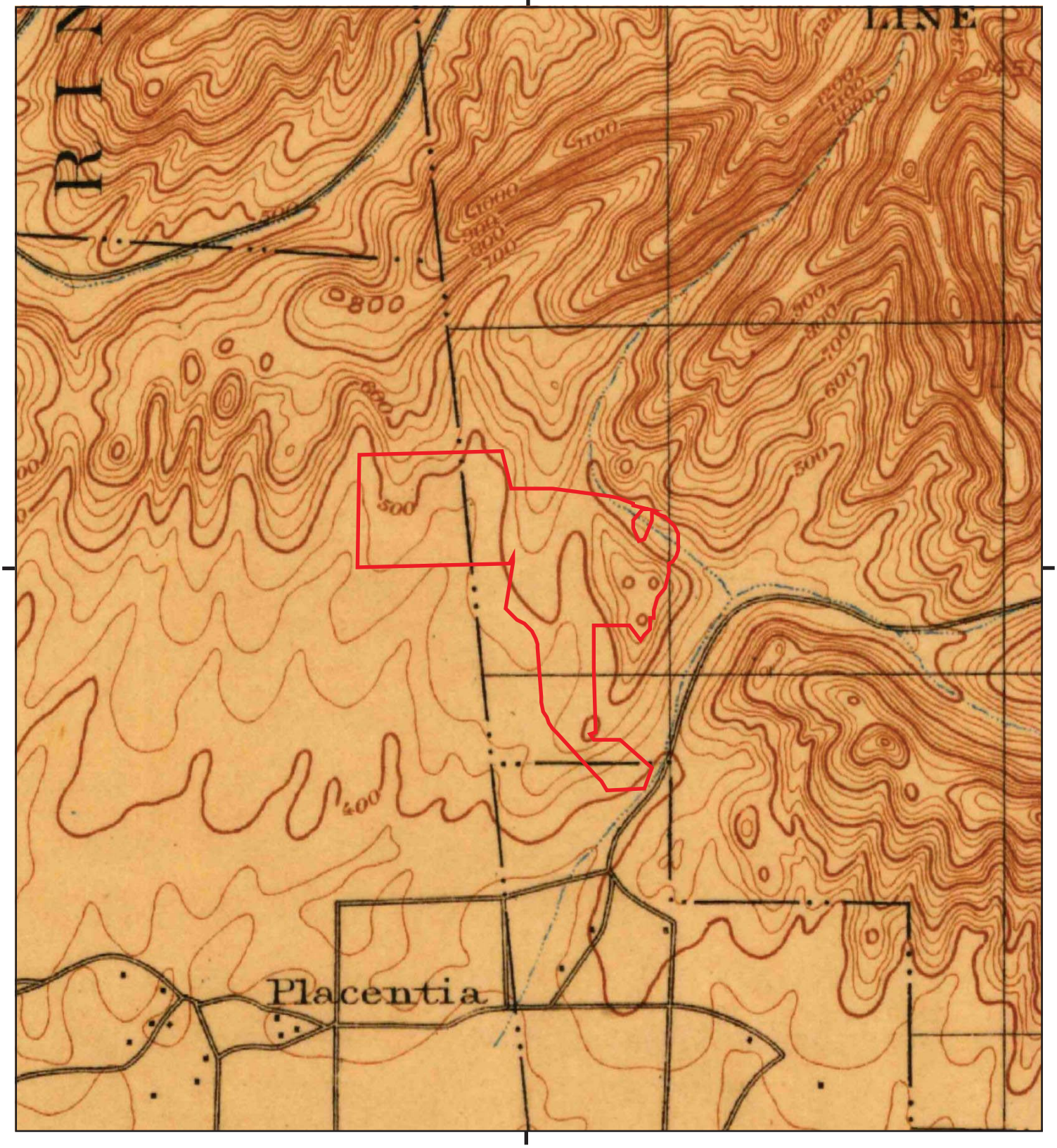
NW N NE
W E
SW S SE

TP, Anaheim, 1898, 15-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-883



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Anaheim, 1896, 15-minute

SITE NAME: 265-Acre Brea Property
ADDRESS: Valencia Avenue
Brea, CA 92823
CLIENT: Northgate Env. Management Inc.

N

H-884

APPENDIX G

THE EDR-CITY DIRECTORY ABSTRACT

265-Acre Brea Property
Valencia Avenue
Brea, CA 92823

Inquiry Number: 4848184.5
February 08, 2017

The EDR-City Directory Image Report

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

Environmental Data Resources Inc

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

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with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2013	☑	☐	Cole Information Services
2008	☑	☐	Cole Information Services
2003	☑	☐	Cole Information Services
1999	☑	☐	Cole Information Services
1995	☑	☐	Cole Information Services
1992	☑	☐	Cole Information Services
1985	☑	☐	Haines Criss-Cross Directory
1980	☑	☐	Haines Criss-Cross Directory
1975	☑	☐	Haines Criss-Cross Directory
1972	☑	☐	Haines Criss-Cross Directory

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FINDINGS

TARGET PROPERTY STREET

Valencia Avenue
Brea, CA 92823

Year	*CD Image*	*Source*
VALENCIA AVE		
2013	pg A1	Cole Information Services
2008	pg A2	Cole Information Services
2003	pg A3	Cole Information Services
1999	pg A4	Cole Information Services
1995	pg A5	Cole Information Services
1992	pg A6	Cole Information Services
1985	pg A7	Haines Criss-Cross Directory
1980	pg A8	Haines Criss-Cross Directory
1975	pg A9	Haines Criss-Cross Directory
1972	pg A10	Haines Criss-Cross Directory

FINDINGS

CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✓	-	Cole Information Services

VALENCIA AVE 2013

525	ARTISTIC DENTAL
	STARBUCKS COFFEE
	YOURS TO TREASURE
601	AAE INC
	MOXA
603	CALVARY CHURCH OF PLACENTIA
	DEBT SETTLORS OF AMERICA
1942	RIDGEWOOD POWER MANAGEMENT
2601	BERGEN NURSERIES
	TONNER HILLS

Target Street	Cross Street	Source
✓	-	Cole Information Services

VALENCIA AVE 2008

275	BANK OF AMERICA
376	ECO SCRAP INC
	HARTLEY UNOCAL
	MOLYCORP INC
	UNOCAL CREDIT UNION
	UNOCAL INTERNATIONAL SUPPLY & TRADIN
525	ARTISTIC DENTAL
	CHRISTINE LEE BEAUTY SUPPLY & SALON
601	ADVANCED APPLIED ENGINEERING
	ADVANCED INFRASTRUCTURE MANAGEMENT
	COLIN L WHIPPLE CPA
	COLIN WHIPPLE
	CONAWAY & CONAWAY
	JAMES CONAWAY
	MILLER GIANGRANDE
	PACIFIC WEST COAST FINANCIAL
	PROFESSIONAL GOLFERS ASSN OF AMERICA
	WINDOW ROCK ENTERPRISES INC
603	SHEA INTERIORS
	SHEA MORTGAGE INC
1942	AIR PRODUCTS & CHEMICALS INC
	RIDGEWOOD POWER MANAGEMENT
1983	BREA GREEN RECYCLING INC
2601	OLINDA NURSERY INC

Target Street	Cross Street	Source
✓	-	Cole Information Services

VALENCIA AVE 2003

275	BOX LEASING
	DREW PARROT
	ERIC HATCHER
	HARRY MOTTLOW
	JEFFREY CARSON
376	ERST INC
	ERST/OBRIENS INC
	KATHLEEN MALLEY
	MOLYCORP INC
	PRODICA LLC
	UNOCAL BREA FEDERAL CREDIT UN
525	UNOCAL IMPERIAL
601	PROFESSIONAL GOLFERS ASCTN
	SIMULATION SCIENCES INC
603	EDWARD TRESKA
	MOUNTAIN SPRING
	SPRING MOUNTAIN ESCROW
	VALERIE JANSON
1942	OCCUPANT UNKNOWN
	RE MONKS
	RIDGEWOOD POWER MANAGEMENT
1952	TEXACO NORTH AMERICAN PRDCTN
2601	PROFESSIONAL GROWERS INC
3202	OCCUPANT UNKNOWN
	OLINDA NURSERY

Target Street	Cross Street	Source
✓	-	Cole Information Services

VALENCIA AVE 1999

275	LCA
376	DINNER AT EIGHT PRODUCTIONS
	ECO SCRAP INCORPORATED
	UNOCAL CORPORATION
525	IMPERIAL UNOCAL
601	PGA OF AMERICA SO CALIF
	PROFESSIONAL GOLFERS ASSOCIATION
	SIMULATION SCIENCES INCORPORATED
603	SHEA HOMES INCORPORATED
	SPRING MOUNTAIN ESCROW
	SPRING MOUNTAIN ESCROW BREA
1942	G S F ENERGY
	RIDGEWOOD POWER MANAGEMENT
1952	TEXACO NORTH AMERICAN PRODUCTION INCORPORATED
1983	BREA GREEN RECYCLING
3202	OLINDA NURSERY

Target Street	Cross Street	Source
✓	-	Cole Information Services

VALENCIA AVE 1995

374 ROOZEK, DARYL
376 GRAHAM, GERRY
525 BREA UNOCAL
IMPERIAL UNOCAL
601 ASSOCIATED CLAIMS MANAGEMENT
DUTTAROY, KUNAL
PROFESSIONAL GOLFERS ASSN
SIMULATION SCIENCES INC
603 CENTER FOR FACIAL SURGERY
INFECTIOUS DISEASES CONSULTANT
JOEL TROTTER MD
JOHN W ZAMARRA INC
PHYSICIAN CARE
RUSSELL C EWING II MD
WILLIAM C FILSINGER MD
3202 OLINDA NURSERY

Target Street	Cross Street	Source
✓	-	Cole Information Services

VALENCIA AVE 1992

376	BREA TRAVEL VALNCIA
	UNOCAL CORP SCN DIV
525	BREA UNOCAL
	UNOCAL IMPERIAL
601	ASSOCTD CLAIMS MNG
603	BERNSTEIN B S MD
	BREA CARDVSCLR INST
	CENTER FACIAL SRGRY
	CROSSAN JAMES MD
	EWING R C 2D MD INC
	PHYSICIAN CARE
	TROTTER JOEL MD
	ZAMARRA JOHN MD
3202	OLINDA NURSERY

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

VALENCIA AVE 1985



VALENCIA AV 92621 BREA

275	SECURITY PAC OPER	961-2100	4
376	BREA TRAVEL VALNCIA	528-2020	4
	UNION OIL CO CALIF	528-7201	0
601	AMER MDCL INTL INC	996-8660	+5
	CONTL PAC ENTPRS	528-4840	4
1991	SHIELDS WILLIAM T	529-3234	3
	STEINER TRUCKING	990-5419	+5
2601	CRESTMONT OIL&GAS	993-6090	
	L&J BACKHOE&TRCK SV	528-4010	+5
2603	XXXX	00	
3201	XXXX	00	
3202	OLINDA NURSERY	993-0760	+5
*	9 BUS 3 RES	4 NEW	

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

VALENCIA AVE 1980

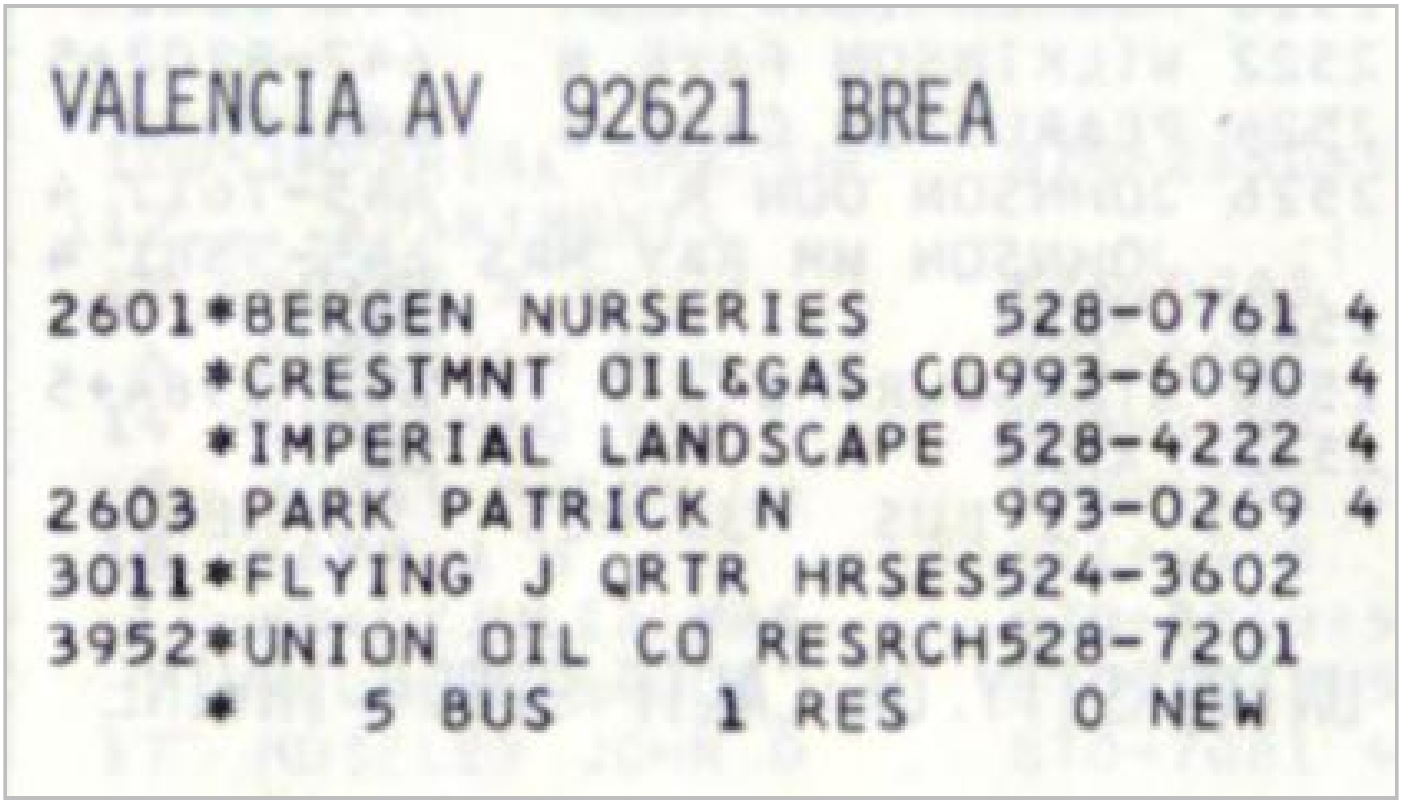


VALENCIA AV 92621 BREA

2601	CRESTMONT OIL&GAS	993-6090	4
2603	PARK PATRICK N	993-0269	4
3011	KLECKNER DON	996-6203	8
3201	OLINDA NURSERY	993-0760	7
3202	XXXX	00	
*	2 BUS 3 RES	0 NEW	

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

VALENCIA AVE 1975

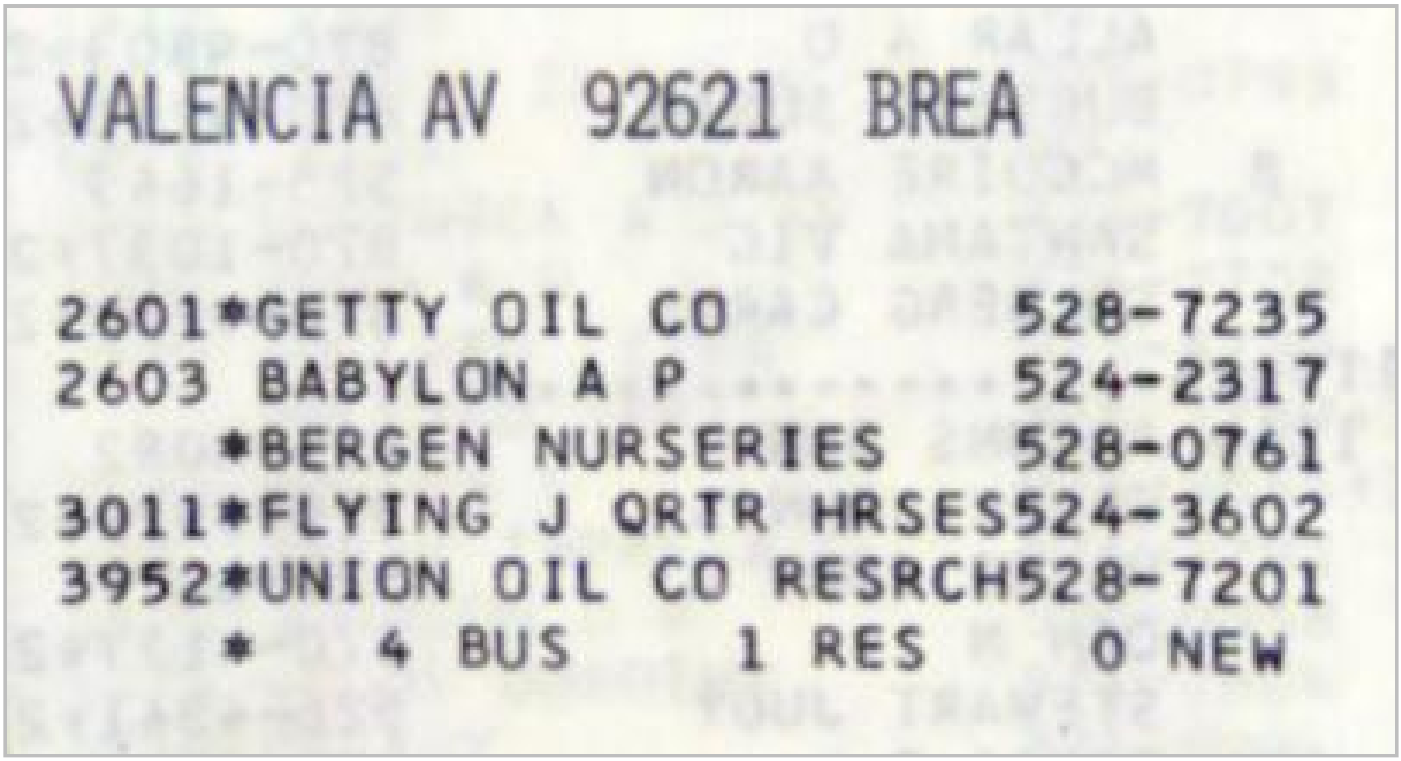


VALENCIA AV 92621 BREA

2601 *BERGEN NURSERIES 528-0761 4
*CRESTMNT OIL&GAS CO 993-6090 4
*IMPERIAL LANDSCAPE 528-4222 4
2603 PARK PATRICK N 993-0269 4
3011 *FLYING J QRTR HRSES 524-3602
3952 *UNION OIL CO RESRCH 528-7201
* 5 BUS 1 RES 0 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

VALENCIA AVE 1972



VALENCIA AV 92621 BREA

2601 *GETTY OIL CO 528-7235
2603 BABYLON A P 524-2317
*BERGEN NURSERIES 528-0761
3011 *FLYING J QRTR HRSES 524-3602
3952 *UNION OIL CO RESRCH 528-7201
* 4 BUS 1 RES 0 NEW

APPENDIX H

ENVIRONMENTAL PROFESSIONAL QUALIFICATIONS

DERRICK S. WILLIS
PRINCIPAL

Mr. Willis has over 24 years' experience serving both public sector and private clients in California and Canada on a wide variety of environmental projects. For the last several years, Mr. Willis' focus has been on formulating and facilitating closure and development strategies for large, complex, high profile, environmental projects for aerospace, industrial, and real estate development firms. Mr. Willis has extensive experience with due diligence/property transfer and development issues in a wide variety of industrial and regulatory settings. He is familiar with the industrial processes that generate environmental wastes, the fate and transport of chemicals in the environment, the potential adverse effects of these substances on human and ecological receptors, compliance challenges faced by business operators, the performance of remedial technologies, and how these issues play into site acquisition, development, and divestiture.

REPRESENTATIVE EXPERIENCE

Litigation Support

- ***Litigation Support, Confidential Client, City of Commerce, California –*** Conducted site review of historical records, developed and implemented soil, soil vapor, and groundwater investigation, and developed Site Conceptual Model (SCM) for former aerospace facility that was now developed as a multi-tenant warehouse. Successful in being able reconstruct historical SCM to show that environmental impacts were caused by historic aerospace operations from the 1940s to 1960s and not from the more recent tenant operations. Provided information and deposition for property management firm's counsel.

Environmental Site Assessments and Regulatory Compliance

- ***TMDL Compliance, City of Torrance and Peninsula Cities, California –*** Principal-in-Charge for surface/stormwater monitoring programs for both the City of Torrance and of the City of Rolling Hills Estates, Rolling Hills, Palos Verdes Estates, and Rancho Palos Verdes (Peninsula Cities). Programs are to maintain regulatory compliance with Total Maximum Daily Load (TMDL) requirements.
- ***RREEF, Villa Marina Marketplace, Marina Del Rey, California —*** Mr. Willis managed the design and installation of a groundwater treatment system to treat groundwater impacted from metals and selenium to meet NPDES discharge requirements for a basement dewatering system for a shopping center. He currently manages the operation, maintenance and reporting associated with the ongoing dewatering system.
- ***RREEF, Multiple Sites, Southern California —*** Mr. Willis serves as client director for RREEF on multiple projects including acquisition studies (which include mold, asbestos and indoor air quality surveys), tenant audit programs, soil remediation, groundwater investigation and remediation, third party oversight, agency negotiation, and mold and asbestos abatement programs.

- ***Opus Corporation, Multiple Sites, Southern California —*** Mr. Willis has directed over 50 acquisition-related due diligence investigations for Opus Corporation (Opus). Scope of work has included Phase I ESAs, soil and groundwater investigations, risk evaluations, agency negotiation, and aiding Opus in evaluating and quantifying the potential risk associated with recognized environmental concerns.
- ***Various Clients, Various Locations, Southern California —*** Project manager for more than 200 Phase I environmental assessments (ESAs) for industrial facilities including aerospace, furniture and paper manufacturing factories; utility companies, vehicle and equipment maintenance facilities; and landfills as well former agricultural land. The objective of the ESAs was to evaluate and quantify potential liabilities associated with the acquisition and development of the properties.

Site Investigation and Remediation

- ***Kimco Realty Corporation, multiple locations in California and Nevada, –*** Serves Principal-in-Charge and program manager for investigation and remediation of several dry-cleaner sites in California (Cupertino, Daly City, Lakewood, and LaVerne) and Reno, Nevada. Projects range from investigation of soil impact to remediation of soil and groundwater. Mr. Willis is responsible for developing remedial strategies, negotiating with regulatory agencies, and providing technical direction to staff in order to evaluate and remediate site impacts, and bring sites to regulatory closure.
- ***Baker Cold Storage, Port of Long Beach Pier B Facility, California –*** Serves as project manager for investigation, remediation and redevelopment support of a 12-acre former wood treatment facility in the Port of Long Beach. The site is impacted with pentachlorophenol (PCP), metals, VOCs, and dioxins/furans. In addition, tidally influenced groundwater is impacted with PCP and petroleum hydrocarbons and methane charged from oilfield operations. Mr. Willis evaluated investigation data, managed a groundwater investigation program and develop a remedial approach for soil and groundwater. Mr. Willis successfully streamlined the regulatory process by aggregating the remedial work plans including RCRA closure of a drip pad, into one encompassing work plan (Soil and Groundwater Response Plan) and one Remedial Design Document ([RDD] that incorporated the facility design components into building mitigation design), and securing agency approvals on components of site construction concurrent with development of the RDD. Site is currently being developed with a 250,000 square-foot cold storage facility.
- ***Black Mountain Industrial Complex Remedial Design and Implementation, Nevada –*** Served as project manager for expedited investigation and remediation program for the Tronox industrial facility within the BMI Complex. Previously the world's largest magnesium production facility during World War II, the site was later utilized for the manufacture of rocket fuel, other products, and most recently alkali and manganese oxide-based chemicals. Historical Industrial operations resulted in subsurface impacts from heavy metals, perchlorate, pesticides, chlorinated solvents, asbestos, radionuclides, and other chemicals. Developed streamlined investigation and remedial approach, prepared remedial plans, and rapidly mobilized and managed a team of staff and subcontractors to remove approximately 800,000 cubic yards of soil from the site to meet commercial soil cleanup goals for direct contact exposure in an expedited timeframe.
- ***Hawaii Wood Preserving Company Treatment Facility, Maui, Hawaii –*** Served as project manager, for decommissioning, investigation, remediation, and closure for a former wood treatment facility to allow for redevelopment. The site operated as from 1972 to 2001 to treat lumber with PCP, chromated copper arsenate (CCA), permithrin, and disodium octoborate. Chemicals were

profiled, all equipment was decontaminated and ecommissioned, and verification sampling was conducted as part of decommissioning. A remedial investigation and remedial alternatives analysis was developed and implemented to investigate and develop a path-forward to closure. The implemented remedial approach consisted of site capping and long-term groundwater monitoring.

- ***Lockheed Martin Former International Light Metals Facility, Torrance, California —*** Served as project manager and principal investigator for a 67-acre aerospace facility where client objective was expedited redevelopment. The project included facility demolition, preparation and implementation of a Resource Conservation and Recovery Act (RCRA) closure plan for 11 permitted RCRA units, negotiations with the Department of Toxic Substance Control (DTSC), preparation of a RCRA Facility Assessment (RFA) (210 features identified that required intrusive investigation), implementation of a RCRA Facility Investigation (RFI) for soil and groundwater, preparation of a health-based risk assessment, and implementation of soil remediation. Site closure for soil was granted only three years after project initiation, in contrast to the normal six to eight year process, and has been used as an example by head DTSC officials as an example of industry and the regulatory community working together to achieve expedited site closures for property redevelopment purposes. Mr. Willis also developed strategy for groundwater investigation and remediation and negotiated the corrective action consent agreement (CACA) with DTSC.
- ***Playa Capital Corporation, Playa Vista Development Project, Los Angeles, California —*** Mr. Willis served as program manager for the Playa Vista project, one of the largest and most visible brownfield development projects in the country. At 1,100 acres, it is the largest underway in Los Angeles County. His primary responsibility included environmental program management (including scoping, developing, scheduling, and tracking environmental activities for the development project), risk management (including developing and negotiating with agencies for appropriate cleanup criteria), remedial strategy/management (including development and implementation of pilot tests and oversight of investigation and remediation activities), agency/RP/buyer negotiations, consultant and contractor selection/oversight, coordination with Playa's infrastructure group on the development/implementation of integrated remedial approach where appropriate, litigation support, data management, and transactional support with respect to the sale of remediated parcels.
- ***Project Manager, Confidential Client, Buena Park, California —*** Served as project manager for multi-media remediation project at a commercial development in Buena Park, California. The site was a former food processing facility that was redeveloped into commercial offices and warehouse space. Evaluated the environmental liability for a Real Estate Investment Trust (REIT) that subsequently purchased the property, and managed remediation program in conjunction with site redevelopment.
- ***Project Manager, Brownfield Redevelopment, Torrance, California —*** Served as project manager for site redevelopment project for a PacTrust. Evaluated environmental liabilities associated with a 12-acre parcel that was part of a butadiene plant (Del Amo Superfund Site) left undeveloped as a brownfield, and formulated a strategy to expedite regulatory closure and redevelopment. A comprehensive investigation was completed on the parcel, and the report submitted to the Environmental Protection Agency (EPA) for review. Successfully negotiated with EPA to conduct a non-Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) closure program. Conducted soil remediation program under EPA oversight in conjunction with site construction activities.

- ***Project Manager, Investigation and Remediation Program, Safety Kleen, Vancouver, British Columbia, Canada —*** Managed remediation of former solvent recycler transfer stations in British Columbia and Alberta, Canada. Sites involved characterization and remediation of soil and perched groundwater zones. Assessed feasibility of vapor extraction for cleanup of vadose zone contamination, and designed and installed a dewatering system for perched water in former tank cavities and surficial saturated zone for Vancouver transfer station. Achieved regulatory site closure two years faster than previous consultant's estimate.
- ***Cupples Manufacturing, Investigation and Remediation Program, La Mirada, California —*** Project manager for soil/groundwater characterization and remediation program at a truck maintenance facility in La Mirada, California. Conducted an underground storage tank and clarifier removal program in conjunction with site characterization activities. Implemented remediation of soil and groundwater impacted with petroleum hydrocarbons. Negotiated and received closure from Regional Water Quality Control Board (RWQCB).
- ***Alberta Environment, Abandoned Wood Treatment Sites, Various Locations, Alberta, Canada —*** Project manager for the Wood Preserving Sites Characterization Program for Alberta Environment. Performed site characterization of four former wood preservation sites in Alberta, Canada. The sites had been used for many years for treating wood poles and railroad ties with a pentachlorophenol/diesel mixture. Soil and/or groundwater were impacted at the sites. Soil borings and groundwater monitoring wells were installed, and laboratory analysis of soil and groundwater was performed, to help determine the lateral and vertical migration of dissolved-phase hydrocarbons in the groundwater and dense non-aqueous phase liquids (DNAPLs) through glacial tills and several non-confining layers. Detailed drilling and sampling plans were necessary to ensure correct evaluation of vertical DNAPL migration. Aquifer tests were performed and receptor data were collected in order to formulate a quantitative assessment of both health-based and environmental risk.
- ***Texaco Refining and Marketing Inc., Investigation and Remediation Programs, Various Locations, Southern California —*** Responsible for remediation programs at several petroleum retail outlets for Texaco in the southern California area. Projects included soil and groundwater investigation programs, underground storage tank (UST) removals, remedial design (including design and implementation of vapor extraction and aquifer tests), implementation of remedial program, and operation and maintenance of remediation systems. This included designing, specifying, permitting, and installing of all equipment (including piping, downhole pumps, off-gas treatment, and water treatment).
- ***Groundwater Contamination Investigation and Analysis, Technisol, Raymond, Alberta, Canada —*** Conducted a groundwater investigation program at a solvent recycling facility located in southern Alberta, Canada. The program was implemented to determine the lateral and vertical extent of several species of chlorinated volatile organic compounds present in the confined aquifer beneath the facility. Aquifer testing was performed to estimate migration rates and to provide preliminary data for remedial action. Successfully negotiated with Alberta Environment (lead regulatory agency) for monitored natural attenuation approach.
- ***Pier A Railyard, Port of Los Angeles, Los Angeles, California —*** Managed a soil and groundwater investigation program at a Port of Los Angeles rail transfer yard. The objective of the project was to characterize previously identified polynuclear aromatic compounds, volatile organic compounds, and petroleum hydrocarbons in the soil and groundwater, and identify any regulated

building materials in the site structures in order to facilitate an expedited redevelopment program. The project was finished ahead of schedule and under budget.

- ***Soil and Groundwater Remediation, Texaco, Various Locations, Southern California —*** Conducted vapor extraction tests, performed data analysis, and generated recommendations for an industrial manufacturing facility to determine the viability of using vapor extraction for remediating chlorinated solvents, primarily tetrachloroethene (PCE), present in the soil beneath the facility. Each test was designed to assess air flow rates and vacuums, vertical interference and crossflow, radii of influence, potential for water upwelling, and effectiveness of vapor extraction in both vadose and capillary zones. Extracted vapors were collected to determine volatile organic compound concentrations. Data were used to determine well spacing and slotting intervals, optimum flow rate/vacuum combinations, extraction blower sizing, and vapor treatment equipment.
- ***Texaco, Various Locations, Southern California—*** Responsible for preparation of South Coast Air Quality Management District (SCAQMD) permitting, installation, operation and maintenance of thermal and catalytic oxidizers/vapor extraction systems for the remediation of soil (containing petroleum hydrocarbons) beneath operating service stations.

EDUCATION

B.S., Geology, University of Alberta, Alberta, 1988

PROFESSIONAL HISTORY

Northgate Environmental Management, Principal, 2006 to date
LFR Levine Fricke, Principal Hydrogeologist, 2002 – 2006
Integrated Environmental Services, Director of Operations/Senior Program Manager, 1999– 2002
ARCADIS Geraghty & Miller, Inc. Senior Hydrogeologist, 1993 – 1999
Environmental Design Corporation, Vice President, 1992
Environmental Science & Engineering, Inc., Staff Geologist, 1991
Terracon Geotechnique, Ltd., Geologist, 1989 – 1991
Contract Positions, Various Locations, Geologist, 1988

REGISTRATIONS

Certified Environmental Manager, Nevada, No. EM 2252

Nicky Galloway, P.E.
PROJECT ENGINEER

Ms. Galloway is a Project Engineer whose focus has been in remediation construction site oversight, Phase I and II environmental site assessments, environmental field sampling, environmental audits, site inspections, and technical data review. Her environmental field experience includes soil and groundwater sampling, soil vapor studies, stormwater sampling, indoor air quality studies, air monitoring activities, and site cleanups. Ms. Galloway is a licensed Civil Engineer in the state of California and has received the OSHA 40 Hour HAZWOPER Training.

REPRESENTATIVE EXPERIENCE

Environmental Site Assessments and regulatory Compliance

- ***Machado Lake Nutrient TMDL Sampling, Rolling Hills Estates, California –*** Ms. Galloway was the field lead for the collection of stormwater samples and flow measurements in accordance with the Palos Verdes Peninsula Coordinated Monitoring Plan and the Machado Lake Eutrophic, Algae, Ammonia, and Odors (Nutrient) TMDL (established by the Los Angeles Regional Water Quality Control Board) to monitor nutrients, including nitrogen and phosphorous discharged from Rolling Hills Estates to Machado Lake. Sampling activities included rapid mobilization during wet weather and dry weather events on a monthly basis between 2012 and 2016 to collect samples from surface waters and confined conveyance systems. She calculated monthly averages of total nitrogen and total phosphorous and compared the results to waste load allocations to determine attainment status.
- ***Machado Lake Nutrient TMDL Sampling, Torrance, California –*** Ms. Galloway is the field lead for the collection of stormwater samples and flow measurements in accordance with the provisions of the Machado Lake TMDL Special Studies Work Plan and the Machado Lake Eutrophic, Algae, Ammonia, and Odors (Nutrient) TMDL (established by the Los Angeles Regional Water Quality Control Board) to monitor nutrients, including nitrogen and phosphorous discharged from the City of Torrance to Machado Lake. Sampling activities include rapid mobilization during wet weather and dry weather events on a monthly basis since 2012 and data collection from data loggers to calculate flow rate and discharge volume and to monitor storm events. She also maintains discharge flow and volume calculations for annual reporting and assists with the preparation of annual report document.
- ***Anthropogenic Source Nutrient Assessment, Rolling Hills Estates, California –*** Ms. Galloway was a field lead for wet weather event stormwater sampling conducted for identification of nutrient sources to study nutrient load reduction at the Model Equestrian Center Project, Rolling Hills Estates, California.
- ***National Pollutant Discharge Elimination System Monitoring, Marina del Rey, California –*** Ms. Galloway coordinates field activities associated with water quality sampling and analysis, flow data collection and analysis, and system operation and maintenance for a groundwater treatment system for VOCs, selenium, and metals prior to discharge to the storm drain. Her responsibilities also include preparing quarterly and annual monitoring reports for the Regional Water Quality

Control Board per requirements in the monitoring and reporting program of the NPDES permit for the project. She currently manages the testing, maintenance, and reporting associated with the ongoing dewatering system.

- ***Environmental Site Assessments, Various Locations, California, Nevada, and Texas –*** Ms. Galloway has conducted and managed dozens of Phase I and Phase II environmental site assessments for commercial, industrial, and residential properties. Her responsibilities included complete site history reviews, identifying recognized environmental conditions and areas of potential concern, as well as field sampling and analysis to investigate potential impacts to soil and groundwater quality. She also managed budgets, schedules, and client communication. Work was performed in general conformance with the ASTM environmental assessment standard and the U.S. EPA *All Appropriate Inquiry* guidelines.
- ***Environmental Audits, Various Locations, California –*** Ms. Galloway has performed and managed multiple environmental audits at several commercial and industrial facilities in California. Her responsibilities included conducting interviews with current tenants, inspecting site facilities to determine environmental compliance or potential issues, and completing a final audit report of findings. She also managed budgets, schedules, and client communication.

Site Investigation and Remediation

- ***Baker Cold Storage Facility Brownfield Clean-up, Long Beach, California –*** Ms. Galloway prepared an initial Phase I ESA and conducted site visits for the site that is impacted with pentachlorophenol (PCP), metals, VOCs, and dioxins/furans and under the regulation of the DTSC. In addition, tidally influenced groundwater is impacted with PCP and petroleum hydrocarbons and methane charged from oilfield operations. She also conducted a groundwater investigation program to evaluate impacts for the design of the remedial actions. Ms. Galloway assisted with the development of the Soil and Groundwater Response Plan and the Remedial Design Document. The site is currently being developed with a 250,000 square-foot cold storage facility. During construction activities, Ms. Galloway has conducted oversight of the site activities, including soil import/export, excavation, construction, and the installation of a methane barrier, and she has performed work zone and perimeter air monitoring. She also prepared daily activity reports including the analysis of air monitoring and Rule 1166 monitoring data to submit to the DTSC. Ms. Galloway has coordinated field activities including the decontamination and sampling of former drip pads, air monitoring activities, and wastewater sampling. She manages the data obtained from daily field activities and additionally has trained field staff.
- ***Black Mountain Industrial Complex, Henderson, Nevada –*** Ms. Galloway was a field engineer on site for the remediation of Tronox's industrial facility in Henderson, Nevada in which approximately 800,000 cubic yards of impacted soil were removed. Previously the world's largest magnesium production facility during World War II, the site was later utilized for the manufacture of rocket fuel, other products, and most recently alkali and manganese oxide-based chemicals. Historical Industrial operations resulted in subsurface impacts from heavy metals, perchlorate, pesticides, chlorinated solvents, asbestos, radionuclides, and other chemicals. Her responsibilities included providing technical oversight of excavation, construction, and groundwater pumping well installation activities; collecting groundwater samples; obtaining soil and air samples; monitoring dust levels; and conducting weekly site inspections for SWPPP compliance.
- ***Monsanto Former Detergent Manufacturing Facility, Carson, California –*** Ms. Galloway measured groundwater levels and collected groundwater samples to monitor for hydrocarbons,

predominantly benzene, which migrated through the soil to the groundwater beneath the site and migrated downgradient. Some samples were collected on the adjacent oil refinery property and Ms. Galloway received the appropriate training to access the refinery.

- ***Oxygen Biosparge Pilot Scale Investigation, Carson, California*** – Ms. Galloway collected groundwater samples using low flow sampling techniques as part of an oxygen biosparge in situ treatment system. Work was performed using supplied air in Level B personal protective equipment. She also routinely works in conjunction with a mobile laboratory to simultaneously collect and analyze soil vapor samples to monitor benzene concentrations as part of the pilot scale investigation.
- ***Former Paint Facility, City of Commerce, California*** – Ms. Galloway was responsible for coordinating the field activities associated with collecting soil vapor and LNAPL samples for a former paint facility. A soil vapor extraction system was operated on the site and sampling was performed to develop a conceptual site model to assess the effectiveness of continued remediation at the Site. Ms. Galloway was responsible for coordinating the sample collection and analysis with the laboratory and worked to draft the analytical report.
- ***Kimco Lakewood Plaza, Bellflower, California*** – Ms. Galloway conducted soil and indoor air sampling to help determine a remedial design for soil impacts with VOCs from a former dry cleaning operation. She oversaw excavation activities and collected confirmation samples. Ms. Galloway managed the data and documents associated with the project and assisted with the preparation of final reports.
- ***Los Angeles World Airports, Los Angeles International Airport, Los Angeles, California*** – Ms. Galloway reviewed historical reports, documents, and data for multiple portions of the Los Angeles International Airport and prepared summary documents. She also managed the review of similar work by other consultants for the facility. Ms. Galloway will utilize the results of these investigation efforts, currently in progress, to develop a facility wide groundwater monitoring program.
- ***Port of Oakland Embarcadero Cove, Oakland, California*** – Ms. Galloway was a staff engineer on site to oversee the abandonment of existing groundwater monitoring wells and the installation and development of new groundwater monitoring wells. Her responsibilities also included annual groundwater sampling at the site that is known to have been impacted by VOCs, SVOCs, organochlorine pesticides, PCBs, dioxins, and furans from facilities that previously occupied the site that were known to have handled and stored solvents, refined petroleum products, wood, preservatives, pesticides, and herbicides. She also assisted the preparation of the annual report and five year review for the site.
- ***Former Apartment Complex Close-Out, Carson, California*** – Ms. Galloway was responsible for the oversight of environmental field activities related to the demolition of an existing apartment complex for redevelopment. Field activities included asbestos and lead-based paint surveys and removal, hazardous waste packaging and disposal, geophysical surveys, and air monitoring. Ms. Galloway also prepared close out reports and documents for the site.
- ***Former Dry Cleaning Facility, Santa Rosa, California*** – Ms. Galloway performed low flow groundwater sampling for quarterly reporting for a site containing both a dry cleaner and a residential apartment building to monitor impacts to the groundwater. The site is known to have existing soil and groundwater impacts from historic use and storage of petroleum products and other hazardous substances on surrounding sites.

- ***King's Court Shopping Center, Los Gatos, California*** **–** Ms. Galloway collected groundwater samples for the semi-annual monitoring report, in compliance with a monitoring plan outlined by the California Regional Water Quality Control Board.
- ***Wetland Restoration Project, San Francisco, California*** **–** Ms. Galloway reviewed contractor submittals, including dust control, decontamination, soil stabilization, and execution plans for compliance with the project specifications and regulatory requirements and prepared responses to requests for information for the restoration of 26.5 acres of tidal wetland habitat. The site is known to have soil containing naturally occurring asbestos, copper, lead, nickel, zinc, TPH, PAHs, pesticides, and PCBs and some metals impacting groundwater.
- ***Sulphur Bank Mercury Mine Superfund Site, Clearlake Oaks, California*** **–** Ms. Galloway was a staff engineer for a site analysis of Sulphur Bank Mercury Mine, a site impacted by metals in the soil as a result of historic mining operations for mercury. Responsibilities included reviewing previous reports; comparing risk based site screening levels; conducting a technical review of past field investigations and data to provide an assessment of background levels of mercury, arsenic, and antimony at the site; and determining the estimated extent of metal-impacted soil as well as the range of appropriate site screening and background levels.

Engineering Design

- ***Vapor Barrier System Design for Duplex Development, Los Angeles, California*** **–** Ms. Galloway was one of the engineers responsible for the design of a vapor barrier system to prevent intrusion of VOCs in soil vapor into the development of several residential duplexes. Her work included working with a Principle Engineer to design the system and details and prepare the design drawings. Ms. Galloway also prepared inspections and oversight of the installation of the system.

EDUCATION

B.S., Civil and Environmental Engineering, University of California, Los Angeles, 2009

PROFESSIONAL HISTORY

Northgate Environmental Management, Inc., Project Engineer, January 2015 to date
Northgate Environmental Management, Inc., Staff Engineer, August 2010 to January 2015
Incledon Consulting Group, Civil Engineer, July 2009 to July 2010
Incledon Kirk Engineers, Engineering Intern, June to September 2007 and June to September 2008

REGISTRATIONS / CERTIFICATIONS

Professional Engineer, California, No. 83985
OSHA 40-hour HAZWOPER

Appendix I Focused Phase II Environmental Investigation

Appendices

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FOCUSED PHASE II ENVIRONMENTAL INVESTIGATION

Brea 265 Property
Valencia Avenue at Lambert Road
Brea, California

Prepared For:

Aera Energy LLC
3030 Saturn Street, Suite 101
Newport Beach, California 92660

Prepared By:

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, California 92653

May 10, 2017

Project No. 2077.01.03S

FOCUSED PHASE II ENVIRONMENTAL INVESTIGATION

Brea 265 Property
Valencia Avenue at Lambert Road
Brea, California

May 10, 2017

Prepared For:

Aera Energy LLC
3030 Saturn Street, Suite 101
Brea, California 92821

Prepared By:

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, California 92653

Derrick S. Willis
Principal

Nicky E. Galloway, PE
Project Engineer

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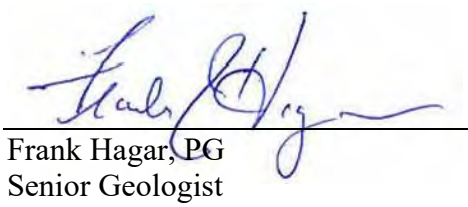
CERTIFICATION

All geologic information, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by a Northgate California Professional Geologist.



May 10, 2017

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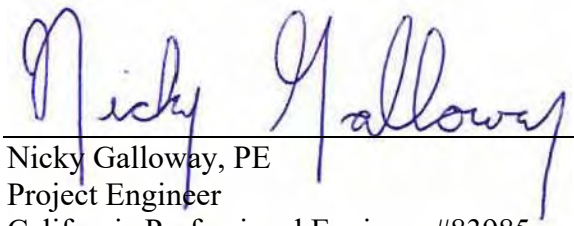

May 10, 2017

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1.0 INTRODUCTION

This report presents the results of a Focused Phase II Environmental Investigation performed by Northgate Environmental Management, Inc. (Northgate) for Aera Energy LLC ("Aera"), at the Brea 265 Property located in the City of Brea, California (the Central Property or Site). The Site consists of approximately 265 acres of land developed as an active oil production field, a plant nursery, and a tree farm, located along Valencia Avenue at the intersections of Lambert Road, Carbon Canyon Road, and Rose Drive. The Site is identified as Assessor's Parcel Numbers (APNs) 320-073-07 and -09, and 322-031-01, -12, -13, -14, -19, -21, and -24 in Orange County.

For the purpose of this report, the Site has been divided into two properties, identified as the 100-Acre Property and the 165-Acre Property. The 100-Acre Property comprises that portion of the Central Property located west of Valencia Avenue and is divided into northern and southern sections by Lambert Road. The 165-Acre Property comprises the portion of the Central Property located east of Valencia Road, south of Carbon Canyon Road, north of Blake Road, and northeast of Rose Drive. A Site Location Map is shown on Figure 1 and a Site Plan is shown on Figure 2.

1.1 Objectives

The primary objective of the Focused Phase II Environmental Investigation is to evaluate the potential presence of contaminated soil related to the long-term historic oil field operations at the Site. The Phase II investigation focused on evaluating potential subsurface contamination impacts at specific features of potential environmental concern identified in a Phase I Environmental Site Assessment (ESA) concurrently being prepared for the Site by Northgate (Northgate, 2017a).

1.2 Scope of Work

The Focused Phase II Environmental Investigation was conducted in general accordance with our *Proposal for Focused Phase II Environmental Investigation, Brea-Olinda Central Oil Field Property, Brea, California* dated March 12, 2017 (Northgate, 2017b) and our *Change Order #1 to Focused Phase II Investigation, Brea-Olinda Central Oil Field Property, Brea, California* dated March 24, 2017 (Northgate, 2017c). The scope of work included the following:

- Site walk to mark the proposed boring locations, and notification to Underground Service Alert (USA) for underground utility clearance;
- Preparing a Site-specific Health and Safety Plan (HASP);
- Obtaining drilling permits;

- Excavating nine trenches to approximately 15 feet below ground surface (bgs) on the 100-Acre Property and five trenches on the 165-Acre Property for collecting representative soil samples (14 trenches total);
- Advancing four hand auger borings to 5 feet bgs along the drainage that traverses the 100-Acre Property for collecting soil samples;
- Advancing two direct-push GeoProbe borings to a maximum depth of 56 feet bgs on the 100-Acre Property;
- Advancing one hollow-stem auger boring to an approximate depth of 60 feet bgs on the 100-Acre Property and one boring to 60 feet bgs on the 165-Acre Property for collecting soil and soil vapor samples (two borings total);
- Analyzing a total of 78 soil samples for total petroleum hydrocarbons (TPH) – carbon chain identification (TPH-cc), 21 soil samples for TPH quantified as gasoline (TPH-g) , 21 soil samples for volatile organic compounds (VOCs), 21 soil samples for semi-volatile organic compounds (SVOCs), 17 soil samples for 17-Title 22 metals, , 14 soil samples for polychlorinated biphenyls (PCBs), 9 soil samples for uranium, 5 soil samples for organochlorine pesticides (OCPs), 5 soil samples for chlorinated herbicides; and 5 soil samples for organophosphorus pesticides (OPPs);
- Installing one temporary soil vapor probe (SVP) at 15 feet bgs in a hollow stem auger borings for collecting a soil vapor sample for VOC analysis;
- Preparing geographic information system (GIS) base maps depicting Site features and sample locations, managing data, and providing statistics and spatial analysis of results; and
- Preparing this report.

This Focused Phase II Environmental Investigation was based on the scope of work outlined in our *Proposal for Focused Phase II Environmental Investigation, Brea-Olinda Central Oil Field Property, Brea, California* dated March 12, 2017, (Northgate, 2017b) and our *Change Order #1 to Focused Phase II Investigation, Brea-Olinda Central Oil Field Property, Brea, California* dated March 24, 2017 (Northgate, 2017c).

2.0 BACKGROUND

2.1 Site Description

The Site, identified as the Brea 265 Property, consists of 265 acres of land covering nine non-contiguous parcels located on the east and west sides of Valencia Avenue at the intersections with Lambert Road, Carbon Canyon Road, and Rose Drive in Brea, California. For the purpose of this report, the Brea 265 Property has been divided into two separate properties for ease of geographic reference in describing historic Site operations, specific locations of potential environmental concerns, and current Site conditions. An overall Site Location Map is shown on Figure 1, and a Site Plan showing the property designations is shown on Figure 2. The properties are defined as follows:

The 100-Acre Property

The 100-Acre Property consists of two parcels totaling 100 acres located west of Valencia Avenue. The property is split into northern and southern sections by Lambert Road. The area north of Lambert road includes APN 320-073-07 which is identified as 2601 Valencia Avenue. The area south of Lambert road includes APN 320-073-29 which is identified as 2501-2811 Valencia Avenue. This property is developed with an active oil production field and agricultural operations including a nursery and an organic food growing business.

The 165-Acre Property

The 165-Acre Property consists of seven contiguous parcels located east of Valencia Avenue, south of Carbon Canyon Road, north of Blake Road, and northeast of Rose Drive. It includes APNs 322-031-01, -12, -13, -14, -19, -21, and -24. There are no street addresses associated with the 165-Acre Property.

2.2 Site History

Information collected by Northgate during a concurrent Phase I ESA at the Site (Northgate, 2017a) indicates that the Site has historically been developed and primarily operated as an oil field since the 1920s, with some agricultural uses since the 1930s. Operations at the oil fields have historically included underground storage tanks (UST) and aboveground storage tanks (ASTs) for the storage and containment of gasoline, diesel, crude oil, and other process hydrocarbons. The 100-Acre Property and the northern and central portions of the 165-Acre Property are still developed as operating oil fields that include 104 oil wells, a dehydration unit, a vapor recovery system, a production unit and tank farm, and a carbon filtration area. Petroleum and steam pipelines are also present throughout the Site as both aboveground and belowground

features. Oil sumps were not observed during our Phase I ESA reconnaissance, but have historically been utilized across the Site for the oil field operations. Sumps are identified at the Site from historical aerial photographs as unlined areas historically utilized for the storage of waste oil and oil field related waste liquids. Approximate locations of historical and current oil field features of potential concern are shown on Figure 3 for the 100-Acre Property and Figure 4 for the 165-Acre Property. Northgate's Phase I ESA identified the presence of the following Recognized Environmental Conditions (RECs) in connection with the property:

- The Site has been developed as an operating oil field since the 1920s. Some oil wells are still operational and various levels of ponded oil and staining were observed at each well, primarily in the vicinity of the well box. The historic and current operations of the oil field, including the oil wells, tank farms, and pipelines, represent a potential threat to soil, groundwater, and/or soil vapor quality at the subject Site. It should be noted that the California Division of Oil Gas and Geothermal Resources generally prohibits construction of residences directly over active or sealed and abandoned oil or gas wells.
- Multiple historic oil sumps, including a large former, unlined oil sump located in the southwestern portion of the 165-Acre Property that has since been filled in and developed to include Rose Road, were present across both properties of the subject Site. These historic sumps represent a potential threat to soil, groundwater, and/or soil vapor quality at the Site.
- Given that the Site is a defined oil/gas field, the Site will be subject to the guidelines and requirements set forth in the Orange County Fire Authority's (OCFA's) *Combustible Soil Gas Hazard Mitigation* document that outlines the guidance for the investigation, remediation, and/or mitigation of potentially hazardous concentrations of combustible soil gases associated with the construction and occupancy of a building located on or within the vicinity of an oil/gas field and the OCFA specified areas.
- Petroleum and natural gas pipelines are present throughout portions of both the 100-Acre and 165-Acre Properties. Petroleum hydrocarbon, or other hazardous materials releases may have occurred along the pipelines

Northgate's review also identified the following Historic REC (HREC) at the Site:

- The 100-Acre Property portion of the Site has a documented release from a leaking diesel UST that impacted soil to depths of 90 feet bgs. The facility received regulatory closure from the OCHCA on August 20, 1991. However, no remedial action was performed and petroleum hydrocarbons remain in soil at the Site.

Northgate's Phase I ESA also identified the following potential environmental concerns:

- A drainage channel traverses the 100-Acre Property from north to south that is reported to originate from the Olinda Alpha Landfill to the north, extend through the adjacent oil field property to the north, and potentially contain runoff from that upgradient facility. Runoff from a landfill facility could contain contaminants that could potentially impact future development of the Site.
- Given the historic use of the Site for agricultural purposes, there is a possibility that pesticides and herbicides may be present in shallow soil in some areas of the Site.
- Test results from indoor air samples collected within the local zip code area indicate that radon may constitute a potential environmental concern at the Site.
- Injection wells are present at the Site and are subject to many new regulations. Further review of specific requirements for closing out the existing injection wells may be required prior to development of the Site.

Northgate's Phase I ESA recommended that a Phase II ESA be conducted to evaluate the existing soil and soil vapor conditions at the Site related to these RECs and issues of potential environmental concern.

2.3 Regional and Local Geology and Hydrology

2.3.1 Geology

The Site is located in the Puente Hills, an area underlain by an assemblage of Cenozoic rocks overlying a Mesozoic basement of igneous and metamorphic rock. Exposed bedrock near the Site consists of marine clastic sedimentary rocks of the Upper Miocene Puente Formation and Pliocene Fernando Formation that were laid down over thin Cretaceous age igneous basement (Yerkes, 1965). The Puente Formation is composed of fine-grained turbidite, flysch, and ash deposits high in organic material. The high heat flow emanating through the thin basement complex facilitated conversion of the organics to petroleum. The Fernando Formation is a marine mudstone, siltstone, and sandstone. Rocks exposed near the Site consist of marine clastic rocks of the Sycamore Canyon Member, the uppermost member of the Fernando Formation (Yerkes, 1972).

Surface soils exposed at the Site are mapped as marine terrace and continental alluvial deposits of Quaternary age. Localized areas of the Site contain lenses of fill placed for oil field roadways and drill pads (Morton 1981 and 2004). Subsurface soils encountered during the current investigation generally consist of dark yellowish brown clays with little silt. Thin beds of sandy and clayey silt are present within the clay near the surface and below 25 feet bgs. The silts and

clays are medium-stiff to stiff, dry, and have little to no plasticity. Calcification was also observed below 25 feet bgs.

2.3.2 Hydrology

The Site is located on the northern edge of the Coastal Plain of Orange County, a sub-unit of the Central Plain of the Orange County Groundwater Basin. The Orange County Groundwater Basin is a northwest-trending elliptical syncline filled with alluvium. The syncline is bounded by the Puente Hills and Whittier Fault to the northeast, the Santa Ana Mountains and San Joaquin Hills to the southeast, and the Newport-Inglewood Fault to the southwest.

The Site is located within the Forebay area of the Orange County Groundwater Basin, in the Yorba Linda subbasin. The Yorba Linda subbasin has very little groundwater pumping due to the high total dissolved solids concentrations and low transmissivity (Warne, 1961). Groundwater from the subbasin flows southward into the main groundwater basin.

The topography of the Site is gently sloping with drainage flowing primarily to the south in various natural drainages that eventually run to storm drains, channels, or seasonal streams. Near the ground surface, groundwater generally exists in zones beneath the arroyo drainages, or as discontinuous perched water zones in the sediments.

According to the Orange County Water District, groundwater is present in the principal aquifer zone at approximately 280 feet bgs in the Site vicinity (Woodside, 2015). The principal aquifer zone is where most of the groundwater production occurs in the Site vicinity. Information presented in unpublished engineering reports for a corrective actions site located approximately one mile southeast of the Site indicated an average depth to groundwater of approximately 88 feet bgs, with a groundwater flow direction toward the southwest at a gradient of 0.02 feet per feet (DEC, 2006). Groundwater was not encountered in the borings advanced to a maximum depth of 60 feet bgs during the present investigation.

3.0 INVESTIGATION METHODS

Northgate conducted soil and soil vapor sampling at the Site between March 17 and 29, 2017. Sampling locations are shown on Figures 5 and 6 for the 100- and 165-Acre Properties, respectively.

3.1 Pre-Field Activities

Before sampling activities began, Northgate coordinated Site access with Mr. Michael Klancher of Aera. In addition, Northgate conducted a walk-through of the Site to mark proposed sampling locations and coordinated with Russ Quinliven and Bill Wren of Linn Energy (operator of the oilfield) to obtain approval of the proposed sampling locations. Other pre-field activities included the specific tasks outlined below.

3.1.1 Health and Safety Plan

Northgate prepared a Site-specific HASP for the Focused Phase II Environmental Investigation. The HASP was prepared in accordance with applicable federal and state regulations. The HASP addressed the potential for exposure to hazardous constituents, and delineated the general safety procedures that are required for the safe operation of mechanical equipment to be used while conducting the field operations at the Site.

3.1.2 Clearance of Underground Utilities

USA was notified, as required by law, 48-hours prior to any intrusive activities began in order to locate utilities in the vicinity of the borings. In addition, all proposed locations were "cleared" with a metal detector and all locations were then reviewed and approved by Linn Energy.

3.1.3 Drilling Permits

Drilling permits for the deep hollow-stem auger borings were obtained from the Orange County Health Care Agency, as required, prior to drilling. Copies of the permits are provided in Appendix A.

3.2 Soil Sampling and Analysis

Northgate conducted a soil sampling program that consisted of excavating 14 trenches, four shallow hand-auger borings, two deeper hollow-stem auger borings, and two direct-push GeoProbe borings as described in the sections below.

3.2.1 Soil Sample Collection – Trenching Program

A total of nine exploratory test trenches were excavated on the 100-Acre Property, and five trenches and three potholes were advanced on the 165-Acre Property as shown on Figures 5 and 6, respectively. The trenches were excavated using a backhoe provided and operated by American Integrated Services (AIS), a licensed contractor headquartered in Wilmington, California. The trenches measured approximately 18 feet in length and were excavated to an approximate depth of 15 feet bgs. Potholes were variable in length and depth, and were excavated only to a specific depth of interest. Soil excavated from the trenches was logged in the field in accordance with the Unified Soil Classification System (USCS) and screened with a photoionization detector (PID) for the possible presence of organic vapors. Representative soil samples were collected from each trench at approximate depths of 5, 10, and 15 feet bgs, or otherwise based upon field indications and PID readings. After the sampling was completed, the trenches were backfilled with the excavated soil cuttings. Copies of the trench logs are attached in Appendix B.

Trench locations are described below:

<u>The 100-Acre Property</u>

- Trench 104-T1 was excavated to 15 feet bgs near an abandoned tank in the vicinity of oil well 104, with soil samples collected at 5, 10, and 15 feet bgs. Select soil samples were analyzed for TPH-cc, TPH-g, VOCs, SVOCs, Title 22 metals, uranium, and PCBs.
- Trench DRU-T1 was excavated to 15 feet bgs in the vicinity of the dehydration unit equipment, with soil samples collected at 5, 10, and 15 feet bgs. Select soil samples were analyzed for TPH-cc, TPH-g, and VOCs.
- Trench S3-T1 was excavated to 15 feet bgs in former sump S3, co-located with a historic tank farm, with soil samples collected at 5, 10, and 15 feet bgs. Select soil samples were analyzed for TPH-cc, TPH-g, VOCs, SVOCs, and Title 22 metals.
- Trench S5-T1 was excavated to 17 feet bgs in former sump S5, located within the historic oil processing area just south of the dehydration unit, with soil samples collected at 5, 10, and 15 feet bgs. Select soil samples were analyzed for TPH-cc, TPH-g, VOCs, SVOCs, Title 22 metals, uranium, and PCBs.
- Trench S7-T1 was excavated to 15 feet bgs in former sump S7, located south of the historic oil processing area, with soil samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc.
- Trench S8-T1 was excavated to a depth of 15 feet bgs in the southern portion of former sump S8, located in the eastern portion of the historic oil processing area, with soil

samples collected at 5, 10, and 15 feet bgs. Soil samples were analyzed for TPH-cc and select samples were analyzed for TPH-g, VOCs, SVOCs, Title 22 metals, uranium, OCPs, PCBs, OPPs, and chlorinated herbicides.

- Trench S8-T2 was excavated to a depth of 15 feet bgs in the northern portion of former sump S8, located in the eastern portion of the historic oil processing area, with soil samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc.
- Trench VRS-T1 was excavated to a depth of 15 feet bgs in the southeastern portion of the vapor recovery system, with samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc. Select soil samples were additionally analyzed for TPH-g, VOCs, Title 22 metals, and PCBs.
- Trench VRS-T2 was excavated to 15 feet bgs in the southwestern portion of the vapor recovery system, with samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc. Select soil samples were additionally analyzed for TPH-g, VOCs, SVOCs, Title 22 metals, and PCBs.

<u>The 165-Acre Property</u>

- Trench BOTF-T1 was excavated to 15 feet bgs in the northeastern portion of the Brea-Olinda Tank Farm in the vicinity of the equipment downslope of the compressor and Header 1, with soil samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc.
- Trench BOTF-T2 was excavated to 15 feet bgs in the southeastern portion of the Brea-Olinda Tank Farm in the vicinity of the former tank foundations and equipment, with soil samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc. Select soil samples were additionally analyzed for TPH-g, VOCs, SVOCs, Title 22 metals, and PCBs.
- Trench H2-T1 was excavated to 15 feet bgs in the vicinity of the Header 2 process pipes located in the northwestern portion of the property, with soil samples collected at 5, 10, and 15 feet bgs analyzed for TPH-cc.
- Trench S20-T1 was excavated to 15 feet bgs in the southern and lowest portion of former sump S20, with soil samples collected at 5, 10, and 15 feet bgs and analyzed for TPH-cc. Select soil samples were additionally analyzed for TPH-cc, VOCs, SVOCs, Title 22 metals, uranium, and PCBs.
- Trench S20-T2 was excavated to 15 feet bgs in the northern portion of former sump S20 at the location of a former tank farm, with soil samples collected at 5, 10, and 15 feet bgs and analyzed for TPH-cc. Select soil samples were additionally analyzed for TPH-g, VOCs, SVOCs, Title 22 metals, and PCBs.

- Pothole S20-PH1 was excavated to approximately 8 feet bgs approximately 20 feet west of trench S20-T1. No samples were collected. However, visual confirmation of petroleum contamination beginning at approximately 5 feet bgs was obtained from this location.
- Pothole S20-PH2 was excavated to approximately 8 feet bgs approximately 20 feet east of trench S20-T1. No samples were collected. However, visual confirmation of petroleum contamination beginning at approximately 5 feet bgs was obtained from this location.

Samples collected for non-volatile compound analysis were collected by manually placing soil from the backhoe bucket into laboratory-supplied sample jars, sealed with Teflon-lined lids, labeled and stored on ice in a cooler. Samples collected for petroleum hydrocarbons or for VOC analysis were collected using Lock^{n}Load^{TM} samplers and preserved in ethanol and sodium bisulfate in volatile organic analysis (VOA) vials in compliance with Environmental Protection Agency (EPA) Method 5035. Soil sampling methodology is further described in Appendix C.

3.2.2 Soil Sample Collection – Hand Auger Program

Northgate advanced four hand auger borings along the drainage channel that traverses the 100-Acre Property. The hand auger borings were targeted to depths of 5 feet bgs. Representative soil samples were collected at approximate depths of 1 and 5 feet bgs. The borings were logged in the field in accordance with the USCS (Appendix B). The hand auger borings were advanced at the locations described below:

- Boring DR-HA-1 was advanced to 5 feet bgs in the northern portion of the drainage channel at the inlet to the Site.
- Boring DR-HA-2 was advanced to 5 feet bgs in the central portion of the drainage channel in the vicinity of the historic oil process area and suspended pipelines over the channel.
- Boring DR-HA-3 was advanced to 5 feet bgs in the central portion of the drainage channel in the vicinity of the historic oil process area and suspended pipelines over the channel.
- Boring DR-HA-4 was advanced to a depth of 5 feet bgs in the southern portion of the drainage channel in a low spot near where the channel exits the Site.

Soil samples collected at 1 and 5 feet bgs from each boring were analyzed for TPH-cc, TPH-g, VOCs, SVOCs, Title 22 metals, uranium, OCPs, PCBs, OPPs, and chlorinated herbicides. Samples collected for non-volatile compound analysis were collected by manually placing soil into laboratory-supplied sample jars, sealed with Teflon-lined lids, labeled and stored on ice in a

cooler. Samples collected for petroleum hydrocarbons or for VOC analysis were collected using Lock^{n}Load^{TM} samplers and preserved in ethanol and sodium bisulfate in volatile organic analysis (VOA) vials in compliance with EPA Method 5035. Soil sampling methodology is further described in Appendix C.

3.2.3 Soil Sample Collection – Boring Program

Northgate advanced two borings to depths ranging from 36 to 61 feet bgs on the Central Property. The borings were advanced by BC2 Environmental of Orange, California, a C-57 licensed drilling company, using a truck-mounted hollow-stem auger rig and a direct push (Geoprobe™) rig. During sampling via the hollow-stem auger rig, continuous cores of subsurface materials were collected using a California Split Spoon sampler with brass sample rings. During sampling via the Geoprobe™ rig, continuous cores of subsurface materials were collected in clear acetate liners. Upon removing the sampler from the borehole, the sample rings or acetate liner containing the soil core were opened at various intervals, and soils were visually inspected and screened with a PID for the possible presence of contamination. The borings were backfilled with hydrated bentonite and a concrete surface plug after sampling. Logs of the borings are presented in Appendix B.

The borings were advanced at the following locations:

<u>The 100-Acre Property</u>

- Boring S5-B1 was advanced using a Geoprobe™ rig to 36 feet bgs in former sump S5 located within the historic oil processing area to evaluate the vertical extent of contaminated soil identified in trench S5-T1. Soil samples were collected at 20, 24, 28, 32, and 36 feet bgs, with select soil samples analyzed for TPH-cc, TPH-g, and VOCs.
- Boring S8-B1 was advanced using a Geoprobe™ rig to a depth of 56 feet bgs in the southern portion of former sump S8 located in the eastern portion of the historic oil processing area to evaluate the vertical extent of contaminated soil identified in trench S8-T1. Soil samples were collected at 15, 20, 23, 27, 31, 35, 43, 47, 51, and 55 feet bgs, with select samples were analyzed for TPH-cc, TPH-g, VOCs, SVOCs, Title 22 metals, uranium, and PCBs.
- Boring VRS-B1 was advanced using a hollow-stem auger rig to 61 feet bgs in the southeastern portion of the vapor recovery system area (deeper within trench VRS-T1), with samples collected at 5, 10, and 15 feet bgs. Select soil samples were analyzed for TPH-cc, TPH-g, GRO, VOCs, and SVOCs.

The 165-Acre Property

- Boring BOTF-B1 was advanced using a hollow-stem auger rig to a depth of 61 feet bgs in the northeastern portion of the Brea-Olinda Tank Farm in the vicinity of the equipment, with soil samples collected at 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60 feet bgs. Select soil samples were analyzed for TPH-cc.

Brass sample ring intervals and sections of the soil core liner that were cut and selected for non-volatile compound analysis were sealed with Teflon-lined endcaps, labeled and stored on ice in a cooler. Samples collected for petroleum hydrocarbons or for VOC analysis were collected using Lock^{n}Load^{TM} samplers and preserved in ethanol and sodium bisulfate in volatile organic analysis (VOA) vials in compliance with EPA Method 5035. Soil sampling methodology is further described in Appendix C.

3.3 Soil Vapor Sampling

A temporary SVP was installed in boring VRS-B1 at 15 feet bgs. The SVP was installed using 2-1/4 inch inside-diameter hollow drill rods. The probe consisted of a 3/8" x 1" Stone PolyPro vapor probe implant with 1/4-inch Speed Fit installed at 5 feet bgs. Nylaflow tubing (¼ inch diameter) was connected from the implant to the ground surface, and terminated above the existing finished grade. The borehole annulus around the implant and tubing was filled through the drill rods with sand 6 inches above and below the implant, 12 inches of dry bentonite placed 1 foot above the

After installation, the SVP was allowed to stabilize for a minimum of 48-hours. Prior to sampling, each probe was purged of approximately three-well volumes of air. A vapor sample was then collected from the probe using a one-liter summa canister and flow regulator that maintained a flow rate of 150 milliliters per minute.

After the soil vapor survey was conducted, the SVP was removed and the borings backfilled with hydrated bentonite to just below the surface soil was placed at the surface to match existing conditions. Soil vapor sampling methodology is further described in Appendix C.

3.4 Laboratory Analysis

Soil samples were transported to SunStar Laboratories, Inc. (SunStar), a California certified laboratory in Lake Forest, California, under proper chain-of- custody control for analysis. Soil samples were analyzed for the following:

- 78 soil samples for TPH-cc using EPA Method 8015B;
- 21 soil samples for TPH-g using EPA Method 8015M/5035;

- 21 soil samples for VOCs using EPA Method 8260B/5035;
- 21 soil samples for SVOCs using EPA Method 8270C;
- 17 soil samples for Title 22 metals (17 metals) using EPA Method 6010B/7471A;
- 14 soil samples for PCBs using EPA Method 8082;
- 9 soil samples for uranium using EPA Method 7141;
- 5 soil samples for OCPs using EPA Method 8081A;
- 5 soil samples for OPPs using EPA Method 8141A; and
- 5 soil samples for chlorinated herbicides using EPA Method 8151A.

The soil vapor sample was transported to SunStar under proper chain-of-custody control for analysis. The sample was analyzed for VOCs using EPA Method TO-15.

3.5 Data Evaluation Criteria

Chemical test results from soil samples collected during this investigation were evaluated using the Regional Screening Levels (RSLs) established by the US EPA Region 9 and the modified Screening Levels (SLs) established by the California Department of Toxic Substances Control (DTSC). The RSLs and DTSC SLs are health-based exposure concentrations to chemicals of concern in both residential and commercial land use. The RSLs and SLs are not regulatory cleanup standards. Soil samples analyzed for TPH were also evaluated using the Regional Water Quality Control Board (RWQCB) TPH Maximum Soil Screening Level (SSL). RWQCB soil cleanup levels are screening levels to evaluate the potential threat to groundwater and were calculated based upon the RWQCB Interim Site Assessment and Cleanup Guidebook procedures by applying attenuation factors, calculated based upon both distance above groundwater and the soil type(s), to establish California Maximum Contaminant Levels (MCLs), the State primary drinking water standard established under Title 22 of the California Code of Regulations. The RWQCB SSLs were calculated for varying soil sample depths based on their varying distance above groundwater. The RWQCB utilizes the SSLs as guidance to close investigations or petroleum and VOC impacted sites (RWQCB, 1996).

The presence of a chemical at a concentration above these standards does not necessarily indicate that adverse impacts to human health or the environment are present, but rather, indicate that a potential for adverse risk may exist and that additional evaluation may be warranted. However, in general practice, the absence of chemical constituents above these screening levels generally indicates that the Site is suitable for its intended use.

Soil vapor sample test results are compared to EPA RSLs and DTSC SLs for residential and commercial land use. The RSLs and SLs have been developed for indoor air concentrations; therefore, RSLs and SLs for soil vapor were calculated using an attenuation factor. A non-Site

specific, conservative attenuation factor of 0.002 was applied to the RSLs and SLs for indoor residential indoor air, and a conservative attenuation factor of 0.001 was applied to the RSLs and SLs for commercial indoor air to develop calculated SLs for soil vapor. The attenuation factors were derived from the DTSC *Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)* (DTSC, 2001),

4.0 INVESTIGATION RESULTS

4.1 Subsurface Conditions

The ground surface at all drilling locations consisted of bare soil. Subsurface soils encountered during drilling generally consisted of dark yellowish brown to red clays with little silt. Thin beds of sandy and clayey silts are present within the clay near the surface and below 25 feet bgs. The silts and clays are medium-stiff to stiff, dry, and have little to no plasticity. Calcification was also observed below 25 feet bgs. Localized areas of the Site contain lenses of fill placed for oil field roadways and drill pads. Groundwater was not encountered in the borings to a maximum depth of 60 feet bgs. Sampling locations are shown on Figures 5 and 6 for the 100- and 165-Acre Properties, respectively. A copy of Northgate's field notes and boring logs are attached in Appendix B. As documented in the boring logs, localized areas of staining were observed in several trenches and borings.

100-Acre Property

An approximate 2-inch hydrocarbon layer with a strong odor was reported in the surface soils at the trench from the eastern portion of the vapor recovery system area. Occasional staining was observed in the upper approximate 8 feet of soil at sump S3. A very light hydrocarbon staining was reported in sump S5 in the upper 2 to 3 feet followed by a heavier staining and stronger hydrocarbon odor to 10 feet bgs and light staining to the total depth of 17 feet bgs. Heavy hydrocarbon staining and a strong odor were noted in sump S8 between depths of approximately 8 to 43 feet bgs. A hydrocarbon odor was reported in sump S8 to the total depth explored of 56 feet bgs and staining was additionally observed between 50 and 56 feet bgs.

165-Acre Property

Surface soils within the upper foot in the southeastern portion of the Brea-Olinda Tank Farm were reported to have a darker color due to staining; however, no staining or odor was observed at deeper depths. In addition, black staining was observed in the southern portion of sump S20 between 4 and seven 7 bgs and an approximate 3-6 inch lenses of staining were reported in the northern portion of sump S20.

4.2 Analytical Results

Chemical test results for TPHs in soil samples analyzed during this investigation are presented in Table 1. A summary of the soil sample analytical results for VOCs is presented in Table 2. Table 3 presents the soil sample analytical results for SVOCs. Chemical test results for soil samples analyzed for Title 22 metals is presented in Table 4 and includes results for mercury and

uranium. Table 5 presents the soil sample analytical results for OCPs, PCBs, OPPs, and CHs. Soil vapor sample test results are presented in Table 6. Copies of the laboratory analytical reports are presented in Appendix D. Test results are discussed in the following sections.

4.2.1 Soil Sampling Analytical Results

4.2.1.1 TPH

As shown in Table 1, TPH was detected above laboratory reporting limits (RLs) in 18 of the 51 samples analyzed from the 100-Acre Property and in 5 of the 27 samples analyzed from the 165-Acre Property. TPH test results from samples collected at each area of concern are discussed below.

Vapor Recovery System – 100-Acre Property:

Low levels of TPH quantified as diesel (TPH-d) and motor oil (TPH-mo) were detected in soil samples collected at depths of 5 and 10 feet bgs from trench VRS-T2. TPH-d and TPH-mo were reported at concentrations of 42 and 86 milligrams per kilogram (mg/kg), respectively, at 5 feet bgs, and at 39 and 45 feet bgs, respectively, at a depth of 10 feet bgs. None of these reported concentrations exceeded their respective regulatory screening criteria. TPH was not detected above laboratory RLs in any of the samples collected between 15 feet bgs and the total depth explored of 60 feet bgs.

Dehydration Unit – 100-Acre Property:

TPH was not detected above the laboratory RLs in any of the samples collected at 5, 10, or 15 feet bgs from trench DRU-T1, advanced in the vicinity of the dehydration unit on the 100-Acre Property.

Historic Sumps – 100-Acre Property:

TPH-g, -d, and -mo were reported in soil samples collected from each of the four historic sumps (sumps S3, S5, S7, and S8) investigated at the Site. The test results are further discussed below:

- **Sump S3** –TPH-d and TPH-mo were reported at concentrations of 790 and 1,100 mg/kg, respectively, in the samples collected at 5 feet bgs in trench S3-T1. The reported TPH concentrations decreased to 44 and 85 mg/kg, respectively at 10 feet bgs, and were not detected above the laboratory RL in the sample from 15 feet bgs. The reported concentration of TPH-d at 5 feet bgs exceeded both the EPA residential and commercial RSLs of 110 and 600 mg/kg, respectively; however, the detected TPH-mo concentrations

were below regulatory screening criteria. TPH-g was not detected in any of the samples collected at this sump.

- **Sump S5** – TPH-d and TPH–mo were detected at decreasing concentrations between depths of 5 and 20 feet bgs in the trench and boring advanced at Sump S5. TPH-d was reported at 9,200, 330, 270, and 11 mg/kg in samples collected at depths of 5, 10, 15, and 20 feet bgs, respectively, in trench S5-T1 and boring S5-B1. TPH-d was not reported above the laboratory RL in the samples collected at 24 and 36 feet bgs.

  TPH-mo was detected at 22,000, 1,500, and 810 mg/kg at depths of 5, 10, and 15 feet bgs, respectively, but was not detected above the laboratory RL in samples from 20, 24, and 36 feet bgs.

  TPH-g was reported at a concentration of 1,700 mg/kg in the sample from 5-feet bgs, but was not present above the laboratory RL in other samples collected to a depth of 36 feet bgs.

  The concentrations of TPH-g, TPH-d, and TPH–mo reported in the sample collected at 5 feet bgs exceed the TPH maximum SSLs of 500, 1,000, and 10,000 mg/kg, respectively. The concentrations also exceed both the EPA residential (82, 110, and 2,500 mg/kg, respectively) and commercial (420, 600, and 33,000, respectively) RSLs. The detected concentrations of TPH-d in samples from 10 and 15 feet bgs also exceeded the EPA residential RSL, but not the EPA commercial RSL.

- **Sump S7** – TPH-mo was detected at a concentration of 33 mg/kg in the sample collected at 5 feet bgs in trench S7-T1, but not detected in the samples from 10 and 15 feet bgs. TPH-g and TPH-d were not reported in the samples from trench S7-T1 above the laboratory RL. The reported concentration of TPH-mo in the 5-foot sample did not exceed any regulatory screening criteria.

- **Sump S8** – TPH-g, TPH-d, and TPH-mo were variously detected in soil samples collected from 1 foot bgs to 55 feet bgs (the total depth sampled) in the trenches (S8-T1 and S8-T2) and boring (S8-B1) advanced at Sump 8. TPH-d was reported at concentrations ranging from 1,100 to 13,000 mg/kg, with the highest concentration reported in a sample collected at 39 feet bgs. Reported TPH-d concentrations exceeded one or more regulatory screening criteria in samples collected at depths ranging from 10 to at least 55 feet bgs.

  TPH-mo was reported in the samples at concentrations ranging from 66 mg/kg to 19,000 mg/kg, with the highest concentration reported in samples from 10 and 15 feet bgs. Reported concentrations of TPH-mo equal or exceed one or more regulatory screening criteria in samples collected at depths between 10 and 39 feet bgs.

TPH-g was reported in the samples at concentrations ranging from 80 mg/kg to 6,300 mg/kg, with the highest concentration reported in the sample from 39 feet bgs. Reported TPH-g concentrations exceeded regulatory screening criteria in samples collected at depths of 10 to 55 feet bgs.

Drainage Channel – 100-Acre Property:

Low levels of TPH-d and TPH-mo were measured in shallow soil samples collected from three of the four hand auger borings (borings DR-HA1, -HA2, -HA3, and -HA4) advanced along the drainage channel extending the length of the 100-Acre Property. TPH-d and TPH-mo were reported at concentrations of 57 and 230 mg/kg, respectively, in the 1-foot sample collected from boring DR-HA1, located in the northern most portion of the drainage channel at the inlet to the Site. TPH-d and TPH-mo were reported at 75 and 220 mg/kg in the 1-foot sample from DR-HA3, located in the central portion of the drainage channel in the vicinity of the historic oil production area. Pipelines were observed to be suspended above the channel in this area. TPH-d and TPH-mo were reported at concentrations of 160 and 460 mg/kg in the 1-foot sample collected from boring DR-HA4, located in the southernmost location within the drainage channel,

With the exception of 16 mg/kg of TPH-mo reported in the 5-foot sample from boring DR-HA3, TPH-d and TPH-mo were not reported in the 5-foot bgs samples from the four borings. None of the samples contained TPH-g above the laboratory RLs. None of the reported concentrations of TPH-d or TPH-mo exceeded their respective regulatory screening criteria.

The measured concentration of TPH-d at 1 foot bgs exceeded the EPA residential RSL of 110 mg/kg.

Abandoned Tank – 100-Acre Property:

TPH was not detected above the laboratory RLs in any of the samples collected to a depth of 15 feet bgs from trench 104-T1, advanced in the vicinity of the abandoned tank on the northern portion of the 100-Acre Property.

Brea-Olinda Tank Farm – 165-Acre Property:

TPH-d and TPH-mo were reported at concentrations of 52 and 83 mg/kg, respectively in the sample from 5 feet bgs in trench BOTF-T2, excavated in the southeastern portion of the tank farm. TPH-mo was detected at 33 mg/kg from a sample collected at 45 feet bgs from boring BOTF-B1, located in the southern portion of the tank farm. TPH-g was not detected above the

laboratory RLs in any of the samples analyzed from this area. None of the reported concentrations of TPH-d and TPH-mo exceeded their respective regulatory screening criteria.

Manifold H2 – 165-Acre Property:

TPH-d and TPH-mo were not detected above their respective laboratory RLs in the samples collected at depths of 5, 10, and 15 feet bgs from trench H2-T1, excavated in the vicinity of manifold header 2 and across a portion of the dirt road in this area.

Historic Sump S20 – 165-Acre Property:

TPH-d and TPH-mo were detected at concentrations of 100 and 390 mg/kg, respectively, at a depth of 5 feet bgs in trench S20-T1, located in the southern and lowest portion of the sump. TPH-d and TPH-mo were not detected in the sample from 10 bgs in this trench, but TPH-mo was reported at 22 mg/kg in the sample from 15 feet bgs. Two potholes were also excavated in the vicinity of this trench (S20-PH1 and S20-PH2). The results of this potholing investigation indicated that the stained soil was present at approximately 4 to 11 feet bgs; similar to what was found in trench S20-T1. Samples from trench S20-T2, advanced in the northern portion of the sump and downslope of a former tank farm area, contained TPH-d and TPH-mo at concentrations of 51 and 120 mg/kg, at a depth of 10 feet bgs. TPH was not detected in samples collected from 5 and 15 feet bgs in this trench. None of the reported concentrations of hydrocarbons from these areas exceeded regulatory screening criteria.

4.2.1.2 VOCs and SVOCs

Based on the results of the TPH analyses, soil samples collected from areas with elevated concentrations of TPH were also analyzed for VOCs and SVOCs. As shown in Table 2, several VOCs were detected above the laboratory RLs in samples collected on the 100-Acre Property including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, isopropylbenzene, m,p-xylene, naphthalene, n-butylbenzene, n-propylbenzene, p-isopropyltoluene, o-xylene, sec-butylbenzene, and ter-butylbenzene. None of the reported concentrations of VOCs exceed their respective regulatory screening criteria.

VOCs were not reported above their laboratory RLs in any samples collected from the 165-Acre Property.

As shown in Table 3, several SVOCs were reported above laboratory RLs in samples collected on the 100-Acre Property, including 1-methylnaphthalene, 2-methylnaphthalene, flourene, n-nitrosodiphenylamine, and phenanthrene. None of the reported concentrations exceed their respective regulatory screening criteria, except for 23,000 micrograms per kilogram (µg/kg)

reported in the 15-foot sample from trench S8-T1 which exceeds the EPA RSL for residential land use of 18,000 µg/kg.

SVOCs were not reported above their laboratory RLs in any samples collected from the 165-Acre Property.

4.2.1.3 Metals

Based on the results of the analyses of soil samples for TPH, soil samples from areas with elevated concentrations of TPH were selected for additional analysis for metals and uranium. As shown in Table 4, low concentrations of several metals, including barium, chromium, cobalt, copper, nickel, vanadium, and zinc were reported in all 16 of the samples analyzed. Low levels of uranium were also detected in all 9 soil samples analyzed for uranium. None of the samples contained metals or uranium above their respective regulatory screening criteria for residential or commercial land use, or in the case of arsenic and vanadium, above naturally occurring background concentrations. The reported concentrations of all metals were within the range of generally accepted background levels.

4.2.1.4 OCPs, PCBs, OPPs, and Chlorinated Herbicides

As shown in Table 5, OCPs were not reported above their respective laboratory RLs in any of the four samples collected at 1 foot bgs from borings DR-HA1 through DR-HA-4, advanced along the 100-Acre Property drainage channel, or from the 1 foot bgs sample collected from trench S8-T1, excavated in historic Sump S8.

With the exception of a single detection of Aroclor-1260, PCBs were not reported above their respective laboratory RLs in any of the 14 samples analyzed. Aroclor-1260 was measured at 19 µg/kg in the sample collected at 1 foot bgs from boring DR-HA3, located in the drainage channel in the central portion of the 100-Acre Property. The reported concentration of Aroclor did not exceed any regulatory screening criteria.

As shown in Table 5, no OPPs or chlorinated herbicides were measured above their laboratory RLs in any of the four samples collected at1 foot bgs from borings DR-HA1 through DR-HA4, located in the 100-Acre Property drainage channel or from trench S8-T1, excavated in historic Sump 8.

4.2.2 Soil Vapor Analytical Results

Test results for soil vapor sample VRS-B1-SV15, collected at a depth of 15 feet bgs near the vapor recovery system located on the northern portion of the 100-Acre Property are shown in

Table 6. As shown in the table, a number of VOCs were reported in the vapor sample, including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 4-ethyltoluene, benzene, carbon disulfide, ethylbenzene, heptane, hexane, o-xylene, m,p-xylene, and toluene. None of the reported concentrations of VOCs exceed their respective residential or commercial soil vapor RSLs or calculated SLs.

5.0 GEOGRAPHIC INFORMATION SYSTEM MAPS AND SPATIAL ANALYSIS

A geographic information system (GIS) was used as a tool to evaluate and estimate the extent of impacted soil at the Site potentially requiring remediation in association with Site redevelopment. The GIS evaluation method is described below.

5.1 Geographic Information System Integration and Data Sources

Geographical data for the Central Property Site was integrated into a GIS to facilitate the display and analysis of the historic and existing project specific data generated during the investigation. Data included:

- Project boundaries, topography, and drainages, supplied by Aera Energy.
- Historical oil field facility operations information supplied by Aera Energy and Linn Energy and compiled by Northgate. Information included the locations and geometry for:
    - Historical sumps;
    - Existing and historical tanks and tank farms;
    - Existing and historical manifolds;
    - Existing and historical nursery operation;
    - Existing and historical storage and processing areas;
    - Existing and historical underground tanks and berms;
    - Site roads, trails and paths; and
    - Surface pipelines to the extent that they have been identified on maps and photographs.
- Interpretation and identification of the feature classes listed above, from historical aerial photographs dated:
    - 1938: Scale: 1” = 1000' Flight Date: January 01, 1938 USDA[1]
    - 1946: Scale: 1” = 1000' Flight Date: January 01, 1946 USGS[2]
    - 1952: Scale: 1” = 1000' Flight Date: January 01, 1952 USDA[1]
    - 1963: Scale: 1" = 1000' Flight Date: January 01, 1963 USGS[2]
    - 1968: Scale: 1” = 480’ USGS[2]
    - 1972: Scale: 1” = 1000' Flight Date: January 01, 1972 USGS[2]
    - 1977: Scale: 1” = 1000' Flight Date: January 01, 1977 Brewster Pacific
    - 1989: Scale: 1” = 1000' Flight Date: January 01, 1989 USDA[1]
    - 1994: Scale: 1” = 666” USGS[2]

[1] USDA – United States Department of Agriculture
[2] USGS – United States Geological Survey

- May 1994 – Google Earth™
- 1995: Scale: 1" = 500' Acquisition Date: October 03, 1995 USGS[2]/DOQQ[3]
- October 1995 – Google Earth™
- May 2002 – Google Earth™
- 2002: Scale: 1" = 666' USGS[2]
- August 2005 – Google Earth™
- 2005: Scale: 1" = 500' Flight Year: 2005 USDA/NAIP[4]
- October 2007 – Google Earth™
- 2009: Scale: 1" = 500' Flight Year: 2009 USDA/NAIP[4]
- 2010: Scale: 1" = 500' Flight Year: 2010 USDA/NAIP[4]
- March 2011 – Google Earth™
- 2012: Scale: 1" = 500' Flight Year: 2012 USDA/NAIP[4]
- February 2016 – Google Earth

- Oil well and lease boundary information from the California Division of Oil, Gas and Geothermal Resources GIS database.
- Sample locations and laboratory analytical results generated during this investigation.

5.2 Subsurface Chemistry

The GIS was also used to display and provide visual analyses of the chemical test results from soil and vapor samples a collected during the Focused Phase II Investigation. After reviewing the spatial distribution of the analytical results, it was determined that the analyses for TPH had the widest coverage and provided the best representation of potentially contaminated subsurface materials. Analytical test results for VOCs, herbicides, pesticides, metals and SVOC analyses provided some additional information and expanded areas of concern in some cases. These additional analyses also provided information on where additional sampling may be advantageous in the future.

The TPH occurrence maps are shown on Figures 7 and 8.

5.3 Spatial Data Analysis for Soil Volume Calculations

Similar oil field features were grouped together within the mapping environments. For example, the historical sumps were grouped as a single feature and tank farms were grouped as a single feature. In cases where the exact outlines of the features were not specifically known, historical aerial photography was used to create a reasonable representation of the perimeter of the features.

[3] DOQQ – Digital Orthophoto Quarter Quads
[4] NAIP – National Agricultural Imagery Program

Once the perimeters of the features were established, the potential surficial impacted areas were calculated within the GIS. An estimated depth of contamination was assumed using the results of the limited subsurface soil sampling performed during this investigation. The estimated volume of material to be excavated was calculated by multiplying the surface area by the total assumed depth of contamination. An angle of repose was assumed (25% slope) in order to maintain a stable slope during excavation activities, which was used to determine the volume of additional material required to be excavated to achieve removal of the contaminated material. The angle of repose 4:1 (vertical:horizontal) was assumed for all potential excavation areas with the exception of Sump S8. Due to the depth of Sump S8, a 2:1 angle of repose was assumed. These values are presented in Table 7.

Most of the features had well defined or estimated surface perimeters except for the roads and disturbed areas, which were more difficult to establish. In Northgate's experience, oil field operators frequently oiled the roads and disturbed areas during the early through mid-1900s to minimize dust. Therefore, Northgate estimated potential volumes of material that may require removal from these areas. The GIS was used with current aerial photographs to determine road and disturbed areas (considered to be areas with less to no vegetation) by creating a discrimination algorithm based on the colors present in the photographs. Areas without vegetation were assumed to have less green reflectance and were identified by a trial and error process where the road/disturbed area polygons were identified by color and outlined. A final range of spectral response was then used to establish the road/disturbed area boundaries at the Site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This Focused Phase II Investigation of the Brea 265 Property consisted of analyzing 78 soil samples and one soil vapor sample collected from 14 trenches, four hand auger borings, two hollow-stem auger borings, two direct push borings and one SVP advanced in areas of the Site where primary historic oil field activities occurred and in areas where potential environmental risk was determined to be highest. The investigation areas of concern include an oil-field vapor recovery system, a dehydration unit, a drainage channel, an abandoned tank, the Brea-Olinda tank farm, a piping header area, and historic sumps located in the vicinity of historic oil production and tank farm areas of the Site. The investigation also included the production and analysis of GIS base maps developed to provide an estimate of the aerial extent and volume of impacted soil at the Site. Conclusions and recommendations based on the sampling performed during this investigation are presented below.

6.1 Soil

The investigation results indicate that oil-field production-related hydrocarbons, quantified primarily in the diesel and motor oil range, are present in soil at concentrations that exceed regulatory screening levels for residential and commercial land use in the historic sump areas of the Site and in a drainage channel that traverses the length of the 100-Acre Property on the western portion of the Site.

At Sump S8, located on the south-central portion of the 100-Acre Property, TPH-contaminated soil was present to the total depth sampled of 55 feet bgs, with TPH-d reported up to 13,000 mg/kg, and TPH-mo present up to 19,000 mg/kg. TPH-d and TPH-mo were detected at concentrations up to 9,200 and 22,000 mg/kg at 5 feet bgs, respectively, in a bermed area located just south of sump S5 on the 100-Acre Property. However, at this location, TPH concentrations attenuated with depth and were not detected in soil samples collected at 24 feet bgs.

TPH impacted soil encountered at Sump S20, located on the western portion of the 165-Acre Property was reported at concentrations below regulatory screening criteria where sampled. However, the sump, and associated TPH impacts cover large area of the Site. Samples collected during the present investigation suggest that TPH impact in the sump area may be limited in vertical extent (i.e., limited to about 10 feet bgs); however, additional evaluation is required to confirm the findings of this limited testing program.

TPH-d and TPH-mo were reported at concentrations of 160 and 460 mg/kg, respectively, in surface soil samples collected at the southern end of the drainage channel that traverses the 100-Acre Property. In general, low concentrations of TPH were reported in other samples

collected at a depth of 1-foot bgs along the drainage channel, but were not reported in samples collected at 5-feet bgs, except for one location in the center of the drainage channel near an area where process piping crosses the channel. The extent of TPH impact likely extends laterally throughout the length of the channel, but appears limited in vertical extent.

Select soil samples containing elevated concentrations of TPH were additionally analyzed for VOCs, SVOCs, metals, PCBs, and uranium. Concentrations of these compounds were either not detected above the laboratory RLs or were reported at low concentrations below their respective regulatory screening criteria, with the exception of one detection of an SVOC above screening criteria at a depth of 15 feet bgs in Sump 8. A low concentration of PCB (aroclor-1260) reported in shallow soil in the central portion of the drainage channel at a location where process piping traverses the channel may suggest a historic release of PCB-containing material in the channel.

OCPs, OPPs, and chlorinated herbicides were not detected above their respective laboratory reporting limits in any of the samples collected from the drainage channel.

Based on the soil testing performed during this investigation, it appears, with the exception of Sump S8, which appeared to be the major historic production sump on the 100-Acre property, that the impacts to the subsurface are generally confined to the upper layers as a result of the large amounts of clay present in subsurface soils. Additional areas of the Site were not investigated during this Focused Phase II Investigation that may present an environmental concern for the Site based on the historic operations. These areas include the additional historic sumps, oil wells, additional former tank areas, the roads, manifolds and pipelines, and the agricultural areas of the Site

6.2 Soil Vapor

A number of VOCs were reported in the soil vapor sample collected at the oil-field vapor recovery system located on the northern end of the 100-Acre Property. However, none of the reported concentrations of VOCs exceeded their respective residential or commercial soil vapor RSLs or SLs.

6.3 Soil Volume Estimate Summary

The investigation results indicate that oil-field production related hydrocarbons are present in soil locally at concentrations that exceed regulatory screening levels for residential and commercial land use. Based on field observations, soil sample analytical results, and the geospatial analysis described above, total impacted soil volumes were calculated for the major features at the Site, including the drainage channel, oil wells, vapor recovery system, dehydration

unit, tank farms, manifolds and pipes, drainage channel, roads, and former agricultural areas. A total of approximately 178,000 cubic yards (CY) of soil were estimated to be impacted across the Site that would require relocation, treatment and/or off-Site disposal. This estimate total includes additional soil removed to accommodate proper sloping for safe excavation activities but does not include the removal of clean overburden soil. The estimated soil volume calculations are presented in detail for the Site in Table 7.

An estimated percent of area impacted was estimated for each Site feature based upon analytical results, field observations, GIS analysis (including review of historical aerial photographs) and experience at other oilfield properties. As shown in Table 7, this estimated percent of area impacted was applied to the area of each major Site feature to calculate the total volume of impacted soil at each feature including any sloping required during the excavation. A clean overburden excavation volume was additionally calculated for several features, as appropriate. As a result, a total excavated volume (which included removal of an assumed clean soil) and a total impacted volume were calculated for each feature. A summary of the impacted soil calculated for major features is provided below:

100-Acre Property

- **Vapor Recovery System -** This feature was estimated to be 50% impacted to a depth of approximately 10 feet bgs. The total estimated impacted volume was calculated to be 512 CY.
- **Dehydration Unit -** This area was estimated to be 35% impacted to a depth of approximately 10 feet bgs. The total estimated impacted volume was calculated to be 2,574 CY.
- **Historic Sump S3 -** This sump was estimated to be 30% impacted to a depth of approximately 10 feet bgs. The total estimated impacted volume was calculated to be 111 CY.
- **Historic Sump S5 -** This area was estimated to be 100% impacted to a depth of approximately 17 feet bgs. The total estimated impacted volume was calculated to be 2,151 CY.
- **Historic Sump S7 -** This sump was estimated to be 30% impacted to a depth of approximately 10 feet bgs. The total estimated impacted volume was calculated to be 257 CY.
- **Historic Sump S8 -** This area was estimated to be 100% impacted to a depth of approximately 50 feet bgs. The sump is known to be impacted to at least 56 feet bgs, the deepest depth explored. Remediation of this sump is planned to include excavation to

50 feet bgs followed by the placement of a liner and the treatment of deeper impacts in-situ. The total estimated impacted volume was calculated to be 27,440 CY.

- **Drainage Channel -** This feature was estimated to be between 75 and 80% impacted to a depth of approximately 2.5 feet bgs. The total estimated impacted volume was calculated to be 11,247 CY.
- **Oil Wells/Roads./Former Agricultural Use/Additional Historic Sumps –** Excavation volumes were also estimated for additional Site features identified to be of potential environmental concern that were not directly investigated at this time. The total estimated impacted volume was calculated to be 46,492 CY.

165-Acre Property

- **Brea-Olinda Tank Farm:** This area was estimated to be 25% impacted to a depth of approximately 5 feet bgs. The total estimated impacted volume was calculated to be 763 CY.
- **Manifolds and Pipelines:** This feature was estimated to be 10% impacted to a depth of approximately 10 feet bgs and includes 6 manifolds and pipeline areas. The total estimated impacted volume was calculated to be 830 CY
- **Historic Sump S20:** This sump was estimated to be 50% impacted to a depth of approximately 7 feet bgs. The total estimated impacted volume was calculated to be 16,597 CY.
- **Oil Wells/Roads/Former Agricultural Use/Additional Historic Sumps –** Excavation volumes were also estimated for additional Site features identified to be of potential environmental concern that were not directly investigated at this time. The total estimated impacted volume was calculated to be 69,301 CY.

6.4 Recommendations

Northgate recommends that additional investigation be performed at the historic sumps and within the drainage channel to further define and better evaluate the vertical and lateral extent of impacted soil. The results of this additional Phase II investigation would provide additional benefit in further refining the estimated volumes and subsequently the cost estimates associated with remedial cleanup of the Site.

Additional Phase II investigation activities are also recommended at other areas of the Site to further evaluate additional areas of concern not covered by the current investigation. Additional areas of concern identified during the previous Phase I ESA that should be considered for additional Phase II testing include additional historic sumps, oil wells, former tank areas, the

roads, manifolds and pipelines, and the agricultural areas of the Site. The collection and analysis of soil samples in these areas is recommended to more fully identify impacts from historic operations, define the extents of these impacts, and to refine impacted soil volumes and associated remedial cost scenarios.

7.0 LIMITATIONS

The purpose of a geologic/hydrogeologic study is to reasonably characterize existing site conditions based on the geology/hydrogeology of the area. In performing such a study, it is understood that a balance must be struck between a reasonable inquiry into the site conditions and an exhaustive analysis of each conceivable environmental characteristic. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation is thorough enough to describe all geologic/hydrogeologic conditions of interest at a given site. If conditions have not been identified during the study, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

We are unable to report on or accurately predict events that may change the site conditions after the described services are performed, whether occurring naturally or caused by external forces. We assume no responsibility for conditions we were not authorized to evaluate, or conditions not generally recognized as predictable when services were performed.

Geologic/hydrogeologic conditions may exist at the site that cannot be identified solely by visual observation. Where subsurface exploratory work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

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TABLES

TABLE 1
Summary of Soil Analytical Results - Total Petroleum Hydrocarbons
Brea 265 Property

			Total Petroleum Hydrocarbons EPA Method 8015B			
Sample Identification	Sample Top	Date Sampled	C13-C28 (TPH-d) Extractable	C29-C40 (TPH-mo) Extractable	C6-C12 (TPH-g) Extractable	C6-C12 (TPH-g) Purgeable
			mg/kg	mg/kg	mg/kg	µg/kg
100-ACRE PARCEL						
Vapor Recovery System						
VRS-B1-20	20	3/23/2017	<10	<10	<10	<350
VRS-B1-25	25	3/23/2017	<10	<10	<10	--
VRS-B1-30	30	3/23/2017	<10	<10	<10	--
VRS-B1-35	35	3/23/2017	<10	<10	<10	--
VRS-B1-40	40	3/23/2017	<10	<10	<10	--
VRS-B1-45	45	3/23/2017	<10	<10	<10	--
VRS-B1-50	50	3/23/2017	<10	<10	<10	--
VRS-B1-55	55	3/23/2017	<10	<10	<10	--
VRS-B1-60	60	3/23/2017	<10	<10	<10	<350
VRS-T1-5	5	3/21/2017	<10	<10	<10	<170
VRS-T1-10	10	3/21/2017	<10	<10	<10	--
VRS-T1-15	15	3/21/2017	<10	<10	<10	--
VRS-T2-5	5	3/21/2017	42	86	<10	<170
VRS-T2-10	10	3/21/2017	39	45	<10	--
VRS-T2-15	15	3/21/2017	<10	<10	<10	--
Dehydration Unit						
DRU-T1-5	5	3/21/2017	<10	<10	<10	<170
DRU-T1-10	10	3/21/2017	<10	<10	<10	--
DRU-T1-15	15	3/21/2017	<10	<10	<10	--
Historic Sumps						
Sump S3						
S3-T1- 5	5	3/29/2017	**790**	1,100	<100	<500
S3-T1- 10	10	3/29/2017	44	85	<10	--
S3-T1- 15	15	3/29/2017	<10	<10	<10	--
Sump S5						
S5-B1-20	20	3/28/2017	11	<10	<10	--
S5-B1-24	24	3/28/2017	<10	<10	--	<500
S5-B1-36	36	3/28/2017	<10	<10	--	<290
S5-T1-5	5	3/21/2017	**9,200**	**22,000**	**1,700**	6,700
S5-T1-10	10	3/21/2017	**330**	1,500	<10	--
S5-T1-15	15	3/21/2017	**270**	810	<10	--
Sump S7						
S7-T1- 5	5	3/29/2017	<10	33	<10	--
S7-T1- 10	10	3/29/2017	<10	<10	<10	--
S7-T1- 15	15	3/29/2017	<10	<10	<10	--
Sump S8						
S8-B1-15	15	3/28/2017	**2,100**	720	80	--
S8-B1-39	39	3/28/2017	**13,000**	**4,300**	--	**380,000**
S8-B1-55	55	3/28/2017	**7,900**	1,800	--	**180,000**
S8-T1-1	1	3/23/2017	<10	66	<10	--
S8-T1-5	5	3/21/2017	<10	<10	<10	<190

TABLE 1
Summary of Soil Analytical Results - Total Petroleum Hydrocarbons
Brea 265 Property

			Total Petroleum Hydrocarbons EPA Method 8015B			
Sample Identification	Sample Top	Date Sampled	C13-C28 (TPH-d) Extractable	C29-C40 (TPH-mo) Extractable	C6-C12 (TPH-g) Extractable	C6-C12 (TPH-g) Purgeable
			mg/kg	mg/kg	mg/kg	µg/kg
100-ACRE PARCEL						
S8-T1-10	10	3/21/2017	**1,100**	**19,000**	**4,900**	--
S8-T1-15	15	3/21/2017	**1,100**	**14,000**	**6,300**	9,400
S8-T2- 5	5	3/29/2017	<10	<10	<10	--
S8-T2- 10	10	3/29/2017	<10	<10	<10	--
S8-T2- 15	15	3/29/2017	**3,200**	**2,500**	<100	--
Drainage Channel						
DR-HA1-1.0	1	3/21/2017	57	230	<10	<200
DR-HA1-5.0	5	3/21/2017	<10	<10	<10	--
DR-HA2-1.0	1	3/21/2017	<10	<10	<10	<190
DR-HA2-5.0	5	3/21/2017	<10	<10	<10	--
DR-HA3-1.0	1	3/21/2017	75	220	<10	<200
DR-HA3-5.0	5	3/21/2017	<10	16	<10	--
DR-HA4-1.0	1	3/21/2017	**160**	460	<10	<200
DR-HA4-5.0	5	3/21/2017	<10	<10	<10	--
Abandoned Tank						
104-T1-5	5	3/21/2017	<10	<10	<10	<220
104-T1-10	10	3/21/2017	<10	<10	<10	--
104-T1-15	15	3/21/2017	<10	<10	<10	--
165-ACRE PARCEL						
Brea-Olinda Tank Farm						
BOTF-B1-5	5	3/23/2017	<10	<10	<10	--
BOTF-B1-10	10	3/23/2017	<10	<10	<10	--
BOTF-B1-15	15	3/23/2017	<10	<10	<10	--
BOTF-B1-20	20	3/23/2017	<10	<10	<10	--
BOTF-B1-25	25	3/23/2017	<10	<10	<10	--
BOTF-B1-30	30	3/23/2017	<10	<10	<10	--
BOTF-B1-35	35	3/23/2017	<10	<10	<10	--
BOTF-B1-40	40	3/23/2017	<10	<10	<10	--
BOTF-B1-45	45	3/23/2017	<10	33	<10	--
BOTF-B1-50	50	3/23/2017	<10	<10	<10	--
BOTF-B1-55	55	3/23/2017	<10	<10	<10	--
BOTF-B1-60	60	3/23/2017	<10	<10	<10	--
BOTF-T1-5	5	3/20/2017	<10	<10	<10	--
BOTF-T1-10	10	3/20/2017	<10	<10	<10	--
BOTF-T1-15	15	3/20/2017	<10	<10	<10	--
BOTF-T2-5	5	3/20/2017	52	83	<10	<160
BOTF-T2-10	10	3/20/2017	<10	<10	<10	--
BOTF-T2-15	15	3/20/2017	<10	<10	<10	--
Manifold H2						
H2-T1-5	5	3/20/2017	<10	<10	<10	--
H2-T1-10	10	3/20/2017	<10	<10	<10	--
H2-T1-15	15	3/20/2017	<10	<10	<10	--

TABLE 1
Summary of Soil Analytical Results - Total Petroleum Hydrocarbons
Brea 265 Property

			Total Petroleum Hydrocarbons EPA Method 8015B			
Sample Identification	**Sample Top**	**Date Sampled**	**C13-C28 (TPH-d) Extractable**	**C29-C40 (TPH-mo) Extractable**	**C6-C12 (TPH-g) Extractable**	**C6-C12 (TPH-g) Purgeable**
			mg/kg	**mg/kg**	**mg/kg**	**µg/kg**
100-ACRE PARCEL						
Historic Sump 20						
S20-T1-5	5	3/20/2017	100	390	<10	<180
S20-T1-10	10	3/20/2017	<10	<10	<10	--
S20-T1-15	15	3/20/2017	<10	22	<10	--
S20-T2-5	5	3/20/2017	<10	<10	<10	<120
S20-T2-10	10	3/20/2017	51	120	<10	--
S20-T2-15	15	3/20/2017	<10	<10	<10	--
REGULATORY SCREENING CRITERIA						
RWQCB TPH Maximum SSLs 20 to 150 feet Above Groundwater			1,000	10,000	500	500,000
EPA Residential Soil RSLs			110	2,500	82	82,000
EPA Commercial Soil RSLs			600	33,000	420	420,000
DTSC Residential Soil SLs (cancer endpoint)			NE	NE	NE	NE
DTSC Commercial Soil SLs (cancer endpoint)			NE	NE	NE	NE

Notes/Abbreviations:

<	Not detected at or above the indicated laboratory method reporting limit
--	Not tested
Bold	Detected above one or more regulatory screening levels
bgs	Below ground surface
DTSC	Department of Toxic Substance Control
EPA	United States Environmental Protection Agency
mg/kg	Milligrams per kilogram (units)
NA	Not available
ND	Not detected
NE	Not established
RSL	EPA Region 9 Regional Screening Level, updated May 2016
RWQCB	Regional Water Quality Control Board - Los Angeles Region
SL	Screening levels, updated January 2016
SSL	RWQCB Maximum Soil Screening Levels - Distance to groundwater 20 to 150 feet, Interim Site Assessment Cleanup Guidance, May 1996.
TPH	Total petroleum hydrocarbons
TPH-d	Total petroleum hydrocarbons quantified as diesel
TPH-g	Total petroleum hydrocarbons quantified as gasoline
TPH-mo	Total petroleum hydrocarbons quantified as motor oil
µg/kg	Micrograms per kilogram (units)

TABLE 2
Summary of Soil Analytical Results - Volatile Organic Compounds - Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Volatile Organic Compounds EPA Method 8260B												
			1,3,5-Trimethylbenzene	Ethylbenzene	o-Xylene	Naphthalene	1,2,4-Trimethylbenzene	Isopropylbenzene	m,p-Xylene	n-Butylbenzene	n-Propylbenzene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Other VOCs
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	ug/kg	µg/kg
100-ACRE PARCEL															
Vapor Recovery System															
VRS-B1-20	20	3/23/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
VRS-B1-25	25	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-30	30	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-35	35	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-40	40	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-45	45	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-50	50	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-55	55	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-60	60	3/23/2017	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<8.8	<4.4	<4.4	<4.4	<4.4	<4.4	ND
VRS-T1-5	5	3/21/2017	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<7.5	<3.7	<3.7	<3.7	<3.7	<3.7	ND
VRS-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T2-5	5	3/21/2017	<4	<4	<4	<4	<4	<4	<7.9	<4	<4	<4	<4	<4	ND
VRS-T2-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T2-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Dehydration Unit															
DRU-T1-5	5	3/21/2017	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<7.6	<3.8	<3.8	<3.8	<3.8	<3.8	ND
DRU-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
DRU-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Historic Sumps															
Sump S3															
S3-T1- 5	5	3/29/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
S3-T1- 10	10	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S3-T1- 15	15	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Sump S5															
S5-B1-20	20	3/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S5-B1-24	24	3/28/2017	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<7.7	<3.9	<3.9	<3.9	<3.9	<3.9	ND
S5-B1-36	36	3/28/2017	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<6.4	<3.2	<3.2	<3.2	<3.2	<3.2	ND
S5-T1-5	5	3/21/2017	10	20	20	150	28	9.2	27	10	11	6.5	8.9	<5.7	ND
S5-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S5-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Sump S7															
S7-T1- 5	5	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S7-T1- 10	10	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S7-T1- 15	15	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 2
Summary of Soil Analytical Results - Volatile Organic Compounds - Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Volatile Organic Compounds EPA Method 8260B												
			1,3,5-Trimethylbenzene	Ethylbenzene	o-Xylene	Naphthalene	1,2,4-Trimethylbenzene	Isopropylbenzene	m,p-Xylene	n-Butylbenzene	n-Propylbenzene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Other VOCs
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	ug/kg	µg/kg
100-ACRE PARCEL															
Sump S8															
S8-B1-15	15	3/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-B1-39	39	3/28/2017	<5	<5	<5	120	<5	57	<10	18	48	<5	56	5.9	ND
S8-B1-55	55	3/28/2017	<3.7	<3.7	<3.7	5.4	<3.7	28	<7.4	18	20	13	42	4.2	ND
S8-T1-1	1	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T1-5	5	3/21/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
S8-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T1-15	15	3/21/2017	<5	17	<5	130	<5	19	<10	16	<5	<5	18	<5	ND
S8-T2- 5	5	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T2- 10	10	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T2- 15	15	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Drainage Channel															
DR-HA1-1.0	1	3/21/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
DR-HA1-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
DR-HA2-1.0	1	3/21/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
DR-HA2-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
DR-HA3-1.0	1	3/21/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
DR-HA3-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
DR-HA4-1.0	1	3/21/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
DR-HA4-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Abandoned Tank															
104-T1-5	5	3/21/2017	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	ND
104-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
104-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
165-ACRE PARCEL															
Brea-Olinda Tank Farm															
BOTF-B1-5	5	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-10	10	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-15	15	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-20	20	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-25	25	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-30	30	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-35	35	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-40	40	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-45	45	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-50	50	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-55	55	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 2
Summary of Soil Analytical Results - Volatile Organic Compounds - Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Volatile Organic Compounds EPA Method 8260B												
			1,3,5-Trimethylbenzene	Ethylbenzene	o-Xylene	Naphthalene	1,2,4-Trimethylbenzene	Isopropylbenzene	m,p-Xylene	n-Butylbenzene	n-Propylbenzene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Other VOCs
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	ug/kg	µg/kg
100-ACRE PARCEL															
BOTF-B1-60	60	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T1-5	5	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T1-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T1-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T2-5	5	3/20/2017	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<7.4	<3.7	<3.7	<3.7	<3.7	<3.7	ND
BOTF-T2-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T2-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Manifold H2															
H2-T1-5	5	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
H2-T1-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
H2-T1-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
Historic Sump S20															
S20-T1-5	5	3/20/2017	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<5.4	<2.7	<2.7	<2.7	<2.7	<2.7	ND
S20-T1-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S20-T1-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S20-T2-5	5	3/20/2017	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<6.4	<3.2	<3.2	<3.2	<3.2	<3.2	ND
S20-T2-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
S20-T2-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
REGULATORY SCREENING CRITERIA															
RWQCB TPH Maximum SSLs 20 to 150 feet Above Groundwater			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NA
EPA Residential Soil RSLs			780,000	5,800	650,000	3,800	58,000	NE	550,000	3,900,000	NE	NE	7,800,000	7,800,000	NA
EPA Commercial Soil RSLs			12,000,000	25,000	2,800,000	17,000	240,000	NE	2,400,000	58,000,000	NE	NE	120,000,000	120,000,000	NA
DTSC Residential Soil SLs (cancer endpoint)			210,000*	NE	NE	NE	NE	NE	NE	1,200,000*	NE	NE	2,200,000*	2,200,000*	NA
DTSC Commercial Soil SLs (cancer endpoint)			1,100,000*	NE	NE	NE	NE	NE	NE	6,400,000*	NE	NE	12,000,000*	12,000,000*	NA

Notes/Abbreviations:

<	Not detected at or above the indicated laboratory method reporting limit
--	Not tested
*	Noncaner endpoint value used as cancer endpoint value was not established
bgs	Below ground surface
DTSC	Department of Toxic Substance Control
EPA	United States Environmental Protection Agency
NA	Not available
ND	Not detected
NE	Not established
RSL	EPA Region 9 Regional Screening Level, updated May 2016
RWQCB	Regional Water Quality Control Board - Los Angeles Region
SL	Screening levels, updated January 2016
SSL	RWQCB Maximum Soil Screening Levels - Dtstance to groundwater 20 to 150 feet, Interim Site Assessment Cleanup Guidance, May 1996.
µg/kg	Micrograms per kilogram (units)
VOCs	Volatile organic compounds

TABLE 3
Summary of Soil Analytical Results - Semi-Volatile Organic Compounds
Brea 265 Property

			SVOCs EPA Method 8270C					
Sample Identification	Sample Top	Date Sampled	2-Methylnaphthalene	1-Methylnaphthalene	Flourene	N-Nitrosodiphenylamine	Phenanthrene	Other SVOCs
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
100-ACRE PARCEL								
Vapor Recovery System								
VRS-B1-20	20	3/23/2017	<300	<300	<300	<300	<300	ND
VRS-B1-25	25	3/23/2017	--	--	--	--	--	--
VRS-B1-30	30	3/23/2017	--	--	--	--	--	--
VRS-B1-35	35	3/23/2017	--	--	--	--	--	--
VRS-B1-40	40	3/23/2017	--	--	--	--	--	--
VRS-B1-45	45	3/23/2017	--	--	--	--	--	--
VRS-B1-50	50	3/23/2017	--	--	--	--	--	--
VRS-B1-55	55	3/23/2017	--	--	--	--	--	--
VRS-B1-60	60	3/23/2017	<300	<300	<300	<300	<300	ND
VRS-T1-5	5	3/21/2017	<300	<300	<300	<300	<300	ND
VRS-T1-10	10	3/21/2017	--	--	--	--	--	--
VRS-T1-15	15	3/21/2017	--	--	--	--	--	--
VRS-T2-5	5	3/21/2017	<300	<300	<300	<300	<300	ND
VRS-T2-10	10	3/21/2017	--	--	--	--	--	--
VRS-T2-15	15	3/21/2017	--	--	--	--	--	--
Dehydration Unit								
DRU-T1-5	5	3/21/2017	<300	<300	<300	<300	<300	ND
DRU-T1-10	10	3/21/2017	--	--	--	--	--	--
DRU-T1-15	15	3/21/2017	--	--	--	--	--	--
Historic Sumps								
Sump S3								
S3-T1- 5	5	3/29/2017	<300	<300	<300	<300	<300	ND
S3-T1- 10	10	3/29/2017	--	--	--	--	--	--
S3-T1- 15	15	3/29/2017	--	--	--	--	--	--
Sump S5								
S5-B1-20	20	3/28/2017	--	--	--	--	--	--
S5-B1-24	24	3/28/2017	--	--	--	--	--	--
S5-B1-36	36	3/28/2017	--	--	--	--	--	--
S5-T1-5	5	3/21/2017	<300	<300	<300	<300	<300	ND
S5-T1-10	10	3/21/2017	--	--	--	--	--	--
S5-T1-15	15	3/21/2017	--	--	--	--	--	--
Sump S7								
S7-T1- 5	5	3/29/2017	--	--	--	--	--	--
S7-T1- 10	10	3/29/2017	--	--	--	--	--	--
S7-T1- 15	15	3/29/2017	--	--	--	--	--	--
Sump S8								
S8-B1-15	15	3/28/2017	<300	<300	480	<300	<300	ND
S8-B1-39	39	3/28/2017	2,800	3,500	<1,500	<1,500	2,800	ND
S8-B1-55	55	3/28/2017	<1,500	<1,500	1,600	2,700	<1,500	ND
S8-T1-1	1	3/23/2017	<300	<300	<300	<300	<300	ND
S8-T1-5	5	3/21/2017	<300	<300	<300	<300	<300	ND
S8-T1-10	10	3/21/2017	--	--	--	--	--	--
S8-T1-15	15	3/21/2017	32,000	**23,000**	<300	<300	<300	ND
S8-T2- 5	5	3/29/2017	--	--	--	--	--	--
S8-T2- 10	10	3/29/2017	--	--	--	--	--	--
S8-T2- 15	15	3/29/2017	--	--	--	--	--	--
Drainage Channel								
DR-HA1-1.0	1	3/21/2017	<300	<300	<300	<300	<300	ND
DR-HA1-5.0	5	3/21/2017	--	--	--	--	--	--
DR-HA2-1.0	1	3/21/2017	<300	<300	<300	<300	<300	ND
DR-HA2-5.0	5	3/21/2017	--	--	--	--	--	--
DR-HA3-1.0	1	3/21/2017	<300	<300	<300	<300	<300	ND
DR-HA3-5.0	5	3/21/2017	--	--	--	--	--	--
DR-HA4-1.0	1	3/21/2017	<300	<300	<300	<300	<300	ND

TABLE 3
Summary of Soil Analytical Results - Semi-Volatile Organic Compounds
Brea 265 Property

Sample Identification	Sample Top	Date Sampled	SVOCs EPA Method 8270C					
			2-Methylnaphthalene	1-Methylnaphthalene	Flourene	N-Nitrosodiphenylamine	Phenanthrene	Other SVOCs
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
100-ACRE PARCEL								
DR-HA4-5.0	5	3/21/2017	--	--	--	--	--	--
Abandoned Tank								
104-T1-5	5	3/21/2017	<300	<300	<300	<300	<300	ND
104-T1-10	10	3/21/2017	--	--	--	--	--	--
104-T1-15	15	3/21/2017	--	--	--	--	--	--
CENTRAL PROPERTY - 165-ACRE PARCEL								
Brea-Olinda Tank Farm								
BOTF-B1-5	5	3/23/2017	--	--	--	--	--	--
BOTF-B1-10	10	3/23/2017	--	--	--	--	--	--
BOTF-B1-15	15	3/23/2017	--	--	--	--	--	--
BOTF-B1-20	20	3/23/2017	--	--	--	--	--	--
BOTF-B1-25	25	3/23/2017	--	--	--	--	--	--
BOTF-B1-30	30	3/23/2017	--	--	--	--	--	--
BOTF-B1-35	35	3/23/2017	--	--	--	--	--	--
BOTF-B1-40	40	3/23/2017	--	--	--	--	--	--
BOTF-B1-45	45	3/23/2017	--	--	--	--	--	--
BOTF-B1-50	50	3/23/2017	--	--	--	--	--	--
BOTF-B1-55	55	3/23/2017	--	--	--	--	--	--
BOTF-B1-60	60	3/23/2017	--	--	--	--	--	--
BOTF-T1-5	5	3/20/2017	--	--	--	--	--	--
BOTF-T1-10	10	3/20/2017	--	--	--	--	--	--
BOTF-T1-15	15	3/20/2017	--	--	--	--	--	--
BOTF-T2-5	5	3/20/2017	--	--	--	--	--	ND
BOTF-T2-10	10	3/20/2017	--	--	--	--	--	--
BOTF-T2-15	15	3/20/2017	--	--	--	--	--	--
Manifold H2								
H2-T1-5	5	3/20/2017	--	--	--	--	--	--
H2-T1-10	10	3/20/2017	--	--	--	--	--	--
H2-T1-15	15	3/20/2017	--	--	--	--	--	--
Historic Sump S20								
S20-T1-5	5	3/20/2017	--	--	--	--	--	ND
S20-T1-10	10	3/20/2017	--	--	--	--	--	--
S20-T1-15	15	3/20/2017	--	--	--	--	--	--
S20-T2-5	5	3/20/2017	--	--	--	--	--	ND
S20-T2-10	10	3/20/2017	--	--	--	--	--	--
S20-T2-15	15	3/20/2017	--	--	--	--	--	--
REGULATORY SCREENING CRITERIA								
RWQCB TPH Maximum SSLs 20 to 150 feet Above Groundwater			NE	NE	NE	NE	NE	NA
EPA Residential Soil RSLs			240,000	18,000	2,400,000	110,000	NE	NA
EPA Commercial Soil RSLs			3,000,000	73,000	30,000,000	470,000	NE	NA
DTSC Residential Soil SLs (cancer endpoint)			NE	NE	NE	NE	NE	NA
DTSC Commercial Soil SLs (cancer endpoint)			NE	NE	NE	NE	NE	NA

Notes/Abbreviations:

<	Not detected at or above the indicated laboratory method reporting limit
--	Not tested
Bold	Detected above one or more regulatory screening levels
bgs	Below ground surface
DTSC	Department of Toxic Substance Control
EPA	United States Environmental Protection Agency
NA	Not available
ND	Not detected
NE	Not established
RSL	EPA Region 9 Regional Screening Level, updated May 2016
RWQCB	Regional Water Quality Control Board - Los Angeles Region
SL	Screening levels, updated January 2016
SSL	RWQCB Maximum Soil Screening Levels - Distance to groundwater 20 to 150 feet Interim Site Assessment Cleanup Guidance, May 1996.
SVOCs	Semi-volatile organic compounds
µg/kg	Micrograms per kilogram (units)

TABLE 4
Summary of Soil Analytical Results - Title 22 Metals
Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Title 22 Metals EPA Method 6010B/7471A																Uranium EPA 6020A
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Uranium
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg
100-ACRE PARCEL																				
Vapor Recovery System																				
VRS-B1-20	20	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-25	25	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-30	30	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-35	35	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-40	40	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-45	45	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-50	50	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-55	55	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-B1-60	60	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T1-5	5	3/21/2017	<3	<5	41	<1	<2	3.2	4.3	<1	<3	<0.1	<5	5.4	<5	<2	<2	6.3	11	--
VRS-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T2-5	5	3/21/2017	<3	<5	67	<1	<2	6.6	4.4	7.4	<3	<0.1	<5	7.8	<5	<2	<2	18	27	--
VRS-T2-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VRS-T2-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dehydration Unit																				
DRU-T1-5	5	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRU-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRU-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Historic Sumps																				
Sump S3																				
S3-T1- 5	5	3/29/2017	<3	<5	88	<1	<2	8.6	5.3	6	<3	<0.1	<5	10	<5	<2	<2	23	34	--
S3-T1- 10	10	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S3-T1- 15	15	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sump S5																				
S5-B1-20	20	3/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S5-B1-24	24	3/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S5-B1-36	36	3/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S5-T1-5	5	3/21/2017	<3	<5	34	<1	<2	3.2	2.7	3.6	<3	<0.1	<5	6.5	<5	<2	<2	11	24	0.71
S5-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S5-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sump S7																				
S7-T1- 5	5	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S7-T1- 10	10	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S7-T1- 15	15	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 4
Summary of Soil Analytical Results - Title 22 Metals
Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Title 22 Metals EPA Method 6010B/7471A																Uranium EPA 6020A
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Uranium
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg
100-ACRE PARCEL																				
Sump S8																				
S8-B1-15	15	3/28/2017	<3	<5	71	<1	<2	7.8	6.0	5.3	<3	<0.1	<5	8.2	<5	<2	<2	24	23	--
S8-B1-39	39	3/28/2017	<3	<5	56	<1	<2	5.8	4.8	5.2	<3	<0.1	<5	11	<5	<2	<2	17	26	0.67
S8-B1-55	55	3/28/2017	<3	<5	57	<1	<2	8.9	5.5	6.7	<3	<0.1	<5	14	<5	<2	<2	24	35	--
S8-T1-1	1	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T1-5	5	3/21/2017	<3	<5	45	<1	<2	4.6	3.5	3.0	<3	<0.1	<5	3.8	<5	<2	<2	14	23	0.76
S8-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T1-15	15	3/21/2017	<3	<5	220	<1	<2	18	5.2	11	<3	<0.1	<5	14	<5	<2	<2	19	35	
S8-T2- 5	5	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T2- 10	10	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S8-T2- 15	15	3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Drainage Channel																				
DR-HA1-1.0	1	3/21/2017	<3	<5	65	<1	<2	7.0	3.9	8.8	<3		<5	8.2	<5	<2	<2	15	35	1
DR-HA1-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--
DR-HA2-1.0	1	3/21/2017	<3	<5	27	<1	<2	2.8	2.0	2.4	<3		<5	4.4	<5	<2	<2	9.0	13	0.73
DR-HA2-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--
DR-HA3-1.0	1	3/21/2017	<3	<5	80	<1	<2	5.6	5.0	5.5	<3		<5	11	<5	<2	<2	16	34	1.2
DR-HA3-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--
DR-HA4-1.0	1	3/21/2017	<3	<5	50	<1	<2	6.4	4.3	4.1	<3		<5	7.5	<5	<2	<2	19	23	0.93
DR-HA4-5.0	5	3/21/2017	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--
Abandoned Tank																				
104-T1-5	5	3/21/2017	<3	<5	47	<1	<2	4.7	4.2	4.9	<3		<5	10	<5	<2	<2	14	24	1.3
104-T1-10	10	3/21/2017	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--
104-T1-15	15	3/21/2017	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--
165-ACRE PARCEL																				
Brea-Olinda Tank Farm																				
BOTF-B1-5	5	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-10	10	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-15	15	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-20	20	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-25	25	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-30	30	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-35	35	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-40	40	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-45	45	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 4
Summary of Soil Analytical Results - Title 22 Metals
Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Title 22 Metals EPA Method 6010B/7471A																Uranium EPA 6020A
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Uranium
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg
100-ACRE PARCEL																				
BOTF-B1-50	50	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-55	55	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-B1-60	60	3/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T1-5	5	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T1-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T1-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T2-5	5	3/20/2017	<3	<5	120	<1	<2	9.5	6.8	7.8	<3	<0.1	5.3	8.8	<5	<2	<2	24	31	--
BOTF-T2-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOTF-T2-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manifold H2																				
H2-T1-5	5	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
H2-T1-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
H2-T1-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Historic Sump S20																				
S20-T1-5	5	3/20/2017	<3	<5	55	<1	<2	6.4	4.1	4.0	<3	<0.1	<5	6.5	<5	<2	<2	16	22	0.53
S20-T1-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S20-T1-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S20-T2-5	5	3/20/2017	<3	<5	88	<1	<2	7.7	5.2	5.1	<3	<0.1	<5	10	<5	<2	<2	22	24	--
S20-T2-10	10	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S20-T2-15	15	3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
REGULATORY SCREENING CRITERIA																				
RWQCB TPH Maximum SSLs 20 to 150 feet Above Groundwater			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA Residential Soil RSLs			31	0.39	15,000	160	70	NE	23	3,100	80 [1]	10	390	1,500	390	390	0.78	390	23,000	230,000
EPA Commercial Soil RSLs			410	1.6	190,000	2,000	800	NE	300	41,000	320 [1]	43	5,100	20,000	5,100	5,100	10	5,200	310,000	3,500,000
DTSC Residential Soil SLs (cancer endpoint)			NE	0.67	NE	NE	2,100	NE	NE	NE	80*	1.0*	NE	NE	NE	390*	NE	390*	NE	NE
DTSC Commercial Soil SLs (cancer endpoint)			NE	2.5	NE	NE	9,300	NE	NE	NE	320*	4.5*	NE	NE	NE	1,500*	NE	1,000*	NE	NE

Notes/Abbreviations:

< Not detected at or above the indicated laboratory method reporting limit
-- Not tested
[1] California Human Health Screening Level (CHHSL) used for lead
bgs Below ground surface
DTSC Department of Toxic Substance Control
EPA United States Environmental Protection Agency
mg/kg Milligrams per kilogram (units)
NA Not available
ND Not detected
NE Not established
RSL EPA Region 9 Regional Screening Level, updated May 2016
RWQCB Regional Water Quality Control Board - Los Angeles Region
SL Screening levels, updated January 2016
SSL RWQCB Maximum Soil Screening Levels - Distance to groundwater 20 to 150 feet, Interim Site Assessment Cleanup Guidance, May 1996.
µg/kg Micrograms per kilogram (units)

TABLE 5
Summary of Soil Analytical Results - OCPs, PCBs, OPPs, and CHs
Brea 265 Property

			OCPs EPA 8081A	PCBs EPA 8082		OPPs EPA 8141A	CHs EPA 8151A
Sample Identification	Sample Top	Date Sampled	OCPs	Aroclor-1260	Other PCBs	OPPs	Chlorinated Herbicides
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
100-ACRE PARCEL							
Vapor Recovery System							
VRS-B1-20	20	3/23/2017	--	--	--	--	--
VRS-B1-25	25	3/23/2017	--	--	--	--	--
VRS-B1-30	30	3/23/2017	--	--	--	--	--
VRS-B1-35	35	3/23/2017	--	--	--	--	--
VRS-B1-40	40	3/23/2017	--	--	--	--	--
VRS-B1-45	45	3/23/2017	--	--	--	--	--
VRS-B1-50	50	3/23/2017	--	--	--	--	--
VRS-B1-55	55	3/23/2017	--	--	--	--	--
VRS-B1-60	60	3/23/2017	--	--	--	--	--
VRS-T1-5	5	3/21/2017	--	<10	ND	--	--
VRS-T1-10	10	3/21/2017	--	--	--	--	--
VRS-T1-15	15	3/21/2017	--	--	--	--	--
VRS-T2-5	5	3/21/2017	--	<10	ND	--	--
VRS-T2-10	10	3/21/2017	--	--	--	--	--
VRS-T2-15	15	3/21/2017	--	--	--	--	--
Dehydration Unit							
DRU-T1-5	5	3/21/2017	--	--	--	--	--
DRU-T1-10	10	3/21/2017	--	--	--	--	--
DRU-T1-15	15	3/21/2017	--	--	--	--	--
Historic Sumps							
Sump S3							
S3-T1- 5	5	3/29/2017	--	--	--	--	--
S3-T1- 10	10	3/29/2017	--	--	--	--	--
S3-T1- 15	15	3/29/2017	--	--	--	--	--
Sump S5							
S5-B1-20	20	3/28/2017	--	--	--	--	--
S5-B1-24	24	3/28/2017	--	--	--	--	--
S5-B1-36	36	3/28/2017	--	--	--	--	--
S5-T1-5	5	3/21/2017	--	<10	ND	--	--
S5-T1-10	10	3/21/2017	--	--	--	--	--
S5-T1-15	15	3/21/2017	--	--	--	--	--
Sump S7							
S7-T1- 5	5	3/29/2017	--	--	--	--	--
S7-T1- 10	10	3/29/2017	--	--	--	--	--
S7-T1- 15	15	3/29/2017	--	--	--	--	--
Sump S8							
S8-B1-15	15	3/28/2017	--	--	--	--	--
S8-B1-39	39	3/28/2017	--	<10	ND	--	--
S8-B1-55	55	3/28/2017	--	<10	ND	--	--
S8-T1-1	1	3/23/2017	ND	--	--	ND	ND
S8-T1-5	5	3/21/2017	--	<10	ND	--	--
S8-T1-10	10	3/21/2017	--	--	--	--	--

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Brea 265 Property

			OCPs EPA 8081A	PCBs EPA 8082		OPPs EPA 8141A	CHs EPA 8151A
Sample Identification	Sample Top	Date Sampled	OCPs	Aroclor-1260	Other PCBs	OPPs	Chlorinated Herbicides
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
100-ACRE PARCEL							
S8-T1-15	15	3/21/2017	--	--	--	--	--
S8-T2- 5	5	3/29/2017	--	--	--	--	--
S8-T2- 10	10	3/29/2017	--	--	--	--	--
S8-T2- 15	15	3/29/2017	--	--	--	--	--
Drainage Channel							
DR-HA1-1.0	1	3/21/2017	ND	<10	ND	ND	ND
DR-HA1-5.0	5	3/21/2017	--	--	--	--	--
DR-HA2-1.0	1	3/21/2017	ND	<10	ND	ND	ND
DR-HA2-5.0	5	3/21/2017	--	--	--	--	--
DR-HA3-1.0	1	3/21/2017	ND	19	ND	ND	ND
DR-HA3-5.0	5	3/21/2017	--	--	--	--	--
DR-HA4-1.0	1	3/21/2017	ND	<10	ND	ND	ND
DR-HA4-5.0	5	3/21/2017	--	--	--	--	--
Abandoned Tank							
104-T1-5	5	3/21/2017	--	<10	ND	--	--
104-T1-10	10	3/21/2017	--	--	--	--	--
104-T1-15	15	3/21/2017	--	--	--	--	--
165-ACRE PARCEL							
Brea-Olinda Tank Farm							
BOTF-B1-5	5	3/23/2017	--	--	--	--	--
BOTF-B1-10	10	3/23/2017	--	--	--	--	--
BOTF-B1-15	15	3/23/2017	--	--	--	--	--
BOTF-B1-20	20	3/23/2017	--	--	--	--	--
BOTF-B1-25	25	3/23/2017	--	--	--	--	--
BOTF-B1-30	30	3/23/2017	--	--	--	--	--
BOTF-B1-35	35	3/23/2017	--	--	--	--	--
BOTF-B1-40	40	3/23/2017	--	--	--	--	--
BOTF-B1-45	45	3/23/2017	--	--	--	--	--
BOTF-B1-50	50	3/23/2017	--	--	--	--	--
BOTF-B1-55	55	3/23/2017	--	--	--	--	--
BOTF-B1-60	60	3/23/2017	--	--	--	--	--
BOTF-T1-5	5	3/20/2017	--	--	--	--	--
BOTF-T1-10	10	3/20/2017	--	--	--	--	--
BOTF-T1-15	15	3/20/2017	--	--	--	--	--
BOTF-T2-5	5	3/20/2017	--	<0.1	ND	--	--
BOTF-T2-10	10	3/20/2017	--	--	--	--	--
BOTF-T2-15	15	3/20/2017	--	--	--	--	--
Manifold H2							
H2-T1-5	5	3/20/2017	--	--	--	--	--
H2-T1-10	10	3/20/2017	--	--	--	--	--
H2-T1-15	15	3/20/2017	--	--	--	--	--

TABLE 5
Summary of Soil Analytical Results - OCPs, PCBs, OPPs, and CHs
Brea 265 Property

			OCPs EPA 8081A	PCBs EPA 8082		OPPs EPA 8141A	CHs EPA 8151A
Sample Identification	Sample Top	Date Sampled	OCPs	Aroclor-1260	Other PCBs	OPPs	Chlorinated Herbicides
			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
100-ACRE PARCEL							
Historic Sump S20							
S20-T1-5	5	3/20/2017	--	<0.1	ND	--	--
S20-T1-10	10	3/20/2017	--	--	--	--	--
S20-T1-15	15	3/20/2017	--	--	--	--	--
S20-T2-5	5	3/20/2017	--	<0.1	ND	--	--
S20-T2-10	10	3/20/2017	--	--	--	--	--
S20-T2-15	15	3/20/2017	--	--	--	--	--
REGULATORY SCREENING CRITERIA							
RWQCB TPH Maximum SSLs 20 to 150 feet Above Groundwater			NA	NE	NA	NA	NA
EPA Residential Soil RSLs			NA	240	NA	NA	NA
EPA Commercial Soil RSLs			NA	990	NA	NA	NA
DTSC Residential Soil SLs (cancer endpoint)			NA	NE	NA	NA	NA
DTSC Commercial Soil SLs (cancer endpoint)			NA	NE	NA	NA	NA

Notes/Abbreviations:

<	Not detected at or above the indicated laboratory method reporting limit
--	Not tested
bgs	Below ground surface
CHs	Chlorinated herbicides
DTSC	Department of Toxic Substance Control
EPA	United States Environmental Protection Agency
NA	Not available
ND	Not detected
NE	Not established
OCPs	Organochlorine pesticides
OPPs	Organophosphorous pesticides
PCBs	Polychlorinated biphenyls
RSL	EPA Region 9 Regional Screening Level, updated May 2016
RWQCB	Regional Water Quality Control Board - Los Angeles Region
SL	Screening levels, updated January 2016
SSL	RWQCB Maximum Soil Screening Levels - Distance to groundwater 20 to 150 feet, Interim Site Assessment Cleanup Guidance, May 1996.
µg/kg	Micrograms per kilogram (units)

TABLE 6
Summary of Soil Vapor Analytical Results - Brea 265 Property

Sample Identification	Sample Top	Date Sampled	Volatile Organic Compounds EPA Method TO-15											
			1,3,5-Trimethylbenzene	Benzene	Carbon disulfide	Ethylbenzene	o-Xylene	Toluene	1,2,4-Trimethylbenzene	4-Ethyltoluene	Heptane	Hexane	m,p-Xylene	Other VOCs
			µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3
100-ACRE PARCEL														
Vapor Recovery System														
VRS-B1-SV15	15	3/29/2017	15	12	26	8.2	9.2	20	86	11	23	74	23	ND
Residential Indoor Air RSLs[1]			NE	0.36	730	1.1	100	520	7.3	NE	NE	NE	100	NA
Attenuation Factor			0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	NA
Calculated EPA Residential Soil Vapor RSLs			**NE**	**180**	**365,000**	**550**	**50,000**	**260,000**	**3,650**	**NE**	**NE**	**NE**	**50,000**	**NA**
Commercial/Industrial Indoor Air RSLs[1]			NE	1.6	3,100	4.9	440	22,000	31	NE	NE	NE	440	NA
Attenuation Factor			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	NA
Calculated EPA Industrial Soil Vapor RSLs			**NE**	**1,600**	**3,100,000**	**4,900**	**440,000**	**22,000,000**	**31,000**	**NE**	**NE**	**NE**	**440,000**	**NA**
DTSC Residential SLs (cancer endpoint)[1]			42*	0.97	NE	NE	NE	310*	NE	NE	NE	NE	NE	NA
Attenuation Factor			0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	NA
Calculated DTSC Residential Soil Vapor SLs			**21,000**	**485**	**NE**	**NE**	**NE**	**155,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NA**
DTSC Commercial/Industrial SLs (cancer endpoint)[1]			180*	4.2	NE	NE	NE	1,300*	NE	NE	NE	NE	NE	NA
Attenuation Factor			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	NA
Calculated DTSC Industrial Soil Vapor SLs			**180,000**	**4,200**	**NE**	**NE**	**NE**	**1,300,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NA**

Notes/Abbreviations:

*	Noncancer endpoint value used as cancer endpoint value not established
Bold	Calculated screening criteria for soil vapor based on quotient of screening criteria for air and attenuation factor
Bold	Exceedance of screening criteria
[1]	Value provided is for indoor air, not soil vapor
bgs	Below ground surface
DTSC	Department of Toxic Substance Control
EPA	United States Environmental Protection Agency
NA	Not available
ND	Not detected
NE	Note Established
RSL	EPA Region 9 Regional Screening Level, updated May 2016
SL	Screening le\ Screening levels, updated January 2016
µg/m3	Units are in micrograms per meter cubed
VOCs	Volatile Organic Compounds

TABLE 7

Impacted Soil Volume Estimates

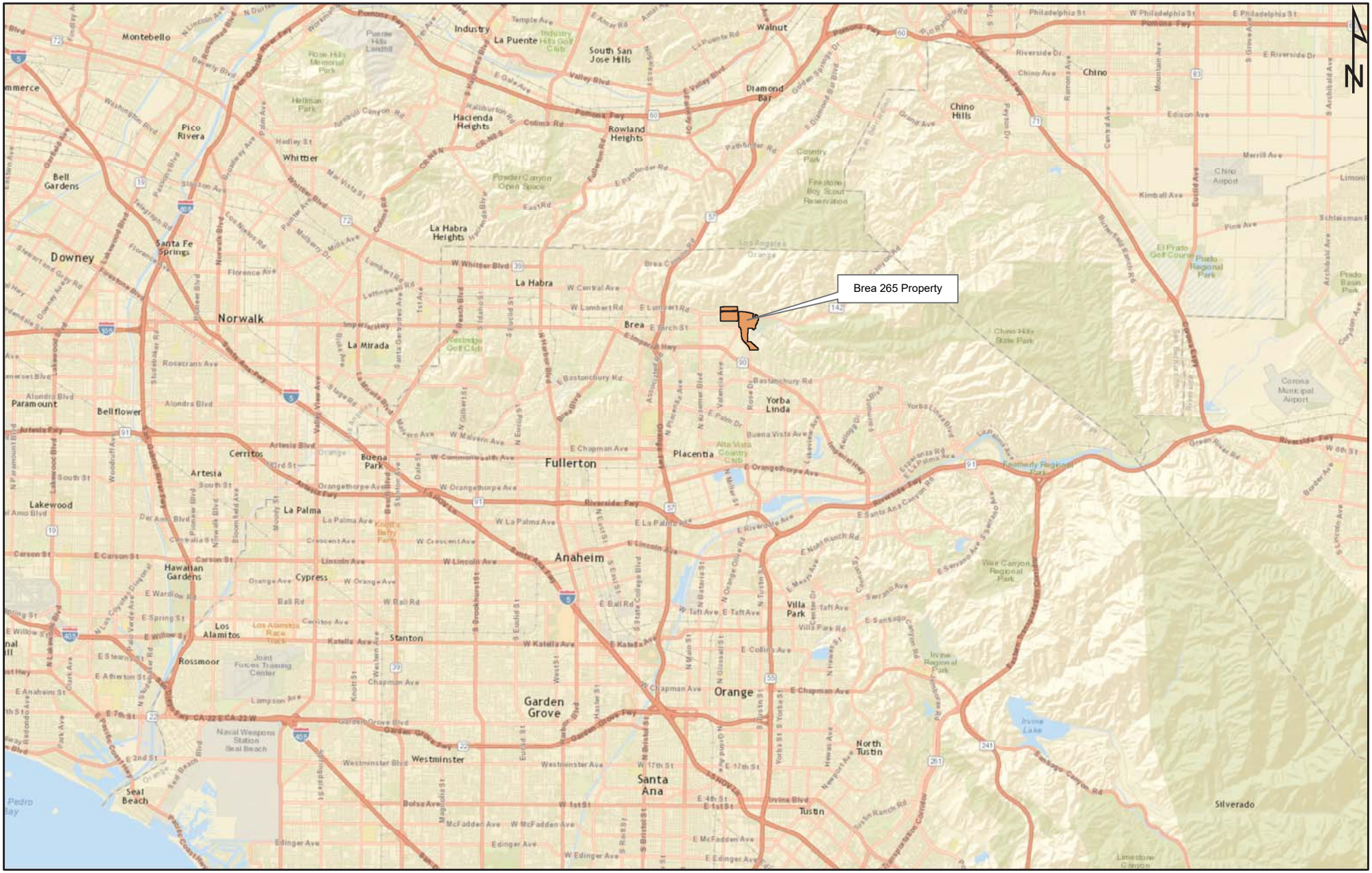
PROPERTY/FEATURE	SOIL IMPACTS FOUND?	IMPACTED SOIL VOLUME									
		Area (sf)	Perimeter (ft)	Percent of Area Impacted (%)	Estimated Depth (ft)	Clean Overburden Depth (ft)	Excav Volume (no slope) (CY)	Slope Volume (CY)	Total Excav Vol (CY)	Total Impacted Vol (CY)	Clean Overburden Vol (CY)
100-ACRE LEASE PROPERTY - NORTH OF LAMBERT:											
DRAINAGE CHANNEL	Y	37,335	1566	80%	2.5	0	2,766	36	2,802	2,802	0
ABANDONED TANK	N	0	0	0%			0	0	0	0	0
OIL WELLS/CURRENT (22)[1]	U	19,800	2640	100%	10	0	7,333	1,222	8,556	8,556	0
OIL WELLS/PLUGGED (DOGGR) (11)[1]	U	9,900	1320	100%	10	0	3,667	611	4,278	4,278	0
ROADS	U	490,114	3600	50%	1.5	1	13,614	19	13,633	4,540	9,093
FORMER AGRICULTURAL USE	U	228,735	1977	10%	1	0	847	1	849	849	0
TOTALS (IMPACTED SOIL ONLY)		327,499	7,211				28,227	1,890	30,117	21,024	9,093
TOTALS (IMPACTED SOIL, OIL WELLS ONLY)		29,700	3,960				11,000	1,833	12,833	12,833	0
TOTALS (IMPACTED SOIL, NON-OIL WELLS ONLY)		297,799	3,251				17,227	56	17,283	8,191	9,093
100-ACRE LEASE PROPERTY - SOUTH OF LAMBERT:											
VAPOR RECOVERY SYSTEM	Y	3,464	235.5	50%	10	2.5	641	55	696	512	184
DEHYDRATION UNIT	N	24,115	706	35%	10	2	3,126	114	3,240	2,574	666
DRAINAGE CHANNEL/PIPES	Y	120,040	5040	75%	2.5	0	8,336	109	8,445	8,445	0
FORMER SUMPS - S1	U	2,102	178.3	30%	10	5	234	25	258	123	135
FORMER SUMPS - S2	U	2,883	229.1	20%	10	5	214	21	235	112	123
FORMER SUMPS - S3	N	1,896	175.2	30%	10	5	211	24	235	111	124
FORMER SUMPS - S4	U	2,393	195.4	30%	10	5	266	27	293	140	153
FORMER SUMPS - S5	Y	4,440	266.1	100%	17	5	2,796	356	3,152	2,151	1,001
FORMER SUMPS - S6	U	1,429	153.2	30%	10	5	159	21	180	85	95
FORMER SUMPS - S7	N	4,466	255.2	30%	10	5	496	35	532	257	275
FORMER SUMPS - S8[2]	Y	15,757	553	100%	50	10	29,180	12,801	41,981	27,440	14,541
FORMER SUMPS - S9	U	1,942	170.8	30%	10	5	216	24	240	114	126
FORMER SUMPS - S10	U	2,355	205.8	30%	10	5	262	29	290	138	152
FORMER TANK FARM	N	4,789	284.1	20%	10	2.5	355	26	381	281	100
OIL AND INJECTION WELLS/CURRENT (25)[1]	N	22,500	3000	100%	10	0	8,333	1,389	9,722	9,722	0
OIL WELLS/PLUGGED (DOGGR) (27)[1]	N	24,300	3240	100%	10	0	9,000	1,500	10,500	10,500	0
ROADS	N	461,473	12500	75%	1.5	1	19,228	98	19,326	6,420	12,906
FORMER AGRICULTURAL USE	N	342,320	3088.1	5%	1	0	634	1	635	635	0
TOTALS (IMPACTED SOIL ONLY)		536,929	21,236.2				83,685	16,656	100,341	69,760	30,581
TOTALS (IMPACTED SOIL, OIL WELLS ONLY)		46,800	6,240.0				17,333	2,889	20,222	20,222	0
TOTALS (IMPACTED SOIL, NON-OIL WELLS ONLY)		490,129	14,996.2				66,352	13,767	80,118	49,538	30,581
165-ACRE LEASE PROPERTY - NORTH:											
ROADS	U	543,200	25000	50%	2	1	20,119	231	20,350	10,117	10,233
MANIFOLDS AND PIPELINES (4)	N	19,880	1112	10%	10	3	736	77	814	553	260
FORMER SUMPS - S11	U	5,095	275.2	30%	10	2	566	38	604	477	127
FORMER SUMPS - S16	U	9,907	373.1	30%	10	2	1,101	52	1,153	914	239
FORMER SUMPS - S17	U	55,791	1116.7	20%	5	2	2,066	26	2,092	1,249	843
OIL WELLS (OnSite) (36)	U	32,400	4320	100%	10	0	12,000	2,000	14,000	14,000	0
OIL WELLS (Plugged/Buried) (21)	U	18,900	2520	100%	10	0	7,000	1,167	8,167	8,167	0
TOTALS (IMPACTED SOIL ONLY)		340,547	19869.03				43,588	3,591	47,179	35,477	11,702
TOTALS (IMPACTED SOIL, OIL WELLS ONLY)		51,300	6,840.0				19,000	3,167	22,167	22,167	0
TOTALS (IMPACTED SOIL, NON-OIL WELLS ONLY)		289,247	13,029.0				24,588	425	25,013	13,311	11,702
165-ACRE LEASE PROPERTY - SOUTH:											
MANIFOLDS AND PIPELINES (2)	U	9,940	556	10%	10	3	368	39	407	277	130
BREA PRODUCTION UNIT/OLINDA TANK FARM	Y	16,161	522.5	25%	5	0	748	15	763	763	0
CARBON FILTRATION TANK AREA	U	5,139	288.5	25%	10	5	476	33	509	246	263
FORMER TANK AREA	Y	8,922	32.8	100%	12	7	3,965	22	3,987	1,656	2,331
OIL WELLS (OnSite) (26)	U	23,400	3120	100%	10	0	8,667	1,444	10,111	10,111	0
OIL WELLS (Plugged/Buried) (19)	U	17,100	2280	100%	10	0	6,333	1,056	7,389	7,389	0
ROADS (Oil Field Operations Only)	U	685,000	25000	50%	1.5	1	19,028	130	19,158	6,357	12,801
FORMER SUMPS - S12	U	5,789	337.8	30%	10	2	643	47	690	545	146
FORMER SUMPS - S13	U	2,641	209.5	50%	10	2	489	48	538	422	115
FORMER SUMPS - S14	U	8,664	352.7	15%	5	2	241	6	247	147	100
FORMER SUMPS - S15	U	3,366	233.4	10%	5	2	62	3	65	38	27
FORMER SUMPS - S18	U	23,654	705	30%	10	2	2,628	98	2,726	2,165	561
FORMER SUMPS - S19	U	12,292	408.7	50%	10	2	2,276	95	2,371	1,882	489
FORMER SUMPS - S20	Y	297,550	3182	50%	7	4	38,571	361	38,932	16,597	22,335
AGRICULTURAL AREA	U	1,844,750	7569.5	5%	2	1	6,832	11	6,843	3,419	3,424
TOTALS (IMPACTED SOIL ONLY)		657,189	20,858.8				91,329	3,407	94,736	52,014	42,723
TOTALS (IMPACTED SOIL, OIL WELLS ONLY)		40,500	5,400.0				15,000	2,500	17,500	17,500	0
TOTALS (IMPACTED SOIL, NON-OIL WELLS ONLY)		616,689	15,458.8				76,329	907	77,236	34,514	42,723
CENTRAL LEASE TOTALS		1,862,164	69,175				246,829	25,544	272,373	**178,275**	94,098
CENTRAL LEASE TOTALS (OIL WELLS)		168,300	22,440				62,333	10,389	**72,722**	**72,722**	**0**
CENTRAL LEASE TOTALS (NON-OIL WELLS)		1,693,864	46,735				184,495	15,155	**199,651**	**105,553**	**94,098**

Total, Onsite Impacted - Biotreat or Direct Fill	**173,372**
Total, Off-site Disposal	**4,902**
	178,275

[1] Assumes impacted area of 30x30 feet around each well

[2] Impacts to at least 56' (deepest drilled). Excavate to 20', place liner; treat deeper impacts in-situ.

FIGURES



Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

FIGURE 1
Site Location Map

Phase II Environmental Investigation
Brea 265 Property
Valencia Avenue at Lambert Road
Brea, California

northgate environmental management, inc.

Project No. 2077.01.03S



0 400 800

Scale (Feet)

N

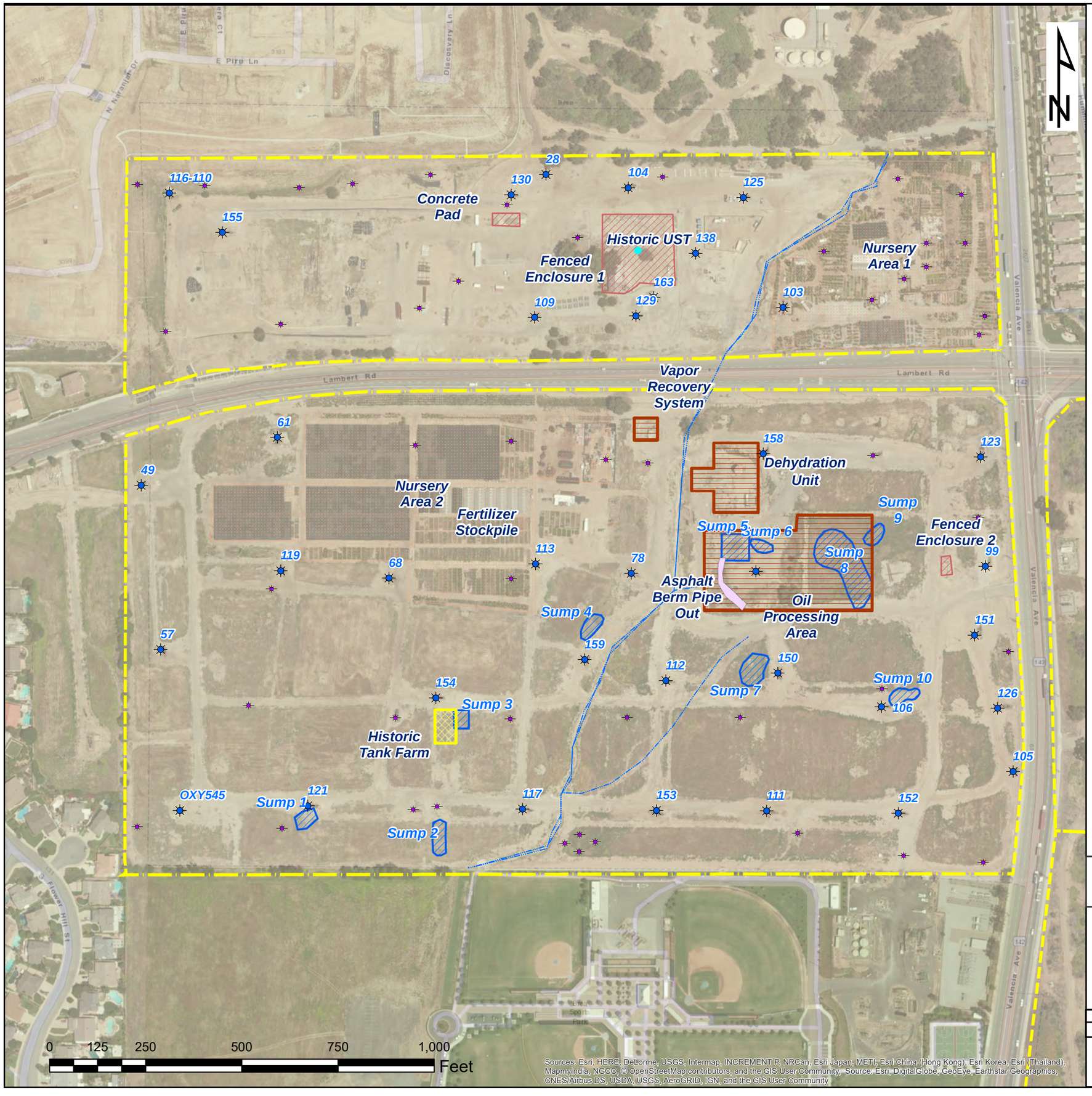
FIGURE 2
Site Plan

Phase I Environmental Site Assessment
Brea 265 Property - Valencia Avenue and Lambert Road
Brea, California

northgate environmental management, inc.

Project No. 2077.01.01S

G:\Projects\Temp\2077 - Brooks Street\2077.01 - Brea-Olinda Oilfield PIESA\Figures\Figure 2 - Site Plan.dwg Layout: 8.5x11-P User: dleg Mar 02, 2017 - 2:02pm



Legend

Wells

- Active
- Plugged

Drainage

Oil Field Features

- Berm
- Misc Processing Area
- Nursery
- Storage
- Tank Farm
- Underground Tank
- Sumps
- Approximate Lease Boundary

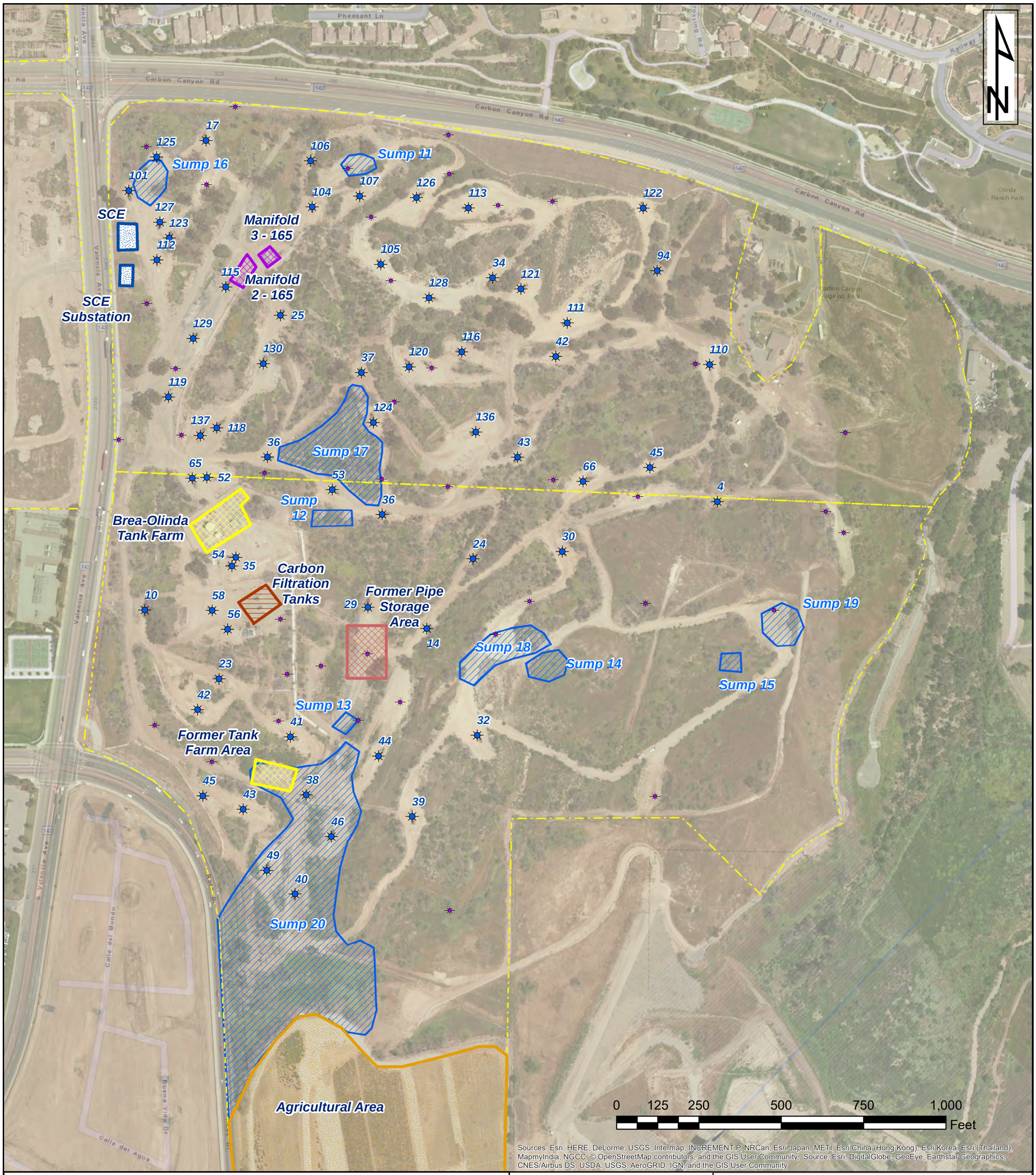
Figure 3

Oil Field Features
100-Acre Property

Project Number	Scale	Approved	Date
2077.01.03S	1:2,250	DW	05/01/2017

northgate environmental management, inc.

Document Path: C:\Projects\Brea-Olinda\GIS\Map File\MapFiles - Report\Figure 3_100.mxd



Legend

Wells

- Active or Idle
- Buried or Plugged

Oil Field Features

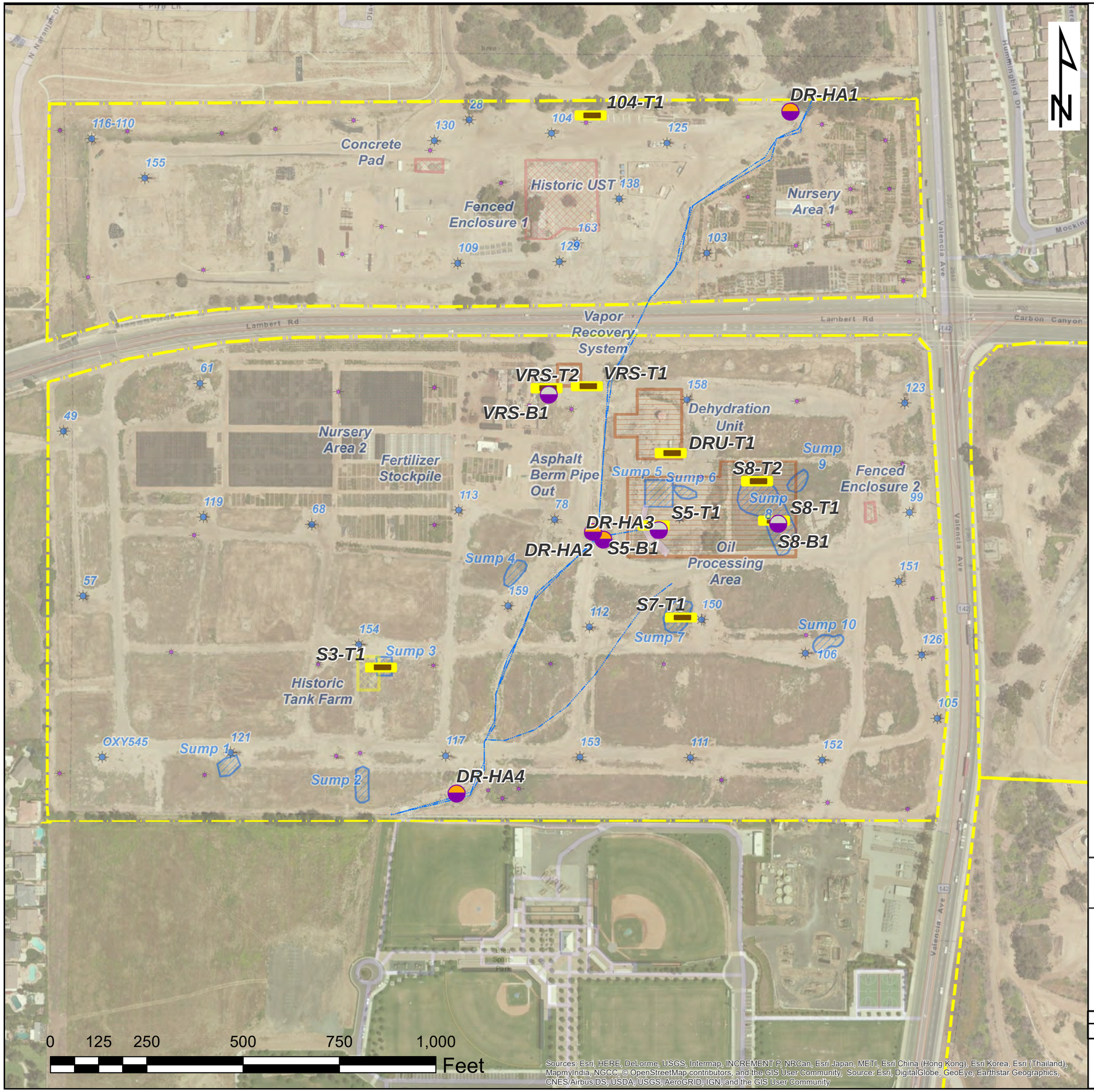
- Agricultural Area
- Electrical
- Manifold
- Misc Processing Area
- Approximate Boundary
- Storage
- Tank Farm
- Sumps

Figure 4

Oil Field Features
165-Acre Property

Project Number	Scale	Approved	Date
2077.01.03S	1:2,500	DW	05/01/2017

northgate environmental management, inc.



Legend

Sample Locations

- Boring
- Hand Auger
- Trench

Wells

- Active
- Plugged

Drainage

Oil Field Features

- Berm
- Processing Area
- Nursery
- Storage
- Tank Farm
- Former Sumps
- Approximate Lease Boundary

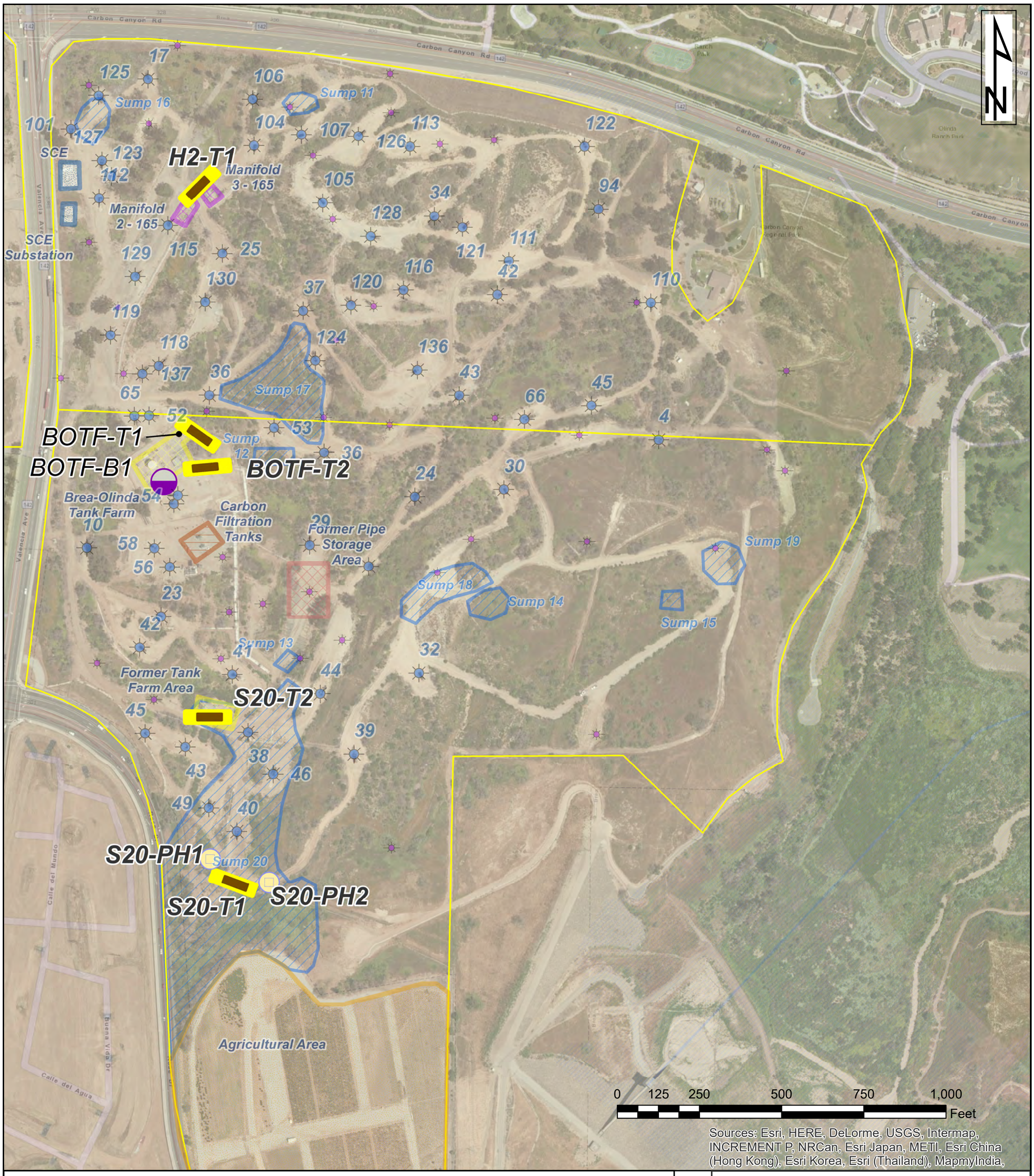
Figure 5

Sampling Locations 100-Acre Property

Project Number	Scale	Approved	Date
2077.01.03S	1:2,250	DW	05/01/2017

northgate environmental management, inc.

Document Path: C:\Projects\Brea-Olinda\GIS\Map File\MapFiles - Report\Figure 5_100.mxd



Legend

Wells

- Active or Idle
- Buried or Plugged

Sample Locations

- Boring
- Hand Auger
- Pot Hole
- Trench

Oil Field Feat

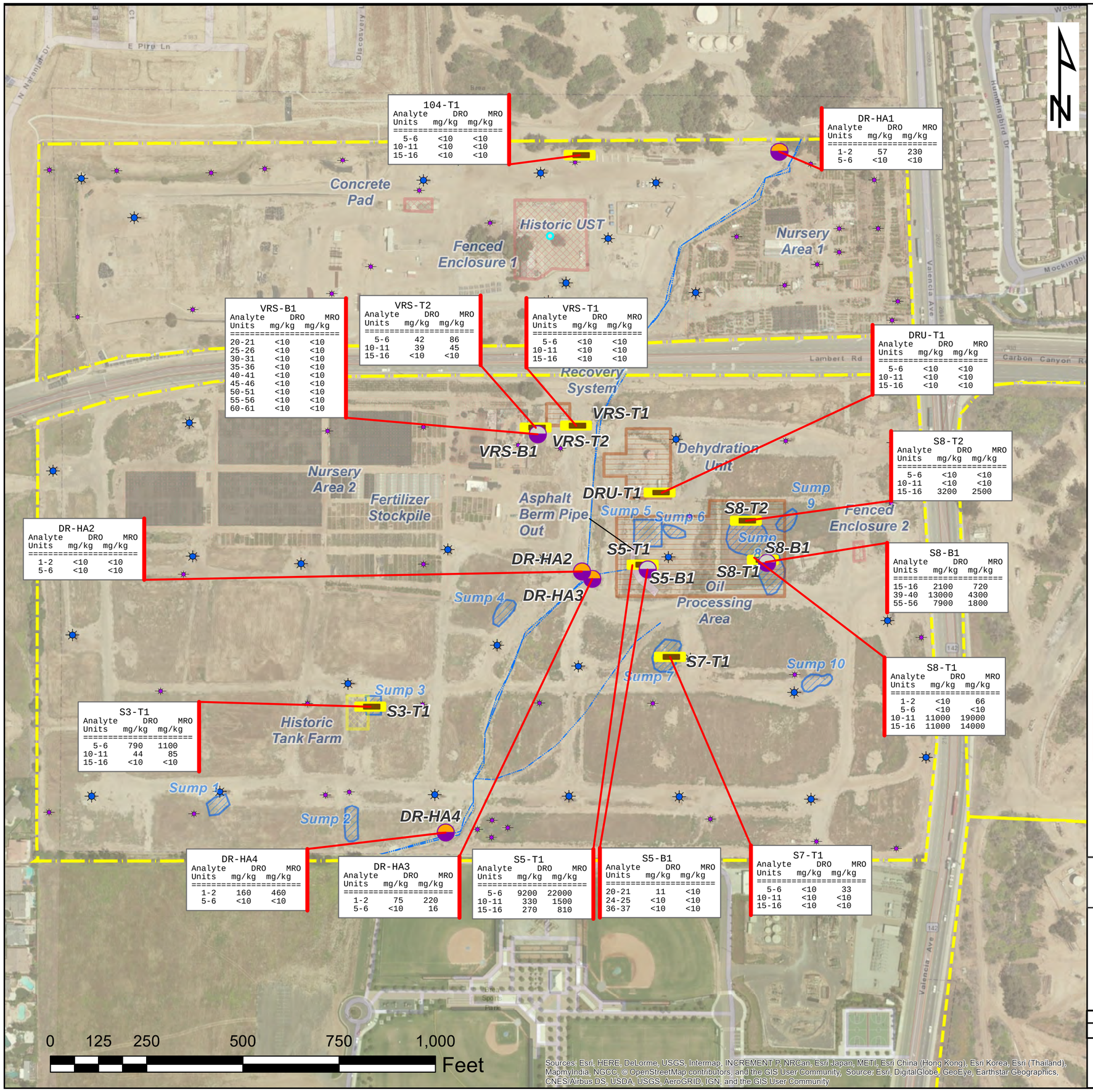
- Agricultural Area
- Electrical
- Manifold
- Misc Processing Area
- Approximate Boundary
- Storage
- Tank Farm
- Sumps

Figure 6

Sampling Locations 165-Acre Property

Project Number	Scale	Approved	Date
2077.01.03S	1:2,500	DW	05/01/2017

northgate environmental management, inc.



Legend

Sample Locations

- Boring
- Hand Auger
- Trench

Wells

- Active
- Plugged

Oil Field Features

- Berm
- Processing Area
- Nursery
- Storage
- Tank Farm
- Underground Tank
- Sumps
- Approximate Lease Boundary

The callout box includes laboratory analysis information obtained using EPA Method 8015M for the samples collected at the location shown in bold type at the top center of the box.

The numbers in the left column (i.e.5-6) are the depth that the soil sample was collected at.

The middle column of numbers is the concentration of diesel range organics/"medium" hydrocarbons (C10-C28) in mg/kg.

The third column of numbers is the concentration of motor oil range organics/"heavy" hydrocarbons (C29-C40) in mg/kg.

A less than sign ("<") indicates that the analyte was not detected at the laboratory reporting limit.

DRU-T1
Analyte DRO MRO
Units mg/kg mg/kg
5-6 <10 <10
10-11 <10 <10
15-16 <10 <10

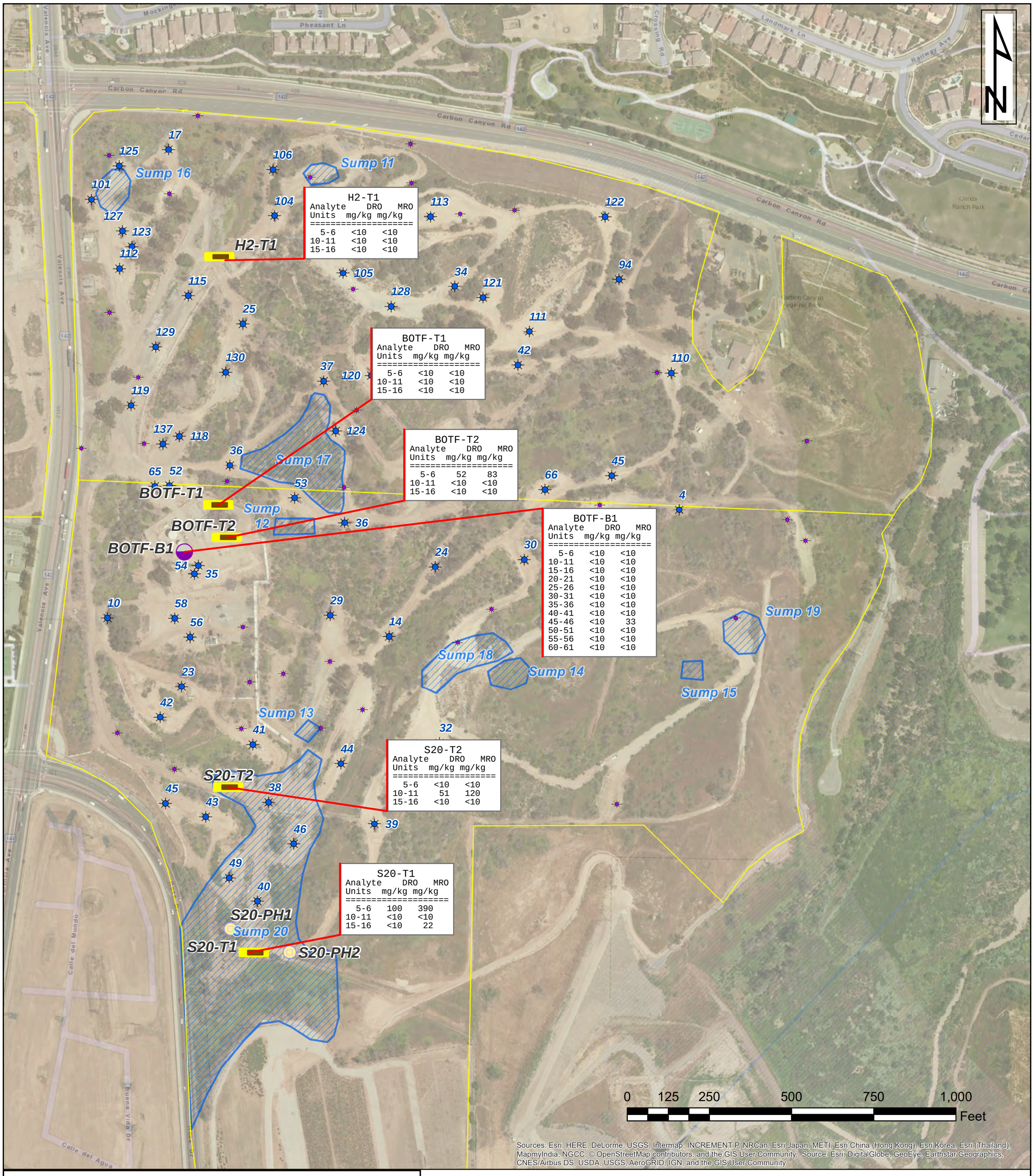
Figure 7

TPH Results in Soil 100-Acre Property

Project Number	Scale	Approved	Date
2077.01.03S	1:2,250	DW	05/01/2017

northgate environmental management, inc.

Document Path: C:\Projects\Brea-Olinda\GIS\Map File\MapFiles - Report\Figure 7_100-2.mxd



Legend

Wells

- Active or Idle
- Buried or Plugged

Sample Locations

- Boring
- Hand Auger
- Pot Hole
- Trench

- Approximate Boundary
- Sumps

DRU-T1

Analyte	DRO	MRO
Units	mg/kg	mg/kg
5-6	<10	<10
10-11	<10	<10
15-16	<10	<10

The callout box includes laboratory analysis information obtained using EPA Method 8015M for the samples collected at the location shown in bold type at the top center of the box.

The numbers in the left column (i.e.5-6) are the depth that the soil sample was collected. The middle column of numbers is the concentration of diesel range organics/"medium" hydrocarbons (C10-C28) in mg/kg. The third column of numbers is the concentration of motor oil range organics/"heavy" hydrocarbons (C29-C40) in mg/kg.

A less than sign ("<") indicates that the analyte was not detected at the laboratory reporting limit.

Figure 8

TPH Results in Soil 165-Acre Property

Project Number	Scale	Approved	Date
2077.01.03S	1:2,500	DW	05/01/2017

northgate environmental management, inc.

APPENDIX A

DRILLING PERMITS

APPLICATION FOR WELL CONSTRUCTION PERMIT

ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION
1241 E. DYER ROAD, SUITE 120
SANTA ANA, CA 92705-5611
(714) 433-6000
FAX: (714) 433-6481

WELL PERMIT NUMBER

CITY: Brea

DATE: 3/16/2017

WELL LOCATION (ADDRESS IF AVAILABLE): Valencia Avenue at Lambert Road

NAME OF WELL OWNER: Aera Energy LLC

ADDRESS: 3030 Saturn Street, Suite 101

CITY: Brea ZIP: 92821 TELEPHONE: (714)924-1003

NAME OF CONSULTING FIRM: Northgate Environmental Management, Inc.

BUSINESS ADDRESS: 24411 Ridge Route Drive, Suite 130

CITY: Laguna Hills, ZIP: 92653 TELEPHONE: (949) 716-0050

NAME OF DRILLING CO.: BC2 Environmental C-57 LICENSE NO.: 969758

CITY: Orange ZIP: 92867 TELEPHONE: (714) 744-2990

TYPE OF WELL (CHECK)

- PRIVATE DOMESTIC ☐
- PUBLIC DOMESTIC ☐
- IRRIGATION ☐
- CATHODIC ☐
- PROBE SURVEY ☐
- MONITORING ☐
- SOIL BORING ☒
- OTHER ☐

TOTAL NUMBER 2

A. WELLS – SUBMIT A WELL CONSTRUCTION DIAGRAM (INCLUDE DIMENSIONS)

B. SOIL BORINGS AND PROBES –
TOTAL DEPTH 60 Feet
SEALING MATERIAL Neat cement/Bentonite

C. PROPOSED START DATE March 23, 2017

DIAGRAM OF WELL SITE (Use additional sheets and/or attachments)

☒ SITE PLAN ATTACHED

I hereby agree to comply in every respect with all requirements of the Health Care Agency and with all ordinances and laws of the County of Orange and of the State of California pertaining to well construction, reconstruction and destruction, including the requirements to maintain the integrity of all significant confining zones.

APPLICANT'S SIGNATURE 3/16/2017 DATE

Frank Hagar / Northgate
PRINT NAME

(949) 716-0050 (949)315-3365
PHONE NUMBER FAX NUMBER

FOR ACCOUNTING USE ONLY:

HSO NO. _____ CHECK NO. _____

DATE _____ AMOUNT _____

INTL. _____

APPROVAL BY OTHER AGENCIES:

JURISDICTION _____

REMARKS _____

AUTHORIZED SIGNATURE DATE

DISPOSITION OF PERMIT (DO NOT FILL IN):

☐ **APPROVED** SUBJECT TO THE FOLLOWING CONDITIONS:

A. NOTIFY THIS AGENCY AT LEAST **48 HOURS**

- ☐ PRIOR TO START.
- ☐ PRIOR TO SEALING THE ANNULAR SPACE OR FILLING OF THE CONDUCTOR CASING.

B. ☐ SUBMIT TO THE AGENCY WITHIN 30 DAYS AFTER COMPLETION OF WORK, A WELL COMPLETION REPORT AND/OR DRILLING LOGS. PLEASE REFERENCE PERMIT NO.

C. ☐ SECURE ALL MONITORING WELLS TO PREVENT TAMPERING.

D. ☐ OTHER _____

☐ **DENIED** _____

PERMIT ISSUED BY DATE

PRINT NAME PHONE NUMBER

WHEN SIGNED BY ORANGE COUNTY HEALTH CARE AGENCY REPRESENTATIVE, THIS APPLICATION IS A PERMIT.

@.F272-09.0803 (R11/01)

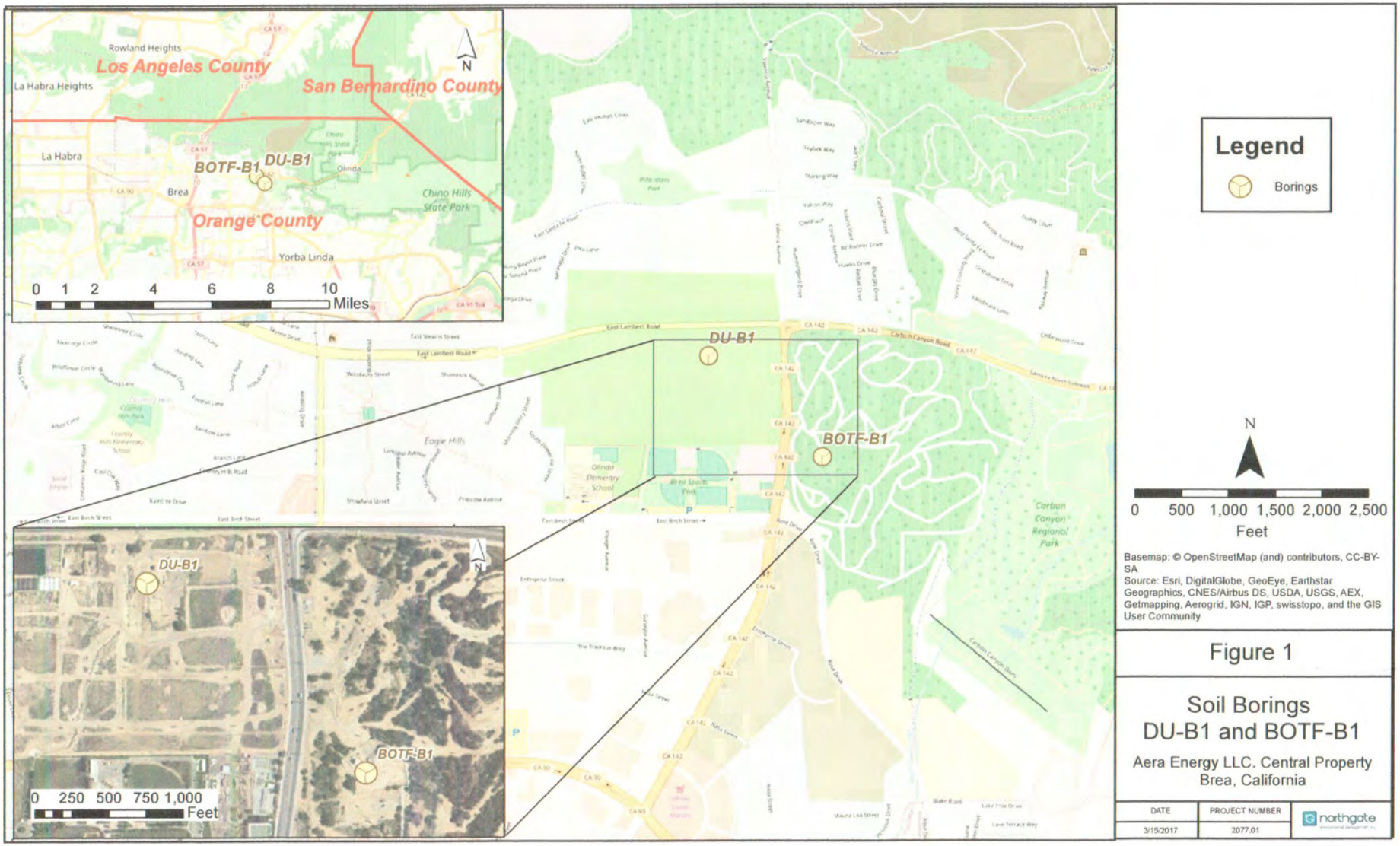


Figure 1

Soil Borings
DU-B1 and BOTF-B1

Aera Energy LLC. Central Property
Brea, California

DATE	PROJECT NUMBER
3/15/2017	2077.01

northgate

County of Orange
Environmental Health
1241 E Dyer Rd, Ste 120
Santa Ana, CA 92705
(714)433-6000

Sales Receipt

Transaction #: 97847
Date: 3/16/2017 Time: 11:20:03 AM
Cashier: 024 Register #: 1

Reference: 377197
AERA ENERGY LLC

Item	Description	Amount
21	WELLS (CONST, RECON, DESTR)	$489.00
54	OVERAGE	$8.00
	Sub Total	$497.00
	Total	$497.00
	Check Tendered	$497.00
	Change Due	$0.00

97847
Thank you for shopping
County of Orange
We hope you'll come back soon!

ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION
HEALTH SERVICE ORDER

377197

Date 3-16-17 Initials JMS
Client Name & Aera Energy LLC
Address Valencia Ave at Lambert Rd
Brea, CA Ph#
Paid By Northgate Environmental
Address 428 13th St., 4th Floor
Oakland CA 94612 Ph# 5108390688

Please circle the respective service code(s)

01	CEQ/HSF (Acct/Bat#)	$
02	CEQ Plan Check/Foods (PC#)	$
03	CEQ Plan Check/Pools (PC#)	$
04	Food Vehicles Cat Decal No(s)	$
05	CEQ/Court Restitution/Judgment Name Case#	$
06	Hotels/Motels (Acct/Bat#)	$
07	Massage Parlor (Acct/Bat#)	$
08	Noise	$
09	Liquid Waste Hauler	$
10	Farm Labor Camp Registration	$
11	Aboveground Petroleum Storage Act	$
12	Hazardous Waste (Acct/Bat#)	$
13	Hazardous Waste Fines	$
14	Hazardous Waste Restitution/Judgment Name Case#	$
15	Hazardous Waste Clean-up	$
16	Medical Waste/Body Art	$
17	UST/HSF (Acct/Bat#)	$
18	UST Plan Check (PC#)	$
19	UST State Surcharge	$
20	UST Restitution/Judgment Name Case#	$
(21)	Wells (Const___ Recon___ Destr___) Water___ Cath___ Init. Monit.___ Add. Monit.___ #Wells Driller Consultant	$489.00
22	Backflow/Cross Connection Client(s)	$
23	Small Water Systems	$
24	CUPA - Base Fee	$
25	CUPA - CalArp	$
26	FOG - OC Sanitation District	$
27	Tiered Permitting	$
~~10~~	OTHER ~~Client Refund~~	$
54	OTHER Overage	$8.00
	OTHER	$
	OTHER	$
	PAID BY CHECK NO:	$497.00

97845

WHITE: Client's Copy YELLOW: Accounting Copy MANILA: Cashier's Copy

NORTHGATE ENVIRONMENTAL MGMNT, INC.

26633

Check Date: 3/15/2017

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
Central Boring Permit	3/15/2017	0026126	497.00			497.00
Orange County Environmental Health		TOTAL	497.00			497.00
Citi Bank Checking	2	O054				

DV-B1 +

BOTF-B1

2077.01

489- Δ = +8$

Requires

Key 40 extra forms

APPENDIX B

FIELD NOTES WITH BORING LOGS

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Page 1 of 7

Date: 3/13/17

Recorded By: F. Hager

Project Name: Brea - Olinda 8, 16 ed

Project No.: 2077.01

Client Name: Brookfield Southern California Division

Weather: Clear Warm

Temperature: 72

Site Conditions:

NORTHGATE PERSONNEL ON-SITE

Derrick Wills

F. Hager

VISITORS

Name	Company/Agency	Time Arrived	Time Left

CONTRACTORS

Contractor Name: Phone No.:

Supervisor: Task:

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Stake out kit

Cable and pipe locator / Pine rental C203382

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/13/17
Recorded By: F. Hagen

Project Name: Brea-Olinda Oilfield
Client Name: Brook St. So Cal.
Project No.: 02077.01

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0930	CRV1 - VRS T1, VRS T2, VRS HA1 Vapor recovery area - cleared with magnetometer
1015	DUT1 Trench - south side DUB1
1030	104-T1 cleared with magnetometer. South of heat separator.
1047	DR-HA1 - 20 feet downstream of culvert - staked.
1100	DR-HA2 DR-HA3 - drainages from VRS and Dehydration tank farm
1115	DR-HA3 - hand auger at turn / low spot in drainage - evidence of recent scour bed load dropping
1155	BOTF-B1 and BOTF-T1 both cleared magnetometer.
1201	BOTF-T2 - south of foundation - short due to old concrete foundation
1215	HZT1 - 1 to road - 12' trench from borell to centerline. magnetometer cleared - short low again
1224	S200-T1 - in wetland drainage south of oilfield operations - Gas pipeline east of location
1:14	S20-T2 cleared along road
13:44	Above cut lab and at solvent storage tanks Mag check - OK for Borehole 1 SLA-B1
1400	BBR at Fire training area. FTA-B1

Print Name: Frank Hagen Signature:

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/20/17
Recorded By: F. Hager

Project Name: Brea-Olinda
Project No.: 02077.01
Client Name: Brooks Street - Southern Div.
Weather: Cloudy / Warm
Temperature:
Site Conditions: Operating oil field

NORTHGATE PERSONNEL ON-SITE

Frank Hager

VISITORS

Name	Company/Agency	Time Arrived	Time Left
Russ	Linn Energy		
Bill Wren	Linn Energy 714-257-1615 714-616-1545	0700	0930

CONTRACTORS

Contractor Name: American Integrated Services Phone No.: 714-921-4102
Supervisor: John Farmer / Roy Ferrer Task: Trenching

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Soil sampling kit - did not use
Encore sample kit - did not use
Staking/Location kit - used
PID - Pine rental - used
Pipe locator - Pine retal - used

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/20/17
Recorded By: F Hogar

Project Name: Brea-Olinda
Project No.: 02077.03
Client Name: Brook St. Southern Div.

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0600	Office to pick up bottles stop to get ice/
0715	Arrive at site H&S meeting and prayer
0745	Move to S20 / PID Calibrate ✓ begin trenching
0800	At 4'6" hit crude/tar in trench -
	5' collected sample S20-T1-5 4oz jar
0815	Loader changing controls
0900	Start trenching again - collect VOC GRO/~~TPO~~ sample at 6'
0905	Sample at 10' - 0.1 lens approx 3" thick from 4'-6" to 5' bgs
0925	Sample at 14' TD no stain - clay no odor PID = 0
0935	move 12' east and pothole to 5'-6" - minor staining no crude/tar material
0945	Moved ~20" west of S20-T1 to edge of channel. Same crude/tar layer at 4'8"-5' 5" - thin (6") staining at 1.5 ft bgs
0955	Move to S20-T2 begin digging after second check with pipe locator
1009	Sample (4oz and 5035) at 5' 0.6 ppmv
1019	Sample (4oz) at 10' S20-T2-10 0.1 ppmv
1032	Sample (4oz and VOC at) 15' S20-T2-15 1.2 ppmv thin layer of HC contam to about 4' 5"
1100	At BOTF-T2 - begin excavating - small diameter abandoned pipe on west end of trench
1150	BOTF-T2 4oz and VOAs - 2.5' of asphalt fill - some odor - headspace 18.2 ppmv
1200	BOTF-T2-10 4oz jar headspace 0.4 ppmv
1204	Headspace only 0.0 ppmv ✓
1208	BOTF-T2-15 - 4oz jar headspace 0.1 ppmv
1300	BOTF-T1 start
1315	BOTF-T1-5 VOA & 4oz
1330	BOTF-T1-10 ~~4~~0 oz glass
~~1445~~ 1345	BOTF-T1-15 4 oz glass.

Print Name: _____ Signature: _____

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/20/17
Recorded By: Frank Hagar

Project Name: Brea-Olinda
Project No.: 02077.01
Client Name: Brooks Street · So Div

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
1345	Moved to H2-T1
	location problems - piping - moved H2-T1 20 ft north immediately adjacent to H3. Trench around pipe w side
1345	Sample H2-T1-5' 4oz jar and 5035 VOAs
1415	Sample H2-T1-10 4oz jar
1435	Sample H2-T1-15 4oz jar
	Fill hole. no staining
1445	leave site
1600	Drop samples at Sunstar
1620	Office

Print Name: Frank Hagar
Signature:

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

DAILY SITE SAFETY MEETING RECORD

Recorded By: F. Hagar
Date & Time: 0715 3/20/17 **Project No.:** 02077.81
Project Name: Brea-Olinda **Project Location:** Brea 165-acre
Field Activities: Trenching
Chemicals Present: Oil field.

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment: Level D
Hazards of Chemicals Present: Inhalation.
Physical Hazards: Slip, trip, fall.
Special Hazards: Underground utilities
Other Topics of Concern:

SITE SAFETY CHECKLIST	YES	NO
Attached Signature Page		X
Written Health and Safety Plan (HASP) is on-site	X	
Information in the HASP matches conditions and activities at the site	X	
Site personnel have appropriate training and certification and medical clearance	X	
Air monitoring equipment has been calibrated daily	X	
Site zones are set up and observed where appropriate	X	
Access to Work Areas is limited to authorized personnel	X	
Decontamination stations (including hand/face wash) are set up and used	X	
Personal protective equipment used matches HASP requirements	X	
Emergency and First Aid equipment is on-site as described in the HASP	X	
Drinking water is readily available	X	

Note: All "NO" answers must be addressed & corrected immediately. Note additionally health and safety observations here.

Ray Forrer
Geoff Harris

Conducted By Print Initials: **Signature:** **Date:** 3/20/17

Chain of Custody Record

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE
25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Dr. Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick D. Ellis

Date: 3/20/17 Page: 1 Of 2
Project Name: Fmr. Old Dutch
Collector: Karl Heger Client Project #: 02-673.01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers
S20-T1-5	3/20/17	0800	Soil	Glass/VOA	X			H				X	M							
S20-T1-5	3/20/17	0805	Soil	Glass/VOA				H				X	H							
S20-T1-10	3/20/17	0815	Soil	Glass				H				X	H							
S20-T1-15	3/20/17	0825	Soil	Glass				H				X	M							
S20-T2-5	3/20/17	1003	Soil	Glass/VOA	H															
S20-T2-5	3/20/17	1007	Soil	Glass				H				X	H							
S20-T2-10	3/20/17	1010	Soil	Glass				H				X	H							
S20-T2-15	3/20/17	1032	Soil	Glass				H				X	H							
S20-T2-15	3/20/17	1035	Soil	Glass/VOA	H															
S20-T2-5	3/20/17	1050	Soil	Glass				H				X	M							
S20-T2-5	3/20/17	1054	Soil	Glass/VOA	H															
S20-T2-10	3/20/17	1200	Soil	Glass				H				X	H							
S20-T2-15	3/20/17	1205	Soil	Glass				H				X	H							

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time	Total # of containers	Notes
[signature]	3/20/17 1710			Chain of Custody seals Y/N/NA	
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time	Seals intact? Y/N/NA	
				Received good condition/cold	
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time		
				Turn around time: STD	

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162516

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Weston Environmental Management Inc
Address: 4411 Ridge Route Drive Suite 150
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Dennis Lewis

Date: 3/20/17 Page: 2 Of 2
Project Name: Pier Oboe Oil Field
Collector: Frank Hagen Client Project #: 02077.01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers
PCTF-T1-5	3/20/17	1015	Soil	4oz Gl				H				X	H							
PCTF-T1-5	3/20/17	1025	Soil	Wipe VOA	H															
PCTF-T1-10	3/20/17	1030	Soil	4oz Gl				H				X	H							
PCTF-T1-10	3/20/17	1035	Soil	Wipe VOA	H															
PCTF-T1-15	3/20/17	1045	Soil	4oz Gl				H				X	H							
PCTF-T1-15	3/20/17	1045	Soil	Wipe VOA	H															
HP-T1-5	3/20/17	1345	Soil	4oz Gl				H				Y	H							
HP-T1-5	3/20/17	1345	Soil	Wipe VOA	H															
HP-T1-10	3/20/17	1415	Soil	4oz Gl				H				X	H							
HP-T1-10	3/20/17	1415	Soil	Wipe VOA	H															
HP-T1-15	3/20/17	1425	Soil	4oz Gl				H				X	H							
HP-T1-15	3/20/17	1425	Soil	Wipe VOA	H															

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 1710		
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold

Turn around time: ST

Notes
Call Hagen Questar 949 689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162515

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/21/17
Recorded By: F Hager

Project Name: Brea Olinda Oil Field
Project No.: 02087.1
Client Name: Brooks Street
Weather: Cloudy
Temperature: 60
Site Conditions: Operating oil field

NORTHGATE PERSONNEL ON-SITE

F Hager, Mark Wenkula, Michelle Hughson

VISITORS

Name	Company/Agency	Time Arrived	Time Left
Bill Wren	Linn Energy	0645	13:00
Matt —			

CONTRACTORS

Contractor Name: American Integrated Services
Phone No.:
Supervisor: Ray Ferrer
Task: Trenching

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Soil Sample Kit, Encore Kit, Stake Kit - Not used
Rental PID (Multi-Rae) Locater

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/21/17
Recorded By: Frank Hegar

Project Name: Brea-Olinda O.I Field
Project No.: 02077.01
Client Name: Brook Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0545	Leave office drive to site
0630	At site - meet Mark Wenhalla, Michelle Hughsom Bill - Linn Energy and Ron Ferren H2S and Days plan.
0710	DRU-T1 - move west .5'
0744	DRU-T1-5 sample 6 VOA 1 4oz jar bag for head.
0754	DRU-T1-10 4oz jar bag for headspace
0800	DRU-T1-15 4oz jar bag for headspace
0810	Leave DRU-T1
0815	VRS-T1 - bad location - Linn not willing to OK due to live electric VRS-T2 - moved west and changed orientation to go downswale
0840	VRS-T2-5 4oz and 6 40ml VOAs bag
0850	VRS-T2-10 4oz jar bag
0900	VRS-T2-15 4oz jar bag
0910	Fill VRS-T2-
0915	Begin VRST1 At 13 feet found conduit cable north side of trench
0935	VRS-T1-5 4oz and 6 40ml VOA 5035
0945	VRS-T1-10 4oz jar sample
0955	VRS-T1-15 4oz jar sample
1000	Fill VRS-T1- Matt? arrived. Move to 58-T1 and clear location - very soft ground - leave truck on road to avoid fire hazard
1020	58-T1-5 Sample 6-40ml VOAs and 1 4oz glass jar
1025	At 8' Very heavily stained → to saturated HC soils - mostly clay with silt - vf sand layers Strong odor
1034	58-T1-10 1 - 4oz glass jar Still saturated with HC - when pressed with bucket free drops of HC/H2O? mix. Soil very soft
1048	58-T1-15 1 - 4oz glass jar as above HC saturation - odor No indication of bottom

Print Name: Frank Hegar
Signature:

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/21/17
Recorded By: Frank Heger

Project Name: Brea-Olinda Oil Field
Project No.: 02022.01
Client Name: Brook Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
11:00	Moved 25' South and potholed. At 8' stained soil - 9-11' HC saturated soils - no samples Fill and move
11:10	Clear 55-T1
!	At 2.5' bgs soil staining in brown SC
11:20	55-T1-5' 6 VOA 1 4oz glass HC saturated soils
1132	55-T1-10' 1 4oz glass HC saturated soils
1142	55-T1-15 1 4oz glass - HC saturated soils Continued trench to 17' bgs at 17' HC staining only and increasing red brown clays
1150	Fill and move
1200	Clear 104-T1
12:10	104-T1-5 6 40ml VOAs 1 4oz glass
12:18	brown SC
	104-T1-10 - 1 4oz glass
12:25	104-T1-15 1 4oz glass No HC indications - Fill
1300	Leave site
1500	Lab
1520	Office and meet with DW
1545	Clean out truck
1610	Leave office

Print Name: Frank Heger
Signature:

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

DAILY SITE SAFETY MEETING RECORD

Recorded By: E. Hegert
Date & Time: 3/21/17 0700 **Project No.:** 02077.01
Project Name: Brea-Olinda **Project Location:** Brea-Olinda Oil Field
Field Activities: Trenching / hand augering
Chemicals Present: TPH - Benzen SVOC's pesticides

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment: Level D
Hazards of Chemicals Present: Ingestion, dermal contact, inhalation (dust)
Physical Hazards: Trip, slip, Fall, uneven ground
Special Hazards:
Other Topics of Concern:

SITE SAFETY CHECKLIST	YES	NO
Attached Signature Page		✓
Written Health and Safety Plan (HASP) is on-site	✓	
Information in the HASP matches conditions and activities at the site	✓	
Site personnel have appropriate training and certification and medical clearance	✓	
Air monitoring equipment has been calibrated daily	✓	
Site zones are set up and observed where appropriate	✓	
Access to Work Areas is limited to authorized personnel	✓	
Decontamination stations (including hand/face wash) are set up and used	✓	
Personal protective equipment used matches HASP requirements	✓	
Emergency and First Aid equipment is on-site as described in the HASP	✓	
Drinking water is readily available	✓	

Note: All "NO" answers must be addressed & corrected immediately. Note additionally health and safety observations here.

Ray Foster
Mark S. Wantala
Michelle Hughson Michelle Hughson

Conducted By Print Initials: EH **Signature:** **Date:** 3/21/17

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: _____ Date: _____ Page: _____ Of _____

Address: _____ Project Name: _____

Phone: _____ Fax: _____ Collector: _____ Client Project #: _____

Project Manager: _____ Batch #: _____ EDF #: _____

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers

Chain of Custody seals Y/N/NA

Seals intact? Y/N/NA

Received good condition/cold

Turn around time: _____

Notes

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162514

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: [illegible]
Address: [illegible]
Phone: [illegible] Fax: 949-716-0053
Project Manager: [illegible]

Date: [illegible] Page: [illegible] Of [illegible]
Project Name: [illegible]
Collector: [illegible] Client Project #: [illegible]
Batch #: [illegible] EDF #: [illegible]

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers
[illegible]												A								
[illegible]					H							A								
[illegible]												A								
[illegible]												A							HIGH TAT!	
[illegible]												A							HIGH TAT!	
[illegible]					H							A								
[illegible]												A								
[illegible]												A								
[illegible]												A								
[illegible]												A								

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
[illegible]	[illegible]	[illegible]	[illegible]
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: [illegible]
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold

Notes

Turn around time: STD

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162512

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 2411 Ridge Park Drive Ste 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derek Willis

Date: 3/21/2017 Page: 1 Of 1
Project Name: Rea Olinda
Collector: Michelle Hughes Client Project #: n2077.01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 - 8020 5032	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	CAM 17 Metals	8141 organophosphorus pesticides	8151 herbicides	Laboratory ID #	Comments/Preservative	Total # of containers
DR-HA1-1.0	3/21/17	0755	Soil	VOA-core	H			H				A	H		H	H	H			1
DR-HA1-5.0	3/21/17	0743	Soil	core				H				A	H		H	H	H			1
DR-HA2-1.0	3/21/17	0802	Soil	VOA-core	H			H				A	H		H	H	H			5
DR-HA2-5.0	3/21/17	0815	Soil	core				H				A	H		H	H	H			1
DR-HA3-1.0	3/21/17	0825	Soil	VOA-core	H			H				A	H		H	H	H			5
DR-HA3-5.0	3/21/17	0846	Soil	core				H				A	H		H	H	H			1
DR-HA4-1.0	3/21/17	0911	Soil	VOA-core	H			H				A	H		H	H	H			5
DR-HA4-5.0	3/21/17	0941	Soil	core				H				A	H		H	H	H			1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Michelle Hughes	3/21/17 1230		3/21/17 1230
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/21/17 1625		3/21/17 1625
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 24
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold

Turn around time: STD

Notes
F. Hager
714-655-3987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162513

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/21/17
Recorded By: Michelle Hughson

Project Name: Bea Olinda
Project No.: 02077.01
Client Name: Brooks Street
Weather: Cool and mostly cloudy
Temperature: ~70°
Site Conditions: Fenced and gated operating oil field

NORTHGATE PERSONNEL ON-SITE

Michelle Hughson
Frank Hagat
Mark Warthala

VISITORS

Name	Company/Agency	Time Arrived	Time Left

CONTRACTORS

Contractor Name: _____ Phone No.: _____
Supervisor: _____ Task: _____

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Camera
Soil sample kit
Level D PPE

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/21/2017
Recorded By: Michelle Hughson

Project Name: Brea Olinda
Project No.: 02077.01
Client Name: Brooks Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0545	Mobilize to Brea Olinda site.
0645	Arrive on site and meet with Mark & Frank
0700	Health and Safety.
0700	Sampling overview with Frank
0710	Drive to first boring location
0720	Begin hand augering DR-HA1
	10YR 3/2 fine sand with ~25% silt, subangular, damp, no odor or staining, non-plastic, medium dense.
0735	Collect sample at one foot. 5' 5035 set collected 1.0-1.5', core collected 1.5-2.0'. DR-HA1-1.0
0740	water table encountered ~4 feet deep.
0743	Collect sample at 5 feet. Core collected 5.0-5.5'. DR-HA1-5.0
0755	Drive to second boring location
0758	Begin hand augering DR-HA2, soil is the same as DR-HA1
0802	Collect one foot sample (same as above) DR-HA2-1.0
0812	Water table encountered ~4.5'. Soil becomes less sandy, more clay: 5% sand, 30% silt, remainder clay. Moderately plastic, stiff
0815	Collect sample DR-HA2-5.0 between 5.0-5.5'
0810	Begin handaugering DR-HA3
	10YR 2/2 Silt with some clay and few fine sand. Low plasticity, subangular, very stiff,
0825	Collect sample DR-HA3-1.0, same as 1' above
0840	At 3' Soil becomes same as DR-HA1 at surface, and damp.
0845	Water table encountered ~5.0', soil also becomes like DR-HA2 at 4.5'
0846	Collect sample DR-HA3-5.0 between 5.0-5.5'
0855	Drive to fourth boring location
0905	Begin hand augering DR-HA4
0911	Collect sample DR-HA4-1.0 same as above fine
	Medium sand with ~30% coarse sand and gravel and 10% coarse gravel. Subrounded, medium dense, dry.
0915	At 1.5' soil becomes:
	10YR 3/6 Clay with ~20% silt, dry, moderately plastic, hard, no odor or staining.
0941	Collect sample DR-HA4-5.0 between 5.0 and 5.5'
0948	Finish hand auger samples, return to meet with Frank.

Print Name: Michelle Hughson Signature: Michelle Hugh

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/21/2017
Recorded By: Michelle Hughson

Project Name: Brea Olinda
Project No.: 02077.01
Client Name: Brooks Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
1010	Begin trench S8-T1 observation. Mark Wanhala is collecting samples under Franks Supervision.
1030	Heavy staining encountered beginning at 8'. Collect additional sample at 8'. Staining continues to at least 15'.
1055	Pothole ~25' South of S8-T1. Stained soils encountered at 6.5'
1110	Begin trench S5-T1
1120	Staining beginning at 2.5 feet and becoming heavier around 8 feet. Lighter staining than at S8-T1
1142	Staining becomes very light around 15 feet.
1200	Begin trench 104-T1
1220	Soil unstained and the same throughout
1230	Pack up equipment
1300	Leave site
1400	Arrive home

Print Name: Michelle Hughson Signature: Michelle Hughson

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/23/17
Recorded By: Frank Hager

Project Name: Brea Olinda
Project No.: 02077.01
Client Name: Brooks Street
Weather: Clear
Temperature: 58
Site Conditions: Operating oil field/tank farm

NORTHGATE PERSONNEL ON-SITE

Frank Hager
Michelle Hughson

VISITORS

Name	Company/Agency	Time Arrived	Time Left
Sergio Perez			
Marco Mendregan			
Figy Espinosa			

CONTRACTORS

Contractor Name: BC2 drilling
Phone No.: 714-794-2990
Supervisor:
Task: HSA drilling

Company	No. of Supervisors	No. of Workers	Remarks
BC2		3	

EQUIPMENT

Rental - Pipe and Cable Locator Multi-Rae 2000
Stakeout kit - not used

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/23/17
Recorded By: Frank Hager

Project Name: Brea-Olinda
Project No.: 02077.01
Client Name: Brook Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0540	Office to get truck, lab supplies and rental equipment
0630	Arrive at 165-acre parcel for drilling. BC2 at wrong location. Met them and led them to site Michelle Hudson there. Bill Wren had cleared the BOTF-T1 location to 4.5' bigs with back hoe. BC2 there with 3 man crew Set up rig - MH to log FH sample and assist
0730	begin drilling - drum waste
0750	Sample BOTF-B1-05 Ring → clay
0757	Sample BOTF-B1-10 5035/Ring → "
0800	Sample BOTF-B1-15 Ring - No supplies for vapor probe install - called BC2 - Derrick on line with them
0807	Sample BOTF-B1-20 5035/Ring → clay
0813	Sample BOTF-B1-25 Ring → clay
0825	Sample BOTF-B1-30 5035/Ring → clay
0834	Sample BOTF-B1-35 Ring → clay
0840	Sample BOTF-B1-40 5035/Ring → clay - Vapor probe building supplies on site.
0853	Sample BOTF-B1-45 Ring - clay
0855	Bill Wren back on site
0908	Sample BOTF-B1-50 Ring and 5035 Clay
0912	Sample BOTF-B1-55 Ring - Dry Clay
0916	Sample BOTF-B1-60 5035/Ring - Clay
0920	Called DW - no vapor probe build since all clay -
0930	Sample maintenance w Drillers build out (abandon) well with neat cement and grout
1040	Leave BOTF-B1-
1100	At BRS-T1 - waiting for Bill Wren to clear location - FH relocated location Problem with rest rooms - drillers need to go — Bill W takes them to town Energy Office - FH follows to find.

Print Name: Frank Hager Signature:

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/23/17
Recorded By: Frank Hugo

Project Name: Brea-Olinda
Client Name: Brookstreet
Project No.: 02077.01

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
1200	Set up on VRS-B1
1235	Sampling to start at 20' bgs since previous trench at location sampled to 15'
	Sample at VRS-B1-20 ring/5035 silty clay
1241	Sample at VRS-B1-25 ring
1246	Sample at VRS-B1-30 ring/5035
1253	Sample at VRS-B1-35 ring
1307	Sample at VRS-B1-40 ring/5035
1317	Sample at VRS-B1-45 ring
	Problem with Kelly chain on rig
1327	Sample at VRS-B1-50 ring/5035
1335	grease guide bars to help relieve chain tension
	Sample at VRS-B1-55 ring
1338	Sample at VRS-B1-60 ring/5035
	Place vapor probe at 15' bgs
	chips to 15' bgs 1' sand, probe
	Sample management
1415	Using shovel at SS-T1 approximate location collected 4 oz jar SOC pesticides etc
1430	Back to drill rig
1445	Emptied 3 drums onto ground PID = 0.0 ppm
1500	Leave site. Instructed Michelle H to make sure drums empty on 165 were property at BOTF-B1
1600	At lab (Suntur) to drop samples
1630	Back to office - Drop truck - rental equipment
	Meet with DW
1645	Leave office

Print Name: Frank Hugo Signature:

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

DAILY SITE SAFETY MEETING RECORD

Recorded By: Frank Hagar
Date & Time: 3/23/17 0715
Project No.: 02077.01
Project Name: Brea Olinda
Project Location: Brea California
Field Activities: HSA drilling - soil borings
Chemicals Present: TPH, Unknown metals

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment: Level D - hearing protection
Hazards of Chemicals Present: Inhalation, Dermal Contact Ingestion
Physical Hazards: Slip, trip, fall, rotating machinery stepping onto truck noise.
Special Hazards:
Other Topics of Concern:

SITE SAFETY CHECKLIST	YES	NO
Attached Signature Page		✓
Written Health and Safety Plan (HASP) is on-site	✓	
Information in the HASP matches conditions and activities at the site	✓	
Site personnel have appropriate training and certification and medical clearance	✓	
Air monitoring equipment has been calibrated daily	✓	
Site zones are set up and observed where appropriate	✓	
Access to Work Areas is limited to authorized personnel	✓	
Decontamination stations (including hand/face wash) are set up and used	✓	
Personal protective equipment used matches HASP requirements	✓	
Emergency and First Aid equipment is on-site as described in the HASP	✓	
Drinking water is readily available		

Note: All "NO" answers must be addressed & corrected immediately. Note additionally health and safety observations here.

Ismael Espinoza - BC2 Bill Wren (LIUN)
Marcos Landazon - BC2
Sergio Perez - BC2
Michelle Hyh - Northgate

Conducted By
Print Initials: FH **Signature:** Frank Hagar **Date:** 3/23/17

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Vantage Environmental Mgmt Inc
Address: 24411 Ridge Route Dr Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/2/17 Page: 2 Of 2
Project Name: Bree Olivia
Collector: Frank Hager Client Project #: 02077.01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB	8081 Pesticides	Filtered & Preserved	Laboratory ID #	Comments/Preservative	Total # of containers
VES-B1-35	3/2/17	1253	Soil	B			H				A	H		H					
VES-B1-40	3/2/17	1307	Soil	Brass+VOA	H		H				A	H		H					
VES-B1-45	3/2/17	1317	Soil	Brass			H				A	H		H					
VES-B1-50	3/2/17	1327	Soil	Brass+VOA	H		H				A	H		H					
VES-B1-55	3/2/17	1335	Soil	Brass			H				A	H		H					
VES-B1-60	3/2/17	1339	Soil	Brass+VOA	H		H				A	H		H					
SB-T1-1	3/1/17	1415	Soil	Glass			H				A	H		H	A	AA			

Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time
Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time
Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold

Turn around time: STD

Notes
Frank Hager
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162582

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/23/17
Recorded By: Michelle Hughson

Project Name: Brea Olinda
Project No.: 02077.01
Client Name: Brooks Street
Weather: Clear
Temperature: ~70° F
Site Conditions: Fenced and gated operating oil fields

NORTHGATE PERSONNEL ON-SITE

Michelle Hughson
Frank Hagar

VISITORS

Name	Company/Agency	Time Arrived	Time Left

CONTRACTORS

Contractor Name: BC2 Environmental
Phone No.:
Supervisor:
Task:

Company	No. of Supervisors	No. of Workers	Remarks
BC2 Environmental		3	

EQUIPMENT

Camera
Soil sampling kit
Level D PPE

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/23/17
Recorded By: Michelle Hughson

Project Name: Brea Olinda
Project No.: 02077.01
Client Name: Brooks Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0530	Mobilize to Brea Olinda, 165 acre site
0625	Arrive on site
0640	Frank and Drillers arrive, drive to first boring location
0645	Meet with Frank and Bill and drillers, Bill has already excavated a five foot pothole to ensure there are no pipes immediately under the surface. Soil is already stained.
0700	BC2 Environmental begins setting up drill rig.
0730	Health and Safety meeting
0740	Begin drilling ~~BOTF-B4~~
0815	Water was added during drilling to cool and lubricate the auger.
0920	Finished drilling and sampling BOTF-B1, begin clean-up.
0925	No soil vapor probes installed in BOTF-B1
1100	Finished clean-up
1110	Drive to 100 acre site, identify second boring location.
1115	Take 15 minute lunch break.
1130	Begin set-up at VRS-B1, Check for pipes in area
1215	Begin drilling VRS-B1, first 15' were trenched previously so were not logged or sampled.
1330	Drill having issues with the chain
1340	Finished drilling and sampling VRS-B1, install soil vapor ~~probe~~
1440	Probe installed at 15' bgs 15'-61': Hydrated bentonite. 14'-15': Sand 0'-14': Hydrated Bentonite 3/8" x 8" probe, bottom at 15', 1/4" ID tubing.
1520	Finish clean up, all soils and rinse water ~~dumped~~ spread on site.
1530	Return to 165 acre site to ~~dump~~ spread soils
1600	Return home
1730 ~~1645~~	Arrive home (End work: 1645)

Print Name: Michelle Hughson
Signature: Michelle Hugh

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/28/17
Recorded By: Frank Hager

Project Name: Brea Olinda
Project No.: 02077.01
Client Name: Brook Street
Weather: Clear
Temperature: 56° 0715
Site Conditions: Operating oil field 100 Acre parcel

NORTHGATE PERSONNEL ON-SITE

F. Hager

VISITORS

Name	Company/Agency	Time Arrived	Time Left

CONTRACTORS

Contractor Name: BC2
Phone No.: 714-744-7990
Supervisor: Sam
Task: Geoprobe exploration

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Marking kit
Rental PID and Pipe/Electrical locator

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/28/17
Recorded By: Frank Hagar

Project Name: Brea-Olinda
Client Name: Brooks Street
Project No.: 02077.01

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0620	At office for truck
0700	At 100-acre parcel
0715	Meet DC:2 -
0719	Call Russ ok to push
0745	Start push SS-B1 in trench.
	Sample times on log
0855	- Broke off reactive - pulling string
	- Steel coming back coated with petroleum stained soils
0900	Plugged hole with hydrated bentonite
0930	collected sample SS-T1-1
	Moved to SS-T1
0940	Set up on SS-B1 - adjacent to operating well 107
1015	Finished SS-B1 red brown clay from 17'-36' no PID, no staining
	Fill hole bentonite chips
1130	Finished leave site - check K Probes
1330	Drop off samples
1400	At office to discuss trenching options
1500	Leave office

Print Name: Frank Hagar Signature:

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

DAILY SITE SAFETY MEETING RECORD

Date & Time: 3/28/17 0730 **Recorded By:** Frank Hegar
Project Name: Brea-Olinda **Project No.:** 02077.01
Field Activities: Push for sampling **Project Location:** Brea-Olinda oilfield, Brea, Ca
Chemicals Present: TPH, light ends

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment: Level D
Hazards of Chemicals Present: Inhalation, ingestion, dermal contact
Physical Hazards: Slip, trip, fall, rotating parts
Special Hazards: Bees and insects, hydration, sun exposure
Other Topics of Concern: Soft ground

SITE SAFETY CHECKLIST	YES	NO
Attached Signature Page		X
Written Health and Safety Plan (HASP) is on-site	X	
Information in the HASP matches conditions and activities at the site	X	
Site personnel have appropriate training and certification and medical clearance	X	
Air monitoring equipment has been calibrated daily	X	
Site zones are set up and observed where appropriate	X	
Access to Work Areas is limited to authorized personnel	X	
Decontamination stations (including hand/face wash) are set up and used	X	
Personal protective equipment used matches HASP requirements	X	
Emergency and First Aid equipment is on-site as described in the HASP	X	
Drinking water is readily available	X	

Note: All "NO" answers must be addressed & corrected immediately. Note additionally health and safety observations here.

Jon Miller BCT
Manuel Espinoza
Frank Hegar

Conducted By
Print Initials: FH **Signature:** Frank Hegar **Date:** 3/28/17

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management Inc
Address: 24411 Ridge Route Drive
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Dollis

Date: 3/28/17 Page: 1 Of 1
Project Name: Dove Olinda
Collector: Frank Hager Client Project #: 02072.01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals (LASC02)	EPA 6010B	EPA 8011	EPA 8151A	Laboratory ID #	Comments/Preservative	Total # of containers
SS-B1-15	3/28/17		Soil	Sleeve				A				A	A	A						
SS-B1-20	3/28/17		Soil	Sleeve SUB	A			A				A	A	A						
SS-B1-25	3/28/17		Soil	Sleeve SUB	A			A				A	A	A						
SS-B1-30	3/28/17		Soil	Sleeve				H				A	H	H						
SS-B1-34	3/28/17		Soil	SL+VOA	A			H				A	H	H						
SS-B1-36	3/28/17		Soil	SL+VOA	A			H				A	H	H						
SS-T1-1	3/28/17		Soil	Glass				A							A	A	A			

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
[signature]	3/28/17 1240	Carmen Guzman	3/28/17 1240
Carmen Guzman	3/28/17 1617	[signature]	3-28-17 1617
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 38
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold:

Turn around time: STD

Notes
Frank Hager
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162583

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/29/17
Recorded By: Frank Hagar

Project Name: Brea-Olinda
Project No.: 02077.01
Client Name: Brooks Street
Weather: Clear Warm
Temperature: 60°F 0700
Site Conditions: Operating oil Field AMPC for FFTA-T1 Central Site for SB-T2, S7-T1, S3-T1

NORTHGATE PERSONNEL ON-SITE

Frank Hagar

VISITORS

Name	Company/Agency	Time Arrived	Time Left

CONTRACTORS

Contractor Name: A.I.S
Phone No.:
Supervisor:
Task:

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Rental - PID and Pipe and Electrical Locator

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

DAILY SITE SAFETY MEETING RECORD

Recorded By: Frank Hayes

Date & Time: 3/29/17 0630 Project No.: 02077.01

Project Name: Brea-Olinda Project Location: Brea-Olinda

Field Activities: Trenching, operating oil fields

Chemicals Present: TPH - unknown metals and lighteuds

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment: Level D - safety glasses, hard hat, hearing protection, steel toe boots, gloves

Hazards of Chemicals Present: Dermal contact, inhalation, ingestion

Physical Hazards: Slip, trip, fall - uneven ground, open trench, bees, hearing, dust

Special Hazards: Traffic

Other Topics of Concern:

SITE SAFETY CHECKLIST	YES	NO
Attached Signature Page		X
Written Health and Safety Plan (HASP) is on-site		
Information in the HASP matches conditions and activities at the site		
Site personnel have appropriate training and certification and medical clearance		
Air monitoring equipment has been calibrated daily		
Site zones are set up and observed where appropriate		
Access to Work Areas is limited to authorized personnel		
Decontamination stations (including hand/face wash) are set up and used		
Personal protective equipment used matches HASP requirements		
Emergency and First Aid equipment is on-site as described in the HASP		
Drinking water is readily available		

Note: All "NO" answers must be addressed & corrected immediately. Note additionally health and safety observations here.

Conducted By Print Initials: FH Signature: Frank Hayes Date: 3/29/17

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/29/17
Recorded By: Frank Hagen

Project Name: Brea - Olinda
Client Name: Brooks Street

Project No.: 02077.01

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
0530	Office
0630	Site
0707	FTA-T1 relocate 45' to in front of clunker -
0723	Pull up asphalt near existing pit
0830	Move to 100 acre property
0845	Setup S8-T2- sample
0920	Fill S8-T2 and move
0930	Clear S7-T1 to 5' with Bill Wren - Armando from Linn with us now
0945	Clear S3-T1 to 5' with Bill and Armando Bill leaves
1015	Leave S3-T1 sampled 5, 10, 15 4oz 5' glass and 5035 10-15
1030	start S7-T1 Sample 5, 10, 15 4oz 5' glass and 5035 10' and 15'
1115	Finish S7-T1 -

Print Name: Frank Hagen
Signature:

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc

Address: 24411 Ridge Route Drive #150

Phone: 949-716-0050 Fax: 949-716-0055

Project Manager: Darrell Hollis

Date: 3/29/13 Page: 1 Of 1

Project Name: Brea-Olinda

Collector: Frank Heger Client Project #: 020-77.01

Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 (full)	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	6020 ICP-MS Title 22 Metals			Laboratory ID #	Comments/Preservative	Total # of containers
EFTA-T1-5	3/28/13	0943	Soil	4oz+VOA	H			H				A	H		H					
EFTA-T1-10	3/28/13	0950	Soil	4oz				H				A	H		H					
EFTA-T1-15	3/28/13	0500	Soil	4oz				H				A	H		H					
SS-T2-5	3/28/13	0700	Soil	4oz				H				A	H		H					
SS-T2-10	3/28/13	0708	Soil	4oz+VOA	H			H				A	H		H					
SS-T2-15	3/28/13	0915	Soil	4oz+VOA	H			H				A	H		H					
SS-T1-5	3/28/13	0956	Soil	4oz				H				A	H		H					
SS-T1-10	3/28/13	1006	Soil	4oz+VOA	H			H				A	H		H					
SS-T1-15	3/28/13	1012	Soil	4oz+VOA	H			H				A	H		H					
SS-T1-5	3/28/13	1035	Soil	4oz				H				A	H		H					
SS-T1-10	3/28/13	1045	Soil	4oz+VOA	H			H				A	H		H					
SS-T1-15	3/28/13	1102	Soil	4oz+VOA	H			H				A	H		H					

I-102

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
[signature]	3/29/13 1730	[signature]	3/29/13
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers

Chain of Custody seals Y/N/NA

Seals intact? Y/N/NA

Received good condition/cold

Turn around time: STD

Notes
Frank Heger
949-659-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162643

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 2411 Rd - Route Drive Suite 120
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Deanne Wilcis

Date: 3/23/17 Page: 1 Of 2
Project Name: Bre - Olude
Collector: F Heger Client Project #: 02073.01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + 5035	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	PCB's EPA 8082			Laboratory ID #	Comments/Preservative	Total # of containers
BOTE-B1-5	3/23/17	0950	Soil	Brass				H				A	H		H					
BOTE-B1-10	3/23/17	0757	Soil	Brass+VOA	H			H				A	H		H					
BOTE-B1-15	3/23/17	0800	Soil	Brass				H				A	H		H					
BOTE-B1-20	3/23/17	0807	Soil	Brass+VOA	H			H				A	H		H					
BOTE-B1-25	3/23/17	0815	Soil	Brass				H				A	H		H					
BOTE-B1-30	3/23/17	0825	Soil	Brass+VOA	H			H				A	H		H					
BOTE-B1-35	3/23/17	0834	Soil	Brass				H				A	H		H					
BOTE-B1-40	3/23/17	0840	Soil	Brass+VOA	H			H				A	H		H					
BOTE-B1-45	3/23/17	0853	Soil	Brass				H				A	H		H					
BOTE-B1-50	3/23/17	0900	Soil	Brass+VOA	H			H				A	H		H					
BOTE-B1-55	3/23/17	0912	Soil	Brass				H				A	H		H					
BOTE-B1-60	3/23/17	0916	Soil	Brass+VOA	H			H				A	H		H					
VRS-B1-30	3/23/17	1225	Soil	Brass+VOA	H			H				A	H		H					
VRS-B1-25	3/23/17	1241	Soil	Brass				H				A	H		H					
VRS-B1-30	3/23/17	1246	Soil	Brass+VOA	H			H				A	H		H					

I-103

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/23/17 1600		3/24/17
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold

Turn around time: STD

Notes
Frank Heger
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162581

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/29/2017
Recorded By: Michelle Hughson

Project Name: Brea Olinda
Project No.: 2077.01
Client Name: Brooks Street
Weather: Clear and warm
Temperature: 30°C
Site Conditions: Active oil fields, fenced and gated.

NORTHGATE PERSONNEL ON-SITE

Michelle Hughson
Frank Hagar (left site ~1215)

VISITORS

Name	Company/Agency	Time Arrived	Time Left

CONTRACTORS

Contractor Name: Phone No.:
Supervisor: Task:

Company	No. of Supervisors	No. of Workers	Remarks

EQUIPMENT

Soil vapor sampling kit
Summa cans and Nitrogen purge
GilAir pumps
Personal vehicle
Camera

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/29/2017
Recorded By: Michelle Hughsan

Project Name: Brea Olinda
Project No.: 2077.01
Client Name: Brooks Street

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
1100	Mobilize to Brea Olinda for Sal vapor sampling (100 Acre site)
1145	Arrive on site. Call Pine delivery driver to coordinate GilAir pump drop off.
1153	Recieve pump from Pine driver
1155	Drive to VRS-B1 and meet Frank Hagar with equipment.
1200	Begin set up at VRS-B1 to sample Soil vapor ~~probe~~ located 15 feet bgs.
1215	Perform shut-in test, test successful
1219	Begin purging VRS-B1-SV15. Purge for 1h33 minutes at 200 mL/min to remove three purge volumes.
1330	Purge manifold SSAT: 2044 with nitrogen.
1353	Stop purging VRS-B1-SV15. Total purge time 94 minutes Percentage of time sampling run varied more than 5% from set flow rate: 0%
1358	Begin Sampling VRS-B1-SV15. Initial pressure -30 psi Hg
1405	Stop sampling VRS-B1-SV15, Final pressure -7.5 psi Hg.
1415	Drive to site at 2000 Site Drive
1425	Arrive on site
1435	Locate BBGP-B1 and set up to purge and sample
1500	Perform shut in test, test successful
1507	Begin purging BBGP-B1-SV10. Purge for 93 minutes at 200mL/min to remove three purge volumes
1550	Drive to SSA-B1
1600	Locate SSA-B1 and set up to purge and sample SSA-B1-SV10
1620	Perform shut in test, test successful
1626	Begin purging ~~BR~~ SSA-B1-SV10. Purge for 93 minutes at 200 mL/min to remove three purge volumes. Return to BBGP-B1-SV10
1639	Purge manifold SSAT 2044 with Nitrogen
1641	Stop purging BBGP-B1-SV10. Total Purge time: 94 minutes Percentage of time sampling run varied more than ±5% from set flow rate: 0%. Attach sample summa can SSAT-0772
1642	Begin sampling BBGP-B1-SV10, initial pressure -29psi Hg
1648	Stop sampling BBGP-B1-SV10, final pressure -7psi Hg.
1650	Clean up equipment around BBGP-B1

Print Name: Michelle Hughsan
Signature: Michelle Hughsan

Field Activity Report

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

Date: 3/29/2017
Recorded By: Michelle Hughson

Project Name: Brea Olinda
Client Name: Brooks Street
Project No.: 2077.01

ACTIVITIES

Time:	Activities (include event, time, observations, observers, etc.)
1710	Drive to SSA-B1 location
1715	Set up to Purge and Sample SSA-B1-SV20
1740	Perform shut-in test : test successful
1800	Stop purging SSA-B1-SV10. Total purge time: 94 minutes
1800	Attach MHP Purge manifold SSAT 2044 with nitrogen
1801	Attach Sample Summa can SSAT-0385
1801	Begin sampling SSA-B1-SV10, initial pressure -29 psi Hg
1806	Stop sampling SSA-B1-SV10, final pressure -7 psi Hg
1807	Begin purging SSA-B1-SV20. Purge for 94 minutes at 200 mL/min to remove three purge volumes
1935	Purge Manifold SSAT:2044 with Nitrogen
~~1940~~ 2007	Stop purging SSA-B1-SV20. Total purge time: 94 minutes
1941	Percentage of run that varied more than 5% from set flow rate: 0%
~~1940~~ 2001	Begin sampling SSA-B1-SV20, initial pressure -28 psi Hg,
1941	Summa can # SSAT-0775.
1948	Stop sampling SSA-B1-SV20, final pressure -5 psi Hg.
1950	Clean up equipment
1955	Leave site.
2055	Arrive home (End work 2030)

Print Name: Michelle Hughson
Signature: Michelle Hughson

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

SUMMA CAN SAMPLING DATA

Project Name: Brea Olinda
Site Address: 2601 Valencia Ave / 2800 Site Dr.
Project No.: 2077.01
Tracer Compound Used:
Date: 3/29/2017
Recorded By: Michelle Hughson

Well ID	Summa Can ID	Flow Regulator ID	Flow Rate (ml/min)	Shut-in Test Start Time	Tracer Test	One Purge Volume (ml)	Sample Collection Start Time	Starting Pressure (psi)	Sample Collection Finish Time	Ending Pressure (psi)	Comments
VRS-BI-15	0358	2044	200	1215	1219	6160	1358	-30	1405	-7.5	
BBGP-BI-10	0772	2044	200	1500	1507	6110	1642	-29	1648	-7	
SSA-BI-10	0385	2044	200	1620	1626	6110	1801	-29	1806	-7	
SSA-BI-20	0775	2044	200	1740	1807	6210	1941	-28	1948	-5	

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
main (949) 716-0050; fax (949) 716-0055

SOIL VAPOR PROBE CONSTRUCTION DATA

Project Name: Brea Olinda
Project Number: 2077.01
Date 3/29/17
Site Address: 2601 Valencia Ave / 2800 Site Drive
Recorded By: Michelle Hughsan

Well Number	Install Time	Depth (ft)	Borehole Diameter (in)	Sand Pack Interval (ft)	Dry Bentonite Interval (ft)	Hydrated Bentonite Interval (ft)	Tubing Inner Diameter (in)	Tubing Length (ft)	Implant Diameter and Length (in)	Borehole Volume (ml)	Implant Volume (ml)	30% Pore Space Volume (ml)	Total Void Volume (ml)	One Purge Volume (ml)	3x Purge Volume
VRS-BI-15	3/23/17 1440	15	8	14 - 15	13 - 14	0 - 13	0.25	15	3/8 x 8	20000	14	6000	6014	6160	18480
BBGP-BI-10	3/27/17	10	8	9 - 10	8 - 9	0 - 8	0.25	10	3/8 x 8	20000	14	6000	6014	6110	18330
SSA-BI-10	3/27/17	10	8	9 - 10	8 - 9	0 - 8	0.25	10	3/8 x 8	20000	14	6000	6014	6110	18330
SSA-BI-20	3/27/17	20	8	19 - 20	18 - 19	10 - 18	0.25	20	3/8 x 8	20000	14	6000	6014	6210	18630
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
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				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						
				-	-	-			x						

clear tape
d tape

I-108

AIR LABORATORY

Chain of Custody Record

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE
25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Client: Northgate Environmental Management
Address: 24411 Ridge Route Drive, Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/29/2017 Page: 1 Of 1
Project Name: Brea Olinda
Collector: Michelle Highsen Client Project #: 2077.01
Batch #: EDF #:

Sample ID	Date Sampled	Start Time	Finish Time	Sample Type : Soil Gas / Indoor Air	Container Type: Summa Can / Tedlar	Initial Pressure	Final Pressure	TO-3	TO-14	TO-15	8015m Methane	8015m Gasoline	Fixed Gases by TCD		Summa Can # / Comments	Laboratory ID #
VRS-B1-SV15	3/29/17	1358	1405	SG	Summa	-30	-7.5			X					SSAT-0358	
BBGP-B1-SV10	3/29/17	1642	1648	SG	Summa	-29	-7			X					SSAT-0772	
SSA-B1-SV10	3/29/17	1801	1806	SG	Summa	-29	-7			X					SSAT-0385	
SSA-B1-SV20	3/29/17	1941	1948	SG	Summa	-28	-5			X					SSAT-0775	

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Michelle Highsen Michelle Highsen	3/30/17 1130		3/30/17 1130
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 4
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold

Turn around time: STD

Notes

* TO-15 SIM analysis available upon prior notification. **(Precertified Summa cans needed)**

COCAL 166459

I-109

northgate environmental management, inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653
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Fax: 949.716.0055

Trench Log

Project Number: 02077.01	**Trench No.: 104-T1**	
Project Name: Brea Olinda	**Logged by: Michelle Hughson**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/21/17**	**Date Completed: 03/21/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1–14				SM	Dark yellowish brown sandy silt, loose, dry.			
5	104-T1-5 12:10						0.1	
10	104-T1-10 12:18						0.3	
15	104-T1-15 12:25				TD=15'		0.1	
16–19								

DRB-ENVIRO BORING 02077.01_2017.03.22.GPJ 3/22/17

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Boring Log

Project Number: 02077.01	**Boring No.: BOTF-B1**	
Project Name: Brea Olinda	**Logged by: Michelle Hughson**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/23/17**	**Date Completed: 03/23/17**
Drilling Contractor: BC2 Environmental	**Total Depth (ft bgs): 61.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Hollow Stem Auger	**Borehole Dia. (in): 8**	**Surface Elevation (ft MSL): UNK**

Remarks: Boring located near the southeast corner of the Tank Farm on the 165 acre parcel. A five foot pothole was excavated prior to drilling to ensure no pipes were within the area. Drilling begins: 07:40

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
0				CL	Black clay with few medium subangular sand, silt, and coarse subrounded gravel. Stiff, low plasticity, and dry. Dark color due to staining.			
1				ML	Yellowish Brown Silt with few clay, sand, and fine gravel. Subangular, stiff, low plasticity, and dry. No staining or odor.			
2				ML	Brownish yellow subangular silt with few fine subrounded gravel. Stiff, low plasticity, and dry. No staining or odor.			
5	BOTF-B1-5 07:50				Dark brown clay with trace silt, very stiff, and dry. No odor or staining.			
10	BOTF-B1-10 07:57				Dark brown clay, very stiff, and dry. No odor or staining.		2.7	
11				CL				
15	BOTF-B1-15 08:00				Strong brown clay, very stiff, and dry. No odor or staining.			

DRB-ENVIRO BORING 02077.01_2017.03.23.GPJ 3/24/17

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Boring Log

Project Number: 02077.01 | **Boring No.: BOTF-B1**

Project Name: Brea Olinda | **Logged by: Michelle Hughson**

Location: Valencia Avenue at Lambert Road, Brea, California | **Date Started: 03/23/17** | **Date Completed: 03/23/17**

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
20	BOTF-B1-20 08:07			CL	Brown clay, very stiff, and dry. No odor or staining.		26.4	
25	BOTF-B1-25 08:13				Yellowish brown clay, very stiff, and dry. No odor or staining.		22.8	
27					Contact inferred			
30	BOTF-B1-30 08:25			ML	Yellowish brown clayey silt, very stiff, and dry. Trace fine white angular gravel (quartz like). No odor or staining.		3.0	
32					Contact inferred			
35	BOTF-B1-35 08:34			CL	Dark yellowish brown clay, very stiff, dry, with calicifcation. No odor or staining.		0.6	
40	BOTF-B1-40 08:40				Dark yellowish brown clay, stiff, dry, with calicifcation. No odor or staining.		0.2	

DRB-ENVIRO BORING 02077.01_2017.03.23.GPJ 3/24/17

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Boring Log

Project Number: 02077.01 | **Boring No.: BOTF-B1**

Project Name: Brea Olinda | **Logged by: Michelle Hughson**

Location: Valencia Avenue at Lambert Road, Brea, California | **Date Started: 03/23/17** | **Date Completed: 03/23/17**

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
45	BOTF-B1-45 08:53	X			Dark yellowish brown clay, stiff, and dry. No odor or staining.		0.1	
50	BOTF-B1-50 09:03	X			Dark yellowish brown clay with few silt and fine sand, stiff, and dry. No odor or staining.		0.0	
52				CL				
55	BOTF-B1-55 09:12	X			Dark yellowish brown clay, stiff, dry, with calicifcation. No odor or staining.		0.0	
60	BOTF-B1-60 09:16	X			Dark yellowish brown clay, stiff, dry, with calicifcation. No odor or staining.		0.0	
61					TD = 61', @ 09:20.			

DRB-ENVIRO BORING 02077.01_2017.03.23.GPJ 3/24/17

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Trench Log

Project Number: 02077.01	**Trench No.: BOTF-T1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/20/17**	**Date Completed: 03/20/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 165 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
0				AF	Asphaltic Fill			
1				SC	Red clayey sand.			
2				CL	Red-brown clay with silt, stiff, dry.			
5	BOTF-T1-5 13:15						0.6	
10	BOTF-T1-10 13:30						0.1	
15	BOTF-T1-15 13:45				TD=15'		0.1	

DRB-ENVIRO BORING 02077.01_2017.03.22.GPJ 3/22/17

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Trench Log

Project Number: 02077.01	**Trench No.: BOTF-T2**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/20/17**	**Date Completed: 03/20/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 165 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1				AF	Asphaltic Fill			
2				CL/ML	Red-brown clay with very fine sand (<10%), stiff, dry.			
5	BOTF-T2-5 11:50						18.2	
10	BOTF-T2-10 12:00						0.4	
15	BOTF-T2-15 12:08				TD=15'		0.1	

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Trench Log

Project Number: 02077.01	**Trench No.: DRU-T1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/21/17**	**Date Completed: 03/21/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
					Tarsand with subangular pebbles and root			
1					Red-brown clayey sand			
2				SC				
3								
4					Clay, stiff, dry			
5	DRU-T1-5 07:44						10.4	
6								
7								
8							5.2	
9				CL				
10	DRU-T1-10 07:54						0.3	
11								
12								
13								
14				CL	Red-brown silty clay, medium stiff, dry.			
15	DRU-T1-15 08:00							
16					TD=15'			
17								
18								
19								

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Trench Log

Project Number: 02077.01	**Trench No.: H2-T1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/20/17**	**Date Completed: 03/20/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 165 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1				SP/AF	Asphaltic surface and tan fill.			
2				SC	Red sandy clay, stiff, dry.			
3								
4				CL	Red-brown clay, very stiff, dry. Some silt layers of 2" or less thick.			
5	H2-T1-5 13:45						0.2	
6								
7								
8								
9								
10	H2-T1-10 14:15						0.2	
11								
12								
13								
14								
15	H2-T1-15 14:35				TD=15'		0.1	
16								
17								
18								
19								

DRB-ENVIRO BORING 02077.01_2017.03.22.GPJ 3/22/17

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Trench Log

Project Number: 02077.01	**Boring No.: S3-T1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/29/17**	**Date Completed: 03/29/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1–4				CL	Reddish brown silty clay, occasional staining.			
5	S3-T1-5 09:56						0.0	
6–7								
8				ML/CL	Red-brown silt with some clay.			
9								
10	S3-T1-10 10:06						0.0	
11–14								
15	S3-T1-15 10:12				TD=15'		0.0	
16–19								

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Boring Log

Project Number: 02077.01	**Boring No.: S5-B1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/28/17**	**Date Completed: 03/28/17**
Drilling Contractor: BC2 Environmental	**Total Depth (ft bgs): 37.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Direct Push	**Borehole Dia. (in): 2**	**Surface Elevation (ft MSL): UNK**

Remarks:

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
2–14					See S5-T1 for log 0' - 15'.			
15					Reddish brown clay, stiff, and dry. No odor, no staining.			
16–19				CL				
20	S5-B1-20 09:48						3.7	

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Boring Log

Project Number: 02077.01

Boring No.: S5-B1

Project Name: Brea Olinda

Logged by: Frank Hagar

Location: Valencia Avenue at Lambert Road, Brea, California

Date Started: 03/28/17

Date Completed: 03/28/17

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
22					Reddish brown clay, stiff, and dry. No odor, no staining.			
23								
24	S5-B1-24 09:51	X					0.0	
25								
26								
27								
28	S5-B1-28 09:58	X					0.0	
29				CL				
30								
31								
32	S5-B1-32 09:59	X					0.0	
33								
34								
35								
36	S5-B1-36 10:05	X					0.0	
37					TD = 37'			
38								
39								
40								
41								
42								
43								

DRB-ENVIRO BORING 02077.01_2017.03.28.GPJ 4/10/17

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Trench Log

Project Number: 02077.01	**Trench No.: S5-T1**	
Project Name: Brea Olinda	**Logged by: Michelle Hughson**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/21/17**	**Date Completed: 03/21/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 17.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1–2				CL	Brown sandy clay, medium stiff, dry. Trace gravel and coarse sand, very light hydrocarbon stating.			
3–9	S5-T1-5 11:20			CL	Dark brown sandy clay, medium stiff, dry. Light hydrocarbon stating and light odor. Heavier stating and stronger odor beginning at 8'.		18	
10–14	S5-T1-10 11:32			ML	Clayey silt with sand, dry, lighter statining.		97	
15–16	S5-T1-15 11:42			ML	Red-brown clayey silt, dry, trace sand, medium stiff, and very light staining.		89	
17					TD=17'			
18–19								

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Trench Log

Project Number: 02077.01	**Boring No.: S7-T1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/29/17**	**Date Completed: 03/29/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1–7	DRU-T1-5 07:44			CL	Reddish brown dry clay.		10.4	
8				GC	Gravel layer with clay.		5.2	
9–14	DRU-T1-10 07:54			CL	Reddish brown clay, stiff, and dry.		0.3	
15	DRU-T1-15 08:00				TD=15'			
16–19								

DRB-ENVIRO BORING 02077.01_2017.03.29.GPJ 4/10/17

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Boring Log

Project Number: 02077.01	**Boring No.: S8-B1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/28/17**	**Date Completed: 03/28/17**
Drilling Contractor: BC2 Environmental	**Total Depth (ft bgs): 56.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Direct Push	**Borehole Dia. (in): 2**	**Surface Elevation (ft MSL): UNK**

Remarks:

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
2–14					See S8-T1 for log 0' - 15'.			
15	S8-B1-15 07:50				Hydrocarbon stained clay, stiff, and dry. Hydrocarbon odor.			
16–18				CL				
19–20	S8-B1-20 07:58							

DRB-ENVIRO BORING 02077.01_2017.03.28.GPJ 4/10/17

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Boring Log

Project Number: 02077.01 | **Boring No.: S8-B1**

Project Name: Brea Olinda | **Logged by: Frank Hagar**

Location: Valencia Avenue at Lambert Road, Brea, California | **Date Started: 03/28/17** | **Date Completed: 03/28/17**

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
22					Hydrocarbon stained clay, stiff, and dry. Hydrocarbon odor.			
23	S8-B1-23 08:03	X						
24								
25								
26				CL				
27	S8-B1-27 08:06	X						
28								
29								
30								
31	S8-B1-31 08:08	X			Hydrocarbon saturated clay, damp, and plastic.		72	
32								
33								
34								
35	S8-B1-35 08:10	X					128	
36								
37				CL				
38								
39								
40	S8-B1-40 08:15	X					98	
41								
42								
43	S8-B1-43 08:20	X		SP/CL	Very fine sand with silt, no staining, hydrocarbon odor.		126	

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Boring Log

Project Number: 02077.01 | **Boring No.: S8-B1**

Project Name: Brea Olinda | **Logged by: Frank Hagar**

Location: Valencia Avenue at Lambert Road, Brea, California | **Date Started: 03/28/17** | **Date Completed: 03/28/17**

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
44				SP/CL	Very fine sand with silt, no staining, hydrocarbon odor.			
47	S8-B1-47 08:26			SM	Silty sand with layer of green stain, and hydrocarbon odor.		75.8	
50				CL	Hydrocarbon stained clay, damp, and plastic.			
51	S8-B1-51 08:30						69.1	
53				SC	Hydrocarbon stained sandy clay with hydrocarbon odor.			
55	S8-B1-55 08:45						89.4	
56					TD = 56'			

DRB-ENVIRO BORING 02077.01_2017.03.28.GPJ 4/10/17

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Fax: 949.716.0055

Trench Log

Project Number: 02077.01	**Trench No.: S8-T1**	
Project Name: Brea Olinda	**Logged by: Michelle Hughson**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/21/17**	**Date Completed: 03/21/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
0–3				SC	Red-brown clayey sand, stiff, dry.			
3–8	S8-T1-5 10:20			CL	Dark brown sandy clay, medium stiff, damp and sticky, trace gravel and coarse sand		29.7	
8–9	S8-T1-8 10:34			CL	Clay with few slt and sand, medium plasticity, damp, and stiff. Heavy hydrocarbon staining and strong odor.		12	
10–15	S8-T1-10 10:43			ML	Clayey silt with few sand, low plasticity. Heavy hydrocarbon stating and strong odor.		142	
15	S8-T1-15 10:48				TD=15'		121	

DRB-ENVIRO BORING 02077.01_2017.03.22.GPJ 3/22/17

northgate environmental management, inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653
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Trench Log

Project Number: 02077.01	**Boring No.: S8-T2**
Project Name: Brea Olinda	**Logged by: Frank Hagar**
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/29/17** / **Date Completed: 03/29/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0** / **Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---** / **Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
0				ML/CL	Dark brown silt with clay			
5	S8-T2-5 09:00							
10	S8-T2-10 09:08			CL	Brown, moderately plastci clay, damp. Hydrocarbon staining and odor.		100	
14				ML/CL	Heavily stained silt with clay, strong hydrocarbon odor.			
15	S8-T2-15 09:15				TD=15'			

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Boring Log

Project Number: 02077.01	**Boring No.: S20-T1**	
Project Name: Brea Olinda	**Logged by: Frank Hagar**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/20/17**	**Date Completed: 03/20/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---**	**Surface Elevation (ft MSL): Unknown**

Remarks: 165 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1				SM	Yellow-brown, fine grained silty sand.			
2				CL	Clayey sand with silt.			
4				ML	Silt with black staining, weathered and soft.			
5	S20-T1-5 08:00						13.3	
7				CL	Brown sandy lean clay, dry, stiff.			
10	S20-T1-10 09:15						0.0	
13				CL	Brown silty lean clay.			
15	S20-T1-15 09:25				TD=15'		0.0	

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Trench Log

Project Number: 02077.01	**Trench No.: S20-T2**
Project Name: Brea Olinda	**Logged by: Frank Hagar**
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/20/17** / **Date Completed: 03/20/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0** / **Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---** / **Surface Elevation (ft MSL): Unknown**

Remarks: 165 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1				SC/SM				
2				CL	Red-brown clay, interbedded with staining lens 3-6" thick.			
3								
4								
5	S20-T2-5 10:09				Red-brown sandy clay, with fine to very fine sand, very stiff, dry.		0.6	
6								
7								
8								
9								
10	S20-T2-10 10:19			CL			0.1	
11								
12								
13								
14								
15	S20-T2-15 10:32						1.2	
16					TD=15'			
17								
18								
19								

DRB-ENVIRO BORING 02077.01_2017.03.22.GPJ 3/22/17

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Boring Log

Project Number: 02077.01	**Boring No.: VRS-B1**	
Project Name: Brea Olinda	**Logged by: Michelle Hughson**	
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/23/17**	**Date Completed: 03/23/17**
Drilling Contractor: BC2 Environmental	**Total Depth (ft bgs): 61.0**	**Depth to Water (ft bgs): ---**
Drilling Method: Hollow Stem Auger	**Borehole Dia. (in): 8**	**Surface Elevation (ft MSL): UNK**

Remarks: Boring located near the southwest corner of the Vapor Recovery System on the 100 acre parcel. The location of the boring was trenched to 15' on 03/21/2017. Drilling begins: 12:15

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1–15					See VRS-T1 for log 0' - 15'.			
17					Contact inferred			
18–19				CL				

DRB-ENVIRO BORING 02077.01_2017.03.23.GPJ 3/24/17

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Boring Log

Project Number: 02077.01 | **Boring No.: VRS-B1**

Project Name: Brea Olinda | **Logged by: Michelle Hughson**

Location: Valencia Avenue at Lambert Road, Brea, California | **Date Started: 03/23/17** | **Date Completed: 03/23/17**

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
20	VRS-B1-20 12:35	X			Dark yellowish brown clay, moderately plastic, medium stiff, and dry. Trace silt, no odor or staining.		0.0	
25	VRS-B1-25 12:41	X			Dark yellowish brown clay, moderately plastic, medium stiff, and dry. Some calcification, no odor or staining.		0.3	
30	VRS-B1-30 12:46	X		CL	Dark yellowish brown clay, moderately plastic, medium stiff, and dry. Some calcification, no odor or staining.		0.0	
35	VRS-B1-35 12:53	X			Dark yellowish brown clay, moderately plastic, medium stiff, and dry. Some calcification, no odor or staining.		0.8	
40	VRS-B1-40 13:07	X			Dark yellowish brown clay, low plasticity, stiff, and dry. Some calcification, no odor or staining.		0.1	

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Boring Log

Project Number: 02077.01

Boring No.: VRS-B1

Project Name: Brea Olinda

Logged by: Michelle Hughson

Location: Valencia Avenue at Lambert Road, Brea, California

Date Started: 03/23/17

Date Completed: 03/23/17

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
43								
44								
45	VRS-B1-45 13:17			CL	Dark yellowish brown clay, moderately plastic, stiff, and dry. Some calcification, no odor or staining.		0.3	
46								
47					Contact inferred			
48								
49								
50	VRS-B1-50 13:27			ML	Yellowish brown silt, medium stiff, and dry. Some thin interebedded layers of clay.		0.0	
51								
52					Contact inferred			
53								
54								
55	VRS-B1-55 13:35				Dark yellowish brown clay, moderately plastic, medium stiff, and dry. Some calcification, no odor or staining.		0.1	
56								
57				CL				
58								
59								
60	VRS-B1-60 13:38				Dark yellowish brown clay, moderately plastic, stiff, and dry. Some calcification, no odor or staining.		0.0	
61								
62					TD = 61', at 13:40. Soil vapor probe installed at 15' at 14:40.			
63								
64								
65								

DRB-ENVIRO BORING 02077.01_2017.03.23.GPJ 3/24/17

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Trench Log

Project Number: 02077.01	**Trench No.: VRS-T1**
Project Name: Brea Olinda	**Logged by: Frank Hagar**
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/21/17** / **Date Completed: 03/21/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0** / **Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---** / **Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
1–4				SC	Dark brown claeyey sand with pebbles. Two inch hydrocarbon layer with strong odor at 2 feet bgs.			
4–5				CL	Red-Brown sandy clay, medium stiff, dry, hydrocarbon odor.			
5	VRS-T1-5 09:35						12.2	
6–9				ML	Red-Brown clayey silt, dry.			
10	VRS-T1-10 09:45						2.0	
10–14				CL/ML	Red-brown silt and silty clay, with interbedded medium stiff clay six inches thick every foot.			
15	VRS-T1-15 09:55						2.0	
15–19					TD=15'			

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Trench Log

Project Number: 02077.01	**Trench No.: VRS-T2**
Project Name: Brea Olinda	**Logged by: Frank Hagar**
Location: Valencia Avenue at Lambert Road, Brea, California	**Date Started: 03/21/17** / **Date Completed: 03/21/17**
Drilling Contractor: American Integrated Services	**Total Depth (ft bgs): 15.0** / **Depth to Water (ft bgs): ---**
Drilling Method: Backhoe	**Borehole Dia. (in): ---** / **Surface Elevation (ft MSL): Unknown**

Remarks: 100 Acre Parcel

Depth (ft)	Sample I.D. Sample Time	Sample Type	Graphic Log	USCS Code	Material Description	Water Level	10.6 ev PID (ppm)	Backfill
0				SP	Light brown poorly graded sand with pebbles			
1–4				ML/CL	Red-brown silty clay, medium plasticity, dry, no staining.			
5	VRS-T2-5 08:40			CL	Red-brown silty clay, medium plasticity, dry, no staining.		18.3	
10	VRS-T2-10 08:50			CL	Red-brown clayey silt, dry, no staining.		15.2	
15	VRS-T2-15 09:00				TD=15'		23.4	

DRB-ENVIRO BORING 02077.01_2017.03.22.GPJ 3/22/17

APPENDIX C

FIELD PROCEDURES

APPENDIX C – FIELD PROCEDURES

Soil Sample Collection Procedures – Trenching Program

Excavation of Trenches

Trenches and potholes were excavated by American Integrated Services, using a backhoe. The trenches measured approximately 18 feet in length and were excavated to an approximate depth of 15 feet bgs. Potholes were variable in length and depth, and were excavated only to a specific depth of interest.

Sample Identification

All soil samples were identified and labeled at the time of collection. Sample identification followed a specific format that contained the boring identification and sample depths to ensure that all sample numbers were unique.

Sampling Procedure

Representative soil samples were collected from each trench by manually placing soil from the backhoe bucket into laboratory-supplied sample jars, sealed with Teflon-lined lids. Soil samples were transferred to glass jars and/or Volatile Organic Analysis (VOA) 60 ml glass vials, depending on analytical requirements.

All samples analyzed for TPH-g/cc and Volatile Organic Constituents (VOCs) were collected using EnCore™ samplers, which were advanced into the undisturbed soils as per EPA Method 5035. The soil cores were placed in VOA containers pre-preserved with methanol and sodium bisulfate, and then sealed. The samples were labeled and stored in a chilled cooler pending delivery to the analytical laboratory. Strict chain-of-custody protocol was followed throughout all phases of the sample handling process.

Equipment Cleaning

To reduce the potential for cross contamination, all equipment and tools were cleaned before introduction borehole. Tools were scrubbed with a laboratory-grade detergent and double-rinsed with distilled water between sampling points.

Soil Sample Collection Procedures – Hand Auger

Advancing of Soil Borings

Soil borings were advanced using a hand-held auger. Soil samples were collected by driving a coring tube lined with stainless steel liners using a 20-lb slide hammer.

To reduce the potential for cross contamination between borings, the auger, coring tube, and sampling equipment were cleaned prior to use at each boring location.

Sample Identification

All soil samples were identified and labeled at the time of collection. Sample identification followed a specific format that contained the boring identification and sample depths to ensure that all sample numbers were unique.

Sampling Procedure

Glass jars were filled with soil collected from the auger. The samples were labeled and stored in a chilled cooler pending delivery to the analytical laboratory. Strict chain-of-custody protocol was followed throughout all phases of the sample handling process.

Equipment Cleaning

To reduce the potential for cross contamination, all equipment and tools were cleaned before introduction borehole. Tools were scrubbed with a laboratory-grade detergent and double-rinsed with distilled water between sampling points.

Soil Sample Collection Procedures – Geoprobe and Hollow Stem Auger Rig

Drilling of Soil Borings

Soil borings were advanced by BC2 Environmental, using a truck-mounted hollow stem auger rig and a truck-mounted Geoprobe™ direct push 6600 rig. The hollow stem auger borings were advanced using 8 inch diameter hollow rods. Continuous cores of soil were collected using a California Split Spoon sampler with brass sample rings. The direct push borings were advanced using 2.25 inch diameter hollow rods. The lead drilling rod contained a removable 1.5 inch core sampler that was retrieved at the end of each run. Acetate sleeves were used as liners for the core sampler to collect undisturbed soil samples as the rods were advanced.

Sample Identification

All soil samples were identified and labeled at the time of collection. Sample identification followed a specific format that contained the boring identification and sample depths to ensure that all sample numbers were unique.

Sampling Procedure

After retrieval of the hollow stem auger soil samples, the brass ring samples were sealed with Teflon-lined endcaps. After retrieval of the direct push soil samples, the acetate sleeve was cut for each desired sampling interval, capped with Teflon tape and plastic caps, and then sealed with Parafilm laboratory-grade tape. Soil samples were transferred to glass jars and/or VOA 60 ml glass vials, depending on analytical requirements.

All samples analyzed for TPH-g/cc and VOCs were collected using EnCore™ samplers, which were advanced into the undisturbed soils as per EPA Method 5035. The soil cores were placed in VOA containers pre-preserved with methanol and sodium bisulfate, and then sealed. The samples were labeled and stored in a chilled cooler pending delivery to the analytical laboratory. Strict chain-of-custody protocol was followed throughout all phases of the sample handling process.

Equipment Cleaning

To reduce the potential for cross contamination, all equipment and tools were cleaned before introduction borehole. Tools were scrubbed with a laboratory-grade detergent and double-rinsed with distilled water between sampling points.

Groundwater Sample Collection Procedures

Drilling of Soil Borings

Soil borings were advanced to groundwater using a truck-mounted Geoprobe rig. Following soil sample collection, temporary wells were installed in the borings.

To reduce the potential for cross contamination between borings, the Geoprobe rods and sampling equipment were cleaned prior to use at each drilling location.

Sample Identification

All groundwater samples were identified and labeled at the time of collection. Sample identification followed a specific format to ensure that all sample numbers were unique.

Sampling Equipment

A new disposable PVC screenpoint sampler was used for each sampling event. The Screen Point Sampler and associated assemblages were triple-rinsed prior to each installation using an approved non-phosphate detergent solution. Detergent was rinsed from the parts initially with tap water followed by a distilled-water rinse. The disposable microbailer was disposed of after its use.

A groundwater sample was collected by lowering a disposable microbailer through the drive rods to the Screen Point Sampler (or temporary well) using cotton or nylon string.

Groundwater samples were collected in VOA containers pre-preserved with hydrochloric acid (HCl) and sealed. The samples were labeled and stored in a chilled cooler pending delivery to the analytical laboratory. Strict chain-of-custody protocol was followed throughout all phases of the sample handling process.

Soil Vapor Sample Collection Procedures

Installation of Temporary Soil Vapor Monitoring Probes

Temporary soil vapor monitoring probes (VMPs) were constructed by Interphase Environmental Inc. in the same locations as soil borings. Borings were advanced using a track GeoProbe™ direct push rig equipped with hollow drill rods approximately 2.25 inches in diameter. The drill rods were sealed at the bottom end until the desired depth was reached, then the end cap was unlatched and retrieved to expose the native soils ahead of the drill steel. VMPs were constructed inside the drill rods which were retrieved as the annular fill materials were placed.

The VMPs consisted of a 6-inch long stainless steel implant at the desired probe depths. Nylaflow tubing (0.33 inch diameter) was connected from the implant to the ground surface, and terminated above the existing surface with a valve.

At the completion of vapor sampling, the borings were abandoned by removing the tubing and backfilling the borings with hydrated amorphous bentonite. The upper 6-inches of the borings were abandoned using cold-patch asphalt compacted and stained to match the existing surface.

Sample Identification

All soil vapor samples were identified and labeled at the time of collection. Sample identification followed a specific format to ensure that all sample numbers were unique and was recorded on laboratory supplied forms.

Sampling Equipment

After installation, each probe was allowed to stabilize two hours. Prior to sampling, each probe was purged of approximately three well volumes. A sample was collected from each probe using a summa canister and flow regulator that maintained a flow rate of 150 milliliters per minute. Each sample was transported to the analytical laboratory.

The samples were analyzed for VOCs using EPA Method 8260B and TPHs using EPA Method 8015. Strict chain-of-custody protocol was followed throughout all phases of the sample handling process.

APPENDIX D

LABORATORY ANALYTICAL REPORTS

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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24 March 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/21/17 15:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DRU-T1-5	T170707-01	Soil	03/21/17 07:44	03/21/17 15:25
DRU-T1-10	T170707-02	Soil	03/21/17 07:54	03/21/17 15:25
DRU-T1-15	T170707-03	Soil	03/21/17 08:00	03/21/17 15:25
VRS-T2-5	T170707-04	Soil	03/21/17 08:40	03/21/17 15:25
VRS-T2-10	T170707-05	Soil	03/21/17 08:50	03/21/17 15:25
VRS-T2-15	T170707-06	Soil	03/21/17 09:00	03/21/17 15:25
VRS-T1-5	T170707-07	Soil	03/21/17 09:35	03/21/17 15:25
VRS-T1-10	T170707-08	Soil	03/21/17 09:45	03/21/17 15:25
VRS-T1-15	T170707-09	Soil	03/21/17 09:55	03/21/17 15:25
S8-T1-5	T170707-10	Soil	03/21/17 10:20	03/21/17 15:25
S8-T1-10	T170707-11	Soil	03/21/17 10:43	03/21/17 15:25
S8-T1-15	T170707-12	Soil	03/21/17 10:48	03/21/17 15:25
S5-T1-5	T170707-13	Soil	03/21/17 11:20	03/21/17 15:25
S5-T1-10	T170707-14	Soil	03/21/17 11:32	03/21/17 15:25
S5-T1-15	T170707-15	Soil	03/21/17 11:42	03/21/17 15:25
104-T1-5	T170707-16	Soil	03/21/17 12:10	03/21/17 15:25
104-T1-10	T170707-17	Soil	03/21/17 12:18	03/21/17 15:25
104-T1-15	T170707-18	Soil	03/21/17 12:25	03/21/17 15:25
DR-HA1-1.0	T170707-19	Soil	03/21/17 07:35	03/21/17 15:25
DR-HA1-5.0	T170707-20	Soil	03/21/17 07:43	03/21/17 15:25
DR-HA2-1.0	T170707-21	Soil	03/21/17 08:02	03/21/17 15:25
DR-HA2-5.0	T170707-22	Soil	03/21/17 08:15	03/21/17 15:25
DR-HA3-1.0	T170707-23	Soil	03/21/17 08:25	03/21/17 15:25
DR-HA3-5.0	T170707-24	Soil	03/21/17 08:46	03/21/17 15:25
DR-HA4-1.0	T170707-25	Soil	03/21/17 09:11	03/21/17 15:25
DR-HA4-5.0	T170707-26	Soil	03/21/17 09:41	03/21/17 15:25

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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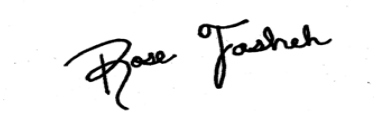
Northgate Environmental Management -- Laguna Hills	Project:	Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number:	02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager:	Derrick Willis	03/24/17 14:41

SunStar Laboratories, Inc.



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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DETECTIONS SUMMARY

Sample ID: DRU-T1-5 **Laboratory ID:** T170707-01

No Results Detected

Sample ID: DRU-T1-10 **Laboratory ID:** T170707-02

No Results Detected

Sample ID: DRU-T1-15 **Laboratory ID:** T170707-03

No Results Detected

Sample ID: VRS-T2-5 **Laboratory ID:** T170707-04

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**42**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**86**	10	mg/kg	EPA 8015B	

Sample ID: VRS-T2-10 **Laboratory ID:** T170707-05

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**39**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**45**	10	mg/kg	EPA 8015B	

Sample ID: VRS-T2-15 **Laboratory ID:** T170707-06

No Results Detected

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

Sample ID: VRS-T1-5 **Laboratory ID:** T170707-07

No Results Detected

Sample ID: VRS-T1-10 **Laboratory ID:** T170707-08

No Results Detected

Sample ID: VRS-T1-15 **Laboratory ID:** T170707-09

No Results Detected

Sample ID: S8-T1-5 **Laboratory ID:** T170707-10

No Results Detected

Sample ID: S8-T1-10 **Laboratory ID:** T170707-11

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**4900**	10	mg/kg	EPA 8015B	
C13-C28 (DRO)	**11000**	1000	mg/kg	EPA 8015B	
C29-C40 (MORO)	**19000**	1000	mg/kg	EPA 8015B	

Sample ID: S8-T1-15 **Laboratory ID:** T170707-12

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**6300**	10	mg/kg	EPA 8015B	
C13-C28 (DRO)	**11000**	1000	mg/kg	EPA 8015B	
C29-C40 (MORO)	**14000**	1000	mg/kg	EPA 8015B	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
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Sample ID: S5-T1-5 **Laboratory ID:** T170707-13

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**1700**	10	mg/kg	EPA 8015B	
C13-C28 (DRO)	**9200**	1000	mg/kg	EPA 8015B	
C29-C40 (MORO)	**22000**	1000	mg/kg	EPA 8015B	

Sample ID: S5-T1-10 **Laboratory ID:** T170707-14

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**330**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**1500**	10	mg/kg	EPA 8015B	

Sample ID: S5-T1-15 **Laboratory ID:** T170707-15

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**270**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**810**	10	mg/kg	EPA 8015B	

Sample ID: 104-T1-5 **Laboratory ID:** T170707-16

No Results Detected

Sample ID: 104-T1-10 **Laboratory ID:** T170707-17

No Results Detected

Sample ID: 104-T1-15 **Laboratory ID:** T170707-18

No Results Detected

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

Sample ID: DR-HA1-1.0 **Laboratory ID:** T170707-19

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**57**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**230**	10	mg/kg	EPA 8015B	

Sample ID: DR-HA1-5.0 **Laboratory ID:** T170707-20

No Results Detected

Sample ID: DR-HA2-1.0 **Laboratory ID:** T170707-21

No Results Detected

Sample ID: DR-HA2-5.0 **Laboratory ID:** T170707-22

No Results Detected

Sample ID: DR-HA3-1.0 **Laboratory ID:** T170707-23

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**75**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**220**	10	mg/kg	EPA 8015B	

Sample ID: DR-HA3-5.0 **Laboratory ID:** T170707-24

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**16**	10	mg/kg	EPA 8015B	

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Sample ID: DR-HA4-1.0 **Laboratory ID:** T170707-25

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**160**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**460**	10	mg/kg	EPA 8015B	

Sample ID: DR-HA4-5.0 **Laboratory ID:** T170707-26

No Results Detected

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DRU-T1-5

T170707-01 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*84.2 %*	*65-135*		*"*	*"*	*"*	*"*	

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DRU-T1-10

T170707-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*87.6 %*	*65-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DRU-T1-15

T170707-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*87.3 %*	*65-135*		*"*	*"*	*"*	*"*	

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VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**42**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**86**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*86.0 %*	*65-135*		*"*	*"*	*"*	*"*	

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VRS-T2-10

T170707-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**39**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**45**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*88.4 %*	*65-135*		*"*	*"*	*"*	*"*	

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VRS-T2-15

T170707-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*76.8 %*	*65-135*		*"*	*"*	*"*	*"*	

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VRS-T1-5

T170707-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*85.4 %*	*65-135*		*"*	*"*	*"*	*"*	

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VRS-T1-10

T170707-08 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*81.0 %*	*65-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

VRS-T1-15

T170707-09 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*75.2 %*	*65-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

S8-T1-5

T170707-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*83.9 %*	*65-135*		*"*	*"*	*"*	*"*	

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S8-T1-10

T170707-11 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	**4900**	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**11000**	1000	"	100	"	"	"	"	
C29-C40 (MORO)	**19000**	1000	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*102 %*	*65-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	**6300**	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**11000**	1000	"	100	"	"	"	"	
C29-C40 (MORO)	**14000**	1000	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*113 %*	*65-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

S5-T1-5

T170707-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	**1700**	10	mg/kg	1	7032220	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**9200**	1000	"	100	"	"	"	"	
C29-C40 (MORO)	**22000**	1000	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*106 %*	*65-135*		*"*	*"*	*"*	*"*	

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S5-T1-10

T170707-14 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	**330**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**1500**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*108 %*	*65-135*		*"*	*"*	*"*	*"*	

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S5-T1-15

T170707-15 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	**270**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**810**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*108 %*	*65-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

104-T1-5

T170707-16 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*105 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

104-T1-10

T170707-17 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*89.5 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

104-T1-15

T170707-18 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*89.9 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Lake Forest, California 92630
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	**57**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**230**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*108 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA1-5.0

T170707-20 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032220	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*100 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA2-1.0

T170707-21 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032221	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*100 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA2-5.0

T170707-22 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032221	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*103 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA3-1.0

T170707-23 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032221	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	**75**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**220**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*93.6 %*	*65-135*		*"*	*"*	*"*	*"*	

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Rose Fasheh, Project Manager

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA3-5.0

T170707-24 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032221	03/22/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**16**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*99.7 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Providing Quality Analytical Services Nationwide

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032221	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	**160**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**460**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*100 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

DR-HA4-5.0

T170707-26 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032221	03/22/17	03/23/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*99.8 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032220 - EPA 3550B GC										
Blank (7032220-BLK1)				Prepared & Analyzed: 03/22/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*133*		*"*	*150*		*88.5*	*65-135*			
LCS (7032220-BS1)				Prepared: 03/22/17 Analyzed: 03/23/17						
C13-C28 (DRO)	500	10	mg/kg	500		100	75-125			
Surrogate: p-Terphenyl	*167*		*"*	*150*		*111*	*65-135*			
LCS Dup (7032220-BSD1)				Prepared: 03/22/17 Analyzed: 03/23/17						
C13-C28 (DRO)	500	10	mg/kg	500		100	75-125	0.220	20	
Surrogate: p-Terphenyl	*159*		*"*	*150*		*106*	*65-135*			
Batch 7032221 - EPA 3550B GC										
Blank (7032221-BLK1)				Prepared: 03/22/17 Analyzed: 03/23/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*110*		*"*	*99.0*		*111*	*65-135*			
LCS (7032221-BS1)				Prepared: 03/22/17 Analyzed: 03/23/17						
C13-C28 (DRO)	510	10	mg/kg	495		103	75-125			
Surrogate: p-Terphenyl	*106*		*"*	*99.0*		*107*	*65-135*			
LCS Dup (7032221-BSD1)				Prepared: 03/22/17 Analyzed: 03/23/17						
C13-C28 (DRO)	520	10	mg/kg	500		103	75-125	0.778	20	
Surrogate: p-Terphenyl	*92.9*		*"*	*100*		*92.9*	*65-135*			

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 14:41

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Nontagate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive #130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/17 Page: 1 Of 3
Project Name: Brea-Olinda
Collector: F. Hager Client Project #: 02077.01
Batch #: 1170207 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +6RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCBs			Laboratory ID #	Comments/Preservative	Total # of containers
DRU-T1-5	3/21/17	0744	VOA	Soil	H			H										01		
DRU-T1-5	3/21/17	0744	4oz Gl	Soil				H				A	H		H					
DRU-T1-10	3/21/17	0754	4oz Gl	Soil				H				A	H		H			02		
DRU-T1-15	3/21/17	0800	4oz Gl	Soil				H				A	H		H			03		
VRS-T2-5	3/21/17	0840	Soil	VOA	H			H										04		
VRS-T2-5	3/21/17	0840	Soil	4oz Gl				H				A	H		H					
VRS-T2-10	3/21/17	0850	Soil	4oz Gl				H				A	H		H			05		
VRS-T2-15	3/21/17	0900	Soil	4oz Gl				H				A	H		H			06		
VRS-T1-5	3/21/17	0935	Soil	VOA	H			H										07		
VRS-T1-5	3/21/17	0935	Soil	4oz Gl				H				A	H		H					
VRS-T1-10	3/21/17	0945	Soil	4oz Gl				H				A	H		H			08		
VRS-T1-15	3/21/17	0955	Soil	4oz Gl				H				A	H		H			09		
SS-T1-5	3/21/17	1020	Soil	VOA	H													10	HIGH TPH	
SS-T1-5	3/21/17	1020	Soil	4oz Gl				H				A	H		H					
SS-T1-10	3/21/17	1043	Soil	4oz Gl				H				A	H		H			11		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Fred Hager	3/21/17 3:25		3/21/17 15:25
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 35
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162514

I-179

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/17 Page: 2 Of 3
Project Name: Brea-Olinda
Collector: Frank Hoger Client Project #: 02077.01
Batch #: 1170707 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB's			Laboratory ID #	Comments/Preservative	Total # of containers
SB-T1-15	3/21/17	1048	Soil	4oz gl				H				A			H			12		
SS-T1-5	3/21/17	1120	Soil	VOA	H													13		
SS-T1-5	3/21/17	1120	Soil	4oz gl				H				A			H					
SS-T1-10	3/21/17	1132	Soil	4oz gl				H				A			H			14	HIGH TPH 1	
SS-T1-15	3/21/17	1142	Soil	4oz gl				H				A			H			15	HIGH TPH 1	
104-T1-5	3/21/17	1210	Soil	VOA	H													16		
104-T1-5	3/21/17	1210	Soil	4oz gl				H				A			H					
104-T1-10	3/21/17	1218	Soil	4oz gl				H				A			H			17		
104-T1-15	3/21/17	1225	Soil	4oz gl				H				A			H			18		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Frank Hoger	3/21/17 3:35		3/21/17 15:35
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 19
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162512

I-180

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 2441 Ridge Park Drive, Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/2017 Page: 1 of 3
Project Name: Brea Olinda
Collector: Michelle Hughson Client Project #: 02077.01
Batch #: 1122707 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260+GRO 5035	8260 + OXY	8260 BTEX, OXY only	8270C	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	EPA 8081 Pesticides	8141 organophosphorus Pesticides	8151 Herbicides	Laboratory ID #	Comments/Preservative	Total # of containers
DR-HA1-1.0	3/21/17	0735	Soil	VOAs + core	H			H				A	H		H	H	H	19		5
DR-HA1-5.0	3/21/17	0743	Soil	core				H				A	H		H	H	H	20		1
DR-HA2-1.0	3/21/17	0802	Soil	VOAs + core	H			H				A	H		H	H	H	21		5
DR-HA2-5.0	3/21/17	0815	Soil	core				H				A	H		H	H	H	22		1
DR-HA3-1.0	3/21/17	0825	Soil	VOAs + core	H			H				A	H		H	H	H	23		5
DR-HA3-5.0	3/21/17	0846	Soil	core				H				A	H		H	H	H	24		1
DR-HA4-1.0	3/21/17	0911	Soil	VOAs + core	H			H				A	H		H	H	H	25		5
DR-HA4-5.0	3/21/17	0941	Soil	core				H				A	H		H	H	H	26		1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Michelle Hughson	3/21/17 1230		3/21/17 1230
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/21/17 3:25		3/21/17 15:25
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 24
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes
F. Hager
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162513

I-181

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 1170107

Client Name: NORTHGATE Project: BREA OLINDA OIL FIELD

Delivered by: ☒ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: BRIAN Date/Time Lab Received: 3/11/17 15:25

Total number of coolers received: 1

Temperature: Cooler #1 5.6	°C +/- the CF (- 0.2°C) = 5.4	°C corrected temperature	
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =	°C corrected temperature	
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =	°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BL

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Report To:

Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due:	03/24/17 17:00 (3 day TAT)		
Received By:	Brian Charon	Date Received:	03/21/17 15:25
Logged In By:	Brian Charon	Date Logged In:	03/21/17 15:35

Samples Received at: **5.4°C**

Custody Seals	No	Received On Ice	Yes
Containers Intact	Yes		
COC/Labels Agree	Yes		
Preservation Confir	Yes		

Analysis	Due	TAT	Expires	Comments
T170707-01 DRU-T1-5 [Soil] Sampled 03/21/17 07:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:44	
T170707-02 DRU-T1-10 [Soil] Sampled 03/21/17 07:54 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:54	
T170707-03 DRU-T1-15 [Soil] Sampled 03/21/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:00	
T170707-04 VRS-T2-5 [Soil] Sampled 03/21/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:40	
T170707-05 VRS-T2-10 [Soil] Sampled 03/21/17 08:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:50	
T170707-06 VRS-T2-15 [Soil] Sampled 03/21/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:00	
T170707-07 VRS-T1-5 [Soil] Sampled 03/21/17 09:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:35	

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Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-08 VRS-T1-10 [Soil] Sampled 03/21/17 09:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:45	
T170707-09 VRS-T1-15 [Soil] Sampled 03/21/17 09:55 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:55	
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:20	
T170707-11 S8-T1-10 [Soil] Sampled 03/21/17 10:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:43	
T170707-12 S8-T1-15 [Soil] Sampled 03/21/17 10:48 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:48	
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:20	
T170707-14 S5-T1-10 [Soil] Sampled 03/21/17 11:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:32	
T170707-15 S5-T1-15 [Soil] Sampled 03/21/17 11:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:42	
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:10	
T170707-17 104-T1-10 [Soil] Sampled 03/21/17 12:18 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:18	
T170707-18 104-T1-15 [Soil] Sampled 03/21/17 12:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:25	

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:35	
T170707-20 DR-HA1-5.0 [Soil] Sampled 03/21/17 07:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:43	
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:02	
T170707-22 DR-HA2-5.0 [Soil] Sampled 03/21/17 08:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:15	
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:25	
T170707-24 DR-HA3-5.0 [Soil] Sampled 03/21/17 08:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:46	
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:11	
T170707-26 DR-HA4-5.0 [Soil] Sampled 03/21/17 09:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:41	

Reviewed By

Date

SunStar Laboratories, Inc.
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26 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/21/17 15:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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03 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

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Project Manager

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DRU-T1-5	T170707-01	Soil	03/21/17 07:44	03/21/17 15:25
VRS-T2-5	T170707-04	Soil	03/21/17 08:40	03/21/17 15:25
VRS-T1-5	T170707-07	Soil	03/21/17 09:35	03/21/17 15:25
S8-T1-5	T170707-10	Soil	03/21/17 10:20	03/21/17 15:25
S5-T1-5	T170707-13	Soil	03/21/17 11:20	03/21/17 15:25
104-T1-5	T170707-16	Soil	03/21/17 12:10	03/21/17 15:25
DR-HA1-1.0	T170707-19	Soil	03/21/17 07:35	03/21/17 15:25
DR-HA2-1.0	T170707-21	Soil	03/21/17 08:02	03/21/17 15:25
DR-HA3-1.0	T170707-23	Soil	03/21/17 08:25	03/21/17 15:25
DR-HA4-1.0	T170707-25	Soil	03/21/17 09:11	03/21/17 15:25

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DETECTIONS SUMMARY

Sample ID: DRU-T1-5 **Laboratory ID:** T170707-01

No Results Detected

Sample ID: VRS-T2-5 **Laboratory ID:** T170707-04

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**67**	1.0	mg/kg	EPA 6010B	
Chromium	**6.6**	2.0	mg/kg	EPA 6010B	
Cobalt	**4.4**	2.0	mg/kg	EPA 6010B	
Copper	**7.4**	1.0	mg/kg	EPA 6010B	
Nickel	**7.8**	2.0	mg/kg	EPA 6010B	
Vanadium	**18**	5.0	mg/kg	EPA 6010B	
Zinc	**27**	1.0	mg/kg	EPA 6010B	

Sample ID: VRS-T1-5 **Laboratory ID:** T170707-07

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**41**	1.0	mg/kg	EPA 6010B	
Chromium	**3.2**	2.0	mg/kg	EPA 6010B	
Cobalt	**4.3**	2.0	mg/kg	EPA 6010B	
Nickel	**5.4**	2.0	mg/kg	EPA 6010B	
Vanadium	**6.3**	5.0	mg/kg	EPA 6010B	
Zinc	**11**	1.0	mg/kg	EPA 6010B	

Sample ID: S8-T1-5 **Laboratory ID:** T170707-10

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**45**	1.0	mg/kg	EPA 6010B	
Chromium	**4.6**	2.0	mg/kg	EPA 6010B	
Cobalt	**3.5**	2.0	mg/kg	EPA 6010B	
Copper	**3.0**	1.0	mg/kg	EPA 6010B	

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Sample ID: S8-T1-5 **Laboratory ID:** T170707-10

Analyte	Result	Reporting Limit	Units	Method	Notes
Nickel	**3.8**	2.0	mg/kg	EPA 6010B	
Vanadium	**14**	5.0	mg/kg	EPA 6010B	
Zinc	**23**	1.0	mg/kg	EPA 6010B	
Uranium, Total	**0.76**	0.50	mg/kg	EPA 6020A	

Sample ID: S5-T1-5 **Laboratory ID:** T170707-13

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**6700**	220	ug/kg	EPA 8015B	
Barium	**34**	1.0	mg/kg	EPA 6010B	
Chromium	**3.2**	2.0	mg/kg	EPA 6010B	
Cobalt	**2.7**	2.0	mg/kg	EPA 6010B	
Copper	**3.6**	1.0	mg/kg	EPA 6010B	
Nickel	**6.5**	2.0	mg/kg	EPA 6010B	
Vanadium	**11**	5.0	mg/kg	EPA 6010B	
Zinc	**24**	1.0	mg/kg	EPA 6010B	
n-Butylbenzene	**10**	5.7	ug/kg	EPA 8260B/5035	
sec-Butylbenzene	**8.9**	5.7	ug/kg	EPA 8260B/5035	
Isopropylbenzene	**9.2**	5.7	ug/kg	EPA 8260B/5035	
p-Isopropyltoluene	**6.5**	5.7	ug/kg	EPA 8260B/5035	
Naphthalene	**150**	5.7	ug/kg	EPA 8260B/5035	
n-Propylbenzene	**11**	5.7	ug/kg	EPA 8260B/5035	
1,3,5-Trimethylbenzene	**10**	5.7	ug/kg	EPA 8260B/5035	
1,2,4-Trimethylbenzene	**28**	5.7	ug/kg	EPA 8260B/5035	
Ethylbenzene	**20**	5.7	ug/kg	EPA 8260B/5035	
m,p-Xylene	**27**	11	ug/kg	EPA 8260B/5035	
o-Xylene	**20**	5.7	ug/kg	EPA 8260B/5035	
Uranium, Total	**0.71**	0.50	mg/kg	EPA 6020A	

Sample ID: 104-T1-5 **Laboratory ID:** T170707-16

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**47**	1.0	mg/kg	EPA 6010B	
Chromium	**4.7**	2.0	mg/kg	EPA 6010B	
Cobalt	**4.2**	2.0	mg/kg	EPA 6010B	

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Sample ID: 104-T1-5 **Laboratory ID:** T170707-16

Analyte	Result	Reporting Limit	Units	Method	Notes
Copper	**4.9**	1.0	mg/kg	EPA 6010B	
Nickel	**10**	2.0	mg/kg	EPA 6010B	
Vanadium	**14**	5.0	mg/kg	EPA 6010B	
Zinc	**24**	1.0	mg/kg	EPA 6010B	
Uranium, Total	**1.3**	0.50	mg/kg	EPA 6020A	

Sample ID: DR-HA1-1.0 **Laboratory ID:** T170707-19

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**65**	1.0	mg/kg	EPA 6010B	
Chromium	**7.0**	2.0	mg/kg	EPA 6010B	
Cobalt	**3.9**	2.0	mg/kg	EPA 6010B	
Copper	**8.8**	1.0	mg/kg	EPA 6010B	
Nickel	**8.2**	2.0	mg/kg	EPA 6010B	
Vanadium	**15**	5.0	mg/kg	EPA 6010B	
Zinc	**35**	1.0	mg/kg	EPA 6010B	
Uranium, Total	**1.0**	0.50	mg/kg	EPA 6020A	

Sample ID: DR-HA2-1.0 **Laboratory ID:** T170707-21

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**27**	1.0	mg/kg	EPA 6010B	
Chromium	**2.8**	2.0	mg/kg	EPA 6010B	
Cobalt	**2.0**	2.0	mg/kg	EPA 6010B	
Copper	**2.4**	1.0	mg/kg	EPA 6010B	
Nickel	**4.4**	2.0	mg/kg	EPA 6010B	
Vanadium	**9.0**	5.0	mg/kg	EPA 6010B	
Zinc	**13**	1.0	mg/kg	EPA 6010B	
Uranium, Total	**0.73**	0.50	mg/kg	EPA 6020A	

Sample ID: DR-HA3-1.0 **Laboratory ID:** T170707-23

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**80**	1.0	mg/kg	EPA 6010B	

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Sample ID: DR-HA3-1.0 **Laboratory ID:** T170707-23

Analyte	Result	Reporting Limit	Units	Method	Notes
Chromium	**5.6**	2.0	mg/kg	EPA 6010B	
Cobalt	**5.0**	2.0	mg/kg	EPA 6010B	
Copper	**5.5**	1.0	mg/kg	EPA 6010B	
Nickel	**11**	2.0	mg/kg	EPA 6010B	
Vanadium	**16**	5.0	mg/kg	EPA 6010B	
Zinc	**34**	1.0	mg/kg	EPA 6010B	
PCB-1260	**19**	10	ug/kg	EPA 8082	
Uranium, Total	**1.2**	0.50	mg/kg	EPA 6020A	

Sample ID: DR-HA4-1.0 **Laboratory ID:** T170707-25

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**50**	1.0	mg/kg	EPA 6010B	
Chromium	**6.4**	2.0	mg/kg	EPA 6010B	
Cobalt	**4.3**	2.0	mg/kg	EPA 6010B	
Copper	**4.1**	1.0	mg/kg	EPA 6010B	
Nickel	**7.5**	2.0	mg/kg	EPA 6010B	
Vanadium	**19**	5.0	mg/kg	EPA 6010B	
Zinc	**23**	1.0	mg/kg	EPA 6010B	
Uranium, Total	**0.93**	0.50	mg/kg	EPA 6020A	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DRU-T1-5

T170707-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	170	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*87.7 %*	*65-135*		"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.8	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	3.8	"	"	"	"	"	"	
Bromodichloromethane	ND	3.8	"	"	"	"	"	"	
Bromoform	ND	3.8	"	"	"	"	"	"	
Bromomethane	ND	3.8	"	"	"	"	"	"	
n-Butylbenzene	ND	3.8	"	"	"	"	"	"	
sec-Butylbenzene	ND	3.8	"	"	"	"	"	"	
tert-Butylbenzene	ND	3.8	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.8	"	"	"	"	"	"	
Chlorobenzene	ND	3.8	"	"	"	"	"	"	
Chloroethane	ND	3.8	"	"	"	"	"	"	
Chloroform	ND	3.8	"	"	"	"	"	"	
Chloromethane	ND	3.8	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.8	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.8	"	"	"	"	"	"	
Dibromochloromethane	ND	3.8	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	7.6	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.8	"	"	"	"	"	"	
Dibromomethane	ND	3.8	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.8	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.8	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.8	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.8	"	"	"	"	"	"	
1,1-Dichloroethane	ND	3.8	"	"	"	"	"	"	
1,2-Dichloroethane	ND	3.8	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.8	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.8	"	"	"	"	"	"	

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DRU-T1-5

T170707-01 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
trans-1,2-Dichloroethene	ND	3.8	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
1,2-Dichloropropane	ND	3.8	"	"	"	"	"	"	
1,3-Dichloropropane	ND	3.8	"	"	"	"	"	"	
2,2-Dichloropropane	ND	3.8	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.8	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.8	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.8	"	"	"	"	"	"	
Isopropylbenzene	ND	3.8	"	"	"	"	"	"	
p-Isopropyltoluene	ND	3.8	"	"	"	"	"	"	
Methylene chloride	ND	3.8	"	"	"	"	"	"	
Naphthalene	ND	3.8	"	"	"	"	"	"	
n-Propylbenzene	ND	3.8	"	"	"	"	"	"	
Styrene	ND	3.8	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.8	"	"	"	"	"	"	
Tetrachloroethene	ND	3.8	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.8	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.8	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.8	"	"	"	"	"	"	
Trichloroethene	ND	3.8	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.8	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	3.8	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	3.8	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.8	"	"	"	"	"	"	
Vinyl chloride	ND	3.8	"	"	"	"	"	"	
Benzene	ND	3.8	"	"	"	"	"	"	
Toluene	ND	3.8	"	"	"	"	"	"	
Ethylbenzene	ND	3.8	"	"	"	"	"	"	
m,p-Xylene	ND	7.6	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DRU-T1-5

T170707-01 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
o-Xylene	ND	3.8	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Surrogate: Toluene-d8		*105 %*	*85.5-116*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*81.2-123*		"	"	"	"	
Surrogate: Dibromofluoromethane		*113 %*	*95.7-135*		"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	170	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*116 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**67**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**6.6**	2.0	"	"	"	"	"	"	
Cobalt	**4.4**	2.0	"	"	"	"	"	"	
Copper	**7.4**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**7.8**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**18**	5.0	"	"	"	"	"	"	
Zinc	**27**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*75.0 %*	*35-140*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*79.3 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	4.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	4.0	"	"	"	"	"	"	
Bromodichloromethane	ND	4.0	"	"	"	"	"	"	
Bromoform	ND	4.0	"	"	"	"	"	"	
Bromomethane	ND	4.0	"	"	"	"	"	"	
n-Butylbenzene	ND	4.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	4.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	4.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	4.0	"	"	"	"	"	"	
Chlorobenzene	ND	4.0	"	"	"	"	"	"	
Chloroethane	ND	4.0	"	"	"	"	"	"	
Chloroform	ND	4.0	"	"	"	"	"	"	
Chloromethane	ND	4.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	4.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	4.0	"	"	"	"	"	"	
Dibromochloromethane	ND	4.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	7.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	4.0	"	"	"	"	"	"	
Dibromomethane	ND	4.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	4.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	4.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	4.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	4.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	4.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	4.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	4.0	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	4.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	4.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	4.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	4.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	4.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	4.0	"	"	"	"	"	"	
Isopropylbenzene	ND	4.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	4.0	"	"	"	"	"	"	
Methylene chloride	ND	4.0	"	"	"	"	"	"	
Naphthalene	ND	4.0	"	"	"	"	"	"	
n-Propylbenzene	ND	4.0	"	"	"	"	"	"	
Styrene	ND	4.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	4.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	4.0	"	"	"	"	"	"	
Tetrachloroethene	ND	4.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	4.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	4.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	4.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	4.0	"	"	"	"	"	"	
Trichloroethene	ND	4.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	4.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	4.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	4.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	4.0	"	"	"	"	"	"	
Vinyl chloride	ND	4.0	"	"	"	"	"	"	
Benzene	ND	4.0	"	"	"	"	"	"	
Toluene	ND	4.0	"	"	"	"	"	"	
Ethylbenzene	ND	4.0	"	"	"	"	"	"	
m,p-Xylene	ND	7.9	"	"	"	"	"	"	
o-Xylene	ND	4.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*100 %*	*85.5-116*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*92.9 %*	*81.2-123*		*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*118 %*	*95.7-135*		*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Butyl benzyl phthalate	ND	300	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T2-5

T170707-04 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Nitrobenzene	ND	1000	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*57.1 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*59.7 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*51.6 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*92.0 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*100 %*	*18.1-105*		"	"	"	"	
Surrogate: Terphenyl-dl4		*124 %*	*29.1-130*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T1-5

T170707-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	170	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*117 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**41**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**3.2**	2.0	"	"	"	"	"	"	
Cobalt	**4.3**	2.0	"	"	"	"	"	"	
Copper	ND	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**5.4**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**6.3**	5.0	"	"	"	"	"	"	
Zinc	**11**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*75.2 %*	*35-140*		"	"	"	"	

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Rose Fasheh

Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T1-5

T170707-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*78.7 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.7	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	3.7	"	"	"	"	"	"	
Bromodichloromethane	ND	3.7	"	"	"	"	"	"	
Bromoform	ND	3.7	"	"	"	"	"	"	
Bromomethane	ND	3.7	"	"	"	"	"	"	
n-Butylbenzene	ND	3.7	"	"	"	"	"	"	
sec-Butylbenzene	ND	3.7	"	"	"	"	"	"	
tert-Butylbenzene	ND	3.7	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.7	"	"	"	"	"	"	
Chlorobenzene	ND	3.7	"	"	"	"	"	"	
Chloroethane	ND	3.7	"	"	"	"	"	"	
Chloroform	ND	3.7	"	"	"	"	"	"	
Chloromethane	ND	3.7	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.7	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.7	"	"	"	"	"	"	
Dibromochloromethane	ND	3.7	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	7.5	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.7	"	"	"	"	"	"	
Dibromomethane	ND	3.7	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloroethane	ND	3.7	"	"	"	"	"	"	
1,2-Dichloroethane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.7	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.7	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	3.7	"	"	"	"	"	"	
1,2-Dichloropropane	ND	3.7	"	"	"	"	"	"	

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VRS-T1-5

T170707-07 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	3.7	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.7	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.7	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.7	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.7	"	"	"	"	"	"	
Isopropylbenzene	ND	3.7	"	"	"	"	"	"	
p-Isopropyltoluene	ND	3.7	"	"	"	"	"	"	
Methylene chloride	ND	3.7	"	"	"	"	"	"	
Naphthalene	ND	3.7	"	"	"	"	"	"	
n-Propylbenzene	ND	3.7	"	"	"	"	"	"	
Styrene	ND	3.7	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.7	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.7	"	"	"	"	"	"	
Tetrachloroethene	ND	3.7	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.7	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.7	"	"	"	"	"	"	
Trichloroethene	ND	3.7	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.7	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	3.7	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	3.7	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.7	"	"	"	"	"	"	
Vinyl chloride	ND	3.7	"	"	"	"	"	"	
Benzene	ND	3.7	"	"	"	"	"	"	
Toluene	ND	3.7	"	"	"	"	"	"	
Ethylbenzene	ND	3.7	"	"	"	"	"	"	
m,p-Xylene	ND	7.5	"	"	"	"	"	"	
o-Xylene	ND	3.7	"	"	"	"	"	"	
Surrogate: Toluene-d8		*102 %*	*85.5-116*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

VRS-T1-5

T170707-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*95.2 %*	*81.2-123*		*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*118 %*	*95.7-135*		*"*	*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S8-T1-5

T170707-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	190	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*129 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**45**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**4.6**	2.0	"	"	"	"	"	"	
Cobalt	**3.5**	2.0	"	"	"	"	"	"	
Copper	**3.0**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**3.8**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**14**	5.0	"	"	"	"	"	"	
Zinc	**23**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*89.3 %*	*35-140*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S8-T1-5

T170707-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*90.5 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	

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S8-T1-5

T170707-10 (Soil)

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Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*104 %*	*85.5-116*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S8-T1-5

T170707-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*93.0 %*	*81.2-123*		*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*117 %*	*95.7-135*		*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
Aniline	ND	300	"	"	"	"	"	"	
Phenol	ND	1000	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S8-T1-5

T170707-10 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Butyl benzyl phthalate	ND	300	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S8-T1-5

T170707-10 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Nitrobenzene	ND	1000	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*62.5 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*53.5 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*49.8 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*80.3 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*113 %*	*18.1-105*		"	"	"	"	*R-07*
Surrogate: Terphenyl-dl4		*114 %*	*29.1-130*		"	"	"	"	
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**0.76**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S5-T1-5

T170707-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	**6700**	220	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*101 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**34**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**3.2**	2.0	"	"	"	"	"	"	
Cobalt	**2.7**	2.0	"	"	"	"	"	"	
Copper	**3.6**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**6.5**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**11**	5.0	"	"	"	"	"	"	
Zinc	**24**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	50	ug/kg	5	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	50	"	"	"	"	"	"	R-07
PCB-1232	ND	50	"	"	"	"	"	"	R-07
PCB-1242	ND	50	"	"	"	"	"	"	R-07
PCB-1248	ND	50	"	"	"	"	"	"	R-07
PCB-1254	ND	50	"	"	"	"	"	"	R-07
PCB-1260	ND	50	"	"	"	"	"	"	R-07
Surrogate: Tetrachloro-meta-xylene		*79.6 %*	*35-140*		"	"	"	"	*R-07*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S5-T1-5

T170707-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*105 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	*R-07*
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.7	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.7	"	"	"	"	"	"	
Bromodichloromethane	ND	5.7	"	"	"	"	"	"	
Bromoform	ND	5.7	"	"	"	"	"	"	
Bromomethane	ND	5.7	"	"	"	"	"	"	
n-Butylbenzene	**10**	5.7	"	"	"	"	"	"	
sec-Butylbenzene	**8.9**	5.7	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.7	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.7	"	"	"	"	"	"	
Chlorobenzene	ND	5.7	"	"	"	"	"	"	
Chloroethane	ND	5.7	"	"	"	"	"	"	
Chloroform	ND	5.7	"	"	"	"	"	"	
Chloromethane	ND	5.7	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.7	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.7	"	"	"	"	"	"	
Dibromochloromethane	ND	5.7	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	11	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.7	"	"	"	"	"	"	
Dibromomethane	ND	5.7	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.7	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.7	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.7	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.7	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.7	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.7	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.7	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.7	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.7	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.7	"	"	"	"	"	"	

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S5-T1-5

T170707-13 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	5.7	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	5.7	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.7	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.7	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.7	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.7	"	"	"	"	"	"	
Isopropylbenzene	**9.2**	5.7	"	"	"	"	"	"	
p-Isopropyltoluene	**6.5**	5.7	"	"	"	"	"	"	
Methylene chloride	ND	5.7	"	"	"	"	"	"	
Naphthalene	**150**	5.7	"	"	"	"	"	"	
n-Propylbenzene	**11**	5.7	"	"	"	"	"	"	
Styrene	ND	5.7	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.7	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.7	"	"	"	"	"	"	
Tetrachloroethene	ND	5.7	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.7	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.7	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.7	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.7	"	"	"	"	"	"	
Trichloroethene	ND	5.7	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.7	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.7	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**10**	5.7	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**28**	5.7	"	"	"	"	"	"	
Vinyl chloride	ND	5.7	"	"	"	"	"	"	
Benzene	ND	5.7	"	"	"	"	"	"	
Toluene	ND	5.7	"	"	"	"	"	"	
Ethylbenzene	**20**	5.7	"	"	"	"	"	"	
m,p-Xylene	**27**	11	"	"	"	"	"	"	
o-Xylene	**20**	5.7	"	"	"	"	"	"	
Surrogate: Toluene-d8		*89.9 %*	*85.5-116*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*77.9 %*	*81.2-123*		"	"	"	"	*S-GC*

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S5-T1-5

T170707-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane		*105 %*		*95.7-135*	*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	15000	ug/kg	50	7032720	03/27/17	03/30/17	EPA 8270C	R-07
Phenol	ND	50000	"	"	"	"	"	"	R-07
Aniline	ND	15000	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	50000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	15000	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	15000	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	15000	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	50000	"	"	"	"	"	"	R-07
1-Methylnaphthalene	ND	15000	"	"	"	"	"	"	R-07
2-Methylnaphthalene	ND	15000	"	"	"	"	"	"	R-07
Acenaphthene	ND	15000	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	50000	"	"	"	"	"	"	R-07
2,4-Dinitrotoluene	ND	15000	"	"	"	"	"	"	R-07
Pentachlorophenol	ND	50000	"	"	"	"	"	"	R-07
Pyrene	ND	15000	"	"	"	"	"	"	R-07
Acenaphthylene	ND	15000	"	"	"	"	"	"	R-07
Anthracene	ND	15000	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	15000	"	"	"	"	"	"	R-07
Benzo (b) fluoranthene	ND	15000	"	"	"	"	"	"	R-07
Benzo (k) fluoranthene	ND	15000	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	50000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	15000	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	15000	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	15000	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	15000	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	15000	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	15000	"	"	"	"	"	"	R-07
4-Bromophenyl phenyl ether	ND	15000	"	"	"	"	"	"	R-07
Butyl benzyl phthalate	ND	15000	"	"	"	"	"	"	R-07

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S5-T1-5

T170707-13 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
4-Chloroaniline	ND	15000	ug/kg	50	7032720	03/27/17	03/30/17	EPA 8270C	R-07
2-Chloronaphthalene	ND	15000	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	15000	"	"	"	"	"	"	R-07
Chrysene	ND	15000	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	15000	"	"	"	"	"	"	R-07
Dibenzofuran	ND	15000	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	15000	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	15000	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	15000	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	50000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	15000	"	"	"	"	"	"	R-07
2,4-Dimethylphenol	ND	50000	"	"	"	"	"	"	R-07
Dimethyl phthalate	ND	15000	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	50000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	50000	"	"	"	"	"	"	R-07
2,6-Dinitrotoluene	ND	50000	"	"	"	"	"	"	R-07
Di-n-octyl phthalate	ND	15000	"	"	"	"	"	"	R-07
Fluoranthene	ND	15000	"	"	"	"	"	"	R-07
Fluorene	ND	15000	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	75000	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	15000	"	"	"	"	"	"	R-07
Hexachlorocyclopentadiene	ND	50000	"	"	"	"	"	"	R-07
Hexachloroethane	ND	15000	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	15000	"	"	"	"	"	"	R-07
Isophorone	ND	15000	"	"	"	"	"	"	R-07
2-Methylphenol	ND	50000	"	"	"	"	"	"	R-07
4-Methylphenol	ND	50000	"	"	"	"	"	"	R-07
Naphthalene	ND	15000	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	15000	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	15000	"	"	"	"	"	"	R-07
4-Nitroaniline	ND	15000	"	"	"	"	"	"	R-07
Nitrobenzene	ND	50000	"	"	"	"	"	"	R-07

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

S5-T1-5

T170707-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
2-Nitrophenol	ND	50000	ug/kg	50	7032720	03/27/17	03/30/17	EPA 8270C	R-07
N-Nitrosodimethylamine	ND	15000	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	ND	15000	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	15000	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	15000	"	"	"	"	"	"	R-07
Phenanthrene	ND	15000	"	"	"	"	"	"	R-07
Azobenzene	ND	15000	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	50000	"	"	"	"	"	"	R-07
Pyridine	ND	15000	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	50000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*55.0 %*	*15-121*		"	"	"	"	*R-07*
Surrogate: Phenol-d6		*28.5 %*	*24-113*		"	"	"	"	*R-07*
Surrogate: Nitrobenzene-d5		*36.5 %*	*21.3-119*		"	"	"	"	*R-07*
Surrogate: 2-Fluorobiphenyl		*74.5 %*	*32.4-102*		"	"	"	"	*R-07*
Surrogate: 2,4,6-Tribromophenol		*%*	*18.1-105*		"	"	"	"	*R-07, S-GC*
Surrogate: Terphenyl-dl4		*113 %*	*29.1-130*		"	"	"	"	*R-07*
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**0.71**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

104-T1-5

T170707-16 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	220	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*96.2 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**47**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**4.7**	2.0	"	"	"	"	"	"	
Cobalt	**4.2**	2.0	"	"	"	"	"	"	
Copper	**4.9**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**10**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**14**	5.0	"	"	"	"	"	"	
Zinc	**24**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*55.9 %*	*35-140*		"	"	"	"	

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104-T1-5

T170707-16 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*66.7 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	

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T170707-16 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*99.6 %*	*85.5-116*		"	"	"	"	

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T170707-16 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*92.3 %*	*81.2-123*		*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*113 %*	*95.7-135*		*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Aniline	ND	300	"	"	"	"	"	"	
Phenol	ND	1000	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	

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T170707-16 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Butyl benzyl phthalate	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	

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104-T1-5

T170707-16 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Nitrobenzene	ND	1000	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*32.3 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*41.0 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*44.9 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*67.6 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*92.4 %*	*18.1-105*		"	"	"	"	
Surrogate: Terphenyl-dl4		*119 %*	*29.1-130*		"	"	"	"	
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**1.3**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	200	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*74.9 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**65**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**7.0**	2.0	"	"	"	"	"	"	
Cobalt	**3.9**	2.0	"	"	"	"	"	"	
Copper	**8.8**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**8.2**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**15**	5.0	"	"	"	"	"	"	
Zinc	**35**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	

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DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organochlorine Pesticides by EPA Method 8081A									
alpha-Chlordane	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*82.0 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*59.6 %*		*35-140*	"	"	"	"	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*76.6 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*76.8 %*		*35-140*	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organophosphorus Pesticides by EPA Method 8141A									
Dichlorvos	ND	5.0	ug/kg	1	7032420	03/27/17	03/28/17	8141a	
Mevinphos	ND	5.0	"	"	"	"	"	"	
Demeton-s	ND	10	"	"	"	"	"	"	
Ethoprophos	ND	5.0	"	"	"	"	"	"	
Phorate	ND	10	"	"	"	"	"	"	
Naled	ND	5.0	"	"	"	"	"	"	
Sulfotep	ND	10	"	"	"	"	"	"	
Diazinon	ND	5.0	"	"	"	"	"	"	
Disulfoton	ND	5.0	"	"	"	"	"	"	
Demeton-o	ND	10	"	"	"	"	"	"	
Dimethoate	ND	5.0	"	"	"	"	"	"	
Ronnel	ND	10	"	"	"	"	"	"	
Merphos	ND	10	"	"	"	"	"	"	
Chlorpyrifos	ND	5.0	"	"	"	"	"	"	
Fenthion	ND	5.0	"	"	"	"	"	"	
Trichloronate	ND	5.0	"	"	"	"	"	"	
Methyl parathion	ND	5.0	"	"	"	"	"	"	
Malathion	ND	10	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	5.0	"	"	"	"	"	"	
Parathion	ND	5.0	"	"	"	"	"	"	
Stirophos (Tetrachlorvinphos)	ND	5.0	"	"	"	"	"	"	
Bolstar	ND	5.0	"	"	"	"	"	"	
Fensulfothion	ND	5.0	"	"	"	"	"	"	
EPN	ND	5.0	"	"	"	"	"	"	
Azinphos methyl	ND	10	"	"	"	"	"	"	
Coumaphos	ND	5.0	"	"	"	"	"	"	
Surrogate: Tributylphosphate		*81.3 %*	*40-125*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chlorinated Herbicides by EPA Method 8151A									
2,4,5-T	ND	5.00	ug/kg	1	7032717	03/27/17	03/29/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*48.2 %*	*35-150*		*"*	*"*	*"*	*"*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	

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DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2-Chlorotoluene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	

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DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*87.8 %*	*85.5-116*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*75.2 %*	*81.2-123*		"	"	"	"	*S-GC*
Surrogate: Dibromofluoromethane		*121 %*	*95.7-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	1500	ug/kg	5	7032720	03/27/17	03/31/17	EPA 8270C	R-07
Phenol	ND	5000	"	"	"	"	"	"	R-07
Aniline	ND	1500	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	5000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	1500	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	5000	"	"	"	"	"	"	R-07
1-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthene	ND	1500	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07

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DR-HA1-1.0

T170707-19 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4-Dinitrotoluene	ND	1500	ug/kg	5	7032720	03/27/17	03/31/17	EPA 8270C	R-07
Pentachlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyrene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthylene	ND	1500	"	"	"	"	"	"	R-07
Anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (b) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (k) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	5000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	1500	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Bromophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Butyl benzyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Chloroaniline	ND	1500	"	"	"	"	"	"	R-07
2-Chloronaphthalene	ND	1500	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Chrysene	ND	1500	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	1500	"	"	"	"	"	"	R-07
Dibenzofuran	ND	1500	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	1500	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
2,4-Dimethylphenol	ND	5000	"	"	"	"	"	"	R-07
Dimethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	R-07

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T170707-19 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,6-Dinitrotoluene	ND	5000	ug/kg	5	7032720	03/27/17	03/31/17	EPA 8270C	R-07
Di-n-octyl phthalate	ND	1500	"	"	"	"	"	"	R-07
Fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Fluorene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	7500	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorocyclopentadiene	ND	5000	"	"	"	"	"	"	R-07
Hexachloroethane	ND	1500	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	1500	"	"	"	"	"	"	R-07
Isophorone	ND	1500	"	"	"	"	"	"	R-07
2-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
4-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
Naphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
4-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
Nitrobenzene	ND	5000	"	"	"	"	"	"	R-07
2-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
N-Nitrosodimethylamine	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	ND	1500	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
Phenanthrene	ND	1500	"	"	"	"	"	"	R-07
Azobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyridine	ND	1500	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*89.5 %*	*15-121*		"	"	"	"	*R-07*
Surrogate: Phenol-d6		*72.6 %*	*24-113*		"	"	"	"	*R-07*
Surrogate: Nitrobenzene-d5		*64.2 %*	*21.3-119*		"	"	"	"	*R-07*
Surrogate: 2-Fluorobiphenyl		*107 %*	*32.4-102*		"	"	"	"	*R-07, S-GC*
Surrogate: 2,4,6-Tribromophenol		*104 %*	*18.1-105*		"	"	"	"	*R-07*

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DR-HA1-1.0

T170707-19 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Surrogate: Terphenyl-dl4		*173 %*	*29.1-130*		*7032720*	*03/27/17*	*03/31/17*	*EPA 8270C*	*R-07, S-GC*
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**1.0**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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DR-HA2-1.0

T170707-21 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	190	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**27**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**2.8**	2.0	"	"	"	"	"	"	
Cobalt	**2.0**	2.0	"	"	"	"	"	"	
Copper	**2.4**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**4.4**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**9.0**	5.0	"	"	"	"	"	"	
Zinc	**13**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA2-1.0

T170707-21 (Soil)

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organochlorine Pesticides by EPA Method 8081A									
alpha-Chlordane	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*71.1 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*48.3 %*		*35-140*	"	"	"	"	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*77.6 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*78.2 %*		*35-140*	"	"	"	"	

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T170707-21 (Soil)

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Organophosphorus Pesticides by EPA Method 8141A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Dichlorvos	ND	5.0	ug/kg	1	7032420	03/27/17	03/28/17	8141a	
Mevinphos	ND	5.0	"	"	"	"	"	"	
Demeton-s	ND	10	"	"	"	"	"	"	
Ethoprophos	ND	5.0	"	"	"	"	"	"	
Phorate	ND	10	"	"	"	"	"	"	
Naled	ND	5.0	"	"	"	"	"	"	
Sulfotep	ND	10	"	"	"	"	"	"	
Diazinon	ND	5.0	"	"	"	"	"	"	
Disulfoton	ND	5.0	"	"	"	"	"	"	
Demeton-o	ND	10	"	"	"	"	"	"	
Dimethoate	ND	5.0	"	"	"	"	"	"	
Ronnel	ND	10	"	"	"	"	"	"	
Merphos	ND	10	"	"	"	"	"	"	
Chlorpyrifos	ND	5.0	"	"	"	"	"	"	
Fenthion	ND	5.0	"	"	"	"	"	"	
Trichloronate	ND	5.0	"	"	"	"	"	"	
Methyl parathion	ND	5.0	"	"	"	"	"	"	
Malathion	ND	10	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	5.0	"	"	"	"	"	"	
Parathion	ND	5.0	"	"	"	"	"	"	
Stirophos (Tetrachlorvinphos)	ND	5.0	"	"	"	"	"	"	
Bolstar	ND	5.0	"	"	"	"	"	"	
Fensulfothion	ND	5.0	"	"	"	"	"	"	
EPN	ND	5.0	"	"	"	"	"	"	
Azinphos methyl	ND	10	"	"	"	"	"	"	
Coumaphos	ND	5.0	"	"	"	"	"	"	
Surrogate: Tributylphosphate		*87.6 %*	*40-125*		"	"	"	"	

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T170707-21 (Soil)

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chlorinated Herbicides by EPA Method 8151A									
2,4,5-T	ND	5.00	ug/kg	1	7032717	03/27/17	03/29/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*62.2 %*	*35-150*		*"*	*"*	*"*	*"*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	

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T170707-21 (Soil)

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Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2-Chlorotoluene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	

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T170707-21 (Soil)

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*96.5 %*	*85.5-116*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*83.9 %*	*81.2-123*		"	"	"	"	
Surrogate: Dibromofluoromethane		*119 %*	*95.7-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	

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Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4-Dinitrotoluene	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	300	"	"	"	"	"	"	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	

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T170707-21 (Soil)

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Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,6-Dinitrotoluene	ND	1000	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	
Nitrobenzene	ND	1000	"	"	"	"	"	"	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*46.7 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*53.7 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*56.6 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*68.4 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*117 %*	*18.1-105*		"	"	"	"	*S-GC*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA2-1.0

T170707-21 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Surrogate: Terphenyl-dl4		*153 %*	*29.1-130*		*7032720*	*03/27/17*	*03/31/17*	*EPA 8270C*	*S-GC*
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**0.73**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA3-1.0

T170707-23 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	200	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*46.4 %*	*65-135*		"	"	"	"	*S-03*
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**80**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**5.6**	2.0	"	"	"	"	"	"	
Cobalt	**5.0**	2.0	"	"	"	"	"	"	
Copper	**5.5**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**11**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**16**	5.0	"	"	"	"	"	"	
Zinc	**34**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	

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DR-HA3-1.0

T170707-23 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organochlorine Pesticides by EPA Method 8081A									
alpha-Chlordane	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*58.7 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*49.3 %*		*35-140*	"	"	"	"	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	**19**	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*82.6 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*78.2 %*		*35-140*	"	"	"	"	

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T170707-23 (Soil)

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Organophosphorus Pesticides by EPA Method 8141A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Dichlorvos	ND	5.0	ug/kg	1	7032420	03/27/17	03/28/17	8141a	
Mevinphos	ND	5.0	"	"	"	"	"	"	
Demeton-s	ND	10	"	"	"	"	"	"	
Ethoprophos	ND	5.0	"	"	"	"	"	"	
Phorate	ND	10	"	"	"	"	"	"	
Naled	ND	5.0	"	"	"	"	"	"	
Sulfotep	ND	10	"	"	"	"	"	"	
Diazinon	ND	5.0	"	"	"	"	"	"	
Disulfoton	ND	5.0	"	"	"	"	"	"	
Demeton-o	ND	10	"	"	"	"	"	"	
Dimethoate	ND	5.0	"	"	"	"	"	"	
Ronnel	ND	10	"	"	"	"	"	"	
Merphos	ND	10	"	"	"	"	"	"	
Chlorpyrifos	ND	5.0	"	"	"	"	"	"	
Fenthion	ND	5.0	"	"	"	"	"	"	
Trichloronate	ND	5.0	"	"	"	"	"	"	
Methyl parathion	ND	5.0	"	"	"	"	"	"	
Malathion	ND	10	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	5.0	"	"	"	"	"	"	
Parathion	ND	5.0	"	"	"	"	"	"	
Stirophos (Tetrachlorvinphos)	ND	5.0	"	"	"	"	"	"	
Bolstar	ND	5.0	"	"	"	"	"	"	
Fensulfothion	ND	5.0	"	"	"	"	"	"	
EPN	ND	5.0	"	"	"	"	"	"	
Azinphos methyl	ND	10	"	"	"	"	"	"	
Coumaphos	ND	5.0	"	"	"	"	"	"	
Surrogate: Tributylphosphate		*86.1 %*		*40-125*	"	"	"	"	

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T170707-23 (Soil)

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chlorinated Herbicides by EPA Method 8151A									
2,4,5-T	ND	5.00	ug/kg	1	7032717	03/27/17	03/29/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*56.4 %*		*35-150*	"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	

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T170707-23 (Soil)

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Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2-Chlorotoluene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	

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T170707-23 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*87.6 %*	*85.5-116*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*72.9 %*	*81.2-123*		"	"	"	"	*S-GC*
Surrogate: Dibromofluoromethane		*118 %*	*95.7-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	

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T170707-23 (Soil)

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Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4-Dinitrotoluene	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	300	"	"	"	"	"	"	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	

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Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,6-Dinitrotoluene	ND	1000	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	
Nitrobenzene	ND	1000	"	"	"	"	"	"	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*51.7 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*55.0 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*60.1 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*79.6 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*78.3 %*	*18.1-105*		"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA3-1.0

T170707-23 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Surrogate: Terphenyl-dl4		*148 %*	*29.1-130*		*7032720*	*03/27/17*	*03/31/17*	*EPA 8270C*	*S-GC*
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**1.2**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	200	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*56.5 %*	*65-135*		"	"	"	"	*S-03*
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**50**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**6.4**	2.0	"	"	"	"	"	"	
Cobalt	**4.3**	2.0	"	"	"	"	"	"	
Copper	**4.1**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**7.5**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**19**	5.0	"	"	"	"	"	"	
Zinc	**23**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organochlorine Pesticides by EPA Method 8081A									
alpha-Chlordane	ND	5.0	ug/kg	1	7032718	03/27/17	03/27/17	EPA 8081A	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*83.3 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*59.4 %*		*35-140*	"	"	"	"	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*87.7 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*84.7 %*		*35-140*	"	"	"	"	

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DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Organophosphorus Pesticides by EPA Method 8141A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Dichlorvos	ND	5.0	ug/kg	1	7032420	03/27/17	03/28/17	8141a	
Mevinphos	ND	5.0	"	"	"	"	"	"	
Demeton-s	ND	10	"	"	"	"	"	"	
Ethoprophos	ND	5.0	"	"	"	"	"	"	
Phorate	ND	10	"	"	"	"	"	"	
Naled	ND	5.0	"	"	"	"	"	"	
Sulfotep	ND	10	"	"	"	"	"	"	
Diazinon	ND	5.0	"	"	"	"	"	"	
Disulfoton	ND	5.0	"	"	"	"	"	"	
Demeton-o	ND	10	"	"	"	"	"	"	
Dimethoate	ND	5.0	"	"	"	"	"	"	
Ronnel	ND	10	"	"	"	"	"	"	
Merphos	ND	10	"	"	"	"	"	"	
Chlorpyrifos	ND	5.0	"	"	"	"	"	"	
Fenthion	ND	5.0	"	"	"	"	"	"	
Trichloronate	ND	5.0	"	"	"	"	"	"	
Methyl parathion	ND	5.0	"	"	"	"	"	"	
Malathion	ND	10	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	5.0	"	"	"	"	"	"	
Parathion	ND	5.0	"	"	"	"	"	"	
Stirophos (Tetrachlorvinphos)	ND	5.0	"	"	"	"	"	"	
Bolstar	ND	5.0	"	"	"	"	"	"	
Fensulfothion	ND	5.0	"	"	"	"	"	"	
EPN	ND	5.0	"	"	"	"	"	"	
Azinphos methyl	ND	10	"	"	"	"	"	"	
Coumaphos	ND	5.0	"	"	"	"	"	"	
Surrogate: Tributylphosphate		*87.8 %*		*40-125*	"	"	"	"	

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DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chlorinated Herbicides by EPA Method 8151A									
2,4,5-T	ND	5.00	ug/kg	1	7032717	03/27/17	03/29/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*53.1 %*		*35-150*	"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	

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DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2-Chlorotoluene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	

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DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Toluene-d8		*85.1 %*	*85.5-116*		"	"	"	"	*S-GC*
Surrogate: 4-Bromofluorobenzene		*68.1 %*	*81.2-123*		"	"	"	"	*S-GC*
Surrogate: Dibromofluoromethane		*128 %*	*95.7-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	

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Rose Fasheh

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DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4-Dinitrotoluene	ND	300	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	300	"	"	"	"	"	"	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

DR-HA4-1.0

T170707-25 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,6-Dinitrotoluene	ND	1000	ug/kg	1	7032720	03/27/17	03/31/17	EPA 8270C	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	
Nitrobenzene	ND	1000	"	"	"	"	"	"	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*58.6 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*57.4 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*62.0 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*83.5 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*109 %*	*18.1-105*		"	"	"	"	*S-GC*

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DR-HA4-1.0

T170707-25 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Surrogate: Terphenyl-dl4		*119 %*	*29.1-130*		*7032720*	*03/27/17*	*03/31/17*	*EPA 8270C*	
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**0.93**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Purgeable Petroleum Hydrocarbons by EPA 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032738 - EPA 5035 GC										
Blank (7032738-BLK1)				Prepared: 03/27/17 Analyzed: 04/03/17						
C6-C12 (GRO)	ND	200	ug/kg							
Surrogate: 4-Bromofluorobenzene	*104*		*"*	*100*		*104*	*65-135*			
LCS (7032738-BS1)				Prepared: 03/27/17 Analyzed: 04/03/17						
C6-C12 (GRO)	10100	200	ug/kg	10900		93.0	75-125			
Surrogate: 4-Bromofluorobenzene	*101*		*"*	*100*		*101*	*65-135*			
LCS Dup (7032738-BSD1)				Prepared: 03/27/17 Analyzed: 04/03/17						
C6-C12 (GRO)	10400	200	ug/kg	11000		94.6	75-125	2.89	20	
Surrogate: 4-Bromofluorobenzene	*83.4*		*"*	*100*		*83.4*	*65-135*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032739 - EPA 3051										
Blank (7032739-BLK1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	2.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
LCS (7032739-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Arsenic	81.3	5.0	mg/kg	100		81.3	75-125			
Barium	83.0	1.0	"	100		83.0	75-125			
Cadmium	83.4	2.0	"	100		83.4	75-125			
Chromium	83.0	2.0	"	100		83.0	75-125			
Lead	89.0	3.0	"	100		89.0	75-125			
Matrix Spike (7032739-MS1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Arsenic	77.1	5.0	mg/kg	99.0	1.25	76.6	75-125			
Barium	155	1.0	"	99.0	67.0	88.4	75-125			
Cadmium	75.0	2.0	"	99.0	0.420	75.3	75-125			
Chromium	82.1	2.0	"	99.0	6.60	76.2	75-125			
Lead	96.1	3.0	"	99.0	ND	97.0	75-125			

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Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032739 - EPA 3051										
Matrix Spike Dup (7032739-MSD1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Arsenic	78.4	5.0	mg/kg	100	1.25	77.2	75-125	1.75	20	
Barium	153	1.0	"	100	67.0	86.1	75-125	0.909	20	
Cadmium	78.3	2.0	"	100	0.420	77.9	75-125	4.33	20	
Chromium	84.2	2.0	"	100	6.60	77.6	75-125	2.58	20	
Lead	88.9	3.0	"	100	ND	88.9	75-125	7.73	20	QR-04

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Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032743 - EPA 7471A Soil										
Blank (7032743-BLK1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	ND	0.10	mg/kg							
LCS (7032743-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	0.336	0.10	mg/kg	0.410		82.1	75-125			
Matrix Spike (7032743-MS1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	0.319	0.10	mg/kg	0.385	ND	83.0	75-125			
Matrix Spike Dup (7032743-MSD1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	0.329	0.10	mg/kg	0.397	ND	83.0	75-125	3.10	20	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032718 - EPA 3550 ECD/GCMS										
Blank (7032718-BLK1)				Prepared & Analyzed: 03/27/17						
alpha-BHC	ND	5.0	ug/kg							
gamma-BHC (Lindane)	ND	5.0	"							
beta-BHC	ND	5.0	"							
delta-BHC	ND	5.0	"							
Heptachlor	ND	5.0	"							
Aldrin	ND	5.0	"							
Heptachlor epoxide	ND	5.0	"							
gamma-Chlordane	ND	5.0	"							
alpha-Chlordane	ND	5.0	"							
Endosulfan I	ND	5.0	"							
4,4´-DDE	ND	5.0	"							
Dieldrin	ND	5.0	"							
Endrin	ND	5.0	"							
4,4´-DDD	ND	5.0	"							
Endosulfan II	ND	5.0	"							
4,4´-DDT	ND	5.0	"							
Endrin aldehyde	ND	5.0	"							
Endosulfan sulfate	ND	5.0	"							
Methoxychlor	ND	10	"							
Endrin ketone	ND	5.0	"							
Toxaphene	ND	200	"							
Surrogate: Tetrachloro-meta-xylene	*6.05*		*"*	*9.80*		*61.8*	*35-140*			
Surrogate: Decachlorobiphenyl	*6.27*		*"*	*9.80*		*64.0*	*35-140*			
LCS (7032718-BS1)				Prepared & Analyzed: 03/27/17						
gamma-BHC (Lindane)	32.7	5.0	ug/kg	40.8		80.1	40-120			
Heptachlor	32.3	5.0	"	40.8		79.0	40-120			
Aldrin	26.0	5.0	"	40.8		63.7	40-120			
Dieldrin	36.4	5.0	"	40.8		89.3	40-120			
Endrin	37.6	5.0	"	40.8		92.1	40-120			
4,4´-DDT	41.3	5.0	"	40.8		101	33-147			
Surrogate: Tetrachloro-meta-xylene	*7.09*		*"*	*10.2*		*69.5*	*35-140*			
Surrogate: Decachlorobiphenyl	*7.13*		*"*	*10.2*		*69.8*	*35-140*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032718 - EPA 3550 ECD/GCMS										
LCS Dup (7032718-BSD1)				Prepared & Analyzed: 03/27/17						
gamma-BHC (Lindane)	32.1	5.0	ug/kg	39.6		81.1	40-120	1.16	30	
Heptachlor	30.9	5.0	"	39.6		78.1	40-120	1.20	30	
Aldrin	26.0	5.0	"	39.6		65.7	40-120	3.08	30	
Dieldrin	34.5	5.0	"	39.6		87.0	40-120	2.55	30	
Endrin	36.3	5.0	"	39.6		91.6	40-120	0.513	30	
4,4´-DDT	38.6	5.0	"	39.6		97.4	33-147	3.66	30	
Surrogate: Tetrachloro-meta-xylene	*7.46*		*"*	*9.90*		*75.3*	*35-140*			
Surrogate: Decachlorobiphenyl	*6.99*		*"*	*9.90*		*70.6*	*35-140*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032719 - EPA 3550 ECD/GCMS										
Blank (7032719-BLK1)				Prepared: 03/27/17 Analyzed: 03/28/17						
PCB-1016	ND	10	ug/kg							
PCB-1221	ND	10	"							
PCB-1232	ND	10	"							
PCB-1242	ND	10	"							
PCB-1248	ND	10	"							
PCB-1254	ND	10	"							
PCB-1260	ND	10	"							
Surrogate: Tetrachloro-meta-xylene	*7.46*		"	*9.80*		*76.1*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.07*		"	*9.80*		*82.3*	*35-140*			
LCS (7032719-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
PCB-1016	87.6	10	ug/kg	99.0		88.5	40-130			
PCB-1260	84.4	10	"	99.0		85.2	40-130			
Surrogate: Tetrachloro-meta-xylene	*7.72*		"	*9.90*		*78.0*	*35-140*			
Surrogate: Decachlorobiphenyl	*7.97*		"	*9.90*		*80.5*	*35-140*			
LCS Dup (7032719-BSD1)				Prepared: 03/27/17 Analyzed: 03/28/17						
PCB-1016	90.0	10	ug/kg	101		89.1	40-130	2.68	30	
PCB-1260	88.6	10	"	101		87.7	40-130	4.89	30	
Surrogate: Tetrachloro-meta-xylene	*8.39*		"	*10.1*		*83.0*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.76*		"	*10.1*		*86.7*	*35-140*			

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Organophosphorus Pesticides by EPA Method 8141A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032420 - EPA 3550 ECD/GCMS										
Blank (7032420-BLK1)				Prepared: 03/24/17 Analyzed: 03/28/17						
Dichlorvos	ND	5.0	ug/kg							
Mevinphos	ND	5.0	"							
Demeton-s	ND	10	"							
Ethoprophos	ND	5.0	"							
Phorate	ND	10	"							
Naled	ND	5.0	"							
Sulfotep	ND	10	"							
Diazinon	ND	5.0	"							
Disulfoton	ND	5.0	"							
Demeton-o	ND	10	"							
Dimethoate	ND	5.0	"							
Ronnel	ND	10	"							
Merphos	ND	10	"							
Chlorpyrifos	ND	5.0	"							
Fenthion	ND	5.0	"							
Trichloronate	ND	5.0	"							
Methyl parathion	ND	5.0	"							
Malathion	ND	10	"							
Tokuthion (Prothiofos)	ND	5.0	"							
Parathion	ND	5.0	"							
Stirophos (Tetrachlorvinphos)	ND	5.0	"							
Bolstar	ND	5.0	"							
Fensulfothion	ND	5.0	"							
EPN	ND	5.0	"							
Azinphos methyl	ND	10	"							
Coumaphos	ND	5.0	"							
Surrogate: Tributylphosphate	*29.8*		*"*	*39.1*		*76.1*	*40-125*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Organophosphorus Pesticides by EPA Method 8141A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032420 - EPA 3550 ECD/GCMS										
LCS (7032420-BS1)				Prepared: 03/24/17 Analyzed: 03/28/17						
Diazinon	28.5	5.0	ug/kg	39.4		72.4	60-130			
Chlorpyrifos	26.9	5.0	"	39.4		68.4	60-130			
Methyl parathion	44.2	5.0	"	39.4		112	60-130			
Stirophos (Tetrachlorvinphos)	33.4	5.0	"	39.4		84.9	60-130			
Surrogate: Tributylphosphate	*23.9*		*"*	*39.4*		*60.7*	*40-125*			
LCS Dup (7032420-BSD1)				Prepared: 03/24/17 Analyzed: 03/28/17						
Diazinon	26.2	5.0	ug/kg	39.2		66.9	60-130	8.29	20	
Chlorpyrifos	28.4	5.0	"	39.2		72.3	60-130	5.15	20	
Methyl parathion	39.8	5.0	"	39.2		102	60-130	10.4	20	
Stirophos (Tetrachlorvinphos)	27.5	5.0	"	39.2		70.2	60-130	19.4	20	
Surrogate: Tributylphosphate	*31.4*		*"*	*39.2*		*80.1*	*40-125*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Chlorinated Herbicides by EPA Method 8151A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032717 - 8151 Prep										
Blank (7032717-BLK1)				Prepared: 03/27/17 Analyzed: 03/29/17						
2,4,5-T	ND	5.00	ug/kg							
2,4,5-TP (Silvex)	ND	5.00	"							
2,4-D	ND	5.00	"							
2,4-DB	ND	5.00	"							
3,5-Dichlorobenzoic acid	ND	5.00	"							
4-Nitrophenol	ND	5.00	"							
Acifluorfen	ND	5.00	"							
Bentazon	ND	5.00	"							
Chloramben	ND	5.00	"							
Dalapon	ND	30.0	"							
DCPA diacid	ND	5.00	"							
Dicamba	ND	5.00	"							
Dichloroprop	ND	5.00	"							
Dinoseb	ND	5.00	"							
Pentachlorophenol	ND	5.00	"							
Picloram	ND	5.00	"							
Surrogate: 2,4-DCAA	*238*		*"*	*396*		*60.0*	*35-150*			
LCS (7032717-BS1)				Prepared: 03/27/17 Analyzed: 03/29/17						
2,4,5-T	69.6	5.00	ug/kg	99.4		70.1	20-150			
2,4,5-TP (Silvex)	94.8	5.00	"	99.6		95.1	20-150			
2,4-D	87.5	5.00	"	99.6		87.9	20-150			
Surrogate: 2,4-DCAA	*255*		*"*	*398*		*64.1*	*35-150*			
LCS Dup (7032717-BSD1)				Prepared: 03/27/17 Analyzed: 03/29/17						
2,4,5-T	66.5	5.00	ug/kg	98.0		67.8	20-150	4.65	30	
2,4,5-TP (Silvex)	92.7	5.00	"	98.2		94.4	20-150	2.21	30	
2,4-D	82.1	5.00	"	98.2		83.6	20-150	6.40	30	
Surrogate: 2,4-DCAA	*215*		*"*	*393*		*54.7*	*35-150*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032736 - EPA 5035 GCMS										
Blank (7032736-BLK1)				Prepared & Analyzed: 03/27/17						
Bromobenzene	ND	5.0	ug/kg							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	10	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032736 - EPA 5035 GCMS										
Blank (7032736-BLK1)				Prepared & Analyzed: 03/27/17						
p-Isopropyltoluene	ND	5.0	ug/kg							
Methylene chloride	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
Benzene	ND	5.0	"							
Toluene	ND	5.0	"							
Ethylbenzene	ND	5.0	"							
m,p-Xylene	ND	10	"							
o-Xylene	ND	5.0	"							
Surrogate: Toluene-d8	*41.8*		*"*	*39.5*		*106*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*36.7*		*"*	*39.5*		*92.9*	*81.2-123*			
Surrogate: Dibromofluoromethane	*38.4*		*"*	*39.5*		*97.1*	*95.7-135*			
LCS (7032736-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Chlorobenzene	109	5.0	ug/kg	99.4		110	75-125			
1,1-Dichloroethene	107	5.0	"	99.4		108	75-125			
Trichloroethene	106	5.0	"	99.4		106	75-125			
Benzene	106	5.0	"	99.4		107	75-125			
Toluene	106	5.0	"	99.4		106	75-125			
Surrogate: Toluene-d8	*38.9*		*"*	*39.8*		*97.9*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*43.0*		*"*	*39.8*		*108*	*81.2-123*			
Surrogate: Dibromofluoromethane	*47.8*		*"*	*39.8*		*120*	*95.7-135*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032736 - EPA 5035 GCMS										
LCS Dup (7032736-BSD1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Chlorobenzene	111	5.0	ug/kg	99.6		111	75-125	1.15	20	
1,1-Dichloroethene	105	5.0	"	99.6		106	75-125	1.82	20	
Trichloroethene	100	5.0	"	99.6		101	75-125	5.17	20	
Benzene	107	5.0	"	99.6		107	75-125	0.573	20	
Toluene	102	5.0	"	99.6		102	75-125	3.68	20	
Surrogate: Toluene-d8	*37.8*		*"*	*39.8*		*95.0*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*41.4*		*"*	*39.8*		*104*	*81.2-123*			
Surrogate: Dibromofluoromethane	*49.1*		*"*	*39.8*		*123*	*95.7-135*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Carbazole	ND	300	ug/kg							
Aniline	ND	300	"							
Phenol	ND	1000	"							
2-Chlorophenol	ND	1000	"							
1,4-Dichlorobenzene	ND	300	"							
N-Nitrosodi-n-propylamine	ND	300	"							
1,2,4-Trichlorobenzene	ND	300	"							
4-Chloro-3-methylphenol	ND	1000	"							
1-Methylnaphthalene	ND	300	"							
2-Methylnaphthalene	ND	300	"							
Acenaphthene	ND	300	"							
4-Nitrophenol	ND	1000	"							
2,4-Dinitrotoluene	ND	300	"							
Pentachlorophenol	ND	1000	"							
Pyrene	ND	300	"							
Acenaphthylene	ND	300	"							
Anthracene	ND	300	"							
Benzo (a) anthracene	ND	300	"							
Benzo (b) fluoranthene	ND	300	"							
Benzo (k) fluoranthene	ND	300	"							
Benzo (g,h,i) perylene	ND	1000	"							
Benzo (a) pyrene	ND	300	"							
Benzyl alcohol	ND	300	"							
Bis(2-chloroethoxy)methane	ND	300	"							
Bis(2-chloroethyl)ether	ND	300	"							
Bis(2-chloroisopropyl)ether	ND	300	"							
Bis(2-ethylhexyl)phthalate	ND	300	"							
4-Bromophenyl phenyl ether	ND	300	"							
Butyl benzyl phthalate	ND	300	"							
4-Chloroaniline	ND	300	"							
2-Chloronaphthalene	ND	300	"							
4-Chlorophenyl phenyl ether	ND	300	"							
Chrysene	ND	300	"							
Dibenz (a,h) anthracene	ND	300	"							
Dibenzofuran	ND	300	"							
Di-n-butyl phthalate	ND	300	"							

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
1,2-Dichlorobenzene	ND	300	ug/kg							
1,3-Dichlorobenzene	ND	300	"							
2,4-Dichlorophenol	ND	1000	"							
Diethyl phthalate	ND	300	"							
2,4-Dimethylphenol	ND	1000	"							
Dimethyl phthalate	ND	300	"							
4,6-Dinitro-2-methylphenol	ND	1000	"							
2,4-Dinitrophenol	ND	1000	"							
2,6-Dinitrotoluene	ND	1000	"							
Di-n-octyl phthalate	ND	300	"							
Fluoranthene	ND	300	"							
Fluorene	ND	300	"							
Hexachlorobenzene	ND	1500	"							
Hexachlorobutadiene	ND	300	"							
Hexachlorocyclopentadiene	ND	1000	"							
Hexachloroethane	ND	300	"							
Indeno (1,2,3-cd) pyrene	ND	300	"							
Isophorone	ND	300	"							
2-Methylphenol	ND	1000	"							
4-Methylphenol	ND	1000	"							
Naphthalene	ND	300	"							
2-Nitroaniline	ND	300	"							
3-Nitroaniline	ND	300	"							
4-Nitroaniline	ND	300	"							
Nitrobenzene	ND	1000	"							
2-Nitrophenol	ND	1000	"							
N-Nitrosodimethylamine	ND	300	"							
N-Nitrosodiphenylamine	ND	300	"							
2,3,5,6-Tetrachlorophenol	ND	300	"							
2,3,4,6-Tetrachlorophenol	ND	300	"							
Phenanthrene	ND	300	"							
Azobenzene	ND	300	"							
2,4,5-Trichlorophenol	ND	1000	"							
Pyridine	ND	300	"							
2,4,6-Trichlorophenol	ND	1000	"							

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Surrogate: 2-Fluorophenol	*1510*		*ug/kg*	*3310*		*45.5*	*15-121*			
Surrogate: Phenol-d6	*1390*		*"*	*3310*		*42.0*	*24-113*			
Surrogate: Nitrobenzene-d5	*1510*		*"*	*3310*		*45.5*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*1910*		*"*	*3310*		*57.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*2630*		*"*	*3310*		*79.4*	*18.1-105*			
Surrogate: Terphenyl-dl4	*2750*		*"*	*3310*		*83.1*	*29.1-130*			
LCS (7032720-BS1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Phenol	3130	1000	ug/kg	3330		93.8	34-114			
2-Chlorophenol	3140	1000	"	3330		94.3	34-114			
1,4-Dichlorobenzene	2430	300	"	3330		72.9	34-114			
N-Nitrosodi-n-propylamine	3180	300	"	3330		95.5	30-110			
1,2,4-Trichlorobenzene	1930	300	"	3330		57.8	39-119			
4-Chloro-3-methylphenol	2270	1000	"	3330		68.1	50-130			
Acenaphthene	2070	300	"	3330		62.1	34-114			
Pentachlorophenol	2620	1000	"	3330		78.6	50-130			
Pyrene	2070	300	"	3330		62.0	30-110			
Surrogate: 2-Fluorophenol	*3250*		*"*	*3330*		*97.4*	*15-121*			
Surrogate: Phenol-d6	*3750*		*"*	*3330*		*113*	*24-113*			
Surrogate: Nitrobenzene-d5	*3290*		*"*	*3330*		*98.6*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*3620*		*"*	*3330*		*109*	*32.4-102*			*S-GC*
Surrogate: 2,4,6-Tribromophenol	*3670*		*"*	*3330*		*110*	*18.1-105*			*S-GC*
Surrogate: Terphenyl-dl4	*3820*		*"*	*3330*		*115*	*29.1-130*			
LCS Dup (7032720-BSD1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Phenol	2650	1000	ug/kg	3300		80.2	34-114	16.7	42	
2-Chlorophenol	3110	1000	"	3300		94.3	34-114	0.953	40	
1,4-Dichlorobenzene	2000	300	"	3300		60.7	34-114	19.3	28	
N-Nitrosodi-n-propylamine	2200	300	"	3300		66.7	30-110	36.4	38	
1,2,4-Trichlorobenzene	1670	300	"	3300		50.5	39-119	14.5	28	
4-Chloro-3-methylphenol	2340	1000	"	3300		70.9	50-130	2.98	42	
Acenaphthene	1770	300	"	3300		53.5	34-114	15.8	31	
Pentachlorophenol	2220	1000	"	3300		67.3	50-130	16.4	50	
Pyrene	1700	300	"	3300		51.5	30-110	19.6	31	
Surrogate: 2-Fluorophenol	*2460*		*"*	*3300*		*74.5*	*15-121*			
Surrogate: Phenol-d6	*2050*		*"*	*3300*		*62.1*	*24-113*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
LCS Dup (7032720-BSD1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Surrogate: Nitrobenzene-d5	*1750*		*ug/kg*	*3300*		*52.9*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2200*		*"*	*3300*		*66.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3170*		*"*	*3300*		*95.9*	*18.1-105*			
Surrogate: Terphenyl-dl4	*3290*		*"*	*3300*		*99.8*	*29.1-130*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods - Quality Control

Weck Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch W7C1566 - EPA 3050M-SCL										
Blank (W7C1566-BLK1)				Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	ND	0.50	mg/kg							
LCS (W7C1566-BS1)				Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	47.3	0.50	mg/kg	50.0		95	80-120			
Matrix Spike (W7C1566-MS1)	**Source: 7C27032-01**			Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	44.6	0.50	mg/kg	48.8	0.529	90	75-125			
Matrix Spike Dup (W7C1566-MSD1)	**Source: 7C27032-01**			Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	46.1	0.50	mg/kg	48.1	0.529	95	75-125	3	20	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:50

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
S-03	The surrogate recovery was below acceptance criteria in the sample because of a possible matrix effect. The surrogate recovery was within acceptance criteria in the method blank and LCS.
R-07	Reporting limit for this compound(s) has been raised to account for dilution necessary due to high levels of interfering compound(s) and/or matrix affect.
QR-04	The pecent recovery and/or RPD was outside acceptance criteria. Results accepted based upon percent recovery results in duplicate QC sample and the CCV and CCB results.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Nontagate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive #130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/17 Page: 1 Of 3
Project Name: Brea-Olinda
Collector: F. Hager Client Project #: 02077.01
Batch #: 170207 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + 6RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCBs			Laboratory ID #	Comments/Preservative	Total # of containers
DRU-T1-5	3/21/17	0744	VOA	Soil	H			H										01		
DRU-T1-5	3/21/17	0744	4oz GL	Soil				H				A	H		H					
DRU-T1-10	3/21/17	0754	4oz GL	Soil				H				A	H		H			02		
DRU-T1-15	3/21/17	0800	4oz GL	Soil				H				A	H		H			03		
VRS-T2-5	3/21/17	0840	Soil	VOA	H			H										04		
VRS-T2-5	3/21/17	0840	Soil	4oz GL				H				A	H		H					
VRS-T2-10	3/21/17	0850	Soil	4oz GL				H				A	H		H			05		
VRS-T2-15	3/21/17	0900	Soil	4oz GL				H				A	H		H			06		
VRS-T1-5	3/21/17	0935	Soil	VOA	H			H										07		
VRS-T1-5	3/21/17	0935	Soil	4oz GL				H				A	H		H					
VRS-T1-10	3/21/17	0945	Soil	4oz GL				H				A	H		H			08		
VRS-T1-15	3/21/17	0955	Soil	4oz GL				H				A	H		H			09		
SS-T1-5	3/21/17	1020	Soil	VOA	H													10	HIGH TPH	
SS-T1-5	3/21/17	1020	Soil	4oz GL				H				A	H		H					
SS-T1-10	3/21/17	1043	Soil	4oz GL				H				A	H		H			11		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Fred Hager	3/21/17 3:25		3/21/17 15:25
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 35
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162514

I-279

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/17 Page: 2 Of 3
Project Name: Brea-Olinda
Collector: Frank Hoger Client Project #: 02077.01
Batch #: 1170707 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB's			Laboratory ID #	Comments/Preservative	Total # of containers
SB-T1-15	3/21/17	1048	Soil	4oz gl				H				A			H			12		
SS-T1-5	3/21/17	1120	Soil	VOA	H													13		
SS-T1-5	3/21/17	1120	Soil	4oz gl				H				A			H					
SS-T1-10	3/21/17	1132	Soil	4oz gl				H				A			H			14	HIGH TPH 1	
SS-T1-15	3/21/17	1142	Soil	4oz gl				H				A			H			15	HIGH TPH 1	
104-T1-5	3/21/17	1210	Soil	VOA	H													16		
104-T1-5	3/21/17	1210	Soil	4oz gl				H				A			H					
104-T1-10	3/21/17	1218	Soil	4oz gl				H				A			H			17		
104-T1-15	3/21/17	1225	Soil	4oz gl				H				A			H			18		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Frank Hoger	3/21/17 3:35		3/21/17 15:35
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 19
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162512

I-280

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 2441 Ridge Park Drive, Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/2017 Page: 1 of 1
Project Name: Brea Olinda
Collector: Michelle Hughson Client Project #: 02077.01
Batch #: 1122707 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260+GRO 5035	8260 + OXY	8260 BTEX, OXY only	8270C	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	EPA 8081 Pesticides	8141 organophosphorus Pesticides	8151 Herbicides	Laboratory ID #	Comments/Preservative	Total # of containers
DR-HA1-1.0	3/21/17	0735	Soil	VOAs + core	H			H				A	H		H	H	H	19		5
DR-HA1-5.0	3/21/17	0743	Soil	core				H				A	H		H	H	H	20		1
DR-HA2-1.0	3/21/17	0802	Soil	VOAs + core	H			H				A	H		H	H	H	21		5
DR-HA2-5.0	3/21/17	0815	Soil	core				H				A	H		H	H	H	22		1
DR-HA3-1.0	3/21/17	0825	Soil	VOAs + core	H			H				A	H		H	H	H	23		5
DR-HA3-5.0	3/21/17	0846	Soil	core				H				A	H		H	H	H	24		1
DR-HA4-1.0	3/21/17	0911	Soil	VOAs + core	H			H				A	H		H	H	H	25		5
DR-HA4-5.0	3/21/17	0941	Soil	core				H				A	H		H	H	H	26		1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Michelle Hughson	3/21/17 1230		3/21/17 1230
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/21/17 3:25		3/21/17 15:25
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 24
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes
F. Hager
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162513

I-281

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 110707

Client Name: NORTHGATE Project: BREA OLINDA OIL FIELD

Delivered by: ☒ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: BRIAN Date/Time Lab Received: 3/11/10 15:25

Total number of coolers received: 1

Temperature: Cooler #1 5.6	°C +/- the CF (- 0.2°C) = 5.4	°C corrected temperature	
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =	°C corrected temperature	
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =	°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BL

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 6:09 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: Additional work order confirmation for Brea Olinda Oil Field (T170707)
Attachments: T170697_WKO_02.pdf; T170707_WKO_02.pdf

Derrick,

Please find attached work orders for confirmation of additionally requested analyses below. Please carefully review and let me know if you have any questions or concerns.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Friday, March 24, 2017 5:38 PM
To: Rose Fasheh
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

Standard TAT is fine, thanks Rose

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 5:36 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

What TAT are you looking for on these? Standard is a 5-day yielding results by COB Monday 4/3.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Friday, March 24, 2017 5:11 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

Hi Rose,
Please run the analyses for the samples shaded in green. Please let me know if you have any questions.
Thanks
Derrick

Derrick S. Willis
Principal

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
phone (949) 716-0050 ext. 101; cell (949) 375-7004; fax (949) 315-3365
http://www.ngem.com

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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 2:45 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: Final Report for Brea Olinda Oil Field (T170707)

Hello Derrick and Frank,

Please see the attached final report for the following:

Project: Brea Olinda Oil Field
Project Number: 02077.01

Thank you for choosing SunStar Labs.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

	Date	Time	PID	Depth	EPH (EPA8015M)	8260 +GRO	SVOC (EPA8270)	CAM 17 (EPA6010)	Uranium	PCB (EPA8082)	Chlorinated Pesticides (EPA8081)	OP Pesticides (EPA8141)	Herbicides (EPA8151)
S20-T1	3/20/2017	8:00	13.3	5	A	1	1	1	1	1	x	x	x
	3/20/2017	9:15	0.0	10	A	x	H	H	H	H	x	x	x
	3/20/2017	9:25	0.0	15	A	x	H	H	H	H	x	x	x
S20-T2	3/20/2017	10:09	0.6	5	A	1	1	1	H	1	x	x	x
	3/20/2017	10:19	0.1	10	A	x	H	H	H	H	x	x	x
	3/20/2017	10:32	1.2	15	A	x	H	H	H	H	x	x	x
BOTF-T2	3/20/2017	11:50	18.2	5	A	1	1	1	H	1	x	x	x
	3/20/2017	12:00	0.4	10	A	x	H	H	H	H	x	x	x
	3/20/2017	12:08	0.1	15	A	x	H	H	H	H	x	x	x
BOTF-T1	3/20/2017	13:15	0.6	5	A	H	H	H	H	H	x	x	x
	3/20/2017	13:30	0.1	10	A	x	H	H	H	H	x	x	x
	3/20/2017	13:45	0.1	15	A	x	H	H	H	H	x	x	x
H2-T1	3/20/2017	13:45	0.2	5	A	H	H	H	H	H	x	x	x
	3/20/2017	14:15	0.2	10	A	x	H	H	H	H	x	x	x
	3/20/2017	14:35	0.1	15	A	x	H	H	H	H	x	x	x
DU-T1	3/21/2017	7:44	10.4	5	A	1	H	H	H	H	x	x	x
	3/21/2017	7:54	5.2	10	A	x	H	H	H	H	x	x	x
	3/21/2017	8:00	0.3	15	A	x	H	H	H	H	x	x	x
VRS-T2	3/21/2017	8:40	18.3	5	A	1	1	1	H	1	x	x	x
	3/21/2017	8:50	15.2	10	A	x	H	H	H	H	x	x	x
	3/21/2017	9:00	23.4	15	A	x	H	H	H	H	x	x	x
VRS-T1	3/21/2017	9:35	12.2	5	A	1	H	1	H	1	x	x	x
	3/21/2017	9:45	2.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	9:55	2.0	15	A	x	H	H	H	H	x	x	x
S8-T1	3/21/2017	10:20	29.7	5	A	1	1	1	1	1	x	x	x
	3/21/2017	10:34	142.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	10:48	121.0	15	A	x	H	H	H	H	x	x	x
S5-T1	3/21/2017	11:20	18.0	5	A	1	1	1	1	1	x	x	x
	3/21/2017	11:32	97.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	11:42	89.0	15	A	x	H	H	H	H	x	x	x
104-T1	3/21/2017	12:10	0.1	5	A	1	1	1	1	1	x	x	x
	3/21/2017	12:18	0.3	10	A	x	H	H	H	H	x	x	x
	3/21/2017	12:25	0.1	15	A	x	H	H	H	H	x	x	x
DR-HA1	3/21/2017	7:35	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	7:43	NA	5	A	x	H	H	H	H	H	H	H
DR-HA2	3/21/2017	8:02	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	8:15	NA	5	A	x	H	H	H	H	H	H	H
DR-HA3	3/21/2017	8:25	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	8:46	NA	5	A	x	H	H	H	H	H	H	H
DR-HA4	3/21/2017	9:11	NA	1	A	1	1	1	1	1	1	1	H
	3/21/2017	9:41	NA	5	A	x	H	H	H	H	H	H	H
						13	11	12	8	12	4	4	3

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Report To:

Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due:	03/24/17 17:00 (3 day TAT)		
Received By:	Brian Charon	Date Received:	03/21/17 15:25
Logged In By:	Brian Charon	Date Logged In:	03/21/17 15:35

Samples Received at: **5.4°C**

Custody Seals	No	Received On Ice	Yes
Containers Intact	Yes		
COC/Labels Agree	Yes		
Preservation Confir	Yes		

Analysis	Due	TAT	Expires	Comments
T170707-01 DRU-T1-5 [Soil] Sampled 03/21/17 07:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:44	
T170707-02 DRU-T1-10 [Soil] Sampled 03/21/17 07:54 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:54	
T170707-03 DRU-T1-15 [Soil] Sampled 03/21/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:00	
T170707-04 VRS-T2-5 [Soil] Sampled 03/21/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:40	
T170707-05 VRS-T2-10 [Soil] Sampled 03/21/17 08:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:50	
T170707-06 VRS-T2-15 [Soil] Sampled 03/21/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:00	
T170707-07 VRS-T1-5 [Soil] Sampled 03/21/17 09:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:35	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-08 VRS-T1-10 [Soil] Sampled 03/21/17 09:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:45	
T170707-09 VRS-T1-15 [Soil] Sampled 03/21/17 09:55 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:55	
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:20	
T170707-11 S8-T1-10 [Soil] Sampled 03/21/17 10:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:43	
T170707-12 S8-T1-15 [Soil] Sampled 03/21/17 10:48 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:48	
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:20	
T170707-14 S5-T1-10 [Soil] Sampled 03/21/17 11:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:32	
T170707-15 S5-T1-15 [Soil] Sampled 03/21/17 11:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:42	
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:10	
T170707-17 104-T1-10 [Soil] Sampled 03/21/17 12:18 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:18	
T170707-18 104-T1-15 [Soil] Sampled 03/21/17 12:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:25	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:35	
T170707-20 DR-HA1-5.0 [Soil] Sampled 03/21/17 07:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:43	
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:02	
T170707-22 DR-HA2-5.0 [Soil] Sampled 03/21/17 08:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:15	
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:25	
T170707-24 DR-HA3-5.0 [Soil] Sampled 03/21/17 08:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:46	
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:11	
T170707-26 DR-HA4-5.0 [Soil] Sampled 03/21/17 09:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:41	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/21/17 15:25
Logged In By: Brian Charon Date Logged In: 03/21/17 15:35

Samples Received at: **5.4°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170707-01 DRU-T1-5 [Soil] Sampled 03/21/17 07:44 (GMT-08:00) Pacific Time (US &				**8260 and GRO added per client request (Derrick, 3/24)**
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:44	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 07:44	
8260 5035	04/03/17 15:00	5	04/04/17 07:44	
T170707-02 DRU-T1-10 [Soil] Sampled 03/21/17 07:54 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:54	
T170707-03 DRU-T1-15 [Soil] Sampled 03/21/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:00	
T170707-04 VRS-T2-5 [Soil] Sampled 03/21/17 08:40 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:40	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:40	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:40	
8082 PCB	04/03/17 15:00	5	04/04/17 08:40	
8260 5035	04/03/17 15:00	5	04/04/17 08:40	
8270C	04/03/17 15:00	5	04/04/17 08:40	
T170707-05 VRS-T2-10 [Soil] Sampled 03/21/17 08:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:50	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170707-06 VRS-T2-15 [Soil] Sampled 03/21/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:00	
T170707-07 VRS-T1-5 [Soil] Sampled 03/21/17 09:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 09:35	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:35	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 09:35	
8082 PCB	04/03/17 15:00	5	04/04/17 09:35	
8260 5035	04/03/17 15:00	5	04/04/17 09:35	
T170707-08 VRS-T1-10 [Soil] Sampled 03/21/17 09:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:45	
T170707-09 VRS-T1-15 [Soil] Sampled 03/21/17 09:55 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:55	
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 10:20	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:20	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 10:20	
8082 PCB	04/03/17 15:00	5	04/04/17 10:20	
8260 5035	04/03/17 15:00	5	04/04/17 10:20	
8270C	04/03/17 15:00	5	04/04/17 10:20	
T170707-11 S8-T1-10 [Soil] Sampled 03/21/17 10:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:43	
T170707-12 S8-T1-15 [Soil] Sampled 03/21/17 10:48 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:48	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 11:20	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:20	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 11:20	
8082 PCB	04/03/17 15:00	5	04/04/17 11:20	
8260 5035	04/03/17 15:00	5	04/04/17 11:20	
8270C	04/03/17 15:00	5	04/04/17 11:20	
T170707-14 S5-T1-10 [Soil] Sampled 03/21/17 11:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:32	
T170707-15 S5-T1-15 [Soil] Sampled 03/21/17 11:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:42	
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 12:10	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:10	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 12:10	
8082 PCB	04/03/17 15:00	5	04/04/17 12:10	
8260 5035	04/03/17 15:00	5	04/04/17 12:10	
8270C	04/03/17 15:00	5	04/04/17 12:10	
T170707-17 104-T1-10 [Soil] Sampled 03/21/17 12:18 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:18	
T170707-18 104-T1-15 [Soil] Sampled 03/21/17 12:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:25	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 07:35	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:35	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 07:35	
8081 Pesticides	04/03/17 15:00	5	04/04/17 07:35	
8082 PCB	04/03/17 15:00	5	04/04/17 07:35	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 07:35	
8151 Herbicides	04/03/17 15:00	5	04/04/17 07:35	
8260 5035	04/03/17 15:00	5	04/04/17 07:35	
8270C	04/03/17 15:00	5	04/04/17 07:35	
T170707-20 DR-HA1-5.0 [Soil] Sampled 03/21/17 07:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:43	
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:02	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:02	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:02	
8081 Pesticides	04/03/17 15:00	5	04/04/17 08:02	
8082 PCB	04/03/17 15:00	5	04/04/17 08:02	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 08:02	
8151 Herbicides	04/03/17 15:00	5	04/04/17 08:02	
8260 5035	04/03/17 15:00	5	04/04/17 08:02	
8270C	04/03/17 15:00	5	04/04/17 08:02	
T170707-22 DR-HA2-5.0 [Soil] Sampled 03/21/17 08:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:15	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:25	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:25	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:25	
8081 Pesticides	04/03/17 15:00	5	04/04/17 08:25	
8082 PCB	04/03/17 15:00	5	04/04/17 08:25	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 08:25	
8151 Herbicides	04/03/17 15:00	5	04/04/17 08:25	
8260 5035	04/03/17 15:00	5	04/04/17 08:25	
8270C	04/03/17 15:00	5	04/04/17 08:25	
T170707-24 DR-HA3-5.0 [Soil] Sampled 03/21/17 08:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:46	
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 09:11	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:11	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 09:11	
8081 Pesticides	04/03/17 15:00	5	04/04/17 09:11	
8082 PCB	04/03/17 15:00	5	04/04/17 09:11	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 09:11	
8151 Herbicides	04/03/17 15:00	5	04/04/17 09:11	
8260 5035	04/03/17 15:00	5	04/04/17 09:11	
8270C	04/03/17 15:00	5	04/04/17 09:11	
T170707-26 DR-HA4-5.0 [Soil] Sampled 03/21/17 09:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:41	
Weck Labs				
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 10:20	EPA 200.8 Uranium
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 11:20	EPA 200.8 Uranium

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
Weck Labs				
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 12:10	EPA 200.8 Uranium
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 07:35	EPA 200.8 Uranium
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 08:02	EPA 200.8 Uranium
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 08:25	EPA 200.8 Uranium
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 09:11	EPA 200.8 Uranium

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S8-T1-15	T170707-12	Soil	03/21/17 10:48	03/21/17 15:25

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

DETECTIONS SUMMARY

Sample ID: S8-T1-15 **Laboratory ID:** T170707-12

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**220**	1.0	mg/kg	EPA 6010B	
Chromium	**18**	2.0	mg/kg	EPA 6010B	
Cobalt	**5.2**	2.0	mg/kg	EPA 6010B	
Copper	**11**	1.0	mg/kg	EPA 6010B	
Lead	**31**	3.0	mg/kg	EPA 6010B	
Nickel	**14**	2.0	mg/kg	EPA 6010B	
Vanadium	**19**	5.0	mg/kg	EPA 6010B	
Zinc	**35**	1.0	mg/kg	EPA 6010B	
n-Butylbenzene	**16**	5.0	ug/kg	EPA 8260B	I-02
sec-Butylbenzene	**18**	5.0	ug/kg	EPA 8260B	I-02
Isopropylbenzene	**19**	5.0	ug/kg	EPA 8260B	I-02
Naphthalene	**130**	5.0	ug/kg	EPA 8260B	I-02
n-Propylbenzene	**29**	5.0	ug/kg	EPA 8260B	I-02
Ethylbenzene	**17**	5.0	ug/kg	EPA 8260B	I-02
C6-C12 (GRO)	**9400**	500	ug/kg	EPA 8260B	I-02
1-Methylnaphthalene	**23000**	15000	ug/kg	EPA 8270C	O-05, R-07
2-Methylnaphthalene	**32000**	15000	ug/kg	EPA 8270C	O-05, R-07

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7041921	04/19/17	04/20/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**220**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**18**	2.0	"	"	"	"	"	"	
Cobalt	**5.2**	2.0	"	"	"	"	"	"	
Copper	**11**	1.0	"	"	"	"	"	"	
Lead	**31**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**14**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**19**	5.0	"	"	"	"	"	"	
Zinc	**35**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7041922	04/19/17	04/20/17	EPA 7471A Soil	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7041920	04/19/17	04/19/17	EPA 8260B	I-02
Bromochloromethane	ND	5.0	"	"	"	"	"	"	I-02
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	I-02
Bromoform	ND	5.0	"	"	"	"	"	"	I-02
Bromomethane	ND	5.0	"	"	"	"	"	"	I-02
n-Butylbenzene	**16**	5.0	"	"	"	"	"	"	I-02
sec-Butylbenzene	**18**	5.0	"	"	"	"	"	"	I-02
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	I-02
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	I-02
Chlorobenzene	ND	5.0	"	"	"	"	"	"	I-02
Chloroethane	ND	5.0	"	"	"	"	"	"	I-02
Chloroform	ND	5.0	"	"	"	"	"	"	I-02

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chloromethane	ND	5.0	ug/kg	1	7041920	04/19/17	04/19/17	EPA 8260B	I-02
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	I-02
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	I-02
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	I-02
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	I-02
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	I-02
Dibromomethane	ND	5.0	"	"	"	"	"	"	I-02
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	I-02
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	I-02
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	I-02
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	I-02
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	I-02
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	I-02
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	I-02
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	I-02
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	I-02
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	I-02
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	I-02
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	I-02
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	I-02
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	I-02
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	I-02
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	I-02
Isopropylbenzene	**19**	5.0	"	"	"	"	"	"	I-02
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	I-02
Methylene chloride	ND	5.0	"	"	"	"	"	"	I-02
Naphthalene	**130**	5.0	"	"	"	"	"	"	I-02
n-Propylbenzene	**29**	5.0	"	"	"	"	"	"	I-02
Styrene	ND	5.0	"	"	"	"	"	"	I-02
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	I-02
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	I-02
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	I-02

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	1	7041920	04/19/17	04/19/17	EPA 8260B	I-02
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	I-02
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	I-02
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	I-02
Trichloroethene	ND	5.0	"	"	"	"	"	"	I-02
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	I-02
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	I-02
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	I-02
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	I-02
Vinyl chloride	ND	5.0	"	"	"	"	"	"	I-02
Benzene	ND	5.0	"	"	"	"	"	"	I-02
Toluene	ND	5.0	"	"	"	"	"	"	I-02
Ethylbenzene	**17**	5.0	"	"	"	"	"	"	I-02
m,p-Xylene	ND	10	"	"	"	"	"	"	I-02
o-Xylene	ND	5.0	"	"	"	"	"	"	I-02
C6-C12 (GRO)	**9400**	500	"	"	"	"	"	"	I-02
Surrogate: 4-Bromofluorobenzene		*106 %*	*81.2-123*		"	"	"	"	*I-02*
Surrogate: Dibromofluoromethane		*110 %*	*95.7-135*		"	"	"	"	*I-02*
Surrogate: Toluene-d8		*111 %*	*85.5-116*		"	"	"	"	*I-02*
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	15000	ug/kg	10	7042028	04/20/17	04/21/17	EPA 8270C	O-05, R-07
Phenol	ND	49000	"	"	"	"	"	"	O-05, R-07
Aniline	ND	15000	"	"	"	"	"	"	O-05, R-07
2-Chlorophenol	ND	49000	"	"	"	"	"	"	O-05, R-07
1,4-Dichlorobenzene	ND	15000	"	"	"	"	"	"	O-05, R-07
N-Nitrosodi-n-propylamine	ND	15000	"	"	"	"	"	"	O-05, R-07
1,2,4-Trichlorobenzene	ND	15000	"	"	"	"	"	"	O-05, R-07
4-Chloro-3-methylphenol	ND	49000	"	"	"	"	"	"	O-05, R-07
1-Methylnaphthalene	**23000**	15000	"	"	"	"	"	"	O-05, R-07
2-Methylnaphthalene	**32000**	15000	"	"	"	"	"	"	O-05, R-07
Acenaphthene	ND	15000	"	"	"	"	"	"	O-05, R-07
4-Nitrophenol	ND	49000	"	"	"	"	"	"	R-07, O-05

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Rose Fasheh

Rose Fasheh, Project Manager

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4-Dinitrotoluene	ND	15000	ug/kg	10	7042028	04/20/17	04/21/17	EPA 8270C	O-05, R-07
Pentachlorophenol	ND	49000	"	"	"	"	"	"	O-05, R-07
Pyrene	ND	15000	"	"	"	"	"	"	O-05, R-07
Acenaphthylene	ND	15000	"	"	"	"	"	"	O-05, R-07
Anthracene	ND	15000	"	"	"	"	"	"	O-05, R-07
Benzo (a) anthracene	ND	15000	"	"	"	"	"	"	O-05, R-07
Benzo (b) fluoranthene	ND	15000	"	"	"	"	"	"	O-05, R-07
Benzo (k) fluoranthene	ND	15000	"	"	"	"	"	"	O-05, R-07
Benzo (g,h,i) perylene	ND	49000	"	"	"	"	"	"	R-07, O-05
Benzo (a) pyrene	ND	15000	"	"	"	"	"	"	O-05, R-07
Benzyl alcohol	ND	15000	"	"	"	"	"	"	O-05, R-07
Bis(2-chloroethoxy)methane	ND	15000	"	"	"	"	"	"	O-05, R-07
Bis(2-chloroethyl)ether	ND	15000	"	"	"	"	"	"	O-05, R-07
Bis(2-chloroisopropyl)ether	ND	15000	"	"	"	"	"	"	O-05, R-07
Bis(2-ethylhexyl)phthalate	ND	15000	"	"	"	"	"	"	O-05, R-07
4-Bromophenyl phenyl ether	ND	15000	"	"	"	"	"	"	O-05, R-07
Butyl benzyl phthalate	ND	15000	"	"	"	"	"	"	O-05, R-07
4-Chloroaniline	ND	15000	"	"	"	"	"	"	O-05, R-07
2-Chloronaphthalene	ND	15000	"	"	"	"	"	"	O-05, R-07
4-Chlorophenyl phenyl ether	ND	15000	"	"	"	"	"	"	O-05, R-07
Chrysene	ND	15000	"	"	"	"	"	"	O-05, R-07
Dibenz (a,h) anthracene	ND	15000	"	"	"	"	"	"	R-07, O-05
Dibenzofuran	ND	15000	"	"	"	"	"	"	O-05, R-07
Di-n-butyl phthalate	ND	15000	"	"	"	"	"	"	O-05, R-07
1,2-Dichlorobenzene	ND	15000	"	"	"	"	"	"	O-05, R-07
1,3-Dichlorobenzene	ND	15000	"	"	"	"	"	"	O-05, R-07
2,4-Dichlorophenol	ND	49000	"	"	"	"	"	"	O-05, R-07
Diethyl phthalate	ND	15000	"	"	"	"	"	"	O-05, R-07
2,4-Dimethylphenol	ND	49000	"	"	"	"	"	"	O-05, R-07
Dimethyl phthalate	ND	15000	"	"	"	"	"	"	O-05, R-07
4,6-Dinitro-2-methylphenol	ND	49000	"	"	"	"	"	"	O-05, R-07
2,4-Dinitrophenol	ND	49000	"	"	"	"	"	"	O-05, R-07

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,6-Dinitrotoluene	ND	49000	ug/kg	10	7042028	04/20/17	04/21/17	EPA 8270C	O-05, R-07
Di-n-octyl phthalate	ND	15000	"	"	"	"	"	"	O-05, R-07
Fluoranthene	ND	15000	"	"	"	"	"	"	O-05, R-07
Fluorene	ND	15000	"	"	"	"	"	"	O-05, R-07
Hexachlorobenzene	ND	74000	"	"	"	"	"	"	O-05, R-07
Hexachlorobutadiene	ND	15000	"	"	"	"	"	"	O-05, R-07
Hexachlorocyclopentadiene	ND	49000	"	"	"	"	"	"	R-07, O-05
Hexachloroethane	ND	15000	"	"	"	"	"	"	O-05, R-07
Indeno (1,2,3-cd) pyrene	ND	15000	"	"	"	"	"	"	O-05, R-07
Isophorone	ND	15000	"	"	"	"	"	"	O-05, R-07
2-Methylphenol	ND	49000	"	"	"	"	"	"	O-05, R-07
4-Methylphenol	ND	49000	"	"	"	"	"	"	O-05, R-07
Naphthalene	ND	15000	"	"	"	"	"	"	O-05, R-07
2-Nitroaniline	ND	15000	"	"	"	"	"	"	O-05, R-07
3-Nitroaniline	ND	15000	"	"	"	"	"	"	R-07, O-05
4-Nitroaniline	ND	15000	"	"	"	"	"	"	O-05, R-07
Nitrobenzene	ND	49000	"	"	"	"	"	"	R-07, O-05
2-Nitrophenol	ND	49000	"	"	"	"	"	"	O-05, R-07
N-Nitrosodimethylamine	ND	15000	"	"	"	"	"	"	O-05, R-07
N-Nitrosodiphenylamine	ND	15000	"	"	"	"	"	"	O-05, R-07
2,3,5,6-Tetrachlorophenol	ND	15000	"	"	"	"	"	"	O-05, R-07
2,3,4,6-Tetrachlorophenol	ND	15000	"	"	"	"	"	"	O-05, R-07
Phenanthrene	ND	15000	"	"	"	"	"	"	O-05, R-07
Azobenzene	ND	15000	"	"	"	"	"	"	O-05, R-07
Pyridine	ND	15000	"	"	"	"	"	"	O-05, R-07
2,4,5-Trichlorophenol	ND	49000	"	"	"	"	"	"	O-05, R-07
2,4,6-Trichlorophenol	ND	49000	"	"	"	"	"	"	O-05, R-07
Surrogate: 2-Fluorophenol		*38.5 %*	*15-121*		"	"	"	"	*O-05, R-07*
Surrogate: Phenol-d6		*%*	*24-113*		"	"	"	"	*O-05, R-07*
Surrogate: Nitrobenzene-d5		*102 %*	*21.3-119*		"	"	"	"	*O-05, R-07*
Surrogate: 2-Fluorobiphenyl		*110 %*	*32.4-102*		"	"	"	"	*O-05, R-07*
Surrogate: 2,4,6-Tribromophenol		*%*	*18.1-105*		"	"	"	"	*O-05, R-07*

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S8-T1-15

T170707-12 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Terphenyl-dl4	*104 %*	*29.1-130*			*7042028*	*04/20/17*	*04/21/17*	*EPA 8270C*	*O-05, R-07*

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7041921 - EPA 3051										
Blank (7041921-BLK1)				Prepared: 04/19/17 Analyzed: 04/20/17						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	2.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
LCS (7041921-BS1)				Prepared: 04/19/17 Analyzed: 04/20/17						
Arsenic	105	5.0	mg/kg	100		105	75-125			
Barium	102	1.0	"	100		102	75-125			
Cadmium	102	2.0	"	100		102	75-125			
Chromium	102	2.0	"	100		102	75-125			
Lead	106	3.0	"	100		106	75-125			
Matrix Spike (7041921-MS1)	**Source: T170929-12**			Prepared: 04/19/17 Analyzed: 04/20/17						
Arsenic	89.2	5.0	mg/kg	95.2	6.09	87.2	75-125			
Barium	236	1.0	"	95.2	132	108	75-125			
Cadmium	83.9	2.0	"	95.2	3.18	84.8	75-125			
Chromium	98.7	2.0	"	95.2	15.8	87.0	75-125			
Lead	87.1	3.0	"	95.2	ND	91.5	75-125			

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Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7041921 - EPA 3051										
Matrix Spike Dup (7041921-MSD1)	**Source: T170929-12**			Prepared: 04/19/17 Analyzed: 04/20/17						
Arsenic	88.1	5.0	mg/kg	97.1	6.09	84.4	75-125	1.22	20	
Barium	202	1.0	"	97.1	132	71.2	75-125	15.6	20	QR-04
Cadmium	84.8	2.0	"	97.1	3.18	84.0	75-125	1.00	20	
Chromium	101	2.0	"	97.1	15.8	87.7	75-125	2.32	20	
Lead	87.7	3.0	"	97.1	ND	90.3	75-125	0.630	20	

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Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7041922 - EPA 7471A Soil										
Blank (7041922-BLK1)				Prepared: 04/19/17 Analyzed: 04/20/17						
Mercury	ND	0.10	mg/kg							
LCS (7041922-BS1)				Prepared: 04/19/17 Analyzed: 04/20/17						
Mercury	0.332	0.10	mg/kg	0.410		81.1	75-125			
Matrix Spike (7041922-MS1)	**Source: T170929-12**			Prepared: 04/19/17 Analyzed: 04/20/17						
Mercury	0.328	0.10	mg/kg	0.397	ND	82.7	75-125			
Matrix Spike Dup (7041922-MSD1)	**Source: T170929-12**			Prepared: 04/19/17 Analyzed: 04/20/17						
Mercury	0.338	0.10	mg/kg	0.410	ND	82.5	75-125	2.96	20	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7041920 - EPA 5030 GCMS										
Blank (7041920-BLK1)				Prepared & Analyzed: 04/19/17						
Bromobenzene	ND	5.0	ug/kg							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	10	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7041920 - EPA 5030 GCMS										
Blank (7041920-BLK1)				Prepared & Analyzed: 04/19/17						
p-Isopropyltoluene	ND	5.0	ug/kg							
Methylene chloride	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
Benzene	ND	5.0	"							
Toluene	ND	5.0	"							
Ethylbenzene	ND	5.0	"							
m,p-Xylene	ND	10	"							
o-Xylene	ND	5.0	"							
C6-C12 (GRO)	ND	500	"							
Surrogate: 4-Bromofluorobenzene	*42.2*		*"*	*39.6*		*106*	*81.2-123*			
Surrogate: Dibromofluoromethane	*41.2*		*"*	*39.6*		*104*	*95.7-135*			
Surrogate: Toluene-d8	*42.6*		*"*	*39.6*		*108*	*85.5-116*			

SunStar Laboratories, Inc.

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Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7041920 - EPA 5030 GCMS										
LCS (7041920-BS1)				Prepared & Analyzed: 04/19/17						
Chlorobenzene	94.3	5.0	ug/kg	99.6		94.6	75-125			
1,1-Dichloroethene	93.8	5.0	"	99.6		94.2	75-125			
Trichloroethene	96.9	5.0	"	99.6		97.2	75-125			
Benzene	95.5	5.0	"	99.6		95.9	75-125			
Toluene	99.3	5.0	"	99.6		99.7	75-125			
Surrogate: 4-Bromofluorobenzene	*42.3*		*"*	*39.8*		*106*	*81.2-123*			
Surrogate: Dibromofluoromethane	*41.3*		*"*	*39.8*		*104*	*95.7-135*			
Surrogate: Toluene-d8	*41.8*		*"*	*39.8*		*105*	*85.5-116*			
LCS Dup (7041920-BSD1)				Prepared & Analyzed: 04/19/17						
Chlorobenzene	103	5.0	ug/kg	99.4		103	75-125	8.64	20	
1,1-Dichloroethene	92.0	5.0	"	99.4		92.6	75-125	1.86	20	
Trichloroethene	101	5.0	"	99.4		102	75-125	4.37	20	
Benzene	96.6	5.0	"	99.4		97.2	75-125	1.20	20	
Toluene	104	5.0	"	99.4		105	75-125	4.69	20	
Surrogate: 4-Bromofluorobenzene	*42.0*		*"*	*39.8*		*106*	*81.2-123*			
Surrogate: Dibromofluoromethane	*40.2*		*"*	*39.8*		*101*	*95.7-135*			
Surrogate: Toluene-d8	*41.2*		*"*	*39.8*		*104*	*85.5-116*			

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7042028 - EPA 3550 ECD/GCMS										
Blank (7042028-BLK1)				Prepared: 04/20/17 Analyzed: 04/21/17						
Carbazole	ND	300	ug/kg							
Phenol	ND	1000	"							
Aniline	ND	300	"							
2-Chlorophenol	ND	1000	"							
1,4-Dichlorobenzene	ND	300	"							
N-Nitrosodi-n-propylamine	ND	300	"							
1,2,4-Trichlorobenzene	ND	300	"							
4-Chloro-3-methylphenol	ND	1000	"							
2-Methylnaphthalene	ND	300	"							
1-Methylnaphthalene	ND	300	"							
Acenaphthene	ND	300	"							
4-Nitrophenol	ND	1000	"							
2,4-Dinitrotoluene	ND	300	"							
Pentachlorophenol	ND	1000	"							
Pyrene	ND	300	"							
Acenaphthylene	ND	300	"							
Anthracene	ND	300	"							
Benzo (a) anthracene	ND	300	"							
Benzo (b) fluoranthene	ND	300	"							
Benzo (k) fluoranthene	ND	300	"							
Benzo (g,h,i) perylene	ND	1000	"							
Benzo (a) pyrene	ND	300	"							
Benzyl alcohol	ND	300	"							
Bis(2-chloroethoxy)methane	ND	300	"							
Bis(2-chloroethyl)ether	ND	300	"							
Bis(2-chloroisopropyl)ether	ND	300	"							
Bis(2-ethylhexyl)phthalate	ND	300	"							
4-Bromophenyl phenyl ether	ND	300	"							
Butyl benzyl phthalate	ND	300	"							
4-Chloroaniline	ND	300	"							
2-Chloronaphthalene	ND	300	"							
4-Chlorophenyl phenyl ether	ND	300	"							
Chrysene	ND	300	"							
Dibenz (a,h) anthracene	ND	300	"							
Dibenzofuran	ND	300	"							
Di-n-butyl phthalate	ND	300	"							

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7042028 - EPA 3550 ECD/GCMS										
Blank (7042028-BLK1)				Prepared: 04/20/17 Analyzed: 04/21/17						
1,2-Dichlorobenzene	ND	300	ug/kg							
1,3-Dichlorobenzene	ND	300	"							
2,4-Dichlorophenol	ND	1000	"							
Diethyl phthalate	ND	300	"							
2,4-Dimethylphenol	ND	1000	"							
Dimethyl phthalate	ND	300	"							
4,6-Dinitro-2-methylphenol	ND	1000	"							
2,4-Dinitrophenol	ND	1000	"							
2,6-Dinitrotoluene	ND	1000	"							
Di-n-octyl phthalate	ND	300	"							
Fluoranthene	ND	300	"							
Fluorene	ND	300	"							
Hexachlorobenzene	ND	1500	"							
Hexachlorobutadiene	ND	300	"							
Hexachlorocyclopentadiene	ND	1000	"							
Hexachloroethane	ND	300	"							
Indeno (1,2,3-cd) pyrene	ND	300	"							
Isophorone	ND	300	"							
2-Methylphenol	ND	1000	"							
4-Methylphenol	ND	1000	"							
Naphthalene	ND	300	"							
2-Nitroaniline	ND	300	"							
3-Nitroaniline	ND	300	"							
4-Nitroaniline	ND	300	"							
Nitrobenzene	ND	1000	"							
2-Nitrophenol	ND	1000	"							
N-Nitrosodimethylamine	ND	300	"							
N-Nitrosodiphenylamine	ND	300	"							
2,3,5,6-Tetrachlorophenol	ND	300	"							
2,3,4,6-Tetrachlorophenol	ND	300	"							
Phenanthrene	ND	300	"							
Azobenzene	ND	300	"							
Pyridine	ND	300	"							
2,4,5-Trichlorophenol	ND	1000	"							
2,4,6-Trichlorophenol	ND	1000	"							

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7042028 - EPA 3550 ECD/GCMS										
Blank (7042028-BLK1)				Prepared: 04/20/17 Analyzed: 04/21/17						
Surrogate: 2-Fluorophenol	*1960*		*ug/kg*	*3240*		*60.7*	*15-121*			
Surrogate: Phenol-d6	*1780*		*"*	*3240*		*55.1*	*24-113*			
Surrogate: Nitrobenzene-d5	*1720*		*"*	*3240*		*53.0*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2210*		*"*	*3240*		*68.3*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3590*		*"*	*3240*		*111*	*18.1-105*			*S-GC*
Surrogate: Terphenyl-dl4	*2890*		*"*	*3240*		*89.3*	*29.1-130*			
LCS (7042028-BS1)				Prepared: 04/20/17 Analyzed: 04/21/17						
Phenol	1720	1000	ug/kg	3290		52.3	34-114			
2-Chlorophenol	1880	1000	"	3290		57.2	34-114			
1,4-Dichlorobenzene	1810	300	"	3290		55.2	34-114			
N-Nitrosodi-n-propylamine	1910	300	"	3290		58.0	30-110			
1,2,4-Trichlorobenzene	1720	300	"	3290		52.2	39-119			
4-Chloro-3-methylphenol	1800	1000	"	3290		54.6	50-130			
Acenaphthene	1670	300	"	3290		50.7	34-114			
Pentachlorophenol	2550	1000	"	3290		77.6	50-130			
Pyrene	1730	300	"	3290		52.5	30-110			
Surrogate: 2-Fluorophenol	*2120*		*"*	*3290*		*64.5*	*15-121*			
Surrogate: Phenol-d6	*2200*		*"*	*3290*		*66.9*	*24-113*			
Surrogate: Nitrobenzene-d5	*1860*		*"*	*3290*		*56.5*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2310*		*"*	*3290*		*70.1*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3350*		*"*	*3290*		*102*	*18.1-105*			
Surrogate: Terphenyl-dl4	*3060*		*"*	*3290*		*93.1*	*29.1-130*			
LCS Dup (7042028-BSD1)				Prepared: 04/20/17 Analyzed: 04/21/17						
Phenol	2250	1000	ug/kg	3330		67.6	34-114	26.8	42	
2-Chlorophenol	1810	1000	"	3330		54.2	34-114	4.13	40	
1,4-Dichlorobenzene	1800	300	"	3330		53.9	34-114	1.04	28	
N-Nitrosodi-n-propylamine	1850	300	"	3330		55.6	30-110	2.99	38	
1,2,4-Trichlorobenzene	1730	300	"	3330		51.9	39-119	0.787	28	
4-Chloro-3-methylphenol	1910	1000	"	3330		57.2	50-130	5.87	42	
Acenaphthene	1680	300	"	3330		50.3	34-114	0.513	31	
Pentachlorophenol	2290	1000	"	3330		68.6	50-130	11.0	50	
Pyrene	1720	300	"	3330		51.5	30-110	0.675	31	
Surrogate: 2-Fluorophenol	*2010*		*"*	*3330*		*60.4*	*15-121*			
Surrogate: Phenol-d6	*1890*		*"*	*3330*		*56.7*	*24-113*			

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7042028 - EPA 3550 ECD/GCMS										
LCS Dup (7042028-BSD1)				Prepared: 04/20/17 Analyzed: 04/21/17						
Surrogate: Nitrobenzene-d5	*1880*		*ug/kg*	*3330*		*56.4*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2340*		*"*	*3330*		*70.3*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3380*		*"*	*3330*		*102*	*18.1-105*			
Surrogate: Terphenyl-dl4	*3380*		*"*	*3330*		*101*	*29.1-130*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/26/17 10:30

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
R-07	Reporting limit for this compound(s) has been raised to account for dilution necessary due to high levels of interfering compound(s) and/or matrix affect.
QR-04	The pecent recovery and/or RPD was outside acceptance criteria. Results accepted based upon percent recovery results in duplicate QC sample and the CCV and CCB results.
O-05	This sample was extracted outside of the EPA recommended holding time.
I-02	This result was analyzed outside of the EPA recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Nortngate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive #130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/17 Page: 1 Of 3
Project Name: Brea-Olinda
Collector: F. Hager Client Project #: 02077.01
Batch #: 1170207 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +6RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCBs			Laboratory ID #	Comments/Preservative	Total # of containers
DRU-T1-5	3/21/17	0744	VOA	Soil	H			H										01		
DRU-T1-5	3/21/17	0744	4oz G	Soil				H				A	H		H					
DRU-T1-10	3/21/17	0754	4oz G	Soil				H				A	H		H			02		
DRU-T1-15	3/21/17	0800	4oz G	Soil				H				A	H		H			03		
VRS-T2-5	3/21/17	0840	Soil	VOA	H			H										04		
VRS-T2-5	3/21/17	0840	Soil	4oz G				H				A	H		H					
VRS-T2-10	3/21/17	0850	Soil	4oz G				H				A	H		H			05		
VRS-T2-15	3/21/17	0900	Soil	4oz G				H				A	H		H			06		
VRS-T1-5	3/21/17	0935	Soil	VOA	H			H										07		
VRS-T1-5	3/21/17	0935	Soil	4oz G				H				A	H		H					
VRS-T1-10	3/21/17	0945	Soil	4oz G				H				A	H		H			08		
VRS-T1-15	3/21/17	0955	Soil	4oz G				H				A	H		H			09		
SS-T1-5	3/21/17	1020	Soil	VOA	H													10	HIGH TPH	
SS-T1-5	3/21/17	1020	Soil	4oz G				H				A	H		H					
SS-T1-10	3/21/17	1043	Soil	4oz G				H				A	H		H			11		

Relinquished by: (signature) Fred Hager Date / Time 3/21/17 3:25
Received by: (signature) Date / Time 3/21/17 15:25

Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time

Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time

Total # of containers 35
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 5.4

Turn around time: STD

Notes
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162514

I-314

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/17 Page: 2 Of 3
Project Name: Brea-Olinda
Collector: Frank Hoger Client Project #: 02077.01
Batch #: 1170707 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB's			Laboratory ID #	Comments/Preservative	Total # of containers
SB-TI-15	3/21/17	1048	Soil	4oz gl				H				A			H			12		
SS-TI-5	3/21/17	1120	Soil	VOA	H													13		
SS-TI-5	3/21/17	1120	Soil	4oz gl				H				A			H					
SS-TI-10	3/21/17	1132	Soil	4oz gl				H				A			H			14	HIGH TPH 1	
SS-TI-15	3/21/17	1142	Soil	4oz gl				H				A			H			15	HIGH TPH 1	
104-TI-5	3/21/17	1210	Soil	VOA	H													16		
104-TI-5	3/21/17	1210	Soil	4oz gl				H				A			H					
104-TI-10	3/21/17	1218	Soil	4oz gl				H				A			H			17		
104-TI-15	3/21/17	1225	Soil	4oz gl				H				A			H			18		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Frank Hoger	3/21/17 3:35		3/21/17 15:35
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 19
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162512

I-315

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management
Address: 2441 Ridge Park Drive, Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/21/2017 Page: 1 of 1
Project Name: Brea Olinda
Collector: Michelle Hughson Client Project #: 02077.01
Batch #: 1122707 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260+GRO 5035	8260 + OXY	8260 BTEX, OXY only	8270C	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	EPA 8081 Pesticides	8141 organophosphorus Pesticides	8151 Herbicides	Laboratory ID #	Comments/Preservative	Total # of containers
DR-HA1-1.0	3/21/17	0735	Soil	VOAs + core	H			H				A	H		H	H	H	19		5
DR-HA1-5.0	3/21/17	0743	Soil	core				H				A	H		H	H	H	20		1
DR-HA2-1.0	3/21/17	0802	Soil	VOAs + core	H			H				A	H		H	H	H	21		5
DR-HA2-5.0	3/21/17	0815	Soil	core				H				A	H		H	H	H	22		1
DR-HA3-1.0	3/21/17	0825	Soil	VOAs + core	H			H				A	H		H	H	H	23		5
DR-HA3-5.0	3/21/17	0846	Soil	core				H				A	H		H	H	H	24		1
DR-HA4-1.0	3/21/17	0911	Soil	VOAs + core	H			H				A	H		H	H	H	25		5
DR-HA4-5.0	3/21/17	0941	Soil	core				H				A	H		H	H	H	26		1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Michelle Hughson	3/21/17 1230		3/21/17 1230
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/21/17 3:25		3/21/17 15:25
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 24
Chain of Custody seals Y/N/NA:
Seals intact? Y/N/NA:
Received good condition/cold: 5.4

Turn around time: STD

Notes
F. Hager
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162513

I-316

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 1120107

Client Name: NORTHGATE Project: BREA OLINDA OIL FIELD

Delivered by: ☒ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: BRIAN Date/Time Lab Received: 3/11/12 15:25

Total number of coolers received: 1

Temperature: Cooler #1 5.6	°C +/- the CF (- 0.2°C) = 5.4		°C corrected temperature
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =		°C corrected temperature
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =		°C corrected temperature
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☑ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☑ N/A
Sample containers intact	☑ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☑ Yes	☐ No*	
Total number of containers received match COC	☑ Yes	☐ No*	
Proper containers received for analyses requested on COC	☑ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☑ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☑ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BL

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 6:09 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: Additional work order confirmation for Brea Olinda Oil Field (T170707)
Attachments: T170697_WKO_02.pdf; T170707_WKO_02.pdf

Derrick,

Please find attached work orders for confirmation of additionally requested analyses below. Please carefully review and let me know if you have any questions or concerns.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Friday, March 24, 2017 5:38 PM
To: Rose Fasheh
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

Standard TAT is fine, thanks Rose

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 5:36 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

What TAT are you looking for on these? Standard is a 5-day yielding results by COB Monday 4/3.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Friday, March 24, 2017 5:11 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

Hi Rose,
Please run the analyses for the samples shaded in green. Please let me know if you have any questions.
Thanks
Derrick

Derrick S. Willis
Principal

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
phone (949) 716-0050 ext. 101; cell (949) 375-7004; fax (949) 315-3365
http://www.ngem.com

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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 2:45 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: Final Report for Brea Olinda Oil Field (T170707)

Hello Derrick and Frank,

Please see the attached final report for the following:

Project: Brea Olinda Oil Field
Project Number: 02077.01

Thank you for choosing SunStar Labs.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

	Date	Time	PID	Depth	EPH (EPA8015M)	8260 +GRO	SVOC (EPA8270)	CAM 17 (EPA6010)	Uranium	PCB (EPA8082)	Chlorinated Pesticides (EPA8081)	OP Pesticides (EPA8141)	Herbicides (EPA8151)
S20-T1	3/20/2017	8:00	13.3	5	A	1	1	1	1	1	x	x	x
	3/20/2017	9:15	0.0	10	A	x	H	H	H	H	x	x	x
	3/20/2017	9:25	0.0	15	A	x	H	H	H	H	x	x	x
S20-T2	3/20/2017	10:09	0.6	5	A	1	1	1	H	1	x	x	x
	3/20/2017	10:19	0.1	10	A	x	H	H	H	H	x	x	x
	3/20/2017	10:32	1.2	15	A	x	H	H	H	H	x	x	x
BOTF-T2	3/20/2017	11:50	18.2	5	A	1	1	1	H	1	x	x	x
	3/20/2017	12:00	0.4	10	A	x	H	H	H	H	x	x	x
	3/20/2017	12:08	0.1	15	A	x	H	H	H	H	x	x	x
BOTF-T1	3/20/2017	13:15	0.6	5	A	H	H	H	H	H	x	x	x
	3/20/2017	13:30	0.1	10	A	x	H	H	H	H	x	x	x
	3/20/2017	13:45	0.1	15	A	x	H	H	H	H	x	x	x
H2-T1	3/20/2017	13:45	0.2	5	A	H	H	H	H	H	x	x	x
	3/20/2017	14:15	0.2	10	A	x	H	H	H	H	x	x	x
	3/20/2017	14:35	0.1	15	A	x	H	H	H	H	x	x	x
DU-T1	3/21/2017	7:44	10.4	5	A	1	H	H	H	H	x	x	x
	3/21/2017	7:54	5.2	10	A	x	H	H	H	H	x	x	x
	3/21/2017	8:00	0.3	15	A	x	H	H	H	H	x	x	x
VRS-T2	3/21/2017	8:40	18.3	5	A	1	1	1	H	1	x	x	x
	3/21/2017	8:50	15.2	10	A	x	H	H	H	H	x	x	x
	3/21/2017	9:00	23.4	15	A	x	H	H	H	H	x	x	x
VRS-T1	3/21/2017	9:35	12.2	5	A	1	H	1	H	1	x	x	x
	3/21/2017	9:45	2.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	9:55	2.0	15	A	x	H	H	H	H	x	x	x
S8-T1	3/21/2017	10:20	29.7	5	A	1	1	1	1	1	x	x	x
	3/21/2017	10:34	142.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	10:48	121.0	15	A	x	H	H	H	H	x	x	x
S5-T1	3/21/2017	11:20	18.0	5	A	1	1	1	1	1	x	x	x
	3/21/2017	11:32	97.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	11:42	89.0	15	A	x	H	H	H	H	x	x	x
104-T1	3/21/2017	12:10	0.1	5	A	1	1	1	1	1	x	x	x
	3/21/2017	12:18	0.3	10	A	x	H	H	H	H	x	x	x
	3/21/2017	12:25	0.1	15	A	x	H	H	H	H	x	x	x
DR-HA1	3/21/2017	7:35	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	7:43	NA	5	A	x	H	H	H	H	H	H	H
DR-HA2	3/21/2017	8:02	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	8:15	NA	5	A	x	H	H	H	H	H	H	H
DR-HA3	3/21/2017	8:25	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	8:46	NA	5	A	x	H	H	H	H	H	H	H
DR-HA4	3/21/2017	9:11	NA	1	A	1	1	1	1	1	1	1	H
	3/21/2017	9:41	NA	5	A	x	H	H	H	H	H	H	H
						13	11	12	8	12	4	4	3

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/21/17 15:25
Logged In By: Brian Charon Date Logged In: 03/21/17 15:35

Samples Received at: **5.4°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170707-01 DRU-T1-5 [Soil] Sampled 03/21/17 07:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:44	
T170707-02 DRU-T1-10 [Soil] Sampled 03/21/17 07:54 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:54	
T170707-03 DRU-T1-15 [Soil] Sampled 03/21/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:00	
T170707-04 VRS-T2-5 [Soil] Sampled 03/21/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:40	
T170707-05 VRS-T2-10 [Soil] Sampled 03/21/17 08:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:50	
T170707-06 VRS-T2-15 [Soil] Sampled 03/21/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:00	
T170707-07 VRS-T1-5 [Soil] Sampled 03/21/17 09:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:35	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-08 VRS-T1-10 [Soil] Sampled 03/21/17 09:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:45	
T170707-09 VRS-T1-15 [Soil] Sampled 03/21/17 09:55 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:55	
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:20	
T170707-11 S8-T1-10 [Soil] Sampled 03/21/17 10:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:43	
T170707-12 S8-T1-15 [Soil] Sampled 03/21/17 10:48 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:48	
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:20	
T170707-14 S5-T1-10 [Soil] Sampled 03/21/17 11:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:32	
T170707-15 S5-T1-15 [Soil] Sampled 03/21/17 11:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:42	
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:10	
T170707-17 104-T1-10 [Soil] Sampled 03/21/17 12:18 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:18	
T170707-18 104-T1-15 [Soil] Sampled 03/21/17 12:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:25	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:35	
T170707-20 DR-HA1-5.0 [Soil] Sampled 03/21/17 07:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:43	
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:02	
T170707-22 DR-HA2-5.0 [Soil] Sampled 03/21/17 08:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:15	
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:25	
T170707-24 DR-HA3-5.0 [Soil] Sampled 03/21/17 08:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:46	
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:11	
T170707-26 DR-HA4-5.0 [Soil] Sampled 03/21/17 09:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:41	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/21/17 15:25
Logged In By: Brian Charon Date Logged In: 03/21/17 15:35

Samples Received at: **5.4°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170707-01 DRU-T1-5 [Soil] Sampled 03/21/17 07:44 (GMT-08:00) Pacific Time (US &				**8260 and GRO added per client request (Derrick, 3/24)**
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:44	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 07:44	
8260 5035	04/03/17 15:00	5	04/04/17 07:44	
T170707-02 DRU-T1-10 [Soil] Sampled 03/21/17 07:54 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:54	
T170707-03 DRU-T1-15 [Soil] Sampled 03/21/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:00	
T170707-04 VRS-T2-5 [Soil] Sampled 03/21/17 08:40 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:40	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:40	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:40	
8082 PCB	04/03/17 15:00	5	04/04/17 08:40	
8260 5035	04/03/17 15:00	5	04/04/17 08:40	
8270C	04/03/17 15:00	5	04/04/17 08:40	
T170707-05 VRS-T2-10 [Soil] Sampled 03/21/17 08:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:50	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-06 VRS-T2-15 [Soil] Sampled 03/21/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:00	
T170707-07 VRS-T1-5 [Soil] Sampled 03/21/17 09:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 09:35	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:35	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 09:35	
8082 PCB	04/03/17 15:00	5	04/04/17 09:35	
8260 5035	04/03/17 15:00	5	04/04/17 09:35	
T170707-08 VRS-T1-10 [Soil] Sampled 03/21/17 09:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:45	
T170707-09 VRS-T1-15 [Soil] Sampled 03/21/17 09:55 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:55	
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 10:20	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:20	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 10:20	
8082 PCB	04/03/17 15:00	5	04/04/17 10:20	
8260 5035	04/03/17 15:00	5	04/04/17 10:20	
8270C	04/03/17 15:00	5	04/04/17 10:20	
T170707-11 S8-T1-10 [Soil] Sampled 03/21/17 10:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:43	
T170707-12 S8-T1-15 [Soil] Sampled 03/21/17 10:48 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:48	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 11:20	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:20	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 11:20	
8082 PCB	04/03/17 15:00	5	04/04/17 11:20	
8260 5035	04/03/17 15:00	5	04/04/17 11:20	
8270C	04/03/17 15:00	5	04/04/17 11:20	
T170707-14 S5-T1-10 [Soil] Sampled 03/21/17 11:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:32	
T170707-15 S5-T1-15 [Soil] Sampled 03/21/17 11:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:42	
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 12:10	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:10	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 12:10	
8082 PCB	04/03/17 15:00	5	04/04/17 12:10	
8260 5035	04/03/17 15:00	5	04/04/17 12:10	
8270C	04/03/17 15:00	5	04/04/17 12:10	
T170707-17 104-T1-10 [Soil] Sampled 03/21/17 12:18 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:18	
T170707-18 104-T1-15 [Soil] Sampled 03/21/17 12:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:25	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 07:35	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:35	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 07:35	
8081 Pesticides	04/03/17 15:00	5	04/04/17 07:35	
8082 PCB	04/03/17 15:00	5	04/04/17 07:35	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 07:35	
8151 Herbicides	04/03/17 15:00	5	04/04/17 07:35	
8260 5035	04/03/17 15:00	5	04/04/17 07:35	
8270C	04/03/17 15:00	5	04/04/17 07:35	
T170707-20 DR-HA1-5.0 [Soil] Sampled 03/21/17 07:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:43	
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:02	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:02	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:02	
8081 Pesticides	04/03/17 15:00	5	04/04/17 08:02	
8082 PCB	04/03/17 15:00	5	04/04/17 08:02	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 08:02	
8151 Herbicides	04/03/17 15:00	5	04/04/17 08:02	
8260 5035	04/03/17 15:00	5	04/04/17 08:02	
8270C	04/03/17 15:00	5	04/04/17 08:02	
T170707-22 DR-HA2-5.0 [Soil] Sampled 03/21/17 08:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:15	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:25	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:25	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:25	
8081 Pesticides	04/03/17 15:00	5	04/04/17 08:25	
8082 PCB	04/03/17 15:00	5	04/04/17 08:25	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 08:25	
8151 Herbicides	04/03/17 15:00	5	04/04/17 08:25	
8260 5035	04/03/17 15:00	5	04/04/17 08:25	
8270C	04/03/17 15:00	5	04/04/17 08:25	
T170707-24 DR-HA3-5.0 [Soil] Sampled 03/21/17 08:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:46	
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 09:11	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:11	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 09:11	
8081 Pesticides	04/03/17 15:00	5	04/04/17 09:11	
8082 PCB	04/03/17 15:00	5	04/04/17 09:11	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 09:11	
8151 Herbicides	04/03/17 15:00	5	04/04/17 09:11	
8260 5035	04/03/17 15:00	5	04/04/17 09:11	
8270C	04/03/17 15:00	5	04/04/17 09:11	
T170707-26 DR-HA4-5.0 [Soil] Sampled 03/21/17 09:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:41	

Weck Labs

T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 10:20	EPA 200.8 Uranium
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 11:20	EPA 200.8 Uranium

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
Weck Labs				
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 12:10	EPA 200.8 Uranium
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 07:35	EPA 200.8 Uranium
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 08:02	EPA 200.8 Uranium
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 08:25	EPA 200.8 Uranium
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 09:11	EPA 200.8 Uranium

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/21/17 15:25
Logged In By: Brian Charon Date Logged In: 03/21/17 15:35

Samples Received at: **5.4°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170707-01 DRU-T1-5 [Soil] Sampled 03/21/17 07:44 (GMT-08:00) Pacific Time (US &				**8260 and GRO added per client request (Derrick, 3/24)**
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:44	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 07:44	
8260 5035	04/03/17 15:00	5	04/04/17 07:44	
T170707-02 DRU-T1-10 [Soil] Sampled 03/21/17 07:54 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:54	
T170707-03 DRU-T1-15 [Soil] Sampled 03/21/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:00	
T170707-04 VRS-T2-5 [Soil] Sampled 03/21/17 08:40 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:40	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:40	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:40	
8082 PCB	04/03/17 15:00	5	04/04/17 08:40	
8260 5035	04/03/17 15:00	5	04/04/17 08:40	
8270C	04/03/17 15:00	5	04/04/17 08:40	
T170707-05 VRS-T2-10 [Soil] Sampled 03/21/17 08:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:50	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-06 VRS-T2-15 [Soil] Sampled 03/21/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:00	
T170707-07 VRS-T1-5 [Soil] Sampled 03/21/17 09:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 09:35	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:35	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 09:35	
8082 PCB	04/03/17 15:00	5	04/04/17 09:35	
8260 5035	04/03/17 15:00	5	04/04/17 09:35	
T170707-08 VRS-T1-10 [Soil] Sampled 03/21/17 09:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:45	
T170707-09 VRS-T1-15 [Soil] Sampled 03/21/17 09:55 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:55	
T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 10:20	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:20	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 10:20	
8082 PCB	04/03/17 15:00	5	04/04/17 10:20	
8260 5035	04/03/17 15:00	5	04/04/17 10:20	
8270C	04/03/17 15:00	5	04/04/17 10:20	
T170707-11 S8-T1-10 [Soil] Sampled 03/21/17 10:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:43	
T170707-12 S8-T1-15 [Soil] Sampled 03/21/17 10:48 (GMT-08:00) Pacific Time (US &				**VOCs, SVOCs, and Title 22 metals added per client request (Derrick, 4/19)**
6010 Title 22	04/26/17 15:00	5	09/17/17 10:48	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 10:48	
8260	04/26/17 15:00	5	04/04/17 10:48	+GRO
8270C	04/26/17 15:00	5	04/04/17 10:48	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 11:20	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:20	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 11:20	
8082 PCB	04/03/17 15:00	5	04/04/17 11:20	
8260 5035	04/03/17 15:00	5	04/04/17 11:20	
8270C	04/03/17 15:00	5	04/04/17 11:20	
T170707-14 S5-T1-10 [Soil] Sampled 03/21/17 11:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:32	
T170707-15 S5-T1-15 [Soil] Sampled 03/21/17 11:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 11:42	
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 12:10	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:10	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 12:10	
8082 PCB	04/03/17 15:00	5	04/04/17 12:10	
8260 5035	04/03/17 15:00	5	04/04/17 12:10	
8270C	04/03/17 15:00	5	04/04/17 12:10	
T170707-17 104-T1-10 [Soil] Sampled 03/21/17 12:18 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:18	
T170707-18 104-T1-15 [Soil] Sampled 03/21/17 12:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 12:25	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 07:35	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:35	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 07:35	
8081 Pesticides	04/03/17 15:00	5	04/04/17 07:35	
8082 PCB	04/03/17 15:00	5	04/04/17 07:35	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 07:35	
8151 Herbicides	04/03/17 15:00	5	04/04/17 07:35	
8260 5035	04/03/17 15:00	5	04/04/17 07:35	
8270C	04/03/17 15:00	5	04/04/17 07:35	
T170707-20 DR-HA1-5.0 [Soil] Sampled 03/21/17 07:43 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 07:43	
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:02	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:02	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:02	
8081 Pesticides	04/03/17 15:00	5	04/04/17 08:02	
8082 PCB	04/03/17 15:00	5	04/04/17 08:02	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 08:02	
8151 Herbicides	04/03/17 15:00	5	04/04/17 08:02	
8260 5035	04/03/17 15:00	5	04/04/17 08:02	
8270C	04/03/17 15:00	5	04/04/17 08:02	
T170707-22 DR-HA2-5.0 [Soil] Sampled 03/21/17 08:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:15	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 08:25	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:25	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 08:25	
8081 Pesticides	04/03/17 15:00	5	04/04/17 08:25	
8082 PCB	04/03/17 15:00	5	04/04/17 08:25	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 08:25	
8151 Herbicides	04/03/17 15:00	5	04/04/17 08:25	
8260 5035	04/03/17 15:00	5	04/04/17 08:25	
8270C	04/03/17 15:00	5	04/04/17 08:25	
T170707-24 DR-HA3-5.0 [Soil] Sampled 03/21/17 08:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 08:46	
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/17/17 09:11	
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:11	
8015 m 5035-GRO	04/03/17 15:00	5	04/04/17 09:11	
8081 Pesticides	04/03/17 15:00	5	04/04/17 09:11	
8082 PCB	04/03/17 15:00	5	04/04/17 09:11	
8141 OP Pesticides	04/03/17 15:00	5	04/04/17 09:11	
8151 Herbicides	04/03/17 15:00	5	04/04/17 09:11	
8260 5035	04/03/17 15:00	5	04/04/17 09:11	
8270C	04/03/17 15:00	5	04/04/17 09:11	
T170707-26 DR-HA4-5.0 [Soil] Sampled 03/21/17 09:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/04/17 09:41	

Weck Labs

T170707-10 S8-T1-5 [Soil] Sampled 03/21/17 10:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 10:20	EPA 200.8 Uranium
T170707-13 S5-T1-5 [Soil] Sampled 03/21/17 11:20 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 11:20	EPA 200.8 Uranium

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170707

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
Weck Labs				
T170707-16 104-T1-5 [Soil] Sampled 03/21/17 12:10 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 12:10	EPA 200.8 Uranium
T170707-19 DR-HA1-1.0 [Soil] Sampled 03/21/17 07:35 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 07:35	EPA 200.8 Uranium
T170707-21 DR-HA2-1.0 [Soil] Sampled 03/21/17 08:02 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 08:02	EPA 200.8 Uranium
T170707-23 DR-HA3-1.0 [Soil] Sampled 03/21/17 08:25 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 08:25	EPA 200.8 Uranium
T170707-25 DR-HA4-1.0 [Soil] Sampled 03/21/17 09:11 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, 8082, 8081, 8141, and 8151 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/17/17 09:11	EPA 200.8 Uranium

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
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30 March 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/23/17 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BOTF-B1-5	T170734-01	Soil	03/23/17 07:50	03/23/17 16:00
BOTF-B1-10	T170734-02	Soil	03/23/17 07:57	03/23/17 16:00
BOTF-B1-15	T170734-03	Soil	03/23/17 08:00	03/23/17 16:00
BOTF-B1-20	T170734-04	Soil	03/23/17 08:07	03/23/17 16:00
BOTF-B1-25	T170734-05	Soil	03/23/17 08:13	03/23/17 16:00
BOTF-B1-30	T170734-06	Soil	03/23/17 08:25	03/23/17 16:00
BOTF-B1-35	T170734-07	Soil	03/23/17 08:44	03/23/17 16:00
BOTF-B1-40	T170734-08	Soil	03/23/17 08:40	03/23/17 16:00
BOTF-B1-45	T170734-09	Soil	03/23/17 08:53	03/23/17 16:00
BOTF-B1-50	T170734-10	Soil	03/23/17 09:03	03/23/17 16:00
BOTF-B1-55	T170734-11	Soil	03/23/17 09:12	03/23/17 16:00
BOTF-B1-60	T170734-12	Soil	03/23/17 09:16	03/23/17 16:00
VRS-B1-20	T170734-13	Soil	03/23/17 12:35	03/23/17 16:00
VRS-B1-25	T170734-14	Soil	03/23/17 12:41	03/23/17 16:00
VRS-B1-30	T170734-15	Soil	03/23/17 12:46	03/23/17 16:00
VRS-B1-35	T170734-16	Soil	03/23/17 12:23	03/23/17 16:00
VRS-B1-40	T170734-17	Soil	03/23/17 13:07	03/23/17 16:00
VRS-B1-45	T170734-18	Soil	03/23/17 13:17	03/23/17 16:00
VRS-B1-50	T170734-19	Soil	03/23/17 13:27	03/23/17 16:00
VRS-B1-55	T170734-20	Soil	03/23/17 13:35	03/23/17 16:00
VRS-B1-60	T170734-21	Soil	03/23/17 13:38	03/23/17 16:00
S8-T1-1	T170734-22	Soil	03/23/17 14:15	03/23/17 16:00

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

DETECTIONS SUMMARY

Sample ID: BOTF-B1-5 **Laboratory ID:** T170734-01

No Results Detected

Sample ID: BOTF-B1-10 **Laboratory ID:** T170734-02

No Results Detected

Sample ID: BOTF-B1-15 **Laboratory ID:** T170734-03

No Results Detected

Sample ID: BOTF-B1-20 **Laboratory ID:** T170734-04

No Results Detected

Sample ID: BOTF-B1-25 **Laboratory ID:** T170734-05

No Results Detected

Sample ID: BOTF-B1-30 **Laboratory ID:** T170734-06

No Results Detected

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Sample ID: BOTF-B1-35 **Laboratory ID:** T170734-07

No Results Detected

Sample ID: BOTF-B1-40 **Laboratory ID:** T170734-08

No Results Detected

Sample ID: BOTF-B1-45 **Laboratory ID:** T170734-09

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**33**	10	mg/kg	EPA 8015B	

Sample ID: BOTF-B1-50 **Laboratory ID:** T170734-10

No Results Detected

Sample ID: BOTF-B1-55 **Laboratory ID:** T170734-11

No Results Detected

Sample ID: BOTF-B1-60 **Laboratory ID:** T170734-12

No Results Detected

Sample ID: VRS-B1-20 **Laboratory ID:** T170734-13

No Results Detected

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Sample ID: VRS-B1-25 **Laboratory ID:** T170734-14

No Results Detected

Sample ID: VRS-B1-30 **Laboratory ID:** T170734-15

No Results Detected

Sample ID: VRS-B1-35 **Laboratory ID:** T170734-16

No Results Detected

Sample ID: VRS-B1-40 **Laboratory ID:** T170734-17

No Results Detected

Sample ID: VRS-B1-45 **Laboratory ID:** T170734-18

No Results Detected

Sample ID: VRS-B1-50 **Laboratory ID:** T170734-19

No Results Detected

Sample ID: VRS-B1-55 **Laboratory ID:** T170734-20

No Results Detected

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Sample ID: VRS-B1-60 **Laboratory ID:** T170734-21

No Results Detected

Sample ID: S8-T1-1 **Laboratory ID:** T170734-22

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**66**	10	mg/kg	EPA 8015B	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-5

T170734-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*124 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-10

T170734-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*133 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-15

T170734-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*124 %*	*65-135*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-20

T170734-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*126 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-25

T170734-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*124 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-30

T170734-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*144 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-35

T170734-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*142 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-40

T170734-08 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*141 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-45

T170734-09 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**33**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*146 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-50

T170734-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*133 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-55

T170734-11 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*153 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-60

T170734-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*141 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-20

T170734-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*145 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-25

T170734-14 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*125 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-30

T170734-15 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*150 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-35

T170734-16 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*136 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-40

T170734-17 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*146 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-45

T170734-18 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*150 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-50

T170734-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*167 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-55

T170734-20 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*121 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-60

T170734-21 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032412	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*85.8 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

S8-T1-1

T170734-22 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032412	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**66**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*61.0 %*	*65-135*		"	"	"	"	*S-03*
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032419	03/24/17	03/27/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	
alpha-Chlordane	ND	5.0	"	"	"	"	"	"	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*67.4 %*	*35-140*		"	"	"	"	
Surrogate: Decachlorobiphenyl		*52.3 %*	*35-140*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

S8-T1-1

T170734-22 (Soil)

SunStar Laboratories, Inc.

Chlorinated Herbicides by EPA Method 8151A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4,5-T	ND	5.00	ug/kg	1	7032425	03/24/17	03/28/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*37.1 %*		*35-150*	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032412 - EPA 3550B GC										
Blank (7032412-BLK1)				Prepared & Analyzed: 03/24/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*85.8*		*"*	*99.0*		*86.7*	*65-135*			
LCS (7032412-BS1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	540	10	mg/kg	495		109	75-125			
Surrogate: p-Terphenyl	*104*		*"*	*99.0*		*105*	*65-135*			
LCS Dup (7032412-BSD1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	580	10	mg/kg	510		113	75-125	6.30	20	
Surrogate: p-Terphenyl	*107*		*"*	*102*		*105*	*65-135*			
Batch 7032421 - EPA 3550B GC										
Blank (7032421-BLK1)				Prepared & Analyzed: 03/24/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*133*		*"*	*99.0*		*135*	*65-135*			
LCS (7032421-BS1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	560	10	mg/kg	500		113	75-125			
Surrogate: p-Terphenyl	*162*		*"*	*100*		*162*	*65-135*			*S-Hi1*
LCS Dup (7032421-BSD1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	530	10	mg/kg	490		108	75-125	6.49	20	
Surrogate: p-Terphenyl	*131*		*"*	*98.0*		*134*	*65-135*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032419 - EPA 3550 ECD/GCMS										
Blank (7032419-BLK1)				Prepared: 03/24/17 Analyzed: 03/27/17						
alpha-BHC	ND	5.0	ug/kg							
gamma-BHC (Lindane)	ND	5.0	"							
beta-BHC	ND	5.0	"							
delta-BHC	ND	5.0	"							
Heptachlor	ND	5.0	"							
Aldrin	ND	5.0	"							
Heptachlor epoxide	ND	5.0	"							
gamma-Chlordane	ND	5.0	"							
alpha-Chlordane	ND	5.0	"							
Endosulfan I	ND	5.0	"							
4,4´-DDE	ND	5.0	"							
Dieldrin	ND	5.0	"							
Endrin	ND	5.0	"							
4,4´-DDD	ND	5.0	"							
Endosulfan II	ND	5.0	"							
4,4´-DDT	ND	5.0	"							
Endrin aldehyde	ND	5.0	"							
Endosulfan sulfate	ND	5.0	"							
Methoxychlor	ND	10	"							
Endrin ketone	ND	5.0	"							
Toxaphene	ND	200	"							
Surrogate: Tetrachloro-meta-xylene	*7.29*		*"*	*10.0*		*72.9*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.36*		*"*	*10.0*		*83.6*	*35-140*			
LCS (7032419-BS1)				Prepared: 03/24/17 Analyzed: 03/27/17						
gamma-BHC (Lindane)	32.3	5.0	ug/kg	40.4		79.8	40-120			
Heptachlor	31.5	5.0	"	40.4		77.9	40-120			
Aldrin	26.7	5.0	"	40.4		66.1	40-120			
Dieldrin	34.5	5.0	"	40.4		85.3	40-120			
Endrin	36.0	5.0	"	40.4		89.1	40-120			
4,4´-DDT	41.6	5.0	"	40.4		103	33-147			
Surrogate: Tetrachloro-meta-xylene	*7.96*		*"*	*10.1*		*78.8*	*35-140*			
Surrogate: Decachlorobiphenyl	*9.03*		*"*	*10.1*		*89.4*	*35-140*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032419 - EPA 3550 ECD/GCMS										
LCS Dup (7032419-BSD1)				Prepared: 03/24/17 Analyzed: 03/27/17						
gamma-BHC (Lindane)	35.7	5.0	ug/kg	40.4		88.3	40-120	10.1	30	
Heptachlor	35.3	5.0	"	40.4		87.2	40-120	11.4	30	
Aldrin	28.5	5.0	"	40.4		70.6	40-120	6.58	30	
Dieldrin	38.5	5.0	"	40.4		95.3	40-120	11.1	30	
Endrin	40.3	5.0	"	40.4		99.8	40-120	11.3	30	
4,4´-DDT	47.0	5.0	"	40.4		116	33-147	12.1	30	
Surrogate: Tetrachloro-meta-xylene	*8.67*		*"*	*10.1*		*85.8*	*35-140*			
Surrogate: Decachlorobiphenyl	*9.84*		*"*	*10.1*		*97.4*	*35-140*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Chlorinated Herbicides by EPA Method 8151A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032425 - 8151 Prep										
Blank (7032425-BLK1)				Prepared: 03/24/17 Analyzed: 03/28/17						
2,4,5-T	ND	5.00	ug/kg							
2,4,5-TP (Silvex)	ND	5.00	"							
2,4-D	ND	5.00	"							
2,4-DB	ND	5.00	"							
3,5-Dichlorobenzoic acid	ND	5.00	"							
4-Nitrophenol	ND	5.00	"							
Acifluorfen	ND	5.00	"							
Bentazon	ND	5.00	"							
Chloramben	ND	5.00	"							
Dalapon	ND	30.0	"							
DCPA diacid	ND	5.00	"							
Dicamba	ND	5.00	"							
Dichloroprop	ND	5.00	"							
Dinoseb	ND	5.00	"							
Pentachlorophenol	ND	5.00	"							
Picloram	ND	5.00	"							
Surrogate: 2,4-DCAA	*212*		*"*	*392*		*54.1*	*35-150*			
LCS (7032425-BS1)				Prepared: 03/24/17 Analyzed: 03/28/17						
2,4,5-T	101	5.00	ug/kg	97.3		104	20-150			
2,4,5-TP (Silvex)	114	5.00	"	97.5		117	20-150			
2,4-D	112	5.00	"	97.5		115	20-150			
Surrogate: 2,4-DCAA	*228*		*"*	*390*		*58.4*	*35-150*			
LCS Dup (7032425-BSD1)				Prepared: 03/24/17 Analyzed: 03/28/17						
2,4,5-T	87.4	5.00	ug/kg	99.8		87.6	20-150	14.2	30	
2,4,5-TP (Silvex)	99.9	5.00	"	100		99.9	20-150	12.8	30	
2,4-D	98.1	5.00	"	100		98.1	20-150	12.9	30	
Surrogate: 2,4-DCAA	*195*		*"*	*400*		*48.7*	*35-150*			

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Notes and Definitions

S-Hi1	Surrogate recovery was high in QC and corresponding samples. Sample results were non-detect. Data was not negatively effected.
S-03	The surrogate recovery was below acceptance criteria in the sample because of a possible matrix effect. The surrogate recovery was within acceptance criteria in the method blank and LCS.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: DERRICK WILLIS

Date: 3/23/17 Page: 1 Of 2
Project Name: Brea-Olinda
Collector: F Hagar Client Project #: B2077.01
Batch #: T170734 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	PCB EPA 8082			Laboratory ID #	Comments/Preservative	Total # of containers
BOTF-B1-5	3/23/17	0750	Soil	Ring				H				A	H		H			01		1
BOTF-B1-10	3/23/17	0757	Soil	Ring+VOA	H			H				A	H		H			02		1
BOTF-B1-15	3/23/17	0800	Soil	Ring				H				A	H		H			03		1
BOTF-B1-20	3/23/17	0807	Soil	Ring+VOA	H			H				A	H		H			04		1
BOTF-B1-25	3/23/17	0813	Soil	Ring				H				A	H		H			05		1
BOTF-B1-30	3/23/17	0825	Soil	Ring+VOA	H			H				A	H		H			06		1
BOTF-B1-35	3/23/17	0834	Soil	Ring				H				A	H		H			07		1
BOTF-B1-40	3/23/17	0840	Soil	Ring+VOA	H			H				A	H		H			08		1
BOTF-B1-45	3/23/17	0853	Soil	Ring				H				A	H		H			09		1
BOTF-B1-50	3/23/17	0903	Soil	Ring+VOA	H			H				A	H		H			10		1
BOTF-B1-55	3/23/17	0912	Soil	Ring				H				A	H		H			11		1
BOTF-B1-60	3/23/17	0916	Soil	Ring+VOA	H			H				A	H		H			12		1
VRS-B1-20	3/23/17	1235	Soil	Ring+VOA	H			H				A	H		H			13		1
VRS-B1-25	3/23/17	1241	Soil	Ring				H				A	H		H			14		1
VRS-B1-30	3/23/17	1246	Soil	Ring+VOA	H			H				A	H		H			15		1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Frank Hagar	3/23/17 1600		3/23/17 16:20
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 4.9

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162581

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Dr Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/23/17 Page: 2 Of 2
Project Name: Brea - Olinda
Collector: Frank Hagar Client Project #: 02077.01
Batch #: T170734 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB	8081 chlor PEST	8141 OP PEST	8151 HERBICIDES	Laboratory ID #	Comments/Preservative	Total # of containers
VRS-B1-35	3/23/17	1253	Soil	Ring				H				A	H		H				16		
VRS-B1-40	3/23/17	1307	Soil	Ring+VOA	H			H				A	H		H				17		
VRS-B1-45	3/23/17	1317	Soil	Ring				H				A	H		H				18		
VRS-B1-50	3/23/17	1327	Soil	Ring+VOA	H			H				A	H		H				19		
VRS-B1-55	3/23/17	1335	Soil	Ring				H				A	H		H				20		
VRS-B1-60	3/23/17	1338	Soil	Ring+VOA	H			H				A	H		H				21		
SB-T1-1	3/23/17	1415	Soil	4oz Glass				H				A	H		H	A	A	A	22		

+371

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/23/17 1600		3/23/17 16:30
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 4.9

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162582

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T170734

Client Name: Northgate - Laguna Hills Project: Brea Olinda

Delivered by: ☐ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: Date/Time Courier Received:

Lab Received by: Brian Date/Time Lab Received: 3-23-17 1620

Total number of coolers received: 0

Temperature: Cooler #1	5.1 °C +/- the CF (- 0.2°C) =	4.9	°C corrected temperature	
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =		°C corrected temperature	
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =		°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?		☒ **Yes** ☐ **No**	
If NO:				
Samples received on ice?	☐ Yes		☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable		☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked Cooler/Sample Review - Initials and date: DM 3-23-17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/30/17 17:00 (5 day TAT)
Received By: Brian Charon Date Received: 03/23/17 16:00
Logged In By: Dan Marteski Date Logged In: 03/24/17 09:19

Samples Received at: **4.9°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170734

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8141 OP Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due:	03/30/17 17:00 (5 day TAT)		
Received By:	Brian Charon	Date Received:	03/23/17 16:00
Logged In By:	Dan Marteski	Date Logged In:	03/24/17 09:19

Samples Received at: **4.9°C**

Custody Seals	No	Received On Ice	Yes
Containers Intact	Yes		
COC/Labels Agree	Yes		
Preservation Confirı	Yes		

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

07 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/23/17 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VRS-B1-20	T170734-13	Soil	03/23/17 12:35	03/23/17 16:00
VRS-B1-60	T170734-21	Soil	03/23/17 13:38	03/23/17 16:00

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

DETECTIONS SUMMARY

Sample ID: VRS-B1-20 **Laboratory ID:** T170734-13

No Results Detected

Sample ID: VRS-B1-60 **Laboratory ID:** T170734-21

No Results Detected

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

VRS-B1-20

T170734-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	350	ug/kg	1	7040522	04/05/17	04/06/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*83.7 %*	*65-135*		"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7040431	04/04/17	04/05/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

VRS-B1-20

T170734-13 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
trans-1,2-Dichloroethene	ND	5.0	ug/kg	1	7040431	04/04/17	04/05/17	EPA 8260B/5035	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

VRS-B1-20

T170734-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
o-Xylene	ND	5.0	ug/kg	1	7040431	04/04/17	04/05/17	EPA 8260B/5035	
Surrogate: Toluene-d8		*99.4 %*	*85.5-116*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96.6 %*	*81.2-123*		"	"	"	"	
Surrogate: Dibromofluoromethane		*110 %*	*95.7-135*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

VRS-B1-60

T170734-21 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	350	ug/kg	1	7040522	04/05/17	04/06/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*82.7 %*	*65-135*		"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	4.4	ug/kg	1	7040431	04/04/17	04/05/17	EPA 8260B/5035	
Bromochloromethane	ND	4.4	"	"	"	"	"	"	
Bromodichloromethane	ND	4.4	"	"	"	"	"	"	
Bromoform	ND	4.4	"	"	"	"	"	"	
Bromomethane	ND	4.4	"	"	"	"	"	"	
n-Butylbenzene	ND	4.4	"	"	"	"	"	"	
sec-Butylbenzene	ND	4.4	"	"	"	"	"	"	
tert-Butylbenzene	ND	4.4	"	"	"	"	"	"	
Carbon tetrachloride	ND	4.4	"	"	"	"	"	"	
Chlorobenzene	ND	4.4	"	"	"	"	"	"	
Chloroethane	ND	4.4	"	"	"	"	"	"	
Chloroform	ND	4.4	"	"	"	"	"	"	
Chloromethane	ND	4.4	"	"	"	"	"	"	
2-Chlorotoluene	ND	4.4	"	"	"	"	"	"	
4-Chlorotoluene	ND	4.4	"	"	"	"	"	"	
Dibromochloromethane	ND	4.4	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	8.8	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	4.4	"	"	"	"	"	"	
Dibromomethane	ND	4.4	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	4.4	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	4.4	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	4.4	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	4.4	"	"	"	"	"	"	
1,1-Dichloroethane	ND	4.4	"	"	"	"	"	"	
1,2-Dichloroethane	ND	4.4	"	"	"	"	"	"	
1,1-Dichloroethene	ND	4.4	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.4	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	4.4	"	"	"	"	"	"	

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VRS-B1-60

T170734-21 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,2-Dichloropropane	ND	4.4	ug/kg	1	7040431	04/04/17	04/05/17	EPA 8260B/5035	
1,3-Dichloropropane	ND	4.4	"	"	"	"	"	"	
2,2-Dichloropropane	ND	4.4	"	"	"	"	"	"	
1,1-Dichloropropene	ND	4.4	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	4.4	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	4.4	"	"	"	"	"	"	
Hexachlorobutadiene	ND	4.4	"	"	"	"	"	"	
Isopropylbenzene	ND	4.4	"	"	"	"	"	"	
p-Isopropyltoluene	ND	4.4	"	"	"	"	"	"	
Methylene chloride	ND	4.4	"	"	"	"	"	"	
Naphthalene	ND	4.4	"	"	"	"	"	"	
n-Propylbenzene	ND	4.4	"	"	"	"	"	"	
Styrene	ND	4.4	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	4.4	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	4.4	"	"	"	"	"	"	
Tetrachloroethene	ND	4.4	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	4.4	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	4.4	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	4.4	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	4.4	"	"	"	"	"	"	
Trichloroethene	ND	4.4	"	"	"	"	"	"	
Trichlorofluoromethane	ND	4.4	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	4.4	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	4.4	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	4.4	"	"	"	"	"	"	
Vinyl chloride	ND	4.4	"	"	"	"	"	"	
Benzene	ND	4.4	"	"	"	"	"	"	
Toluene	ND	4.4	"	"	"	"	"	"	
Ethylbenzene	ND	4.4	"	"	"	"	"	"	
m,p-Xylene	ND	8.8	"	"	"	"	"	"	
o-Xylene	ND	4.4	"	"	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

VRS-B1-60

T170734-21 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Toluene-d8	*102 %*		*85.5-116*		*7040431*	*04/04/17*	*04/05/17*	*EPA 8260B/5035*	
Surrogate: 4-Bromofluorobenzene	*100 %*		*81.2-123*		*"*	*"*	*"*	*"*	
Surrogate: Dibromofluoromethane	*110 %*		*95.7-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

Purgeable Petroleum Hydrocarbons by EPA 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040522 - EPA 5035 GC										
Blank (7040522-BLK1)				Prepared: 04/05/17 Analyzed: 04/07/17						
C6-C12 (GRO)	ND	400	ug/kg							
Surrogate: 4-Bromofluorobenzene	*99.3*		*"*	*100*		*99.3*	*65-135*			
LCS (7040522-BS1)				Prepared: 04/05/17 Analyzed: 04/06/17						
C6-C12 (GRO)	10200	400	ug/kg	10900		93.5	75-125			
Surrogate: 4-Bromofluorobenzene	*89.9*		*"*	*100*		*89.9*	*65-135*			
LCS Dup (7040522-BSD1)				Prepared: 04/05/17 Analyzed: 04/06/17						
C6-C12 (GRO)	10300	400	ug/kg	10900		94.3	75-125	0.887	20	
Surrogate: 4-Bromofluorobenzene	*98.0*		*"*	*100*		*98.0*	*65-135*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040431 - EPA 5035 GCMS										
Blank (7040431-BLK1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Bromobenzene	ND	5.0	ug/kg							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	10	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040431 - EPA 5035 GCMS										
Blank (7040431-BLK1)				Prepared: 04/04/17 Analyzed: 04/05/17						
p-Isopropyltoluene	ND	5.0	ug/kg							
Methylene chloride	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
Benzene	ND	5.0	"							
Toluene	ND	5.0	"							
Ethylbenzene	ND	5.0	"							
m,p-Xylene	ND	10	"							
o-Xylene	ND	5.0	"							
Surrogate: Toluene-d8	*39.4*		*"*	*39.9*		*98.6*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*39.4*		*"*	*39.9*		*98.8*	*81.2-123*			
Surrogate: Dibromofluoromethane	*38.4*		*"*	*39.9*		*96.2*	*95.7-135*			
LCS (7040431-BS1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Chlorobenzene	88.0	5.0	ug/kg	99.4		88.5	75-125			
1,1-Dichloroethene	77.4	5.0	"	99.4		77.8	75-125			
Trichloroethene	77.2	5.0	"	99.4		77.7	75-125			
Benzene	78.9	5.0	"	99.4		79.4	75-125			
Toluene	80.5	5.0	"	99.4		81.0	75-125			
Surrogate: Toluene-d8	*38.5*		*"*	*39.8*		*96.9*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*41.4*		*"*	*39.8*		*104*	*81.2-123*			
Surrogate: Dibromofluoromethane	*44.3*		*"*	*39.8*		*111*	*95.7-135*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040431 - EPA 5035 GCMS										
LCS Dup (7040431-BSD1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Chlorobenzene	96.9	5.0	ug/kg	99.4		97.4	75-125	9.63	20	
1,1-Dichloroethene	75.3	5.0	"	99.4		75.8	75-125	2.73	20	
Trichloroethene	85.7	5.0	"	99.4		86.2	75-125	10.4	20	
Benzene	93.5	5.0	"	99.4		94.1	75-125	16.9	20	
Toluene	89.3	5.0	"	99.4		89.8	75-125	10.4	20	
Surrogate: Toluene-d8	*40.7*		*"*	*39.8*		*102*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*43.6*		*"*	*39.8*		*110*	*81.2-123*			
Surrogate: Dibromofluoromethane	*43.3*		*"*	*39.8*		*109*	*95.7-135*			

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/07/17 12:50

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: DERRICK WILLIS

Date: 3/23/17 Page: 1 Of 2
Project Name: Brea-Olinda
Collector: F Hagar Client Project #: B2077.01
Batch #: T170734 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	PCB EPA 8082			Laboratory ID #	Comments/Preservative	Total # of containers
BOTF-B1-5	3/23/17	0750	Soil	Ring				H				A	H		H			01		1
BOTF-B1-10	3/23/17	0757	Soil	Ring+VOA	H			H				A	H		H			02		1
BOTF-B1-15	3/23/17	0800	Soil	Ring				H				A	H		H			03		1
BOTF-B1-20	3/23/17	0807	Soil	Ring+VOA	H			H				A	H		H			04		1
BOTF-B1-25	3/23/17	0813	Soil	Ring				H				A	H		H			05		1
BOTF-B1-30	3/23/17	0825	Soil	Ring+VOA	H			H				A	H		H			06		1
BOTF-B1-35	3/23/17	0834	Soil	Ring				H				A	H		H			07		1
BOTF-B1-40	3/23/17	0840	Soil	Ring+VOA	H			H				A	H		H			08		1
BOTF-B1-45	3/23/17	0853	Soil	Ring				H				A	H		H			09		1
BOTF-B1-50	3/23/17	0903	Soil	Ring+VOA	H			H				A	H		H			10		1
BOTF-B1-55	3/23/17	0912	Soil	Ring				H				A	H		H			11		1
BOTF-B1-60	3/23/17	0916	Soil	Ring+VOA	H			H				A	H		H			12		1
VRS-B1-20	3/23/17	1235	Soil	Ring+VOA	H			H				A	H		H			13		1
VRS-B1-25	3/23/17	1241	Soil	Ring				H				A	H		H			14		1
VRS-B1-30	3/23/17	1246	Soil	Ring+VOA	H			H				A	H		H			15		1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
[signature]	3/23/17 1600	[signature]	3/23/17 16:20
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 4.9

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162581

I-393

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Dr Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/23/17 Page: 2 Of 2
Project Name: Brea - Olinda
Collector: Frank Hagar Client Project #: 02077.01
Batch #: T170734 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB	8081 chlor PEST	8141 OP PEST	8151 HERBICIDES	Laboratory ID #	Comments/Preservative	Total # of containers
VRS-B1-35	3/23/17	1253	Soil	Ring				H				A	H		H				16		
VRS-B1-40	3/23/17	1307	Soil	Ring+VOA	H			H				A	H		H				17		
VRS-B1-45	3/23/17	1317	Soil	Ring				H				A	H		H				18		
VRS-B1-50	3/23/17	1327	Soil	Ring+VOA	H			H				A	H		H				19		
VRS-B1-55	3/23/17	1335	Soil	Ring				H				A	H		H				20		
VRS-B1-60	3/23/17	1338	Soil	Ring+VOA	H			H				A	H		H				21		
SB-T1-1	3/23/17	1415	Soil	4oz Glass				H				A	H		H	A	A	A	22		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/23/17 1600		3/23/17 16:30
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 4.9

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162582

+394

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T170734

Client Name: Northgate - Laguna Hills Project: Brea Olinda

Delivered by: ☐ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: Date/Time Courier Received:

Lab Received by: Brian Date/Time Lab Received: 3-23-17 1620

Total number of coolers received: 0

Temperature: Cooler #1	5.1 °C +/- the CF (- 0.2°C) =	4.9	°C corrected temperature	
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =		°C corrected temperature	
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =		°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?		☒ **Yes** ☐ **No**	
If NO:				
Samples received on ice?	☐ Yes		☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable		☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked Cooler/Sample Review - Initials and date: DM 3-23-17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 12:10 PM
To: 'Frank Hagar'
Cc: 'Derrick Willis'
Subject: RE: The FINAL Word Additional request for Brea Olinda (T170734, T170759, T170788, and T170798)
Attachments: T170734_WKO_03.pdf; T170759_WKO_03.pdf; T170788_WKO_02.pdf; T170798_WKO_02.pdf

I believe I got it all coded in correctly gentlemen!

Please find attached work orders for confirmation. You will see in the comments section which analyses were added for each sample. It's a bit confusing since the samples were amongst several projects. All the samples that we did not receive 5035 kits for will be done by standard 8260 and 8015 Gas Purge as requested below. Please review and let me know if you have any questions or need anything else.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 11:22 AM
To: Rose Fasheh
Cc: Derrick Willis
Subject: The FINAL Word

Rose,

Per our call this morning, Back to the same samples without 5035 extractions – regular analyses.

Thanks

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
Laguna Hills, Ca 92653
phone (949)716-0050 **mobile (949) 689-9987**; fax (949) 716-0055
www.ngem.com

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From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 10:14 AM
To: Rose Fasheh; Derrick Willis
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Rose,

Derrick is out of pocket a bit this morning so….

Please change the following samples for analysis of 8260 and GRO
SLA-B1-5 change to SLA-B1-10
SLA-B1-15 change to SLA-B1-20
S3-T1-5 change to S3-T1-10
S7-T1-5 change to S1-T1-10
I had a note on the COC for BB6P-B1-30 to lab extract a 5035 for that sample. GO ahead and do that please.

SLA-B1-15 no analysis as SLA-B1-10 and SLA-B1-20 will cover.

Let me know if there are any other issues with these samples.

Thanks
Frank

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
Laguna Hills, Ca 92653
phone (949)716-0050 **mobile (949) 689-9987**; fax (949) 716-0055
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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 9:40 AM
To: 'Derrick Willis' <derrick.willis@ngem.com>

Cc: 'Frank Hagar' <frank.hagar@ngem.com>
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Several of the samples you have requested 8260 and GRO for, we did not receive 5035 kits. We can run standard OR can make some kits using the jars or sleeves provided but it will be noted on the report that the kits were made in house, not a true 5035 prep. Specifically samples: SLA-B1-5 (T170759-01), SLA-B1-15 (T170759-03), BB6P-B1-30 (T170759-18), S3-T1-5 (T170798-07), and S7-T1-5 (T170798-10).

Also, sample SLA-B1-15 you have requested 8260 and GRO. This sample was on hold so no results were sent, did you mean for us to run another sample?

Please advise how you wish for me to proceed.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Wednesday, April 05, 2017 8:19 AM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
Yes, please also report the GRO. Can I get prelims on the volatiles at the 3-day mark? Thanks
Derrick

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 5, 2017 8:17 AM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Good morning Derrick,

For all the samples you requested VOCs by 8260 below, did you also need the GRO 5035 purgable?

Standard 5-day TAT okay?

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Tuesday, April 04, 2017 6:07 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
I would like to request the following:
VRS-B1-20 - 8260
VRS-B1-60 – 8260
SLA-B1-5 – 8260
SLA-B1-15 – 8260
SLA-B1-60 – 8260
BBGP-B1-30 – 8260, Metals, Uranium
S8-B1-39 – Uranium, PCBs
S3-T1-5 - 8260, 8270, metals
S7-T1-5 - 8270

Thanks
Derrick

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/30/17 17:00 (5 day TAT)
Received By: Brian Charon Date Received: 03/23/17 16:00
Logged In By: Dan Marteski Date Logged In: 03/24/17 09:19

Samples Received at: **4.9°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8141 OP Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170734

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/30/17 17:00 (5 day TAT)
Received By: Brian Charon Date Received: 03/23/17 16:00
Logged In By: Dan Marteski Date Logged In: 03/24/17 09:19

Samples Received at: **4.9°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confirı Yes

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/30/17 17:00 (5 day TAT)
Received By: Brian Charon Date Received: 03/23/17 16:00
Logged In By: Dan Marteski Date Logged In: 03/24/17 09:19

Samples Received at: **4.9°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

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WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				**8260 and GRO added per client request (Derrick, 4/5)**
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
8015 m 5035-GRO	04/10/17 15:00	3	04/06/17 12:35	
8260 5035	04/10/17 15:00	3	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	

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WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				**8260 and GRO added per client request (Derrick, 4/5)**
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
8015 m 5035-GRO	04/10/17 15:00	3	04/06/17 13:38	
8260 5035	04/10/17 15:00	3	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
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06 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/28/17 16:57. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S8-B1-15	T170788-01	Soil	03/28/17 00:00	03/28/17 16:57
S8-B1-39	T170788-02	Soil	03/28/17 00:00	03/28/17 16:57
S8-B1-55	T170788-03	Soil	03/28/17 00:00	03/28/17 16:57
S5-B1-20	T170788-04	Soil	03/28/17 00:00	03/28/17 16:57
S5-B1-24	T170788-05	Soil	03/28/17 00:00	03/28/17 16:57
S5-B1-36	T170788-06	Soil	03/28/17 00:00	03/28/17 16:57
S8-T1-1	T170788-07	Soil	03/28/17 00:00	03/28/17 16:57

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

DETECTIONS SUMMARY

Sample ID: S8-B1-15 **Laboratory ID:** T170788-01

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**80**	10	mg/kg	EPA 8015B	
C13-C28 (DRO)	**2100**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**720**	10	mg/kg	EPA 8015B	
Barium	**71**	0.86	mg/kg	EPA 6010B	
Chromium	**7.8**	1.7	mg/kg	EPA 6010B	
Cobalt	**6.0**	1.7	mg/kg	EPA 6010B	
Copper	**5.3**	0.86	mg/kg	EPA 6010B	
Nickel	**8.2**	1.7	mg/kg	EPA 6010B	
Vanadium	**24**	4.3	mg/kg	EPA 6010B	
Zinc	**23**	0.86	mg/kg	EPA 6010B	
Fluorene	**480**	300	ug/kg	EPA 8270C	

Sample ID: S8-B1-39 **Laboratory ID:** T170788-02

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**380000**	16000	ug/kg	EPA 8015B	
C13-C28 (DRO)	**13000**	100	mg/kg	EPA 8015B	
C29-C40 (MORO)	**4300**	100	mg/kg	EPA 8015B	
Barium	**56**	1.0	mg/kg	EPA 6010B	
Chromium	**5.8**	2.0	mg/kg	EPA 6010B	
Cobalt	**4.8**	2.0	mg/kg	EPA 6010B	
Copper	**5.2**	1.0	mg/kg	EPA 6010B	
Nickel	**11**	2.0	mg/kg	EPA 6010B	
Vanadium	**17**	5.0	mg/kg	EPA 6010B	
Zinc	**26**	1.0	mg/kg	EPA 6010B	
n-Butylbenzene	**18**	5.0	ug/kg	EPA 8260B/5035	
sec-Butylbenzene	**56**	5.0	ug/kg	EPA 8260B/5035	
tert-Butylbenzene	**5.9**	5.0	ug/kg	EPA 8260B/5035	
Isopropylbenzene	**57**	5.0	ug/kg	EPA 8260B/5035	
Naphthalene	**120**	5.0	ug/kg	EPA 8260B/5035	
n-Propylbenzene	**48**	5.0	ug/kg	EPA 8260B/5035	
2-Methylnaphthalene	**2800**	1500	ug/kg	EPA 8270C	R-07

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Sample ID: S8-B1-39 **Laboratory ID:** T170788-02

Analyte	Result	Reporting Limit	Units	Method	Notes
1-Methylnaphthalene	**3500**	1500	ug/kg	EPA 8270C	R-07
Phenanthrene	**2800**	1500	ug/kg	EPA 8270C	R-07

Sample ID: S8-B1-55 **Laboratory ID:** T170788-03

Analyte	Result	Reporting Limit	Units	Method	Notes
C6-C12 (GRO)	**180000**	11000	ug/kg	EPA 8015B	
C13-C28 (DRO)	**7900**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**1800**	10	mg/kg	EPA 8015B	
Barium	**57**	1.0	mg/kg	EPA 6010B	
Chromium	**8.9**	2.0	mg/kg	EPA 6010B	
Cobalt	**5.5**	2.0	mg/kg	EPA 6010B	
Copper	**6.7**	1.0	mg/kg	EPA 6010B	
Nickel	**14**	2.0	mg/kg	EPA 6010B	
Vanadium	**24**	5.0	mg/kg	EPA 6010B	
Zinc	**35**	1.0	mg/kg	EPA 6010B	
n-Butylbenzene	**18**	3.7	ug/kg	EPA 8260B/5035	
sec-Butylbenzene	**42**	3.7	ug/kg	EPA 8260B/5035	
tert-Butylbenzene	**4.2**	3.7	ug/kg	EPA 8260B/5035	
Isopropylbenzene	**28**	3.7	ug/kg	EPA 8260B/5035	
p-Isopropyltoluene	**13**	3.7	ug/kg	EPA 8260B/5035	
Naphthalene	**5.4**	3.7	ug/kg	EPA 8260B/5035	
n-Propylbenzene	**20**	3.7	ug/kg	EPA 8260B/5035	
Fluorene	**1600**	1500	ug/kg	EPA 8270C	R-07
N-Nitrosodiphenylamine	**2700**	1500	ug/kg	EPA 8270C	R-07

Sample ID: S5-B1-20 **Laboratory ID:** T170788-04

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**11**	10	mg/kg	EPA 8015B	

Sample ID: S5-B1-24 **Laboratory ID:** T170788-05

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Sample ID: S5-B1-24 **Laboratory ID:** T170788-05

No Results Detected

Sample ID: S5-B1-36 **Laboratory ID:** T170788-06

No Results Detected

Sample ID: S8-T1-1 **Laboratory ID:** T170788-07

No Results Detected

SunStar Laboratories, Inc.
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-15

T170788-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	**80**	10	mg/kg	1	7032913	03/29/17	03/30/17	EPA 8015B	
C13-C28 (DRO)	**2100**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**720**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*110 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	2.6	mg/kg	1	7032921	03/29/17	03/30/17	EPA 6010B	
Silver	ND	1.7	"	"	"	"	"	"	
Arsenic	ND	4.3	"	"	"	"	"	"	
Barium	**71**	0.86	"	"	"	"	"	"	
Beryllium	ND	0.86	"	"	"	"	"	"	
Cadmium	ND	1.7	"	"	"	"	"	"	
Chromium	**7.8**	1.7	"	"	"	"	"	"	
Cobalt	**6.0**	1.7	"	"	"	"	"	"	
Copper	**5.3**	0.86	"	"	"	"	"	"	
Lead	ND	2.6	"	"	"	"	"	"	
Molybdenum	ND	4.3	"	"	"	"	"	"	
Nickel	**8.2**	1.7	"	"	"	"	"	"	
Selenium	ND	4.3	"	"	"	"	"	"	
Thallium	ND	1.7	"	"	"	"	"	"	
Vanadium	**24**	4.3	"	"	"	"	"	"	
Zinc	**23**	0.86	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032920	03/29/17	03/30/17	EPA 7471A Soil	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-15

T170788-01 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Carbazole	ND	300	ug/kg	1	7032720	03/29/17	03/31/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	300	"	"	"	"	"	"	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-15

T170788-01 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chrysene	ND	300	ug/kg	1	7032720	03/29/17	03/31/17	EPA 8270C	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	**480**	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	
Nitrobenzene	ND	1000	"	"	"	"	"	"	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-15

T170788-01 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,3,5,6-Tetrachlorophenol	ND	300	ug/kg	1	7032720	03/29/17	03/31/17	EPA 8270C	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*49.1 %*		*15-121*	"	"	"	"	
Surrogate: Phenol-d6		*47.6 %*		*24-113*	"	"	"	"	
Surrogate: Nitrobenzene-d5		*62.4 %*		*21.3-119*	"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*89.1 %*		*32.4-102*	"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*88.3 %*		*18.1-105*	"	"	"	"	
Surrogate: Terphenyl-dl4		*144 %*		*29.1-130*	"	"	"	"	*S-GC*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-39

T170788-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	**380000**	16000	ug/kg	50	7032938	03/29/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*111 %*	*65-135*		"	"	"	"	
Extractable Petroleum Hydrocarbons by 8015B									
C13-C28 (DRO)	**13000**	100	mg/kg	10	7032913	03/29/17	03/30/17	EPA 8015B	
C29-C40 (MORO)	**4300**	100	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*111 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032921	03/29/17	03/30/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**56**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**5.8**	2.0	"	"	"	"	"	"	
Cobalt	**4.8**	2.0	"	"	"	"	"	"	
Copper	**5.2**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**11**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**17**	5.0	"	"	"	"	"	"	
Zinc	**26**	1.0	"	"	"	"	"	"	

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S8-B1-39

T170788-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032920	03/29/17	03/30/17	EPA 7471A Soil	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	**18**	5.0	"	"	"	"	"	"	
sec-Butylbenzene	**56**	5.0	"	"	"	"	"	"	
tert-Butylbenzene	**5.9**	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-39

T170788-02 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,2-Dichloropropane	ND	5.0	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	**57**	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	**120**	5.0	"	"	"	"	"	"	
n-Propylbenzene	**48**	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	

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S8-B1-39

T170788-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Toluene-d8	*112 %*	*85.5-116*			*7032939*	*03/29/17*	*04/01/17*	*EPA 8260B/5035*	
Surrogate: 4-Bromofluorobenzene	*198 %*	*81.2-123*			*"*	*"*	*"*	*"*	*S-GC*
Surrogate: Dibromofluoromethane	*119 %*	*95.7-135*			*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	1500	ug/kg	5	7032720	03/29/17	03/31/17	EPA 8270C	R-07
Phenol	ND	5000	"	"	"	"	"	"	R-07
Aniline	ND	1500	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	5000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	1500	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2-Methylnaphthalene	**2800**	1500	"	"	"	"	"	"	R-07
1-Methylnaphthalene	**3500**	1500	"	"	"	"	"	"	R-07
Acenaphthene	ND	1500	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrotoluene	ND	1500	"	"	"	"	"	"	R-07
Pentachlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyrene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthylene	ND	1500	"	"	"	"	"	"	R-07
Anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (b) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (k) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	5000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	1500	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	1500	"	"	"	"	"	"	R-07

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S8-B1-39

T170788-02 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
4-Bromophenyl phenyl ether	ND	1500	ug/kg	5	7032720	03/29/17	03/31/17	EPA 8270C	R-07
Butyl benzyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Chloroaniline	ND	1500	"	"	"	"	"	"	R-07
2-Chloronaphthalene	ND	1500	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Chrysene	ND	1500	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	1500	"	"	"	"	"	"	R-07
Dibenzofuran	ND	1500	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	1500	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
2,4-Dimethylphenol	ND	5000	"	"	"	"	"	"	R-07
Dimethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,6-Dinitrotoluene	ND	5000	"	"	"	"	"	"	R-07
Di-n-octyl phthalate	ND	1500	"	"	"	"	"	"	R-07
Fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Fluorene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	7500	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorocyclopentadiene	ND	5000	"	"	"	"	"	"	R-07
Hexachloroethane	ND	1500	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	1500	"	"	"	"	"	"	R-07
Isophorone	ND	1500	"	"	"	"	"	"	R-07
2-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
4-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
Naphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07

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S8-B1-39

T170788-02 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
4-Nitroaniline	ND	1500	ug/kg	5	7032720	03/29/17	03/31/17	EPA 8270C	R-07
Nitrobenzene	ND	5000	"	"	"	"	"	"	R-07
2-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
N-Nitrosodimethylamine	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	ND	1500	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
Phenanthrene	**2800**	1500	"	"	"	"	"	"	R-07
Azobenzene	ND	1500	"	"	"	"	"	"	R-07
Pyridine	ND	1500	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*57.6 %*	*15-121*		"	"	"	"	*R-07*
Surrogate: Phenol-d6		*37.1 %*	*24-113*		"	"	"	"	*R-07*
Surrogate: Nitrobenzene-d5		*73.5 %*	*21.3-119*		"	"	"	"	*R-07*
Surrogate: 2-Fluorobiphenyl		*97.5 %*	*32.4-102*		"	"	"	"	*R-07*
Surrogate: 2,4,6-Tribromophenol		*112 %*	*18.1-105*		"	"	"	"	*S-GC, R-07*
Surrogate: Terphenyl-dl4		*148 %*	*29.1-130*		"	"	"	"	*R-07, S-GC*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-55

T170788-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	**180000**	11000	ug/kg	50	7032938	03/29/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*109 %*	*65-135*		"	"	"	"	
Extractable Petroleum Hydrocarbons by 8015B									
C13-C28 (DRO)	**7900**	10	mg/kg	1	7032913	03/29/17	03/30/17	EPA 8015B	
C29-C40 (MORO)	**1800**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*121 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032921	03/29/17	03/30/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**57**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**8.9**	2.0	"	"	"	"	"	"	
Cobalt	**5.5**	2.0	"	"	"	"	"	"	
Copper	**6.7**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**14**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**24**	5.0	"	"	"	"	"	"	
Zinc	**35**	1.0	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-55

T170788-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032920	03/29/17	03/30/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032932	03/29/17	03/30/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*73.3 %*		*35-140*	"	"	"	"	
Surrogate: Decachlorobiphenyl		*38.0 %*		*35-140*	"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.7	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
Bromochloromethane	ND	3.7	"	"	"	"	"	"	
Bromodichloromethane	ND	3.7	"	"	"	"	"	"	
Bromoform	ND	3.7	"	"	"	"	"	"	
Bromomethane	ND	3.7	"	"	"	"	"	"	
n-Butylbenzene	**18**	3.7	"	"	"	"	"	"	
sec-Butylbenzene	**42**	3.7	"	"	"	"	"	"	
tert-Butylbenzene	**4.2**	3.7	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.7	"	"	"	"	"	"	
Chlorobenzene	ND	3.7	"	"	"	"	"	"	
Chloroethane	ND	3.7	"	"	"	"	"	"	
Chloroform	ND	3.7	"	"	"	"	"	"	
Chloromethane	ND	3.7	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.7	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.7	"	"	"	"	"	"	
Dibromochloromethane	ND	3.7	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	7.4	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.7	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-55

T170788-03 (Soil)

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Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Dibromomethane	ND	3.7	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
1,2-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloroethane	ND	3.7	"	"	"	"	"	"	
1,2-Dichloroethane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.7	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.7	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	3.7	"	"	"	"	"	"	
1,2-Dichloropropane	ND	3.7	"	"	"	"	"	"	
1,3-Dichloropropane	ND	3.7	"	"	"	"	"	"	
2,2-Dichloropropane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.7	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.7	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.7	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.7	"	"	"	"	"	"	
Isopropylbenzene	**28**	3.7	"	"	"	"	"	"	
p-Isopropyltoluene	**13**	3.7	"	"	"	"	"	"	
Methylene chloride	ND	3.7	"	"	"	"	"	"	
Naphthalene	**5.4**	3.7	"	"	"	"	"	"	
n-Propylbenzene	**20**	3.7	"	"	"	"	"	"	
Styrene	ND	3.7	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.7	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.7	"	"	"	"	"	"	
Tetrachloroethene	ND	3.7	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.7	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.7	"	"	"	"	"	"	
Trichloroethene	ND	3.7	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.7	"	"	"	"	"	"	

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T170788-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
1,2,3-Trichloropropane	ND	3.7	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
1,3,5-Trimethylbenzene	ND	3.7	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.7	"	"	"	"	"	"	
Vinyl chloride	ND	3.7	"	"	"	"	"	"	
Benzene	ND	3.7	"	"	"	"	"	"	
Toluene	ND	3.7	"	"	"	"	"	"	
Ethylbenzene	ND	3.7	"	"	"	"	"	"	
m,p-Xylene	ND	7.4	"	"	"	"	"	"	
o-Xylene	ND	3.7	"	"	"	"	"	"	
Surrogate: Toluene-d8		*109 %*		*85.5-116*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*200 %*		*81.2-123*	"	"	"	"	*S-GC*
Surrogate: Dibromofluoromethane		*112 %*		*95.7-135*	"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	1500	ug/kg	5	7032720	03/29/17	03/31/17	EPA 8270C	R-07
Phenol	ND	5000	"	"	"	"	"	"	R-07
Aniline	ND	1500	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	5000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	1500	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	5000	"	"	"	"	"	"	R-07
1-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthene	ND	1500	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrotoluene	ND	1500	"	"	"	"	"	"	R-07
Pentachlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyrene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthylene	ND	1500	"	"	"	"	"	"	R-07
Anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	1500	"	"	"	"	"	"	R-07

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T170788-03 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzo (b) fluoranthene	ND	1500	ug/kg	5	7032720	03/29/17	03/31/17	EPA 8270C	R-07
Benzo (k) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	5000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	1500	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Bromophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Butyl benzyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Chloroaniline	ND	1500	"	"	"	"	"	"	R-07
2-Chloronaphthalene	ND	1500	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Chrysene	ND	1500	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	1500	"	"	"	"	"	"	R-07
Dibenzofuran	ND	1500	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	1500	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
2,4-Dimethylphenol	ND	5000	"	"	"	"	"	"	R-07
Dimethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,6-Dinitrotoluene	ND	5000	"	"	"	"	"	"	R-07
Di-n-octyl phthalate	ND	1500	"	"	"	"	"	"	R-07
Fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Fluorene	**1600**	1500	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	7500	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	1500	"	"	"	"	"	"	R-07

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-B1-55

T170788-03 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Hexachlorocyclopentadiene	ND	5000	ug/kg	5	7032720	03/29/17	03/31/17	EPA 8270C	R-07
Hexachloroethane	ND	1500	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	1500	"	"	"	"	"	"	R-07
Isophorone	ND	1500	"	"	"	"	"	"	R-07
2-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
4-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
Naphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
4-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
Nitrobenzene	ND	5000	"	"	"	"	"	"	R-07
2-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
N-Nitrosodimethylamine	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	**2700**	1500	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
Phenanthrene	ND	1500	"	"	"	"	"	"	R-07
Azobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyridine	ND	1500	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*72.1 %*	*15-121*		"	"	"	"	*R-07*
Surrogate: Phenol-d6		*68.9 %*	*24-113*		"	"	"	"	*R-07*
Surrogate: Nitrobenzene-d5		*94.4 %*	*21.3-119*		"	"	"	"	*R-07*
Surrogate: 2-Fluorobiphenyl		*102 %*	*32.4-102*		"	"	"	"	*R-07*
Surrogate: 2,4,6-Tribromophenol		*102 %*	*18.1-105*		"	"	"	"	*R-07*
Surrogate: Terphenyl-dl4		*137 %*	*29.1-130*		"	"	"	"	*R-07, S-GC*

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S5-B1-20

T170788-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032913	03/29/17	03/30/17	EPA 8015B	
C13-C28 (DRO)	**11**	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*97.7 %*		*65-135*		*"*	*"*	*"*	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S5-B1-24

T170788-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	500	ug/kg	1	7032938	03/29/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*79.8 %*	*65-135*		"	"	"	"	
Extractable Petroleum Hydrocarbons by 8015B									
C13-C28 (DRO)	ND	10	mg/kg	1	7032913	03/29/17	03/30/17	EPA 8015B	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*101 %*	*65-135*		"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.9	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
Bromochloromethane	ND	3.9	"	"	"	"	"	"	
Bromodichloromethane	ND	3.9	"	"	"	"	"	"	
Bromoform	ND	3.9	"	"	"	"	"	"	
Bromomethane	ND	3.9	"	"	"	"	"	"	
n-Butylbenzene	ND	3.9	"	"	"	"	"	"	
sec-Butylbenzene	ND	3.9	"	"	"	"	"	"	
tert-Butylbenzene	ND	3.9	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.9	"	"	"	"	"	"	
Chlorobenzene	ND	3.9	"	"	"	"	"	"	
Chloroethane	ND	3.9	"	"	"	"	"	"	
Chloroform	ND	3.9	"	"	"	"	"	"	
Chloromethane	ND	3.9	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.9	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.9	"	"	"	"	"	"	
Dibromochloromethane	ND	3.9	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	7.7	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	"	"	"	"	"	"	
Dibromomethane	ND	3.9	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.9	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.9	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.9	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.9	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S5-B1-24

T170788-05 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,1-Dichloroethane	ND	3.9	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
1,2-Dichloroethane	ND	3.9	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.9	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.9	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	3.9	"	"	"	"	"	"	
1,2-Dichloropropane	ND	3.9	"	"	"	"	"	"	
1,3-Dichloropropane	ND	3.9	"	"	"	"	"	"	
2,2-Dichloropropane	ND	3.9	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.9	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.9	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.9	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.9	"	"	"	"	"	"	
Isopropylbenzene	ND	3.9	"	"	"	"	"	"	
p-Isopropyltoluene	ND	3.9	"	"	"	"	"	"	
Methylene chloride	ND	3.9	"	"	"	"	"	"	
Naphthalene	ND	3.9	"	"	"	"	"	"	
n-Propylbenzene	ND	3.9	"	"	"	"	"	"	
Styrene	ND	3.9	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.9	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.9	"	"	"	"	"	"	
Tetrachloroethene	ND	3.9	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.9	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.9	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.9	"	"	"	"	"	"	
Trichloroethene	ND	3.9	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.9	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	3.9	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	3.9	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.9	"	"	"	"	"	"	
Vinyl chloride	ND	3.9	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S5-B1-24

T170788-05 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	3.9	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
Toluene	ND	3.9	"	"	"	"	"	"	
Ethylbenzene	ND	3.9	"	"	"	"	"	"	
m,p-Xylene	ND	7.7	"	"	"	"	"	"	
o-Xylene	ND	3.9	"	"	"	"	"	"	
Surrogate: Toluene-d8		*102 %*		*85.5-116*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*101 %*		*81.2-123*	"	"	"	"	
Surrogate: Dibromofluoromethane		*105 %*		*95.7-135*	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S5-B1-36

T170788-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	290	ug/kg	1	7032938	03/29/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*75.4 %*	*65-135*		"	"	"	"	
Extractable Petroleum Hydrocarbons by 8015B									
C13-C28 (DRO)	ND	10	mg/kg	1	7032913	03/29/17	03/30/17	EPA 8015B	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*97.9 %*	*65-135*		"	"	"	"	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.2	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
Bromochloromethane	ND	3.2	"	"	"	"	"	"	
Bromodichloromethane	ND	3.2	"	"	"	"	"	"	
Bromoform	ND	3.2	"	"	"	"	"	"	
Bromomethane	ND	3.2	"	"	"	"	"	"	
n-Butylbenzene	ND	3.2	"	"	"	"	"	"	
sec-Butylbenzene	ND	3.2	"	"	"	"	"	"	
tert-Butylbenzene	ND	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	"	"	"	"	"	"	
Chlorobenzene	ND	3.2	"	"	"	"	"	"	
Chloroethane	ND	3.2	"	"	"	"	"	"	
Chloroform	ND	3.2	"	"	"	"	"	"	
Chloromethane	ND	3.2	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.2	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.2	"	"	"	"	"	"	
Dibromochloromethane	ND	3.2	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	6.4	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.2	"	"	"	"	"	"	
Dibromomethane	ND	3.2	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.2	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.2	"	"	"	"	"	"	

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S5-B1-36

T170788-06 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,1-Dichloroethane	ND	3.2	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
1,2-Dichloroethane	ND	3.2	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.2	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.2	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	3.2	"	"	"	"	"	"	
1,2-Dichloropropane	ND	3.2	"	"	"	"	"	"	
1,3-Dichloropropane	ND	3.2	"	"	"	"	"	"	
2,2-Dichloropropane	ND	3.2	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.2	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.2	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.2	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.2	"	"	"	"	"	"	
Isopropylbenzene	ND	3.2	"	"	"	"	"	"	
p-Isopropyltoluene	ND	3.2	"	"	"	"	"	"	
Methylene chloride	ND	3.2	"	"	"	"	"	"	
Naphthalene	ND	3.2	"	"	"	"	"	"	
n-Propylbenzene	ND	3.2	"	"	"	"	"	"	
Styrene	ND	3.2	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.2	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.2	"	"	"	"	"	"	
Tetrachloroethene	ND	3.2	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.2	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.2	"	"	"	"	"	"	
Trichloroethene	ND	3.2	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.2	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	3.2	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	3.2	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.2	"	"	"	"	"	"	
Vinyl chloride	ND	3.2	"	"	"	"	"	"	

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S5-B1-36

T170788-06 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	3.2	ug/kg	1	7032939	03/29/17	04/01/17	EPA 8260B/5035	
Toluene	ND	3.2	"	"	"	"	"	"	
Ethylbenzene	ND	3.2	"	"	"	"	"	"	
m,p-Xylene	ND	6.4	"	"	"	"	"	"	
o-Xylene	ND	3.2	"	"	"	"	"	"	
Surrogate: Toluene-d8		*105 %*		*85.5-116*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*		*81.2-123*	"	"	"	"	
Surrogate: Dibromofluoromethane		*104 %*		*95.7-135*	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-T1-1

T170788-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032831	03/29/17	03/31/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	04/01/17	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	
alpha-Chlordane	ND	5.0	"	"	"	"	03/31/17	"	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	04/01/17	"	
Endrin	ND	5.0	"	"	"	"	03/31/17	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	04/01/17	"	
Endrin aldehyde	ND	5.0	"	"	"	"	03/31/17	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*77.6 %*	*35-140*		*"*	*"*	*04/01/17*	*"*	
Surrogate: Decachlorobiphenyl		*75.2 %*	*35-140*		*"*	*"*	*"*	*"*	
Organophosphorus Pesticides by EPA Method 8141A									
Dichlorvos	ND	5.0	ug/kg	1	7033020	03/30/17	03/31/17	8141a	
Mevinphos	ND	5.0	"	"	"	"	"	"	
Demeton-s	ND	10	"	"	"	"	"	"	
Ethoprophos	ND	5.0	"	"	"	"	"	"	
Phorate	ND	10	"	"	"	"	"	"	
Naled	ND	5.0	"	"	"	"	"	"	
Sulfotep	ND	10	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-T1-1

T170788-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organophosphorus Pesticides by EPA Method 8141A									
Diazinon	ND	5.0	ug/kg	1	7033020	03/30/17	03/31/17	8141a	
Disulfoton	ND	5.0	"	"	"	"	"	"	
Demeton-o	ND	10	"	"	"	"	"	"	
Dimethoate	ND	5.0	"	"	"	"	"	"	
Ronnel	ND	10	"	"	"	"	"	"	
Merphos	ND	10	"	"	"	"	"	"	
Chlorpyrifos	ND	5.0	"	"	"	"	"	"	
Fenthion	ND	5.0	"	"	"	"	"	"	
Trichloronate	ND	5.0	"	"	"	"	"	"	
Methyl parathion	ND	5.0	"	"	"	"	"	"	
Malathion	ND	10	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	5.0	"	"	"	"	"	"	
Parathion	ND	5.0	"	"	"	"	"	"	
Stirophos (Tetrachlorvinphos)	ND	5.0	"	"	"	"	"	"	
Bolstar	ND	5.0	"	"	"	"	"	"	
Fensulfothion	ND	5.0	"	"	"	"	"	"	
EPN	ND	5.0	"	"	"	"	"	"	
Azinphos methyl	ND	10	"	"	"	"	"	"	
Coumaphos	ND	5.0	"	"	"	"	"	"	
Surrogate: Tributylphosphate		*93.5 %*		*40-125*	"	"	"	"	
Chlorinated Herbicides by EPA Method 8151A									
2,4,5-T	ND	5.00	ug/kg	1	7032915	03/29/17	03/31/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-T1-1

T170788-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chlorinated Herbicides by EPA Method 8151A									
DCPA diacid	ND	5.00	ug/kg	1	7032915	03/29/17	03/31/17	8151	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*52.8 %*		*35-150*	"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/29/17	03/31/17	EPA 8270C	
Aniline	ND	300	"	"	"	"	"	"	
Phenol	ND	1000	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	

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Rose Fasheh

Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

S8-T1-1

T170788-07 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bis(2-chloroethoxy)methane	ND	300	ug/kg	1	7032720	03/29/17	03/31/17	EPA 8270C	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	300	"	"	"	"	"	"	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
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S8-T1-1

T170788-07 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
4-Methylphenol	ND	1000	ug/kg	1	7032720	03/29/17	03/31/17	EPA 8270C	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	
Nitrobenzene	ND	1000	"	"	"	"	"	"	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*49.3 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*44.6 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*53.1 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*73.0 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*90.3 %*	*18.1-105*		"	"	"	"	
Surrogate: Terphenyl-dl4		*127 %*	*29.1-130*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Purgeable Petroleum Hydrocarbons by EPA 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032938 - EPA 5035 GC										
Blank (7032938-BLK1)				Prepared: 03/29/17 Analyzed: 04/03/17						
C6-C12 (GRO)	ND	400	ug/kg							
Surrogate: 4-Bromofluorobenzene	*118*		*"*	*100*		*118*	*65-135*			
LCS (7032938-BS1)				Prepared: 03/29/17 Analyzed: 04/03/17						
C6-C12 (GRO)	10600	400	ug/kg	11000		97.2	75-125			
Surrogate: 4-Bromofluorobenzene	*97.4*		*"*	*100*		*97.4*	*65-135*			
LCS Dup (7032938-BSD1)				Prepared: 03/29/17 Analyzed: 04/03/17						
C6-C12 (GRO)	10800	400	ug/kg	10900		98.6	75-125	1.25	20	
Surrogate: 4-Bromofluorobenzene	*96.5*		*"*	*100*		*96.5*	*65-135*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032913 - EPA 3550B GC										
Blank (7032913-BLK1)				Prepared: 03/29/17 Analyzed: 03/30/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*104*		*"*	*99.0*		*105*	*65-135*			
Surrogate: p-Terphenyl	*103*		*"*	*99.0*		*104*	*65-135*			
LCS (7032913-BS1)				Prepared: 03/29/17 Analyzed: 03/30/17						
C13-C28 (DRO)	520	10	mg/kg	495		104	75-125			
C13-C28 (DRO)	520	10	"	495		105	75-125			
Surrogate: p-Terphenyl	*102*		*"*	*99.0*		*103*	*65-135*			
Surrogate: p-Terphenyl	*101*		*"*	*99.0*		*102*	*65-135*			
LCS Dup (7032913-BSD1)				Prepared: 03/29/17 Analyzed: 03/30/17						
C13-C28 (DRO)	530	10	mg/kg	490		108	75-125	2.90	20	
C13-C28 (DRO)	540	10	"	490		110	75-125	3.88	20	
Surrogate: p-Terphenyl	*87.9*		*"*	*98.0*		*89.6*	*65-135*			
Surrogate: p-Terphenyl	*86.1*		*"*	*98.0*		*87.9*	*65-135*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032921 - EPA 3051										
Blank (7032921-BLK1)				Prepared: 03/29/17 Analyzed: 03/30/17						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	2.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
LCS (7032921-BS1)				Prepared: 03/29/17 Analyzed: 03/30/17						
Arsenic	112	5.0	mg/kg	100		112	75-125			
Barium	109	1.0	"	100		109	75-125			
Cadmium	108	2.0	"	100		108	75-125			
Chromium	108	2.0	"	100		108	75-125			
Lead	113	3.0	"	100		113	75-125			
Matrix Spike (7032921-MS1)	**Source: T170765-17**			Prepared: 03/29/17 Analyzed: 03/30/17						
Arsenic	99.8	5.0	mg/kg	100	1.15	98.7	75-125			
Barium	124	1.0	"	100	31.3	92.8	75-125			
Cadmium	96.5	2.0	"	100	0.434	96.1	75-125			
Chromium	102	2.0	"	100	3.64	98.1	75-125			
Lead	99.1	3.0	"	100	2.12	96.9	75-125			

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Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032921 - EPA 3051										
Matrix Spike Dup (7032921-MSD1)	**Source: T170765-17**			Prepared: 03/29/17 Analyzed: 03/30/17						
Arsenic	105	5.0	mg/kg	100	1.15	103	75-125	4.57	20	
Barium	129	1.0	"	100	31.3	97.3	75-125	3.58	20	
Cadmium	95.9	2.0	"	100	0.434	95.5	75-125	0.632	20	
Chromium	100	2.0	"	100	3.64	96.7	75-125	1.39	20	
Lead	103	3.0	"	100	2.12	101	75-125	4.11	20	

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Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032920 - EPA 7471A Soil										
Blank (7032920-BLK1)				Prepared: 03/29/17 Analyzed: 03/30/17						
Mercury	ND	0.10	mg/kg							
LCS (7032920-BS1)				Prepared: 03/29/17 Analyzed: 03/30/17						
Mercury	0.336	0.10	mg/kg	0.410		82.1	75-125			
Matrix Spike (7032920-MS1)	**Source: T170788-01**			Prepared: 03/29/17 Analyzed: 03/30/17						
Mercury	0.324	0.10	mg/kg	0.391	ND	82.9	75-125			
Matrix Spike Dup (7032920-MSD1)	**Source: T170788-01**			Prepared: 03/29/17 Analyzed: 03/30/17						
Mercury	0.332	0.10	mg/kg	0.391	ND	84.9	75-125	2.41	20	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032831 - EPA 3550 ECD/GCMS										
Blank (7032831-BLK1)				Prepared: 03/29/17 Analyzed: 04/01/17						
alpha-BHC	ND	5.0	ug/kg							
gamma-BHC (Lindane)	ND	5.0	"							
beta-BHC	ND	5.0	"							
delta-BHC	ND	5.0	"							
Heptachlor	ND	5.0	"							
Aldrin	ND	5.0	"							
Heptachlor epoxide	ND	5.0	"							
gamma-Chlordane	ND	5.0	"							
alpha-Chlordane	ND	5.0	"							
Endosulfan I	ND	5.0	"							
4,4´-DDE	ND	5.0	"							
Dieldrin	ND	5.0	"							
Endrin	ND	5.0	"							
4,4´-DDD	ND	5.0	"							
Endosulfan II	ND	5.0	"							
4,4´-DDT	ND	5.0	"							
Endrin aldehyde	ND	5.0	"							
Endosulfan sulfate	ND	5.0	"							
Methoxychlor	ND	10	"							
Endrin ketone	ND	5.0	"							
Toxaphene	ND	200	"							
Surrogate: Tetrachloro-meta-xylene	*11.2*		*"*	*10.0*		*112*	*35-140*			
Surrogate: Decachlorobiphenyl	*11.5*		*"*	*10.0*		*115*	*35-140*			
LCS (7032831-BS1)				Prepared: 03/29/17 Analyzed: 04/01/17						
gamma-BHC (Lindane)	10.7	5.0	ug/kg	10.1		106	40-120			
Heptachlor	10.1	5.0	"	10.1		99.7	40-120			
Aldrin	10.3	5.0	"	10.1		102	40-120			
Dieldrin	10.9	5.0	"	10.1		108	40-120			
Endrin	9.85	5.0	"	10.1		97.5	40-120			
4,4´-DDT	8.51	5.0	"	10.1		84.2	33-147			
Surrogate: Tetrachloro-meta-xylene	*10.4*		*"*	*10.1*		*103*	*35-140*			
Surrogate: Decachlorobiphenyl	*10.5*		*"*	*10.1*		*104*	*35-140*			

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Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032831 - EPA 3550 ECD/GCMS										
LCS Dup (7032831-BSD1)				Prepared: 03/29/17 Analyzed: 04/01/17						
gamma-BHC (Lindane)	10.4	5.0	ug/kg	10.2		102	40-120	4.28	30	
Heptachlor	9.55	5.0	"	10.2		93.6	40-120	6.31	30	
Aldrin	9.81	5.0	"	10.2		96.2	40-120	6.00	30	
Dieldrin	11.3	5.0	"	10.2		110	40-120	2.33	30	
Endrin	9.66	5.0	"	10.2		94.7	40-120	2.95	30	
4,4´-DDT	8.09	5.0	"	10.2		79.3	33-147	6.06	30	
Surrogate: Tetrachloro-meta-xylene	*10.2*		*"*	*10.2*		*99.9*	*35-140*			
Surrogate: Decachlorobiphenyl	*9.98*		*"*	*10.2*		*97.8*	*35-140*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032932 - EPA 3550 ECD/GCMS										
Blank (7032932-BLK1)				Prepared: 03/29/17 Analyzed: 03/30/17						
PCB-1016	ND	10	ug/kg							
PCB-1221	ND	10	"							
PCB-1232	ND	10	"							
PCB-1242	ND	10	"							
PCB-1248	ND	10	"							
PCB-1254	ND	10	"							
PCB-1260	ND	10	"							
Surrogate: Tetrachloro-meta-xylene	*6.90*		*"*	*10.0*		*69.0*	*35-140*			
Surrogate: Decachlorobiphenyl	*6.96*		*"*	*10.0*		*69.6*	*35-140*			
LCS (7032932-BS1)				Prepared: 03/29/17 Analyzed: 03/30/17						
PCB-1016	85.8	10	ug/kg	98.0		87.5	40-130			
PCB-1260	82.9	10	"	98.0		84.6	40-130			
Surrogate: Tetrachloro-meta-xylene	*6.90*		*"*	*9.80*		*70.4*	*35-140*			
Surrogate: Decachlorobiphenyl	*6.72*		*"*	*9.80*		*68.6*	*35-140*			
LCS Dup (7032932-BSD1)				Prepared: 03/29/17 Analyzed: 03/30/17						
PCB-1016	77.4	10	ug/kg	101		76.6	40-130	10.3	30	
PCB-1260	72.9	10	"	101		72.2	40-130	12.8	30	
Surrogate: Tetrachloro-meta-xylene	*6.02*		*"*	*10.1*		*59.6*	*35-140*			
Surrogate: Decachlorobiphenyl	*6.00*		*"*	*10.1*		*59.4*	*35-140*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
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Organophosphorus Pesticides by EPA Method 8141A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7033020 - EPA 3550 ECD/GCMS										
Blank (7033020-BLK1)				Prepared: 03/30/17 Analyzed: 03/31/17						
Dichlorvos	ND	5.0	ug/kg							
Mevinphos	ND	5.0	"							
Demeton-s	ND	10	"							
Ethoprophos	ND	5.0	"							
Phorate	ND	10	"							
Naled	ND	5.0	"							
Sulfotep	ND	10	"							
Diazinon	ND	5.0	"							
Disulfoton	ND	5.0	"							
Demeton-o	ND	10	"							
Dimethoate	ND	5.0	"							
Ronnel	ND	10	"							
Merphos	ND	10	"							
Chlorpyrifos	ND	5.0	"							
Fenthion	ND	5.0	"							
Trichloronate	ND	5.0	"							
Methyl parathion	ND	5.0	"							
Malathion	ND	10	"							
Tokuthion (Prothiofos)	ND	5.0	"							
Parathion	ND	5.0	"							
Stirophos (Tetrachlorvinphos)	ND	5.0	"							
Bolstar	ND	5.0	"							
Fensulfothion	ND	5.0	"							
EPN	ND	5.0	"							
Azinphos methyl	ND	10	"							
Coumaphos	ND	5.0	"							
Surrogate: Tributylphosphate	*35.1*		*"*	*39.3*		*89.4*	*40-125*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Organophosphorus Pesticides by EPA Method 8141A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7033020 - EPA 3550 ECD/GCMS										
LCS (7033020-BS1)				Prepared: 03/30/17 Analyzed: 03/31/17						
Diazinon	34.5	5.0	ug/kg	40.0		86.1	60-130			
Chlorpyrifos	35.9	5.0	"	40.0		89.8	60-130			
Methyl parathion	42.4	5.0	"	40.0		106	60-130			
Stirophos (Tetrachlorvinphos)	35.1	5.0	"	40.0		87.7	60-130			
Surrogate: Tributylphosphate	*37.1*		*"*	*40.0*		*92.7*	*40-125*			
LCS Dup (7033020-BSD1)				Prepared: 03/30/17 Analyzed: 03/31/17						
Diazinon	32.6	5.0	ug/kg	39.5		82.4	60-130	5.62	20	
Chlorpyrifos	32.6	5.0	"	39.5		82.4	60-130	9.79	20	
Methyl parathion	41.1	5.0	"	39.5		104	60-130	3.20	20	
Stirophos (Tetrachlorvinphos)	42.0	5.0	"	39.5		106	60-130	18.0	20	
Surrogate: Tributylphosphate	*32.9*		*"*	*39.5*		*83.2*	*40-125*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Chlorinated Herbicides by EPA Method 8151A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032915 - 8151 Prep										
Blank (7032915-BLK1)				Prepared: 03/29/17 Analyzed: 03/31/17						
2,4,5-T	ND	5.00	ug/kg							
2,4,5-TP (Silvex)	ND	5.00	"							
2,4-D	ND	5.00	"							
2,4-DB	ND	5.00	"							
3,5-Dichlorobenzoic acid	ND	5.00	"							
4-Nitrophenol	ND	5.00	"							
Acifluorfen	ND	5.00	"							
Bentazon	ND	5.00	"							
Chloramben	ND	5.00	"							
Dalapon	ND	30.0	"							
DCPA diacid	ND	5.00	"							
Dicamba	ND	5.00	"							
Dichloroprop	ND	5.00	"							
Dinoseb	ND	5.00	"							
Pentachlorophenol	ND	5.00	"							
Picloram	ND	5.00	"							
Surrogate: 2,4-DCAA	*221*		*"*	*400*		*55.2*	*35-150*			
LCS (7032915-BS1)				Prepared: 03/29/17 Analyzed: 03/31/17						
2,4,5-T	78.8	5.00	ug/kg	99.0		79.6	20-150			
2,4,5-TP (Silvex)	93.3	5.00	"	99.2		94.0	20-150			
2,4-D	86.8	5.00	"	99.2		87.5	20-150			
Surrogate: 2,4-DCAA	*257*		*"*	*397*		*64.8*	*35-150*			
LCS Dup (7032915-BSD1)				Prepared: 03/29/17 Analyzed: 03/31/17						
2,4,5-T	84.6	5.00	ug/kg	99.6		84.9	20-150	7.12	30	
2,4,5-TP (Silvex)	100	5.00	"	99.8		100	20-150	7.19	30	
2,4-D	94.1	5.00	"	99.8		94.2	20-150	8.02	30	
Surrogate: 2,4-DCAA	*270*		*"*	*399*		*67.7*	*35-150*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032939 - EPA 5035 GCMS										
Blank (7032939-BLK1)				Prepared: 03/29/17 Analyzed: 03/31/17						
Bromobenzene	ND	5.0	ug/kg							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	10	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032939 - EPA 5035 GCMS										
Blank (7032939-BLK1)				Prepared: 03/29/17 Analyzed: 03/31/17						
p-Isopropyltoluene	ND	5.0	ug/kg							
Methylene chloride	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
Benzene	ND	5.0	"							
Toluene	ND	5.0	"							
Ethylbenzene	ND	5.0	"							
m,p-Xylene	ND	10	"							
o-Xylene	ND	5.0	"							
Surrogate: Toluene-d8	*37.4*		*"*	*39.8*		*94.1*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*39.1*		*"*	*39.8*		*98.4*	*81.2-123*			
Surrogate: Dibromofluoromethane	*39.8*		*"*	*39.8*		*100*	*95.7-135*			
LCS (7032939-BS1)				Prepared: 03/29/17 Analyzed: 03/31/17						
Chlorobenzene	92.4	5.0	ug/kg	99.0		93.3	75-125			
1,1-Dichloroethene	79.2	5.0	"	99.0		80.0	75-125			
Trichloroethene	85.5	5.0	"	99.0		86.4	75-125			
Benzene	83.5	5.0	"	99.0		84.3	75-125			
Toluene	81.0	5.0	"	99.0		81.9	75-125			
Surrogate: Toluene-d8	*38.5*		*"*	*39.6*		*97.1*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*42.3*		*"*	*39.6*		*107*	*81.2-123*			
Surrogate: Dibromofluoromethane	*41.9*		*"*	*39.6*		*106*	*95.7-135*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032939 - EPA 5035 GCMS										
LCS Dup (7032939-BSD1)				Prepared: 03/29/17 Analyzed: 04/01/17						
Chlorobenzene	84.6	5.0	ug/kg	99.6		84.9	75-125	8.83	20	
1,1-Dichloroethene	74.8	5.0	"	99.6		75.1	75-125	5.72	20	
Trichloroethene	83.8	5.0	"	99.6		84.1	75-125	2.10	20	
Benzene	86.5	5.0	"	99.6		86.9	75-125	3.52	20	
Toluene	76.5	5.0	"	99.6		76.8	75-125	5.77	20	
Surrogate: Toluene-d8	*39.6*		*"*	*39.8*		*99.5*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*37.1*		*"*	*39.8*		*93.1*	*81.2-123*			
Surrogate: Dibromofluoromethane	*38.9*		*"*	*39.8*		*97.7*	*95.7-135*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Carbazole	ND	300	ug/kg							
Phenol	ND	1000	"							
Aniline	ND	300	"							
2-Chlorophenol	ND	1000	"							
1,4-Dichlorobenzene	ND	300	"							
N-Nitrosodi-n-propylamine	ND	300	"							
1,2,4-Trichlorobenzene	ND	300	"							
4-Chloro-3-methylphenol	ND	1000	"							
1-Methylnaphthalene	ND	300	"							
2-Methylnaphthalene	ND	300	"							
Acenaphthene	ND	300	"							
4-Nitrophenol	ND	1000	"							
2,4-Dinitrotoluene	ND	300	"							
Pentachlorophenol	ND	1000	"							
Pyrene	ND	300	"							
Acenaphthylene	ND	300	"							
Anthracene	ND	300	"							
Benzo (a) anthracene	ND	300	"							
Benzo (b) fluoranthene	ND	300	"							
Benzo (k) fluoranthene	ND	300	"							
Benzo (g,h,i) perylene	ND	1000	"							
Benzo (a) pyrene	ND	300	"							
Benzyl alcohol	ND	300	"							
Bis(2-chloroethoxy)methane	ND	300	"							
Bis(2-chloroethyl)ether	ND	300	"							
Bis(2-chloroisopropyl)ether	ND	300	"							
Bis(2-ethylhexyl)phthalate	ND	300	"							
4-Bromophenyl phenyl ether	ND	300	"							
Butyl benzyl phthalate	ND	300	"							
4-Chloroaniline	ND	300	"							
2-Chloronaphthalene	ND	300	"							
4-Chlorophenyl phenyl ether	ND	300	"							
Chrysene	ND	300	"							
Dibenz (a,h) anthracene	ND	300	"							
Dibenzofuran	ND	300	"							
Di-n-butyl phthalate	ND	300	"							

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
1,2-Dichlorobenzene	ND	300	ug/kg							
1,3-Dichlorobenzene	ND	300	"							
2,4-Dichlorophenol	ND	1000	"							
Diethyl phthalate	ND	300	"							
2,4-Dimethylphenol	ND	1000	"							
Dimethyl phthalate	ND	300	"							
4,6-Dinitro-2-methylphenol	ND	1000	"							
2,4-Dinitrophenol	ND	1000	"							
2,6-Dinitrotoluene	ND	1000	"							
Di-n-octyl phthalate	ND	300	"							
Fluoranthene	ND	300	"							
Fluorene	ND	300	"							
Hexachlorobenzene	ND	1500	"							
Hexachlorobutadiene	ND	300	"							
Hexachlorocyclopentadiene	ND	1000	"							
Hexachloroethane	ND	300	"							
Indeno (1,2,3-cd) pyrene	ND	300	"							
Isophorone	ND	300	"							
2-Methylphenol	ND	1000	"							
4-Methylphenol	ND	1000	"							
Naphthalene	ND	300	"							
2-Nitroaniline	ND	300	"							
3-Nitroaniline	ND	300	"							
4-Nitroaniline	ND	300	"							
Nitrobenzene	ND	1000	"							
2-Nitrophenol	ND	1000	"							
N-Nitrosodimethylamine	ND	300	"							
N-Nitrosodiphenylamine	ND	300	"							
2,3,5,6-Tetrachlorophenol	ND	300	"							
2,3,4,6-Tetrachlorophenol	ND	300	"							
Phenanthrene	ND	300	"							
Azobenzene	ND	300	"							
Pyridine	ND	300	"							
2,4,5-Trichlorophenol	ND	1000	"							
2,4,6-Trichlorophenol	ND	1000	"							

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Surrogate: 2-Fluorophenol	*1510*		*ug/kg*	*3310*		*45.5*	*15-121*			
Surrogate: Phenol-d6	*1390*		*"*	*3310*		*42.0*	*24-113*			
Surrogate: Nitrobenzene-d5	*1510*		*"*	*3310*		*45.5*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*1910*		*"*	*3310*		*57.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*2630*		*"*	*3310*		*79.4*	*18.1-105*			
Surrogate: Terphenyl-dl4	*2750*		*"*	*3310*		*83.1*	*29.1-130*			
LCS (7032720-BS1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Phenol	3130	1000	ug/kg	3330		93.8	34-114			
2-Chlorophenol	3140	1000	"	3330		94.3	34-114			
1,4-Dichlorobenzene	2430	300	"	3330		72.9	34-114			
N-Nitrosodi-n-propylamine	3180	300	"	3330		95.5	30-110			
1,2,4-Trichlorobenzene	1930	300	"	3330		57.8	39-119			
4-Chloro-3-methylphenol	2270	1000	"	3330		68.1	50-130			
Acenaphthene	2070	300	"	3330		62.1	34-114			
Pentachlorophenol	2620	1000	"	3330		78.6	50-130			
Pyrene	2070	300	"	3330		62.0	30-110			
Surrogate: 2-Fluorophenol	*3250*		*"*	*3330*		*97.4*	*15-121*			
Surrogate: Phenol-d6	*3750*		*"*	*3330*		*113*	*24-113*			
Surrogate: Nitrobenzene-d5	*3290*		*"*	*3330*		*98.6*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*3620*		*"*	*3330*		*109*	*32.4-102*			*S-GC*
Surrogate: 2,4,6-Tribromophenol	*3670*		*"*	*3330*		*110*	*18.1-105*			*S-GC*
Surrogate: Terphenyl-dl4	*3820*		*"*	*3330*		*115*	*29.1-130*			
LCS Dup (7032720-BSD1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Phenol	2650	1000	ug/kg	3300		80.2	34-114	16.7	42	
2-Chlorophenol	3110	1000	"	3300		94.3	34-114	0.953	40	
1,4-Dichlorobenzene	2000	300	"	3300		60.7	34-114	19.3	28	
N-Nitrosodi-n-propylamine	2200	300	"	3300		66.7	30-110	36.4	38	
1,2,4-Trichlorobenzene	1670	300	"	3300		50.5	39-119	14.5	28	
4-Chloro-3-methylphenol	2340	1000	"	3300		70.9	50-130	2.98	42	
Acenaphthene	1770	300	"	3300		53.5	34-114	15.8	31	
Pentachlorophenol	2220	1000	"	3300		67.3	50-130	16.4	50	
Pyrene	1700	300	"	3300		51.5	30-110	19.6	31	
Surrogate: 2-Fluorophenol	*2460*		*"*	*3300*		*74.5*	*15-121*			
Surrogate: Phenol-d6	*2050*		*"*	*3300*		*62.1*	*24-113*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
LCS Dup (7032720-BSD1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Surrogate: Nitrobenzene-d5	*1750*		*ug/kg*	*3300*		*52.9*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2200*		*"*	*3300*		*66.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3170*		*"*	*3300*		*95.9*	*18.1-105*			
Surrogate: Terphenyl-dl4	*3290*		*"*	*3300*		*99.8*	*29.1-130*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/06/17 11:32

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
R-07	Reporting limit for this compound(s) has been raised to account for dilution necessary due to high levels of interfering compound(s) and/or matrix affect.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/28/17 Page: 1 Of 1
Project Name: Brea-Olinda
Collector: Frank Hagar Client Project #: 02077.01
Batch #: 1170788 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + 6RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals-EPA6020	EPA8081	EPA8141	EPA8151	Laboratory ID #	Comments/Preservative	Total # of containers
SB-B1-15	3/28/17		Soil	Sleeve				A				A	A	H				01		
SB-B1-39	3/28/17		Soil	Sleeve SOS	A			A				A	A	H				02		
SB-B1-55	3/28/17		Soil	Sleeve SOS	A			A				A	A	A				03		
SS-B1-20	3/28/17		Soil	Sleeve				H				A	H	H				04		
SS-B1-24	3/28/17		Soil	SL+VOA	A			H				A	H	H				05		
SS-B1-36	3/28/17		Soil	SL+40A	A			H				A	H	H				06		
SB-T1-1	3/28/17		Soil	4oz Glass				A							A	A	A	07		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/28/17 1240	Carmen Guzman	3/28/17 1240
Carmen Guzman	3/28/17 1617		3-28-17 1617
	3-28-17 1657		3.28.17 16:57

Total # of containers: 38
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold: 2.2°

Turn around time: STD

Notes
Frank Hagar
949-689-9487

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162583

I-461

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 1170788

Client Name: Northgate Env. Project: Brea Olinda

Delivered by: ☐ Client ☒ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: Dan Date/Time Courier Received: 3.28.17 / 16:17

Lab Received by: Sunny Date/Time Lab Received: 3.28.17 / 16:57

Total number of coolers received: 1

Temperature: Cooler #1	2.4 °C +/- the CF (- 0.2°C) =	2.2	°C corrected temperature
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =		°C corrected temperature
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =		°C corrected temperature
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: SL 3.28.17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 12:10 PM
To: 'Frank Hagar'
Cc: 'Derrick Willis'
Subject: RE: The FINAL Word Additional request for Brea Olinda (T170734, T170759, T170788, and T170798)
Attachments: T170734_WKO_03.pdf; T170759_WKO_03.pdf; T170788_WKO_02.pdf; T170798_WKO_02.pdf

I believe I got it all coded in correctly gentlemen!

Please find attached work orders for confirmation. You will see in the comments section which analyses were added for each sample. It's a bit confusing since the samples were amongst several projects. All the samples that we did not receive 5035 kits for will be done by standard 8260 and 8015 Gas Purge as requested below. Please review and let me know if you have any questions or need anything else.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 11:22 AM
To: Rose Fasheh
Cc: Derrick Willis
Subject: The FINAL Word

Rose,

Per our call this morning, Back to the same samples without 5035 extractions – regular analyses.

Thanks

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
Laguna Hills, Ca 92653
phone (949)716-0050 **mobile (949) 689-9987**; fax (949) 716-0055
www.ngem.com

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From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 10:14 AM
To: Rose Fasheh; Derrick Willis
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Rose,

Derrick is out of pocket a bit this morning so….

Please change the following samples for analysis of 8260 and GRO
SLA-B1-5 change to SLA-B1-10
SLA-B1-15 change to SLA-B1-20
S3-T1-5 change to S3-T1-10
S7-T1-5 change to S1-T1-10
I had a note on the COC for BB6P-B1-30 to lab extract a 5035 for that sample. GO ahead and do that please.

SLA-B1-15 no analysis as SLA-B1-10 and SLA-B1-20 will cover.

Let me know if there are any other issues with these samples.

Thanks
Frank

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 9:40 AM
To: 'Derrick Willis' <derrick.willis@ngem.com>

Cc: 'Frank Hagar' <frank.hagar@ngem.com>
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Several of the samples you have requested 8260 and GRO for, we did not receive 5035 kits. We can run standard OR can make some kits using the jars or sleeves provided but it will be noted on the report that the kits were made in house, not a true 5035 prep. Specifically samples: SLA-B1-5 (T170759-01), SLA-B1-15 (T170759-03), BB6P-B1-30 (T170759-18), S3-T1-5 (T170798-07), and S7-T1-5 (T170798-10).

Also, sample SLA-B1-15 you have requested 8260 and GRO. This sample was on hold so no results were sent, did you mean for us to run another sample?

Please advise how you wish for me to proceed.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Wednesday, April 05, 2017 8:19 AM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
Yes, please also report the GRO. Can I get prelims on the volatiles at the 3-day mark? Thanks
Derrick

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 5, 2017 8:17 AM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Good morning Derrick,

For all the samples you requested VOCs by 8260 below, did you also need the GRO 5035 purgable?

Standard 5-day TAT okay?

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Tuesday, April 04, 2017 6:07 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
I would like to request the following:
VRS-B1-20 - 8260
VRS-B1-60 – 8260
SLA-B1-5 – 8260
SLA-B1-15 – 8260
SLA-B1-60 – 8260
BBGP-B1-30 – 8260, Metals, Uranium
S8-B1-39 – Uranium, PCBs
S3-T1-5 - 8260, 8270, metals
S7-T1-5 - 8270

Thanks
Derrick

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due:	04/05/17 17:00 (5 day TAT)		
Received By:	Sunny Lounethone	Date Received:	03/28/17 16:57
Logged In By:	Sunny Lounethone	Date Logged In:	03/28/17 17:00

Samples Received at: **2.2°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170788-01 S8-B1-15 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 Carbon Chain	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-02 S8-B1-39 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-03 S8-B1-55 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8082 PCB	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170788-04 S5-B1-20 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/05/17 15:00	5	04/11/17 00:00	
T170788-05 S5-B1-24 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-06 S5-B1-36 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-07 S8-T1-1 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8081 Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8141 OP Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8151 Herbicides	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 04/05/17 17:00 (5 day TAT)
Received By: Sunny Lounethone Date Received: 03/28/17 16:57
Logged In By: Sunny Lounethone Date Logged In: 03/28/17 17:00

Samples Received at: **2.2°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170788-01 S8-B1-15 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 Carbon Chain	04/03/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-02 S8-B1-39 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				**8082 and Uranium added per client request (Derrick, 4/5)**
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8082 PCB	04/12/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-03 S8-B1-55 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8082 PCB	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170788-04 S5-B1-20 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	5	04/11/17 00:00	
T170788-05 S5-B1-24 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-06 S5-B1-36 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-07 S8-T1-1 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8081 Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8141 OP Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8151 Herbicides	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

Weck Labs

T170788-02 S8-B1-39 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				**8082 and Uranium added per client request (Derrick, 4/5)**
Misc. Subcontract (see notes)	04/12/17 15:00	5	09/24/17 00:00	6020 Uranium

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

10 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/28/17 16:57. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/10/17 14:08

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S8-B1-39	T170788-02	Soil	03/28/17 00:00	03/28/17 16:57

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/10/17 14:08

DETECTIONS SUMMARY

Sample ID: S8-B1-39 **Laboratory ID:** T170788-02

No Results Detected

Uranium, Total	**0.67**	0.50	mg/kg	EPA 6020A

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/10/17 14:08

S8-B1-39

T170788-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7040523	04/05/17	04/06/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*72.9 %*	*35-140*		"	"	"	"	
Surrogate: Decachlorobiphenyl		*25.5 %*	*35-140*		"	"	"	"	*S-GC*
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**0.67**	0.50	mg/kg	1	W7D0297	04/06/17	04/10/17	EPA 6020A	

SunStar Laboratories, Inc.

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Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/10/17 14:08

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040523 - EPA 3550 ECD/GCMS										
Blank (7040523-BLK1)				Prepared: 04/05/17 Analyzed: 04/06/17						
PCB-1016	ND	10	ug/kg							
PCB-1221	ND	10	"							
PCB-1232	ND	10	"							
PCB-1242	ND	10	"							
PCB-1248	ND	10	"							
PCB-1254	ND	10	"							
PCB-1260	ND	10	"							
Surrogate: Tetrachloro-meta-xylene	*8.04*		*"*	*9.80*		*82.0*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.22*		*"*	*9.80*		*83.8*	*35-140*			
LCS (7040523-BS1)				Prepared: 04/05/17 Analyzed: 04/06/17						
PCB-1016	115	10	ug/kg	100		115	40-130			
PCB-1260	108	10	"	100		108	40-130			
Surrogate: Tetrachloro-meta-xylene	*7.75*		*"*	*10.0*		*77.5*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.03*		*"*	*10.0*		*80.3*	*35-140*			
LCS Dup (7040523-BSD1)				Prepared: 04/05/17 Analyzed: 04/06/17						
PCB-1016	99.9	10	ug/kg	99.0		101	40-130	14.3	30	
PCB-1260	98.4	10	"	99.0		99.4	40-130	9.29	30	
Surrogate: Tetrachloro-meta-xylene	*8.24*		*"*	*9.90*		*83.2*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.30*		*"*	*9.90*		*83.9*	*35-140*			

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/10/17 14:08

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods - Quality Control

Weck Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch W7D0297 - EPA 3050M-SCL										
Blank (W7D0297-BLK1)				Prepared: 04/06/17 Analyzed: 04/10/17						
Uranium, Total	ND	0.50	mg/kg							
LCS (W7D0297-BS1)				Prepared: 04/06/17 Analyzed: 04/10/17						
Uranium, Total	47.0	0.50	mg/kg	50.0		94	80-120			
Matrix Spike (W7D0297-MS1)	**Source: 7D06016-01**			Prepared: 04/06/17 Analyzed: 04/10/17						
Uranium, Total	48.7	0.50	mg/kg	48.2	5.13	90	75-125			
Matrix Spike Dup (W7D0297-MSD1)	**Source: 7D06016-01**			Prepared: 04/06/17 Analyzed: 04/10/17						
Uranium, Total	50.0	0.50	mg/kg	47.9	5.13	94	75-125	3	20	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/10/17 14:08

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/28/17 Page: 1 Of 1
Project Name: Brea-Olinda
Collector: Frank Hagar Client Project #: 02077.01
Batch #: 1170788 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + 6RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals-EPA6020	EPA8081	EPA8141	EPA8151	Laboratory ID #	Comments/Preservative	Total # of containers
SB-B1-15	3/28/17		Soil	Sleeve				A				A	A	I				01		
SB-B1-39	3/28/17		Soil	Sleeve 5035	A			A				A	A	H				02		
SB-B1-55	3/28/17		Soil	Sleeve 5035	A			A				A	A	A				03		
SS-B1-20	3/28/17		Soil	Sleeve				H				A	H	H				04		
SS-B1-24	3/28/17		Soil	5l + VOA	A			H				A	H	H				05		
SS-B1-36	3/28/17		Soil	5l + 40A	A			H				A	H	H				06		
SB-T1-1	3/28/17		Soil	4oz Glass				A							A	A	A	07		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/28/17 1240	Carmen Guzman	3/28/17 1240
Carmen Guzman	3/28/17 1617		3-28-17 1617
	3-28-17 1657		3.28.17 16:57

Total # of containers: 38
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold: 2.2°

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162583

I-478

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 1170788

Client Name: Northgate Env. Project: Brea Olinda

Delivered by: ☐ Client ☒ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: Dan Date/Time Courier Received: 3.28.17 / 16:17

Lab Received by: Sunny Date/Time Lab Received: 3.28.17 / 16:57

Total number of coolers received: 1

Temperature: Cooler #1	2.4 °C +/- the CF (- 0.2°C) =	2.2	°C corrected temperature
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =		°C corrected temperature
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =		°C corrected temperature
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: SL 3.28.17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 12:10 PM
To: 'Frank Hagar'
Cc: 'Derrick Willis'
Subject: RE: The FINAL Word Additional request for Brea Olinda (T170734, T170759, T170788, and T170798)
Attachments: T170734_WKO_03.pdf; T170759_WKO_03.pdf; T170788_WKO_02.pdf; T170798_WKO_02.pdf

I believe I got it all coded in correctly gentlemen!

Please find attached work orders for confirmation. You will see in the comments section which analyses were added for each sample. It's a bit confusing since the samples were amongst several projects. All the samples that we did not receive 5035 kits for will be done by standard 8260 and 8015 Gas Purge as requested below. Please review and let me know if you have any questions or need anything else.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 11:22 AM
To: Rose Fasheh
Cc: Derrick Willis
Subject: The FINAL Word

Rose,

Per our call this morning, Back to the same samples without 5035 extractions – regular analyses.

Thanks

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
Laguna Hills, Ca 92653
phone (949)716-0050 **mobile (949) 689-9987**; fax (949) 716-0055
www.ngem.com

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From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 10:14 AM
To: Rose Fasheh; Derrick Willis
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Rose,

Derrick is out of pocket a bit this morning so….

Please change the following samples for analysis of 8260 and GRO
SLA-B1-5 change to SLA-B1-10
SLA-B1-15 change to SLA-B1-20
S3-T1-5 change to S3-T1-10
S7-T1-5 change to S1-T1-10
I had a note on the COC for BB6P-B1-30 to lab extract a 5035 for that sample. GO ahead and do that please.

SLA-B1-15 no analysis as SLA-B1-10 and SLA-B1-20 will cover.

Let me know if there are any other issues with these samples.

Thanks
Frank

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
Laguna Hills, Ca 92653
phone (949)716-0050 **mobile (949) 689-9987**; fax (949) 716-0055
www.ngem.com

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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 9:40 AM
To: 'Derrick Willis' <derrick.willis@ngem.com>

Cc: 'Frank Hagar' <frank.hagar@ngem.com>
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Several of the samples you have requested 8260 and GRO for, we did not receive 5035 kits. We can run standard OR can make some kits using the jars or sleeves provided but it will be noted on the report that the kits were made in house, not a true 5035 prep. Specifically samples: SLA-B1-5 (T170759-01), SLA-B1-15 (T170759-03), BB6P-B1-30 (T170759-18), S3-T1-5 (T170798-07), and S7-T1-5 (T170798-10).

Also, sample SLA-B1-15 you have requested 8260 and GRO. This sample was on hold so no results were sent, did you mean for us to run another sample?

Please advise how you wish for me to proceed.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Wednesday, April 05, 2017 8:19 AM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
Yes, please also report the GRO. Can I get prelims on the volatiles at the 3-day mark? Thanks
Derrick

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 5, 2017 8:17 AM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Good morning Derrick,

For all the samples you requested VOCs by 8260 below, did you also need the GRO 5035 purgable?

Standard 5-day TAT okay?

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Tuesday, April 04, 2017 6:07 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
I would like to request the following:
VRS-B1-20 - 8260
VRS-B1-60 – 8260
SLA-B1-5 – 8260
SLA-B1-15 – 8260
SLA-B1-60 – 8260
BBGP-B1-30 – 8260, Metals, Uranium
S8-B1-39 – Uranium, PCBs
S3-T1-5 - 8260, 8270, metals
S7-T1-5 - 8270

Thanks
Derrick

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due:	04/05/17 17:00 (5 day TAT)		
Received By:	Sunny Lounethone	Date Received:	03/28/17 16:57
Logged In By:	Sunny Lounethone	Date Logged In:	03/28/17 17:00

Samples Received at: **2.2°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170788-01 S8-B1-15 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 Carbon Chain	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-02 S8-B1-39 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-03 S8-B1-55 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8082 PCB	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170788-04 S5-B1-20 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/05/17 15:00	5	04/11/17 00:00	
T170788-05 S5-B1-24 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-06 S5-B1-36 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/05/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-07 S8-T1-1 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8081 Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8141 OP Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8151 Herbicides	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 04/05/17 17:00 (5 day TAT)
Received By: Sunny Lounethone Date Received: 03/28/17 16:57
Logged In By: Sunny Lounethone Date Logged In: 03/28/17 17:00

Samples Received at: **2.2°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170788-01 S8-B1-15 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 Carbon Chain	04/03/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-02 S8-B1-39 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				**8082 and Uranium added per client request (Derrick, 4/5)**
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8082 PCB	04/12/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	
T170788-03 S8-B1-55 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/05/17 15:00	5	09/24/17 00:00	
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8082 PCB	04/05/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170788

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170788-04 S5-B1-20 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	5	04/11/17 00:00	
T170788-05 S5-B1-24 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-06 S5-B1-36 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8015 CC (D/MO)	04/03/17 15:00	5	04/11/17 00:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/11/17 00:00	
8260 5035	04/05/17 15:00	5	04/11/17 00:00	
T170788-07 S8-T1-1 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				
8081 Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8141 OP Pesticides	04/05/17 15:00	5	04/11/17 00:00	
8151 Herbicides	04/05/17 15:00	5	04/11/17 00:00	
8270C	04/05/17 15:00	5	04/11/17 00:00	

Weck Labs

T170788-02 S8-B1-39 [Soil] Sampled 03/28/17 00:00 (GMT-08:00) Pacific Time (US &				**8082 and Uranium added per client request (Derrick, 4/5)**
Misc. Subcontract (see notes)	04/12/17 15:00	5	09/24/17 00:00	6020 Uranium

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By

Date

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 7D06018

Project: T170788

Attn: Rose Fasheh

Client: SunStar Laboratories, Inc.
25712 Commercentre Drive
Lake Forest, CA 92630

Report Date: 4/10/2017
Received Date: 4/6/2017
Turnaround Time: 4 workdays
Phones: (949) 297-5020
Fax: (949) 297-5027
P.O. #:
Billing Code:

Dear Rose Fasheh,

Enclosed are the results of analyses for samples received 4/06/17 with the Chain-of-Custody document. The samples were received in good condition, at 14.5 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: T170788-02 — Sampled: 03/28/17 0:00 by Client
7D06018-01 (Solid)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: EPA 6020A **Batch ID:** W7D0297 **Instr:** ICPMS02 **Prepared:** 04/06/17 15:05 **Analyst:** mtt						
Uranium, Total	**0.67**	0.50	mg/kg	1	04/10/17 12:36	

14859 East Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

Quality Control Results

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7D0297 - EPA 3050M-SCL										
Blank (W7D0297-BLK1)				**Prepared: 04/06/17**	**Analyzed: 04/10/17**					
Uranium, Total	ND	0.50	mg/kg							
LCS (W7D0297-BS1)				**Prepared: 04/06/17**	**Analyzed: 04/10/17**					
Uranium, Total	47.0	0.50	mg/kg	50.0		94	80-120			
Matrix Spike (W7D0297-MS1)	**Source: 7D06016-01**			**Prepared: 04/06/17**	**Analyzed: 04/10/17**					
Uranium, Total	48.7	0.50	mg/kg	48.2	5.13	90	75-125			
Matrix Spike Dup (W7D0297-MSD1)	**Source: 7D06016-01**			**Prepared: 04/06/17**	**Analyzed: 04/10/17**					
Uranium, Total	50.0	0.50	mg/kg	47.9	5.13	94	75-125	3	20	

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Notes and Definitions

Item	Definition
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

Reviewed by:

Kim G. Tu
Project Manager

ELAP-CA #1132 • EPA-UCMR #CA00211 • LACSD #10143 • NJ-DEP #CA015 • NV-DEP #NAC 445A

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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03 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/29/17 13:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FFTA-T1- 5	T170798-01	Soil	03/29/17 07:42	03/29/17 13:30
FFTA-T1- 10	T170798-02	Soil	03/29/17 07:50	03/29/17 13:30
FFTA-T1- 15	T170798-03	Soil	03/29/17 08:00	03/29/17 13:30
S8-T2- 5	T170798-04	Soil	03/29/17 09:00	03/29/17 13:30
S8-T2- 10	T170798-05	Soil	03/29/17 09:08	03/29/17 13:30
S8-T2- 15	T170798-06	Soil	03/29/17 09:15	03/29/17 13:30
S3-T1- 5	T170798-07	Soil	03/29/17 09:56	03/29/17 13:30
S3-T1- 10	T170798-08	Soil	03/29/17 10:06	03/29/17 13:30
S3-T1- 15	T170798-09	Soil	03/29/17 10:12	03/29/17 13:30
S7-T1- 5	T170798-10	Soil	03/29/17 10:35	03/29/17 13:30
S7-T1- 10	T170798-11	Soil	03/29/17 10:45	03/29/17 13:30
S7-T1- 15	T170798-12	Soil	03/29/17 11:02	03/29/17 13:30

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

DETECTIONS SUMMARY

Sample ID: FFTA-T1- 5 **Laboratory ID:** T170798-01

No Results Detected

Sample ID: FFTA-T1- 10 **Laboratory ID:** T170798-02

No Results Detected

Sample ID: FFTA-T1- 15 **Laboratory ID:** T170798-03

No Results Detected

Sample ID: S8-T2- 5 **Laboratory ID:** T170798-04

No Results Detected

Sample ID: S8-T2- 10 **Laboratory ID:** T170798-05

No Results Detected

Sample ID: S8-T2- 15 **Laboratory ID:** T170798-06

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**3200**	100	mg/kg	EPA 8015B	
C29-C40 (MORO)	**2500**	100	mg/kg	EPA 8015B	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

Sample ID: S3-T1- 5 **Laboratory ID:** T170798-07

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**790**	100	mg/kg	EPA 8015B	
C29-C40 (MORO)	**1100**	100	mg/kg	EPA 8015B	

Sample ID: S3-T1- 10 **Laboratory ID:** T170798-08

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**44**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**85**	10	mg/kg	EPA 8015B	

Sample ID: S3-T1- 15 **Laboratory ID:** T170798-09

No Results Detected

Sample ID: S7-T1- 5 **Laboratory ID:** T170798-10

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**33**	10	mg/kg	EPA 8015B	

Sample ID: S7-T1- 10 **Laboratory ID:** T170798-11

No Results Detected

Sample ID: S7-T1- 15 **Laboratory ID:** T170798-12

No Results Detected

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

FFTA-T1- 5

T170798-01 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*108 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

FFTA-T1- 10

T170798-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*95.7 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

FFTA-T1- 15

T170798-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*103 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S8-T2- 5

T170798-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*105 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S8-T2- 10

T170798-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*92.9 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S8-T2- 15

T170798-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	100	mg/kg	10	7032934	03/29/17	03/31/17	EPA 8015B	R-07
C13-C28 (DRO)	**3200**	100	"	"	"	"	"	"	
C29-C40 (MORO)	**2500**	100	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*107 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S3-T1- 5

T170798-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	100	mg/kg	10	7032934	03/29/17	03/31/17	EPA 8015B	R-07
C13-C28 (DRO)	**790**	100	"	"	"	"	"	"	
C29-C40 (MORO)	**1100**	100	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*96.6 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S3-T1- 10

T170798-08 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	**44**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**85**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*98.2 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S3-T1- 15

T170798-09 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*102 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S7-T1- 5

T170798-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**33**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*105 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S7-T1- 10

T170798-11 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*85.5 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

S7-T1- 15

T170798-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032934	03/29/17	03/31/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*103 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032934 - EPA 3550B GC										
Blank (7032934-BLK1)				Prepared: 03/29/17 Analyzed: 03/31/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*101*		*"*	*98.0*		*103*	*65-135*			
LCS (7032934-BS1)				Prepared: 03/29/17 Analyzed: 03/31/17						
C13-C28 (DRO)	550	10	mg/kg	510		108	75-125			
Surrogate: p-Terphenyl	*92.9*		*"*	*102*		*91.0*	*65-135*			
LCS Dup (7032934-BSD1)				Prepared: 03/29/17 Analyzed: 03/31/17						
C13-C28 (DRO)	530	10	mg/kg	495		108	75-125	3.58	20	
Surrogate: p-Terphenyl	*106*		*"*	*99.0*		*107*	*65-135*			

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 11:55

Notes and Definitions

R-07	Reporting limit for this compound(s) has been raised to account for dilution necessary due to high levels of interfering compound(s) and/or matrix affect.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

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Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive #130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/29/17 Page: 1 Of 1
Project Name: Brea-Olinda
Collector: Frank Hogar Client Project #: 02077.01
Batch #: 170798 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260+620	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB			Laboratory ID #	Comments/Preservative	Total # of containers
FFTA-T1-5	3/29/17	0742	Soil	4oz & VOA	H			H				A	H		H			01		
FFTA-T1-10	3/29/17	0750	Soil	4oz				H				A	H		H			02		
FFTA-T1-15	3/29/17	0800	Soil	4oz				H				A	H		H			03		
SB-T2-5	3/29/17	0900	Soil	4oz				H				A	H		H			04		
SB-T2-10	3/29/17	0908	Soil	4oz +VOAs	H			H				A	H		H			05		
SB-T2-15	3/29/17	0915	Soil	4oz +VOAs	H			H				A	H		H			06		
SB-T1-5	3/29/17	0956	Soil	4oz				H				A	H		H			07		
SB-T1-10	3/29/17	1006	Soil	4oz+VOAs	H			H				A	H		H			08		
SB-T1-15	3/29/17	1012	Soil	4oz+VOAs	H			H				A	H		H			09		
S7-T1-5	3/29/17	1035	Soil	4oz				H				A	H		H			10		
S7-T1-10	3/29/17	1045	Soil	4oz+VOAs	H			H				A	H		H			11		
S7-T1-15	3/29/17	1102	Soil	4oz+VOAs	H			H				A	H		H			12		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
[signature]	3/29/17 1330	[signature]	3/29/17 13:30
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/(NA)
Seals intact? Y/N/(NA)
Received good condition/cold 5.8

Turn around time: STD

Notes
Frank Hogar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162643

I-510

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 1170798

Client Name: NORTHGATE Project: BREA CANYON

Delivered by: ☒ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: BRIAN Date/Time Lab Received: 3/29/17 13:50

Total number of coolers received: 1

Temperature: Cooler #1	6.0 °C +/- the CF (- 0.2°C)	= 5.8	°C corrected temperature
Temperature: Cooler #2	°C +/- the CF (- 0.2°C)	=	°C corrected temperature
Temperature: Cooler #3	°C +/- the CF (- 0.2°C)	=	°C corrected temperature
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BL 3/29/17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170798

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 04/03/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/29/17 13:30
Logged In By: Brian Charon Date Logged In: 03/29/17 13:38

Samples Received at: **5.8°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170798-01 FFTA-T1- 5 [Soil] Sampled 03/29/17 07:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 07:42	
T170798-02 FFTA-T1- 10 [Soil] Sampled 03/29/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 07:50	
T170798-03 FFTA-T1- 15 [Soil] Sampled 03/29/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 08:00	
T170798-04 S8-T2- 5 [Soil] Sampled 03/29/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:00	
T170798-05 S8-T2- 10 [Soil] Sampled 03/29/17 09:08 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:08	
T170798-06 S8-T2- 15 [Soil] Sampled 03/29/17 09:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:15	
T170798-07 S3-T1- 5 [Soil] Sampled 03/29/17 09:56 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:56	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170798

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170798-08 S3-T1- 10 [Soil] Sampled 03/29/17 10:06 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:06	
T170798-09 S3-T1- 15 [Soil] Sampled 03/29/17 10:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:12	
T170798-10 S7-T1- 5 [Soil] Sampled 03/29/17 10:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:35	
T170798-11 S7-T1- 10 [Soil] Sampled 03/29/17 10:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:45	
T170798-12 S7-T1- 15 [Soil] Sampled 03/29/17 11:02 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 11:02	

Reviewed By

Date

SunStar Laboratories, Inc.
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11 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/29/17 13:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S3-T1- 5	T170798-07	Soil	03/29/17 09:56	03/29/17 13:30
S7-T1- 5	T170798-10	Soil	03/29/17 10:35	03/29/17 13:30

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

DETECTIONS SUMMARY

Sample ID: S3-T1- 5 **Laboratory ID:** T170798-07

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**88**	1.0	mg/kg	EPA 6010B	
Chromium	**8.6**	2.0	mg/kg	EPA 6010B	
Cobalt	**5.3**	2.0	mg/kg	EPA 6010B	
Copper	**6.0**	1.0	mg/kg	EPA 6010B	
Nickel	**10**	2.0	mg/kg	EPA 6010B	
Vanadium	**23**	5.0	mg/kg	EPA 6010B	
Zinc	**34**	1.0	mg/kg	EPA 6010B	

Sample ID: S7-T1- 5 **Laboratory ID:** T170798-10

No Results Detected

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S3-T1- 5

T170798-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	500	ug/kg	1	7040530	04/05/17	04/05/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*74.5 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7040438	04/05/17	04/05/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**88**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**8.6**	2.0	"	"	"	"	"	"	
Cobalt	**5.3**	2.0	"	"	"	"	"	"	
Copper	**6.0**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**10**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**23**	5.0	"	"	"	"	"	"	
Zinc	**34**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7040439	04/05/17	04/05/17	EPA 7471A Soil	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	5.0	ug/kg	1	7040529	04/05/17	04/05/17	EPA 8260B	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	

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Rose Fasheh

Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S3-T1- 5

T170798-07 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Carbon tetrachloride	ND	5.0	ug/kg	1	7040529	04/05/17	04/05/17	EPA 8260B	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S3-T1- 5

T170798-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Styrene	ND	5.0	ug/kg	1	7040529	04/05/17	04/05/17	EPA 8260B	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Benzene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	10	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*79.1 %*	*81.2-123*		"	"	"	"	*S-GC*
Surrogate: Dibromofluoromethane		*127 %*	*95.7-135*		"	"	"	"	
Surrogate: Toluene-d8		*106 %*	*85.5-116*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	1500	ug/kg	5	7040524	04/05/17	04/06/17	EPA 8270C	R-07
Aniline	ND	1500	"	"	"	"	"	"	R-07
Phenol	ND	5000	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	5000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	1500	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	5000	"	"	"	"	"	"	R-07

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S3-T1- 5

T170798-07 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1-Methylnaphthalene	ND	1500	ug/kg	5	7040524	04/05/17	04/06/17	EPA 8270C	R-07
2-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthene	ND	1500	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrotoluene	ND	1500	"	"	"	"	"	"	R-07
Pentachlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyrene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthylene	ND	1500	"	"	"	"	"	"	R-07
Anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (b) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (k) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	5000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	1500	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Bromophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Butyl benzyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Chloroaniline	ND	1500	"	"	"	"	"	"	R-07
2-Chloronaphthalene	ND	1500	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Chrysene	ND	1500	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	1500	"	"	"	"	"	"	R-07
Dibenzofuran	ND	1500	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	1500	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	1500	"	"	"	"	"	"	R-07

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S3-T1- 5

T170798-07 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4-Dimethylphenol	ND	5000	ug/kg	5	7040524	04/05/17	04/06/17	EPA 8270C	R-07
Dimethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,6-Dinitrotoluene	ND	5000	"	"	"	"	"	"	R-07
Di-n-octyl phthalate	ND	1500	"	"	"	"	"	"	R-07
Fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Fluorene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	7500	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorocyclopentadiene	ND	5000	"	"	"	"	"	"	R-07
Hexachloroethane	ND	1500	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	1500	"	"	"	"	"	"	R-07
Isophorone	ND	1500	"	"	"	"	"	"	R-07
2-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
4-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
Naphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
4-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
Nitrobenzene	ND	5000	"	"	"	"	"	"	R-07
2-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
N-Nitrosodimethylamine	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	ND	1500	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
Phenanthrene	ND	1500	"	"	"	"	"	"	R-07
Azobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyridine	ND	1500	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*90.4 %*		*15-121*		"	"	"	*R-07*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S3-T1- 5

T170798-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Surrogate: Phenol-d6	*54.1 %*	*24-113*		*7040524*	*04/05/17*	*04/06/17*	*EPA 8270C*	*R-07*	
Surrogate: Nitrobenzene-d5	*81.8 %*	*21.3-119*		*"*	*"*	*"*	*"*	*R-07*	
Surrogate: 2-Fluorobiphenyl	*103 %*	*32.4-102*		*"*	*"*	*"*	*"*	*R-07, S-GC*	
Surrogate: 2,4,6-Tribromophenol	*100 %*	*18.1-105*		*"*	*"*	*"*	*"*	*R-07*	
Surrogate: Terphenyl-dl4	*141 %*	*29.1-130*		*"*	*"*	*"*	*"*	*R-07, S-GC*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

S7-T1- 5

T170798-10 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Carbazole	ND	300	ug/kg	1	7040524	04/05/17	04/06/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	300	"	"	"	"	"	"	
4-Chloroaniline	ND	300	"	"	"	"	"	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	

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S7-T1- 5

T170798-10 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chrysene	ND	300	ug/kg	1	7040524	04/05/17	04/06/17	EPA 8270C	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	
Nitrobenzene	ND	1000	"	"	"	"	"	"	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	

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Rose Fasheh

Rose Fasheh, Project Manager

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S7-T1- 5

T170798-10 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,3,5,6-Tetrachlorophenol	ND	300	ug/kg	1	7040524	04/05/17	04/06/17	EPA 8270C	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*75.5 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*63.3 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*59.9 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*80.9 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*94.3 %*	*18.1-105*		"	"	"	"	
Surrogate: Terphenyl-dl4		*113 %*	*29.1-130*		"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Purgeable Petroleum Hydrocarbons by EPA 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040530 - EPA 5030 GC										
Blank (7040530-BLK1)				Prepared: 04/05/17 Analyzed: 04/07/17						
C6-C12 (GRO)	ND	500	ug/kg							
Surrogate: 4-Bromofluorobenzene	*91.7*		*"*	*100*		*91.7*	*65-135*			
LCS (7040530-BS1)				Prepared & Analyzed: 04/05/17						
C6-C12 (GRO)	10600	500	ug/kg	10900		97.7	75-125			
Surrogate: 4-Bromofluorobenzene	*96.1*		*"*	*100*		*96.1*	*65-135*			
LCS Dup (7040530-BSD1)				Prepared & Analyzed: 04/05/17						
C6-C12 (GRO)	10600	500	ug/kg	10900		97.9	75-125	0.182	20	
Surrogate: 4-Bromofluorobenzene	*92.5*		*"*	*100*		*92.5*	*65-135*			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040438 - EPA 3051										
Blank (7040438-BLK1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	2.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
LCS (7040438-BS1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Arsenic	102	5.0	mg/kg	100		102	75-125			
Barium	104	1.0	"	100		104	75-125			
Cadmium	104	2.0	"	100		104	75-125			
Chromium	104	2.0	"	100		104	75-125			
Lead	104	3.0	"	100		104	75-125			
Matrix Spike (7040438-MS1)	**Source: T170862-04**			Prepared: 04/04/17 Analyzed: 04/05/17						
Arsenic	89.6	5.0	mg/kg	96.2	1.63	91.5	75-125			
Barium	209	1.0	"	96.2	125	87.6	75-125			
Cadmium	83.8	2.0	"	96.2	0.582	86.5	75-125			
Chromium	100	2.0	"	96.2	16.5	87.0	75-125			
Lead	88.2	3.0	"	96.2	ND	91.7	75-125			

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040438 - EPA 3051										
Matrix Spike Dup (7040438-MSD1)	**Source: T170862-04**			Prepared: 04/04/17 Analyzed: 04/05/17						
Arsenic	109	5.0	mg/kg	92.6	1.63	116	75-125	19.4	20	
Barium	198	1.0	"	92.6	125	79.1	75-125	5.36	20	
Cadmium	76.9	2.0	"	92.6	0.582	82.4	75-125	8.51	20	
Chromium	95.0	2.0	"	92.6	16.5	84.9	75-125	5.17	20	
Lead	103	3.0	"	92.6	ND	112	75-125	16.0	20	

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Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040439 - EPA 7471A Soil										
Blank (7040439-BLK1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Mercury	ND	0.10	mg/kg							
LCS (7040439-BS1)				Prepared: 04/04/17 Analyzed: 04/05/17						
Mercury	0.336	0.10	mg/kg	0.397		84.6	75-125			
Matrix Spike (7040439-MS1)	**Source: T170862-04**			Prepared: 04/04/17 Analyzed: 04/05/17						
Mercury	0.356	0.10	mg/kg	0.391	ND	91.0	75-125			
Matrix Spike Dup (7040439-MSD1)	**Source: T170862-04**			Prepared: 04/04/17 Analyzed: 04/05/17						
Mercury	0.368	0.10	mg/kg	0.397	ND	92.8	75-125	3.55	20	

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040529 - EPA 5030 GCMS										
Blank (7040529-BLK1)				Prepared & Analyzed: 04/05/17						
Bromobenzene	ND	5.0	ug/kg							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	10	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040529 - EPA 5030 GCMS										
Blank (7040529-BLK1)				Prepared & Analyzed: 04/05/17						
p-Isopropyltoluene	ND	5.0	ug/kg							
Methylene chloride	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
Benzene	ND	5.0	"							
Toluene	ND	5.0	"							
Ethylbenzene	ND	5.0	"							
m,p-Xylene	ND	10	"							
o-Xylene	ND	5.0	"							
Surrogate: 4-Bromofluorobenzene	*34.8*		"	*40.0*		*86.9*	*81.2-123*			
Surrogate: Dibromofluoromethane	*41.3*		"	*40.0*		*103*	*95.7-135*			
Surrogate: Toluene-d8	*41.6*		"	*40.0*		*104*	*85.5-116*			
LCS (7040529-BS1)				Prepared & Analyzed: 04/05/17						
Chlorobenzene	98.9	5.0	ug/kg	100		98.9	75-125			
1,1-Dichloroethene	90.0	5.0	"	100		90.0	75-125			
Trichloroethene	90.4	5.0	"	100		90.4	75-125			
Benzene	93.6	5.0	"	100		93.6	75-125			
Toluene	91.8	5.0	"	100		91.8	75-125			
Surrogate: 4-Bromofluorobenzene	*44.4*		"	*40.0*		*111*	*81.2-123*			
Surrogate: Dibromofluoromethane	*50.4*		"	*40.0*		*126*	*95.7-135*			
Surrogate: Toluene-d8	*39.0*		"	*40.0*		*97.5*	*85.5-116*			

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

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25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040529 - EPA 5030 GCMS										
LCS Dup (7040529-BSD1)				Prepared & Analyzed: 04/05/17						
Chlorobenzene	92.4	5.0	ug/kg	100		92.4	75-125	6.85	20	
1,1-Dichloroethene	83.2	5.0	"	100		83.2	75-125	7.85	20	
Trichloroethene	81.4	5.0	"	100		81.4	75-125	10.4	20	
Benzene	86.4	5.0	"	100		86.4	75-125	8.00	20	
Toluene	82.6	5.0	"	100		82.6	75-125	10.5	20	
Surrogate: 4-Bromofluorobenzene	*43.7*		*"*	*40.0*		*109*	*81.2-123*			
Surrogate: Dibromofluoromethane	*47.8*		*"*	*40.0*		*119*	*95.7-135*			
Surrogate: Toluene-d8	*39.1*		*"*	*40.0*		*97.8*	*85.5-116*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040524 - EPA 3550 ECD/GCMS										
Blank (7040524-BLK1)				Prepared: 04/05/17 Analyzed: 04/06/17						
Carbazole	ND	300	ug/kg							
Aniline	ND	300	"							
Phenol	ND	1000	"							
2-Chlorophenol	ND	1000	"							
1,4-Dichlorobenzene	ND	300	"							
N-Nitrosodi-n-propylamine	ND	300	"							
1,2,4-Trichlorobenzene	ND	300	"							
4-Chloro-3-methylphenol	ND	1000	"							
2-Methylnaphthalene	ND	300	"							
1-Methylnaphthalene	ND	300	"							
Acenaphthene	ND	300	"							
4-Nitrophenol	ND	1000	"							
2,4-Dinitrotoluene	ND	300	"							
Pentachlorophenol	ND	1000	"							
Pyrene	ND	300	"							
Acenaphthylene	ND	300	"							
Anthracene	ND	300	"							
Benzo (a) anthracene	ND	300	"							
Benzo (b) fluoranthene	ND	300	"							
Benzo (k) fluoranthene	ND	300	"							
Benzo (g,h,i) perylene	ND	1000	"							
Benzo (a) pyrene	ND	300	"							
Benzyl alcohol	ND	300	"							
Bis(2-chloroethoxy)methane	ND	300	"							
Bis(2-chloroethyl)ether	ND	300	"							
Bis(2-chloroisopropyl)ether	ND	300	"							
Bis(2-ethylhexyl)phthalate	ND	300	"							
4-Bromophenyl phenyl ether	ND	300	"							
Butyl benzyl phthalate	ND	300	"							
4-Chloroaniline	ND	300	"							
2-Chloronaphthalene	ND	300	"							
4-Chlorophenyl phenyl ether	ND	300	"							
Chrysene	ND	300	"							
Dibenz (a,h) anthracene	ND	300	"							
Dibenzofuran	ND	300	"							
Di-n-butyl phthalate	ND	300	"							

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040524 - EPA 3550 ECD/GCMS										
Blank (7040524-BLK1)				Prepared: 04/05/17 Analyzed: 04/06/17						
1,2-Dichlorobenzene	ND	300	ug/kg							
1,3-Dichlorobenzene	ND	300	"							
2,4-Dichlorophenol	ND	1000	"							
Diethyl phthalate	ND	300	"							
2,4-Dimethylphenol	ND	1000	"							
Dimethyl phthalate	ND	300	"							
4,6-Dinitro-2-methylphenol	ND	1000	"							
2,4-Dinitrophenol	ND	1000	"							
2,6-Dinitrotoluene	ND	1000	"							
Di-n-octyl phthalate	ND	300	"							
Fluoranthene	ND	300	"							
Fluorene	ND	300	"							
Hexachlorobenzene	ND	1500	"							
Hexachlorobutadiene	ND	300	"							
Hexachlorocyclopentadiene	ND	1000	"							
Hexachloroethane	ND	300	"							
Indeno (1,2,3-cd) pyrene	ND	300	"							
Isophorone	ND	300	"							
2-Methylphenol	ND	1000	"							
4-Methylphenol	ND	1000	"							
Naphthalene	ND	300	"							
2-Nitroaniline	ND	300	"							
3-Nitroaniline	ND	300	"							
4-Nitroaniline	ND	300	"							
Nitrobenzene	ND	1000	"							
2-Nitrophenol	ND	1000	"							
N-Nitrosodimethylamine	ND	300	"							
N-Nitrosodiphenylamine	ND	300	"							
2,3,5,6-Tetrachlorophenol	ND	300	"							
2,3,4,6-Tetrachlorophenol	ND	300	"							
Phenanthrene	ND	300	"							
Azobenzene	ND	300	"							
2,4,5-Trichlorophenol	ND	1000	"							
Pyridine	ND	300	"							
2,4,6-Trichlorophenol	ND	1000	"							

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Rose Fasheh, Project Manager

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Providing Quality Analytical Services Nationwide

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040524 - EPA 3550 ECD/GCMS										
Blank (7040524-BLK1)				Prepared: 04/05/17 Analyzed: 04/06/17						
Surrogate: 2-Fluorophenol	*1980*		*ug/kg*	*3360*		*58.9*	*15-121*			
Surrogate: Phenol-d6	*1700*		*"*	*3360*		*50.7*	*24-113*			
Surrogate: Nitrobenzene-d5	*1720*		*"*	*3360*		*51.2*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2220*		*"*	*3360*		*66.2*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*2930*		*"*	*3360*		*87.3*	*18.1-105*			
Surrogate: Terphenyl-dl4	*2810*		*"*	*3360*		*83.8*	*29.1-130*			
LCS (7040524-BS1)				Prepared: 04/05/17 Analyzed: 04/06/17						
Phenol	1980	1000	ug/kg	3290		60.3	34-114			
2-Chlorophenol	2670	1000	"	3290		81.2	34-114			
1,4-Dichlorobenzene	1810	300	"	3290		55.1	34-114			
N-Nitrosodi-n-propylamine	1960	300	"	3290		59.6	30-110			
1,2,4-Trichlorobenzene	1850	300	"	3290		56.2	39-119			
4-Chloro-3-methylphenol	1920	1000	"	3290		58.3	50-130			
Acenaphthene	1760	300	"	3290		53.6	34-114			
Pentachlorophenol	2530	1000	"	3290		76.9	50-130			
Pyrene	1840	300	"	3290		55.9	30-110			
Surrogate: 2-Fluorophenol	*1820*		*"*	*3290*		*55.2*	*15-121*			
Surrogate: Phenol-d6	*1860*		*"*	*3290*		*56.7*	*24-113*			
Surrogate: Nitrobenzene-d5	*1950*		*"*	*3290*		*59.3*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2450*		*"*	*3290*		*74.5*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3060*		*"*	*3290*		*93.1*	*18.1-105*			
Surrogate: Terphenyl-dl4	*2900*		*"*	*3290*		*88.3*	*29.1-130*			
LCS Dup (7040524-BSD1)				Prepared: 04/05/17 Analyzed: 04/06/17						
Phenol	1870	1000	ug/kg	3330		56.1	34-114	5.89	42	
2-Chlorophenol	2610	1000	"	3330		78.2	34-114	2.45	40	
1,4-Dichlorobenzene	1830	300	"	3330		54.8	34-114	0.851	28	
N-Nitrosodi-n-propylamine	2080	300	"	3330		62.3	30-110	5.81	38	
1,2,4-Trichlorobenzene	1850	300	"	3330		55.6	39-119	0.197	28	
4-Chloro-3-methylphenol	1910	1000	"	3330		57.4	50-130	0.250	42	
Acenaphthene	1860	300	"	3330		55.8	34-114	5.26	31	
Pentachlorophenol	2600	1000	"	3330		77.9	50-130	2.55	50	
Pyrene	2140	300	"	3330		64.1	30-110	15.0	31	
Surrogate: 2-Fluorophenol	*1780*		*"*	*3330*		*53.4*	*15-121*			
Surrogate: Phenol-d6	*1610*		*"*	*3330*		*48.2*	*24-113*			

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
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949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7040524 - EPA 3550 ECD/GCMS										
LCS Dup (7040524-BSD1)				Prepared: 04/05/17 Analyzed: 04/06/17						
Surrogate: Nitrobenzene-d5	*1900*		*ug/kg*	*3330*		*57.0*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2440*		*"*	*3330*		*73.1*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3190*		*"*	*3330*		*95.8*	*18.1-105*			
Surrogate: Terphenyl-dl4	*3060*		*"*	*3330*		*91.8*	*29.1-130*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/11/17 17:02

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
R-07	Reporting limit for this compound(s) has been raised to account for dilution necessary due to high levels of interfering compound(s) and/or matrix affect.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

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Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive #130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/29/17 Page: 1 Of 1
Project Name: Brea-Olinda
Collector: Frank Hogar Client Project #: 02077.01
Batch #: 170798 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260+620	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB			Laboratory ID #	Comments/Preservative	Total # of containers
FFTA-T1-5	3/29/17	0742	Soil	4oz & VOA	H			H				A	H		H			01		
FFTA-T1-10	3/29/17	0750	Soil	4oz				H				A	H		H			02		
FFTA-T1-15	3/29/17	0800	Soil	4oz				H				A	H		H			03		
SB-T2-5	3/29/17	0900	Soil	4oz				H				A	H		H			04		
SB-T2-10	3/29/17	0908	Soil	4oz +VOAs	H			H				A	H		H			05		
SB-T2-15	3/29/17	0915	Soil	4oz+VOAs	H			H				A	H		H			06		
S3-T1-5	3/29/17	0956	Soil	4oz				H				A	H		H			07		
S3-T1-10	3/29/17	1006	Soil	4oz+VOAs	H			H				A	H		H			08		
S3-T1-15	3/29/17	1012	Soil	4oz+VOAs	H			H				A	H		H			09		
S7-T1-5	3/29/17	1035	Soil	4oz				H				A	H		H			10		
S7-T1-10	3/29/17	1045	Soil	4oz+VOAs	H			H				A	H		H			11		
S7-T1-15	3/29/17	1102	Soil	4oz+VOAs	H			H				A	H		H			12		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/29/17 1330		3/29/17 13:30
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/(NA)
Seals intact? Y/N/(NA)
Received good condition/cold 5.8

Turn around time: STD

Notes
Frank Hogar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162643

I-538

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: 1170798

Client Name: NORTHGATE Project: BREA CANYON

Delivered by: ☒ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: BRIAN Date/Time Lab Received: 3/29/17 13:50

Total number of coolers received: 1

Temperature: Cooler #1	6.0 °C +/- the CF (- 0.2°C)	= 5.8	°C corrected temperature
Temperature: Cooler #2	°C +/- the CF (- 0.2°C)	=	°C corrected temperature
Temperature: Cooler #3	°C +/- the CF (- 0.2°C)	=	°C corrected temperature
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes**	☐ **No**
If NO:			
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BL 3/29/17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 12:10 PM
To: 'Frank Hagar'
Cc: 'Derrick Willis'
Subject: RE: The FINAL Word Additional request for Brea Olinda (T170734, T170759, T170788, and T170798)
Attachments: T170734_WKO_03.pdf; T170759_WKO_03.pdf; T170788_WKO_02.pdf; T170798_WKO_02.pdf

I believe I got it all coded in correctly gentlemen!

Please find attached work orders for confirmation. You will see in the comments section which analyses were added for each sample. It's a bit confusing since the samples were amongst several projects. All the samples that we did not receive 5035 kits for will be done by standard 8260 and 8015 Gas Purge as requested below. Please review and let me know if you have any questions or need anything else.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 11:22 AM
To: Rose Fasheh
Cc: Derrick Willis
Subject: The FINAL Word

Rose,

Per our call this morning, Back to the same samples without 5035 extractions – regular analyses.

Thanks

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
24411 Ridge Route Drive
Suite 130
Laguna Hills, Ca 92653
phone (949)716-0050 **mobile (949) 689-9987**; fax (949) 716-0055
www.ngem.com

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From: Frank Hagar [mailto:frank.hagar@ngem.com]
Sent: Wednesday, April 05, 2017 10:14 AM
To: Rose Fasheh; Derrick Willis
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Rose,

Derrick is out of pocket a bit this morning so….

Please change the following samples for analysis of 8260 and GRO
SLA-B1-5 change to SLA-B1-10
SLA-B1-15 change to SLA-B1-20
S3-T1-5 change to S3-T1-10
S7-T1-5 change to S1-T1-10
I had a note on the COC for BB6P-B1-30 to lab extract a 5035 for that sample. GO ahead and do that please.

SLA-B1-15 no analysis as SLA-B1-10 and SLA-B1-20 will cover.

Let me know if there are any other issues with these samples.

Thanks
Frank

Frank Hagar PG, CHg, CEG
Associate

Northgate Environmental Management, Inc.
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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 05, 2017 9:40 AM
To: 'Derrick Willis' <derrick.willis@ngem.com>

Cc: 'Frank Hagar' <frank.hagar@ngem.com>
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Several of the samples you have requested 8260 and GRO for, we did not receive 5035 kits. We can run standard OR can make some kits using the jars or sleeves provided but it will be noted on the report that the kits were made in house, not a true 5035 prep. Specifically samples: SLA-B1-5 (T170759-01), SLA-B1-15 (T170759-03), BB6P-B1-30 (T170759-18), S3-T1-5 (T170798-07), and S7-T1-5 (T170798-10).

Also, sample SLA-B1-15 you have requested 8260 and GRO. This sample was on hold so no results were sent, did you mean for us to run another sample?

Please advise how you wish for me to proceed.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Wednesday, April 05, 2017 8:19 AM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
Yes, please also report the GRO. Can I get prelims on the volatiles at the 3-day mark? Thanks
Derrick

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Wednesday, April 5, 2017 8:17 AM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Good morning Derrick,

For all the samples you requested VOCs by 8260 below, did you also need the GRO 5035 purgable?

Standard 5-day TAT okay?

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Tuesday, April 04, 2017 6:07 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Additional Reports for Brea Olinda Oil Field (T170697 and T170707)

Hi Rose,
I would like to request the following:
VRS-B1-20 - 8260
VRS-B1-60 – 8260
SLA-B1-5 – 8260
SLA-B1-15 – 8260
SLA-B1-60 – 8260
BBGP-B1-30 – 8260, Metals, Uranium
S8-B1-39 – Uranium, PCBs
S3-T1-5 - 8260, 8270, metals
S7-T1-5 - 8270

Thanks
Derrick

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170798

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 04/03/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/29/17 13:30
Logged In By: Brian Charon Date Logged In: 03/29/17 13:38

Samples Received at: **5.8°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170798-01 FFTA-T1- 5 [Soil] Sampled 03/29/17 07:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 07:42	
T170798-02 FFTA-T1- 10 [Soil] Sampled 03/29/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 07:50	
T170798-03 FFTA-T1- 15 [Soil] Sampled 03/29/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 08:00	
T170798-04 S8-T2- 5 [Soil] Sampled 03/29/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:00	
T170798-05 S8-T2- 10 [Soil] Sampled 03/29/17 09:08 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:08	
T170798-06 S8-T2- 15 [Soil] Sampled 03/29/17 09:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:15	
T170798-07 S3-T1- 5 [Soil] Sampled 03/29/17 09:56 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:56	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170798

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170798-08 S3-T1- 10 [Soil] Sampled 03/29/17 10:06 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:06	
T170798-09 S3-T1- 15 [Soil] Sampled 03/29/17 10:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:12	
T170798-10 S7-T1- 5 [Soil] Sampled 03/29/17 10:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:35	
T170798-11 S7-T1- 10 [Soil] Sampled 03/29/17 10:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:45	
T170798-12 S7-T1- 15 [Soil] Sampled 03/29/17 11:02 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 11:02	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170798

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 04/03/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/29/17 13:30
Logged In By: Brian Charon Date Logged In: 03/29/17 13:38

Samples Received at: **5.8°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170798-01 FFTA-T1- 5 [Soil] Sampled 03/29/17 07:42 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 07:42	
T170798-02 FFTA-T1- 10 [Soil] Sampled 03/29/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 07:50	
T170798-03 FFTA-T1- 15 [Soil] Sampled 03/29/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 08:00	
T170798-04 S8-T2- 5 [Soil] Sampled 03/29/17 09:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:00	
T170798-05 S8-T2- 10 [Soil] Sampled 03/29/17 09:08 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:08	
T170798-06 S8-T2- 15 [Soil] Sampled 03/29/17 09:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:15	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170798

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170798-07 S3-T1- 5 [Soil] Sampled 03/29/17 09:56 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270 and metals added per client request (Derrick, 4/5)**
6010 Title 22	04/12/17 15:00	5	09/25/17 09:56	
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 09:56	
8015 m Gas Purge	04/10/17 15:00	3	04/12/17 09:56	
8260	04/10/17 15:00	3	04/12/17 09:56	
8270C	04/12/17 15:00	5	04/12/17 09:56	
T170798-08 S3-T1- 10 [Soil] Sampled 03/29/17 10:06 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:06	
T170798-09 S3-T1- 15 [Soil] Sampled 03/29/17 10:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:12	
T170798-10 S7-T1- 5 [Soil] Sampled 03/29/17 10:35 (GMT-08:00) Pacific Time (US &				**8270 added per client request (Derrick, 4/5)**
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:35	
8270C	04/12/17 15:00	5	04/12/17 10:35	
T170798-11 S7-T1- 10 [Soil] Sampled 03/29/17 10:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 10:45	
T170798-12 S7-T1- 15 [Soil] Sampled 03/29/17 11:02 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	04/03/17 15:00	3	04/12/17 11:02	

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

24 March 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/20/17 17:10. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S20-T1-5	T170697-01	Soil	03/20/17 08:00	03/20/17 17:10
S20-T1-10	T170697-02	Soil	03/20/17 09:15	03/20/17 17:10
S20-T1-15	T170697-03	Soil	03/20/17 09:25	03/20/17 17:10
S20-T2-5	T170697-04	Soil	03/20/17 10:09	03/20/17 17:10
S20-T2-10	T170697-05	Soil	03/20/17 10:19	03/20/17 17:10
S20-T2-15	T170697-06	Soil	03/20/17 10:32	03/20/17 17:10
BOTF-T2-5	T170697-07	Soil	03/20/17 11:50	03/20/17 17:10
BOTF-T2-10	T170697-08	Soil	03/20/17 12:00	03/20/17 17:10
BOTF-T2-15	T170697-09	Soil	03/20/17 12:08	03/20/17 17:10
BOTF-T1-5	T170697-10	Soil	03/20/17 13:15	03/20/17 17:10
BOTF-T1-10	T170697-11	Soil	03/20/17 13:30	03/20/17 17:10
BOTF-T1-15	T170697-12	Soil	03/20/17 13:45	03/20/17 17:10
H2-T1-5	T170697-13	Soil	03/20/17 13:45	03/20/17 17:10
H2-T1-10	T170697-14	Soil	03/20/17 14:15	03/20/17 17:10
H2-T1-15	T170697-15	Soil	03/20/17 14:15	03/20/17 17:10

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

DETECTIONS SUMMARY

Sample ID: S20-T1-5 **Laboratory ID:** T170697-01

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**100**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**390**	10	mg/kg	EPA 8015B	

Sample ID: S20-T1-10 **Laboratory ID:** T170697-02

No Results Detected

Sample ID: S20-T1-15 **Laboratory ID:** T170697-03

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**22**	10	mg/kg	EPA 8015B	

Sample ID: S20-T2-5 **Laboratory ID:** T170697-04

No Results Detected

Sample ID: S20-T2-10 **Laboratory ID:** T170697-05

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**51**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**120**	10	mg/kg	EPA 8015B	

Sample ID: S20-T2-15 **Laboratory ID:** T170697-06

No Results Detected

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

Sample ID: BOTF-T2-5 **Laboratory ID:** T170697-07

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**52**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**83**	10	mg/kg	EPA 8015B	

Sample ID: BOTF-T2-10 **Laboratory ID:** T170697-08

No Results Detected

Sample ID: BOTF-T2-15 **Laboratory ID:** T170697-09

No Results Detected

Sample ID: BOTF-T1-5 **Laboratory ID:** T170697-10

No Results Detected

Sample ID: BOTF-T1-10 **Laboratory ID:** T170697-11

No Results Detected

Sample ID: BOTF-T1-15 **Laboratory ID:** T170697-12

No Results Detected

Sample ID: H2-T1-5 **Laboratory ID:** T170697-13

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

Sample ID: H2-T1-5 **Laboratory ID:** T170697-13

No Results Detected

Sample ID: H2-T1-10 **Laboratory ID:** T170697-14

No Results Detected

Sample ID: H2-T1-15 **Laboratory ID:** T170697-15

No Results Detected

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

S20-T1-5

T170697-01 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**100**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**390**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*113 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

S20-T1-10

T170697-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*96.3 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
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949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

S20-T1-15

T170697-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**22**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*97.9 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

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949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*101 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

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949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

S20-T2-10

T170697-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**51**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**120**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*101 %*	*65-135*		"	"	"	"	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

S20-T2-15

T170697-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*91.3 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/22/17	EPA 8015B	
C13-C28 (DRO)	**52**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**83**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*107 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

BOTF-T2-10

T170697-08 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*101 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

BOTF-T2-15

T170697-09 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*95.8 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

BOTF-T1-5

T170697-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*104 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

BOTF-T1-10

T170697-11 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*104 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

BOTF-T1-15

T170697-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*95.1 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

H2-T1-5

T170697-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*97.8 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

H2-T1-10

T170697-14 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*84.9 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

H2-T1-15

T170697-15 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032129	03/21/17	03/21/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*108 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032129 - EPA 3550B GC										
Blank (7032129-BLK1)				Prepared & Analyzed: 03/21/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*77.7*		*"*	*99.0*		*78.5*	*65-135*			
LCS (7032129-BS1)				Prepared: 03/21/17 Analyzed: 03/22/17						
C13-C28 (DRO)	530	10	mg/kg	495		108	75-125			
Surrogate: p-Terphenyl	*120*		*"*	*99.0*		*122*	*65-135*			
LCS Dup (7032129-BSD1)				Prepared: 03/21/17 Analyzed: 03/22/17						
C13-C28 (DRO)	490	10	mg/kg	490		100	75-125	8.45	20	
Surrogate: p-Terphenyl	*96.6*		*"*	*98.0*		*98.5*	*65-135*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/24/17 09:55

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Dr Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/20/17 Page: 1 of 2
Project Name: Brea - Olinda Oil Field
Collector: Frank Hager Client Project #: 02077.01
Batch #: T170697 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + 6 RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers
S20-T1-5	3/20/17	0800	Grab	4oz glass				H				X	H				01	01	Hold all except 8015M	
S20-T1-5	3/20/17	0800	Grab	40ml VOA	H													02	"	
S20-T1-10	3/20/17	0915	Grab	4oz glass				H				X	H				02	03	"	
S20-T1-15	3/20/17	0925	Grab	4oz glass				H				X	H				03	04	"	
S20-T2-5	3/20/17	1009	Soil	4oz gl				H				X	H				04	05	"	
S20-T2-5	3/20/17	1009	5035	40ml VOA	H													06	"	
S20-T2-10	3/20/17	1019	Soil	4oz gl				H				X	H				05	07	"	
S20-T2-15	3/20/17	1032	Soil	4oz gl				H				X	H				06	08	"	
BBO-T2-15	3/20/17	1032	5035	40ml VOA	H													09	"	
BOTF-T2-5	3/20/17	1150	Soil	4oz gl				H				X	H				07	10	"	
BOTF-T2-5	3/20/17	1150	5035	40ml VOA	H													11	"	
BOTF-T2-10	3/20/17	1200	Soil	4oz gl				H				X	H				08	12	"	
BOTF-T2-15	3/20/17	1208	Soil	4oz gl				H				X	H				09	13	"	

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 17:10		3/20/17 17:10
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 07:16		3/21/17 07:16
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 5.1

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162516

I-570

SunStar Laboratories, Inc.

Providing Quality Analytical Services Nationwide

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949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management Inc
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0035
Project Manager: DERRICK WILLIS

Date: 3/20/17 Page: 2 Of 2
Project Name: Brea-Olinda Oil Field
Collector: Frank Hagar Client Project #: 02077.01
Batch #: T170697 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	BC Comments/Preservative	Total # of containers
BOTF-T1-5	3/20/17	1315	Soil	4oz Gl				H				X	H				10	14		
BOTF-T1-5	3/20/17	1315	5035	40ml VOA	H													15	-	
BOTF-T1-10	3/20/17	1330	Soil	4oz Gl				H				X	H				11	16		
~~BOTF-T1-10~~	~~3/20/17~~	~~1330~~	~~5035~~	~~VOA~~	~~H~~															
BOTF-T1-15	3/20/17	1345	Soil	4oz Gl				H				X	H				12	17		
BOTF-T1-15	3/20/17	1345	5035	VOA	H													18	-	
H2-T1-5	3/20/17	1345	Soil	4oz Gl				H				X	H				13	19		
H2-T1-5	3/20/17	1345	5035	VOA	H													20	-	
H2-T1-10	3/20/17	1415	Soil	4oz Gl				H				X	H				14	21		
~~H2-T1-10~~	~~3/20/17~~	~~1415~~	~~5035~~	~~VOA~~	~~H~~															
H2-T1-15	3/20/17	1435	Soil	4oz Gl				H				X	H				15	22		
~~H2-T1-15~~	~~3/20/17~~	~~1435~~	~~5035~~	~~VOA~~	~~H~~															

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 1710		3/20/17 17:10
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 07:16		3/21/17 07:16
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA (8)
Seals intact? Y/N/NA (8)
Received good condition/cold 5.1

Turn around time: ST

Notes
Call F. Hagar
Questor S
949 689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162515

I-571

SunStar Laboratories

Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T170697

Client Name: NORTHGATE Project: BREA OLINDA OIL FIELD

Delivered by: ☐ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: JOEY Date/Time Lab Received: 3/20/17 1710

Total number of coolers received:

Temperature:	Cooler #1 5.3	°C +/- the CF (- 0.2°C)	= 5.1	°C corrected temperature
Temperature:	Cooler #2	°C +/- the CF (- 0.2°C)	=	°C corrected temperature
Temperature:	Cooler #3	°C +/- the CF (- 0.2°C)	=	°C corrected temperature

Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes** ☐ **No**
If NO:		
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☐ Yes	☒ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☒ N/A BC
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☐ **Yes**	☒ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BC 3/21/17

Comments:

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SunStar Laboratories — Celebrating 20 Years!

SAMPLE NON-CONFORMANCE SHEET

Batch/Work Order # T170697

- **COOLERS**
  - ☐ Not Received (received COC only)
  - ☐ Leaking/Damaged
  - ☐ Other:
- **CUSTODY SEALS**
  - ☐ None
  - ☐ Not Intact
- **TEMPERATURE (Temp criteria = ≤ 6°C)**
  - ☐ Cooler/Sample Temp(s)
  - ☐ Temperature Blank(s)
- **CHAIN OF CUSTODY (COC)**
  - ☐ Not relinquished by client; No date/time relinquished
  - ☐ Incomplete information provided
  - ☐ COC not received – notify PM
- **CONTAINERS**
  - ☐ Leaking ☐ Broken
  - ☐ Extra ☒ Missing
- **LABELS**
  - ☐ Not the same sample ID / info as on the COC
  - ☐ Incomplete Information
  - ☐ Markings/Info illegible
- **SAMPLES**
  - ☒ Samples **NOT RECEIVED** but listed on COC
  - ☐ Samples received but **NOT LISTED** on COC
  - ☐ Logged based on Label Information and not COC
  - ☐ Logged according to Work Plan and not COC
  - ☐ Logged in, **ON HOLD** until further notice
  - ☐ Insufficient quantities for analysis
  - ☐ Improper container used
  - ☐ Mislabeled as to tests, preservatives, etc.
  - ☐ Holding time expired – list sample ID and test
  - ☐ Not preserved/Improper preservative used
  - ☐ Without Labels, no information on containers
  - ☐ Other

Comments: SAMPLE 12 NO SOSS KITS RECEIVED

Sample fractioning only if broken container compromises other samples or if out of temp reading impacts more than one cooler

Fraction													Preser.
VOA													

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170697

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/21/17 07:16
Logged In By: Brian Charon Date Logged In: 03/21/17 07:32

Samples Received at: **5.1°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170697-01 S20-T1-5 [Soil] Sampled 03/20/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 08:00	
T170697-02 S20-T1-10 [Soil] Sampled 03/20/17 09:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 09:15	
T170697-03 S20-T1-15 [Soil] Sampled 03/20/17 09:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 09:25	
T170697-04 S20-T2-5 [Soil] Sampled 03/20/17 10:09 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:09	
T170697-05 S20-T2-10 [Soil] Sampled 03/20/17 10:19 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:19	
T170697-06 S20-T2-15 [Soil] Sampled 03/20/17 10:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:32	
T170697-07 BOTF-T2-5 [Soil] Sampled 03/20/17 11:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 11:50	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170697

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170697-08 BOTF-T2-10 [Soil] Sampled 03/20/17 12:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 12:00	
T170697-09 BOTF-T2-15 [Soil] Sampled 03/20/17 12:08 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 12:08	
T170697-10 BOTF-T1-5 [Soil] Sampled 03/20/17 13:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:15	
T170697-11 BOTF-T1-10 [Soil] Sampled 03/20/17 13:30 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:30	
T170697-12 BOTF-T1-15 [Soil] Sampled 03/20/17 13:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:45	
T170697-13 H2-T1-5 [Soil] Sampled 03/20/17 13:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:45	
T170697-14 H2-T1-10 [Soil] Sampled 03/20/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 14:15	
T170697-15 H2-T1-15 [Soil] Sampled 03/20/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 14:15	

Reviewed By Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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03 April 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/20/17 17:10. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S20-T1-5	T170697-01	Soil	03/20/17 08:00	03/20/17 17:10
S20-T2-5	T170697-04	Soil	03/20/17 10:09	03/20/17 17:10
BOTF-T2-5	T170697-07	Soil	03/20/17 11:50	03/20/17 17:10

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

DETECTIONS SUMMARY

Sample ID: S20-T1-5 **Laboratory ID:** T170697-01

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**55**	1.0	mg/kg	EPA 6010B	
Chromium	**6.4**	2.0	mg/kg	EPA 6010B	
Cobalt	**4.1**	2.0	mg/kg	EPA 6010B	
Copper	**4.0**	1.0	mg/kg	EPA 6010B	
Nickel	**6.5**	2.0	mg/kg	EPA 6010B	
Vanadium	**16**	5.0	mg/kg	EPA 6010B	
Zinc	**22**	1.0	mg/kg	EPA 6010B	
Uranium, Total	**0.53**	0.50	mg/kg	EPA 6020A	

Sample ID: S20-T2-5 **Laboratory ID:** T170697-04

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**88**	1.0	mg/kg	EPA 6010B	
Chromium	**7.7**	2.0	mg/kg	EPA 6010B	
Cobalt	**5.2**	2.0	mg/kg	EPA 6010B	
Copper	**5.1**	1.0	mg/kg	EPA 6010B	
Nickel	**10**	2.0	mg/kg	EPA 6010B	
Vanadium	**22**	5.0	mg/kg	EPA 6010B	
Zinc	**24**	1.0	mg/kg	EPA 6010B	

Sample ID: BOTF-T2-5 **Laboratory ID:** T170697-07

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**120**	1.0	mg/kg	EPA 6010B	
Chromium	**9.5**	2.0	mg/kg	EPA 6010B	
Cobalt	**6.8**	2.0	mg/kg	EPA 6010B	
Copper	**7.8**	1.0	mg/kg	EPA 6010B	
Molybdenum	**5.3**	5.0	mg/kg	EPA 6010B	
Nickel	**8.8**	2.0	mg/kg	EPA 6010B	
Vanadium	**24**	5.0	mg/kg	EPA 6010B	
Zinc	**31**	1.0	mg/kg	EPA 6010B	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T1-5

T170697-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	180	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*61.9 %*	*65-135*		"	"	"	"	*S-03*
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**55**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**6.4**	2.0	"	"	"	"	"	"	
Cobalt	**4.1**	2.0	"	"	"	"	"	"	
Copper	**4.0**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**6.5**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**16**	5.0	"	"	"	"	"	"	
Zinc	**22**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*79.6 %*	*35-140*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T1-5

T170697-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*78.2 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	2.7	ug/kg	1	7032736	03/27/17	03/28/17	EPA 8260B/5035	
Bromochloromethane	ND	2.7	"	"	"	"	"	"	
Bromodichloromethane	ND	2.7	"	"	"	"	"	"	
Bromoform	ND	2.7	"	"	"	"	"	"	
Bromomethane	ND	2.7	"	"	"	"	"	"	
n-Butylbenzene	ND	2.7	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.7	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.7	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.7	"	"	"	"	"	"	
Chlorobenzene	ND	2.7	"	"	"	"	"	"	
Chloroethane	ND	2.7	"	"	"	"	"	"	
Chloroform	ND	2.7	"	"	"	"	"	"	
Chloromethane	ND	2.7	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.7	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.7	"	"	"	"	"	"	
Dibromochloromethane	ND	2.7	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.4	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.7	"	"	"	"	"	"	
Dibromomethane	ND	2.7	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.7	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.7	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.7	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.7	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.7	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.7	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.7	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.7	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.7	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.7	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T1-5

T170697-01 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	2.7	ug/kg	1	7032736	03/27/17	03/28/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	2.7	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.7	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.7	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.7	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.7	"	"	"	"	"	"	
Isopropylbenzene	ND	2.7	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.7	"	"	"	"	"	"	
Methylene chloride	ND	2.7	"	"	"	"	"	"	
Naphthalene	ND	2.7	"	"	"	"	"	"	
n-Propylbenzene	ND	2.7	"	"	"	"	"	"	
Styrene	ND	2.7	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.7	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.7	"	"	"	"	"	"	
Tetrachloroethene	ND	2.7	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.7	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.7	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.7	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.7	"	"	"	"	"	"	
Trichloroethene	ND	2.7	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.7	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.7	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.7	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.7	"	"	"	"	"	"	
Vinyl chloride	ND	2.7	"	"	"	"	"	"	
Benzene	ND	2.7	"	"	"	"	"	"	
Toluene	ND	2.7	"	"	"	"	"	"	
Ethylbenzene	ND	2.7	"	"	"	"	"	"	
m,p-Xylene	ND	5.4	"	"	"	"	"	"	
o-Xylene	ND	2.7	"	"	"	"	"	"	
Surrogate: Toluene-d8		*104 %*	*85.5-116*		"	"	"	"	

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S20-T1-5

T170697-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*101 %*		*81.2-123*	*7032736*	*03/27/17*	*03/28/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*113 %*		*95.7-135*	*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	1500	ug/kg	5	7032720	03/27/17	03/30/17	EPA 8270C	R-07
Phenol	ND	5000	"	"	"	"	"	"	R-07
Aniline	ND	1500	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	5000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	1500	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
1-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthene	ND	1500	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrotoluene	ND	1500	"	"	"	"	"	"	R-07
Pentachlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyrene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthylene	ND	1500	"	"	"	"	"	"	R-07
Anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (b) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (k) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	5000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	1500	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Bromophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T1-5

T170697-01 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Butyl benzyl phthalate	ND	1500	ug/kg	5	7032720	03/27/17	03/30/17	EPA 8270C	R-07
4-Chloroaniline	ND	1500	"	"	"	"	"	"	R-07
2-Chloronaphthalene	ND	1500	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Chrysene	ND	1500	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	1500	"	"	"	"	"	"	R-07
Dibenzofuran	ND	1500	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	1500	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
2,4-Dimethylphenol	ND	5000	"	"	"	"	"	"	R-07
Dimethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,6-Dinitrotoluene	ND	5000	"	"	"	"	"	"	R-07
Di-n-octyl phthalate	ND	1500	"	"	"	"	"	"	R-07
Fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Fluorene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	7500	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorocyclopentadiene	ND	5000	"	"	"	"	"	"	R-07
Hexachloroethane	ND	1500	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	1500	"	"	"	"	"	"	R-07
Isophorone	ND	1500	"	"	"	"	"	"	R-07
2-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
4-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
Naphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
4-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07

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Rose Fasheh

Rose Fasheh, Project Manager

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T1-5

T170697-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Semivolatile Organic Compounds by EPA Method 8270C									
Nitrobenzene	ND	5000	ug/kg	5	7032720	03/27/17	03/30/17	EPA 8270C	R-07
2-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
N-Nitrosodimethylamine	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	ND	1500	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
Phenanthrene	ND	1500	"	"	"	"	"	"	R-07
Azobenzene	ND	1500	"	"	"	"	"	"	R-07
Pyridine	ND	1500	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*67.8 %*	*15-121*		"	"	"	"	*R-07*
Surrogate: Phenol-d6		*68.8 %*	*24-113*		"	"	"	"	*R-07*
Surrogate: Nitrobenzene-d5		*83.6 %*	*21.3-119*		"	"	"	"	*R-07*
Surrogate: 2-Fluorobiphenyl		*89.3 %*	*32.4-102*		"	"	"	"	*R-07*
Surrogate: 2,4,6-Tribromophenol		*96.5 %*	*18.1-105*		"	"	"	"	*R-07*
Surrogate: Terphenyl-dl4		*137 %*	*29.1-130*		"	"	"	"	*R-07, S-GC*
Weck Laboratories, Inc.									
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods									
Uranium, Total	**0.53**	0.50	mg/kg	1	W7C1566	03/28/17	04/03/17	EPA 6020A	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	120	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*84.8 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**88**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**7.7**	2.0	"	"	"	"	"	"	
Cobalt	**5.2**	2.0	"	"	"	"	"	"	
Copper	**5.1**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**10**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**22**	5.0	"	"	"	"	"	"	
Zinc	**24**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*69.8 %*	*35-140*		"	"	"	"	

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Rose Fasheh

Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*76.3 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.2	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	3.2	"	"	"	"	"	"	
Bromodichloromethane	ND	3.2	"	"	"	"	"	"	
Bromoform	ND	3.2	"	"	"	"	"	"	
Bromomethane	ND	3.2	"	"	"	"	"	"	
n-Butylbenzene	ND	3.2	"	"	"	"	"	"	
sec-Butylbenzene	ND	3.2	"	"	"	"	"	"	
tert-Butylbenzene	ND	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	"	"	"	"	"	"	
Chlorobenzene	ND	3.2	"	"	"	"	"	"	
Chloroethane	ND	3.2	"	"	"	"	"	"	
Chloroform	ND	3.2	"	"	"	"	"	"	
Chloromethane	ND	3.2	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.2	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.2	"	"	"	"	"	"	
Dibromochloromethane	ND	3.2	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	6.4	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.2	"	"	"	"	"	"	
Dibromomethane	ND	3.2	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.2	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.2	"	"	"	"	"	"	
1,1-Dichloroethane	ND	3.2	"	"	"	"	"	"	
1,2-Dichloroethane	ND	3.2	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.2	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.2	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	3.2	"	"	"	"	"	"	
1,2-Dichloropropane	ND	3.2	"	"	"	"	"	"	

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S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	3.2	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	3.2	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.2	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.2	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.2	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.2	"	"	"	"	"	"	
Isopropylbenzene	ND	3.2	"	"	"	"	"	"	
p-Isopropyltoluene	ND	3.2	"	"	"	"	"	"	
Methylene chloride	ND	3.2	"	"	"	"	"	"	
Naphthalene	ND	3.2	"	"	"	"	"	"	
n-Propylbenzene	ND	3.2	"	"	"	"	"	"	
Styrene	ND	3.2	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.2	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.2	"	"	"	"	"	"	
Tetrachloroethene	ND	3.2	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.2	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.2	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.2	"	"	"	"	"	"	
Trichloroethene	ND	3.2	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.2	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	3.2	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	3.2	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.2	"	"	"	"	"	"	
Vinyl chloride	ND	3.2	"	"	"	"	"	"	
Benzene	ND	3.2	"	"	"	"	"	"	
Toluene	ND	3.2	"	"	"	"	"	"	
Ethylbenzene	ND	3.2	"	"	"	"	"	"	
m,p-Xylene	ND	6.4	"	"	"	"	"	"	
o-Xylene	ND	3.2	"	"	"	"	"	"	
Surrogate: Toluene-d8		*108 %*	*85.5-116*		"	"	"	"	

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S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*96.8 %*	*81.2-123*		*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*119 %*	*95.7-135*		*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	300	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
Phenol	ND	1000	"	"	"	"	"	"	
Aniline	ND	300	"	"	"	"	"	"	
2-Chlorophenol	ND	1000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	300	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	300	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	300	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1000	"	"	"	"	"	"	
2-Methylnaphthalene	ND	300	"	"	"	"	"	"	
1-Methylnaphthalene	ND	300	"	"	"	"	"	"	
Acenaphthene	ND	300	"	"	"	"	"	"	
4-Nitrophenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	300	"	"	"	"	"	"	
Pentachlorophenol	ND	1000	"	"	"	"	"	"	
Pyrene	ND	300	"	"	"	"	"	"	
Acenaphthylene	ND	300	"	"	"	"	"	"	
Anthracene	ND	300	"	"	"	"	"	"	
Benzo (a) anthracene	ND	300	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	300	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	300	"	"	"	"	"	"	
Benzyl alcohol	ND	300	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	300	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	300	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	300	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	300	"	"	"	"	"	"	

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Butyl benzyl phthalate	ND	300	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
4-Chloroaniline	ND	300	"	"	"	"	03/30/17	"	
2-Chloronaphthalene	ND	300	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	300	"	"	"	"	"	"	
Chrysene	ND	300	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	300	"	"	"	"	"	"	
Dibenzofuran	ND	300	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	300	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	300	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	300	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1000	"	"	"	"	"	"	
Diethyl phthalate	ND	300	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1000	"	"	"	"	"	"	
Dimethyl phthalate	ND	300	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	1000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	1000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	1000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	300	"	"	"	"	"	"	
Fluoranthene	ND	300	"	"	"	"	"	"	
Fluorene	ND	300	"	"	"	"	"	"	
Hexachlorobenzene	ND	1500	"	"	"	"	"	"	
Hexachlorobutadiene	ND	300	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1000	"	"	"	"	"	"	
Hexachloroethane	ND	300	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	300	"	"	"	"	"	"	
Isophorone	ND	300	"	"	"	"	"	"	
2-Methylphenol	ND	1000	"	"	"	"	"	"	
4-Methylphenol	ND	1000	"	"	"	"	"	"	
Naphthalene	ND	300	"	"	"	"	"	"	
2-Nitroaniline	ND	300	"	"	"	"	"	"	
3-Nitroaniline	ND	300	"	"	"	"	"	"	
4-Nitroaniline	ND	300	"	"	"	"	"	"	

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S20-T2-5

T170697-04 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Nitrobenzene	ND	1000	ug/kg	1	7032720	03/27/17	03/30/17	EPA 8270C	
2-Nitrophenol	ND	1000	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	300	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	300	"	"	"	"	"	"	
2,3,5,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
2,3,4,6-Tetrachlorophenol	ND	300	"	"	"	"	"	"	
Phenanthrene	ND	300	"	"	"	"	"	"	
Azobenzene	ND	300	"	"	"	"	"	"	
Pyridine	ND	300	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*51.9 %*	*15-121*		"	"	"	"	
Surrogate: Phenol-d6		*44.7 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*42.8 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*58.4 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*89.2 %*	*18.1-105*		"	"	"	"	
Surrogate: Terphenyl-dl4		*111 %*	*29.1-130*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Purgeable Petroleum Hydrocarbons by EPA 8015B									
C6-C12 (GRO)	ND	160	ug/kg	1	7032738	03/27/17	04/03/17	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*94.1 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	7032739	03/27/17	03/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**120**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**9.5**	2.0	"	"	"	"	"	"	
Cobalt	**6.8**	2.0	"	"	"	"	"	"	
Copper	**7.8**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	**5.3**	5.0	"	"	"	"	"	"	
Nickel	**8.8**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**24**	5.0	"	"	"	"	"	"	
Zinc	**31**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7032743	03/27/17	03/28/17	EPA 7471A Soil	
Polychlorinated Biphenyls by EPA Method 8082									
PCB-1016	ND	10	ug/kg	1	7032719	03/27/17	03/28/17	EPA 8082	
PCB-1221	ND	10	"	"	"	"	"	"	
PCB-1232	ND	10	"	"	"	"	"	"	
PCB-1242	ND	10	"	"	"	"	"	"	
PCB-1248	ND	10	"	"	"	"	"	"	
PCB-1254	ND	10	"	"	"	"	"	"	
PCB-1260	ND	10	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*78.6 %*	*35-140*		"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Polychlorinated Biphenyls by EPA Method 8082									
Surrogate: Decachlorobiphenyl		*79.6 %*		*35-140*	*7032719*	*03/27/17*	*03/28/17*	*EPA 8082*	
Volatile Organic Compounds by EPA Method 8260B									
Bromobenzene	ND	3.7	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
Bromochloromethane	ND	3.7	"	"	"	"	"	"	
Bromodichloromethane	ND	3.7	"	"	"	"	"	"	
Bromoform	ND	3.7	"	"	"	"	"	"	
Bromomethane	ND	3.7	"	"	"	"	"	"	
n-Butylbenzene	ND	3.7	"	"	"	"	"	"	
sec-Butylbenzene	ND	3.7	"	"	"	"	"	"	
tert-Butylbenzene	ND	3.7	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.7	"	"	"	"	"	"	
Chlorobenzene	ND	3.7	"	"	"	"	"	"	
Chloroethane	ND	3.7	"	"	"	"	"	"	
Chloroform	ND	3.7	"	"	"	"	"	"	
Chloromethane	ND	3.7	"	"	"	"	"	"	
2-Chlorotoluene	ND	3.7	"	"	"	"	"	"	
4-Chlorotoluene	ND	3.7	"	"	"	"	"	"	
Dibromochloromethane	ND	3.7	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	7.4	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.7	"	"	"	"	"	"	
Dibromomethane	ND	3.7	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.7	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloroethane	ND	3.7	"	"	"	"	"	"	
1,2-Dichloroethane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloroethene	ND	3.7	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	3.7	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	3.7	"	"	"	"	"	"	
1,2-Dichloropropane	ND	3.7	"	"	"	"	"	"	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,3-Dichloropropane	ND	3.7	ug/kg	1	7032736	03/27/17	03/27/17	EPA 8260B/5035	
2,2-Dichloropropane	ND	3.7	"	"	"	"	"	"	
1,1-Dichloropropene	ND	3.7	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	3.7	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	3.7	"	"	"	"	"	"	
Hexachlorobutadiene	ND	3.7	"	"	"	"	"	"	
Isopropylbenzene	ND	3.7	"	"	"	"	"	"	
p-Isopropyltoluene	ND	3.7	"	"	"	"	"	"	
Methylene chloride	ND	3.7	"	"	"	"	"	"	
Naphthalene	ND	3.7	"	"	"	"	"	"	
n-Propylbenzene	ND	3.7	"	"	"	"	"	"	
Styrene	ND	3.7	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.7	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.7	"	"	"	"	"	"	
Tetrachloroethene	ND	3.7	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.7	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	3.7	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	3.7	"	"	"	"	"	"	
Trichloroethene	ND	3.7	"	"	"	"	"	"	
Trichlorofluoromethane	ND	3.7	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	3.7	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	3.7	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	3.7	"	"	"	"	"	"	
Vinyl chloride	ND	3.7	"	"	"	"	"	"	
Benzene	ND	3.7	"	"	"	"	"	"	
Toluene	ND	3.7	"	"	"	"	"	"	
Ethylbenzene	ND	3.7	"	"	"	"	"	"	
m,p-Xylene	ND	7.4	"	"	"	"	"	"	
o-Xylene	ND	3.7	"	"	"	"	"	"	
Surrogate: Toluene-d8		*98.6 %*	*85.5-116*		"	"	"	"	

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BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: 4-Bromofluorobenzene		*84.8 %*	*81.2-123*		*7032736*	*03/27/17*	*03/27/17*	*EPA 8260B/5035*	
Surrogate: Dibromofluoromethane		*120 %*	*95.7-135*		*"*	*"*	*"*	*"*	
Semivolatile Organic Compounds by EPA Method 8270C									
Carbazole	ND	1500	ug/kg	5	7032720	03/27/17	03/30/17	EPA 8270C	R-07
Aniline	ND	1500	"	"	"	"	"	"	R-07
Phenol	ND	5000	"	"	"	"	"	"	R-07
2-Chlorophenol	ND	5000	"	"	"	"	"	"	R-07
1,4-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodi-n-propylamine	ND	1500	"	"	"	"	"	"	R-07
1,2,4-Trichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
4-Chloro-3-methylphenol	ND	5000	"	"	"	"	"	"	R-07
1-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Methylnaphthalene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthene	ND	1500	"	"	"	"	"	"	R-07
4-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrotoluene	ND	1500	"	"	"	"	"	"	R-07
Pentachlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyrene	ND	1500	"	"	"	"	"	"	R-07
Acenaphthylene	ND	1500	"	"	"	"	"	"	R-07
Anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (a) anthracene	ND	1500	"	"	"	"	"	"	R-07
Benzo (b) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (k) fluoranthene	ND	1500	"	"	"	"	"	"	R-07
Benzo (g,h,i) perylene	ND	5000	"	"	"	"	"	"	R-07
Benzo (a) pyrene	ND	1500	"	"	"	"	"	"	R-07
Benzyl alcohol	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethoxy)methane	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroethyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-chloroisopropyl)ether	ND	1500	"	"	"	"	"	"	R-07
Bis(2-ethylhexyl)phthalate	ND	1500	"	"	"	"	"	"	R-07
4-Bromophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07

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BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Butyl benzyl phthalate	ND	1500	ug/kg	5	7032720	03/27/17	03/30/17	EPA 8270C	R-07
4-Chloroaniline	ND	1500	"	"	"	"	"	"	R-07
2-Chloronaphthalene	ND	1500	"	"	"	"	"	"	R-07
4-Chlorophenyl phenyl ether	ND	1500	"	"	"	"	"	"	R-07
Chrysene	ND	1500	"	"	"	"	"	"	R-07
Dibenz (a,h) anthracene	ND	1500	"	"	"	"	"	"	R-07
Dibenzofuran	ND	1500	"	"	"	"	"	"	R-07
Di-n-butyl phthalate	ND	1500	"	"	"	"	"	"	R-07
1,2-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
1,3-Dichlorobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4-Dichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Diethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
2,4-Dimethylphenol	ND	5000	"	"	"	"	"	"	R-07
Dimethyl phthalate	ND	1500	"	"	"	"	"	"	R-07
4,6-Dinitro-2-methylphenol	ND	5000	"	"	"	"	"	"	R-07
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	R-07
2,6-Dinitrotoluene	ND	5000	"	"	"	"	"	"	R-07
Di-n-octyl phthalate	ND	1500	"	"	"	"	03/30/17	"	R-07
Fluoranthene	ND	1500	"	"	"	"	03/30/17	"	R-07
Fluorene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorobenzene	ND	7500	"	"	"	"	"	"	R-07
Hexachlorobutadiene	ND	1500	"	"	"	"	"	"	R-07
Hexachlorocyclopentadiene	ND	5000	"	"	"	"	"	"	R-07
Hexachloroethane	ND	1500	"	"	"	"	"	"	R-07
Indeno (1,2,3-cd) pyrene	ND	1500	"	"	"	"	"	"	R-07
Isophorone	ND	1500	"	"	"	"	03/30/17	"	R-07
2-Methylphenol	ND	5000	"	"	"	"	03/30/17	"	R-07
4-Methylphenol	ND	5000	"	"	"	"	"	"	R-07
Naphthalene	ND	1500	"	"	"	"	"	"	R-07
2-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
3-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07
4-Nitroaniline	ND	1500	"	"	"	"	"	"	R-07

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BOTF-T2-5

T170697-07 (Soil)

SunStar Laboratories, Inc.

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Nitrobenzene	ND	5000	ug/kg	5	7032720	03/27/17	03/30/17	EPA 8270C	R-07
2-Nitrophenol	ND	5000	"	"	"	"	"	"	R-07
N-Nitrosodimethylamine	ND	1500	"	"	"	"	"	"	R-07
N-Nitrosodiphenylamine	ND	1500	"	"	"	"	"	"	R-07
2,3,5,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
2,3,4,6-Tetrachlorophenol	ND	1500	"	"	"	"	"	"	R-07
Phenanthrene	ND	1500	"	"	"	"	"	"	R-07
Azobenzene	ND	1500	"	"	"	"	"	"	R-07
2,4,5-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Pyridine	ND	1500	"	"	"	"	"	"	R-07
2,4,6-Trichlorophenol	ND	5000	"	"	"	"	"	"	R-07
Surrogate: 2-Fluorophenol		*49.9 %*	*15-121*		"	"	"	"	*R-07*
Surrogate: Phenol-d6		*52.2 %*	*24-113*		"	"	"	"	*R-07*
Surrogate: Nitrobenzene-d5		*55.8 %*	*21.3-119*		"	"	"	"	*R-07*
Surrogate: 2-Fluorobiphenyl		*106 %*	*32.4-102*		"	"	"	"	*R-07, S-GC*
Surrogate: 2,4,6-Tribromophenol		*98.6 %*	*18.1-105*		"	"	"	"	*R-07*
Surrogate: Terphenyl-dl4		*132 %*	*29.1-130*		"	"	"	"	*R-07, S-GC*

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Purgeable Petroleum Hydrocarbons by EPA 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032738 - EPA 5035 GC										
Blank (7032738-BLK1)				Prepared: 03/27/17 Analyzed: 04/03/17						
C6-C12 (GRO)	ND	200	ug/kg							
Surrogate: 4-Bromofluorobenzene	*104*		*"*	*100*		*104*	*65-135*			
LCS (7032738-BS1)				Prepared: 03/27/17 Analyzed: 04/03/17						
C6-C12 (GRO)	10100	200	ug/kg	10900		93.0	75-125			
Surrogate: 4-Bromofluorobenzene	*101*		*"*	*100*		*101*	*65-135*			
LCS Dup (7032738-BSD1)				Prepared: 03/27/17 Analyzed: 04/03/17						
C6-C12 (GRO)	10400	200	ug/kg	11000		94.6	75-125	2.89	20	
Surrogate: 4-Bromofluorobenzene	*83.4*		*"*	*100*		*83.4*	*65-135*			

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Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032739 - EPA 3051										
Blank (7032739-BLK1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	2.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
LCS (7032739-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Arsenic	81.3	5.0	mg/kg	100		81.3	75-125			
Barium	83.0	1.0	"	100		83.0	75-125			
Cadmium	83.4	2.0	"	100		83.4	75-125			
Chromium	83.0	2.0	"	100		83.0	75-125			
Lead	89.0	3.0	"	100		89.0	75-125			
Matrix Spike (7032739-MS1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Arsenic	77.1	5.0	mg/kg	99.0	1.25	76.6	75-125			
Barium	155	1.0	"	99.0	67.0	88.4	75-125			
Cadmium	75.0	2.0	"	99.0	0.420	75.3	75-125			
Chromium	82.1	2.0	"	99.0	6.60	76.2	75-125			
Lead	96.1	3.0	"	99.0	ND	97.0	75-125			

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Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032739 - EPA 3051										
Matrix Spike Dup (7032739-MSD1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Arsenic	78.4	5.0	mg/kg	100	1.25	77.2	75-125	1.75	20	
Barium	153	1.0	"	100	67.0	86.1	75-125	0.909	20	
Cadmium	78.3	2.0	"	100	0.420	77.9	75-125	4.33	20	
Chromium	84.2	2.0	"	100	6.60	77.6	75-125	2.58	20	
Lead	88.9	3.0	"	100	ND	88.9	75-125	7.73	20	QR-04

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Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032743 - EPA 7471A Soil										
Blank (7032743-BLK1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	ND	0.10	mg/kg							
LCS (7032743-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	0.336	0.10	mg/kg	0.410		82.1	75-125			
Matrix Spike (7032743-MS1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	0.319	0.10	mg/kg	0.385	ND	83.0	75-125			
Matrix Spike Dup (7032743-MSD1)	**Source: T170707-04**			Prepared: 03/27/17 Analyzed: 03/28/17						
Mercury	0.329	0.10	mg/kg	0.397	ND	83.0	75-125	3.10	20	

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Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032719 - EPA 3550 ECD/GCMS										
Blank (7032719-BLK1)				Prepared: 03/27/17 Analyzed: 03/28/17						
PCB-1016	ND	10	ug/kg							
PCB-1221	ND	10	"							
PCB-1232	ND	10	"							
PCB-1242	ND	10	"							
PCB-1248	ND	10	"							
PCB-1254	ND	10	"							
PCB-1260	ND	10	"							
Surrogate: Tetrachloro-meta-xylene	*7.46*		"	*9.80*		*76.1*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.07*		"	*9.80*		*82.3*	*35-140*			
LCS (7032719-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
PCB-1016	87.6	10	ug/kg	99.0		88.5	40-130			
PCB-1260	84.4	10	"	99.0		85.2	40-130			
Surrogate: Tetrachloro-meta-xylene	*7.72*		"	*9.90*		*78.0*	*35-140*			
Surrogate: Decachlorobiphenyl	*7.97*		"	*9.90*		*80.5*	*35-140*			
LCS Dup (7032719-BSD1)				Prepared: 03/27/17 Analyzed: 03/28/17						
PCB-1016	90.0	10	ug/kg	101		89.1	40-130	2.68	30	
PCB-1260	88.6	10	"	101		87.7	40-130	4.89	30	
Surrogate: Tetrachloro-meta-xylene	*8.39*		"	*10.1*		*83.0*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.76*		"	*10.1*		*86.7*	*35-140*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032736 - EPA 5035 GCMS										
Blank (7032736-BLK1)				Prepared & Analyzed: 03/27/17						
Bromobenzene	ND	5.0	ug/kg							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	10	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032736 - EPA 5035 GCMS										
Blank (7032736-BLK1)				Prepared & Analyzed: 03/27/17						
p-Isopropyltoluene	ND	5.0	ug/kg							
Methylene chloride	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
Benzene	ND	5.0	"							
Toluene	ND	5.0	"							
Ethylbenzene	ND	5.0	"							
m,p-Xylene	ND	10	"							
o-Xylene	ND	5.0	"							
Surrogate: Toluene-d8	*41.8*		*"*	*39.5*		*106*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*36.7*		*"*	*39.5*		*92.9*	*81.2-123*			
Surrogate: Dibromofluoromethane	*38.4*		*"*	*39.5*		*97.1*	*95.7-135*			
LCS (7032736-BS1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Chlorobenzene	109	5.0	ug/kg	99.4		110	75-125			
1,1-Dichloroethene	107	5.0	"	99.4		108	75-125			
Trichloroethene	106	5.0	"	99.4		106	75-125			
Benzene	106	5.0	"	99.4		107	75-125			
Toluene	106	5.0	"	99.4		106	75-125			
Surrogate: Toluene-d8	*38.9*		*"*	*39.8*		*97.9*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*43.0*		*"*	*39.8*		*108*	*81.2-123*			
Surrogate: Dibromofluoromethane	*47.8*		*"*	*39.8*		*120*	*95.7-135*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032736 - EPA 5035 GCMS										
LCS Dup (7032736-BSD1)				Prepared: 03/27/17 Analyzed: 03/28/17						
Chlorobenzene	111	5.0	ug/kg	99.6		111	75-125	1.15	20	
1,1-Dichloroethene	105	5.0	"	99.6		106	75-125	1.82	20	
Trichloroethene	100	5.0	"	99.6		101	75-125	5.17	20	
Benzene	107	5.0	"	99.6		107	75-125	0.573	20	
Toluene	102	5.0	"	99.6		102	75-125	3.68	20	
Surrogate: Toluene-d8	*37.8*		*"*	*39.8*		*95.0*	*85.5-116*			
Surrogate: 4-Bromofluorobenzene	*41.4*		*"*	*39.8*		*104*	*81.2-123*			
Surrogate: Dibromofluoromethane	*49.1*		*"*	*39.8*		*123*	*95.7-135*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Carbazole	ND	300	ug/kg							
Aniline	ND	300	"							
Phenol	ND	1000	"							
2-Chlorophenol	ND	1000	"							
1,4-Dichlorobenzene	ND	300	"							
N-Nitrosodi-n-propylamine	ND	300	"							
1,2,4-Trichlorobenzene	ND	300	"							
4-Chloro-3-methylphenol	ND	1000	"							
2-Methylnaphthalene	ND	300	"							
1-Methylnaphthalene	ND	300	"							
Acenaphthene	ND	300	"							
4-Nitrophenol	ND	1000	"							
2,4-Dinitrotoluene	ND	300	"							
Pentachlorophenol	ND	1000	"							
Pyrene	ND	300	"							
Acenaphthylene	ND	300	"							
Anthracene	ND	300	"							
Benzo (a) anthracene	ND	300	"							
Benzo (b) fluoranthene	ND	300	"							
Benzo (k) fluoranthene	ND	300	"							
Benzo (g,h,i) perylene	ND	1000	"							
Benzo (a) pyrene	ND	300	"							
Benzyl alcohol	ND	300	"							
Bis(2-chloroethoxy)methane	ND	300	"							
Bis(2-chloroethyl)ether	ND	300	"							
Bis(2-chloroisopropyl)ether	ND	300	"							
Bis(2-ethylhexyl)phthalate	ND	300	"							
4-Bromophenyl phenyl ether	ND	300	"							
Butyl benzyl phthalate	ND	300	"							
4-Chloroaniline	ND	300	"							
2-Chloronaphthalene	ND	300	"							
4-Chlorophenyl phenyl ether	ND	300	"							
Chrysene	ND	300	"							
Dibenz (a,h) anthracene	ND	300	"							
Dibenzofuran	ND	300	"							
Di-n-butyl phthalate	ND	300	"							

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
1,2-Dichlorobenzene	ND	300	ug/kg							
1,3-Dichlorobenzene	ND	300	"							
2,4-Dichlorophenol	ND	1000	"							
Diethyl phthalate	ND	300	"							
2,4-Dimethylphenol	ND	1000	"							
Dimethyl phthalate	ND	300	"							
4,6-Dinitro-2-methylphenol	ND	1000	"							
2,4-Dinitrophenol	ND	1000	"							
2,6-Dinitrotoluene	ND	1000	"							
Di-n-octyl phthalate	ND	300	"							
Fluoranthene	ND	300	"							
Fluorene	ND	300	"							
Hexachlorobenzene	ND	1500	"							
Hexachlorobutadiene	ND	300	"							
Hexachlorocyclopentadiene	ND	1000	"							
Hexachloroethane	ND	300	"							
Indeno (1,2,3-cd) pyrene	ND	300	"							
Isophorone	ND	300	"							
2-Methylphenol	ND	1000	"							
4-Methylphenol	ND	1000	"							
Naphthalene	ND	300	"							
2-Nitroaniline	ND	300	"							
3-Nitroaniline	ND	300	"							
4-Nitroaniline	ND	300	"							
Nitrobenzene	ND	1000	"							
2-Nitrophenol	ND	1000	"							
N-Nitrosodimethylamine	ND	300	"							
N-Nitrosodiphenylamine	ND	300	"							
2,3,5,6-Tetrachlorophenol	ND	300	"							
2,3,4,6-Tetrachlorophenol	ND	300	"							
Phenanthrene	ND	300	"							
Azobenzene	ND	300	"							
Pyridine	ND	300	"							
2,4,5-Trichlorophenol	ND	1000	"							
2,4,6-Trichlorophenol	ND	1000	"							

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
Blank (7032720-BLK1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Surrogate: 2-Fluorophenol	*1510*		*ug/kg*	*3310*		*45.5*	*15-121*			
Surrogate: Phenol-d6	*1390*		*"*	*3310*		*42.0*	*24-113*			
Surrogate: Nitrobenzene-d5	*1510*		*"*	*3310*		*45.5*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*1910*		*"*	*3310*		*57.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*2630*		*"*	*3310*		*79.4*	*18.1-105*			
Surrogate: Terphenyl-dl4	*2750*		*"*	*3310*		*83.1*	*29.1-130*			
LCS (7032720-BS1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Phenol	3130	1000	ug/kg	3330		93.8	34-114			
2-Chlorophenol	3140	1000	"	3330		94.3	34-114			
1,4-Dichlorobenzene	2430	300	"	3330		72.9	34-114			
N-Nitrosodi-n-propylamine	3180	300	"	3330		95.5	30-110			
1,2,4-Trichlorobenzene	1930	300	"	3330		57.8	39-119			
4-Chloro-3-methylphenol	2270	1000	"	3330		68.1	50-130			
Acenaphthene	2070	300	"	3330		62.1	34-114			
Pentachlorophenol	2620	1000	"	3330		78.6	50-130			
Pyrene	2070	300	"	3330		62.0	30-110			
Surrogate: 2-Fluorophenol	*3250*		*"*	*3330*		*97.4*	*15-121*			
Surrogate: Phenol-d6	*3750*		*"*	*3330*		*113*	*24-113*			
Surrogate: Nitrobenzene-d5	*3290*		*"*	*3330*		*98.6*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*3620*		*"*	*3330*		*109*	*32.4-102*			*S-GC*
Surrogate: 2,4,6-Tribromophenol	*3670*		*"*	*3330*		*110*	*18.1-105*			*S-GC*
Surrogate: Terphenyl-dl4	*3820*		*"*	*3330*		*115*	*29.1-130*			
LCS Dup (7032720-BSD1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Phenol	2650	1000	ug/kg	3300		80.2	34-114	16.7	42	
2-Chlorophenol	3110	1000	"	3300		94.3	34-114	0.953	40	
1,4-Dichlorobenzene	2000	300	"	3300		60.7	34-114	19.3	28	
N-Nitrosodi-n-propylamine	2200	300	"	3300		66.7	30-110	36.4	38	
1,2,4-Trichlorobenzene	1670	300	"	3300		50.5	39-119	14.5	28	
4-Chloro-3-methylphenol	2340	1000	"	3300		70.9	50-130	2.98	42	
Acenaphthene	1770	300	"	3300		53.5	34-114	15.8	31	
Pentachlorophenol	2220	1000	"	3300		67.3	50-130	16.4	50	
Pyrene	1700	300	"	3300		51.5	30-110	19.6	31	
Surrogate: 2-Fluorophenol	*2460*		*"*	*3300*		*74.5*	*15-121*			
Surrogate: Phenol-d6	*2050*		*"*	*3300*		*62.1*	*24-113*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032720 - EPA 3550 ECD/GCMS										
LCS Dup (7032720-BSD1)				Prepared: 03/27/17 Analyzed: 03/30/17						
Surrogate: Nitrobenzene-d5	*1750*		*ug/kg*	*3300*		*52.9*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*2200*		*"*	*3300*		*66.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*3170*		*"*	*3300*		*95.9*	*18.1-105*			
Surrogate: Terphenyl-dl4	*3290*		*"*	*3300*		*99.8*	*29.1-130*			

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods - Quality Control

Weck Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch W7C1566 - EPA 3050M-SCL										
Blank (W7C1566-BLK1)				Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	ND	0.50	mg/kg							
LCS (W7C1566-BS1)				Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	47.3	0.50	mg/kg	50.0		95	80-120			
Matrix Spike (W7C1566-MS1)	**Source: T170697-01**			Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	44.6	0.50	mg/kg	48.8	0.529	90	75-125			
Matrix Spike Dup (W7C1566-MSD1)	**Source: T170697-01**			Prepared: 03/28/17 Analyzed: 04/03/17						
Uranium, Total	46.1	0.50	mg/kg	48.1	0.529	95	75-125	3	20	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	04/03/17 16:45

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
S-03	The surrogate recovery was below acceptance criteria in the sample because of a possible matrix effect. The surrogate recovery was within acceptance criteria in the method blank and LCS.
R-07	Reporting limit for this compound(s) has been raised to account for dilution necessary due to high levels of interfering compound(s) and/or matrix affect.
QR-04	The pecent recovery and/or RPD was outside acceptance criteria. Results accepted based upon percent recovery results in duplicate QC sample and the CCV and CCB results.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Dr Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/20/17 Page: 1 of 2
Project Name: Brea - Olinda Oil Field
Collector: Frank Hager Client Project #: 02077.01
Batch #: T170697 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + 6 RO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers
S20-T1-5	3/20/17	0800	Grab	4oz glass				H				X	H				01	01	Hold all except 8015M	
S20-T1-5	3/20/17	0800	Grab	40ml VOA	H													02	"	
S20-T1-10	3/20/17	0915	Grab	4oz glass				H				X	H				02	03	"	
S20-T1-15	3/20/17	0925	Grab	4oz glass				H				X	H				03	04	"	
S20-T2-5	3/20/17	1009	Soil	4oz GL				H				X	H				04	05	"	
S20-T2-5	3/20/17	1009	5035	40ml VOA	H													06	"	
S20-T2-10	3/20/17	1019	Soil	4oz GL				H				X	H				05	07	"	
S20-T2-15	3/20/17	1032	Soil	4oz GL				H				X	H				06	08	"	
BBO-T2-15	3/20/17	1032	5035	40ml VOA	H													09	"	
BOTF-T2-5	3/20/17	1150	Soil	4oz GL				H				X	H				07	10	"	
BOTF-T2-5	3/20/17	1150	5035	40ml VOA	H													11	"	
BOTF-T2-10	3/20/17	1200	Soil	4oz GL				H				X	H				08	12	"	
BOTF-T2-15	3/20/17	1208	Soil	4oz GL				H				X	H				09	13	"	

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 1710		3/20/17 17:10
	3/20/17 07:16		3/21/17 07:16

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 5.1

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162516

I-612

SunStar Laboratories, Inc.

Providing Quality Analytical Services Nationwide

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Management Inc
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0035
Project Manager: DERRICK WILLIS

Date: 3/20/17 Page: 2 Of 2
Project Name: Drea-Olmda 0,1 field
Collector: Frank Hagar Client Project #: 02077.01
Batch #: T170697 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	BC Comments/Preservative	Total # of containers
BOTF-T1-5	3/20/17	1315	Soil	4oz Gl				H				X	H				10	14		
BOTF-T1-5	3/20/17	1315	5035	40ml VOA	H													15	-	
BOTF-T1-10	3/20/17	1330	Soil	4oz Gl				H				X	H				11	16		
~~BOTF-T1-10~~	~~3/20/17~~	~~1330~~	~~5035~~	~~VOA~~	~~H~~															
BOTF-T1-15	3/20/17	1345	Soil	4oz Gl				H				X	H				12	17		
BOTF-T1-15	3/20/17	1345	5035	VOA	H													18	-	
H2-T1-5	3/20/17	1345	Soil	4oz Gl				H				X	H				13	19		
H2-T1-5	3/20/17	1345	5035	VOA	H													20	-	
H2-T1-10	3/20/17	1415	Soil	4oz Gl				H				X	H				14	21		
~~H2-T1-10~~	~~3/20/17~~	~~1415~~	~~5035~~	~~VOA~~	~~H~~															
H2-T1-15	3/20/17	1435	Soil	4oz Gl				H				X	H				15	22		
~~H2-T1-15~~	~~3/20/17~~	~~1435~~	~~5035~~	~~VOA~~	~~H~~															

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 1710		3/20/17 17:10
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
	3/20/17 07:16		3/21/17 07:16
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA (8)
Seals intact? Y/N/NA (8)
Received good condition/cold 5.1

Turn around time: ST

Notes
Call F. Hagar
Questor S
949 689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162515

I-613

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T170697

Client Name: NORTHGATE Project: BREA OLINDA OIL FIELD

Delivered by: ☐ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: JOEY Date/Time Lab Received: 3/20/17 1710

Total number of coolers received:

Temperature:	Cooler #1 5.3	°C +/- the CF (- 0.2°C)	= 5.1	°C corrected temperature
Temperature:	Cooler #2	°C +/- the CF (- 0.2°C)	=	°C corrected temperature
Temperature:	Cooler #3	°C +/- the CF (- 0.2°C)	=	°C corrected temperature

Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ **Yes** ☐ **No**
If NO:		
Samples received on ice?	☐ Yes	☐ **No → Complete Non-Conformance Sheet**
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ **No → Complete Non-Conformance Sheet**

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☐ Yes	☒ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☒ N/A BC
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☐ **Yes**	☒ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BC 3/21/17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

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SAMPLE NON-CONFORMANCE SHEET

Batch/Work Order # T170697

- **COOLERS**
  - ☐ Not Received (received COC only)
  - ☐ Leaking/Damaged
  - ☐ Other:
- **CUSTODY SEALS**
  - ☐ None
  - ☐ Not Intact
- **TEMPERATURE (Temp criteria = ≤ 6°C)**
  - ☐ Cooler/Sample Temp(s)
  - ☐ Temperature Blank(s)
- **CHAIN OF CUSTODY (COC)**
  - ☐ Not relinquished by client; No date/time relinquished
  - ☐ Incomplete information provided
  - ☐ COC not received – notify PM
- **CONTAINERS**
  - ☐ Leaking ☐ Broken
  - ☐ Extra ☒ Missing
- **LABELS**
  - ☐ Not the same sample ID / info as on the COC
  - ☐ Incomplete Information
  - ☐ Markings/Info illegible
- **SAMPLES**
  - ☒ Samples **NOT RECEIVED** but listed on COC
  - ☐ Samples received but **NOT LISTED** on COC
  - ☐ Logged based on Label Information and not COC
  - ☐ Logged according to Work Plan and not COC
  - ☐ Logged in, **ON HOLD** until further notice
  - ☐ Insufficient quantities for analysis
  - ☐ Improper container used
  - ☐ Mislabeled as to tests, preservatives, etc.
  - ☐ Holding time expired – list sample ID and test
  - ☐ Not preserved/Improper preservative used
  - ☐ Without Labels, no information on containers
  - ☐ Other

Comments: SAMPLE 12 NO SOSS KITS RECEIVED

Sample fractioning only if broken container compromises other samples or if out of temp reading impacts more than one cooler

Fraction													Preser.
VOA													

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

Rose Fasheh

From: Rose Fasheh [Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 6:09 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: Additional work order confirmation for Brea Olinda Oil Field (T170707)
Attachments: T170697_WKO_02.pdf; T170707_WKO_02.pdf

Derrick,

Please find attached work orders for confirmation of additionally requested analyses below. Please carefully review and let me know if you have any questions or concerns.

Thank you,

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Friday, March 24, 2017 5:38 PM
To: Rose Fasheh
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

Standard TAT is fine, thanks Rose

From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 5:36 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

What TAT are you looking for on these? Standard is a 5-day yielding results by COB Monday 4/3.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

From: Derrick Willis [mailto:derrick.willis@ngem.com]
Sent: Friday, March 24, 2017 5:11 PM
To: Rose Fasheh
Cc: Frank Hagar
Subject: RE: Final Report for Brea Olinda Oil Field (T170707)

Hi Rose,
Please run the analyses for the samples shaded in green. Please let me know if you have any questions.
Thanks
Derrick

Derrick S. Willis
Principal

Northgate Environmental Management, Inc.
24411 Ridge Route Drive, Suite 130, Laguna Hills, CA 92653
phone (949) 716-0050 ext. 101; cell (949) 375-7004; fax (949) 315-3365
http://www.ngem.com

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From: Rose Fasheh [mailto:Rose@sunstarlabs.com]
Sent: Friday, March 24, 2017 2:45 PM
To: 'Derrick Willis'
Cc: 'Frank Hagar'
Subject: Final Report for Brea Olinda Oil Field (T170707)

Hello Derrick and Frank,

Please see the attached final report for the following:

Project: Brea Olinda Oil Field
Project Number: 02077.01

Thank you for choosing SunStar Labs.

Rose Fasheh
Project Manager

SunStar 20 Laboratories

25712 Commercentre Dr., Lake Forest, CA 92630
Office: (949) 297-5020 | Fax: (949) 297-5027
CA ELAP Certification: 2250 | CA Small Business Certification: 31511

	Date	Time	PID	Depth	EPH (EPA8015M)	8260 +GRO	SVOC (EPA8270)	CAM 17 (EPA6010)	Uranium	PCB (EPA8082)	Chlorinated Pesticides (EPA8081)	OP Pesticides (EPA8141)	Herbicides (EPA8151)
S20-T1	3/20/2017	8:00	13.3	5	A	1	1	1	1	1	x	x	x
	3/20/2017	9:15	0.0	10	A	x	H	H	H	H	x	x	x
	3/20/2017	9:25	0.0	15	A	x	H	H	H	H	x	x	x
S20-T2	3/20/2017	10:09	0.6	5	A	1	1	1	H	1	x	x	x
	3/20/2017	10:19	0.1	10	A	x	H	H	H	H	x	x	x
	3/20/2017	10:32	1.2	15	A	x	H	H	H	H	x	x	x
BOTF-T2	3/20/2017	11:50	18.2	5	A	1	1	1	H	1	x	x	x
	3/20/2017	12:00	0.4	10	A	x	H	H	H	H	x	x	x
	3/20/2017	12:08	0.1	15	A	x	H	H	H	H	x	x	x
BOTF-T1	3/20/2017	13:15	0.6	5	A	H	H	H	H	H	x	x	x
	3/20/2017	13:30	0.1	10	A	x	H	H	H	H	x	x	x
	3/20/2017	13:45	0.1	15	A	x	H	H	H	H	x	x	x
H2-T1	3/20/2017	13:45	0.2	5	A	H	H	H	H	H	x	x	x
	3/20/2017	14:15	0.2	10	A	x	H	H	H	H	x	x	x
	3/20/2017	14:35	0.1	15	A	x	H	H	H	H	x	x	x
DU-T1	3/21/2017	7:44	10.4	5	A	1	H	H	H	H	x	x	x
	3/21/2017	7:54	5.2	10	A	x	H	H	H	H	x	x	x
	3/21/2017	8:00	0.3	15	A	x	H	H	H	H	x	x	x
VRS-T2	3/21/2017	8:40	18.3	5	A	1	1	1	H	1	x	x	x
	3/21/2017	8:50	15.2	10	A	x	H	H	H	H	x	x	x
	3/21/2017	9:00	23.4	15	A	x	H	H	H	H	x	x	x
VRS-T1	3/21/2017	9:35	12.2	5	A	1	H	1	H	1	x	x	x
	3/21/2017	9:45	2.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	9:55	2.0	15	A	x	H	H	H	H	x	x	x
S8-T1	3/21/2017	10:20	29.7	5	A	1	1	1	1	1	x	x	x
	3/21/2017	10:34	142.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	10:48	121.0	15	A	x	H	H	H	H	x	x	x
S5-T1	3/21/2017	11:20	18.0	5	A	1	1	1	1	1	x	x	x
	3/21/2017	11:32	97.0	10	A	x	H	H	H	H	x	x	x
	3/21/2017	11:42	89.0	15	A	x	H	H	H	H	x	x	x
104-T1	3/21/2017	12:10	0.1	5	A	1	1	1	1	1	x	x	x
	3/21/2017	12:18	0.3	10	A	x	H	H	H	H	x	x	x
	3/21/2017	12:25	0.1	15	A	x	H	H	H	H	x	x	x
DR-HA1	3/21/2017	7:35	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	7:43	NA	5	A	x	H	H	H	H	H	H	H
DR-HA2	3/21/2017	8:02	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	8:15	NA	5	A	x	H	H	H	H	H	H	H
DR-HA3	3/21/2017	8:25	NA	1	A	1	1	1	1	1	1	1	1
	3/21/2017	8:46	NA	5	A	x	H	H	H	H	H	H	H
DR-HA4	3/21/2017	9:11	NA	1	A	1	1	1	1	1	1	1	H
	3/21/2017	9:41	NA	5	A	x	H	H	H	H	H	H	H
						13	11	12	8	12	4	4	3

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170697

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Brian Charon Date Received: 03/21/17 07:16
Logged In By: Brian Charon Date Logged In: 03/21/17 07:32

Samples Received at: **5.1°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170697-01 S20-T1-5 [Soil] Sampled 03/20/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 08:00	
T170697-02 S20-T1-10 [Soil] Sampled 03/20/17 09:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 09:15	
T170697-03 S20-T1-15 [Soil] Sampled 03/20/17 09:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 09:25	
T170697-04 S20-T2-5 [Soil] Sampled 03/20/17 10:09 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:09	
T170697-05 S20-T2-10 [Soil] Sampled 03/20/17 10:19 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:19	
T170697-06 S20-T2-15 [Soil] Sampled 03/20/17 10:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:32	
T170697-07 BOTF-T2-5 [Soil] Sampled 03/20/17 11:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 11:50	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170697

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170697-08 BOTF-T2-10 [Soil] Sampled 03/20/17 12:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 12:00	
T170697-09 BOTF-T2-15 [Soil] Sampled 03/20/17 12:08 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 12:08	
T170697-10 BOTF-T1-5 [Soil] Sampled 03/20/17 13:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:15	
T170697-11 BOTF-T1-10 [Soil] Sampled 03/20/17 13:30 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:30	
T170697-12 BOTF-T1-15 [Soil] Sampled 03/20/17 13:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:45	
T170697-13 H2-T1-5 [Soil] Sampled 03/20/17 13:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:45	
T170697-14 H2-T1-10 [Soil] Sampled 03/20/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 14:15	
T170697-15 H2-T1-15 [Soil] Sampled 03/20/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 14:15	

Reviewed By Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170697

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/24/17 17:00 (3 day TAT)
Received By: Joey Himes Date Received: 03/20/17 17:10
Logged In By: Brian Charon Date Logged In: 03/21/17 07:32

Samples Received at: **5.1°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170697-01 S20-T1-5 [Soil] Sampled 03/20/17 08:00 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/16/17 08:00	
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 08:00	
8015 m 5035-GRO	04/03/17 15:00	5	04/03/17 08:00	
8082 PCB	04/03/17 15:00	5	04/03/17 08:00	
8260 5035	04/03/17 15:00	5	04/03/17 08:00	
8270C	04/03/17 15:00	5	04/03/17 08:00	
T170697-02 S20-T1-10 [Soil] Sampled 03/20/17 09:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 09:15	
T170697-03 S20-T1-15 [Soil] Sampled 03/20/17 09:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 09:25	
T170697-04 S20-T2-5 [Soil] Sampled 03/20/17 10:09 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/16/17 10:09	
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:09	
8015 m 5035-GRO	04/03/17 15:00	5	04/03/17 10:09	
8082 PCB	04/03/17 15:00	5	04/03/17 10:09	
8260 5035	04/03/17 15:00	5	04/03/17 10:09	
8270C	04/03/17 15:00	5	04/03/17 10:09	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170697

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170697-05 S20-T2-10 [Soil] Sampled 03/20/17 10:19 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:19	
T170697-06 S20-T2-15 [Soil] Sampled 03/20/17 10:32 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 10:32	
T170697-07 BOTF-T2-5 [Soil] Sampled 03/20/17 11:50 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
6010 Title 22	04/03/17 15:00	5	09/16/17 11:50	
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 11:50	
8015 m 5035-GRO	04/03/17 15:00	5	04/03/17 11:50	
8082 PCB	04/03/17 15:00	5	04/03/17 11:50	
8260 5035	04/03/17 15:00	5	04/03/17 11:50	
8270C	04/03/17 15:00	5	04/03/17 11:50	
T170697-08 BOTF-T2-10 [Soil] Sampled 03/20/17 12:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 12:00	
T170697-09 BOTF-T2-15 [Soil] Sampled 03/20/17 12:08 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 12:08	
T170697-10 BOTF-T1-5 [Soil] Sampled 03/20/17 13:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:15	
T170697-11 BOTF-T1-10 [Soil] Sampled 03/20/17 13:30 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:30	
T170697-12 BOTF-T1-15 [Soil] Sampled 03/20/17 13:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:45	
T170697-13 H2-T1-5 [Soil] Sampled 03/20/17 13:45 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 13:45	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170697

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170697-14 H2-T1-10 [Soil] Sampled 03/20/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 14:15	
T170697-15 H2-T1-15 [Soil] Sampled 03/20/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/24/17 15:00	3	04/03/17 14:15	

Weck Labs

T170697-01 S20-T1-5 [Soil] Sampled 03/20/17 08:00 (GMT-08:00) Pacific Time (US &				**8260, GRO, 8270, metals, and 8082 added per client request (Derrick, 3/24)**
Misc. Subcontract (see notes)	04/03/17 15:00	5	09/16/17 08:00	EPA 200.8 Uranium

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By Date

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 7C27032

Project: T170697

Attn: Rose Fasheh

Client: SunStar Laboratories, Inc.
25712 Commercentre Drive
Lake Forest, CA 92630

Report Date: 4/03/2017

Received Date: 3/27/2017

Turnaround Time: 5 workdays

Phones: (949) 297-5020

Fax: (949) 297-5027

P.O. #:

Billing Code:

Dear Rose Fasheh,

Enclosed are the results of analyses for samples received 3/27/17 with the Chain-of-Custody document. The samples were received in good condition, at 3.5 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: T170697-01 — Sampled: 03/20/17 8:00 by Client

7C27032-01 (Solid)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: EPA 6020A **Batch ID:** W7C1566 **Instr:** ICPMS02 **Prepared:** 03/28/17 12:39 **Analyst:** mtt						
Uranium, Total	**0.53**	0.50	mg/kg	1	04/03/17 11:34	

14859 East Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
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Quality Control Results

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7C1566 - EPA 3050M-SCL										
Blank (W7C1566-BLK1)				**Prepared: 03/28/17**	**Analyzed: 04/03/17**					
Uranium, Total	ND	0.50	mg/kg							
LCS (W7C1566-BS1)				**Prepared: 03/28/17**	**Analyzed: 04/03/17**					
Uranium, Total	47.3	0.50	mg/kg	50.0		95	80-120			
Matrix Spike (W7C1566-MS1)	**Source: 7C27032-01**			**Prepared: 03/28/17**	**Analyzed: 04/03/17**					
Uranium, Total	44.6	0.50	mg/kg	48.8	0.529	90	75-125			
Matrix Spike Dup (W7C1566-MSD1)	**Source: 7C27032-01**			**Prepared: 03/28/17**	**Analyzed: 04/03/17**					
Uranium, Total	46.1	0.50	mg/kg	48.1	0.529	95	75-125	3	20	

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Notes and Definitions

Item	Definition
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

Reviewed by:

Kim G. Tu
Project Manager

ELAP-CA #1132 • EPA-UCMR #CA00211 • LACSD #10143 • NJ-DEP #CA015 • NV-DEP #NAC 445A

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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30 March 2017

Derrick Willis
Northgate Environmental Management -- Laguna Hills
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

RE: Brea Olinda Oil Field

Enclosed are the results of analyses for samples received by the laboratory on 03/23/17 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BOTF-B1-5	T170734-01	Soil	03/23/17 07:50	03/23/17 16:00
BOTF-B1-10	T170734-02	Soil	03/23/17 07:57	03/23/17 16:00
BOTF-B1-15	T170734-03	Soil	03/23/17 08:00	03/23/17 16:00
BOTF-B1-20	T170734-04	Soil	03/23/17 08:07	03/23/17 16:00
BOTF-B1-25	T170734-05	Soil	03/23/17 08:13	03/23/17 16:00
BOTF-B1-30	T170734-06	Soil	03/23/17 08:25	03/23/17 16:00
BOTF-B1-35	T170734-07	Soil	03/23/17 08:44	03/23/17 16:00
BOTF-B1-40	T170734-08	Soil	03/23/17 08:40	03/23/17 16:00
BOTF-B1-45	T170734-09	Soil	03/23/17 08:53	03/23/17 16:00
BOTF-B1-50	T170734-10	Soil	03/23/17 09:03	03/23/17 16:00
BOTF-B1-55	T170734-11	Soil	03/23/17 09:12	03/23/17 16:00
BOTF-B1-60	T170734-12	Soil	03/23/17 09:16	03/23/17 16:00
VRS-B1-20	T170734-13	Soil	03/23/17 12:35	03/23/17 16:00
VRS-B1-25	T170734-14	Soil	03/23/17 12:41	03/23/17 16:00
VRS-B1-30	T170734-15	Soil	03/23/17 12:46	03/23/17 16:00
VRS-B1-35	T170734-16	Soil	03/23/17 12:23	03/23/17 16:00
VRS-B1-40	T170734-17	Soil	03/23/17 13:07	03/23/17 16:00
VRS-B1-45	T170734-18	Soil	03/23/17 13:17	03/23/17 16:00
VRS-B1-50	T170734-19	Soil	03/23/17 13:27	03/23/17 16:00
VRS-B1-55	T170734-20	Soil	03/23/17 13:35	03/23/17 16:00
VRS-B1-60	T170734-21	Soil	03/23/17 13:38	03/23/17 16:00
S8-T1-1	T170734-22	Soil	03/23/17 14:15	03/23/17 16:00

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

DETECTIONS SUMMARY

Sample ID: BOTF-B1-5 **Laboratory ID:** T170734-01

No Results Detected

Sample ID: BOTF-B1-10 **Laboratory ID:** T170734-02

No Results Detected

Sample ID: BOTF-B1-15 **Laboratory ID:** T170734-03

No Results Detected

Sample ID: BOTF-B1-20 **Laboratory ID:** T170734-04

No Results Detected

Sample ID: BOTF-B1-25 **Laboratory ID:** T170734-05

No Results Detected

Sample ID: BOTF-B1-30 **Laboratory ID:** T170734-06

No Results Detected

SunStar Laboratories, Inc.

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Rose Fasheh

Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Sample ID: BOTF-B1-35 **Laboratory ID:** T170734-07

No Results Detected

Sample ID: BOTF-B1-40 **Laboratory ID:** T170734-08

No Results Detected

Sample ID: BOTF-B1-45 **Laboratory ID:** T170734-09

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**33**	10	mg/kg	EPA 8015B	

Sample ID: BOTF-B1-50 **Laboratory ID:** T170734-10

No Results Detected

Sample ID: BOTF-B1-55 **Laboratory ID:** T170734-11

No Results Detected

Sample ID: BOTF-B1-60 **Laboratory ID:** T170734-12

No Results Detected

Sample ID: VRS-B1-20 **Laboratory ID:** T170734-13

No Results Detected

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Sample ID: VRS-B1-25 **Laboratory ID:** T170734-14

No Results Detected

Sample ID: VRS-B1-30 **Laboratory ID:** T170734-15

No Results Detected

Sample ID: VRS-B1-35 **Laboratory ID:** T170734-16

No Results Detected

Sample ID: VRS-B1-40 **Laboratory ID:** T170734-17

No Results Detected

Sample ID: VRS-B1-45 **Laboratory ID:** T170734-18

No Results Detected

Sample ID: VRS-B1-50 **Laboratory ID:** T170734-19

No Results Detected

Sample ID: VRS-B1-55 **Laboratory ID:** T170734-20

No Results Detected

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Sample ID: VRS-B1-60 **Laboratory ID:** T170734-21

No Results Detected

Sample ID: S8-T1-1 **Laboratory ID:** T170734-22

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**66**	10	mg/kg	EPA 8015B	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-5

T170734-01 (Soil)

SunStar Laboratories, Inc.

Extractable Petroleum Hydrocarbons by 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*124 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-10

T170734-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*133 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-15

T170734-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*124 %*	*65-135*		"	"	"	"	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-20

T170734-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*126 %*	*65-135*		"	"	"	"	

SunStar Laboratories, Inc.

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-25

T170734-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*124 %*	*65-135*		*"*	*"*	*"*	*"*	

SunStar Laboratories, Inc.
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-30

T170734-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*144 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-35

T170734-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*142 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-40

T170734-08 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*141 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-45

T170734-09 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**33**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*146 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-50

T170734-10 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*133 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-55

T170734-11 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*153 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

BOTF-B1-60

T170734-12 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*141 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-20

T170734-13 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*145 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-25

T170734-14 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*125 %*	*65-135*		*"*	*"*	*"*	*"*	

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-30

T170734-15 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*150 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-35

T170734-16 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*136 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-40

T170734-17 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*146 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-45

T170734-18 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*150 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-50

T170734-19 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*167 %*	*65-135*		*"*	*"*	*"*	*"*	*S-Hi1*

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-55

T170734-20 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032421	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*121 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

VRS-B1-60

T170734-21 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032412	03/24/17	03/24/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*85.8 %*	*65-135*		*"*	*"*	*"*	*"*	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

S8-T1-1

T170734-22 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	7032412	03/24/17	03/25/17	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	**66**	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*61.0 %*	*65-135*		"	"	"	"	*S-03*
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	7032419	03/24/17	03/27/17	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	
alpha-Chlordane	ND	5.0	"	"	"	"	"	"	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*67.4 %*	*35-140*		"	"	"	"	
Surrogate: Decachlorobiphenyl		*52.3 %*	*35-140*		"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

S8-T1-1

T170734-22 (Soil)

SunStar Laboratories, Inc.

Chlorinated Herbicides by EPA Method 8151A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,4,5-T	ND	5.00	ug/kg	1	7032425	03/24/17	03/28/17	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*37.1 %*		*35-150*	"	"	"	"	

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032412 - EPA 3550B GC										
Blank (7032412-BLK1)				Prepared & Analyzed: 03/24/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*85.8*		*"*	*99.0*		*86.7*	*65-135*			
LCS (7032412-BS1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	540	10	mg/kg	495		109	75-125			
Surrogate: p-Terphenyl	*104*		*"*	*99.0*		*105*	*65-135*			
LCS Dup (7032412-BSD1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	580	10	mg/kg	510		113	75-125	6.30	20	
Surrogate: p-Terphenyl	*107*		*"*	*102*		*105*	*65-135*			
Batch 7032421 - EPA 3550B GC										
Blank (7032421-BLK1)				Prepared & Analyzed: 03/24/17						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*133*		*"*	*99.0*		*135*	*65-135*			
LCS (7032421-BS1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	560	10	mg/kg	500		113	75-125			
Surrogate: p-Terphenyl	*162*		*"*	*100*		*162*	*65-135*			*S-Hi1*
LCS Dup (7032421-BSD1)				Prepared: 03/24/17 Analyzed: 03/25/17						
C13-C28 (DRO)	530	10	mg/kg	490		108	75-125	6.49	20	
Surrogate: p-Terphenyl	*131*		*"*	*98.0*		*134*	*65-135*			

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24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032419 - EPA 3550 ECD/GCMS										
Blank (7032419-BLK1)				Prepared: 03/24/17 Analyzed: 03/27/17						
alpha-BHC	ND	5.0	ug/kg							
gamma-BHC (Lindane)	ND	5.0	"							
beta-BHC	ND	5.0	"							
delta-BHC	ND	5.0	"							
Heptachlor	ND	5.0	"							
Aldrin	ND	5.0	"							
Heptachlor epoxide	ND	5.0	"							
gamma-Chlordane	ND	5.0	"							
alpha-Chlordane	ND	5.0	"							
Endosulfan I	ND	5.0	"							
4,4´-DDE	ND	5.0	"							
Dieldrin	ND	5.0	"							
Endrin	ND	5.0	"							
4,4´-DDD	ND	5.0	"							
Endosulfan II	ND	5.0	"							
4,4´-DDT	ND	5.0	"							
Endrin aldehyde	ND	5.0	"							
Endosulfan sulfate	ND	5.0	"							
Methoxychlor	ND	10	"							
Endrin ketone	ND	5.0	"							
Toxaphene	ND	200	"							
Surrogate: Tetrachloro-meta-xylene	*7.29*		*"*	*10.0*		*72.9*	*35-140*			
Surrogate: Decachlorobiphenyl	*8.36*		*"*	*10.0*		*83.6*	*35-140*			
LCS (7032419-BS1)				Prepared: 03/24/17 Analyzed: 03/27/17						
gamma-BHC (Lindane)	32.3	5.0	ug/kg	40.4		79.8	40-120			
Heptachlor	31.5	5.0	"	40.4		77.9	40-120			
Aldrin	26.7	5.0	"	40.4		66.1	40-120			
Dieldrin	34.5	5.0	"	40.4		85.3	40-120			
Endrin	36.0	5.0	"	40.4		89.1	40-120			
4,4´-DDT	41.6	5.0	"	40.4		103	33-147			
Surrogate: Tetrachloro-meta-xylene	*7.96*		*"*	*10.1*		*78.8*	*35-140*			
Surrogate: Decachlorobiphenyl	*9.03*		*"*	*10.1*		*89.4*	*35-140*			

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032419 - EPA 3550 ECD/GCMS										
LCS Dup (7032419-BSD1)				Prepared: 03/24/17 Analyzed: 03/27/17						
gamma-BHC (Lindane)	35.7	5.0	ug/kg	40.4		88.3	40-120	10.1	30	
Heptachlor	35.3	5.0	"	40.4		87.2	40-120	11.4	30	
Aldrin	28.5	5.0	"	40.4		70.6	40-120	6.58	30	
Dieldrin	38.5	5.0	"	40.4		95.3	40-120	11.1	30	
Endrin	40.3	5.0	"	40.4		99.8	40-120	11.3	30	
4,4´-DDT	47.0	5.0	"	40.4		116	33-147	12.1	30	
Surrogate: Tetrachloro-meta-xylene	*8.67*		*"*	*10.1*		*85.8*	*35-140*			
Surrogate: Decachlorobiphenyl	*9.84*		*"*	*10.1*		*97.4*	*35-140*			

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Chlorinated Herbicides by EPA Method 8151A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7032425 - 8151 Prep										
Blank (7032425-BLK1)				Prepared: 03/24/17 Analyzed: 03/28/17						
2,4,5-T	ND	5.00	ug/kg							
2,4,5-TP (Silvex)	ND	5.00	"							
2,4-D	ND	5.00	"							
2,4-DB	ND	5.00	"							
3,5-Dichlorobenzoic acid	ND	5.00	"							
4-Nitrophenol	ND	5.00	"							
Acifluorfen	ND	5.00	"							
Bentazon	ND	5.00	"							
Chloramben	ND	5.00	"							
Dalapon	ND	30.0	"							
DCPA diacid	ND	5.00	"							
Dicamba	ND	5.00	"							
Dichloroprop	ND	5.00	"							
Dinoseb	ND	5.00	"							
Pentachlorophenol	ND	5.00	"							
Picloram	ND	5.00	"							
Surrogate: 2,4-DCAA	*212*		*"*	*392*		*54.1*	*35-150*			
LCS (7032425-BS1)				Prepared: 03/24/17 Analyzed: 03/28/17						
2,4,5-T	101	5.00	ug/kg	97.3		104	20-150			
2,4,5-TP (Silvex)	114	5.00	"	97.5		117	20-150			
2,4-D	112	5.00	"	97.5		115	20-150			
Surrogate: 2,4-DCAA	*228*		*"*	*390*		*58.4*	*35-150*			
LCS Dup (7032425-BSD1)				Prepared: 03/24/17 Analyzed: 03/28/17						
2,4,5-T	87.4	5.00	ug/kg	99.8		87.6	20-150	14.2	30	
2,4,5-TP (Silvex)	99.9	5.00	"	100		99.9	20-150	12.8	30	
2,4-D	98.1	5.00	"	100		98.1	20-150	12.9	30	
Surrogate: 2,4-DCAA	*195*		*"*	*400*		*48.7*	*35-150*			

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Northgate Environmental Management -- Laguna Hills	Project: Brea Olinda Oil Field	
24411 Ridge Route Drive, Suite 130	Project Number: 02077.01	**Reported:**
Laguna Hills CA, 92653	Project Manager: Derrick Willis	03/30/17 08:49

Notes and Definitions

S-Hi1	Surrogate recovery was high in QC and corresponding samples. Sample results were non-detect. Data was not negatively effected.
S-03	The surrogate recovery was below acceptance criteria in the sample because of a possible matrix effect. The surrogate recovery was within acceptance criteria in the method blank and LCS.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

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Rose Fasheh, Project Manager

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Drive Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: DERRICK WILLIS

Date: 3/23/17 Page: 1 Of 2
Project Name: Brea-Olinda
Collector: F Hagar Client Project #: B2077.01
Batch #: T170734 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 + GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	PCB EPA 8082			Laboratory ID #	Comments/Preservative	Total # of containers
BOTF-B1-5	3/23/17	0750	Soil	Ring				H				A	H		H			01		1
BOTF-B1-10	3/23/17	0757	Soil	Ring+VOA	H			H				A	H		H			02		1
BOTF-B1-15	3/23/17	0800	Soil	Ring				H				A	H		H			03		1
BOTF-B1-20	3/23/17	0807	Soil	Ring+VOA	H			H				A	H		H			04		1
BOTF-B1-25	3/23/17	0813	Soil	Ring				H				A	H		H			05		1
BOTF-B1-30	3/23/17	0825	Soil	Ring+VOA	H			H				A	H		H			06		1
BOTF-B1-35	3/23/17	0834	Soil	Ring				H				A	H		H			07		1
BOTF-B1-40	3/23/17	0840	Soil	Ring+VOA	H			H				A	H		H			08		1
BOTF-B1-45	3/23/17	0853	Soil	Ring				H				A	H		H			09		1
BOTF-B1-50	3/23/17	0903	Soil	Ring+VOA	H			H				A	H		H			10		1
BOTF-B1-55	3/23/17	0912	Soil	Ring				H				A	H		H			11		1
BOTF-B1-60	3/23/17	0916	Soil	Ring+VOA	H			H				A	H		H			12		1
VRS-B1-20	3/23/17	1235	Soil	Ring+VOA	H			H				A	H		H			13		1
VRS-B1-25	3/23/17	1241	Soil	Ring				H				A	H		H			14		1
VRS-B1-30	3/23/17	1246	Soil	Ring+VOA	H			H				A	H		H			15		1

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
F Hagar	3/23/17 1600		3/23/17 16:20
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 4.9

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162581

I-661

SunStar Laboratories, Inc.

PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Northgate Environmental Mgmt Inc
Address: 24411 Ridge Route Dr Suite 130
Phone: 949-716-0050 Fax: 949-716-0055
Project Manager: Derrick Willis

Date: 3/23/17 Page: 2 Of 2
Project Name: Brea - Olinda
Collector: Frank Hagar Client Project #: 02077.01
Batch #: T170734 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 +GRO	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals	8082 PCB	8081 chlor PEST	8141 OP PEST	8151 HERBICIDES	Laboratory ID #	Comments/Preservative	Total # of containers
VRS-B1-35	3/23/17	1253	Soil	Ring				H				A	H		H				16		
VRS-B1-40	3/23/17	1307	Soil	Ring+VOA	H			H				A	H		H				17		
VRS-B1-45	3/23/17	1317	Soil	Ring				H				A	H		H				18		
VRS-B1-50	3/23/17	1327	Soil	Ring+VOA	H			H				A	H		H				19		
VRS-B1-55	3/23/17	1335	Soil	Ring				H				A	H		H				20		
VRS-B1-60	3/23/17	1338	Soil	Ring+VOA	H			H				A	H		H				21		
SB-T1-1	3/23/17	1415	Soil	4oz Glass				H				A	H		H	A	A	A	22		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
[signature]	3/23/17 1600	[signature]	3/23/17 16:30
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 4.9

Turn around time: STD

Notes
Frank Hagar
949-689-9987

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 162582

+662

SunStar Laboratories — Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T170734

Client Name: Northgate - Laguna Hills Project: Brea Olinda

Delivered by: ☐ Client ☐ SunStar Courier ☐ GSO ☐ FedEx ☐ Other

If Courier, Received by: Date/Time Courier Received:

Lab Received by: Brian Date/Time Lab Received: 3-23-17 1620

Total number of coolers received: 0

Temperature: Cooler #1	5.1 °C +/- the CF (- 0.2°C) =	4.9	°C corrected temperature	
Temperature: Cooler #2	°C +/- the CF (- 0.2°C) =		°C corrected temperature	
Temperature: Cooler #3	°C +/- the CF (- 0.2°C) =		°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?		☒ **Yes** ☐ **No**	
If NO:				
Samples received on ice?	☐ Yes		☐ **No → Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable		☐ **No → Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked Cooler/Sample Review - Initials and date: DM 3-23-17

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: **Northgate Environmental Management -- Laguna** **Project Manager:** **Rose Fasheh**
Project: **Brea Olinda Oil Field** **Project Number:** **02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due: 03/30/17 17:00 (5 day TAT)
Received By: Brian Charon Date Received: 03/23/17 16:00
Logged In By: Dan Marteski Date Logged In: 03/24/17 09:19

Samples Received at: **4.9°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir Yes

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna **Project Manager:** Rose Fasheh
Project: Brea Olinda Oil Field **Project Number:** 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client: Northgate Environmental Management -- Laguna
Project: Brea Olinda Oil Field
Project Manager: Rose Fasheh
Project Number: 02077.01

Analysis	Due	TAT	Expires	Comments
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8141 OP Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Report To:
Northgate Environmental Management -- Laguna Hills
Derrick Willis
24411 Ridge Route Drive, Suite 130
Laguna Hills, CA 92653

Date Due:	03/30/17 17:00 (5 day TAT)		
Received By:	Brian Charon	Date Received:	03/23/17 16:00
Logged In By:	Dan Marteski	Date Logged In:	03/24/17 09:19

Samples Received at: **4.9°C**

Custody Seals	No	Received On Ice	Yes
Containers Intact	Yes		
COC/Labels Agree	Yes		
Preservation Confirı	Yes		

Analysis	Due	TAT	Expires	Comments
T170734-01 BOTF-B1-5 [Soil] Sampled 03/23/17 07:50 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:50	
T170734-02 BOTF-B1-10 [Soil] Sampled 03/23/17 07:57 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 07:57	
T170734-03 BOTF-B1-15 [Soil] Sampled 03/23/17 08:00 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:00	
T170734-04 BOTF-B1-20 [Soil] Sampled 03/23/17 08:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:07	
T170734-05 BOTF-B1-25 [Soil] Sampled 03/23/17 08:13 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:13	
T170734-06 BOTF-B1-30 [Soil] Sampled 03/23/17 08:25 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:25	
T170734-07 BOTF-B1-35 [Soil] Sampled 03/23/17 08:44 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:44	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170734

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170734-08 BOTF-B1-40 [Soil] Sampled 03/23/17 08:40 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:40	
T170734-09 BOTF-B1-45 [Soil] Sampled 03/23/17 08:53 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 08:53	
T170734-10 BOTF-B1-50 [Soil] Sampled 03/23/17 09:03 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:03	
T170734-11 BOTF-B1-55 [Soil] Sampled 03/23/17 09:12 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:12	
T170734-12 BOTF-B1-60 [Soil] Sampled 03/23/17 09:16 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 09:16	
T170734-13 VRS-B1-20 [Soil] Sampled 03/23/17 12:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:35	
T170734-14 VRS-B1-25 [Soil] Sampled 03/23/17 12:41 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:41	
T170734-15 VRS-B1-30 [Soil] Sampled 03/23/17 12:46 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:46	
T170734-16 VRS-B1-35 [Soil] Sampled 03/23/17 12:23 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 12:23	
T170734-17 VRS-B1-40 [Soil] Sampled 03/23/17 13:07 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:07	
T170734-18 VRS-B1-45 [Soil] Sampled 03/23/17 13:17 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:17	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T170734

Client:	**Northgate Environmental Management -- Laguna**	**Project Manager:**	**Rose Fasheh**
Project:	**Brea Olinda Oil Field**	**Project Number:**	**02077.01**

Analysis	Due	TAT	Expires	Comments
T170734-19 VRS-B1-50 [Soil] Sampled 03/23/17 13:27 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:27	
T170734-20 VRS-B1-55 [Soil] Sampled 03/23/17 13:35 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:35	
T170734-21 VRS-B1-60 [Soil] Sampled 03/23/17 13:38 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 13:38	
T170734-22 S8-T1-1 [Soil] Sampled 03/23/17 14:15 (GMT-08:00) Pacific Time (US &				
8015 Carbon Chain	03/30/17 15:00	5	04/06/17 14:15	
8081 Pesticides	03/30/17 15:00	5	04/06/17 14:15	
8151 Herbicides	03/30/17 15:00	5	04/06/17 14:15	

Reviewed By

Date

Appendix J Preliminary/Conceptual Draft Water Quality Management Plan

Appendices

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PRELIMINARY/CONCEPTUAL DRAFT WATER QUALITY MANAGEMENT PLAN

Project Address:
South of Lambert Road and Valencia Avenue
City of Brea, CA

Prepared For:

3030 Saturn Street, Suite 101
Brea, CA 92821
(714) 577-9154

Prepared By:

Hunsaker & Associates Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949) 583-1010

WQMP Preparation Date:
May 1, 2021
Revised (November 15, 2021; January 18, 2022; February 11, 2022)

PRELIMINARY/CONCEPTUAL DRAFT WATER QUALITY MANAGEMENT PLAN

"BREA 265"

South of Lambert Road and Valencia Avenue

City of Brea, California

PRELIMINARY/CONCEPTUAL DRAFT WATER QUALITY MANAGEMENT PLAN (WQMP)

Project Name:

BREA 265

Northwest, Southwest and Southeast of Lambert Road and Valencia Avenue

Brea, California

Prepared for:

AERA

3030 Saturn Street, Suite 101
Brea, CA 92821
(714) 577-9154

Prepared by:

Hunsaker and Associates Irvine, Inc.

Engineer: Ed Mandich Registration No.: 59089

Three Hughes
Irvine, CA 92618
(949) 583-1010

Prepared: May 1, 2021
(Revised: November 15, 2021; January 18, 2022; February 11, 2022)

Project Owner's Certification			
Permit/Planning Application No.	CD0449	Grading Permit No.	N/A
Tract/Parcel Map No.	TBD	Building Permit No.	N/A
CUP, SUP and/or APN (Specify Lot Numbers if Portions of Tract)			APN No. 320-073-08; 320-071-29; 308-011-23; 322-031-24; 322-031-12; 322-031-13; 322-031-14, -19, -20 & -21

This Water Quality Management Plan (WQMP) has been prepared for Aera Energy LLC. by Hunsaker and Associates Irvine, Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: Aera Energy LLC.			
Name/Title			
Company	Aera Energy LLC.		
Address	3030 Saturn Street, Suite 101 Brea, CA 92821		
Email			
Telephone #	(714) 577-9154		
I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein.			
Signature		Date	

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Attachment A ..... Educational Materials
Attachment B ..... BMP Worksheets/Calculations & BMP Details
Attachment C ..... Hydromodification Analysis
Attachment D ..... Supporting Project Information
Attachment E ..... City Plan Check Correspondence

SECTION I DISCRETIONARY PERMIT(S) AND WATER QUALITY CONDITIONS

The project's discretionary permit and water quality information are provided in the following:

PROJECT INFORMATION			
Permit/Application No.	CD0449	Tract/Parcel Map No.	TBD
Additional Information/ Comments:	This Preliminary Water Quality Management Plan has been developed in accordance with Section 7.II-1.5 of the Model Water Quality Management Plan and provides the basic framework to address the water quality component for each anticipated phase of the Brea 265 project.		
WATER QUALITY CONDITIONS			
Water Quality Conditions (list verbatim.)	The project is considered a priority project under the City of Brea Local Implementation Plan and Water Quality Ordinance (City Code Section 13.32.030). Therefore, the project is subject to the requirements of a Water Quality Management Plan (WQMP) to minimize the adverse effects of urbanization on site hydrology, runoff flow rates and pollutant loads. The project is in the preliminary planning phase of development, with this preliminary document prepared to support the environmental documents (CEQA) for the Brea 265 project. There are currently no site-specific water quality conditions of approval for the project.		
WATERSHED-BASED PLAN CONDITIONS			
Provide applicable conditions from watershed-based plans including WIHMPs and TMDLs	The project resides within the San Gabriel River – Coyote Creek Watershed (project areas west of Valencia Avenue) and the Santa Ana River Watershed (project areas east of Valencia Avenue). 303(d) and TMDL (in italic) Listed impairments for the project's receiving waters are as follows: San Gabriel River – Coyote Creek Watershed: Loftus Diversion Channel (Facility A06) – None Fullerton Creek Channel (Facility A03) – None Coyote Creek Channel (Facility A01) – *Copper*, *Indicator Bacteria,* Iron, Malathion, pH, Toxicity San Gabriel River Reach 1 – pH, Temperature San Gabriel River Estuary – *Copper*, Dioxin, *Indicator Bacteria*, Nickel, Dissolved Oxygen		

	Santa Ana River Watershed: Carbon Canyon Creek Channel (E03) – None Carbon Canyon Creek Diversion Channel (E02) – None Santa Ana River (E01) Reach 3 – None Santa Ana River (E01) Reach 2 – None There is currently no approved WIHMP for either watershed.

SECTION II PROJECT DESCRIPTION

II.1 PROJECT DESCRIPTION

<table>
<tr><th colspan="3">DESCRIPTION OF PROPOSED PROJECT</th></tr>
<tr><td>Development Category (Verbatim from WQMP):</td><td colspan="2">This project is considered a priority project under the following categories:

Priority Project, Category 1 – New development projects that create 10,000 square feet or more of impervious surface. This category includes commercial, industrial, residential housing subdivisions, mixed-use, and public projects on private or public property that falls under the planning and building authority or the Permittees.

Priority Project, Category 4 – Hillside development greater than 5,000 square feet. Hillside development is defined as any development which is located in an area with known erosive soil conditions or where the natural slope is twenty-five percent or greater.

Priority Project, Category 6 – Parking lots 5,000 square feet or more including associated drive aisle, and potentially exposed to urban stormwater runoff. A parking lot is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.

Priority Project, Category 7 – Streets, road, highways and freeways. This Category includes any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles and other vehicles.</td></tr>
<tr><td>Project Area (ft^2):
11,417,076 ft^2
(262.1 Ac.)[1]</td><td>Number of Dwelling Units: <u>up to 1,100 residential units</u></td><td>SIC Code: <u>No facilities subject to Standard Industrial Classification anticipated. Residential, parks, streets and open space / trail improvements only.</u></td></tr>
<tr><td>Narrative Project Description:</td><td colspan="2">The proposed "Brea 265" project (the Project) is master planned residential community of great neighborhoods, offering a mix of residential, open space and recreational opportunities that are organized and connected by public trails, parks and adjacent open spaces.

The approximately 262.1-acre (gross area) project is located within the central portion of the City of Brea and in unincorporated land within the City of Brea's Sphere of Influence and is located just northwest, southwest and southeast of the intersection of Lambert Road and Valencia Avenue. These areas are referenced in this WQMP as Northwestern, Southwestern and Eastern Project Areas, respectively.</td></tr>
</table>

[1] Project gross area based on property/tract limits. Net improvement areas, hydrological boundaries and BMP Drainage Management Areas will differ based on project grading, proposed improvements areas, developed drainage areas and BMP management areas.

DESCRIPTION OF PROPOSED PROJECT

Specially, the project is bound to the north by existing residential homes, oil field use and Lambert Road (State Route 142); to the east by Valencia Avenue (for Northwestern Site), vacant land and existing golf course (for Eastern Site); to the south by Brea Sports Park, an existing elementary school (Southwestern Site) and Blake Road (Eastern Site); and to the west by Rose Road (Eastern Site) and existing residential homes (Western Site).

The project will include thirteen (13) planning areas with the following general land uses:

- A mix of approximately 1,100 residential units (450 Low Density Residential – LDR; 650 Medium Density Residential – MDR);
- 15.1 acres of parks/recreation uses; and
- 42.7 acres of open space.

These land use areas will be linked together through a trail system that connects the park/recreation areas to the adjacent neighborhoods and offsite-parks, open space, employment centers and retail venues.

Proposed land use summary is provided in the following table, with additional description provided in the following text:

Land Use	Acreage	Density Range	Dwelling Units
Low Density Residential	135.1	1-6 du/ac	450
Medium Density Residential	62.9	6.1-12.0 du/ac	650
Parks/Paseo/ Parkways	15.1	--	--
Open Space/ Slopes	47.0	--	--
Master Plan Roadways	2.0	--	--
Total	**262.1**	**--**	**1,100**

Residential

Low density designation will consist of approximately 450 units covering approximately 135.1 acres within the northwestern and western portions of the project site.

Medium density designation will consist of approximately 650 units covering approximately 62.9 acres within the southwestern and southeastern portions of the project area. See Exhibit 3-1 Land Use Plan from the Brea 265 Specific Plan at the end of this discussion.

Park/Recreation

Approximately 15.1 acres of the site are designated for passive neighborhood parks/vista points throughout the project. Some of the parks and vista point areas will take advantage of views from higher elevations within the site. In addition, as individual planning areas are developed, the creation of smaller neighborhood/mini parks is anticipated to provide walkable small scale recreation opportunities for residents within the proposed residential neighborhoods. Proposed park and community recreation amenities will differ from park to park and are anticipated to include swimming pool and spa facilities, lounge/media room, multi-purpose room, children's play areas, dog parks, hiking trails, shade structures with seating areas, open lawn areas, game courts, barbecue facilities, community event space, community gardens, natural open space and designated parking areas.

Open Space

Approximately 47.0 acres of the site are designated as open space which are areas left in its original condition or within revegetated slope areas and setback areas away from historical oil well sites, and/or other conditions preventing development from occurring within these areas.

TABLE 3-2
SPECIFIC PLAN STATISTICAL SUMMARY BY PLANNING AREA

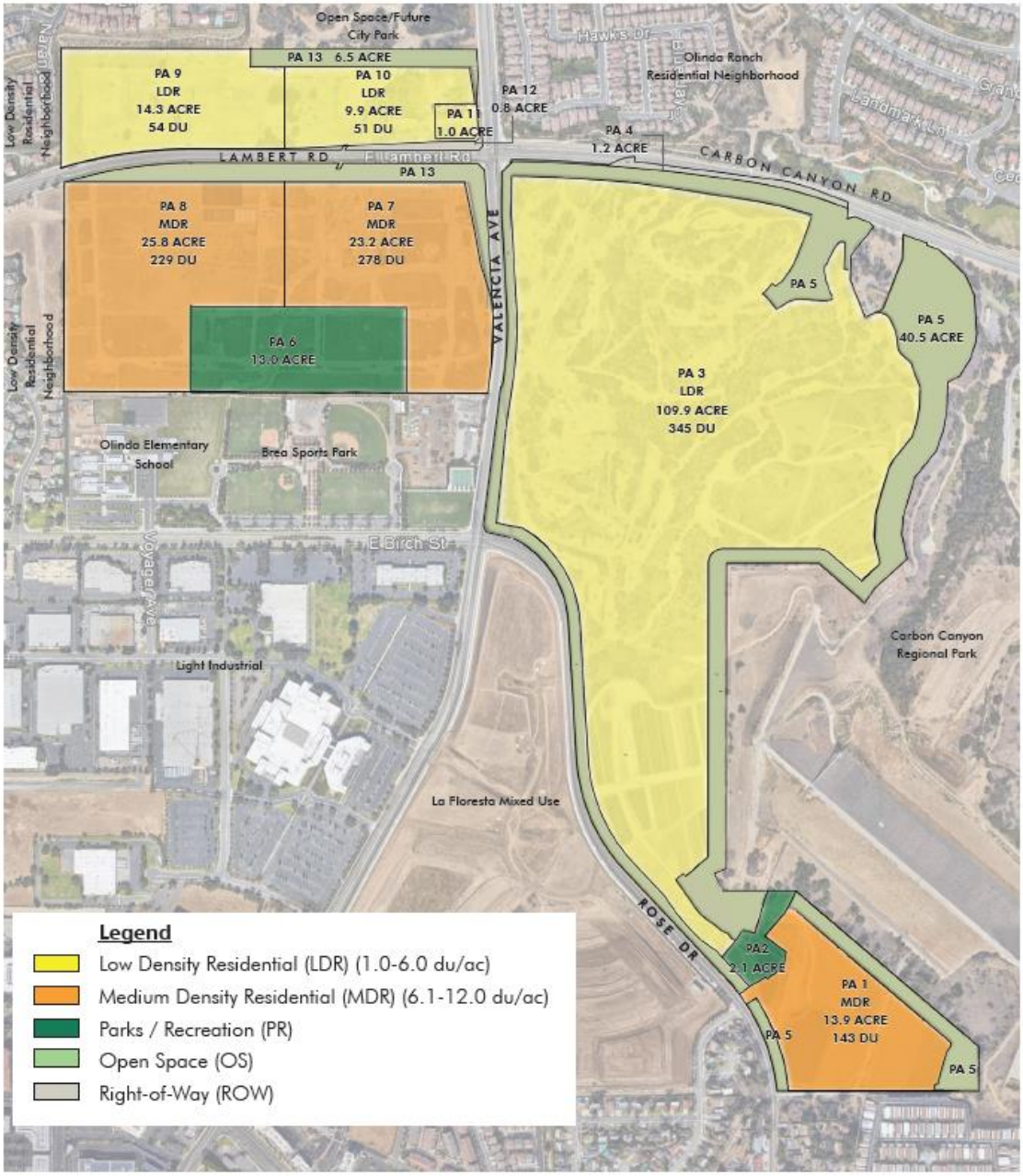
Planning Area (PA)	Land Use Category	Gross Area (AC)	Density Range (DU/AC)	Target Density (DU/AC)	Dwelling Units (DU) *
1	MDR	13.9	6.1-12.0	10.3	143
2	PR	2.1	N/A	N/A	N/A
3	LDR	109.9	1.0-6.0	3.1	345
4	ROW	1.2	N/A	N/A	N/A
5	OS	40.5	N/A	N/A	N/A
6	PR	13.0	N/A	N/A	N/A
7	MDR	23.2	6.1-12.0	7.7	278
8	MDR	25.8	6.1-12.0	8.9	229
9	LDR	14.3	1.0-6.0	3.8	54
10	LDR	9.9	1.0-6.0	5.2	51
11**	LDR	1.0	1.0-6.0	N/A	N/A
12	ROW	0.8	N/A	N/A	N/A
13	OS	6.5	N/A	N/A	N/A
Total		262.1		4.2	**1,100**

Circulation

The project will consist of approximately 34.8 acres of land dedicated to the roadway network necessary to serve the proposed project, with access provided from Lambert Road, Valencia Avenue and Rose Drive. The vehicular circulation system for the project consists of hierarchy of roadways ranging from 120' to 124' Major Arterial Roads (Lambert Road), 100' Primal Arterial Roads (Valencia Avenue and Rose Drive); and on-site roads consisting of 64' Enhanced Local Collector Roads and 58' Enhanced Local Streets. All roadway improvements will be designed to

DESCRIPTION OF PROPOSED PROJECT	
	comply with the City of Brea's Public Work standards for streets and roadways. See Circulation Plan Exhibit from the Brea 265 Area Plan provided at the end of this discussion. *Infrastructure* The proposed storm drain system will utilize underground conduit and surface drainage and will include water quality treatment as well as detention for flood runoff. The proposed sanitary sewer system will connect to both existing City of Brea infrastructure and Orange County Sanitation District infrastructure. The Domestic Water System will be a looped system tying into the existing City of Brea water system. Reclaimed or recycled water can be used for slope irrigation and fuel modification irrigation if available. Dry utilities, including electric, gas and TV will be provided base on demand requirements. *Parking* Parking will be provided via residential garage spaces, un-covered street parking and covered/uncovered parking lots. All dwelling units will have at minimum, a two-car garage, with uncovered parking spaces provided in private driveways or project streets. Covered and uncovered parking areas are anticipated for the project parks and other community facilities. Total parking shall be consistent with City of Brea requirements. *Pervious/Impervious Areas* Project pervious areas include designated open space lots, natural areas, park, trails, slopes, parkways and common landscaping areas, as well as within private areas of each residential unit. Total landscaping/pervious area is anticipated to consist of approximately 117.6 acres, or 44.8% of the site. Anticipated paved areas include project streets, sidewalks and hardscape, parking areas, building footprints and other impervious improvements. These improvements are anticipated to consist of approximately 144.5 acres, or 55.2% of the project site. *Trash* Typical household wastes are anticipated to be generated daily from the residential, parks and community facilities. Each single-family residential unit will have trash bins located/stored within the private residence of each home. Designated trash enclosures (and receptacles) are anticipated to address trash from community facilities. It is also anticipated that receptacles will be provided throughout the project's trails and parks for community use. All trash will be collected on a weekly basis (at minimum) by the contracted local waste disposal company.

DESCRIPTION OF PROPOSED PROJECT	
	Design information and locations of site-specific improvements for the project are not available at this time. Additional information for these improvements will be provided in future WQMP submittals to the City. All currently known improvements are shown in and the WQMP Site Plan in Section VI.

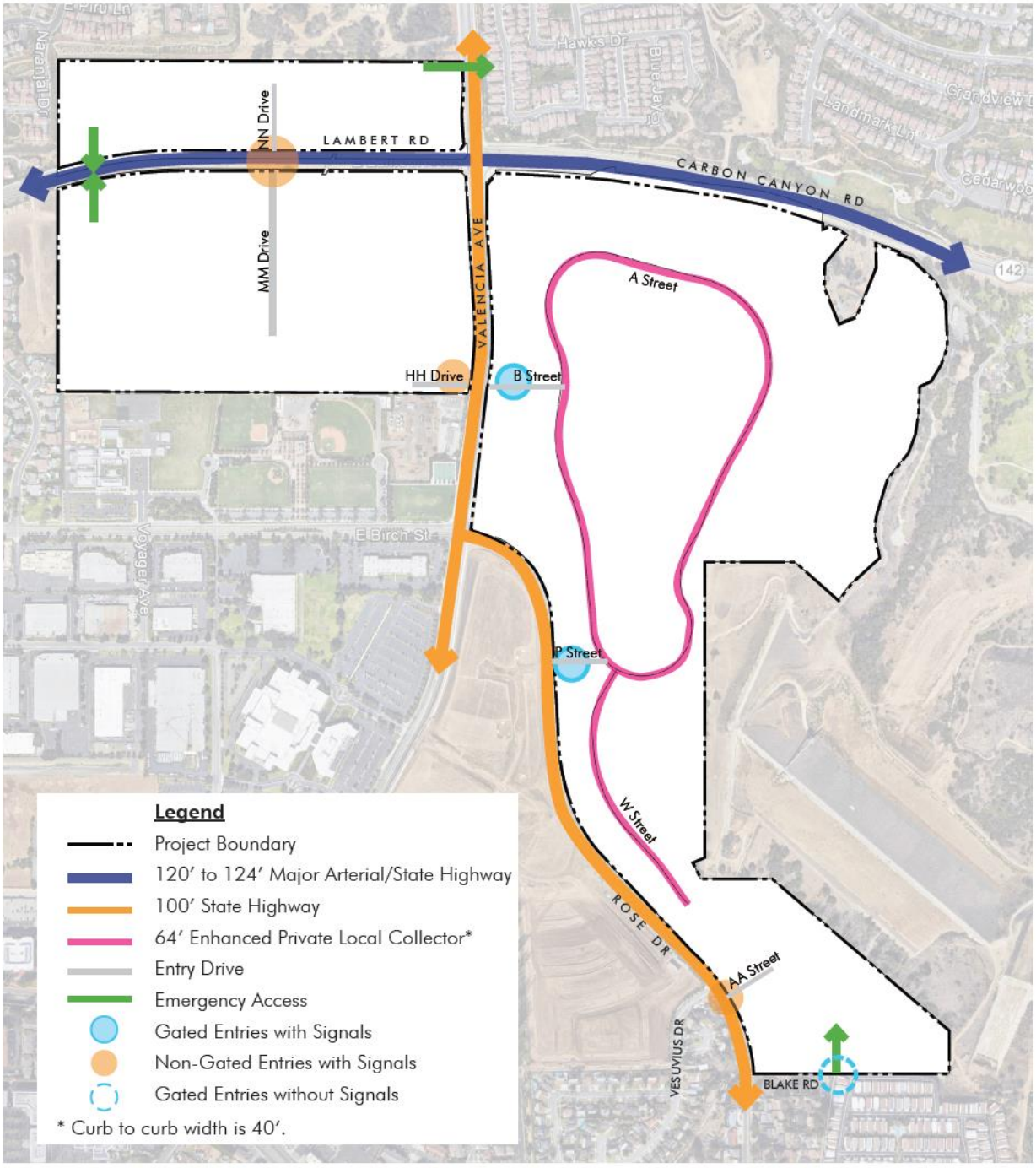


For illustrative purposes only; final design may vary.

N.T.S.

EXHIBIT 3-1, SPECIFIC PLAN LAND USE PLAN

DESCRIPTION OF PROPOSED PROJECT



For illustrative purposes only; location and alignment may vary.

EXHIBIT 3-3, CIRCULATION PLAN

N.T.S.

DESCRIPTION OF PROPOSED PROJECT				
Project Area	Pervious Surface		Impervious Surface	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	260.1	99.2%	2.0	0.8%
Post-Project Conditions	117.6	44.8%	144.5	55.2%
Drainage Patterns/Connections (Existing/Pre-Project)	In the pre-project condition, onsite drainage is divided into a Western Drainage and an Eastern Drainage. The Western Drainage consists of project areas west of Valencia Avenue and the Eastern Drainage consists of project areas east of Valencia Avenue. The Western Drainage totals approximately 96.4 acres and is divided into three sub-areas (A, B and C). Subarea Drainage "A" totals approximately 59.7 acres and consists of the eastern portion of the Western Drainage. A natural drainage traverses the drainage in a north to south direction. Runoff from areas north of Lambert Road is conveyed southerly toward Lambert Road and then centrally to the drainage. Similarly, runoff from the areas south of Lambert Road is primarily conveyed southerly to and then centrally prior to discharging to the drainage. Runoff is then conveyed southerly through Brea Sports Park prior to discharging to the Loftus Diversion Channel, which is tributary to Fullerton Creek Channel, Coyote Creek Channel, the San Gabriel River and ultimately the Pacific Ocean. Subarea "B" totals approximately 20.7 acres and consists of the northwestern portion of the Western Drainage. Runoff is conveyed southerly to an existing v-ditch located on the northern side of Lambert Road and then westerly to an existing inlet prior to discharging to the existing storm drain line in Lambert Road. Runoff is then conveyed westerly and southerly prior to discharging to the Loftus Diversion Channel. Subarea "C" totals approximately 16.0 acres and consists of the western-central portion of the Western Drainage. Runoff is conveyed southwesterly to an existing drainage prior to discharging to the existing 60" storm drain line in an adjacent residential development to the west and conveyed southwesterly to the Loftus Channel. The Eastern Drainage totals approximately 183.8 acres and consists of the Eastern Project Area (south of Lambert Road and east of Valencia Avenue). Carbon Canyon Channel traverses the site in a southerly direction and divides the southeastern portion of the project site from the remaining portion of the Eastern Project Area (from Carbon Canyon Channel) to just east of the intersection of Rose Drive and Vesuvius Drive. Runoff from the larger northwestern portion of this drainage area is conveyed as sheet flow westerly to a system of paved and unpaved drainages and then southerly prior to discharging to the Carbon Canyon			

DESCRIPTION OF PROPOSED PROJECT	
	Channel. Runoff from the southeastern portion of this drainage area is conveyed as sheet flow and via an unimproved drainage to a low area located northwest of the intersection of Blake Road and Rose Drive, prior to discharging to the Carbon Canyon Channel to the west. All runoff is then conveyed southerly to the Santa Ana River (via the Carbon Canyon Diversion Channel) and then westerly to the Pacific Ocean.

II.2 POTENTIAL STORMWATER POLLUTANTS

Table 2.1, Anticipated and Potential Pollutants Generated by Land Use Type, from the Technical Guidance Document (December 2013) lists the following Pollutants of Concern (POC's) associated with the proposed development:

POLLUTANTS OF CONCERN			
Pollutant	Check One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended Solids/Sediment	E ☒	N ☐	Pollutant is a Primary POC. Potential sources of sediment include disturbed or unstabilized landscaping areas and disturbed earth surfaces.
Nutrients	E ☒	N ☐	Pollutant is Primary POC as downstream water is impaired for Nutrients. Potential sources of nutrients include fertilizers, sediment and trash/debris.
Heavy Metals	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include automobiles and uncovered parking areas.
Pathogens (Bacteria/Virus)	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include food wastes, pet wastes, sediment and landscaping areas.
Pesticides	E ☒	N ☐	Pollutant is a Primary POC. Potential sources of pesticides include landscaping and open space areas.
Oil and Grease	E ☒	N ☐	Potential sources include project streets and parked vehicles.
Toxic Organic Compounds	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include automobiles and uncovered parking areas.
Trash and Debris	E ☒	N ☐	Potential sources of trash and debris include landscaping activities, food wrappers and food wastes.

II.3 HYDROLOGIC CONDITIONS OF CONCERN

The purpose of this section is to identify any hydrologic conditions of concern (HCOC) with respect to downstream flooding, erosion potential of natural channels downstream, impacts of increased flows on natural habitat, etc. that may occur as the result of project implementation. As specified in Section 2.3.3 of the Model WQMP, projects must identify and mitigate any HCOCs. An HCOC is a combination of upland hydrologic conditions and stream biological and physical conditions that present a condition of concern for physical and/or biological degradation of streams.

The project resides within the jurisdiction of the Santa Ana RWQCB and is subject to the requirements of the North Orange County WQMP TGD, in which HCOCs are considered to exist if the volume for the 2-year runoff event for post-development condition exceeds pre-development condition by more than 5% or the time of concentration is less than the pre-development condition by greater than 5%.

Is the proposed project potentially susceptible to hydromodification impacts?

☐ No – Show map and/or describe and reference supporting documentation in the space below

☒ Yes – Describe applicable hydrologic conditions of concern in the space below.

The proposed project will increase the amount of impervious area located within the project site, thereby increasing runoff volume and rate. Based on the County's Technical Guidance Documents for Hydromodification Susceptibility (Figure XVI.3-1 Susceptibility Analysis for San Gabriel River-Coyote Creek and Figure XVI.3-3 Susceptibility Analysis for Santa Ana River in Attachment C), only project areas located west of Valencia Drive (Western Drainage Area that discharges to Loftus Channel) have potential hydromodification impacts.

A summary of the analysis for the Western Drainage is provided in the following table:

HCOC Analysis Summary (2-year event) for Western Drainage Area

Sub-Drainage Area	Existing Condition				Proposed Condition				Δ Acres	Δ Q_2 (cfs)	Δ Tc (min)	Δ V (ac-ft))
	Acres	Q_2 (cfs)	Tc (min)	V (ac-ft)	Acres[1]	Q_2 (cfs)	Tc (min)	V (ac-ft)				
A	59.70	49.90	16.86	1.97	66.90	80.80	13.99	8.12	+7.20	+30.90	-2.87	+6.15
B	20.70	20.40	13.44	0.76	16.20	18.20	13.16	1.69	-4.50	-2.20	-0.28	+0.93
C	16.00	13.50	16.78	0.55	10.50	15.20	8.73	1.40	-5.50	+1.70	-8.05	+0.85
Total	96.40	83.80	--	3.28	93.6	114.2	--	11.21	-2.8	+30.40	--	+7.93

[1] *Discrepancy in proposed condition Drainage acres resulting from edge grading effects and onsite routing of storm drain.*

To address the project's HCOC as well as overall increase in runoff for larger storm events, surface and sub-surface detention facilities are proposed in the western project site to detain the volume required to mitigate the difference between the project's pre- and post-development peak runoff and change in time of concentration at the each of the project's point of compliance (outlet) to the existing downstream drainage system. With implementation of the detention facilities, the project's hydromodification impacts (as well as impacts from larger storm events) will be minimized in the developed condition.

II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

The project's post-development drainage characteristics are described as follows:

In the developed condition, runoff from each of the project's two onsite drainage areas are consistent with pre-project drainage patterns, with each of the project's drainage areas discharging to the pre-existing storm drain connections downstream. Runoff is generally discharged to the backbone storm drain system via a system of area drains, curb and gutters and catch basin inlets. Runoff is then conveyed to the Loftus Channel and Carbon Canyon Channel, as in pre-project conditions.

Low Impact Development

To satisfy the project's requirements for Low Impact Development (LID) requirements and water quality treatment, water qualify runoff from each of the project's Drainage Management Areas (DMAs) are addressed via traditional bioretention BMPs (flow-through type due to contamination from oil extraction activities in existing project site) proprietary biotreatment BMPs (vault type) and open basins equipped with proprietary biotreatment media at basin bottom.

DMA 1 (11.02 acres) – Consists of the northwestern portion of the Western Project Area and is bound to the south by Lambert Road. Runoff from this DMA will be conveyed to a proposed bioretention (flow-through)/detention basin, located at the southwestern portion of the DMA. The BMP will also address hydromodification impacts. Alternative BMP for this DMA is the use of proprietary biotreatment media within the basin.

DMA 2 & 3 (2.18 acres; 1.97 acres) – Consists of westbound Lambert Road and eastbound Lambert Road, located just south of DMA 1. Runoff from these DMAs will be conveyed to a proprietary biofiltration BMP prior to discharging to the existing storm drain system in Lambert Road.

DMA 4 (10.50 acres) – Consists of the southwestern portion of the Western Project Area. Runoff is conveyed southwesterly to an underground detention vault that outlets through a proprietary biofiltration BMP. The detention vault will also address hydromodification impacts.

DMA 5 (25.47 acres) – Consists of the central-western and south-central portions of the Western Drainage Area. Runoff is conveyed southwesterly to an underground detention vault that outlets through a proprietary biofiltration BMP. The detention vault will also address hydromodification impacts.

DMA 6 (38.67 acres) – Consists northeastern portion and the central-eastern portions of the Western Drainage Area. Runoff is conveyed southerly and then southeasterly to an open basin that has been designed with proprietary biofiltration media. The basin will also provide mitigation for hydromodification impacts.

DMA 7 through 11 (0.73 acres, 0.55 acres, 0.26 acres, 0.43 acres & 0.79 acres) – Consists of the southeastern portion of the Western Drainage Area. Runoff from these DMAs will be conveyed to a proprietary biofiltration BMP prior to discharging to the backbone storm drain system.

DMA 12 (26.66 acres) – Consists of the northwestern portion of the Eastern Drainage Area. Runoff from this DMA is conveyed southerly to an open basin that has been designed with proprietary biofiltration media.

DMA 13 (51.62 acres) – Consists of the Northeastern portion of the project's Eastern Drainage Area. Runoff from this DMA is conveyed southerly to an open basin that has been designed with proprietary biofiltration media.

DMA 14 through 20; 22 through 24; 26 through 35; 37 through 40 & 42 through 43 (See Section IV.2.2 for acreages) - Consists of the central and southwestern portions of the Eastern Drainage Area. Runoff from these DMAs will be conveyed to a proprietary biofiltration BMP prior to discharging to the backbone storm drain system.

DMA 21 (1.52 acres) – Consists of open space area located just east of Valencia Avenue and Rose Drive. Runoff from this area will be conveyed to a bioretention (flow-through type) BMP or proprietary biofiltration BMP prior to discharging to the backbone storm drain system.

DMA 25 (3.21 acres) – Consists a small area located in the central-eastern portion of the Eastern Drainage Area. Runoff from this DMA is conveyed southerly to an open basin that has been designed with proprietary biofiltration media.

DMA 36 (9.86 acres) – Consists of the northern section of the southeastern portion of the project site. Runoff from this DMA is conveyed westerly to an open basin that has been designed with proprietary biofiltration media.

DMA 41 (20.12 acres) – Consists of the southeastern most portion of the project site. Runoff from this DMA is conveyed westerly to an open basin that has been designed with proprietary biofiltration media.

In addition the BMPs proposed, the project may also incorporate the use of BMPs prescribed in the US EPA's "Green Streets" guidance manual to a manner consistent with the Maximum Extent Practicable (MEP) standard (Section 2.7.2 of TGD) to address proposed improvements to Lambert Road and Valencia Avenue/Rose Drive. These include the use of other LID BMPs such as swales and planters, as well as structural BMPs (pervious pavement).

To meet the trash capture requirements of the Ocean Plan, full trash capture screens and/or hydrodynamic separator (CDS Unit) will be employed within the project's catch basins that are sized to accommodate the 1-year storm event.

II.5 PROPERTY OWNERSHIP/MANAGEMENT

The project proponent, Aera Energy LLC., shall assume all onsite BMP maintenance, inspection and funding responsibilities until such time, these activities have been turned over to the Homeowners Association (HOA). Inspection and maintenance activities are in Section V of this WQMP.

SECTION III SITE DESCRIPTION

III.1 PHYSICAL SETTING

General descriptions of the project area are provided below:

PHYSICAL SETTING	
Planning Area/ Community Name	Planning Area – Currently not located within Planning Area. Proposed – Brea 265 Specific Plan. Community Name – "Brea 265".
Location/Address	The Project is located within the central portion of the City of Brea and in unincorporated land within the City of Brea's Sphere of Influence and is located just northwest, southwest and southeast of the intersection of Lambert Road and Valencia Avenue.
Land Use	Existing: Vacant and Graded, Agriculture, Oil Extraction Proposed: Low, Medium and High Density Residential, Community Park and Open Space
Zoning	Existing: R-1 Single Family Residential (Areas west of Valencia) and None (Areas east of Valencia) Proposed: Master Planned Community/Brea 265 Specific Plan
Acreage	260.7 Acres
Predominant Soil Type	Hydrologic Soil Type C and D

III.2 SITE CHARACTERISTICS

The following table summarizes general characteristics of the project site:

SITE CHARACTERISTICS	
Precipitation Zone	0.90 in
Topography	The majority of the site is relatively flat with elevations gradually increasing in the north-eastern portions of the project. The majority of the site falls into the 0-10% slope range.
Drainage Patterns/Connections	In the pre-project condition, onsite drainage is divided into a Western Drainage and an Eastern Drainage. The Western Drainage consists of project areas west of Valencia Avenue and the Eastern Drainage consists of project areas east of Valencia Avenue. The Western Drainage totals approximately 96.4 acres and is divided into three sub-areas (A, B and C). Subarea Drainage "A" totals approximately 59.7 acres and consists of the eastern portion of the Western Drainage. A natural drainage traverses the drainage in a north to south direction. Runoff from areas north of Lambert Road is conveyed southerly toward Lambert Road and then centrally to the drainage. Similarly, runoff from the areas south of Lambert Road is primarily conveyed southerly to and then centrally prior to

SITE CHARACTERISTICS	
	discharging to the drainage. Runoff is then conveyed southerly through Brea Sports Park prior to discharging to the Loftus Diversion Channel, which is tributary to Fullerton Creek Channel, Coyote Creek Channel, the San Gabriel River and ultimately the Pacific Ocean. Subarea "B" totals approximately 20.7 acres and consists of the northwestern portion of the Western Drainage. Runoff is conveyed southerly to an existing v-ditch located on the northern side of Lambert Road and then westerly to an existing inlet prior to discharging to the existing storm drain line in Lambert Road. Runoff is then conveyed westerly and southerly prior to discharging to the Loftus Diversion Channel. Subarea "C" totals approximately 16.0 acres and consists of the western-central portion of the Western Drainage. Runoff is conveyed southwesterly to an existing drainage prior to discharging to the existing 60" storm drain line in an adjacent residential development to the west and conveyed southwesterly to the Loftus Channel. The Eastern Drainage totals approximately 183.8 acres and consists of the Eastern Project Area (south of Lambert Road and east of Valencia Avenue). Carbon Canyon Channel traverses the site in a southerly direction and divides the southeastern portion of the project site from the remaining portion of the Eastern Project Area (from Carbon Canyon Channel) to just east of the intersection of Rose Drive and Vesuvius Drive. Runoff from the larger northwestern portion of this drainage area is conveyed as sheet flow westerly to a system of paved and unpaved drainages and then southerly prior to discharging to the Carbon Canyon Channel. Runoff from the southeastern portion of this drainage area is conveyed as sheet flow and via an unimproved drainage to a low area located northwest of the intersection of Blake Road and Rose Drive, prior to discharging to the Carbon Canyon Channel to the west. All runoff is then conveyed southerly to the Santa Ana River (via the Carbon Canyon Diversion Channel) and then westerly to the Pacific Ocean.

SITE CHARACTERISTICS	
Soil Type, Geology, and Infiltration Properties	The site is located easterly of the Los Angeles Basin on the southwestern flank of the Puente Hills that form the western to northwestern margin of the Peninsular Ranges Geomorphic Province. The Puente Hills are bracketed by the Whittier and Chino Fault Zones and have been created by uplift along these faults. Approximately 13,000 feet of Miocene-aged marine clastic sedimentary rock underlies the Puente Hills. These sediments overlie approximately 16,000 feet of Tertiary aged rock, which are underlain by Mesozoic plutonic basement rocks. The site is underlain by Quaternary-aged alluvium and terrace deposits. Based on the County of Orange Technical Guidance Document (TGD) for Preparation of WQMPs and the geotechnical investigation, onsite soils consist primarily of Hydrologic Group C and D Soils, characterized as having slow to very slow infiltration rates when thoroughly wet. These soils are not favorable for infiltration. See WQMP Attachment D for soils information.
Hydrogeologic (Groundwater) Conditions	Project site is not located within a shallow groundwater zone, as defined by the TGD. Groundwater is expected to be greater than 10' below existing surface.
Geotechnical Conditions (relevant to infiltration)	Based on the TGD, majority of underlying soils consist primarily of Group "C" and "D" soils, which are not favorable for infiltration. Additionally, per the project's Focused Phase II Environmental Investigation[2], total petroleum hydrocarbons (TPH) have been identified in various locations throughout the project site. These locations have been identified in the exhibits provided in Attachment D. The contaminated soils will be removed, remediated and then placed throughout the project site at select locations. As such, infiltration has not been proposed for the project.
Off-Site Drainage	The project site receives run-on from upstream areas to the north. In the developed condition, storm water run-on from areas to the north will be conveyed through the project site via a separate onsite storm drain line (no comingling of onsite runoff) prior to discharging to pre-existing downstream connections.
Utility and Infrastructure Information	There are no major utilities currently on the project site. Wet and dry utilities are proposed for this project and will connect to existing facilities located in Valencia Avenue and Lambert Road.

[2] Northgate Environmental Management, Inc. May 10, 2017. *Focused Phase II Environmental Investigation. Brea 265 Property. Valencia Avenue at Lambert Road. Brea, California.*

III.3 WATERSHED DESCRIPTION

The following table provides descriptions of the project's receiving waters.

WATERSHED DESCRIPTION	
Receiving Waters	**San Gabriel River – Coyote Creek Watershed:** Loftus Diversion Channel (Facility A06), Fullerton Creek Channel (Facility A03), Coyote Creek Channel (Facility A01) **Santa Ana River Watershed:** Carbon Canyon Creek Channel (E03), Carbon Canyon Creek Diversion Channel (E02), Santa Ana River (E01) Reach 3, Santa Ana River (E01) Reach 2
303(d) Listed Impairments	**San Gabriel River – Coyote Creek Watershed:** Loftus Diversion Channel (Facility A06) – None Fullerton Creek Channel (Facility A03) – None Coyote Creek Channel (Facility A01) – Copper, Indicator Bacteria, Iron, Malathion, pH, Toxicity San Gabriel River Reach 1 – pH, Temperature San Gabriel River Estuary – Copper, Dioxin, Indicator Bacteria, Nickel, Dissolved Oxygen **Santa Ana River Watershed:** Carbon Canyon Creek Channel (E03) – None Carbon Canyon Creek Diversion Channel (E02) – None Santa Ana River (E01) Reach 3 – None Santa Ana River (E01) Reach 2 – None There is currently no approved WIHMP for either watershed.
Applicable TMDLs	**San Gabriel River – Coyote Creek Watershed:** Loftus Diversion Channel (Facility A06) – None Fullerton Creek Channel (Facility A03) – None Coyote Creek Channel (Facility A01) – *Copper*, *Indicator Bacteria* San Gabriel River Reach 1 – None San Gabriel River Estuary – *Copper*, *Indicator Bacteria* **Santa Ana River Watershed:** Carbon Canyon Creek Channel (E03) – None Carbon Canyon Creek Diversion Channel (E02) – None Santa Ana River (E01) Reach 3 – None Santa Ana River (E01) Reach 2 – None

WATERSHED DESCRIPTION	
Pollutants of Concern for the Project	Pollutants of Concern for the project include: Suspended Solids/Sediment, Nutrients, Metals, Pathogens, Pesticides, Oil & Grease, Toxic Organic Compounds and Trash & Debris. Primary Pollutants of Concern for the project include: Metals, Pathogens, Pesticides and Toxic Organic Compounds.
Environmentally Sensitive and Special Biological Significant Areas	The project site is not located within 200' of a 303(d) listed water body (which is defined as an Environmentally Sensitive Area (ESA) under Section 2.3.3.4 of the Technical Guidance Document).

SECTION IV BEST MANAGEMENT PRACTICES (BMPS)

IV. 1 PROJECT PERFORMANCE CRITERIA

The project's performance criteria for HCOCs and LID BMPs are provided in the following table:

PROJECT PERFORMANCE CRITERIA		
Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implanting LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	There is currently no approved WIHMP for the project's receiving waters.	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	Due to the increase in the project's post-development runoff volume and decrease in time to reach peak flows, hydromodification impacts are anticipated in the project's western drainage areas (west of Valencia Avenue), which discharges to the Loftus Channel. Project will implement hydromodification controls to address hydromodification impacts.	
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	• LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency. • LID BMPs must be designed to: - Retain, onsite, (infiltrate, harvest and use, or evapotranspire) stormwater runoff as feasible up to the Design Capture Volume, and - Recover (i.e., draw down) the storage volume as soon as possible after a storm event, and if necessary - **Biotreat, on-site, additional runoff, as feasible, up to 80 percent average annual capture efficiency (cumulative, retention plus biotreatment), and, if necessary** - Retain or biotreat, in a regional facility, the remaining runoff up to 80 percent annual capture efficiency (cumulative, retention plus biotreatment, onsite plus offsite), and, if necessary - Fulfill alternative compliance obligations for runoff volume not retained or biotreated up to 80 percent average annual capture efficiency using treatment controls or other alternative approaches as described in Section 7.II-3.	

PROJECT PERFORMANCE CRITERIA	
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	Ocean Plan Trash Amendments – Full Capture System to trap particles 5mm or greater, and has a design treatment capacity that is either (the project's selected performance criteria is provided in bold): • **Equal to or greater than peak flow rate for the one-year, one-hour storm in the sub-drainage area; or** • Appropriately sized to, and designed to carry at least the same flows as, the corresponding storm drain.
Calculate LID design storm capture volume for Project.	See Section IV.2.2 for the project's required DCV for each of the project's Drainage Management Areas (DMA). In general, DCV = C x D x A x 43560 sf/ac x 1ft/12in Where: DCV = design storm capture volume, cu-ft C = runoff coefficient = (0.75 x imp + 0.15) Imp = impervious fraction of drainage area (ranges from 0 to 1) D = storm depth (inches) A = tributary area (acres)

IV.2 Site Design and Drainage Plan

The primary goal of site design principles and techniques is to reduce land development impacts on water quality and downstream hydrologic conditions. Benefits of site design include reductions in the size of downstream BMPs, conveyance systems, pollutant loading and hydromodification impacts.

IV.2.1 Site Design BMPs

The following section describes the site design BMPs that have been incorporated into this project.

Minimize Impervious Area

Landscaping will be provided throughout the site, along project streets, within private lots as well as common lettered lots and recreation lot to minimize the amount of impervious area onsite.

Maximize Natural Infiltration Capacity

The project site consists primarily of HSG C and D soils, which are not feasible for infiltration. However, the project will utilize some retention of runoff in the project's landscaping areas to allow for some incidental infiltration and evapotranspiration processes. These areas include depressed parkways and landscaping areas.

Preserve Existing Drainage Patterns and Time of Concentration

In the developed condition, runoff from each of the project's development areas will be collected and discharged to the existing drainage downstream storm drain system. Changes in the time of concentration and peak flows from natural/pre-project conditions will be controlled via the project's hydromodification controls and detention facilities.

Disconnect Impervious Areas

Landscaping will be provided within the project's development areas to minimize the amount of directly connected impervious areas.

Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas

Project site will include natural conservation areas.

Revegetate Disturbed Areas and Xeriscape Landscaping

Native and/or tolerant landscaping will be incorporated into site design, consistent with City guidelines, in proposed landscaping areas.

IV.2.2 Drainage Management Areas (DMAs)

Per the TGD, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas tributary to the project's BMPs. DMA limits have been delineated based on the tributary drainage area for each BMP.

The design capture volume (DCV) utilizing the "Simple Method" described in TGD Section III.1.1 is provided below. Locations of DMAs and associated LID BMPs are provided on the exhibits in Section VI. Calculations and TGD Worksheets are provided in Appendix B of this WQMP.

DMA	Area (Ac.)	Imp.	C-value	Design Storm Depth (in)	DCV_{SIMPLE} (cu-ft)	Intensity (in/hr)	Q_{BMP} (cfs)
1	11.02	0.5	0.525	0.90	18,901.2	0.24	1.39
2	2.18	0.8	0.750	0.90	5,341.5	0.24	0.39
3	1.97	0.8	0.750	0.90	4,827.0	0.25	0.37
4	10.50	0.8	0.750	0.90	25,727.6	0.24	1.89
5	25.47	0.65	0.638	0.90	53,046.7	0.24	3.90
6	38.67	0.8	0.750	0.90	94,751.2	0.24	6.96
7	0.78	0.85	0.788	0.90	2,006.8	0.25	0.15
8	0.55	0.85	0.788	0.90	1,415.0	0.25	0.11
9	0.26	0.85	0.788	0.90	668.9	0.25	0.05
10	0.43	0.85	0.788	0.90	1,106.3	0.25	0.08
11	0.79	0.85	0.788	0.90	2,032.5	0.25	0.16
12	26.66	0.5	0.525	0.90	45,726.6	0.24	3.36
13	51.62	0.5	0.525	0.90	88,537.3	0.24	6.50
14	2.90	0.65	0.638	0.90	6,039.9	0.25	0.46
15	2.36	0.65	0.638	0.90	4,915.2	0.25	0.38
16	0.17	0.85	0.788	0.90	437.4	0.25	0.03
17	0.81	0.65	0.638	0.90	1,687.0	0.25	0.13
18	0.80	0.85	0.788	0.90	2,058.2	0.25	0.16
19	0.33	0.85	0.788	0.90	849.0	0.25	0.06
20	2.78	0.65	0.638	0.90	5,789.9	0.25	0.44
21	1.52	0.15	0.263	0.90	1,303.5	0.25	0.10
22	1.12	0.65	0.638	0.90	2,332.6	0.25	0.18
23	0.80	0.65	0.638	0.90	1,666.2	0.25	0.13

DMA	Area (Ac.)	Imp.	C-value	Design Storm Depth (in)	DCV_{SIMPLE} (cu-ft)	Intensity (in/hr)	Q_{BMP} (cfs)
24	1.44	0.65	0.638	0.90	2,999.1	0.25	0.23
25	3.21	0.65	0.638	0.90	6,685.5	0.25	0.51
26	1.53	0.5	0.525	0.90	2,624.2	0.25	0.20
27	2.30	0.65	0.638	0.90	4,790.2	0.25	0.37
28	0.18	0.85	0.788	0.90	463.1	0.25	0.04
29	2.07	0.65	0.638	0.90	4,311.2	0.25	0.33
30	1.88	0.65	0.638	0.90	3,915.5	0.25	0.30
31	0.49	0.5	0.525	0.90	840.4	0.25	0.06
32	1.40	0.5	0.525	0.90	2,401.2	0.25	0.18
33	0.67	0.8	0.750	0.90	1,641.7	0.25	0.13
34	3.66	0.5	0.525	0.90	6,277.5	0.25	0.48
35	0.63	0.5	0.525	0.90	1,080.6	0.25	0.08
36	9.86	0.5	0.525	0.90	16,911.6	0.24	1.24
37	1.64	0.65	0.638	0.90	3,415.6	0.25	0.26
38	1.43	0.65	0.638	0.90	2,978.3	0.25	0.23
39	2.83	0.65	0.638	0.90	5,894.1	0.25	0.45
40	1.59	0.65	0.638	0.90	3,311.5	0.25	0.25
41	20.12	0.8	0.750	0.90	49,299.0	0.24	3.62
42	0.82	0.65	0.638	0.90	1,707.8	0.25	0.13
43	0.56	0.65	0.638	0.90	1,166.3	0.25	0.09
Total	242.80	--	--	--	493,882.2	--	36.57

IV.3 LID BMP Selection and Project Conformance Analysis

Per the TGD, Low Impact Development (LID) BMPs must be incorporated into design features and source controls to reduce project related storm water pollutants. The incorporation of LID BMPs into project design requires evaluation of LID measures in the following treatment hierarchy: infiltration, evapotranspiration, harvest/reuse and biotreatment.

IV.3.1 Hydrologic Source Controls (HSC)

Hydrologic source controls (HSCs) can be considered to be an integration of site design practices and LID BMPs. The goal of HSCs is to reduce runoff volume for a given drainage area without reducing the site's true impervious area.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☒
Street trees (canopy interception)	☒
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐

Name	Included?
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐

HSC-2 Impervious Area Dispersion

Where feasible, runoff from the project's roof and walkway areas will be directed to adjacent landscaping areas for filtration, evapotranspiration and incidental infiltration of runoff and volume reduction, prior to discharging to the storm drain system.

HSC-3 Street Trees

Trees will be planted along the project's parkways and within common lot areas to intercept rainfall and provide some volume reduction benefits for the project.

At current, DCV reduction credits have not been determined for these areas as the project is in the planning phase of development. As such their benefits are incidental at the moment, as the areas have not been specifically designed to retain runoff.

IV.3.2 Infiltration BMPs

Infiltration BMPs are LID BMPs that capture, store and infiltrate storm water runoff. These BMPs are engineered to store a specified volume of water and have no design surface discharge (underdrain or outlet structure) until this volume is exceeded. Examples of infiltration BMPs include infiltration trenches, bioretention without underdrains, drywells, permeable pavement, and underground infiltration galleries.

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐

Due to the presence of unfavorable soil types (HSG Type C & D), the project's existing and past use for oil extraction and the presence of contaminated soils, BMPs that employ infiltration as the primary mechanism for pollutant removal are not feasible.

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Name	Included?
EVAPOTRANSPIRATION	
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
HARVEST & REUSE/ RAINWATER HARVESTING	
Above-ground cisterns and basins	☐
Underground detention	☐

Evapotranspiration

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, through some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site. Since ET is not the sole process in these BMPs, specific design and sizing criteria have not been developed for ET-based BMPs.

Harvest and Reuse

Harvest and Reuse (aka. Rainwater Harvesting) BMPs are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

The project does not propose the use of harvesting BMPs, as harvesting runoff exclusively for landscape irrigation or toilet/urinal flushing was determined to be infeasible since the project's minimum required number of use (toilet flushing) or irrigation area for each harvesting BMP would exceed the project's estimated uses (See Worksheet J in Section IV.8).

Consideration was also given to harvesting runoff for multiples uses (both irrigation and toilet flushing). However, harvesting runoff for multiple uses was determined to be infeasible due to the difficulty in conveying harvested runoff from a focal collection point to each residential lot and also proposed irrigated landscaping areas (as opposed to high rise structures or cluster developments).

There is the possibility that harvest and use BMPs can be employed at a smaller scale in parks and landscaping areas. The feasibility of using harvest and use BMPs in these areas will be considered once project designs are more refined.

At the current phase of the project, biofiltration BMPs will be the primary LID BMPs employed to address low flow (irrigation and other non-storm water runoff) and storm water runoff from project areas.

IV.3.4 Biotreatment BMPs

Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristic of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume.

BIOTREATMENT	
Name	Included?
Bioretention with underdrains	☒
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☒
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐

The project proposes the use of biotreatment BMPs to address the project's pollutants of concern from each of the project's DMAs. Anticipated BMPs within this category include bioretention (with underdrains) and proprietary biotreatment BMPs.

Bioretention BMPs will consist of traditional basin type bioretention (with underdrains) facilities. Each bioretention facility will be designed with a nutrient sensitive media, which would allow the units to provide a medium to high level of effectiveness at removing the project's storm water pollutants, as well as sub-drains to convey treated runoff to the storm drain system.

Proprietary biotreatment BMPs will be sized to address the water quality volume for its tributary area and designed with volume-based (with the BMP system equipped with a subsurface detention facility to capture DCV, then discharges through a proprietary biotreatment BMP unit) or flow-based (runoff is conveyed directly to proprietary biofiltration BMP unit, or media area within open basin) configurations. These BMPs have been selected based on their proven pollutant removal efficiencies, as well as site constraints from proposed land use areas.

BIOTREATMENT BMP DESIGN SUMMARY							
DMA	DCV_{SIMPLE} (cu-ft)	Q_{BMP} (cfs)	BMP Alternatives	DCV_{BMP} Footprint Required (sf)[1]	Q_{BMP} Footprint Required (sf)[2]	BMP Footprint / Model Provided[4]	BMP Lat/Long (DD)
1	18,901.2	1.39	BIORETENTION WITH UNDERDRAINS, PROPRIETARY BIOFILTRATION	12,600.8	514.3	TBD	33.924254°, -117.855139°
2	5,341.5	0.39	PROPRIETARY BIOFILTRATION	--	145.3		33.923916°, -117.854935°
3	4,827.0	0.37	PROPRIETARY BIOFILTRATION	--	136.8		33.923653°, -117.855158°
4	25,727.6	1.89	SUBSURFACE VAULT WITH PROPRIETARY BIOFILTRATION	212.3[3]	700.0		33.921623°, -117.855028°
5	53,046.7	3.90	SUBSURFACE VAULT WITH PROPRIETARY BIOFILTRATION	438.5[3]	1,443.3		33.920827°, -117.853190°
6	94,751.2	6.96	BASIN WITH PROPRIETARY BIOFILTRATION	--	2,578.0		33.921744°, -117.848148°
7	2,006.8	0.15	PROPRIETARY BIOFILTRATION	--	56.9		33.920916°, -117.849499°
8	1,415.0	0.11	PROPRIETARY BIOFILTRATION	--	40.1		33.920925°, -117.848871°
9	668.9	0.05	PROPRIETARY BIOFILTRATION	--	19.0		33.920938°, -117.849103°
10	1,106.3	0.08	PROPRIETARY BIOFILTRATION	--	31.4		33.920767°, -117.848812°
11	2,032.5	0.16	PROPRIETARY BIOFILTRATION	--	57.6		33.920583°, -117.849500°
12	45,726.6	3.36	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,244.1		33.918872°, -117.846523°
13	88,537.3	6.50	BASIN WITH PROPRIETARY BIOFILTRATION	--	2,408.9		33.917689°, -117.843665°
14	6,039.9	0.46	PROPRIETARY BIOFILTRATION	--	171.2		33.920493°, -117.844312°
15	4,915.2	0.38	PROPRIETARY BIOFILTRATION	--	139.3	TBD	33.919762°, -117.844664°
16	437.4	0.03	PROPRIETARY BIOFILTRATION	--	12.4		33.920379°, -117.844259°
17	1,687.0	0.13	PROPRIETARY BIOFILTRATION	--	47.8		33.919787°, -117.844519°
18	2,058.2	0.16	PROPRIETARY BIOFILTRATION	--	58.3		33.918866°, -117.845760°
19	849.0	0.06	PROPRIETARY BIOFILTRATION	--	24.1		33.917973°, -117.845404°
20	5,789.9	0.44	PROPRIETARY BIOFILTRATION	--	164.1		33.918001°, -117.844839°
21	1,303.5	0.10	BIORETENTION WITH UNDERDRAINS OR PROPRIETARY BIOFILTRATION	869.0	36.9		33.918509°, -117.847218°
22	2,332.6	0.18	PROPRIETARY BIOFILTRATION	--	66.1		33.918768°, -117.845933°
23	1,666.2	0.13	PROPRIETARY BIOFILTRATION	--	47.2		33.918640°, -117.845912°

BIOTREATMENT BMP DESIGN SUMMARY							
DMA	DCV_{SIMPLE} (cu-ft)	Q_{BMP} (cfs)	BMP Alternatives	DCV_{BMP} Footprint Required (sf)[1]	Q_{BMP} Footprint Required (sf)[2]	BMP Footprint / Model Provided[4]	BMP Lat/Long (DD)
24	2,999.1	0.23	PROPRIETARY BIOFILTRATION	--	85.0		33.917997°, -117.844700°
25	6,685.5	0.51	PROPRIETARY BIOFILTRATION	--	189.5		33.916719°, -117.843678°
26	2,624.2	0.20	PROPRIETARY BIOFILTRATION	--	74.4		33.917258°, -117.846184°
27	4,790.2	0.37	PROPRIETARY BIOFILTRATION	--	135.8		33.916950°, -117.845525°
28	463.1	0.04	PROPRIETARY BIOFILTRATION	--	13.1		33.917909°, -117.845307°
29	4,311.2	0.33	PROPRIETARY BIOFILTRATION	--	122.2		33.917098°, -117.844647°
30	3,915.5	0.30	PROPRIETARY BIOFILTRATION	--	111.0		33.917036°, -117.844737°
31	840.4	0.06	PROPRIETARY BIOFILTRATION	--	23.8		33.916571°, -117.846040°
32	2,401.2	0.18	PROPRIETARY BIOFILTRATION	--	68.1		33.916620°, -117.845238°
33	1,641.7	0.13	PROPRIETARY BIOFILTRATION	--	46.5		33.916262°, -117.844855°
34	6,277.5	0.48	PROPRIETARY BIOFILTRATION	--	177.9	TBD	33.916362°, -117.846010°
35	1,080.6	0.08	PROPRIETARY BIOFILTRATION	--	30.6		33.916532°, -117.845430°
36	16,911.6	1.24	BASIN WITH PROPRIETARY BIOFILTRATION	--	460.1		33.914622°, -117.845790°
37	3,415.6	0.26	PROPRIETARY BIOFILTRATION	--	96.8		33.915952°, -117.845023°
38	2,978.3	0.23	PROPRIETARY BIOFILTRATION	--	84.4		33.915748°, -117.845071°
39	5,894.1	0.45	PROPRIETARY BIOFILTRATION	--	167.0		33.915290°, -117.845078°
40	3,311.5	0.25	PROPRIETARY BIOFILTRATION	--	93.9		33.915045°, -117.845026°
41	49,299.0	3.62	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,341.3		33.910692°, -117.842110°
42	1,707.8	0.13	PROPRIETARY BIOFILTRATION	--	48.4		33.911667°, -117.843064°
43	1,166.3	0.09	PROPRIETARY BIOFILTRATION	--	33.1		33.910768°, -117.842439°

[1] Based on 1.5' ponding depth.
[2] Based on 0.0027 cfs (1.0 gpm) per sf of proprietary media for flow-based BMPs. This is the typical media flow rate for systems such as Filterra, Focal Point and Modular Wetland System (MWS) units.
[3] Based on 0.0007 cfs (0.26 gpm) per sf of proprietary media with 48 hour draw down. This is based on MWS units configured for volume-based treatment approach.
[4] Minimum footprint for each BMP will be provided in each DMA. Actual manufacturer / model or footprint to be determined.

IV.3.5 Hydromodification Control BMPs

The project is subject to hydromodification. The following BMP will be employed to address project impacts.

<table>
<tr><th colspan="2">HYDROMODIFICATION CONTROL BMPS</th></tr>
<tr><th>BMP Name</th><th>BMP Description</th></tr>
<tr><td>Detention Facilities</td><td>2 subsurface detention vaults and 2 biofiltration basin BMPs located in the project's Western Drainage will be employed to detain the difference in runoff for the 2-year event and larger storms as needed. Sizing of the proposed facilities will be provided to detain the required volume increases provided in Section II.3

Sub-Drainage Area "A" (DMAs 5 through 11) – 6.15 ac-ft – Required detention volume will be addressed via a subsurface detention vault located beneath a parking lot located in the western southwestern portion of this drainage area and an open proprietary biofiltration basin located in the eastern portion of this sub-drainage area. The vault will provide 3.3 acre-feet of storage (in addition to storage for DCV). The basin will provide 2.85 acre-feet of storage.
Sub-Drainage Area "B" (DMAs 1 through 3) – 0.92 ac-ft – Required detention volume will be addressed via a bioretention with underdrains facility located at the southwestern portion of this sub-drainage area.
Sub-Drainage Area "C" (DMA 4) – 0.85 ac-ft – Required detention volume will be addressed via a subsurface detention vault located in the western portion of this sub-drainage area.

Hydromodification Summary Table
<table>
<tr><th>Sub-Drainage</th><th>Detention BMP</th><th>Size</th><th>Total Storage Provided (ac-ft)</th></tr>
<tr><td rowspan="2">A</td><td rowspan="2">Vault & Basin</td><td>Vault: 23,097 ft^2 X 8.6'</td><td>4.52[1]</td></tr>
<tr><td>Basin: 2,977 ft^2 X 8'</td><td>2.85</td></tr>
<tr><td>B</td><td>Basin</td><td>17,123 ft^2 X 4'</td><td>1.57[1]</td></tr>
<tr><td>C</td><td>Vault</td><td>13,689 ft^2 X 4.6'</td><td>1.46[1]</td></tr>
</table>
[1] Includes storage volume for DCV</td></tr>
</table>

IV.3.6 Regional/Sub-Regional LID BMPs

Not applicable to project. Project is not part of any regional or sub-regional BMP programs. Project will employ use of onsite LID BMPs to address project runoff.

IV.3.7 Treatment Control BMPs

The project is able to meet LID requirements onsite. Treatment control BMPs for this project applies to the treatment BMP employed to meet current full trash capture requirements per the Ocean Plan.

To address this requirement, the project proposes the use of connector pipe screens in project

catch basins and/or hydrodynamic separators that have been approved by the SWRCB and meet the sizing requirement for Full Trash Capture BMPs per the Ocean Plan (Equal to or greater than peak flow rate for the one-year, one-hour storm in the sub-drainage area).

Source Control BMPs

In accordance with the County DAMP and City of Brea Local Implementation Plan (LIP), both structural and non-structural source control BMPs are required for all priority projects unless deemed not applicable based on project characteristics. The following tables summarize the source control BMPs (Non-Structural and Structural) specified in the County DAMP and City's LIP.

The following tables show source control BMPs (routine non-structural and routine structural) included in this project and those that were not included.

IV.3.8 Non-Structural Source Control BMPs

The table below indicates all Non-Structural Source Control BMPs to be utilized in the project. Additional discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	Proposed facility will not generate waste subject to Title 22 CCR compliance.
N6	Local Industrial Permit Compliance	☐	☒	Project is not subject to industrial permit.
N7	Spill Contingency Plan	☐	☒	Proposed facility will not generate waste or store materials subject to the requirements of Chapter 6.95 of the CA Health and Safety Code.
N8	Underground Storage Tank Compliance	☐	☒	No underground storage tanks proposed for the project.
N9	Hazardous Materials Disclosure Compliance	☐	☒	Proposed facility will not store or generate hazardous materials subject to agency requirements.
N10	Uniform Fire Code Implementation	☐	☒	Proposed facility does not propose to store toxic or highly toxic compressed gases.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☐	☒	Not in project scope.
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Public Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	Not in project scope.

N1 – Education for Property Owners

Educational materials will be provided to homeowners at close of escrow by owner/developer and periodically thereafter by the HOA to inform them of their actions and the potential impacts to downstream water quality. Materials include those described in Section VII of this WQMP and any updates to educational materials.

N2 – Activity Restrictions

Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the project's Covenant, Conditions and Restrictions (CC&Rs), or other equally effective measure.

N3 – Common Area Landscape Management

Maintenance activities for landscape areas shall be consistent with City and manufacturer guidelines for fertilizer and pesticide use (OC DAMP Section 5.5). Maintenance includes trimming, weeding and debris removal and vegetation planting and replacement and shall be consistent with the City's Landscape Ordinance. Stockpiled materials during maintenance activities shall be placed away from drain inlets and runoff conveyance devices. Wastes shall be properly disposed of or recycled.

N4 – BMP Maintenance

The project proponent shall be responsible for implementation of each applicable non-structural, structural and LID BMPs as well as scheduling inspection and maintenance cleaning of all applicable structural BMP facilities. The proponent shall be responsible for inspection and maintenance activities in landscape areas (see WQMP Site Plan).

N11 – Common Area Litter Control

Litter control onsite will include the use of litter patrols, violation reporting and clean up during landscaping maintenance activities and as needed to ensure good housekeeping of the project's common areas.

N12 – Employee Training

All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc.

N14 – Common Area Catch Basin Inspection

As required by the TGD, at least 80% of all drainage facilities shall be inspected each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year; with 100% of all drainage facilities inspected, cleaned and maintained within a two year period. Drainage facilities include catch basins and inlets, detention vaults and the project's LID BMPs.

N15 – Street Sweeping Public Streets and Parking Lots

All project streets shall be vacuum swept on a weekly basis, consistent with City's sweeping schedule.

Refer to Section V for implementation frequency and maintenance responsibilities.

IV.3.9 Structural Source Control BMPs

The source control BMPs have been selected in the following table to address the anticipated pollutants generated by the proposed project. These BMPs are designed to work in conjunction with the project's LID BMPs to minimize potential impacts to the site's receiving waters.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No outdoor storage areas proposed for park.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☒	☐	
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	Not applicable to project area.
S6	Dock areas	☐	☒	
S7	Maintenance bays	☐	☒	No maintenance bays proposed for project.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S8	Vehicle wash areas	☐	☒	No vehicle washing allowed onsite.
S9	Outdoor processing areas	☐	☒	No outdoor processing of goods required for project.
S10	Equipment wash areas	☐	☒	No wash areas onsite.
S11	Fueling areas	☐	☒	No fueling areas in project scope.
S12	Hillside landscaping	☐	☒	Project is not hillside development with large slopes.
S13	Wash water control for food preparation areas	☐	☒	
S14	Community car wash racks	☐	☒	Not in project scope.

S1 – Provide Storm Drain System Stenciling and Signage (CASQA SD-13)

Storm drain stenciling with a brief message or graphical icons with symbols, prohibiting the dumping of improper materials into the storm drain system shall be placed in highly visible areas adjacent to all storm drain inlets. The BMP is designed to alert and educate homeowners and guests of the destination of pollutants discharged into storm drain systems. Legibility of stencils and signs shall be maintained.

S3 – Trash Enclosure (CASQA SD-32)

All trash and waste shall be stored in containers that have lids or tarps to minimize direct precipitation into the containers. The trash storage areas will be designed to City standards, and will be walled, roofed, have gates and proper drainage per City standards. Trash enclosure locations are not known at this time. Locations will be identified as project designs approach final.

S4 – Efficient Irrigation System & Landscape Design (CASQA SD-10 & SD-12)

Landscaping will be designed to consist of native species or drought tolerant, water conserving landscaping. Irrigation system will be designed, constructed and adjusted to eliminate overspray to hardscape areas, with timing and cycle lengths adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.

S5 – Project Slopes and Channels and Provide Energy Dissipation

The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

The project is able to fully address the design capture volume via onsite LID BMPs. Therefore, an alternative compliance plan is not applicable to this project.

IV.4.1 Water Quality Credits

Not applicable to project. Project will utilize LID BMPs onsite to address storm water.

<table>
<tr><th colspan="5">DESCRIPTION OF PROPOSED PROJECT</th></tr>
<tr><td colspan="5">Project Types that Qualify for Water Quality Credits (Select all that apply):</td></tr>
<tr><td colspan="2">☐Redevelopment projects that reduce the overall impervious footprint of the project site.</td><td colspan="2">☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.</td><td>☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).</td></tr>
<tr><td colspan="2">☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).</td><td colspan="2">☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned</td><td>☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).</td></tr>
<tr><td>☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.</td><td>☐ Developments in a city center area.</td><td>☐ Developments in historic districts or historic preservation areas.</td><td>☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.</td><td>☐ In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.</td></tr>
<tr><td>Calculation of Water Quality Credits (if applicable)</td><td colspan="4">N/A</td></tr>
</table>

IV.4.2 Alternative Compliance Plan Information

Not applicable to project. Project will utilize LID BMPs onsite to address storm water pollutants.

SECTION V INSPECTION/MAINTENANCE RESPONSIBILITY FOR BMPS

It has been determined that the Owner shall assume all BMP funding, inspection and maintenance responsibilities for the Brea 265 project, until such time, site ownership, maintenance and funding responsibilities have been transferred to the HOA and the City of Brea, as appropriate.

Contact/Title _____

Company Aera Energy LLC.

Address 3030 Saturn Street, Suite 101
Brea, CA 92821

Email _____

Telephone # (714) 577-9154

The Owner shall verify BMP implementation and ongoing maintenance through inspection, self-certification or other equally effective measure. The certification shall verify that the inspection and maintenance of all BMPs are performed in accordance to the requirements of this WQMP.

The BMP Inspection and Maintenance Responsibility Matrix is provided in the following table. An Operations and Maintenance (O&M) Plan is also included as an attachment to this WQMP.

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
HYDROLOGIC SOURCE CONTROL BMPs			
HSC-2 Impervious Area Dispersion	Owner/HOA	Inspect for standing water and that water infiltrates into underlying soil completely. Remove accumulated sediment or repair eroded areas as needed.	After qualifying storm events of 0.5" or greater and monthly with landscaping maintenance
HSC-3 Street Trees	Owner/HOA	Conduct general inspection and maintenance monthly per routine landscaping maintenance activities. Trim trees as needed. Conduct bi-annual tree health evaluations.	After qualifying storm events of 0.5" or greater and monthly with landscaping maintenance

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
BIOTREATMENT BMPs			
BIO-1 Bioretention with Underdrains	Owner/HOA	Conduct general inspection and maintenance per routine landscaping maintenance activities. Inspect surface area for debris, trash and vegetation accumulation. Inspect for general plant health. Inspect for sediment, build up on planting surface and in area drain inlet. Inspect for sediment or debris clogging inlet. Clean/repair items as necessary.	Monthly
		Remove vegetation, permeable soil and drain rock. Replace in kind. Check sub-drain pipe and inlet. Repair if necessary.	Every 5 to 7 years
BIO-7 Proprietary Biotreatment (includes Basins with proprietary media)	Owner/HOA	Inspect unit for accumulated debris and sediment and plant health; remove trash from screening device and separation chamber; trim vegetation. Remove sediment from pre-chamber, replace pre-filter cartridge media and drain down filter media. Replace wetland media.	Annually 20 years
DETENTION BMP			
Detention Basin or Vault	Owner/HOA	Inspect for standing water and that water is discharged to the downstream storm drain system completely in no greater than 72 hours. Inspect and remove accumulated sediment and debris in settling chamber (first few modules of system).	Storms exceeding 2-year event (greater than 2" within 24 hours), semi-annual
GROSS SOLIDS REMOVAL BMPs			
PRE-1 Gross Solids Removal Devices (Connector Pipe Screens)	Owner/HOA	Inspect unit for accumulated debris and sediment. Remove when accumulated material reaches ½ height of screen.	Inspect monthly and after significant storm events. Clean annually and as needed.

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
PRE-1 Gross Solids Removal Devices (Hydrodynamic Separation Device)	Owner/HOA	Inspect prior to and after traditional rainy season. Inspect for accumulated debris, trash and oil/grease accumulation; remove (vactor truck) accumulated debris when system reaches 75% of capacity and as needed based on site activities (e.g. spills, leaks, etc.).	Semi-annual (Spring and Fall)
NON-STRUCTURAL SOURCE CONTROL BMPs			
N1 Education for Property Owners, Tenants and Occupants	Owner/HOA	Educational materials will be provided to homeowners at close of escrow by the developer and thereafter on an annual basis by the HOA. Materials shall include those shown in Section VII of this WQMP.	At close of escrow and Annually
N2 Activity Restrictions	Owner/HOA	Owner will prescribe activity restrictions to protect surface water quality, through a Covenant, Conditions and Restrictions (CC&Rs) agreement, or other equally effective measure, for the property. Upon takeover of site responsibilities by the HOA. The HOA shall be responsible for ensuring residents compliance.	Ongoing
N3 Common Area Landscape Management	Owner/HOA	Maintenance shall be consistent with City requirements; any fertilizer and/or pesticide usages shall be consistent with City and manufacturer guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Monthly and as needed

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
N4 BMP Maintenance	Owner/HOA	Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the City and documented with the WQMP.	Ongoing
N11 Common Area Litter control	Owner/HOA	Litter patrol, violations investigation, reporting and other litter control activities shall be performed by the owner/HOA as needed and in conjunction with maintenance activities for common areas.	Ongoing
N12 Employee Training	Owner/HOA	All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc.	Upon hire and annually thereafter
N14 Common Area Catch Basin Inspection	Owner/HOA and City, as appropriate	Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of facilities inspected and maintained within a 2-year period.	Annually
N15 Street Sweeping	Owner/HOA and City, as appropriate	Project streets and parking areas shall be vacuum swept at a minimum, weekly basis, consistent with City schedules.	Weekly

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
STRUCTURAL SOURCE CONTROL BMPs			
S1 Provide storm drain system stencilling and signage	Owner/HOA and City, as appropriate	As a part of the Preliminary civil engineering drawings, it will be required by the Developer to stencil on all of the project's catch basins, where applicable in paved areas, the words, "No Dumping - Drains to Ocean." Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible.	Annually
S3 Trash Enclosure	Owner/HOA	All trash and waste shall be stored in containers that have lids or tarps to minimize direct precipitation into the containers. The trash storage areas will be designed to City standards, and will be walled, roofed, have gates and proper drainage per City standards. Trash enclosure locations are not known at this time. Locations will be identified as project designs approach final.	Daily
S4 Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	Owner/HOA	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Monthly

BMP INSPECTION/MAINTENANCE			
BMP	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
S5 – Project Slopes and Channels	Owner/HOA	Lined concrete drains and down drains will be constructed on slope areas to convey runoff safely from top of slopes and to prevent storm and irrigation runoff from discharging in an uncontrolled manner, thereby causing erosion. Runoff from the slope areas will be conveyed to either the storm drain system or to outlet dissipation devices to prevent scouring and erosion. All slope areas will have at least 70% vegetative cover consisting of native and/or drought tolerant plant species with a deep root system. These areas will be inspected on a monthly basis for signs of erosion and plant health.	Monthly
S12 – Hillside Landscaping	Owner/HOA	Hillside areas that are disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County of Orange requirements and City of San Juan Capistrano requirements. Areas shall be inspected per guidelines provided in N3.	Monthly

SECTION VI SITE PLAN AND DRAINAGE PLAN

The exhibits provided in this section are to illustrate the post construction BMPs prescribed within this WQMP. Drainage flow information of the proposed project, such as general surface flow lines, concrete or other surface drainage conveyances, and storm drain facilities are also depicted. All structural source control and LID BMPs are shown as well.

Exhibits

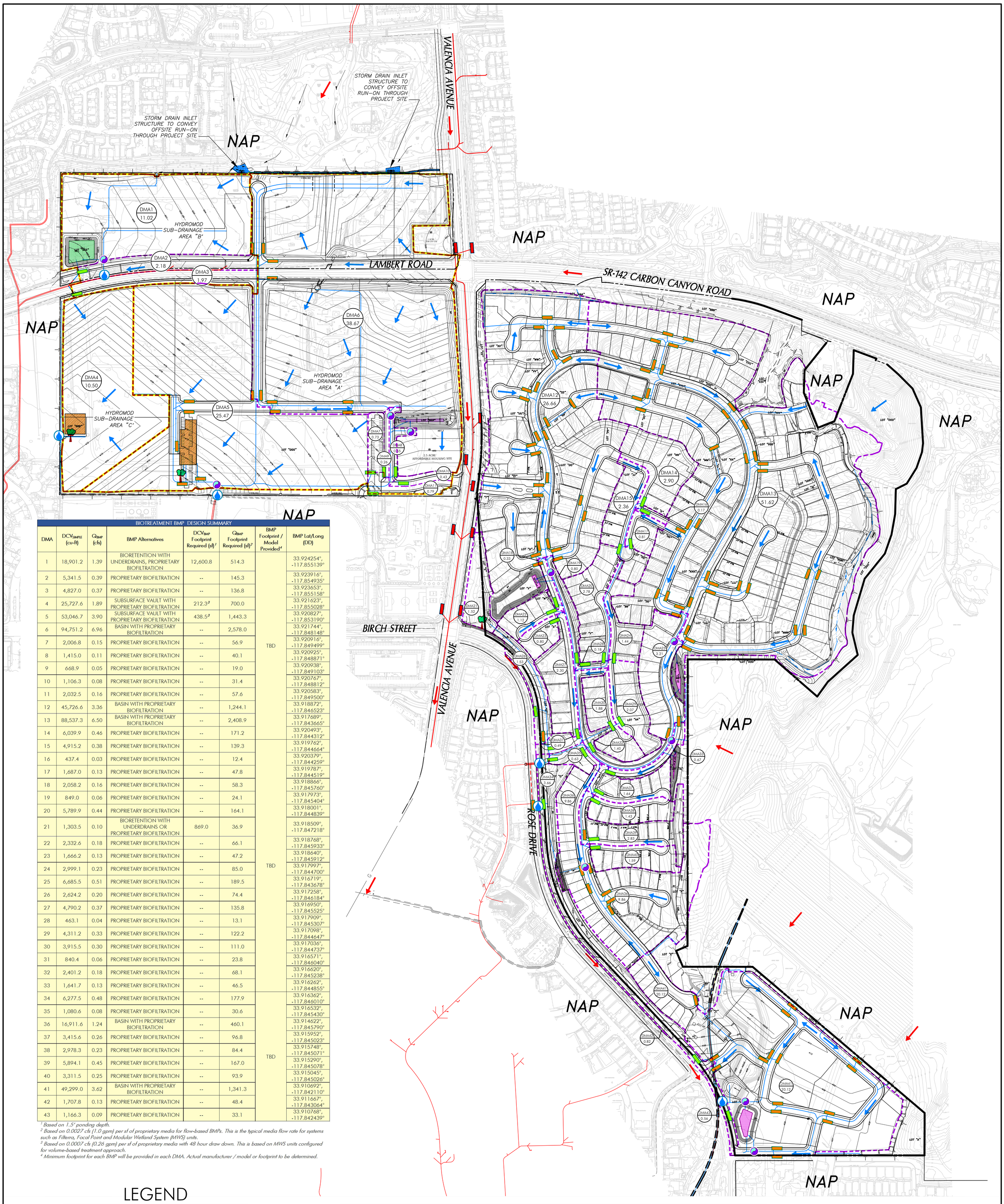
- Vicinity Map
- WQMP Site Plan Exhibit

BREA 265

SCALE: 1" = 2000'

DRAWN BY: TIH	PREPARED BY: HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING ■ ENGINEERING ■ SURVEYING Three Hughes, Irvine, CA 92618 ■ PH: (949) 583-1010 ■ FX: (949) 583-0759	PREPARED FOR: CAERA 3030 SATURN STREET, SUITE 101 BREA, CA 92821 (714) 577-9147	"BREA 265" SOUTH OF LAMBERT ROAD AND VALENCIA AVENUE CITY OF BREA, CA	WQMP VICINITY MAP
DATE: 03/08/2019				
W.O.: 2256-17X				

DATE: Mar. 19, 2019 01:10:16 PM FILE: F:\0477\Planning\SY_WQ\PWQMP\Exhibits\PWQMP_VIC Brea 265.dwg



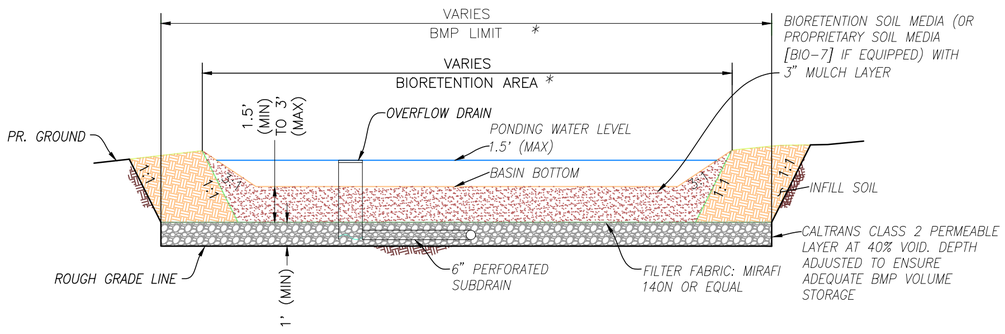
BIOTREATMENT BMP DESIGN SUMMARY

DMA	DCV_{SIMPLE} (cu-ft)	Q_{BMP} (cfs)	BMP Alternatives	DCV_{BMP} Footprint Required (sf)[1]	Q_{BMP} Footprint Required (sf)[2]	BMP Footprint / Model Provided[4]	BMP Lat/Long (DD)
1	18,901.2	1.39	BIORETENTION WITH UNDERDRAINS, PROPRIETARY BIOFILTRATION	12,600.8	514.3	TBD	33.924254°, -117.855139°
2	5,341.5	0.39	PROPRIETARY BIOFILTRATION	--	145.3		33.923916°, -117.854935°
3	4,827.0	0.37	PROPRIETARY BIOFILTRATION	--	136.8		33.923653°, -117.855158°
4	25,727.6	1.89	SUBSURFACE VAULT WITH PROPRIETARY BIOFILTRATION	212.3[3]	700.0		33.921623°, -117.855028°
5	53,046.7	3.90	SUBSURFACE VAULT WITH PROPRIETARY BIOFILTRATION	438.5[3]	1,443.3		33.920827°, -117.853190°
6	94,751.2	6.96	BASIN WITH PROPRIETARY BIOFILTRATION	--	2,578.0		33.921744°, -117.848148°
7	2,006.8	0.15	PROPRIETARY BIOFILTRATION	--	56.9		33.920916°, -117.849499°
8	1,415.0	0.11	PROPRIETARY BIOFILTRATION	--	40.1		33.920925°, -117.848871°
9	668.9	0.05	PROPRIETARY BIOFILTRATION	--	19.0		33.920938°, -117.849103°
10	1,106.3	0.08	PROPRIETARY BIOFILTRATION	--	31.4		33.920767°, -117.848812°
11	2,032.5	0.16	PROPRIETARY BIOFILTRATION	--	57.6		33.920583°, -117.849500°
12	45,726.6	3.36	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,244.1		33.918872°, -117.846523°
13	88,537.3	6.50	BASIN WITH PROPRIETARY BIOFILTRATION	--	2,408.9		33.917689°, -117.843665°
14	6,039.9	0.46	PROPRIETARY BIOFILTRATION	--	171.2		33.920493°, -117.844312°
15	4,915.2	0.38	PROPRIETARY BIOFILTRATION	--	139.3	TBD	33.919762°, -117.844664°
16	437.4	0.03	PROPRIETARY BIOFILTRATION	--	12.4		33.920379°, -117.844259°
17	1,687.0	0.13	PROPRIETARY BIOFILTRATION	--	47.8		33.919787°, -117.844519°
18	2,058.2	0.16	PROPRIETARY BIOFILTRATION	--	58.3		33.918866°, -117.845760°
19	849.0	0.06	PROPRIETARY BIOFILTRATION	--	24.1		33.917973°, -117.845404°
20	5,789.9	0.44	PROPRIETARY BIOFILTRATION	--	164.1		33.918001°, -117.844839°
21	1,303.5	0.10	BIORETENTION WITH UNDERDRAINS OR PROPRIETARY BIOFILTRATION	869.0	36.9		33.918509°, -117.847218°
22	2,332.6	0.18	PROPRIETARY BIOFILTRATION	--	66.1		33.918768°, -117.845933°
23	1,666.2	0.13	PROPRIETARY BIOFILTRATION	--	47.2		33.918640°, -117.845912°
24	2,999.1	0.23	PROPRIETARY BIOFILTRATION	--	85.0		33.917997°, -117.844700°
25	6,685.5	0.51	PROPRIETARY BIOFILTRATION	--	189.5		33.916719°, -117.843678°
26	2,624.2	0.20	PROPRIETARY BIOFILTRATION	--	74.4		33.917258°, -117.846184°
27	4,790.2	0.37	PROPRIETARY BIOFILTRATION	--	135.8		33.916950°, -117.845525°
28	463.1	0.04	PROPRIETARY BIOFILTRATION	--	13.1		33.917909°, -117.845307°
29	4,311.2	0.33	PROPRIETARY BIOFILTRATION	--	122.2		33.917098°, -117.844647°
30	3,915.5	0.30	PROPRIETARY BIOFILTRATION	--	111.0		33.917036°, -117.844737°
31	840.4	0.06	PROPRIETARY BIOFILTRATION	--	23.8		33.916571°, -117.846040°
32	2,401.2	0.18	PROPRIETARY BIOFILTRATION	--	68.1		33.916620°, -117.845238°
33	1,641.7	0.13	PROPRIETARY BIOFILTRATION	--	46.5		33.916262°, -117.844855°
34	6,277.5	0.48	PROPRIETARY BIOFILTRATION	--	177.9	TBD	33.916362°, -117.846010°
35	1,080.6	0.08	PROPRIETARY BIOFILTRATION	--	30.6		33.916532°, -117.845430°
36	16,911.6	1.24	BASIN WITH PROPRIETARY BIOFILTRATION	--	460.1		33.914622°, -117.845790°
37	3,415.6	0.26	PROPRIETARY BIOFILTRATION	--	96.8		33.915952°, -117.845023°
38	2,978.3	0.23	PROPRIETARY BIOFILTRATION	--	84.4		33.915748°, -117.845071°
39	5,894.1	0.45	PROPRIETARY BIOFILTRATION	--	167.0		33.915290°, -117.845078°
40	3,311.5	0.25	PROPRIETARY BIOFILTRATION	--	93.9		33.915045°, -117.845026°
41	49,299.0	3.62	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,341.3		33.910692°, -117.842110°
42	1,707.8	0.13	PROPRIETARY BIOFILTRATION	--	48.4		33.911667°, -117.843064°
43	1,166.3	0.09	PROPRIETARY BIOFILTRATION	--	33.1		33.910768°, -117.842439°

[1] *Based on 1.5' ponding depth.*
[2] *Based on 0.0027 cfs (1.0 gpm) per sf of proprietary media for flow-based BMPs. This is the typical media flow rate for systems such as Filterra, Focal Point and Modular Wetland System (MWS) units.*
[3] *Based on 0.0007 cfs (0.26 gpm) per sf of proprietary media with 48 hour draw down. This is based on MWS units configured for volume-based treatment approach.*
[4] *Minimum footprint for each BMP will be provided in each DMA. Actual manufacturer / model or footprint to be determined.*

LEGEND

- PROJECT LIMITS
- NAP — NOT A PART
- SUBDRAINAGE BOUNDARY (HYDROMODIFICATION AREAS)
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- DMA / ACRE — DMA DESIGNATION AND ACRES
- DMA DESIGNATION AND ACRES
- DMA DESIGNATION AND ACRES
- PROJECT STORM DRAIN SYSTEM (PRIVATE)
- EXISTING/OFFSITE STORM DRAIN SYSTEM (PUBLIC)
- PROJECT CATCH BASIN WITH BMP (PRIVATE) S1 STORM DRAIN SYSTEM STENCILING/SIGNAGE
- PROJECT CATCH BASIN WITH BMPS (PRIVATE) S1 STORM DRAIN SYSTEM STENCILING/SIGNAGE BIO-7 PROPRIETARY BIOFILTRATION (BIOTREATMENT)
- EXISTING/OFFSITE CATCH BASIN (PUBLIC)
- WATER QUALITY DIVERSION STRUCTURE (PRIVATE) INCLUDES 2-YEAR STORM FOR WESTERN PROJECT AREA
- BIO-7 PROPRIETARY BIOFILTRATION (PRIVATE)
- BIO-7 BASIN WITH PROPRIETARY BIOFILTRATION MEDIA (PRIVATE)
- BIO-7 BASIN WITH PROPRIETARY BIOFILTRATION MEDIA (PRIVATE) ALSO FOR HYDROMODIFICATION CONTROL
- BIO-1 BIORETENTION WITH UNDERDRAIN (PRIVATE) ALSO FOR HYDROMODIFICATION CONTROL
- SUBSURFACE DETENTION FACILITY (PRIVATE) FOR WATER QUALITY AND HYDROMODIFICATION CONTROL
- DISCHARGE POINT



BIO-1 BIORETENTION WITH UNDERDRAIN & BIO-7 PROPRIETARY BIOTREATMENT (BASIN TYPE)
N.T.S.
TYPICAL SECTION DETAIL

N

GRAPHIC SCALE
0 125 250 500
(IN FEET)
1 INCH = 250 FT.

PRELIMINARY/CONCEPTUAL DRAFT WATER QUALITY MANAGEMENT PLAN - SITE PLAN

APPLICANT:
AERA
3030 SATURN STREET, SUITE 101
BREA, CA 92821
(714) 577-9147

PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

"BREA 265"
SOUTH OF LAMBERT ROAD
AND VALENCIA AVENUE
CITY OF BREA, COUNTY OF ORANGE, CALIFORNIA

DRAFTED BY:	DATE:	W.O. NO:	SHEET NO:
TIH	02/11/2022	4213-3	1 OF 1

DATE: Feb. 11, 2022 01:30:46 PM FILE: F:\0477\Planning\SY_WQ\PWQMP\Exhibits\PWQMP_SP Brea 265.dwg

SECTION VII EDUCATIONAL MATERIALS INCLUDED

The following table contains a list of applicable educational materials to be included in the project's Final WQMP.

EDUCATION MATERIALS			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☒	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☒	Proper Maintenance Practices for Your Business	☐
Household Tips	☒	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☐		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☒		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☒		☐
Sewer Spill	☒		☐
Tips for the Home Improvement Projects	☒		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☒		☐
Tips for Pool Maintenance	☒		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☒		☐
Tips for Projects Using Paint	☒		☐

Attachment A – Educational Materials

(Provided at Final WQMP)

Attachment B – BMP Worksheets, Calculations & BMP Details

BIO-1 – Bioretention with Underdrains

BIO-7 Proprietary Biotreatment

Proprietary Biotreatment Alternatives (Focal Point, Filterra, Modular Wetlands)

BMP Worksheets and Calculations

Table 2.7: Infiltration BMP Feasibility Worksheet

	Infeasibility Criteria	*Yes*	*No*
1	**Would Infiltration BMPs pose significant risk for groundwater related concerns?** Refer to Appendix VII (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria.	X	
Provide basis: Site's current and previous use for oil extraction and presence of oil at depth			
2	Would Infiltration BMPs **pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level**? (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert):		X
Provide basis: Per TGD Maps, site consists primarily of C and D soils.			
3	Would infiltration of the DCV from drainage area **violate downstream water rights**?		X
Provide basis: Per County TGD Maps, no restrictions on infiltration due to water rights.			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)

	Partial Infeasibility Criteria	*Yes*	*No*
4	Is proposed infiltration facility **located on HSG D soils** or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils?	X	
Provide basis: Based on TGD maps, majority of site contains HSG D and C soils.			
5	Is **measured infiltration rate below proposed facility less than 0.3 inches per hour**? This calculation shall be based on the methods described in Appendix VII.	Not available	Not available
Provide basis: Not known. Percolation test were not conducted onsite.			
6	Would **reduction of over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?**		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Project discharges to storm channel that is not ephemeral.			
7	Would **an increase in infiltration over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?**		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Based on TGD and County GIS records, no restrictions on infiltration due to ephemeral washes or groundwater concerns.			

Infiltration Screening Results (check box corresponding to result):		
8	Is there substantial evidence that infiltration from the project would result in a significant increase in I&I to the sanitary sewer that cannot be sufficiently mitigated? (See Appendix XVII)? Provide narrative discussion and supporting evidence: Per TGD and County of Orange GIS data, project is not located in an area where increase in I&I to the sanitary sewer is of concern.	No
9	If any answer from row 1-3 is yes: infiltration of any volume is **not feasible** within the DMA or equivalent. Provide basis: Item 1 is yes. Due to site's current and past use for oil extraction, there is potential for contamination of groundwater due to infiltration.	Item 1 is yes.
10	If any answer from row 4-7 is yes, infiltration is **permissible but is not presumed to be feasible for the entire DCV.** Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply. Provide basis:	
11	If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable.	

Worksheet J: Summary of Harvested Water Demand and Feasibility – Overall Project Site

1	What demands for harvested water exist in the tributary area (check all that apply):			
2	Toilet and urinal flushing		☒	
3	Landscape irrigation		☒	
4	Other:		☐	
5	What is the design capture storm depth? (Figure III.1)	d	0.90	inches
6	What is the project size?	A	242.64	ac
7	What is the acreage of impervious area?	IA	152.99	ac
	For projects with multiple types of demand (toilet flushing, irrigation demand, and/or other demand)			
8	What is the minimum use required for partial capture? (Table X.6)	111,683		gpd
9	What is the project estimated wet season total daily use (Section X.2)?	30,690		gpd
10	Is partial capture potentially feasible? (Line 9 > Line 8?)	No		
	For projects with only toilet flushing demand			
11	What is the minimum TUTIA for partial capture? (Table X.7)	16,829		users
12	What is the project estimated TUTIA?	21,013		users
13	Is partial capture potentially feasible? (Line 12 > Line 11?)	No		
	For projects with only irrigation demand			
14	What is the minimum irrigation area required based on conservation landscape design? (Table X.8)	154.52		ac
15	What is the proposed project irrigated area? (multiply conservation landscaping by 1; multiply active turf by 2)	89.65		ac
16	Is partial capture potentially feasible? (Line 15 > Line 14?)	No		

Provide supporting assumptions and citations for controlling demand calculation:
Item 6 – Based on sum of all DMAs
Item 7 – Based on DMA impervious area
Item 8 – 730 gpd x 152.99 ac = **111,683 gpd**
Item 9 – 9.3 x (1,100 x 3 residents min) = **30,690 gpd**
Item 11 – Per Table X.7, minim TUTIA ratio = 110 users/acre x 152.99 acres = **16,829 users**
Item 12 – Per Table X.1 Total use = 9.3 use x (1,100 units x 3 residents min) = 30,690 users. Adjusting value to account for assumption that at least 75% of residents are either at school or work for 10 hours of the day and 25% remain home: Onsite: 30,690 users X (0.25) = 7,673 users at home daily; remaining 23,017 users X 0.58 days (14 hours) = 13,350 users. Estimated total users = 7,673 users + 13,350 users = **21,023 users**
Item 14 – Min. irrigation area for conservation landscape (K_L= 0.35) = 1.01 x 152.99 ac = **154.52 ac**
Item 15 – Proposed irrigated area = 89.65 ac x 1 = **89.65 ac** (HOA/landscape slopes).

Worksheet B: Simple Design Capture Volume Sizing Method

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.90	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.90	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	See table below	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=		
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=		
4	Calculate runoff volume, $V_{design}= (C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=		cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII)	$K_{measured}$=	N/A	In/hr
2	Enter combined safety factor from Worksheet H, $S_{Preliminary}$ (unitless)	$S_{Preliminary}$=	N/A	
3	Calculate design infiltration rate, $K_{design} = K_{measured} / S_{Preliminary}$	K_{design}=	N/A	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	N/A	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	N/A	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	N/A	sq-ft
Calculations				

DMA	ACRES	IMP	C-Value	D_{BMP} (IN)	DCV_{SIMPLE} (FT^3)
1	11.02	0.5	0.525	0.90	18,901.2
2	2.18	0.8	0.750	0.90	5,341.5
3	1.97	0.8	0.750	0.90	4,827.0
4	10.50	0.8	0.750	0.90	25,727.6
5	25.47	0.65	0.638	0.90	53,046.7
6	38.67	0.8	0.750	0.90	94,751.2
7	0.78	0.85	0.788	0.90	2,006.8
8	0.55	0.85	0.788	0.90	1,415.0
9	0.26	0.85	0.788	0.90	668.9
10	0.43	0.85	0.788	0.90	1,106.3
11	0.79	0.85	0.788	0.90	2,032.5
12	26.66	0.5	0.525	0.90	45,726.6
13	51.62	0.5	0.525	0.90	88,537.3
14	2.90	0.65	0.638	0.90	6,039.9

15	2.36	0.65	0.638	0.90	4,915.2	
16	0.17	0.85	0.788	0.90	437.4	
17	0.81	0.65	0.638	0.90	1,687.0	
18	0.80	0.85	0.788	0.90	2,058.2	
19	0.33	0.85	0.788	0.90	849.0	
20	2.78	0.65	0.638	0.90	5,789.9	
21	1.52	0.15	0.263	0.90	1,303.5	
22	1.12	0.65	0.638	0.90	2,332.6	
23	0.80	0.65	0.638	0.90	1,666.2	
24	1.44	0.65	0.638	0.90	2,999.1	
25	3.21	0.65	0.638	0.90	6,685.5	
26	1.53	0.5	0.525	0.90	2,624.2	
27	2.30	0.65	0.638	0.90	4,790.2	
28	0.18	0.85	0.788	0.90	463.1	
29	2.07	0.65	0.638	0.90	4,311.2	
30	1.88	0.65	0.638	0.90	3,915.5	
31	0.49	0.5	0.525	0.90	840.4	
32	1.40	0.5	0.525	0.90	2,401.2	
33	0.67	0.8	0.750	0.90	1,641.7	
34	3.66	0.5	0.525	0.90	6,277.5	
35	0.63	0.5	0.525	0.90	1,080.6	
36	9.86	0.5	0.525	0.90	16,911.6	
37	1.64	0.65	0.638	0.90	3,415.6	
38	1.43	0.65	0.638	0.90	2,978.3	
39	2.83	0.65	0.638	0.90	5,894.1	
40	1.59	0.65	0.638	0.90	3,311.5	
41	20.12	0.8	0.750	0.90	49,299.0	
42	0.82	0.65	0.638	0.90	1,707.8	
43	0.56	0.65	0.638	0.90	1,166.3	

Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See Appendix IV.2)	T_c=	See Table Below	
2	Using Figure III.4, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=		in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (Worksheet A)	Y_2=	0	%
5	Using Figure III.4, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	
6	Determine the design intensity that must be provided by BMP $I_{design} = I_1 - I_2$	I_{design}=	See Table Below	
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), A (acres)	A=	See Table Below	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=		
3	Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$	C=		
4	Calculate design flow rate, $Q_{design} = (C \times i_{design} \times A)$	Q_{design}=		cfs
Supporting Calculations				

Describe system:

DMA	ACRES	IMP	C-Value	I_{BMP} (IN/HR)	Q_{BMP} (CFS)
1	11.02	0.5	0.525	0.24	1.39
2	2.18	0.8	0.750	0.24	0.39
3	1.97	0.8	0.750	0.25	0.37
4	10.50	0.8	0.750	0.24	1.89
5	25.47	0.65	0.638	0.24	3.90
6	38.67	0.8	0.750	0.24	6.96
7	0.78	0.85	0.788	0.25	0.15
8	0.55	0.85	0.788	0.25	0.11
9	0.26	0.85	0.788	0.25	0.05
10	0.43	0.85	0.788	0.25	0.08
11	0.79	0.85	0.788	0.25	0.16
12	26.66	0.5	0.525	0.24	3.36
13	51.62	0.5	0.525	0.24	6.50
14	2.90	0.65	0.638	0.25	0.46
15	2.36	0.65	0.638	0.25	0.38

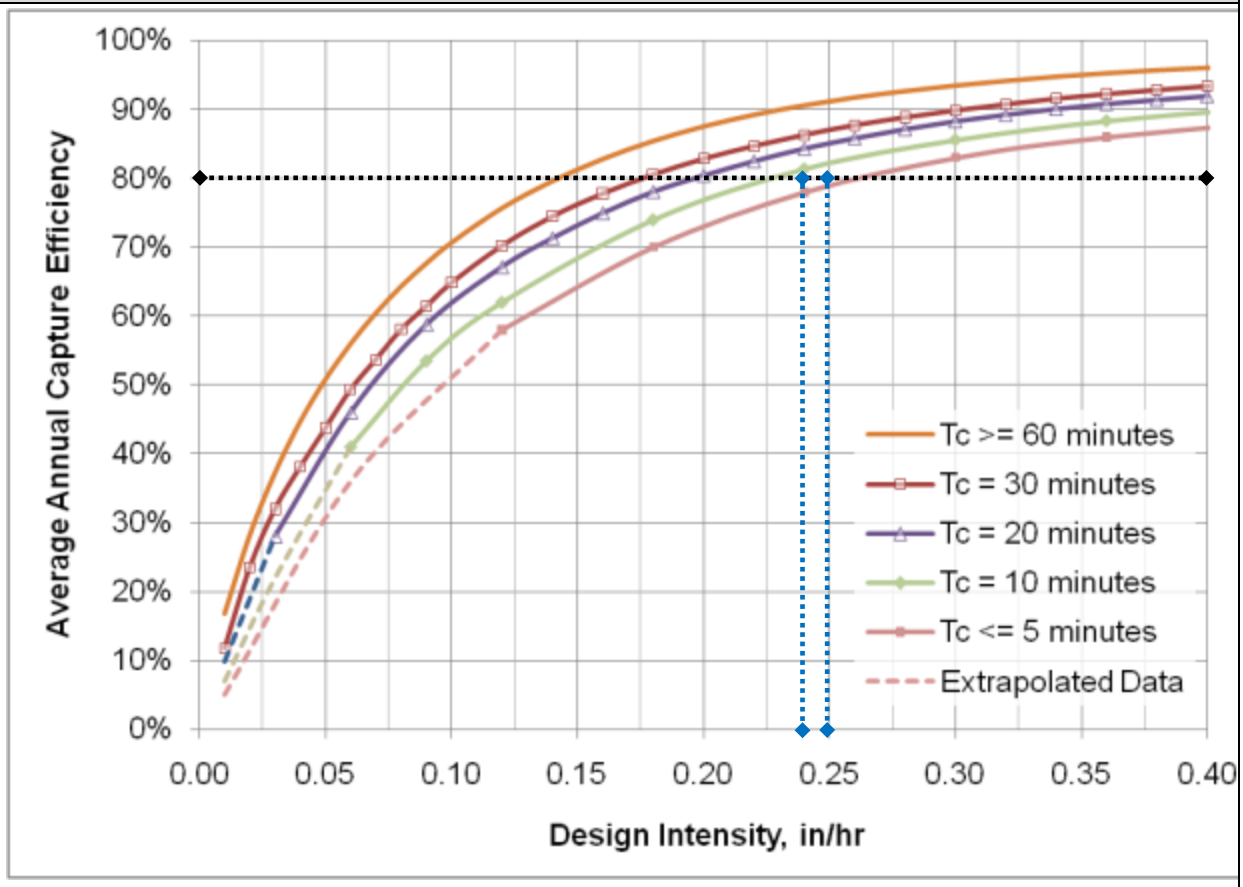
Worksheet D: Capture Efficiency Method for Flow-Based BMPs

16	0.17	0.85	0.788	0.25	0.03
17	0.81	0.65	0.638	0.25	0.13
18	0.80	0.85	0.788	0.25	0.16
19	0.33	0.85	0.788	0.25	0.06
20	2.78	0.65	0.638	0.25	0.44
21	1.52	0.15	0.263	0.25	0.10
22	1.12	0.65	0.638	0.25	0.18
23	0.80	0.65	0.638	0.25	0.13
24	1.44	0.65	0.638	0.25	0.23
25	3.21	0.65	0.638	0.25	0.51
26	1.53	0.5	0.525	0.25	0.20
27	2.30	0.65	0.638	0.25	0.37
28	0.18	0.85	0.788	0.25	0.04
29	2.07	0.65	0.638	0.25	0.33
30	1.88	0.65	0.638	0.25	0.30
31	0.49	0.5	0.525	0.25	0.06
32	1.40	0.5	0.525	0.25	0.18
33	0.67	0.8	0.750	0.25	0.13
34	3.66	0.5	0.525	0.25	0.48
35	0.63	0.5	0.525	0.25	0.08
36	9.86	0.5	0.525	0.24	1.24
37	1.64	0.65	0.638	0.25	0.26
38	1.43	0.65	0.638	0.25	0.23
39	2.83	0.65	0.638	0.25	0.45
40	1.59	0.65	0.638	0.25	0.25
41	20.12	0.8	0.750	0.24	3.62
42	0.82	0.65	0.638	0.25	0.13
43	0.56	0.65	0.638	0.25	0.09
Total	242.80		--	--	36.57

Provide time of concentration assumptions: For small DMAs, assume maximum Tc of 5 mins, followed by 7.5 mins for larger DMAs.

Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Graphical Operations



BMP Details

BIO-1 Bioretention with Underdrains

XIV.5. Biotreatment BMP Fact Sheets (BIO)

Conceptual criteria for biotreatment BMP selection, design, and maintenance are contained in **Appendix XII**. These criteria are generally applicable to the design of biotreatment BMPs in Orange County and BMP-specific guidance is provided in the following fact sheets.

*Note: Biotreatment BMPs shall be designed to provide the maximum feasible infiltration and ET based on criteria contained in **Appendix XI.2**.*

BIO-1: Bioretention with Underdrains

Also known as:

- *Rain gardens with underdrains*
- *Vegetated media filter*
- *Downspout planter boxes*



Bioretention
Source: Geosyntec Consultants

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, planting soils, and plants. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants. Bioretention with an underdrain are utilized for areas with low permeability native soils or steep slopes where the underdrain system that routes the treated runoff to the storm drain system rather than depending entirely on infiltration. **Bioretention must be designed without an underdrain** in areas of high soil permeability.

Feasibility Screening

Considerations

- If there are no hazards associated with infiltration (such as groundwater concerns, contaminant plumes or geotechnical concerns), **bioinfiltration facilities**, which achieve partial infiltration, should be used to maximize infiltration.
- Bioretention with underdrain facilities should be lined if contaminant plumes or geotechnical concerns exist. If high groundwater is the reason for infiltration infeasibility, bioretention facilities with underdrains do not need to be lined.

Opportunity Criteria

- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Bioretention may also be applied in parking lot islands, cul-de-sacs, traffic circles, road shoulders, road medians, and next to buildings in planter boxes.
- Drainage area is ≤ 5 acres.
- Area is available for infiltration.

- Site must have adequate relief between land surface and the stormwater conveyance system to permit vertical percolation through the soil media and collection and conveyance in underdrain to stormwater conveyance system.

OC-Specific Design Criteria and Considerations

- ☐ Ponding depth should not exceed 18 inches; fencing may be required if ponding depth is greater than 6 inches to mitigate drowning.
- ☐ The minimum soil depth is 2 feet (3 feet is preferred).
- ☐ The maximum drawdown time of the bioretention ponding area is 48 hours. The maximum drawdown time of the planting media and gravel drainage layer is 96 hours, if applicable.
- ☐ Infiltration pathways may need to be restricted due to the close proximity of roads, foundations, or other infrastructure. A geomembrane liner, or other equivalent water proofing, may be placed along the vertical walls to reduce lateral flows. This liner should have a minimum thickness of 30 mils.
- ☐ If infiltration in bioretention location is hazardous due to groundwater or geotechnical concerns, a geomembrane liner must be installed at the base of the bioretention facility. This liner should have a minimum thickness of 30 mils.
- ☐ The planting media placed in the cell shall be designed per the recommendations contained in MISC-1: Planting/Storage Media
- ☐ Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours; native place species and/or hardy cultivars that are not invasive and do not require chemical inputs should be used to the maximum extent feasible
- ☐ The bioretention area should be covered with 2-4 inches (average 3 inches) or mulch at the start and an additional placement of 1-2 inches of mulch should be added annually.
- ☐ Underdrain should be sized with a 6 inch minimum diameter and have a 0.5% minimum slope. Underdrain should be slotted polyvinyl chloride (PVC) pipe; underdrain pipe should be more than 5 feet from tree locations (if space allows).
- ☐ A gravel blanket or bedding is required for the underdrain pipe(s). At least 0.5 feet of washed aggregate must be placed below, to the top, and to the sides of the underdrain pipe(s).
- ☐ An overflow device is required at the top of the bioretention area ponding depth.
- ☐ Dispersed flow or energy dissipation (i.e. splash rocks) for piped inlets should be provided at basin inlet to prevent erosion.
- ☐ Ponding area side slopes shall be no steeper than 3:1 (H:V) unless designed as a planter box BMP with appropriate consideration for trip and fall hazards.

Simple Sizing Method for Bioretention with Underdrain

If the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** is used to size a bioretention with underdrain facility, the user selects the basin depth and then determines the appropriate surface area to capture the DCV. The sizing steps are as follows:

Step 1: Determine DCV

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

Step 2: Verify that the Ponding Depth will Draw Down within 48 Hours

The ponding area drawdown time can be calculated using the following equation:

$DD_P = (d_P / K_{MEDIA}) \times 12$ in/

ft Where:

DD_P = time to drain ponded water, hours

d_P = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

K_{MEDIA} = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; K_{MEDIA} of 2.5 in/hr should be used unless other information is available)

If the drawdown time exceeds 48 hours, adjust ponding depth and/or media infiltration rate until 48 hour drawdown time is achieved.

Step 3: Determine the Depth of Water Filtered During Design Capture Storm

The depth of water filtered during the design capture storm can be estimated as the amount routed through the media during the storm, or the ponding depth, whichever is smaller.

$d_{FILTERED}$ = Minimum [$((K_{MEDIA} \times T_{ROUTING})/12)$, d_P]

Where:

$d_{FILTERED}$ = depth of water that may be considered to be filtered during the design storm event, ft

K_{MEDIA} = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; K_{MEDIA} of 2.5 in/hr should be used unless other information is available)

$T_{ROUTING}$ = storm duration that may be assumed for routing calculations; this should be assumed to be no greater than 3 hours. If the designer desires to account for further routing effects, the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) should be used.

d_P = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

Step 4: Determine the Facility Surface Area

$A = DCV / (d_P + d_{FILTERED})$

Where:

A = required area of bioretention facility, sq-ft

DCV = design capture volume, cu-ft

$d_{FILTERED}$ = depth of water that may be considered to be filtered during the design storm event, ft

d_P = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

Capture Efficiency Method for Bioretention with Underdrains

If the bioretention geometry has already been defined and the user wishes to account more explicitly for routing, the user can determine the required footprint area using the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

Step 1: Determine the drawdown time associated with the selected basin geometry

$DD = (d_p / K_{DESIGN}) \times 12$ in/ft

Where:

DD = time to completely drain infiltration basin ponding depth, hours

d_P = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

K_{DESIGN} = design media infiltration rate, in/hr (assume 2.5 inches per hour unless otherwise proposed)

If drawdown is less than 3 hours, the drawdown time should be rounded to 3 hours or the Capture Efficiency Method for Flow-based BMPs (See **Appendix III.3.3**) shall be used.

Step 2: Determine the Required Adjusted DCV for this Drawdown Time

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to calculate the fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the basin drawdown time calculated above.

Step 3: Determine the Basin Infiltrating Area Needed

The required infiltrating area (i.e. the surface area of the top of the media layer) can be calculated using the following equation:

A = Design Volume / d_p

Where:

A = required infiltrating area, sq-ft (measured at the media surface)

Design Volume = fraction of DCV, adjusted for drawdown, cu-ft (see Step 2)

d_p = ponding depth of water stored in bioretention area, ft (from Step 1)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint. If the area required is greater than the selected basin area, adjust surface area or adjust ponding depth and recalculate required area until the required area is achieved.

Configuration for Use in a Treatment Train

- Bioretention areas may be preceeded in a treatment train by HSCs in the drainage area, which would reduce the required design volume of the bioretention cell. For example, bioretention could be used to manage overflow from a cistern.
- Bioretention areas can be used to provide pretreatment for underground infiltration systems.

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment: http://www.cabmphandbooks.com/Documents/Development/TC-32.pdf
- SMC LID Manual (pp 68): http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 5: http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf
- San Diego County LID Handbook Appendix 4 (Factsheet 7): http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf

  Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850
- County of Los Angeles Low Impact Development Standards Manual, Chapter 5: http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf

BIO-7 Proprietary Biotreatment

BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

Also known as:

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*



Proprietary biotreatment
Source: http://www.americastusa.com /index.php/filterra/

Feasibility Screening Considerations

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

Opportunity Criteria

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

OC-Specific Design Criteria and Considerations

☐ Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.

☐ Consult proprietors for specific criteria concerning the design and performance.

☐ Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.

☐ Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☐ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

Computing Sizing Criteria for Proprietary Biotreatment Device

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3)**.

Additional References for Design Guidance

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

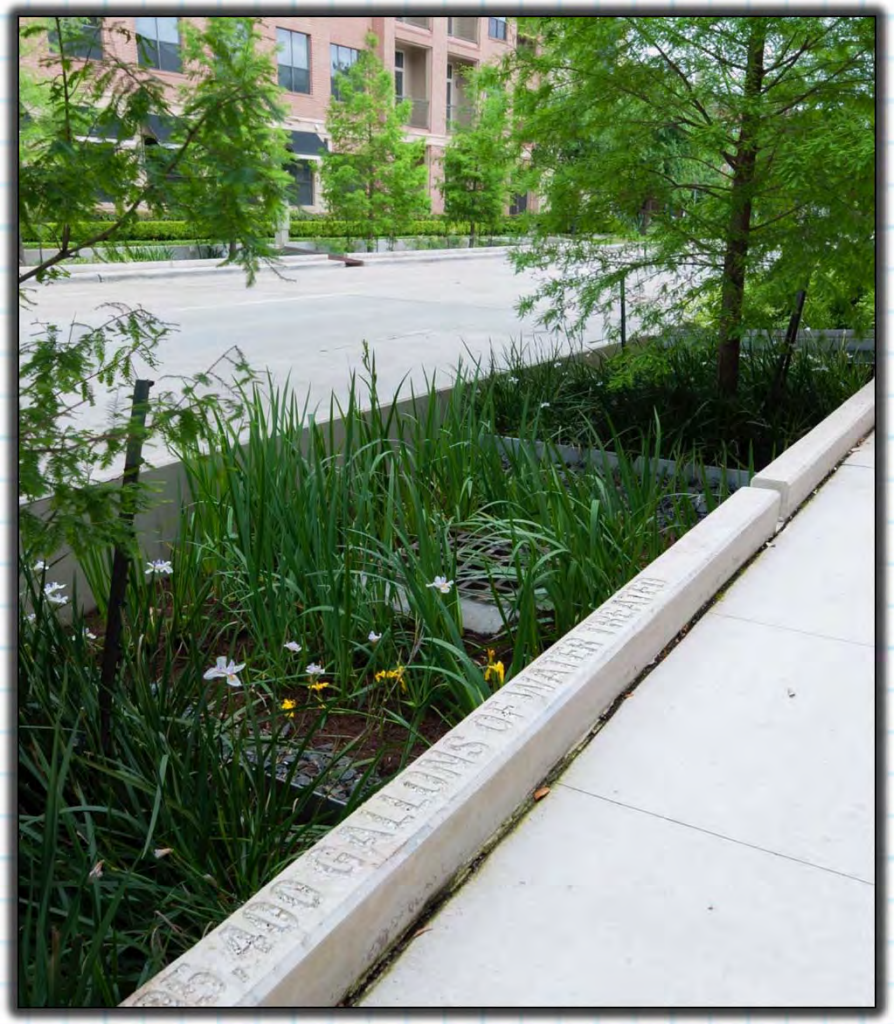
Proprietary Biotreatment Alternatives (Focal Point, Filterra, Modular Wetland System)

FocalPoint
BIOFILTRATION SYSTEMS

Next Generation Bioretention

High Performance Modular System





- **Reduced Infrastructure Cost**
- **Reduced Overall Maintenance Cost**

ACF ENVIRONMENTAL
LET'S GET IT DONE

FocalPoint Scalable Biofiltration System Application Concepts:

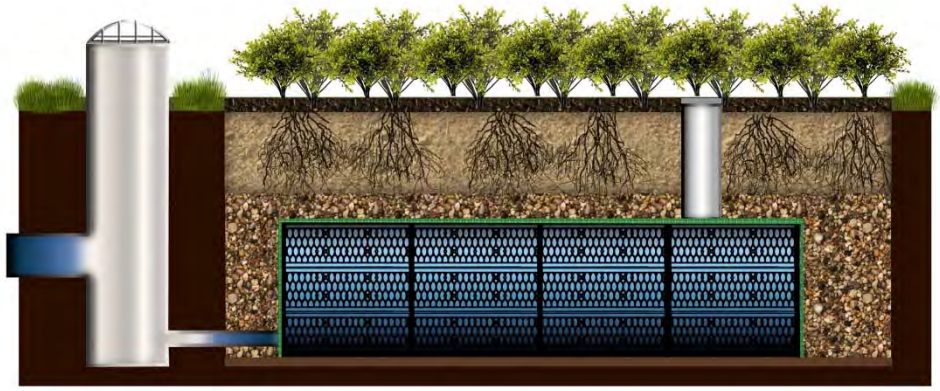
- ***Traditional SWM***
- ***Green Infrastructure***
- ***Low Impact Development***



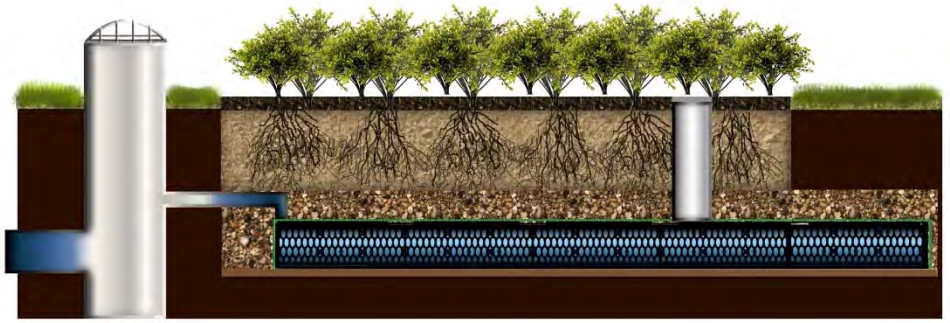


FocalPoint
BIOFILTRATION SYSTEMS

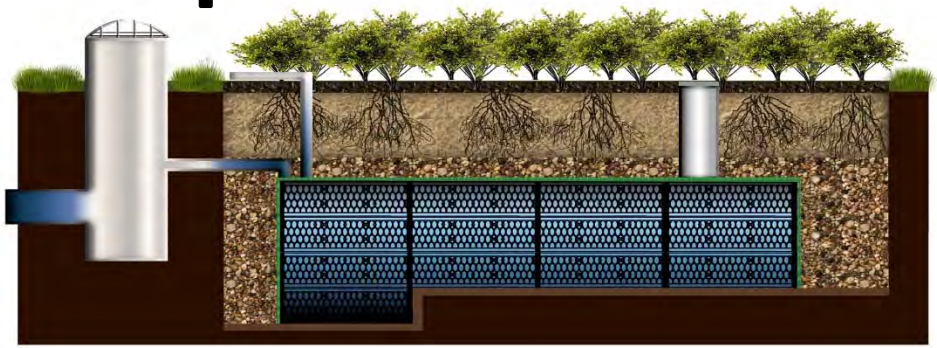
FocalPoint HPMBS gives designers maximum flexibility in meeting both water quality and water volume requirements!



Expanded Detention



Expanded Infiltration

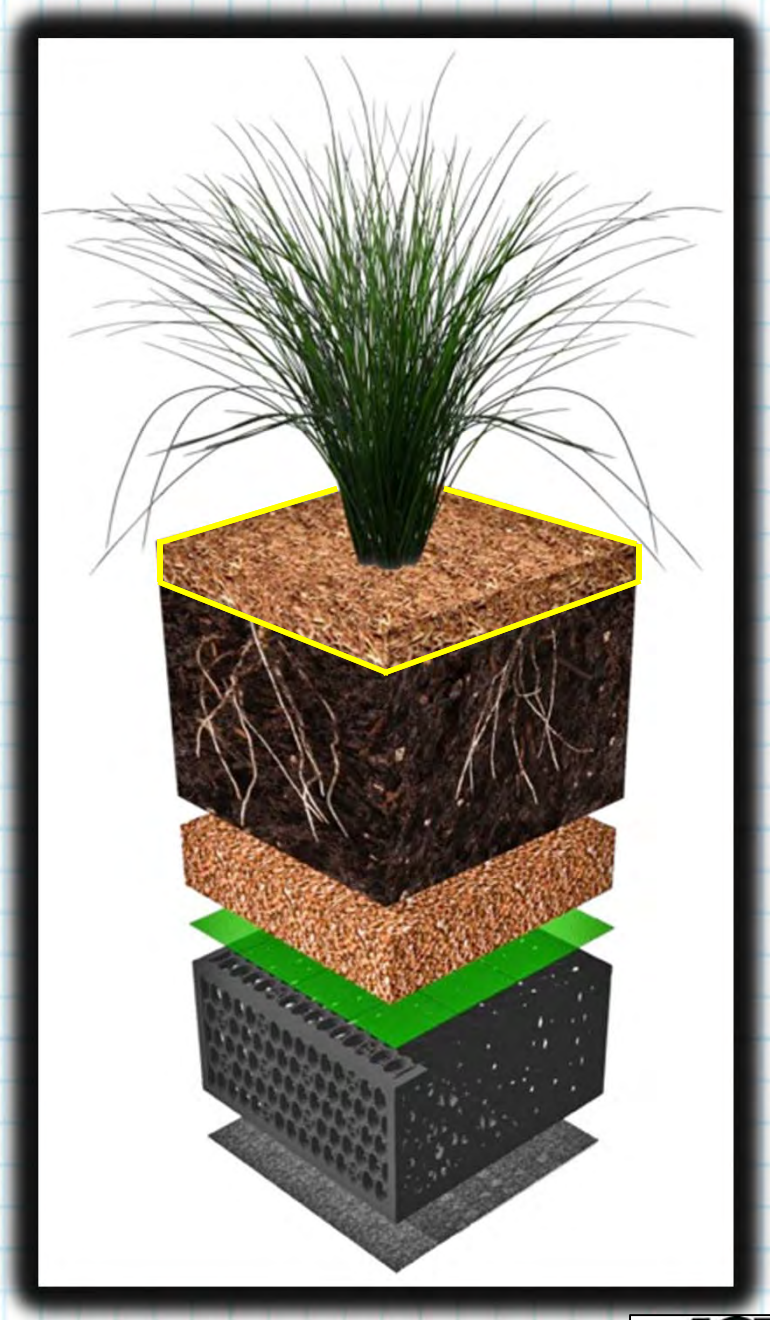


Rain Water Harvesting

FocalPoint
BIOFILTRATION SYSTEMS

3” Layer of Shredded Hardwood Mulch:

- Acts as pre-treatment mechanism to capture silt, sediment and certain pollutants.
- Removal and replacement of mulch represents the bulk of system maintenance!



ACF ENVIRONMENTAL
LET'S GET IT DONE

18” High Performance Media:

- Flows at 100” Per Hour!
- Flows Faster With Age as Root System Grows
- Resistant to Clogging

Pollutant Removal:

- TSS = 91%
- Nitrogen = 48%
- Phosphorus = 66%



FocalPoint
BIOFILTRATION SYSTEMS

Quality Assurance/ Quality Control (QA/QC):



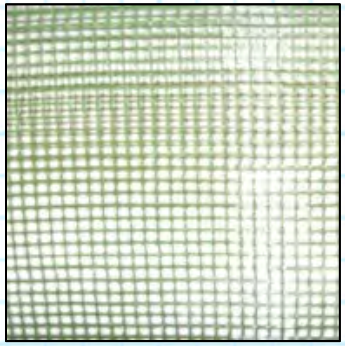
- All Components of the FocalPoint System are sold as a bundle to provide raw material quality control.
- Media Certification
- Performance Guarantee backed with In-Situ Testing at Time of Install and One Year Later!



ACF ENVIRONMENTAL

6” Bridging Stone & Separation Layer:





Clean Stone & Micro-Mesh Replace Traditional Geotextile Layer



No Geotextile = No Clogging



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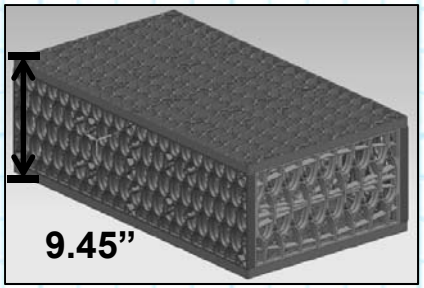
LET'S GET IT DONE

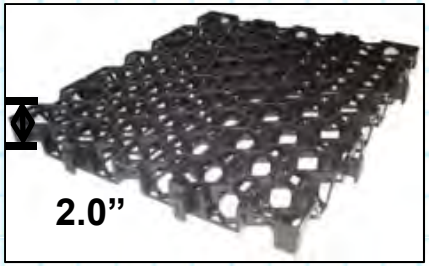
High Performance Underdrain:

9.45” Modular Tank, or “Flat Pipe” w/95% Open Surface Collects Water Efficiently.



System Depth 36

2” Low-Profile Panel Addresses Shallow Applications.



System Depth 29

Expand into Modular Tanks for Larger Storage Needs.





FocalPoint Maintenance Manual:

Provides Comprehensive Guidance & Record Keeping Tools.

1st Year of Maintenance Included!



Pick Up Trash

Remove & Replace Mulch

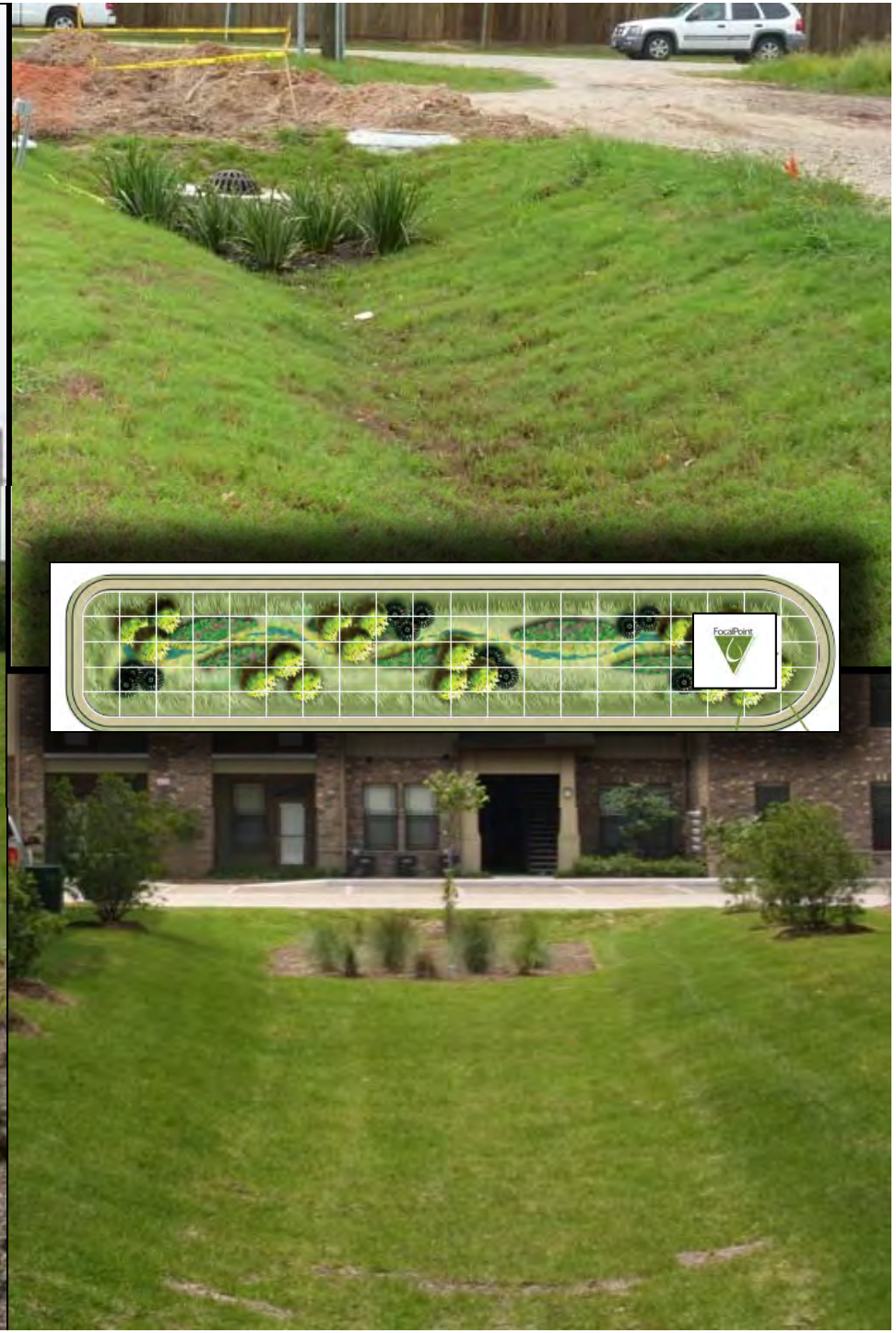


Clean Sediment Entry Points



Design With A Low Cost and Easy to Maintain Surface Depression to Implement Low Impact Development:





Example Applications:



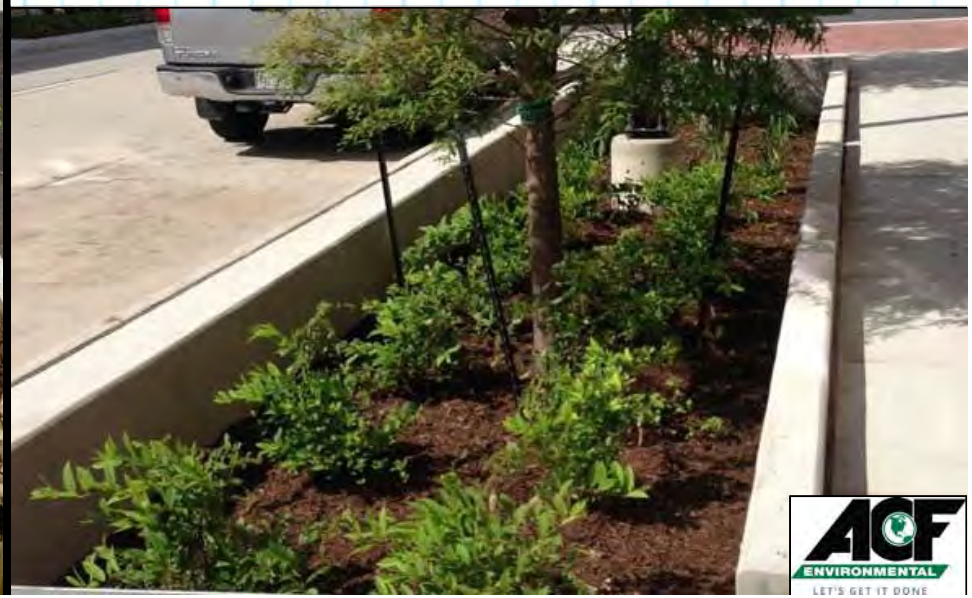


Highway

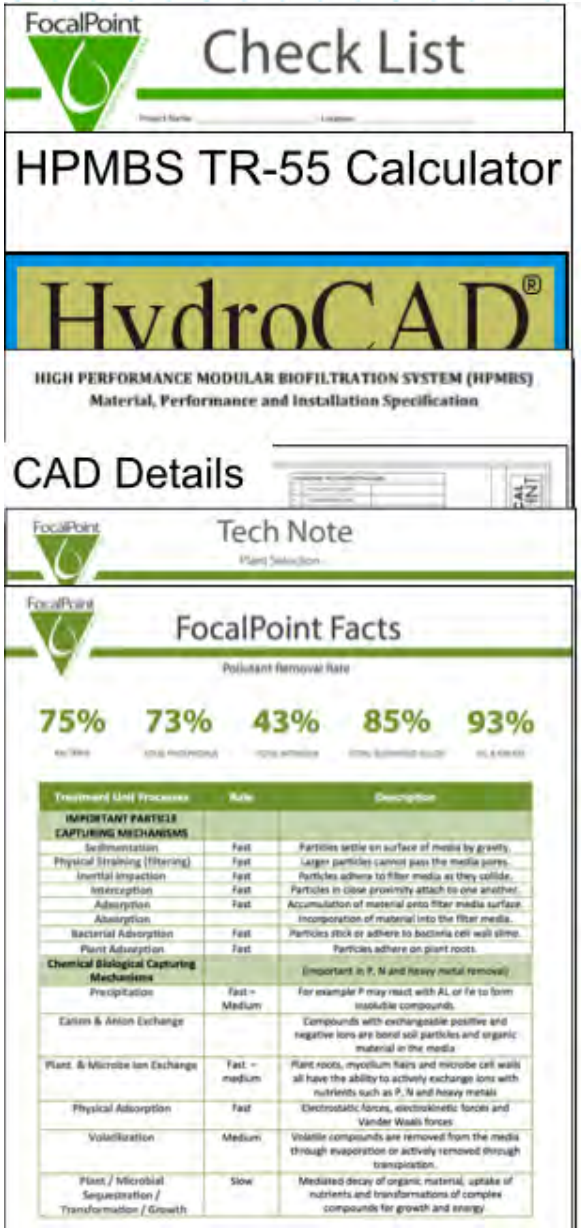
Parking Lots



Urban retrofit



ACF's Engineering team can provide project specific support or you can access the tools below:



- Specifications
- Calculator
- CAD Details
- Flow Rate & Pollutant Removal Documentation
- Media Certification
- Installation & Maintenance Manuals
- Performance Guarantee
- And More!



FOCALPOINT HP PERFORMANCE SPECIFICATION:

HIGH PERFORMANCE MEDIA

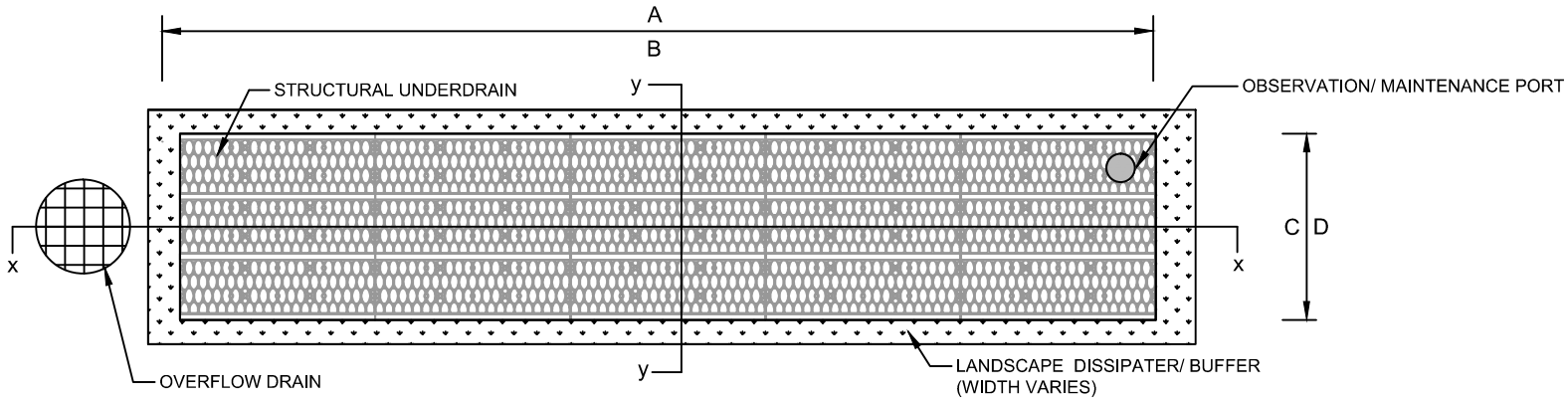
HIGH PERFORMANCE MEDIA MUST MEET A MINIMUM OF 100" PER HOUR INFILTRATION RATE.
FIELD HYDRAULIC CONDUCTIVITY TESTING MUST BE CONDUCTED WITHIN 30 DAYS OF INSTALLATION.
FIELD TEST MUST BE CONDUCTED WITH PROSCRIBED INFILTROMETER AND SOP (SEE SPECIFICATION).
FAILURE TO MEET FIELD TESTING WILL RESULT IN THE REMOVAL OF MEDIA AND REPLACEMENT FROM ALTERNATE BATCH.

HIGH PERFORMANCE STRUCTURAL UNDERDRAIN

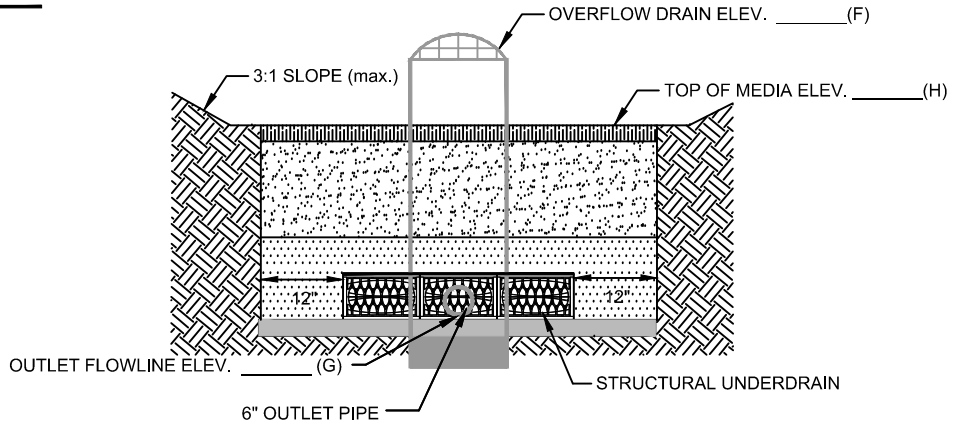
MUST HAVE A MINIMUM OF 19 SQUARE INCHES OF ORIFICE OPENING PER SQUARE FOOT.
MUST MEET H20 LOADING REQUIREMENTS.
MUST BE MODULAR IN NATURE AND ASSEMBLED ON SITE.
MUST HAVE MINIMUM 90% INTERIOR VOID SPACE.

FOCALPOINT HP CONSTRUCTION GUIDE		
A	FOCALPOINT LENGTH	
B	# UNDERDRAIN LONG	
C	FOCALPOINT WIDTH	
D	# UNDERDRAIN WIDE	
E	WATER QUALITY VOLUME	
F	OVERFLOW ELEVATION	
G	OUTLET FLOWLINE	
H	TOP OF MEDIA	
I	TOP OF GABION (OPTIONAL)	

PLAN VIEW



SECTION Y-Y



FOCALPOINT HP CONSTRUCTION GUIDE

FocalPoint BIOFILTRATION SYSTEMS

TO FIND A VALUE ADDED RESELLER IN YOUR AREA VISIT
WWW.CONVERGENTWATER.COM/STORMWATER-PRODUCTS OR CONTACT
CONVERGENT WATER TECHNOLOGIES AT 800.771.5428

CONVERGENT WATER TECHNOLOGIES

FOCALPOINT HP DETAILED CROSS SECTION

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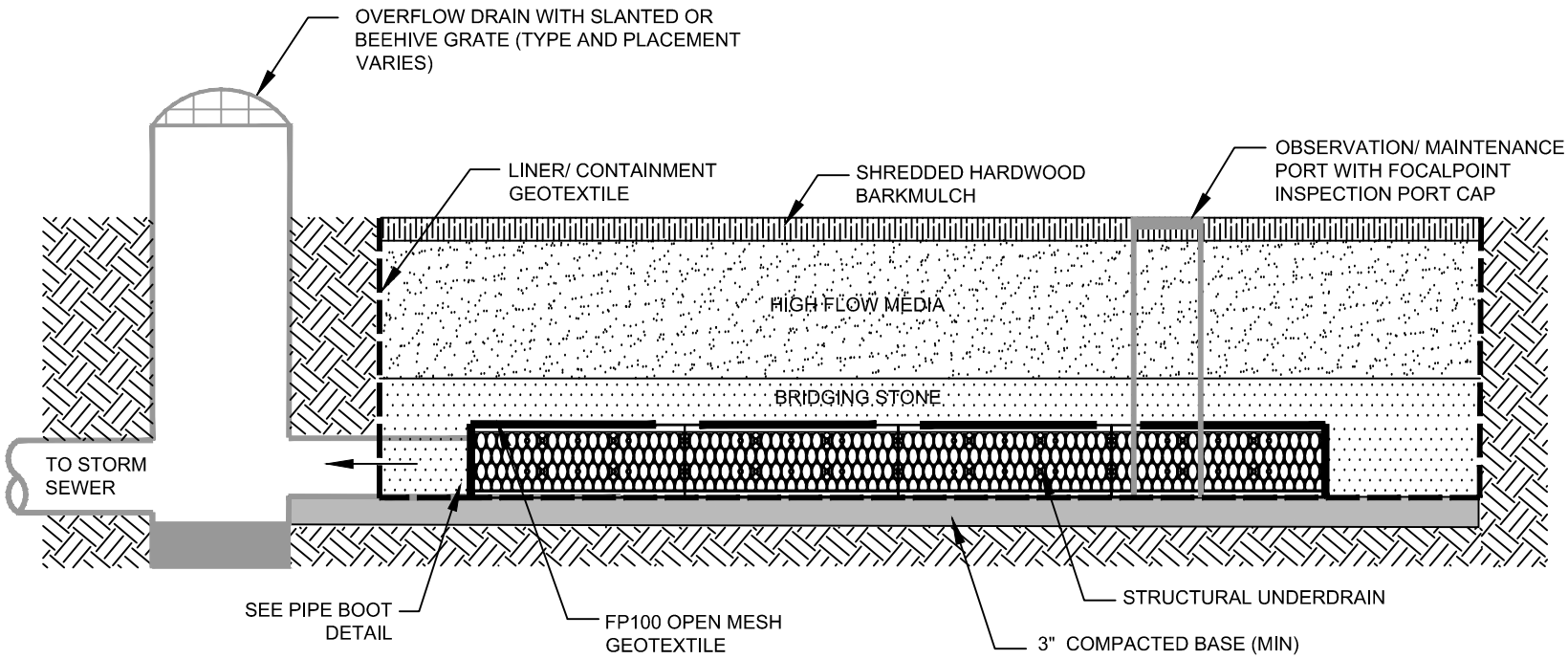
CONVERGENT WATER TECHNOLOGIES

FOCALPOINT HP SECTION X-X



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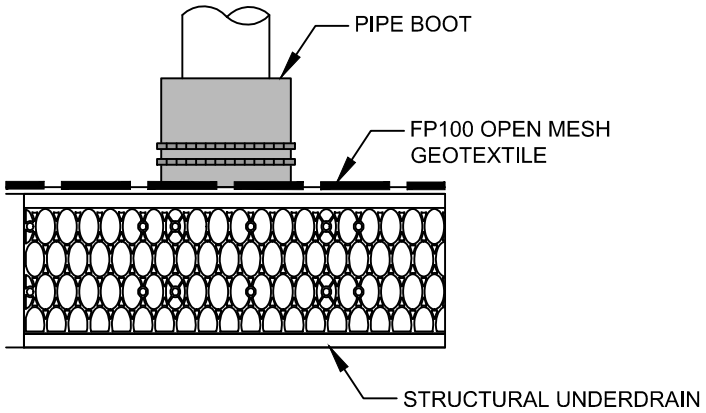
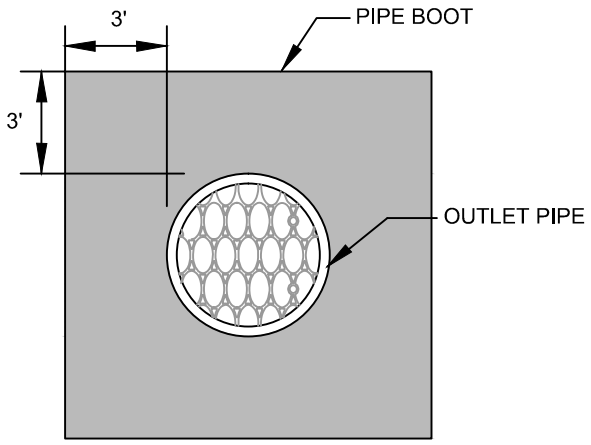
CONVERGENT WATER TECHNOLOGIES AT 800.771.5428

CONVERGENT WATER TECHNOLOGIES

OBSERVATION/ MAINTENANCE PORT CONNECTION

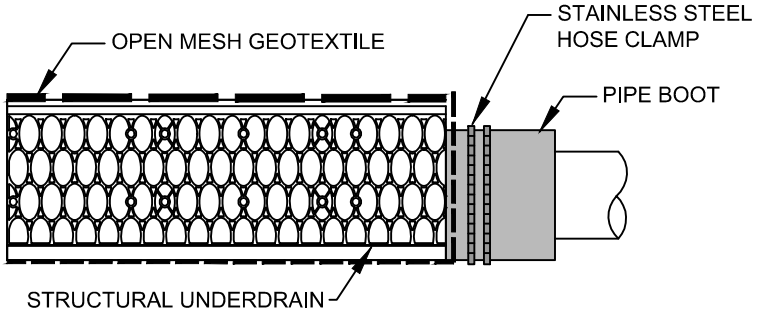


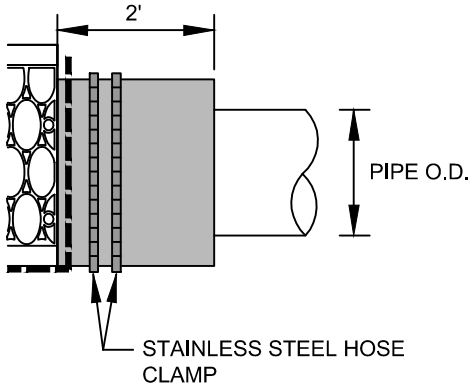
PIPE BOOT DETAIL



FRONT VIEW

OUTLET/ INLET PIPE CONNECTION





SIDE VIEW

FOCALPOINT PIPE CONNECTION

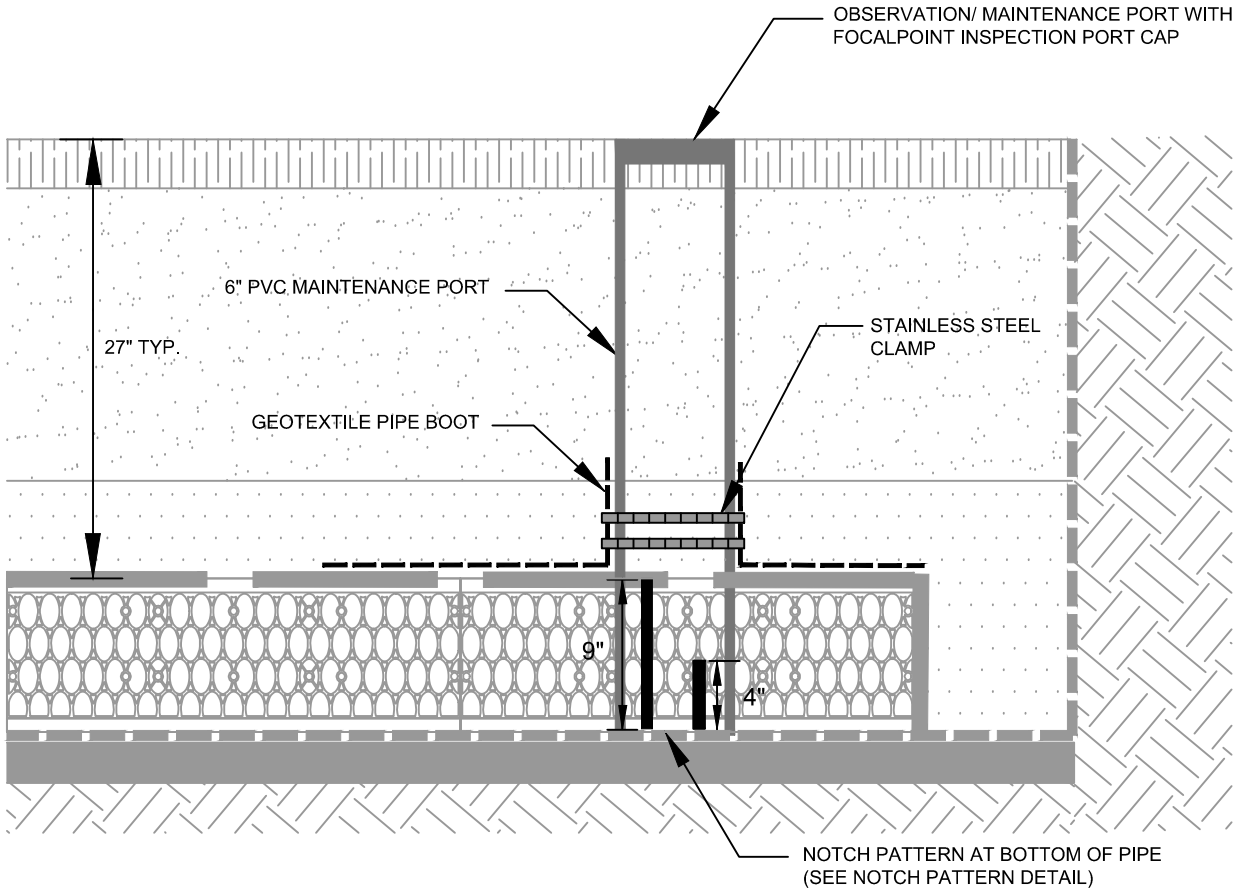
FocalPoint BIOFILTRATION SYSTEMS

TO FIND A VALUE ADDED RESELLER IN YOUR AREA VISIT
WWW.CONVERGENTWATER.COM/STORMWATER-PRODUCTS OR CONTACT
CONVERGENT WATER TECHNOLOGIES AT 800.771.5428

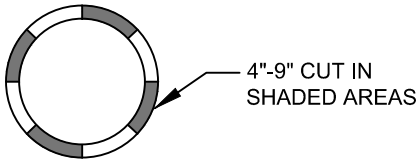
CONVERGENT WATER TECHNOLOGIES

OBSERVATION/ MAINTENANCE PORT

PORT USED FOR INSPECTION PURPOSES AND FOR SYSTEM MAINTENANCE AS REQUIRED. WATER SHALL BE PUMPED INTO THE SYSTEM AND RESUSPEND ACCUMULATED SEDIMENT. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION FOR THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER FLUSH AS NEEDED.



PIPE NOTCH PATTERN DETAIL



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CONTECH®
ENGINEERED SOLUTIONS

Filterra®
High Performance Bioretention



The experts you need to solve your stormwater challenges



Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team



STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.



STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.



REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.



SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.



Low Impact Development in a Small Footprint – Filterra®

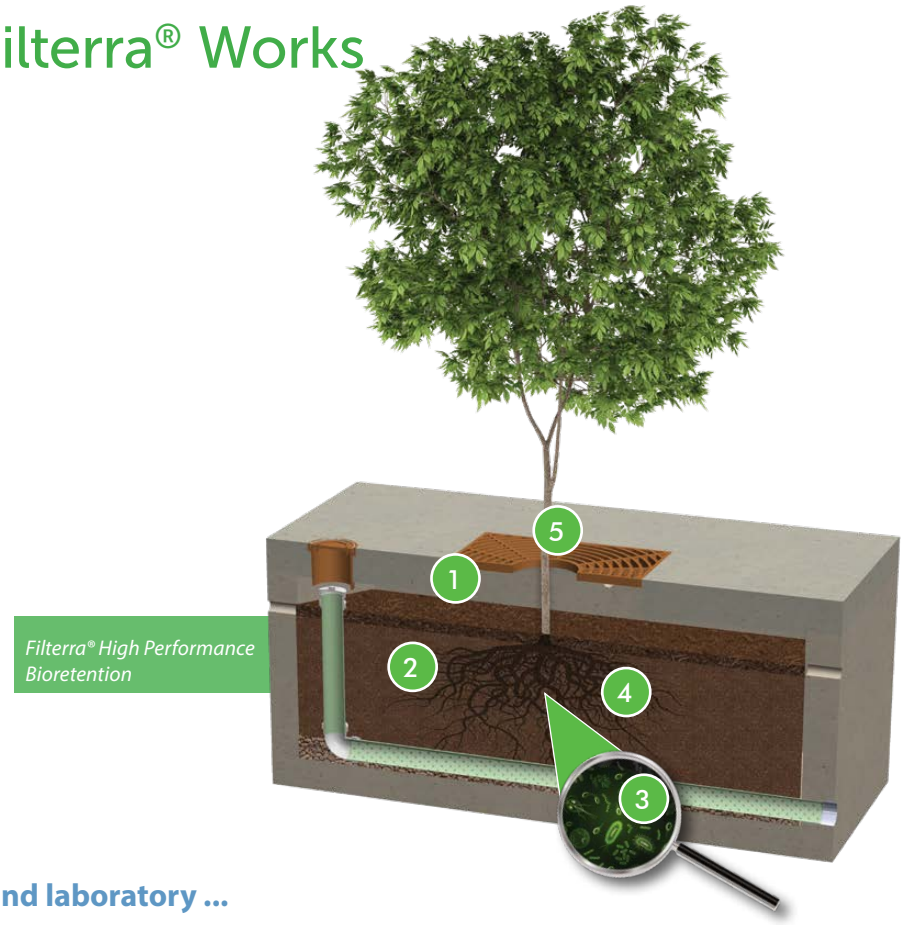
Filterra is an engineered high-performance bioretention system. While it operates similar to traditional bioretention, its high flow media allows for a reduction in footprint of up to 95% versus traditional bioretention practices. Filterra provides a Low Impact Development (LID) solution for tight, highly developed sites such as urban development projects, commercial parking lots, residential streets, and streetscapes. Its small footprint also reduces installation and life cycle costs versus traditional bioretention. Filterra can be configured in many different ways to enhance site aesthetics, integrate with other LID practices, or increase runoff reduction through infiltration below or downstream of the system.

At the Manchester Stormwater Park seen above, the Filterra systems surrounding the central courtyard allowed for the creation of a community space with parking, sidewalks, and benches in a quaint downtown area. A traditional bioretention system treating the same drainage area would have occupied the entire park area leaving no room for these amenities.

filterra® Bioretention Systems

filterra® Bioscape®

How the Filterra® Works



Tested in the field and laboratory ...

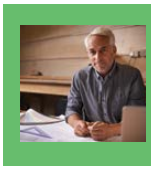
1. Stormwater enters the Filterra through a pipe, curb inlet, or sheet flow and ponds over the pretreatment mulch layer, capturing heavy sediment and debris. Organics and microorganisms within the mulch trap and degrade metals and hydrocarbons. The mulch also provides water retention for the system's vegetation.

2. Stormwater flows through engineered Filterra media which filters fine pollutants and nutrients. Organic material in the media removes dissolved metals and acts as a food source for root-zone microorganisms. Treated water exits through an underdrain pipe or infiltrates (if designed accordingly).

3. Rootzone microorganisms digest and transform pollutants into forms easily absorbed by plants.

4. Plant roots absorb stormwater and pollutants that were transformed by microorganisms, regenerating the media's pollutant removal capacity. The roots grow, provide a hospitable environment for the rootzone microorganisms and penetrate the media, maintaining hydraulic conductivity.

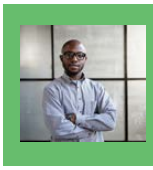
5. The plant trunk and foliage utilize nutrients such as Nitrogen and Phosphorus for plant health, sequester heavy metals into the biomass, and provide evapotranspiration of residual water within the system.



Plants and organic material are vital to the long term performance of bioretention systems

Filterra® Features and Benefits

FEATURE	BENEFITS
High biofiltration media flow rate (up to 175"/hr+)	Greatly reduced footprint versus traditional bioretention and LID solutions
Filterra system is packaged, including all components necessary for system performance	Quality control for easy, fast and successful installation
Quick and easy maintenance	Low lifecycle costs
Variety of configurations and aesthetic options	Integrates easily into any site or landscape plan
Natural stormwater management processes featuring organics and vegetation	Meets Low Impact Development requirements and ensures long-term performance



The Filterra system can be configured with many different aesthetic options

Select Filterra® Approvals

Filterra is approved through numerous local, state and federal verification programs, including:

- New Jersey Department of Environmental Protection (NJ DEP)
- Washington Department of Ecology (GULD) – Basic, Enhanced, Phosphorus, and Oil
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Texas Commission on Environmental Quality (TCEQ)
- Virginia Department of Environmental Quality (VA DEQ)
- Maine Department of Environmental Protection (ME DEP)
- Atlanta, GA Regional Commission
- Los Angeles County, CA - Alternate to Attachment H
- City of Portland, Oregon Bureau of Environmental Services
- North Carolina Department of Environmental Quality (NC DEQ)

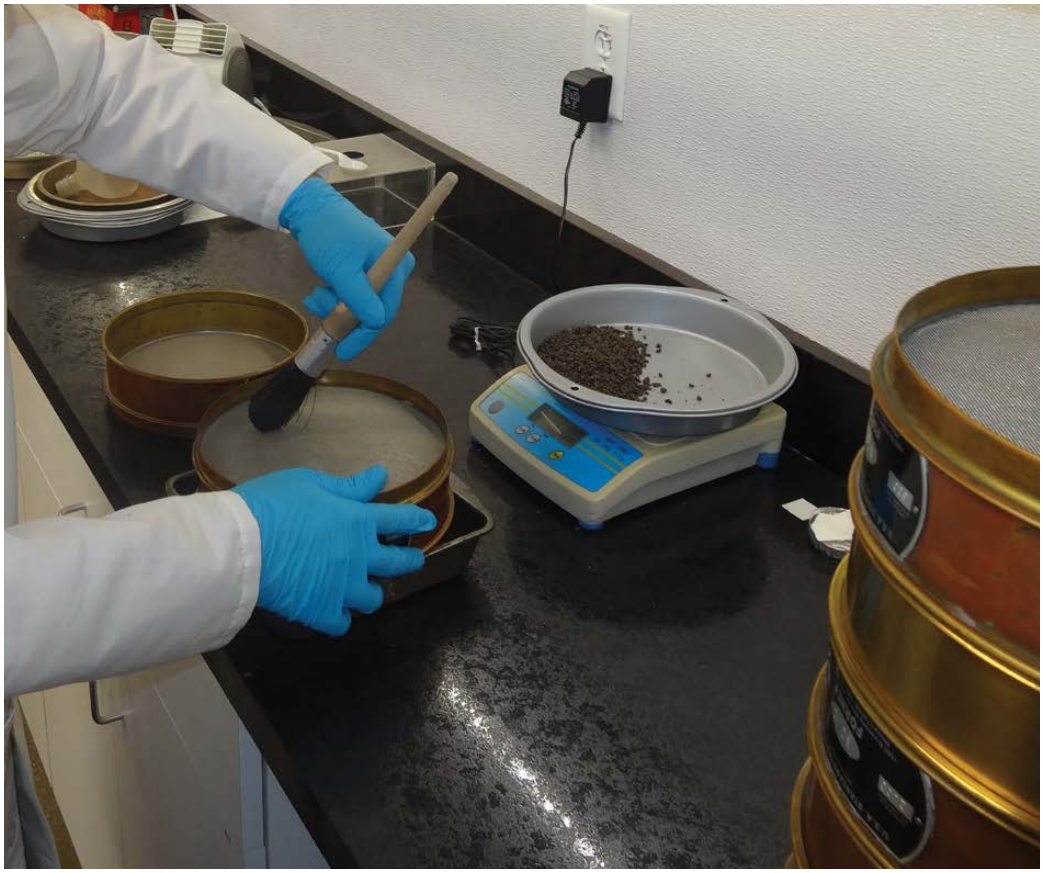


Filterra® Performance Testing Results



APPLICATION TIPS

- The Filterra system has been tested under industry standard protocols and has proven its pollutant removal performance and system longevity.
- Contech invests significant resources in media blending calibration and product testing to ensure our media meets our strict performance specifications every time.
- Keep regulators and owners happy by selecting a product with predictable and proven maintenance longevity.



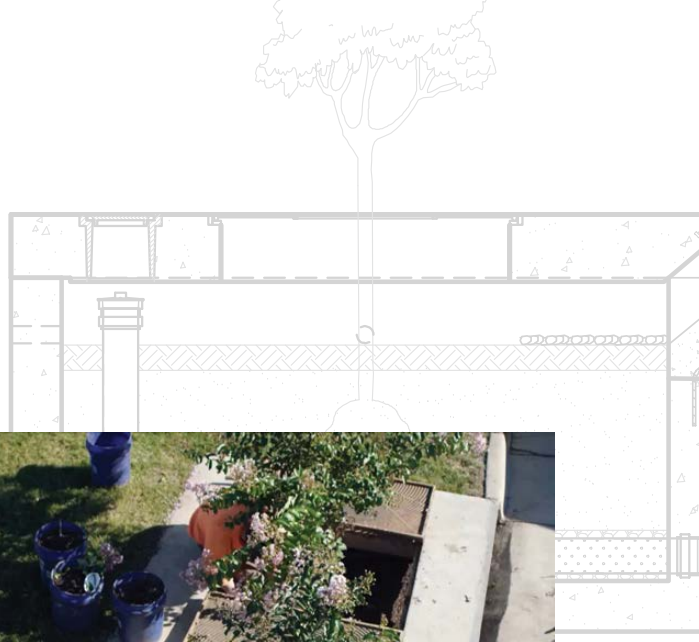
POLLUTANT OF CONCERN	MEDIAN REMOVAL EFFICIENCY	MEDIAN EFFLUENT CONCENTRATION (MG/L)
Total Suspended Solids (TSS)	86%	3.3
Total Phosphorus - TAPE (TP)	70%	0.05
Total Nitrogen (TN)	34%	0.54
Total Copper (TCu)	55%	0.004
Total Dissolved Copper	43%	0.003
Total Zinc (TZn)	56%	0.04
Total Dissolved Zinc	54%	0.1
Total Zinc (TZn)	56%	0.04
Total Petroleum Hydrocarbons	87%	0.71

Each batch of Filterra® media has been extensively tested to ensure consistent performance every time.

Sources:
UVA (TARP) Field Study - 2006
Herrera (TAPE) Study - 2009
Herrera (TAPE) Study - 2014
NC State Study - 2015

Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.

Filterra® Maintenance



Activation and first year of maintenance is included with every system.*

With proper routine maintenance, the engineered media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation.* This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation.

Maintenance is low-cost, low-tech and simple:

- Remove trash, sediment, and mulch
- Replace with a fresh 3" layer of mulch
- No confined space entry or special tools
- Easily performed by landscape contractor or facilities maintenance provider

** Some exclusions may apply.*



Filterra offers high performance bioretention for advanced pollutant removal with easy maintenance.



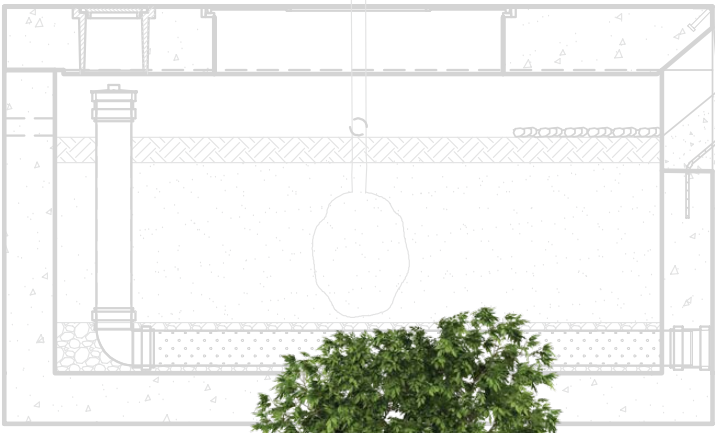
Plant health evaluation and pruning is important to encourage growth.

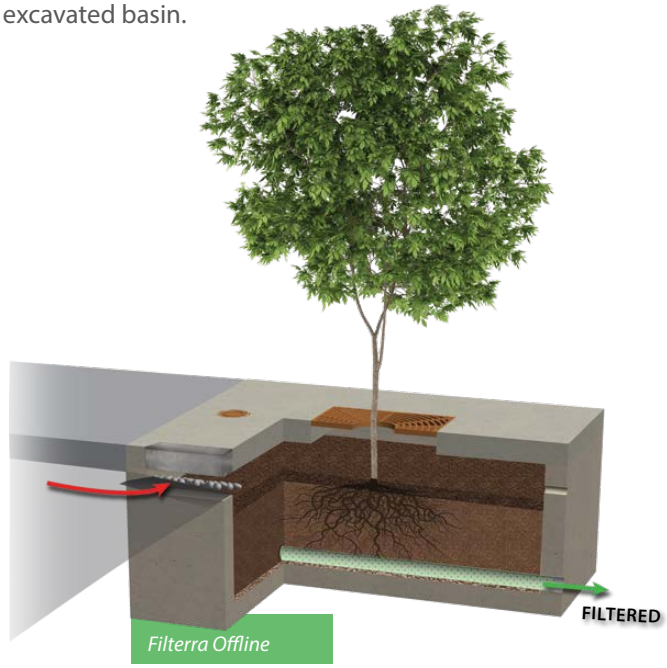
All stormwater treatment systems require maintenance for effective operation.

Filterra® Configurations

Multiple system configurations integrate with site hydraulic design and layout ...

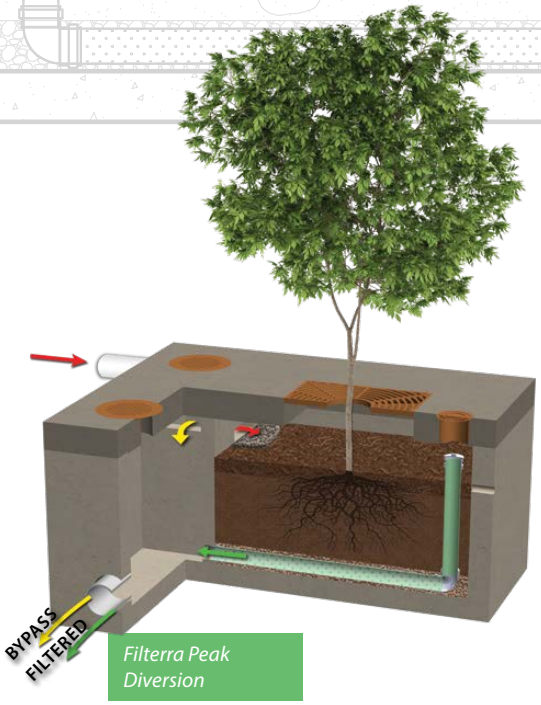
The Filterra is available in a variety of precast configurations as well as Filterra Bioscape, which can be installed directly into an excavated basin.



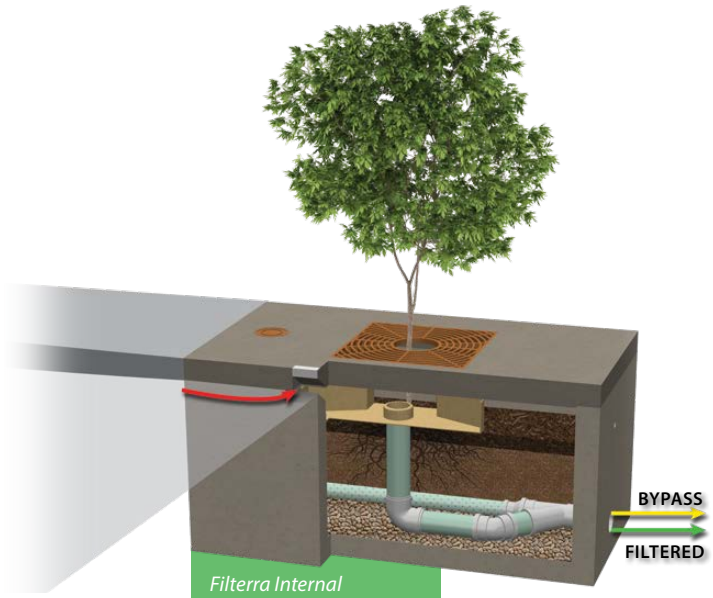


Filterra Offline

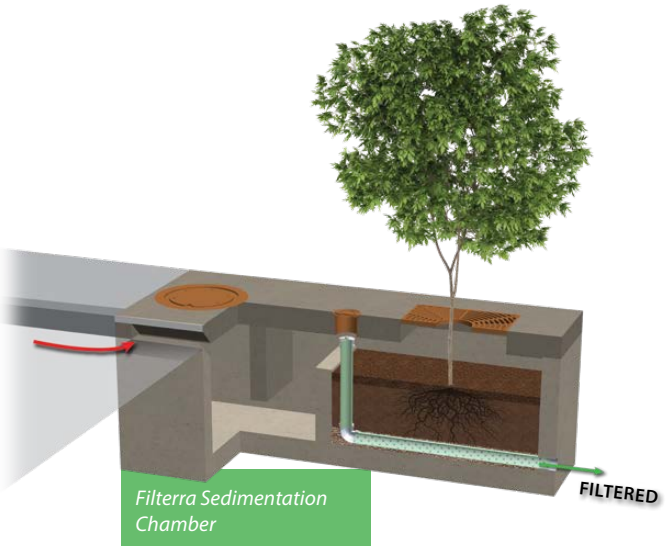
Bypass via downstream catch basin.



Filterra Peak Diversion



Filterra Internal Bypass Curb



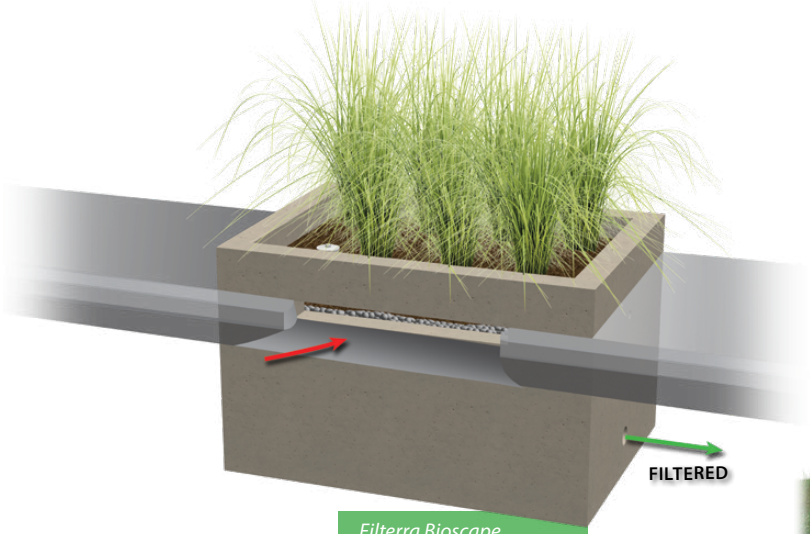
Filterra Sedimentation Chamber

Bypass via downstream catch basin.

**Additional configurations available, including offline - pipe, peak diversion - grate, and internal bypass curb-chamber.*

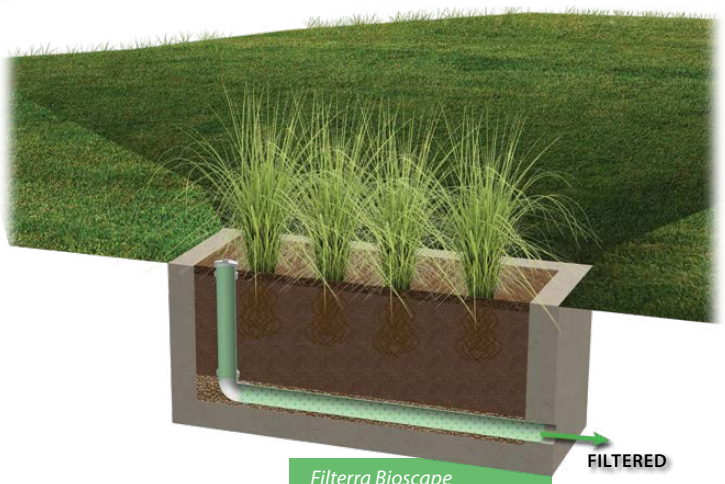
Multiple configurations allow for easy site integration

Filterra® Bioscape® Configurations



Filterra Bioscape Vault Offline

Bypass via downstream catch basin.



Filterra Bioscape Vault Basin

Bypass via upstream structure. Multiple inlet options.



Filterra Bioscape

Bypass via upstream structure. Multiple inlet options.

**Additional configurations available, including bioscape vault offline pipe.*

Filterra® Aesthetic Options

Multiple aesthetic options to enhance the appearance and integrate with landscaping ...



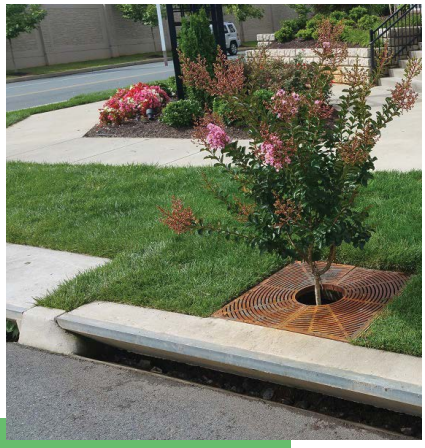
Standard Tree Grate



Custom/Decorative Tree Grate



Full Grate with Grasses



Recessed Top Slab

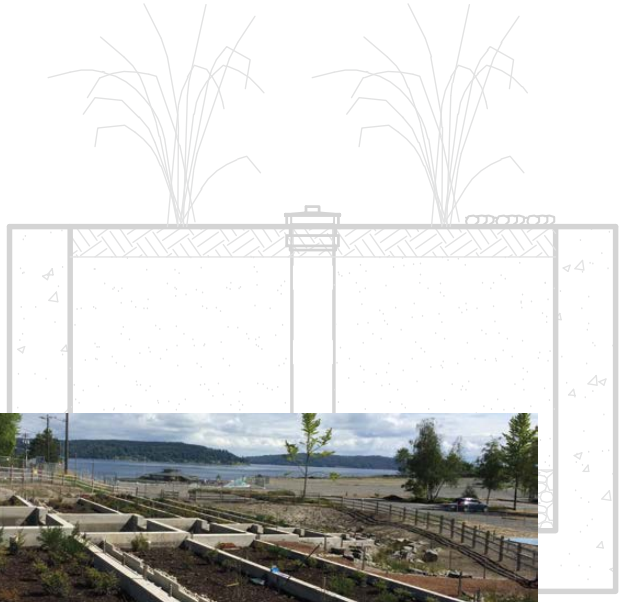


Open Top Planter - Filterra Bioscape



Street Tree

Filterra® Bioscape®







Large-scale Filterra that can be customized to your site ...

- Ideal for Filterra systems greater than 300 square feet
- Design with or without containment structure
- Incorporate infiltration directly below the system, where required
- Combine with upstream storage or downstream infiltration
- Use as an alternative to larger regional traditional bioretention systems
- Easily add pretreatment Hydrodynamic Separator for large-scale or heavy pollutant loading applications



A partner you can rely on



STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

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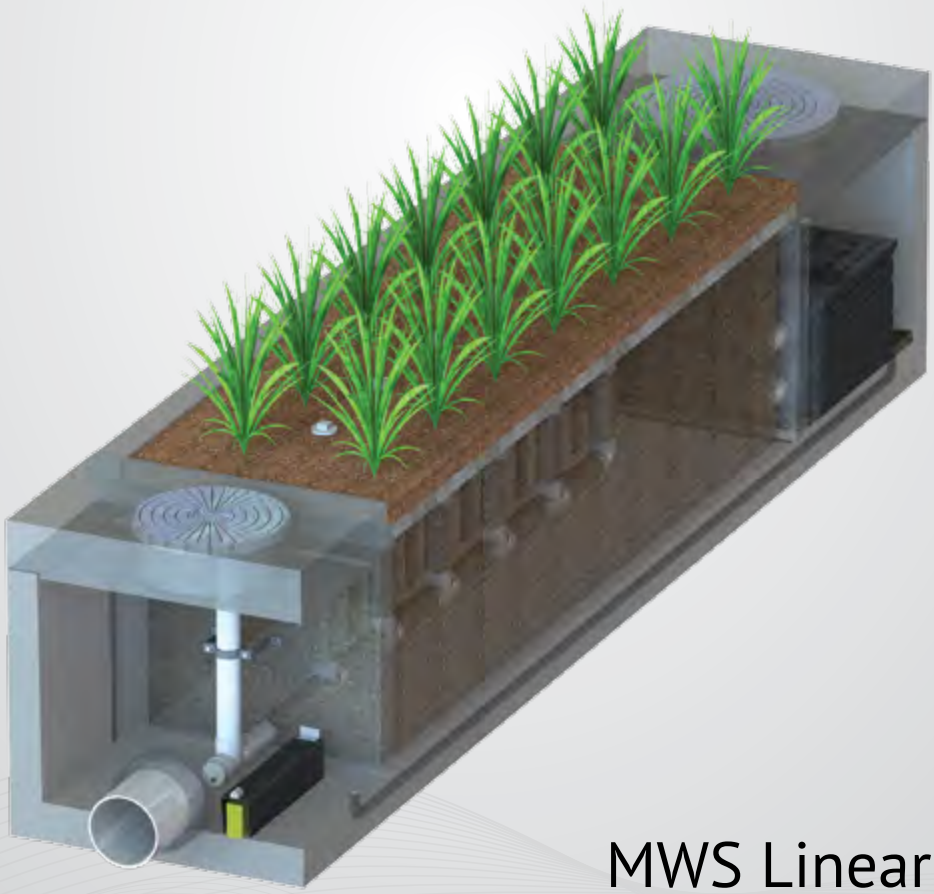
MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS Linear



Contents

1 Introduction

2 Applications

3 Configurations

4 Advantages

5 Operation

6 Orientations | Bypass

7 Performance | Approvals

8 Sizing

9 Installation | Maintenance | Plants

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.



Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.





MWS Linear

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.



Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.



Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.



Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.



Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.



Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.



Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

- Agriculture
- Reuse
- Low Impact Development
- Waste Water





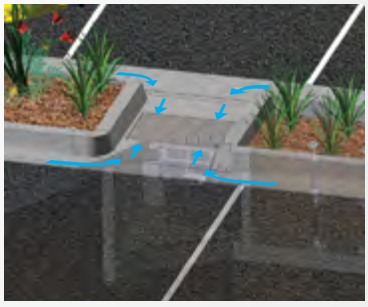
Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.



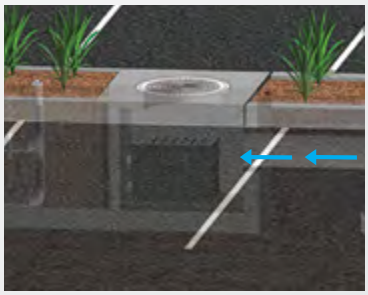
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.



Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

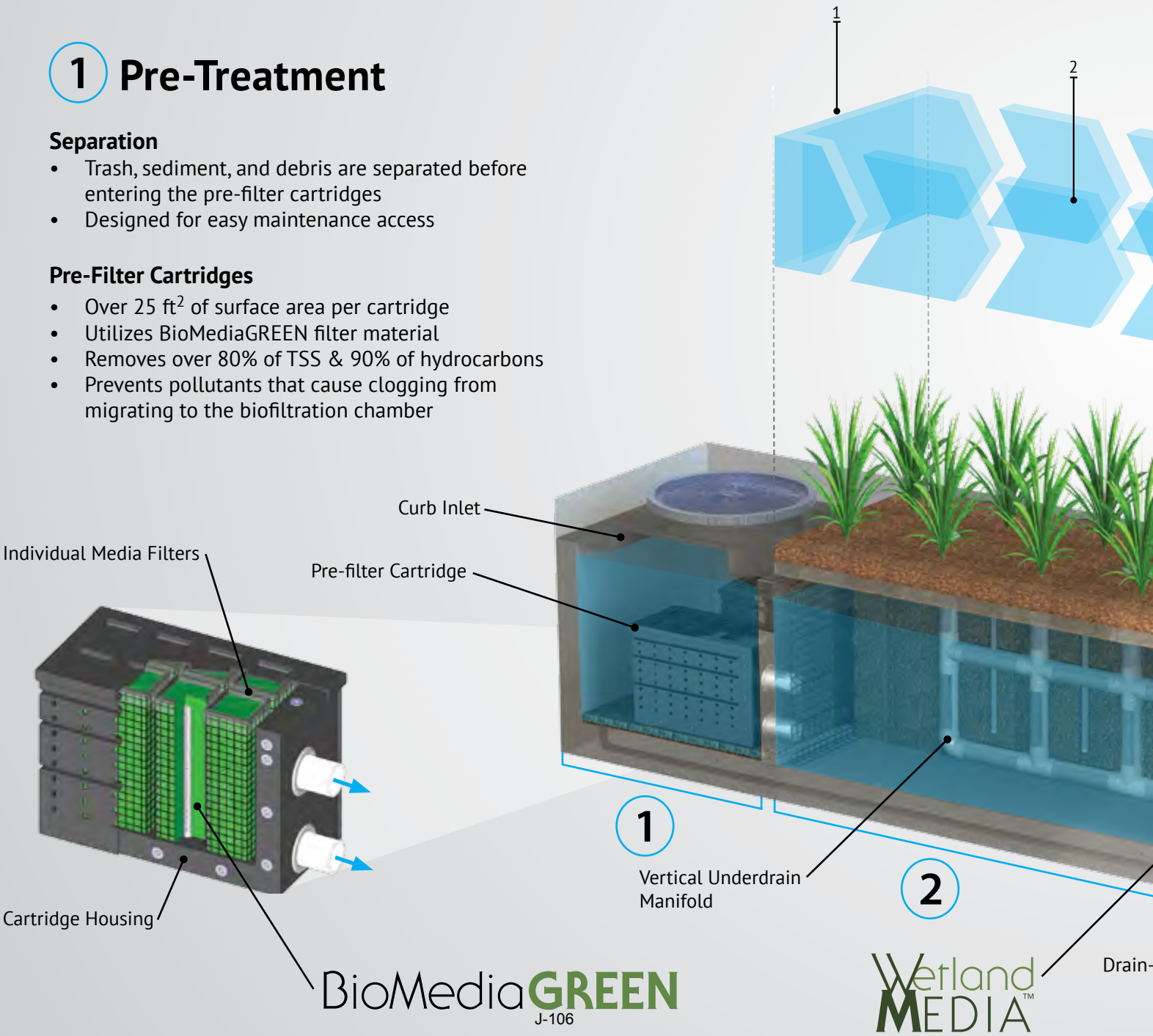
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



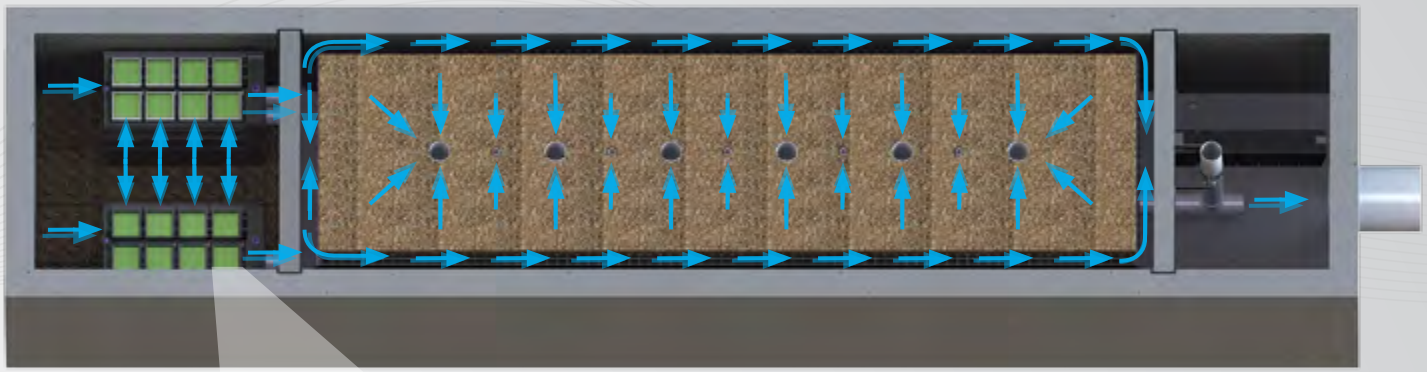


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.



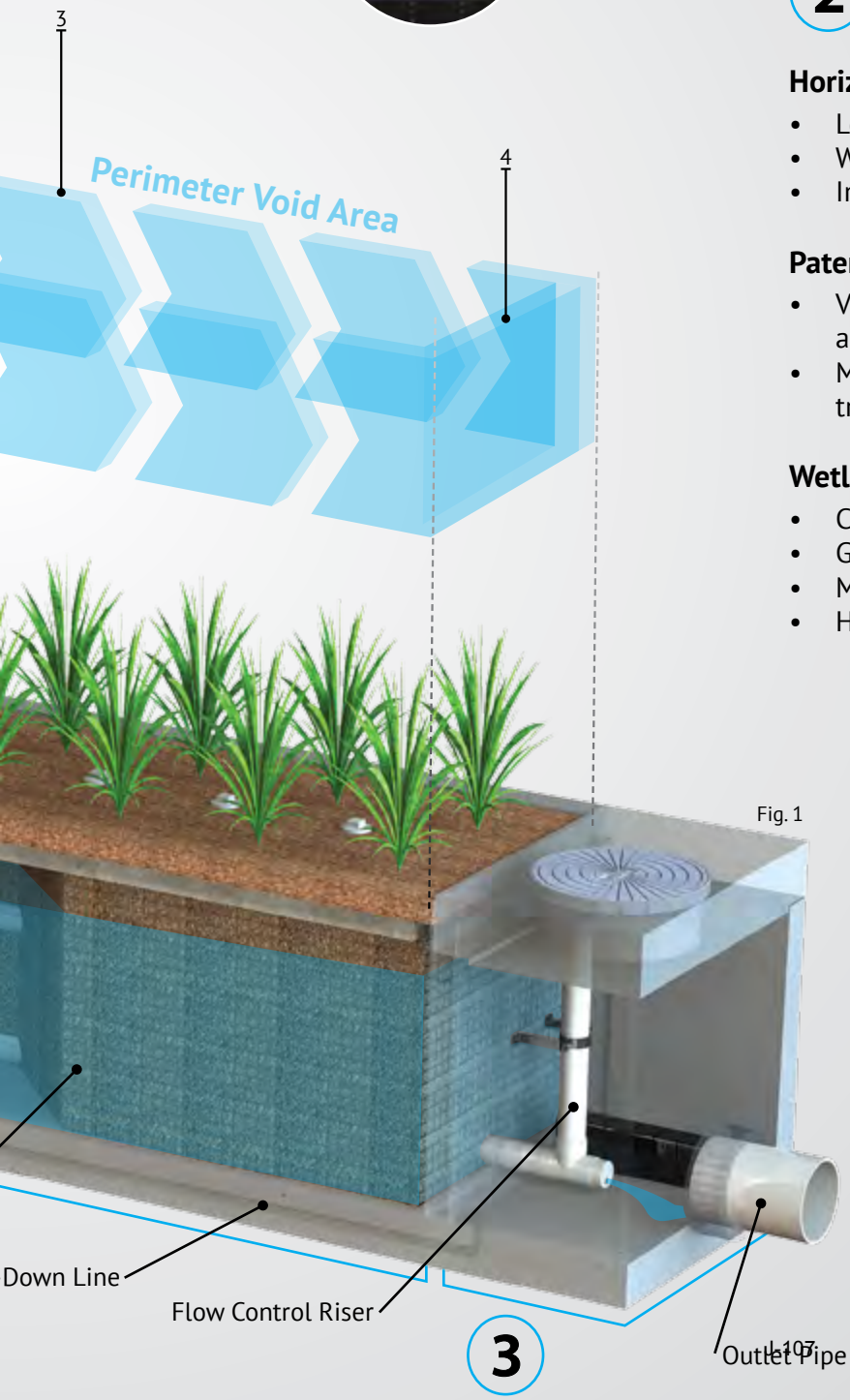


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

Drain-Down Filter

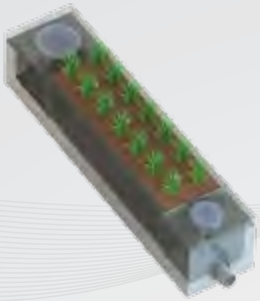
- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations



Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.



End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

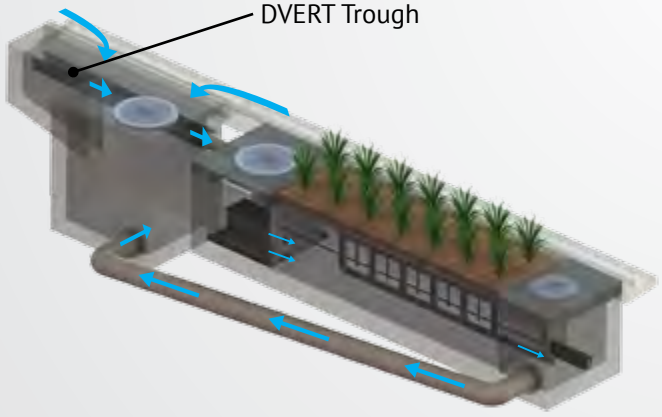
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.





Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.



Washington State DOE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%



DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.



MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.



Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus for discharges to freshwater systems, and 30% Total Nitrogen for discharges to saltwater or tidal systems.

Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

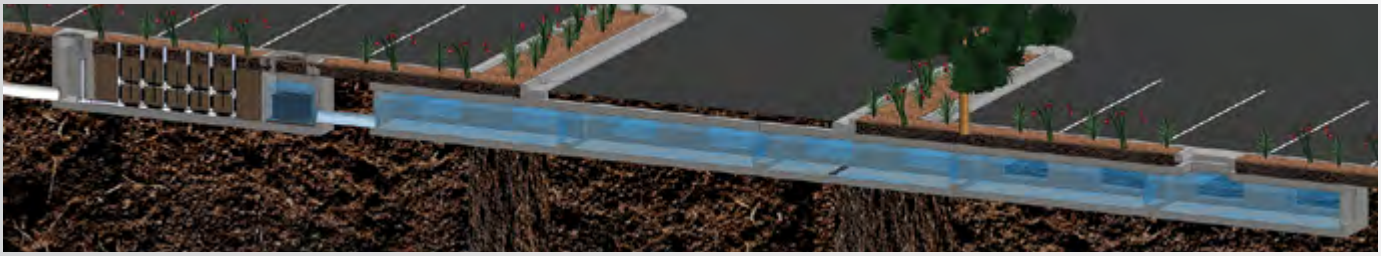


Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.



Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.



Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

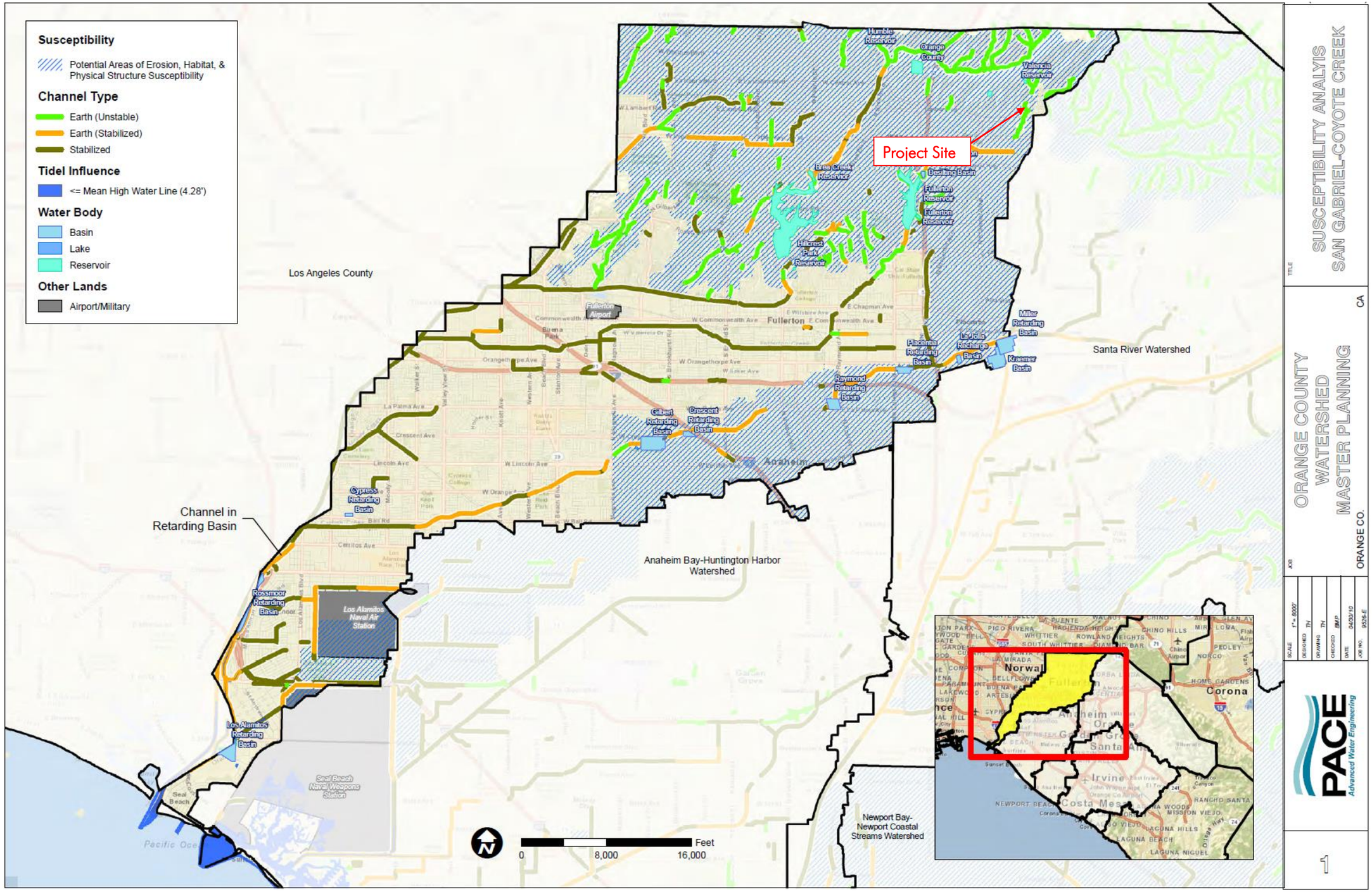
A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

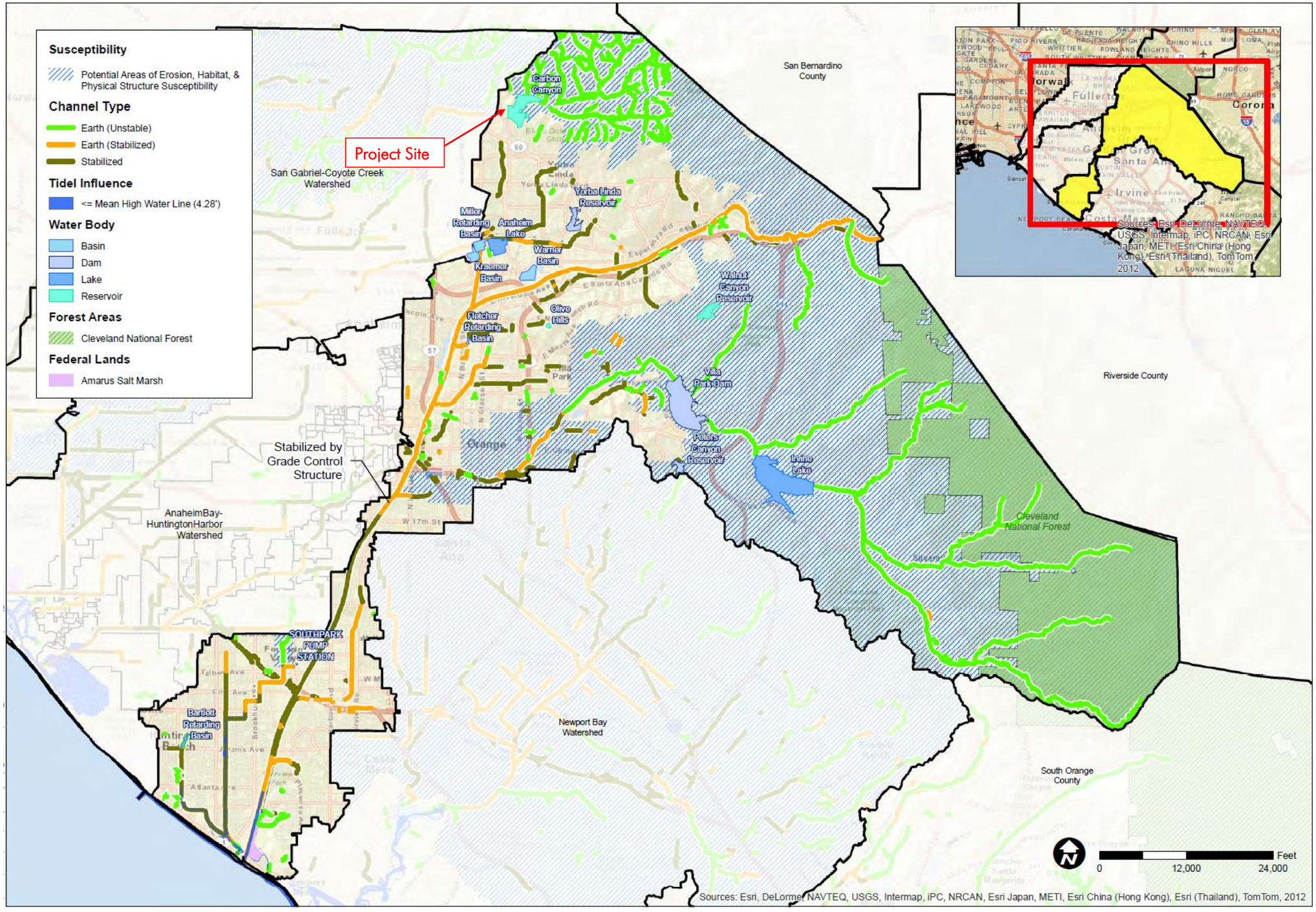
Please visit www.ModularWetlands.com/Plants for more information and various plant lists.



Attachment C – Hydromodification Analysis

(Incorporated by Reference. See project Hydrology Report)


Susceptibility
Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility
Channel Type
Earth (Unstable)
Earth (Stabilized)
Stabilized
Tidel Influence
<= Mean High Water Line (4.28')
Water Body
Basin
Lake
Reservoir
Other Lands
Airport/Military
Project Site
Los Angeles County
Santa River Watershed
Channel in Retarding Basin
Anaheim Bay-Huntington Harbor Watershed
Newport Bay-Newport Coastal Streams Watershed
Humble Reservoir
Orange County
Valencia Reservoir
Brea Creek Reservoir
Desilting Basin
Fullerton Reservoir
Hillcrest Park Reservoir
Fullerton Airport
Fullerton
Miller Retarding Basin
La Jolla Recharge Basin
Placentia Retarding Basin
Kraemer Basin
Raymond Retarding Basin
Gilbert Retarding Basin
Crescent Retarding Basin
Cypress Retarding Basin
Rossmoor Retarding Basin
Los Alamitos Naval Air Station
Los Alamitos Retarding Basin
Seal Beach Naval Weapons Station
Seal Beach
Pacific Ocean
Anaheim
Feet
0
8,000
16,000
SUSCEPTIBILITY ANALYIS
SAN GABRIEL-COYOTE CREEK
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO.
PACE
Advanced Water Engineering


Susceptibility
Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility
Channel Type
Earth (Unstable)
Earth (Stabilized)
Stabilized
Tidel Influence
<= Mean High Water Line (4.28')
Water Body
Basin
Dam
Lake
Reservoir
Forest Areas
Cleveland National Forest
Federal Lands
Amarus Salt Marsh
Project Site
San Gabriel-Coyote Creek Watershed
San Bernardino County
Riverside County
South Orange County
Carbon Canyon
Yorba Linda Reservoir
Miller Retarding Basin
Anaheim Lake
Warner Basin
Kraemer Basin
Walnut Canyon Reservoir
Olive Hills
Fletcher Retarding Basin
Villa Park Dam
Peters Canyon Reservoir
Irvine Lake
Cleveland National Forest
Stabilized by Grade Control Structure
AnaheimBay-HuntingtonHarbor Watershed
SOUTHPARK PUMP STATION
Bartlett Retarding Basin
Newport Bay Watershed
Orange
Irvine
Fullerton
Santa Ana
Costa Mesa
Laguna Niguel
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012
0
12,000
24,000
Feet
SUSCEPTIBILITY ANALYIS
SANTA ANA RIVER
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO.
CA
PACE
Advanced Water Engineering
FIGURE
3

W.O. #4213-3, BREA 265
1/14/2022

2-YR STUDY - WEST - AREAS 'A', 'B' & 'C'

FOR HYDRO-MODIFICATION DUE TO PART OF LOFTUS CHANNEL NOT IMPROVED

	EXISTING CONDITION			PROPOSED CONDITION			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	7.20	-4.50	-5.50	**AREA (ac)**
Q (cfs)	49.90	20.40	13.50	80.80	18.20	15.20	30.90	-2.20	1.70	**Q (cfs)**
Tc (min)	16.86	13.44	16.78	13.99	13.16	8.73	-2.87	-0.28	-8.05	**Tc (min)**
V (ac.ft)	1.97	0.76	0.55	8.12	1.69	1.40	6.15	0.93	0.85	**V (ac.ft)**

2-YR STUDY

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ************************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 18:38 11/06/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.422
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    83   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      1.22

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.288
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        6.99      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.87
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   2.12
 Tc(MIN.) =   13.36
 SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =    6.84
 EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =       7.93

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   5.99
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS   4.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
 GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.93
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   13.63
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.212
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.16      0.20     1.000    83
 COMMERCIAL                  D        1.06      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
 AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   1.22
 Tc(MIN.) =   14.86
 SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   10.39
 EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
```

```
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      17.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   7.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       40.34      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.14
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =   16.86
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =   33.64
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =      49.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   9.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20      0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   5.18   Tc(MIN.) =   11.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.404
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =    7.05
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =       7.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.98
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.36
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.18
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.18
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.358
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =       9.83

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.83
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.87
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.316
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        8.58      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
  SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =    8.84
  EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      18.31

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.31
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.44
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.283
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        2.69      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    2.62
  EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      20.42

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.29      0.20     0.100    57    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.51

******************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    8.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.673
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.25      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.37
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       0.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.41
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.396
  SUBAREA LOSS RATE DATA(AMC  I ):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        2.57      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.13
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   3.15
  Tc(MIN.) =   11.61
  SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    2.77
  EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   3.53
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.130
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       12.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.16
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   5.17
  Tc(MIN.) =   16.78
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   10.80
  EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
  TOTAL AREA(ACRES) =       16.0         PEAK FLOW RATE(CFS) =      13.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   3.59
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     16.78
  EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
  PEAK FLOW RATE(CFS)   =      13.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         59.70       98.00       75.(AMC II)     0.200       0.035

    TOTAL AREA (Acres) =     59.70

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.196

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.965
==========================================================================
```

```
******************************************************************************

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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
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            Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: WE-A.DAT
  TIME/DATE OF STUDY: 10:26 01/14/2022


******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      59.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.196
         LOW LOSS FRACTION = 0.965
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.997
          30-MINUTE FACTOR = 0.997
           1-HOUR FACTOR = 0.997
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.319



==============================================================================
                      UNIT HYDROGRAPH DETERMINATION

------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	2.588	18.682
2	17.032	104.287
3	43.494	191.058
4	72.197	207.231
5	88.229	115.752
6	95.282	50.925
7	98.044	19.938
8	98.842	5.761
9	99.436	4.294
10	99.775	2.441
11	99.944	1.221
12	100.000	0.407

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 8.2280
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.9685

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	12.5	25.0	37.5	50.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0003	0.03	Q	.	.	.	.
0.333	0.0006	0.05	Q	.	.	.	.
0.417	0.0010	0.06	Q	.	.	.	.
0.500	0.0015	0.06	Q	.	.	.	.
0.583	0.0019	0.07	Q	.	.	.	.
0.667	0.0024	0.07	Q	.	.	.	.
0.750	0.0029	0.07	Q	.	.	.	.
0.833	0.0034	0.07	Q	.	.	.	.
0.917	0.0038	0.07	Q	.	.	.	.
1.000	0.0043	0.07	Q	.	.	.	.
1.083	0.0048	0.07	Q	.	.	.	.
1.167	0.0053	0.07	Q	.	.	.	.
1.250	0.0057	0.07	Q	.	.	.	.
1.333	0.0062	0.07	Q	.	.	.	.
1.417	0.0067	0.07	Q	.	.	.	.
1.500	0.0072	0.07	Q	.	.	.	.
1.583	0.0077	0.07	Q	.	.	.	.
1.667	0.0082	0.07	Q	.	.	.	.
1.750	0.0087	0.07	Q	.	.	.	.
1.833	0.0092	0.07	Q	.	.	.	.
1.917	0.0097	0.07	Q	.	.	.	.
2.000	0.0102	0.07	Q	.	.	.	.
2.083	0.0107	0.07	Q	.	.	.	.
2.167	0.0112	0.07	Q	.	.	.	.
2.250	0.0117	0.07	Q	.	.	.	.
2.333	0.0122	0.07	Q	.	.	.	.
2.417	0.0127	0.07	Q	.	.	.	.
2.500	0.0132	0.07	Q	.	.	.	.
2.583	0.0137	0.07	Q	.	.	.	.
2.667	0.0142	0.07	Q	.	.	.	.
2.750	0.0147	0.07	Q	.	.	.	.
2.833	0.0152	0.07	Q	.	.	.	.
2.917	0.0158	0.08	Q	.	.	.	.
3.000	0.0163	0.08	Q	.	.	.	.
3.083	0.0168	0.08	Q	.	.	.	.
3.167	0.0173	0.08	Q	.	.	.	.
3.250	0.0178	0.08	Q	.	.	.	.
3.333	0.0184	0.08	Q	.	.	.	.
3.417	0.0189	0.08	Q	.	.	.	.
3.500	0.0194	0.08	Q	.	.	.	.
3.583	0.0200	0.08	Q	.	.	.	.
3.667	0.0205	0.08	Q	.	.	.	.
3.750	0.0211	0.08	Q	.	.	.	.
3.833	0.0216	0.08	Q	.	.	.	.
3.917	0.0221	0.08	Q	.	.	.	.
4.000	0.0227	0.08	Q	.	.	.	.
4.083	0.0232	0.08	Q	.	.	.	.
4.167	0.0238	0.08	Q	.	.	.	.
4.250	0.0243	0.08	Q	.	.	.	.
4.333	0.0249	0.08	Q	.	.	.	.
4.417	0.0255	0.08	Q	.	.	.	.
4.500	0.0260	0.08	Q	.	.	.	.
4.583	0.0266	0.08	Q	.	.	.	.
4.667	0.0271	0.08	Q	.	.	.	.
4.750	0.0277	0.08	Q	.	.	.	.
4.833	0.0283	0.08	Q	.	.	.	.
4.917	0.0289	0.08	Q	.	.	.	.
5.000	0.0294	0.08	Q	.	.	.	.

5.083	0.0300	0.08	Q	.	.	.	.
5.167	0.0306	0.08	Q	.	.	.	.
5.250	0.0312	0.08	Q	.	.	.	.
5.333	0.0318	0.09	Q	.	.	.	.
5.417	0.0324	0.09	Q	.	.	.	.
5.500	0.0330	0.09	Q	.	.	.	.
5.583	0.0335	0.09	Q	.	.	.	.
5.667	0.0341	0.09	Q	.	.	.	.
5.750	0.0347	0.09	Q	.	.	.	.
5.833	0.0354	0.09	Q	.	.	.	.
5.917	0.0360	0.09	Q	.	.	.	.
6.000	0.0366	0.09	Q	.	.	.	.
6.083	0.0372	0.09	Q	.	.	.	.
6.167	0.0378	0.09	Q	.	.	.	.
6.250	0.0384	0.09	Q	.	.	.	.
6.333	0.0390	0.09	Q	.	.	.	.
6.417	0.0397	0.09	Q	.	.	.	.
6.500	0.0403	0.09	Q	.	.	.	.
6.583	0.0409	0.09	Q	.	.	.	.
6.667	0.0416	0.09	Q	.	.	.	.
6.750	0.0422	0.09	Q	.	.	.	.
6.833	0.0429	0.09	Q	.	.	.	.
6.917	0.0435	0.09	Q	.	.	.	.
7.000	0.0442	0.09	Q	.	.	.	.
7.083	0.0448	0.10	Q	.	.	.	.
7.167	0.0455	0.10	Q	.	.	.	.
7.250	0.0461	0.10	Q	.	.	.	.
7.333	0.0468	0.10	Q	.	.	.	.
7.417	0.0475	0.10	Q	.	.	.	.
7.500	0.0481	0.10	Q	.	.	.	.
7.583	0.0488	0.10	Q	.	.	.	.
7.667	0.0495	0.10	QV	.	.	.	.
7.750	0.0502	0.10	QV	.	.	.	.
7.833	0.0509	0.10	QV	.	.	.	.
7.917	0.0516	0.10	QV	.	.	.	.
8.000	0.0523	0.10	QV	.	.	.	.
8.083	0.0530	0.10	QV	.	.	.	.
8.167	0.0537	0.10	QV	.	.	.	.
8.250	0.0544	0.10	QV	.	.	.	.
8.333	0.0551	0.10	QV	.	.	.	.
8.417	0.0558	0.10	QV	.	.	.	.
8.500	0.0566	0.11	QV	.	.	.	.
8.583	0.0573	0.11	QV	.	.	.	.
8.667	0.0580	0.11	QV	.	.	.	.
8.750	0.0588	0.11	QV	.	.	.	.
8.833	0.0595	0.11	QV	.	.	.	.
8.917	0.0603	0.11	QV	.	.	.	.
9.000	0.0610	0.11	QV	.	.	.	.
9.083	0.0618	0.11	QV	.	.	.	.
9.167	0.0626	0.11	QV	.	.	.	.
9.250	0.0633	0.11	QV	.	.	.	.
9.333	0.0641	0.11	QV	.	.	.	.
9.417	0.0649	0.11	QV	.	.	.	.
9.500	0.0657	0.11	QV	.	.	.	.
9.583	0.0665	0.12	QV	.	.	.	.
9.667	0.0673	0.12	QV	.	.	.	.
9.750	0.0681	0.12	QV	.	.	.	.
9.833	0.0689	0.12	QV	.	.	.	.
9.917	0.0697	0.12	QV	.	.	.	.
10.000	0.0706	0.12	QV	.	.	.	.
10.083	0.0714	0.12	QV	.	.	.	.
10.167	0.0723	0.12	QV	.	.	.	.
10.250	0.0731	0.12	QV	.	.	.	.
10.333	0.0740	0.12	QV	.	.	.	.
10.417	0.0748	0.13	QV	.	.	.	.
10.500	0.0757	0.13	QV	.	.	.	.
10.583	0.0766	0.13	QV	.	.	.	.
10.667	0.0775	0.13	QV	.	.	.	.
10.750	0.0784	0.13	QV	.	.	.	.
10.833	0.0793	0.13	QV	.	.	.	.
10.917	0.0802	0.13	QV	.	.	.	.

11.000	0.0811	0.13	QV	.	.	.	.
11.083	0.0821	0.14	QV	.	.	.	.
11.167	0.0830	0.14	QV	.	.	.	.
11.250	0.0840	0.14	QV	.	.	.	.
11.333	0.0849	0.14	QV	.	.	.	.
11.417	0.0859	0.14	QV	.	.	.	.
11.500	0.0869	0.14	QV	.	.	.	.
11.583	0.0879	0.14	QV	.	.	.	.
11.667	0.0889	0.15	QV	.	.	.	.
11.750	0.0899	0.15	QV	.	.	.	.
11.833	0.0909	0.15	QV	.	.	.	.
11.917	0.0920	0.15	QV	.	.	.	.
12.000	0.0930	0.15	QV	.	.	.	.
12.083	0.0941	0.16	QV	.	.	.	.
12.167	0.0952	0.16	QV	.	.	.	.
12.250	0.0964	0.17	QV	.	.	.	.
12.333	0.0977	0.19	QV	.	.	.	.
12.417	0.0990	0.19	Q V	.	.	.	.
12.500	0.1004	0.20	Q V	.	.	.	.
12.583	0.1018	0.20	Q V	.	.	.	.
12.667	0.1032	0.20	Q V	.	.	.	.
12.750	0.1046	0.21	Q V	.	.	.	.
12.833	0.1061	0.21	Q V	.	.	.	.
12.917	0.1076	0.21	Q V	.	.	.	.
13.000	0.1090	0.22	Q V	.	.	.	.
13.083	0.1106	0.22	Q V	.	.	.	.
13.167	0.1121	0.22	Q V	.	.	.	.
13.250	0.1136	0.23	Q V	.	.	.	.
13.333	0.1152	0.23	Q V	.	.	.	.
13.417	0.1168	0.23	Q V	.	.	.	.
13.500	0.1185	0.24	Q V	.	.	.	.
13.583	0.1201	0.24	Q V	.	.	.	.
13.667	0.1218	0.24	Q V	.	.	.	.
13.750	0.1235	0.25	Q V	.	.	.	.
13.833	0.1253	0.25	Q V	.	.	.	.
13.917	0.1270	0.26	Q V	.	.	.	.
14.000	0.1288	0.26	Q V	.	.	.	.
14.083	0.1307	0.27	Q V	.	.	.	.
14.167	0.1326	0.28	Q V	.	.	.	.
14.250	0.1346	0.29	Q V	.	.	.	.
14.333	0.1366	0.30	Q V	.	.	.	.
14.417	0.1387	0.30	Q V	.	.	.	.
14.500	0.1408	0.31	Q V	.	.	.	.
14.583	0.1431	0.32	Q V	.	.	.	.
14.667	0.1453	0.33	Q V	.	.	.	.
14.750	0.1477	0.34	Q V	.	.	.	.
14.833	0.1501	0.35	Q V	.	.	.	.
14.917	0.1525	0.36	Q V	.	.	.	.
15.000	0.1551	0.37	Q V	.	.	.	.
15.083	0.1578	0.39	Q V	.	.	.	.
15.167	0.1607	0.43	Q V	.	.	.	.
15.250	0.1646	0.56	Q V	.	.	.	.
15.333	0.1705	0.86	Q V	.	.	.	.
15.417	0.1793	1.28	.Q V	.	.	.	.
15.500	0.1906	1.64	.Q V	.	.	.	.
15.583	0.2035	1.88	.Q V	.	.	.	.
15.667	0.2191	2.27	.Q V	.	.	.	.
15.750	0.2410	3.17	. Q V	.	.	.	.
15.833	0.2737	4.75	. Q V	.	.	.	.
15.917	0.3227	7.11	. QV	.	.	.	.
16.000	0.3986	11.02	. Q	.	.	.	.
16.083	0.5313	19.27	. V Q	.	.	.	.
16.167	0.7820	36.41	. V	.	. Q.	.	.
16.250	1.1256	49.89	.	.	. V	.	Q.
16.333	1.4596	48.49	.	.	.	V.	Q .
16.417	1.6662	30.01	.	.	. Q	. V	.
16.500	1.7748	15.76	.	. Q	.	.	V .
16.583	1.8297	7.97	. Q	.	.	.	V .
16.667	1.8571	3.98	. Q	.	.	.	V .
16.750	1.8742	2.48	.Q	.	.	.	V .
16.833	1.8841	1.44	.Q	.	.	.	V .

16.917	1.8900	0.86	Q	.	.	.	V .
17.000	1.8937	0.54	Q	.	.	.	V .
17.083	1.8964	0.39	Q	.	.	.	V .
17.167	1.8988	0.34	Q	.	.	.	V .
17.250	1.9009	0.31	Q	.	.	.	V .
17.333	1.9029	0.29	Q	.	.	.	V .
17.417	1.9048	0.27	Q	.	.	.	V .
17.500	1.9066	0.26	Q	.	.	.	V .
17.583	1.9083	0.25	Q	.	.	.	V .
17.667	1.9100	0.24	Q	.	.	.	V .
17.750	1.9116	0.23	Q	.	.	.	V .
17.833	1.9131	0.23	Q	.	.	.	V .
17.917	1.9146	0.22	Q	.	.	.	V .
18.000	1.9161	0.21	Q	.	.	.	V .
18.083	1.9175	0.21	Q	.	.	.	V .
18.167	1.9189	0.20	Q	.	.	.	V .
18.250	1.9202	0.18	Q	.	.	.	V.
18.333	1.9213	0.17	Q	.	.	.	V.
18.417	1.9224	0.16	Q	.	.	.	V.
18.500	1.9235	0.15	Q	.	.	.	V.
18.583	1.9245	0.15	Q	.	.	.	V.
18.667	1.9255	0.15	Q	.	.	.	V.
18.750	1.9265	0.14	Q	.	.	.	V.
18.833	1.9274	0.14	Q	.	.	.	V.
18.917	1.9284	0.14	Q	.	.	.	V.
19.000	1.9293	0.13	Q	.	.	.	V.
19.083	1.9302	0.13	Q	.	.	.	V.
19.167	1.9311	0.13	Q	.	.	.	V.
19.250	1.9320	0.13	Q	.	.	.	V.
19.333	1.9328	0.12	Q	.	.	.	V.
19.417	1.9336	0.12	Q	.	.	.	V.
19.500	1.9345	0.12	Q	.	.	.	V.
19.583	1.9353	0.12	Q	.	.	.	V.
19.667	1.9361	0.12	Q	.	.	.	V.
19.750	1.9369	0.11	Q	.	.	.	V.
19.833	1.9376	0.11	Q	.	.	.	V.
19.917	1.9384	0.11	Q	.	.	.	V.
20.000	1.9392	0.11	Q	.	.	.	V.
20.083	1.9399	0.11	Q	.	.	.	V.
20.167	1.9406	0.11	Q	.	.	.	V.
20.250	1.9414	0.10	Q	.	.	.	V.
20.333	1.9421	0.10	Q	.	.	.	V.
20.417	1.9428	0.10	Q	.	.	.	V.
20.500	1.9435	0.10	Q	.	.	.	V.
20.583	1.9441	0.10	Q	.	.	.	V.
20.667	1.9448	0.10	Q	.	.	.	V.
20.750	1.9455	0.10	Q	.	.	.	V.
20.833	1.9462	0.10	Q	.	.	.	V.
20.917	1.9468	0.10	Q	.	.	.	V.
21.000	1.9475	0.09	Q	.	.	.	V.
21.083	1.9481	0.09	Q	.	.	.	V.
21.167	1.9487	0.09	Q	.	.	.	V.
21.250	1.9494	0.09	Q	.	.	.	V.
21.333	1.9500	0.09	Q	.	.	.	V.
21.417	1.9506	0.09	Q	.	.	.	V.
21.500	1.9512	0.09	Q	.	.	.	V.
21.583	1.9518	0.09	Q	.	.	.	V.
21.667	1.9524	0.09	Q	.	.	.	V.
21.750	1.9530	0.09	Q	.	.	.	V.
21.833	1.9536	0.08	Q	.	.	.	V.
21.917	1.9542	0.08	Q	.	.	.	V.
22.000	1.9547	0.08	Q	.	.	.	V.
22.083	1.9553	0.08	Q	.	.	.	V.
22.167	1.9559	0.08	Q	.	.	.	V.
22.250	1.9564	0.08	Q	.	.	.	V.
22.333	1.9570	0.08	Q	.	.	.	V.
22.417	1.9575	0.08	Q	.	.	.	V.
22.500	1.9581	0.08	Q	.	.	.	V.
22.583	1.9586	0.08	Q	.	.	.	V.
22.667	1.9591	0.08	Q	.	.	.	V.
22.750	1.9597	0.08	Q	.	.	.	V.

22.833	1.9602	0.08	Q	.	.	.	V.
22.917	1.9607	0.08	Q	.	.	.	V.
23.000	1.9612	0.08	Q	.	.	.	V.
23.083	1.9618	0.07	Q	.	.	.	V.
23.167	1.9623	0.07	Q	.	.	.	V.
23.250	1.9628	0.07	Q	.	.	.	V.
23.333	1.9633	0.07	Q	.	.	.	V.
23.417	1.9638	0.07	Q	.	.	.	V.
23.500	1.9643	0.07	Q	.	.	.	V.
23.583	1.9648	0.07	Q	.	.	.	V.
23.667	1.9653	0.07	Q	.	.	.	V.
23.750	1.9657	0.07	Q	.	.	.	V.
23.833	1.9662	0.07	Q	.	.	.	V.
23.917	1.9667	0.07	Q	.	.	.	V.
24.000	1.9672	0.07	Q	.	.	.	V.
24.083	1.9676	0.07	Q	.	.	.	V.
24.167	1.9680	0.06	Q	.	.	.	V.
24.250	1.9683	0.04	Q	.	.	.	V.
24.333	1.9684	0.02	Q	.	.	.	V.
24.417	1.9685	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1465.0
10%	45.0
20%	35.0
30%	30.0
40%	20.0
50%	20.0
60%	20.0
70%	15.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'B'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         20.70       95.00       75.(AMC II)     0.200       0.061

    TOTAL AREA (Acres) =     20.70

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.190

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.939
==========================================================================
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******************************************************************************

              F L O O D    R O U T I N G    A N A L Y S I S
              USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                       Planning * Engineering * Surveying
            Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'B'                                                              *
 ************************************************************************

  FILE NAME: WE-B.DAT
  TIME/DATE OF STUDY: 10:49 01/14/2022


******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      20.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.185 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.190
         LOW LOSS FRACTION = 0.939
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  44.996



==============================================================================
                      UNIT HYDROGRAPH DETERMINATION

------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	3.625	9.074
2	24.314	51.794
3	59.212	87.363
4	84.735	63.896
5	94.844	25.305
6	98.167	8.321
7	99.078	2.279
8	99.631	1.385
9	99.908	0.693
10	100.000	0.231

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.7732
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.7625

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0002	0.02	Q	.	.	.	.
0.333	0.0005	0.03	Q	.	.	.	.
0.417	0.0008	0.04	Q	.	.	.	.
0.500	0.0010	0.04	Q	.	.	.	.
0.583	0.0013	0.04	Q	.	.	.	.
0.667	0.0016	0.04	Q	.	.	.	.
0.750	0.0019	0.04	Q	.	.	.	.
0.833	0.0022	0.04	Q	.	.	.	.
0.917	0.0025	0.04	Q	.	.	.	.
1.000	0.0027	0.04	Q	.	.	.	.
1.083	0.0030	0.04	Q	.	.	.	.
1.167	0.0033	0.04	Q	.	.	.	.
1.250	0.0036	0.04	Q	.	.	.	.
1.333	0.0039	0.04	Q	.	.	.	.
1.417	0.0042	0.04	Q	.	.	.	.
1.500	0.0045	0.04	Q	.	.	.	.
1.583	0.0048	0.04	Q	.	.	.	.
1.667	0.0051	0.04	Q	.	.	.	.
1.750	0.0054	0.04	Q	.	.	.	.
1.833	0.0057	0.04	Q	.	.	.	.
1.917	0.0060	0.04	Q	.	.	.	.
2.000	0.0063	0.04	Q	.	.	.	.
2.083	0.0066	0.04	Q	.	.	.	.
2.167	0.0069	0.04	Q	.	.	.	.
2.250	0.0072	0.04	Q	.	.	.	.
2.333	0.0075	0.04	Q	.	.	.	.
2.417	0.0078	0.04	Q	.	.	.	.
2.500	0.0081	0.04	Q	.	.	.	.
2.583	0.0084	0.04	Q	.	.	.	.
2.667	0.0087	0.05	Q	.	.	.	.
2.750	0.0090	0.05	Q	.	.	.	.
2.833	0.0094	0.05	Q	.	.	.	.
2.917	0.0097	0.05	Q	.	.	.	.
3.000	0.0100	0.05	Q	.	.	.	.
3.083	0.0103	0.05	Q	.	.	.	.
3.167	0.0106	0.05	Q	.	.	.	.
3.250	0.0109	0.05	Q	.	.	.	.
3.333	0.0113	0.05	Q	.	.	.	.
3.417	0.0116	0.05	Q	.	.	.	.
3.500	0.0119	0.05	Q	.	.	.	.
3.583	0.0122	0.05	Q	.	.	.	.
3.667	0.0126	0.05	Q	.	.	.	.
3.750	0.0129	0.05	Q	.	.	.	.
3.833	0.0132	0.05	Q	.	.	.	.
3.917	0.0135	0.05	Q	.	.	.	.
4.000	0.0139	0.05	Q	.	.	.	.
4.083	0.0142	0.05	Q	.	.	.	.
4.167	0.0145	0.05	Q	.	.	.	.
4.250	0.0149	0.05	Q	.	.	.	.
4.333	0.0152	0.05	Q	.	.	.	.
4.417	0.0155	0.05	Q	.	.	.	.
4.500	0.0159	0.05	Q	.	.	.	.
4.583	0.0162	0.05	Q	.	.	.	.
4.667	0.0166	0.05	Q	.	.	.	.
4.750	0.0169	0.05	Q	.	.	.	.
4.833	0.0173	0.05	Q	.	.	.	.
4.917	0.0176	0.05	Q	.	.	.	.
5.000	0.0180	0.05	Q	.	.	.	.

5.083	0.0183	0.05	Q	.	.	.	.
5.167	0.0187	0.05	Q	.	.	.	.
5.250	0.0190	0.05	Q	.	.	.	.
5.333	0.0194	0.05	QV	.	.	.	.
5.417	0.0197	0.05	QV	.	.	.	.
5.500	0.0201	0.05	QV	.	.	.	.
5.583	0.0204	0.05	QV	.	.	.	.
5.667	0.0208	0.05	QV	.	.	.	.
5.750	0.0212	0.05	QV	.	.	.	.
5.833	0.0215	0.05	QV	.	.	.	.
5.917	0.0219	0.05	QV	.	.	.	.
6.000	0.0223	0.05	QV	.	.	.	.
6.083	0.0227	0.05	QV	.	.	.	.
6.167	0.0230	0.05	QV	.	.	.	.
6.250	0.0234	0.05	QV	.	.	.	.
6.333	0.0238	0.05	QV	.	.	.	.
6.417	0.0242	0.06	QV	.	.	.	.
6.500	0.0245	0.06	QV	.	.	.	.
6.583	0.0249	0.06	QV	.	.	.	.
6.667	0.0253	0.06	QV	.	.	.	.
6.750	0.0257	0.06	QV	.	.	.	.
6.833	0.0261	0.06	QV	.	.	.	.
6.917	0.0265	0.06	QV	.	.	.	.
7.000	0.0269	0.06	QV	.	.	.	.
7.083	0.0273	0.06	QV	.	.	.	.
7.167	0.0277	0.06	QV	.	.	.	.
7.250	0.0281	0.06	QV	.	.	.	.
7.333	0.0285	0.06	QV	.	.	.	.
7.417	0.0289	0.06	QV	.	.	.	.
7.500	0.0293	0.06	QV	.	.	.	.
7.583	0.0297	0.06	QV	.	.	.	.
7.667	0.0301	0.06	QV	.	.	.	.
7.750	0.0305	0.06	QV	.	.	.	.
7.833	0.0309	0.06	QV	.	.	.	.
7.917	0.0314	0.06	QV	.	.	.	.
8.000	0.0318	0.06	QV	.	.	.	.
8.083	0.0322	0.06	QV	.	.	.	.
8.167	0.0326	0.06	QV	.	.	.	.
8.250	0.0331	0.06	QV	.	.	.	.
8.333	0.0335	0.06	QV	.	.	.	.
8.417	0.0340	0.06	QV	.	.	.	.
8.500	0.0344	0.06	QV	.	.	.	.
8.583	0.0348	0.06	QV	.	.	.	.
8.667	0.0353	0.06	QV	.	.	.	.
8.750	0.0357	0.07	QV	.	.	.	.
8.833	0.0362	0.07	QV	.	.	.	.
8.917	0.0366	0.07	QV	.	.	.	.
9.000	0.0371	0.07	QV	.	.	.	.
9.083	0.0376	0.07	QV	.	.	.	.
9.167	0.0380	0.07	QV	.	.	.	.
9.250	0.0385	0.07	Q V	.	.	.	.
9.333	0.0390	0.07	Q V	.	.	.	.
9.417	0.0394	0.07	Q V	.	.	.	.
9.500	0.0399	0.07	Q V	.	.	.	.
9.583	0.0404	0.07	Q V	.	.	.	.
9.667	0.0409	0.07	Q V	.	.	.	.
9.750	0.0414	0.07	Q V	.	.	.	.
9.833	0.0419	0.07	Q V	.	.	.	.
9.917	0.0424	0.07	Q V	.	.	.	.
10.000	0.0429	0.07	Q V	.	.	.	.
10.083	0.0434	0.07	Q V	.	.	.	.
10.167	0.0439	0.07	Q V	.	.	.	.
10.250	0.0444	0.08	Q V	.	.	.	.
10.333	0.0449	0.08	Q V	.	.	.	.
10.417	0.0455	0.08	Q V	.	.	.	.
10.500	0.0460	0.08	Q V	.	.	.	.
10.583	0.0465	0.08	Q V	.	.	.	.
10.667	0.0471	0.08	Q V	.	.	.	.
10.750	0.0476	0.08	Q V	.	.	.	.
10.833	0.0482	0.08	Q V	.	.	.	.
10.917	0.0487	0.08	Q V	.	.	.	.

11.000	0.0493	0.08	Q V	.	.	.	.
11.083	0.0499	0.08	Q V	.	.	.	.
11.167	0.0504	0.08	Q V	.	.	.	.
11.250	0.0510	0.08	Q V	.	.	.	.
11.333	0.0516	0.08	Q V	.	.	.	.
11.417	0.0522	0.09	Q V	.	.	.	.
11.500	0.0528	0.09	Q V	.	.	.	.
11.583	0.0534	0.09	Q V	.	.	.	.
11.667	0.0540	0.09	Q V	.	.	.	.
11.750	0.0546	0.09	Q V	.	.	.	.
11.833	0.0553	0.09	Q V	.	.	.	.
11.917	0.0559	0.09	Q V	.	.	.	.
12.000	0.0565	0.09	Q V	.	.	.	.
12.083	0.0572	0.09	Q V	.	.	.	.
12.167	0.0579	0.10	Q V	.	.	.	.
12.250	0.0586	0.11	Q V	.	.	.	.
12.333	0.0594	0.12	Q V	.	.	.	.
12.417	0.0602	0.12	Q V	.	.	.	.
12.500	0.0611	0.12	Q V	.	.	.	.
12.583	0.0619	0.12	Q V	.	.	.	.
12.667	0.0628	0.12	Q V	.	.	.	.
12.750	0.0637	0.13	Q V	.	.	.	.
12.833	0.0645	0.13	Q V	.	.	.	.
12.917	0.0654	0.13	Q V	.	.	.	.
13.000	0.0663	0.13	Q V	.	.	.	.
13.083	0.0673	0.13	Q V	.	.	.	.
13.167	0.0682	0.14	Q V	.	.	.	.
13.250	0.0691	0.14	Q V	.	.	.	.
13.333	0.0701	0.14	Q V	.	.	.	.
13.417	0.0711	0.14	Q V	.	.	.	.
13.500	0.0721	0.14	Q V	.	.	.	.
13.583	0.0731	0.15	Q V	.	.	.	.
13.667	0.0741	0.15	Q V	.	.	.	.
13.750	0.0751	0.15	Q V	.	.	.	.
13.833	0.0762	0.15	Q V	.	.	.	.
13.917	0.0773	0.16	Q V	.	.	.	.
14.000	0.0784	0.16	Q V	.	.	.	.
14.083	0.0795	0.16	Q V	.	.	.	.
14.167	0.0807	0.17	Q V	.	.	.	.
14.250	0.0819	0.18	Q V	.	.	.	.
14.333	0.0831	0.18	Q V	.	.	.	.
14.417	0.0844	0.19	Q V	.	.	.	.
14.500	0.0857	0.19	Q V	.	.	.	.
14.583	0.0871	0.20	Q V	.	.	.	.
14.667	0.0885	0.20	Q V	.	.	.	.
14.750	0.0899	0.21	Q V	.	.	.	.
14.833	0.0914	0.21	Q V	.	.	.	.
14.917	0.0929	0.22	Q V	.	.	.	.
15.000	0.0944	0.23	Q V	.	.	.	.
15.083	0.0961	0.24	Q V	.	.	.	.
15.167	0.0979	0.26	Q V	.	.	.	.
15.250	0.1002	0.33	Q V	.	.	.	.
15.333	0.1034	0.47	Q V	.	.	.	.
15.417	0.1078	0.64	Q V	.	.	.	.
15.500	0.1129	0.75	Q V	.	.	.	.
15.583	0.1185	0.80	.Q V	.	.	.	.
15.667	0.1253	0.99	.Q V	.	.	.	.
15.750	0.1349	1.40	.Q V	.	.	.	.
15.833	0.1491	2.05	. Q V	.	.	.	.
15.917	0.1699	3.02	. Q V	.	.	.	.
16.000	0.2017	4.62	. Q V	.	.	.	.
16.083	0.2583	8.22	. Q V	.	.	.	.
16.167	0.3678	15.89	. .	V.Q	.	.	.
16.250	0.5086	20.44	. .	.	VQ	.	.
16.333	0.6128	15.14	. .	Q	.	V	.
16.417	0.6643	7.48	. Q.	.	.	V	.
16.500	0.6883	3.49	. Q .	.	.	V	.
16.583	0.7005	1.76	. Q .	.	.	V	.
16.667	0.7080	1.10	.Q .	.	.	V	.
16.750	0.7124	0.64	Q .	.	.	V	.
16.833	0.7150	0.38	Q .	.	.	V	.

16.917	0.7168	0.26	Q	.	.	.	V .
17.000	0.7183	0.22	Q	.	.	.	V .
17.083	0.7197	0.20	Q	.	.	.	V .
17.167	0.7211	0.19	Q	.	.	.	V .
17.250	0.7223	0.18	Q	.	.	.	V .
17.333	0.7234	0.17	Q	.	.	.	V .
17.417	0.7245	0.16	Q	.	.	.	V .
17.500	0.7256	0.15	Q	.	.	.	V .
17.583	0.7266	0.15	Q	.	.	.	V .
17.667	0.7276	0.14	Q	.	.	.	V .
17.750	0.7286	0.14	Q	.	.	.	V .
17.833	0.7295	0.13	Q	.	.	.	V .
17.917	0.7304	0.13	Q	.	.	.	V .
18.000	0.7313	0.13	Q	.	.	.	V .
18.083	0.7321	0.12	Q	.	.	.	V .
18.167	0.7329	0.12	Q	.	.	.	V .
18.250	0.7336	0.11	Q	.	.	.	V .
18.333	0.7343	0.10	Q	.	.	.	V .
18.417	0.7350	0.09	Q	.	.	.	V .
18.500	0.7356	0.09	Q	.	.	.	V .
18.583	0.7362	0.09	Q	.	.	.	V .
18.667	0.7368	0.09	Q	.	.	.	V .
18.750	0.7374	0.08	Q	.	.	.	V .
18.833	0.7380	0.08	Q	.	.	.	V .
18.917	0.7385	0.08	Q	.	.	.	V .
19.000	0.7391	0.08	Q	.	.	.	V .
19.083	0.7396	0.08	Q	.	.	.	V .
19.167	0.7401	0.08	Q	.	.	.	V .
19.250	0.7407	0.08	Q	.	.	.	V .
19.333	0.7412	0.07	Q	.	.	.	V .
19.417	0.7417	0.07	Q	.	.	.	V .
19.500	0.7422	0.07	Q	.	.	.	V .
19.583	0.7426	0.07	Q	.	.	.	V .
19.667	0.7431	0.07	Q	.	.	.	V .
19.750	0.7436	0.07	Q	.	.	.	V.
19.833	0.7441	0.07	Q	.	.	.	V.
19.917	0.7445	0.07	Q	.	.	.	V.
20.000	0.7450	0.07	Q	.	.	.	V.
20.083	0.7454	0.06	Q	.	.	.	V.
20.167	0.7459	0.06	Q	.	.	.	V.
20.250	0.7463	0.06	Q	.	.	.	V.
20.333	0.7467	0.06	Q	.	.	.	V.
20.417	0.7471	0.06	Q	.	.	.	V.
20.500	0.7476	0.06	Q	.	.	.	V.
20.583	0.7480	0.06	Q	.	.	.	V.
20.667	0.7484	0.06	Q	.	.	.	V.
20.750	0.7488	0.06	Q	.	.	.	V.
20.833	0.7492	0.06	Q	.	.	.	V.
20.917	0.7496	0.06	Q	.	.	.	V.
21.000	0.7500	0.06	Q	.	.	.	V.
21.083	0.7503	0.06	Q	.	.	.	V.
21.167	0.7507	0.06	Q	.	.	.	V.
21.250	0.7511	0.05	Q	.	.	.	V.
21.333	0.7515	0.05	Q	.	.	.	V.
21.417	0.7518	0.05	Q	.	.	.	V.
21.500	0.7522	0.05	Q	.	.	.	V.
21.583	0.7526	0.05	Q	.	.	.	V.
21.667	0.7529	0.05	Q	.	.	.	V.
21.750	0.7533	0.05	Q	.	.	.	V.
21.833	0.7536	0.05	Q	.	.	.	V.
21.917	0.7540	0.05	Q	.	.	.	V.
22.000	0.7543	0.05	Q	.	.	.	V.
22.083	0.7547	0.05	Q	.	.	.	V.
22.167	0.7550	0.05	Q	.	.	.	V.
22.250	0.7554	0.05	Q	.	.	.	V.
22.333	0.7557	0.05	Q	.	.	.	V.
22.417	0.7560	0.05	Q	.	.	.	V.
22.500	0.7563	0.05	Q	.	.	.	V.
22.583	0.7567	0.05	Q	.	.	.	V.
22.667	0.7570	0.05	Q	.	.	.	V.
22.750	0.7573	0.05	Q	.	.	.	V.

22.833	0.7576	0.05	Q	.	.	.	V.
22.917	0.7579	0.05	Q	.	.	.	V.
23.000	0.7583	0.05	Q	.	.	.	V.
23.083	0.7586	0.04	Q	.	.	.	V.
23.167	0.7589	0.04	Q	.	.	.	V.
23.250	0.7592	0.04	Q	.	.	.	V.
23.333	0.7595	0.04	Q	.	.	.	V.
23.417	0.7598	0.04	Q	.	.	.	V.
23.500	0.7601	0.04	Q	.	.	.	V.
23.583	0.7604	0.04	Q	.	.	.	V.
23.667	0.7607	0.04	Q	.	.	.	V.
23.750	0.7610	0.04	Q	.	.	.	V.
23.833	0.7613	0.04	Q	.	.	.	V.
23.917	0.7615	0.04	Q	.	.	.	V.
24.000	0.7618	0.04	Q	.	.	.	V.
24.083	0.7621	0.04	Q	.	.	.	V.
24.167	0.7623	0.03	Q	.	.	.	V.
24.250	0.7624	0.02	Q	.	.	.	V.
24.333	0.7625	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	45.0
20%	30.0
30%	25.0
40%	20.0
50%	15.0
60%	15.0
70%	15.0
80%	5.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'C'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         16.00       97.00       75.(AMC II)     0.200       0.044

    TOTAL AREA (Acres) =     16.00

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.194

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.956
==========================================================================
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**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
             USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'C'                                                              *
 ************************************************************************

  FILE NAME: WE-C.DAT
  TIME/DATE OF STUDY: 11:03 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      16.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.194
         LOW LOSS FRACTION = 0.956
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.369



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	2.593	5.018
2	17.076	28.024
3	43.597	51.319
4	72.304	55.549
5	88.291	30.934
6	95.315	13.592
7	98.055	5.303
8	98.849	1.535
9	99.440	1.144
10	99.776	0.650
11	99.944	0.325
12	100.000	0.108

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.1834
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.5496

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0001	0.01	Q	.	.	.	.
0.333	0.0002	0.02	Q	.	.	.	.
0.417	0.0004	0.02	Q	.	.	.	.
0.500	0.0005	0.02	Q	.	.	.	.
0.583	0.0007	0.02	Q	.	.	.	.
0.667	0.0008	0.02	Q	.	.	.	.
0.750	0.0010	0.02	Q	.	.	.	.
0.833	0.0011	0.02	Q	.	.	.	.
0.917	0.0013	0.02	Q	.	.	.	.
1.000	0.0015	0.02	Q	.	.	.	.
1.083	0.0016	0.02	Q	.	.	.	.
1.167	0.0018	0.02	Q	.	.	.	.
1.250	0.0019	0.02	Q	.	.	.	.
1.333	0.0021	0.02	Q	.	.	.	.
1.417	0.0023	0.02	Q	.	.	.	.
1.500	0.0024	0.02	Q	.	.	.	.
1.583	0.0026	0.02	Q	.	.	.	.
1.667	0.0028	0.02	Q	.	.	.	.
1.750	0.0029	0.02	Q	.	.	.	.
1.833	0.0031	0.02	Q	.	.	.	.
1.917	0.0033	0.02	Q	.	.	.	.
2.000	0.0034	0.02	Q	.	.	.	.
2.083	0.0036	0.02	Q	.	.	.	.
2.167	0.0038	0.02	Q	.	.	.	.
2.250	0.0039	0.02	Q	.	.	.	.
2.333	0.0041	0.02	Q	.	.	.	.
2.417	0.0043	0.02	Q	.	.	.	.
2.500	0.0044	0.02	Q	.	.	.	.
2.583	0.0046	0.02	Q	.	.	.	.
2.667	0.0048	0.03	Q	.	.	.	.
2.750	0.0050	0.03	Q	.	.	.	.
2.833	0.0051	0.03	Q	.	.	.	.
2.917	0.0053	0.03	Q	.	.	.	.
3.000	0.0055	0.03	Q	.	.	.	.
3.083	0.0057	0.03	Q	.	.	.	.
3.167	0.0058	0.03	Q	.	.	.	.
3.250	0.0060	0.03	Q	.	.	.	.
3.333	0.0062	0.03	Q	.	.	.	.
3.417	0.0064	0.03	Q	.	.	.	.
3.500	0.0066	0.03	Q	.	.	.	.
3.583	0.0067	0.03	Q	.	.	.	.
3.667	0.0069	0.03	Q	.	.	.	.
3.750	0.0071	0.03	Q	.	.	.	.
3.833	0.0073	0.03	Q	.	.	.	.
3.917	0.0075	0.03	Q	.	.	.	.
4.000	0.0076	0.03	Q	.	.	.	.
4.083	0.0078	0.03	Q	.	.	.	.
4.167	0.0080	0.03	Q	.	.	.	.
4.250	0.0082	0.03	Q	.	.	.	.
4.333	0.0084	0.03	Q	.	.	.	.
4.417	0.0086	0.03	Q	.	.	.	.
4.500	0.0088	0.03	Q	.	.	.	.
4.583	0.0090	0.03	Q	.	.	.	.
4.667	0.0091	0.03	Q	.	.	.	.
4.750	0.0093	0.03	Q	.	.	.	.
4.833	0.0095	0.03	Q	.	.	.	.
4.917	0.0097	0.03	Q	.	.	.	.
5.000	0.0099	0.03	Q	.	.	.	.

5.083	0.0101	0.03	Q	.	.	.	.
5.167	0.0103	0.03	Q	.	.	.	.
5.250	0.0105	0.03	Q	.	.	.	.
5.333	0.0107	0.03	Q	.	.	.	.
5.417	0.0109	0.03	Q	.	.	.	.
5.500	0.0111	0.03	Q	.	.	.	.
5.583	0.0113	0.03	Q	.	.	.	.
5.667	0.0115	0.03	Q	.	.	.	.
5.750	0.0117	0.03	Q	.	.	.	.
5.833	0.0119	0.03	Q	.	.	.	.
5.917	0.0121	0.03	Q	.	.	.	.
6.000	0.0123	0.03	Q	.	.	.	.
6.083	0.0125	0.03	Q	.	.	.	.
6.167	0.0127	0.03	Q	.	.	.	.
6.250	0.0129	0.03	Q	.	.	.	.
6.333	0.0132	0.03	Q	.	.	.	.
6.417	0.0134	0.03	Q	.	.	.	.
6.500	0.0136	0.03	Q	.	.	.	.
6.583	0.0138	0.03	QV	.	.	.	.
6.667	0.0140	0.03	QV	.	.	.	.
6.750	0.0142	0.03	QV	.	.	.	.
6.833	0.0144	0.03	QV	.	.	.	.
6.917	0.0147	0.03	QV	.	.	.	.
7.000	0.0149	0.03	QV	.	.	.	.
7.083	0.0151	0.03	QV	.	.	.	.
7.167	0.0153	0.03	QV	.	.	.	.
7.250	0.0155	0.03	QV	.	.	.	.
7.333	0.0158	0.03	QV	.	.	.	.
7.417	0.0160	0.03	QV	.	.	.	.
7.500	0.0162	0.03	QV	.	.	.	.
7.583	0.0164	0.03	QV	.	.	.	.
7.667	0.0167	0.03	QV	.	.	.	.
7.750	0.0169	0.03	QV	.	.	.	.
7.833	0.0171	0.03	QV	.	.	.	.
7.917	0.0174	0.03	QV	.	.	.	.
8.000	0.0176	0.03	QV	.	.	.	.
8.083	0.0178	0.03	QV	.	.	.	.
8.167	0.0181	0.03	QV	.	.	.	.
8.250	0.0183	0.03	QV	.	.	.	.
8.333	0.0186	0.04	QV	.	.	.	.
8.417	0.0188	0.04	QV	.	.	.	.
8.500	0.0191	0.04	QV	.	.	.	.
8.583	0.0193	0.04	QV	.	.	.	.
8.667	0.0196	0.04	QV	.	.	.	.
8.750	0.0198	0.04	QV	.	.	.	.
8.833	0.0201	0.04	QV	.	.	.	.
8.917	0.0203	0.04	QV	.	.	.	.
9.000	0.0206	0.04	QV	.	.	.	.
9.083	0.0208	0.04	QV	.	.	.	.
9.167	0.0211	0.04	QV	.	.	.	.
9.250	0.0213	0.04	QV	.	.	.	.
9.333	0.0216	0.04	QV	.	.	.	.
9.417	0.0219	0.04	QV	.	.	.	.
9.500	0.0221	0.04	QV	.	.	.	.
9.583	0.0224	0.04	QV	.	.	.	.
9.667	0.0227	0.04	QV	.	.	.	.
9.750	0.0229	0.04	QV	.	.	.	.
9.833	0.0232	0.04	QV	.	.	.	.
9.917	0.0235	0.04	QV	.	.	.	.
10.000	0.0238	0.04	QV	.	.	.	.
10.083	0.0241	0.04	QV	.	.	.	.
10.167	0.0243	0.04	QV	.	.	.	.
10.250	0.0246	0.04	QV	.	.	.	.
10.333	0.0249	0.04	QV	.	.	.	.
10.417	0.0252	0.04	QV	.	.	.	.
10.500	0.0255	0.04	QV	.	.	.	.
10.583	0.0258	0.04	QV	.	.	.	.
10.667	0.0261	0.04	QV	.	.	.	.
10.750	0.0264	0.04	QV	.	.	.	.
10.833	0.0267	0.04	QV	.	.	.	.
10.917	0.0270	0.04	QV	.	.	.	.

11.000	0.0273	0.05	QV	.	.	.	.
11.083	0.0276	0.05	Q V	.	.	.	.
11.167	0.0280	0.05	Q V	.	.	.	.
11.250	0.0283	0.05	Q V	.	.	.	.
11.333	0.0286	0.05	Q V	.	.	.	.
11.417	0.0289	0.05	Q V	.	.	.	.
11.500	0.0293	0.05	Q V	.	.	.	.
11.583	0.0296	0.05	Q V	.	.	.	.
11.667	0.0299	0.05	Q V	.	.	.	.
11.750	0.0303	0.05	Q V	.	.	.	.
11.833	0.0306	0.05	Q V	.	.	.	.
11.917	0.0310	0.05	Q V	.	.	.	.
12.000	0.0313	0.05	Q V	.	.	.	.
12.083	0.0317	0.05	Q V	.	.	.	.
12.167	0.0321	0.05	Q V	.	.	.	.
12.250	0.0325	0.06	Q V	.	.	.	.
12.333	0.0329	0.06	Q V	.	.	.	.
12.417	0.0334	0.07	Q V	.	.	.	.
12.500	0.0338	0.07	Q V	.	.	.	.
12.583	0.0343	0.07	Q V	.	.	.	.
12.667	0.0348	0.07	Q V	.	.	.	.
12.750	0.0353	0.07	Q V	.	.	.	.
12.833	0.0357	0.07	Q V	.	.	.	.
12.917	0.0362	0.07	Q V	.	.	.	.
13.000	0.0367	0.07	Q V	.	.	.	.
13.083	0.0372	0.07	Q V	.	.	.	.
13.167	0.0378	0.07	Q V	.	.	.	.
13.250	0.0383	0.08	Q V	.	.	.	.
13.333	0.0388	0.08	Q V	.	.	.	.
13.417	0.0394	0.08	Q V	.	.	.	.
13.500	0.0399	0.08	Q V	.	.	.	.
13.583	0.0405	0.08	Q V	.	.	.	.
13.667	0.0410	0.08	Q V	.	.	.	.
13.750	0.0416	0.08	Q V	.	.	.	.
13.833	0.0422	0.09	Q V	.	.	.	.
13.917	0.0428	0.09	Q V	.	.	.	.
14.000	0.0434	0.09	Q V	.	.	.	.
14.083	0.0440	0.09	Q V	.	.	.	.
14.167	0.0447	0.09	Q V	.	.	.	.
14.250	0.0453	0.10	Q V	.	.	.	.
14.333	0.0460	0.10	Q V	.	.	.	.
14.417	0.0467	0.10	Q V	.	.	.	.
14.500	0.0474	0.10	Q V	.	.	.	.
14.583	0.0482	0.11	Q V	.	.	.	.
14.667	0.0490	0.11	Q V	.	.	.	.
14.750	0.0497	0.11	Q V	.	.	.	.
14.833	0.0505	0.12	Q V	.	.	.	.
14.917	0.0514	0.12	Q V	.	.	.	.
15.000	0.0522	0.12	Q V	.	.	.	.
15.083	0.0531	0.13	Q V	.	.	.	.
15.167	0.0541	0.14	Q V	.	.	.	.
15.250	0.0553	0.18	Q V	.	.	.	.
15.333	0.0571	0.26	Q V	.	.	.	.
15.417	0.0597	0.37	Q V	.	.	.	.
15.500	0.0629	0.47	Q V	.	.	.	.
15.583	0.0666	0.54	.Q V	.	.	.	.
15.667	0.0710	0.64	.Q V	.	.	.	.
15.750	0.0771	0.89	.Q V	.	.	.	.
15.833	0.0862	1.31	. Q V	.	.	.	.
15.917	0.0996	1.95	. Q V	.	.	.	.
16.000	0.1203	3.00	. Q V	.	.	.	.
16.083	0.1562	5.22	. QV	.	.	.	.
16.167	0.2239	9.83	.	. V Q.	.	.	.
16.250	0.3166	13.45	.	. V Q	.	.	.
16.333	0.4065	13.06	.	. Q V.	.	.	.
16.417	0.4622	8.08	.	. Q	.	. V	.
16.500	0.4915	4.26	. Q	.	.	. V	.
16.583	0.5064	2.16	. Q	.	.	. V	.
16.667	0.5139	1.10	. Q	.	.	. V	.
16.750	0.5187	0.69	.Q	.	.	. V	.
16.833	0.5215	0.41	Q	.	.	. V	.

16.917	0.5233	0.26	Q	.	.	.	V .
17.000	0.5244	0.17	Q	.	.	.	V .
17.083	0.5253	0.13	Q	.	.	.	V .
17.167	0.5261	0.11	Q	.	.	.	V .
17.250	0.5268	0.10	Q	.	.	.	V .
17.333	0.5275	0.10	Q	.	.	.	V .
17.417	0.5281	0.09	Q	.	.	.	V .
17.500	0.5287	0.09	Q	.	.	.	V .
17.583	0.5293	0.08	Q	.	.	.	V .
17.667	0.5299	0.08	Q	.	.	.	V .
17.750	0.5304	0.08	Q	.	.	.	V .
17.833	0.5309	0.08	Q	.	.	.	V .
17.917	0.5314	0.07	Q	.	.	.	V .
18.000	0.5319	0.07	Q	.	.	.	V .
18.083	0.5324	0.07	Q	.	.	.	V .
18.167	0.5329	0.07	Q	.	.	.	V .
18.250	0.5333	0.06	Q	.	.	.	V .
18.333	0.5337	0.06	Q	.	.	.	V .
18.417	0.5341	0.05	Q	.	.	.	V .
18.500	0.5344	0.05	Q	.	.	.	V .
18.583	0.5348	0.05	Q	.	.	.	V .
18.667	0.5351	0.05	Q	.	.	.	V .
18.750	0.5354	0.05	Q	.	.	.	V .
18.833	0.5357	0.05	Q	.	.	.	V .
18.917	0.5361	0.05	Q	.	.	.	V.
19.000	0.5364	0.04	Q	.	.	.	V.
19.083	0.5367	0.04	Q	.	.	.	V.
19.167	0.5370	0.04	Q	.	.	.	V.
19.250	0.5373	0.04	Q	.	.	.	V.
19.333	0.5375	0.04	Q	.	.	.	V.
19.417	0.5378	0.04	Q	.	.	.	V.
19.500	0.5381	0.04	Q	.	.	.	V.
19.583	0.5384	0.04	Q	.	.	.	V.
19.667	0.5387	0.04	Q	.	.	.	V.
19.750	0.5389	0.04	Q	.	.	.	V.
19.833	0.5392	0.04	Q	.	.	.	V.
19.917	0.5394	0.04	Q	.	.	.	V.
20.000	0.5397	0.04	Q	.	.	.	V.
20.083	0.5399	0.04	Q	.	.	.	V.
20.167	0.5402	0.04	Q	.	.	.	V.
20.250	0.5404	0.04	Q	.	.	.	V.
20.333	0.5407	0.03	Q	.	.	.	V.
20.417	0.5409	0.03	Q	.	.	.	V.
20.500	0.5411	0.03	Q	.	.	.	V.
20.583	0.5414	0.03	Q	.	.	.	V.
20.667	0.5416	0.03	Q	.	.	.	V.
20.750	0.5418	0.03	Q	.	.	.	V.
20.833	0.5420	0.03	Q	.	.	.	V.
20.917	0.5423	0.03	Q	.	.	.	V.
21.000	0.5425	0.03	Q	.	.	.	V.
21.083	0.5427	0.03	Q	.	.	.	V.
21.167	0.5429	0.03	Q	.	.	.	V.
21.250	0.5431	0.03	Q	.	.	.	V.
21.333	0.5433	0.03	Q	.	.	.	V.
21.417	0.5435	0.03	Q	.	.	.	V.
21.500	0.5437	0.03	Q	.	.	.	V.
21.583	0.5440	0.03	Q	.	.	.	V.
21.667	0.5442	0.03	Q	.	.	.	V.
21.750	0.5444	0.03	Q	.	.	.	V.
21.833	0.5445	0.03	Q	.	.	.	V.
21.917	0.5447	0.03	Q	.	.	.	V.
22.000	0.5449	0.03	Q	.	.	.	V.
22.083	0.5451	0.03	Q	.	.	.	V.
22.167	0.5453	0.03	Q	.	.	.	V.
22.250	0.5455	0.03	Q	.	.	.	V.
22.333	0.5457	0.03	Q	.	.	.	V.
22.417	0.5459	0.03	Q	.	.	.	V.
22.500	0.5461	0.03	Q	.	.	.	V.
22.583	0.5462	0.03	Q	.	.	.	V.
22.667	0.5464	0.03	Q	.	.	.	V.
22.750	0.5466	0.03	Q	.	.	.	V.

22.833	0.5468	0.03	Q	.	.	.	V.
22.917	0.5470	0.03	Q	.	.	.	V.
23.000	0.5471	0.03	Q	.	.	.	V.
23.083	0.5473	0.03	Q	.	.	.	V.
23.167	0.5475	0.02	Q	.	.	.	V.
23.250	0.5476	0.02	Q	.	.	.	V.
23.333	0.5478	0.02	Q	.	.	.	V.
23.417	0.5480	0.02	Q	.	.	.	V.
23.500	0.5482	0.02	Q	.	.	.	V.
23.583	0.5483	0.02	Q	.	.	.	V.
23.667	0.5485	0.02	Q	.	.	.	V.
23.750	0.5486	0.02	Q	.	.	.	V.
23.833	0.5488	0.02	Q	.	.	.	V.
23.917	0.5490	0.02	Q	.	.	.	V.
24.000	0.5491	0.02	Q	.	.	.	V.
24.083	0.5493	0.02	Q	.	.	.	V.
24.167	0.5494	0.02	Q	.	.	.	V.
24.250	0.5495	0.01	Q	.	.	.	V.
24.333	0.5495	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	45.0
20%	35.0
30%	30.0
40%	20.0
50%	20.0
60%	20.0
70%	15.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

2-YR STUDY

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

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******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2016 Advanced Engineering Software (aes)
              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                        Planning * Engineering * Surveying
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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 2-YR STUDY                                                             *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: WEST-A.DAT
  TIME/DATE OF STUDY: 10:40 01/12/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.774
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    57    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.18

******************************************************************************
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```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.18
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.598
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =    6.10
  EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =       8.06

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.06
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.518
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =    6.07
  EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
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------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.72
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   1.44
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    57    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    8.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.659
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.26
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.39
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.659
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.24

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.60
  RAINFALL INTENSITY(INCH/HR) =   1.66
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.72   10.95    1.444  0.20( 0.04) 0.20      10.3       1.00
      2        1.24    8.60    1.659  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.66    8.60    1.659  0.20( 0.04) 0.19       8.9       5.00
      2       14.79   10.95    1.444  0.20( 0.04) 0.19      11.1       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.79    Tc(MIN.) =    10.95
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20     0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
```

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  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   4.45   Tc(MIN.) =   10.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.458
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.64      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    2.12
  EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       3.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.70
  FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.35
  TOTAL STREAM AREA(ACRES) =       2.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.04

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.66    8.73    1.644  0.20( 0.04) 0.19       8.9       5.00
      1       14.79   11.08    1.434  0.20( 0.04) 0.19      11.1       1.00
      2        3.04   10.77    1.458  0.20( 0.02) 0.10       2.3       8.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.44    8.73    1.644  0.20( 0.03) 0.17      10.8       5.00
      2       17.68   10.77    1.458  0.20( 0.04) 0.18      13.2       8.00
      3       17.78   11.08    1.434  0.20( 0.04) 0.18      13.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.78    Tc(MIN.) =    11.08
  EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       13.5
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.78
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.27
  RAINFALL INTENSITY(INCH/HR) =   1.42
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.78

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    57    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   4.35   Tc(MIN.) =   11.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.410
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.00
  FLOW VELOCITY(FEET/SEC.) =  2.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.64

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.44    8.93    1.623  0.20( 0.03) 0.17      10.8       5.00
      1       17.68   10.96    1.443  0.20( 0.04) 0.18      13.2       8.00
      1       17.78   11.27    1.420  0.20( 0.04) 0.18      13.5       1.00
      2        2.64   11.41    1.410  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.83    8.93    1.623  0.20( 0.03) 0.16      12.5       5.00
      2       20.28   10.96    1.443  0.20( 0.03) 0.17      15.2       8.00
      3       20.41   11.27    1.420  0.20( 0.03) 0.17      15.6       1.00
      4       20.29   11.41    1.410  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.41    Tc(MIN.) =    11.27
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.41
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.23
  RAINFALL INTENSITY(INCH/HR) =   1.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.41

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.161
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    57    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    7.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.50
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   1.85
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.83    9.91    1.529  0.20( 0.03) 0.16      12.5       5.00
      1       20.28   11.92    1.375  0.20( 0.03) 0.17      15.2       8.00
      1       20.41   12.23    1.355  0.20( 0.03) 0.17      15.6       1.00
      1       20.29   12.37    1.346  0.20( 0.03) 0.17      15.6      11.00
      2        1.86    7.10    1.851  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.26    7.10    1.851  0.20( 0.03) 0.16      10.1      14.00
      2       20.36    9.91    1.529  0.20( 0.03) 0.16      13.6       5.00
      3       21.65   11.92    1.375  0.20( 0.03) 0.16      16.4       8.00
      4       21.76   12.23    1.355  0.20( 0.03) 0.16      16.7       1.00
      5       21.64   12.37    1.346  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.76    Tc(MIN.) =    12.23
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.76
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.55
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.33      0.20      0.100    57    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    6.96
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.03

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   1.87
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.26    7.44    1.802  0.20( 0.03) 0.16      10.1      14.00
      1       20.36   10.25    1.500  0.20( 0.03) 0.16      13.6       5.00
      1       21.65   12.25    1.354  0.20( 0.03) 0.16      16.4       8.00
      1       21.76   12.55    1.334  0.20( 0.03) 0.16      16.7       1.00
      1       21.64   12.70    1.326  0.20( 0.03) 0.16      16.7      11.00
      2        1.03    6.96    1.873  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.79    6.96    1.873  0.20( 0.03) 0.15      10.0      17.00
      2       19.25    7.44    1.802  0.20( 0.03) 0.15      10.7      14.00
      3       21.18   10.25    1.500  0.20( 0.03) 0.16      14.2       5.00
      4       22.40   12.25    1.354  0.20( 0.03) 0.16      17.0       8.00
      5       22.50   12.55    1.334  0.20( 0.03) 0.16      17.3       1.00
      6       22.37   12.70    1.326  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.50    Tc(MIN.) =    12.55
  EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      22.50
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.65
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.50

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.815
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    57    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.51
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      2.51

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.51
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.687
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =    5.54
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =       7.87

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   1.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.87

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.79    7.06    1.858  0.20( 0.03) 0.15      10.0      17.00
      1       19.25    7.54    1.788  0.20( 0.03) 0.15      10.7      14.00
      1       21.18   10.34    1.492  0.20( 0.03) 0.16      14.2       5.00
      1       22.40   12.34    1.348  0.20( 0.03) 0.16      17.0       8.00
      1       22.50   12.65    1.329  0.20( 0.03) 0.16      17.3       1.00
      1       22.37   12.79    1.320  0.20( 0.03) 0.16      17.4      11.00
      2        7.87    8.34    1.687  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.13    7.06    1.858  0.20( 0.03) 0.17      14.5      17.00
      2       26.80    7.54    1.788  0.20( 0.03) 0.17      15.5      14.00
      3       27.68    8.34    1.687  0.20( 0.03) 0.17      17.0      19.00
      4       28.12   10.34    1.492  0.20( 0.03) 0.17      19.6       5.00
      5       28.65   12.34    1.348  0.20( 0.03) 0.17      22.3       8.00
      6       28.66   12.65    1.329  0.20( 0.03) 0.17      22.6       1.00
      7       28.48   12.79    1.320  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.66    Tc(MIN.) =    12.65
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.66
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.16
  RAINFALL INTENSITY(INCH/HR) =   1.25
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.66

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.914
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    57    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   1.91
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.48

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.972
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20      0.100    57    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.46
```

```
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   1.97
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.13    8.58    1.661  0.20( 0.03) 0.17      14.5      17.00
      1       26.80    9.06    1.610  0.20( 0.03) 0.17      15.5      14.00
      1       27.68    9.85    1.534  0.20( 0.03) 0.17      17.0      19.00
      1       28.12   11.85    1.379  0.20( 0.03) 0.17      19.6       5.00
      1       28.65   13.85    1.261  0.20( 0.03) 0.17      22.3       8.00
      1       28.66   14.16    1.246  0.20( 0.03) 0.17      22.6       1.00
      1       28.48   14.30    1.238  0.20( 0.03) 0.17      22.7      11.00
      2        0.48    6.70    1.914  0.20( 0.02) 0.10       0.3      22.00
      3        0.46    6.36    1.972  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.00    6.36    1.972  0.20( 0.03) 0.17      11.3      40.00
      2       24.51    6.70    1.914  0.20( 0.03) 0.17      11.9      22.00
      3       26.93    8.58    1.661  0.20( 0.03) 0.17      15.1      17.00
      4       27.58    9.06    1.610  0.20( 0.03) 0.17      16.0      14.00
      5       28.41    9.85    1.534  0.20( 0.03) 0.17      17.6      19.00
      6       28.78   11.85    1.379  0.20( 0.03) 0.17      20.1       5.00
      7       29.25   13.85    1.261  0.20( 0.03) 0.17      22.8       8.00
      8       29.25   14.16    1.246  0.20( 0.03) 0.17      23.2       1.00
      9       29.08   14.30    1.238  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.25    Tc(MIN.) =    14.16
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   14.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.31
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.25

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20      0.100    57    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    5.79
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20      0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.09

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
 FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.09
 PIPE TRAVEL TIME(MIN.) =   4.06    Tc(MIN.) =    9.85
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.85
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.534
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =    9.99
 EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      10.79

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.79
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.87
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.87
 RAINFALL INTENSITY(INCH/HR) =   1.53
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =       8.02
 TOTAL STREAM AREA(ACRES) =       8.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.00    6.52    1.944  0.20( 0.03) 0.17      11.3      40.00
```

```
     1       24.51    6.86    1.888  0.20( 0.03) 0.17      11.9      22.00
     1       26.93    8.73    1.643  0.20( 0.03) 0.17      15.1      17.00
     1       27.58    9.21    1.594  0.20( 0.03) 0.17      16.0      14.00
     1       28.41   10.01    1.520  0.20( 0.03) 0.17      17.6      19.00
     1       28.78   12.01    1.369  0.20( 0.03) 0.17      20.1       5.00
     1       29.25   14.01    1.253  0.20( 0.03) 0.17      22.8       8.00
     1       29.25   14.31    1.238  0.20( 0.03) 0.17      23.2       1.00
     1       29.08   14.46    1.230  0.20( 0.03) 0.17      23.2      11.00
     2       10.79    9.87    1.532  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.10    6.52    1.944  0.20( 0.03) 0.17      16.6      40.00
      2       33.80    6.86    1.888  0.20( 0.03) 0.17      17.5      22.00
      3       37.19    8.73    1.643  0.20( 0.03) 0.17      22.2      17.00
      4       38.07    9.21    1.594  0.20( 0.03) 0.17      23.5      14.00
      5       39.06    9.87    1.532  0.20( 0.03) 0.17      25.3      24.00
      6       39.12   10.01    1.520  0.20( 0.03) 0.17      25.6      19.00
      7       38.40   12.01    1.369  0.20( 0.03) 0.17      28.1       5.00
      8       38.03   14.01    1.253  0.20( 0.03) 0.17      30.9       8.00
      9       37.92   14.31    1.238  0.20( 0.03) 0.17      31.2       1.00
     10       37.69   14.46    1.230  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.12    Tc(MIN.) =    10.01
  EFFECTIVE AREA(ACRES) =      25.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.12
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   1.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      25.59
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.12

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    57    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.40
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      2.40

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.709
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    4.61
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =       6.82

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.94
  RAINFALL INTENSITY(INCH/HR) =   1.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.10    7.09    1.852  0.20( 0.03) 0.17      16.6      40.00
      1       33.80    7.43    1.803  0.20( 0.03) 0.17      17.5      22.00
      1       37.19    9.30    1.585  0.20( 0.03) 0.17      22.2      17.00
      1       38.07    9.76    1.542  0.20( 0.03) 0.17      23.5      14.00
      1       39.06   10.42    1.485  0.20( 0.03) 0.17      25.3      24.00
      1       39.12   10.56    1.474  0.20( 0.03) 0.17      25.6      19.00
      1       38.40   12.56    1.334  0.20( 0.03) 0.17      28.1       5.00
      1       38.03   14.56    1.226  0.20( 0.03) 0.17      30.9       8.00
      1       37.92   14.86    1.211  0.20( 0.03) 0.17      31.2       1.00
      1       37.69   15.01    1.204  0.20( 0.03) 0.17      31.2      11.00
      2        6.82    8.94    1.622  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.30    7.09    1.852  0.20( 0.04) 0.18      20.2      40.00
      2       40.12    7.43    1.803  0.20( 0.04) 0.18      21.2      22.00
      3       43.35    8.94    1.622  0.20( 0.04) 0.18      25.8      29.00
      4       43.86    9.30    1.585  0.20( 0.04) 0.18      26.7      17.00
      5       44.54    9.76    1.542  0.20( 0.04) 0.18      28.1      14.00
      6       45.29   10.42    1.485  0.20( 0.04) 0.18      29.9      24.00
      7       45.30   10.56    1.474  0.20( 0.04) 0.18      30.1      19.00
      8       43.98   12.56    1.334  0.20( 0.04) 0.18      32.7       5.00
      9       43.14   14.56    1.226  0.20( 0.04) 0.18      35.4       8.00
     10       42.97   14.86    1.211  0.20( 0.04) 0.18      35.7       1.00
     11       42.71   15.01    1.204  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.30    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      30.13   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.30
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.98
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.30
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.72
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.13
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.30

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.81      0.20     0.900    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.52
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.52
  RAINFALL INTENSITY(INCH/HR) =   2.14
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.30    7.26    1.828  0.20( 0.04) 0.18      20.2      40.00
      1       40.12    7.60    1.780  0.20( 0.04) 0.18      21.2      22.00
      1       43.35    9.10    1.605  0.20( 0.04) 0.18      25.8      29.00
      1       43.86    9.46    1.569  0.20( 0.04) 0.18      26.7      17.00
      1       44.54    9.93    1.527  0.20( 0.04) 0.18      28.1      14.00
      1       45.29   10.58    1.472  0.20( 0.04) 0.18      29.9      24.00
      1       45.30   10.72    1.461  0.20( 0.04) 0.18      30.1      19.00
      1       43.98   12.72    1.324  0.20( 0.04) 0.18      32.7       5.00
      1       43.14   14.72    1.218  0.20( 0.04) 0.18      35.4       8.00
      1       42.97   15.03    1.204  0.20( 0.04) 0.18      35.7       1.00
      1       42.71   15.18    1.197  0.20( 0.04) 0.18      35.8      11.00
      2        1.52    5.52    2.138  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.60    5.52    2.138  0.20( 0.04) 0.21      16.2      34.00
      2       40.58    7.26    1.828  0.20( 0.04) 0.21      21.0      40.00
      3       41.36    7.60    1.780  0.20( 0.04) 0.21      22.1      22.00
      4       44.46    9.10    1.605  0.20( 0.04) 0.20      26.6      29.00
      5       44.94    9.46    1.569  0.20( 0.04) 0.20      27.5      17.00
      6       45.59    9.93    1.527  0.20( 0.04) 0.20      28.9      14.00
      7       46.29   10.58    1.472  0.20( 0.04) 0.20      30.7      24.00
      8       46.29   10.72    1.461  0.20( 0.04) 0.20      30.9      19.00
      9       44.86   12.72    1.324  0.20( 0.04) 0.20      33.5       5.00
     10       43.95   14.72    1.218  0.20( 0.04) 0.19      36.2       8.00
     11       43.76   15.03    1.204  0.20( 0.04) 0.19      36.6       1.00
     12       43.50   15.18    1.197  0.20( 0.04) 0.19      36.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.29    Tc(MIN.) =    10.72
  EFFECTIVE AREA(ACRES) =      30.94   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       36.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.29
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.94
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      46.29

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    57    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.25
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.73
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.73
  RAINFALL INTENSITY(INCH/HR) =   1.76
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.60    5.57    2.128  0.20( 0.04) 0.21      16.2      34.00
      1       40.58    7.31    1.821  0.20( 0.04) 0.21      21.0      40.00
```

```
     1       41.36    7.64    1.774  0.20( 0.04) 0.21      22.1      22.00
     1       44.46    9.15    1.600  0.20( 0.04) 0.20      26.6      29.00
     1       44.94    9.51    1.565  0.20( 0.04) 0.20      27.5      17.00
     1       45.59    9.97    1.523  0.20( 0.04) 0.20      28.9      14.00
     1       46.29   10.63    1.469  0.20( 0.04) 0.20      30.7      24.00
     1       46.29   10.77    1.458  0.20( 0.04) 0.20      30.9      19.00
     1       44.86   12.77    1.322  0.20( 0.04) 0.20      33.5       5.00
     1       43.95   14.77    1.216  0.20( 0.04) 0.19      36.2       8.00
     1       43.76   15.07    1.201  0.20( 0.04) 0.19      36.6       1.00
     1       43.50   15.22    1.195  0.20( 0.04) 0.19      36.6      11.00
     2        3.25    7.73    1.762  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.44    5.57    2.128  0.20( 0.04) 0.21      17.7      34.00
      2       43.75    7.31    1.821  0.20( 0.04) 0.21      23.0      40.00
      3       44.59    7.64    1.774  0.20( 0.04) 0.20      24.1      22.00
      4       44.79    7.73    1.762  0.20( 0.04) 0.20      24.4      37.00
      5       47.40    9.15    1.600  0.20( 0.04) 0.20      28.7      29.00
      6       47.81    9.51    1.565  0.20( 0.04) 0.20      29.6      17.00
      7       48.38    9.97    1.523  0.20( 0.04) 0.20      30.9      14.00
      8       48.98   10.63    1.469  0.20( 0.04) 0.20      32.7      24.00
      9       48.96   10.77    1.458  0.20( 0.04) 0.20      33.0      19.00
     10       47.28   12.77    1.322  0.20( 0.04) 0.20      35.5       5.00
     11       46.16   14.77    1.216  0.20( 0.04) 0.19      38.3       8.00
     12       45.95   15.07    1.201  0.20( 0.04) 0.19      38.6       1.00
     13       45.67   15.22    1.195  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.98    Tc(MIN.) =    10.63
  EFFECTIVE AREA(ACRES) =      32.73   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.98
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.39
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.73
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.98

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.26      0.20     0.100    57    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.55      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    0.91
 EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.34

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.06
 RAINFALL INTENSITY(INCH/HR) =   1.86
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.44    6.38    1.968  0.20( 0.04) 0.21      17.7      34.00
     1       43.75    8.10    1.716  0.20( 0.04) 0.21      23.0      40.00
     1       44.59    8.44    1.676  0.20( 0.04) 0.20      24.1      22.00
     1       44.79    8.53    1.666  0.20( 0.04) 0.20      24.4      37.00
     1       47.40    9.92    1.528  0.20( 0.04) 0.20      28.7      29.00
     1       47.81   10.28    1.497  0.20( 0.04) 0.20      29.6      17.00
     1       48.38   10.74    1.459  0.20( 0.04) 0.20      30.9      14.00
     1       48.98   11.39    1.411  0.20( 0.04) 0.20      32.7      24.00
     1       48.96   11.54    1.401  0.20( 0.04) 0.20      33.0      19.00
     1       47.28   13.54    1.278  0.20( 0.04) 0.20      35.5       5.00
     1       46.16   15.54    1.181  0.20( 0.04) 0.19      38.3       8.00
     1       45.95   15.85    1.167  0.20( 0.04) 0.19      38.6       1.00
     1       45.67   16.02    1.160  0.20( 0.04) 0.19      38.6      11.00
```

```
     2        1.34    7.06    1.857  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.72    6.38    1.968  0.20( 0.04) 0.21      18.4      34.00
      2       42.47    7.06    1.857  0.20( 0.04) 0.21      20.6      40.00
      3       44.98    8.10    1.716  0.20( 0.04) 0.20      23.8      40.00
      4       45.80    8.44    1.676  0.20( 0.04) 0.20      24.9      22.00
      5       45.99    8.53    1.666  0.20( 0.04) 0.20      25.2      37.00
      6       48.50    9.92    1.528  0.20( 0.04) 0.20      29.5      29.00
      7       48.89   10.28    1.497  0.20( 0.04) 0.20      30.4      17.00
      8       49.43   10.74    1.459  0.20( 0.04) 0.20      31.8      14.00
      9       50.00   11.39    1.411  0.20( 0.04) 0.20      33.5      24.00
     10       49.97   11.54    1.401  0.20( 0.04) 0.20      33.8      19.00
     11       48.20   13.54    1.278  0.20( 0.04) 0.19      36.3       5.00
     12       47.01   15.54    1.181  0.20( 0.04) 0.19      39.1       8.00
     13       46.79   15.85    1.167  0.20( 0.04) 0.19      39.4       1.00
     14       46.51   16.02    1.160  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      50.00    Tc(MIN.) =    11.39
  EFFECTIVE AREA(ACRES) =      33.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.00
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.54
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.00

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.892
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.43      0.20     0.100    57    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.72
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      0.72

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   1.89
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.72

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       40.72    6.46    1.954  0.20( 0.04) 0.21      18.4      34.00
     1       42.47    7.14    1.845  0.20( 0.04) 0.21      20.6      40.00
     1       44.98    8.18    1.706  0.20( 0.04) 0.20      23.8      40.00
     1       45.80    8.52    1.667  0.20( 0.04) 0.20      24.9      22.00
     1       45.99    8.61    1.657  0.20( 0.04) 0.20      25.2      37.00
     1       48.50   10.00    1.521  0.20( 0.04) 0.20      29.5      29.00
     1       48.89   10.36    1.490  0.20( 0.04) 0.20      30.4      17.00
     1       49.43   10.82    1.453  0.20( 0.04) 0.20      31.8      14.00
     1       50.00   11.47    1.405  0.20( 0.04) 0.20      33.5      24.00
     1       49.97   11.61    1.396  0.20( 0.04) 0.20      33.8      19.00
     1       48.20   13.62    1.274  0.20( 0.04) 0.19      36.3       5.00
     1       47.01   15.62    1.177  0.20( 0.04) 0.19      39.1       8.00
     1       46.79   15.93    1.164  0.20( 0.04) 0.19      39.4       1.00
     1       46.51   16.10    1.157  0.20( 0.04) 0.19      39.5      11.00
     2        0.72    6.83    1.892  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.43    6.46    1.954  0.20( 0.04) 0.21      18.8      34.00
     2       42.41    6.83    1.892  0.20( 0.04) 0.21      20.0      42.00
     3       43.18    7.14    1.845  0.20( 0.04) 0.20      21.0      40.00
     4       45.64    8.18    1.706  0.20( 0.04) 0.20      24.2      40.00
     5       46.44    8.52    1.667  0.20( 0.04) 0.20      25.3      22.00
     6       46.62    8.61    1.657  0.20( 0.04) 0.20      25.6      37.00
     7       49.08   10.00    1.521  0.20( 0.04) 0.20      29.9      29.00
     8       49.45   10.36    1.490  0.20( 0.04) 0.20      30.8      17.00
     9       49.99   10.82    1.453  0.20( 0.04) 0.20      32.2      14.00
    10       50.53   11.47    1.405  0.20( 0.04) 0.19      34.0      24.00
    11       50.50   11.61    1.396  0.20( 0.04) 0.19      34.2      19.00
    12       48.68   13.62    1.274  0.20( 0.04) 0.19      36.8       5.00
    13       47.46   15.62    1.177  0.20( 0.04) 0.19      39.5       8.00
    14       47.23   15.93    1.164  0.20( 0.04) 0.19      39.9       1.00
    15       46.95   16.10    1.157  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.53    Tc(MIN.) =    11.47
```

```
  EFFECTIVE AREA(ACRES) =      33.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       39.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.53
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   11.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.90
  RAINFALL INTENSITY(INCH/HR) =   1.38
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.97
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.53

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20      0.100    57    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    8.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    0.64
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.49
  FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   1.70
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    57    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.91
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.91
  RAINFALL INTENSITY(INCH/HR) =   1.88
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.43    6.91    1.880  0.20( 0.04) 0.21      18.8      34.00
      1       42.41    7.28    1.824  0.20( 0.04) 0.21      20.0      42.00
      1       43.18    7.59    1.782  0.20( 0.04) 0.20      21.0      40.00
      1       45.64    8.62    1.656  0.20( 0.04) 0.20      24.2      40.00
      1       46.44    8.95    1.621  0.20( 0.04) 0.20      25.3      22.00
      1       46.62    9.04    1.611  0.20( 0.04) 0.20      25.6      37.00
      1       49.08   10.42    1.485  0.20( 0.04) 0.20      29.9      29.00
      1       49.45   10.79    1.456  0.20( 0.04) 0.20      30.8      17.00
      1       49.99   11.25    1.421  0.20( 0.04) 0.20      32.2      14.00
      1       50.53   11.90    1.376  0.20( 0.04) 0.19      34.0      24.00
      1       50.50   12.04    1.367  0.20( 0.04) 0.19      34.2      19.00
      1       48.68   14.05    1.251  0.20( 0.04) 0.19      36.8       5.00
      1       47.46   16.05    1.159  0.20( 0.04) 0.19      39.5       8.00
      1       47.23   16.36    1.146  0.20( 0.04) 0.19      39.9       1.00
      1       46.95   16.53    1.140  0.20( 0.04) 0.19      39.9      11.00
      2        1.20    8.20    1.704  0.20( 0.02) 0.10       0.8      44.00
      3        1.24    6.91    1.880  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.78    6.91    1.880  0.20( 0.04) 0.20      20.2      34.00
      2       43.78    6.91    1.880  0.20( 0.04) 0.20      20.2      40.00
      3       44.75    7.28    1.824  0.20( 0.04) 0.20      21.5      42.00
      4       45.51    7.59    1.782  0.20( 0.04) 0.20      22.5      40.00
      5       46.97    8.20    1.704  0.20( 0.04) 0.20      24.4      44.00
      6       47.89    8.62    1.656  0.20( 0.04) 0.19      25.7      40.00
      7       48.64    8.95    1.621  0.20( 0.04) 0.19      26.9      22.00
      8       48.82    9.04    1.611  0.20( 0.04) 0.19      27.1      37.00
      9       51.10   10.42    1.485  0.20( 0.04) 0.19      31.4      29.00
     10       51.43   10.79    1.456  0.20( 0.04) 0.19      32.3      17.00
     11       51.92   11.25    1.421  0.20( 0.04) 0.19      33.7      14.00
     12       52.40   11.90    1.376  0.20( 0.04) 0.19      35.5      24.00
     13       52.36   12.04    1.367  0.20( 0.04) 0.19      35.8      19.00
     14       50.38   14.05    1.251  0.20( 0.04) 0.19      38.3       5.00
     15       49.02   16.05    1.159  0.20( 0.04) 0.19      41.0       8.00
     16       48.78   16.36    1.146  0.20( 0.04) 0.19      41.4       1.00
```

```
     17       48.49   16.53    1.140  0.20( 0.04) 0.19      41.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.40    Tc(MIN.) =    11.90
  EFFECTIVE AREA(ACRES) =      35.49   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.40
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =   13.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.40
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   13.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    57    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.52
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      2.52

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.52
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.05
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.610
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   13.16
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      15.42

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.00
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.42
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   1.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.42

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    57    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
  STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    8.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.33
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.38
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.38
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
```

```
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       1.33

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.33
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.46
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.46
  RAINFALL INTENSITY(INCH/HR) =   1.67
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.42   10.30    1.495  0.20( 0.04) 0.20      10.9      48.00
      2        1.33    8.46    1.674  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.55    8.46    1.674  0.20( 0.04) 0.19       9.8      51.00
      2       16.61   10.30    1.495  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.61    Tc(MIN.) =    10.30
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.61
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.74
 RAINFALL INTENSITY(INCH/HR) =   1.46
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      11.79
 TOTAL STREAM AREA(ACRES) =      11.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.61

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.120
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.17      0.20     0.100    57    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   2.12
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.32

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.55    8.91    1.625  0.20( 0.04) 0.19       9.8      51.00
     1       16.61   10.74    1.459  0.20( 0.04) 0.19      11.8      48.00
     2        0.32    5.60    2.120  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.16    5.60    2.120  0.20( 0.04) 0.19       6.4      53.00
     2       15.80    8.91    1.625  0.20( 0.04) 0.19      10.0      51.00
     3       16.83   10.74    1.459  0.20( 0.04) 0.19      12.0      48.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.83    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.83
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   11.30
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.30
  RAINFALL INTENSITY(INCH/HR) =   1.42
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.83

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    57    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.72
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.645
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =    5.01
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       5.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.40
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.72
  RAINFALL INTENSITY(INCH/HR) =   1.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.16    6.20    2.000  0.20( 0.04) 0.19       6.4      53.00
      1       15.80    9.47    1.569  0.20( 0.04) 0.19      10.0      51.00
      1       16.83   11.30    1.418  0.20( 0.04) 0.19      12.0      48.00
      2        5.32    8.72    1.645  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.78    6.20    2.000  0.20( 0.04) 0.19       9.0      53.00
      2       20.51    8.72    1.645  0.20( 0.04) 0.19      12.9      56.00
      3       20.87    9.47    1.569  0.20( 0.04) 0.19      13.7      51.00
      4       21.39   11.30    1.418  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.39    Tc(MIN.) =    11.30
```

```
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.39
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.50
  RAINFALL INTENSITY(INCH/HR) =   1.40
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.39

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.386
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 D        1.10      0.20      0.850    57   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.20
  PIPE TRAVEL TIME(MIN.) =   2.99    Tc(MIN.) =   14.75
```

```
 LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.75
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                D        8.75      0.20     0.850    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =    8.24
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =       9.28

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.75
 RAINFALL INTENSITY(INCH/HR) =   1.22
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.28

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.78    6.40    1.964  0.20( 0.04) 0.19       9.0      53.00
     1       20.51    8.92    1.623  0.20( 0.04) 0.19      12.9      56.00
     1       20.87    9.67    1.550  0.20( 0.04) 0.19      13.7      51.00
     1       21.39   11.50    1.404  0.20( 0.04) 0.19      15.6      48.00
     2        9.28   14.75    1.217  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.68    6.40    1.964  0.20( 0.08) 0.40      13.3      53.00
     2       28.31    8.92    1.623  0.20( 0.08) 0.40      18.8      56.00
     3       28.89    9.67    1.550  0.20( 0.08) 0.40      20.2      51.00
     4       29.92   11.50    1.404  0.20( 0.08) 0.41      23.3      48.00
     5       27.74   14.75    1.217  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      29.92    Tc(MIN.) =    11.50
 EFFECTIVE AREA(ACRES) =      23.32   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.92
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   11.74
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.68    6.67    1.919  0.20( 0.08) 0.40      13.3      53.00
     2       28.31    9.17    1.598  0.20( 0.08) 0.40      18.8      56.00
     3       28.89    9.92    1.528  0.20( 0.08) 0.40      20.2      51.00
     4       29.92   11.74    1.387  0.20( 0.08) 0.41      23.3      48.00
     5       27.74   15.00    1.205  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.78    9.09    1.606  0.20( 0.04) 0.20      20.2      34.00
     2       43.78    9.09    1.606  0.20( 0.04) 0.20      20.2      40.00
     3       44.75    9.46    1.570  0.20( 0.04) 0.20      21.5      42.00
     4       45.51    9.76    1.542  0.20( 0.04) 0.20      22.5      40.00
     5       46.97   10.37    1.489  0.20( 0.04) 0.20      24.4      44.00
     6       47.89   10.73    1.460  0.20( 0.04) 0.19      25.7      40.00
     7       48.64   11.06    1.435  0.20( 0.04) 0.19      26.9      22.00
     8       48.82   11.15    1.428  0.20( 0.04) 0.19      27.1      37.00
     9       51.10   12.52    1.336  0.20( 0.04) 0.19      31.4      29.00
    10       51.43   12.88    1.315  0.20( 0.04) 0.19      32.3      17.00
    11       51.92   13.34    1.289  0.20( 0.04) 0.19      33.7      14.00
    12       52.40   13.99    1.254  0.20( 0.04) 0.19      35.5      24.00
    13       52.36   14.13    1.247  0.20( 0.04) 0.19      35.8      19.00
    14       50.38   16.15    1.155  0.20( 0.04) 0.19      38.3       5.00
    15       49.02   18.16    1.080  0.20( 0.04) 0.19      41.0       8.00
    16       48.78   18.47    1.069  0.20( 0.04) 0.19      41.4       1.00
    17       48.49   18.64    1.064  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       63.21    6.67    1.919  0.20( 0.06) 0.30      28.1      53.00
     2       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      34.00
     3       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      40.00
     4       72.31    9.17    1.598  0.20( 0.06) 0.29      39.3      56.00
     5       73.28    9.46    1.570  0.20( 0.06) 0.29      40.8      42.00
     6       74.28    9.76    1.542  0.20( 0.06) 0.29      42.3      40.00
     7       74.78    9.92    1.528  0.20( 0.06) 0.29      43.1      51.00
     8       76.11   10.37    1.489  0.20( 0.06) 0.29      45.4      44.00
     9       77.24   10.73    1.460  0.20( 0.06) 0.29      47.3      40.00
    10       78.18   11.06    1.435  0.20( 0.06) 0.29      49.0      22.00
    11       78.40   11.15    1.428  0.20( 0.06) 0.29      49.4      37.00
    12       79.72   11.74    1.387  0.20( 0.06) 0.29      52.3      48.00
    13       80.49   12.52    1.336  0.20( 0.06) 0.29      55.3      29.00
    14       80.59   12.88    1.315  0.20( 0.06) 0.29      56.4      17.00
    15       80.77   13.34    1.289  0.20( 0.06) 0.29      58.1      14.00
    16       80.82   13.99    1.254  0.20( 0.06) 0.29      60.3      24.00
    17       80.68   14.13    1.247  0.20( 0.06) 0.29      60.7      19.00
    18       79.25   15.00    1.205  0.20( 0.06) 0.29      62.3      59.00
    19       76.87   16.15    1.155  0.20( 0.06) 0.29      63.8       5.00
    20       73.65   18.16    1.080  0.20( 0.06) 0.29      66.5       8.00
    21       73.15   18.47    1.069  0.20( 0.06) 0.29      66.9       1.00
```

```
     22       72.71   18.64    1.064  0.20( 0.06) 0.29      66.9      11.00
    TOTAL AREA(ACRES) =        66.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       80.82  Tc(MIN.) =   13.991
  EFFECTIVE AREA(ACRES) =     60.31  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     13.99
  EFFECTIVE AREA(ACRES) =     60.31  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.291
  PEAK FLOW RATE(CFS)   =      80.82

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.21    6.67    1.919  0.20( 0.06) 0.30      28.1      53.00
      2       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      34.00
      3       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      40.00
      4       72.31    9.17    1.598  0.20( 0.06) 0.29      39.3      56.00
      5       73.28    9.46    1.570  0.20( 0.06) 0.29      40.8      42.00
      6       74.28    9.76    1.542  0.20( 0.06) 0.29      42.3      40.00
      7       74.78    9.92    1.528  0.20( 0.06) 0.29      43.1      51.00
      8       76.11   10.37    1.489  0.20( 0.06) 0.29      45.4      44.00
      9       77.24   10.73    1.460  0.20( 0.06) 0.29      47.3      40.00
     10       78.18   11.06    1.435  0.20( 0.06) 0.29      49.0      22.00
     11       78.40   11.15    1.428  0.20( 0.06) 0.29      49.4      37.00
     12       79.72   11.74    1.387  0.20( 0.06) 0.29      52.3      48.00
     13       80.49   12.52    1.336  0.20( 0.06) 0.29      55.3      29.00
     14       80.59   12.88    1.315  0.20( 0.06) 0.29      56.4      17.00
     15       80.77   13.34    1.289  0.20( 0.06) 0.29      58.1      14.00
     16       80.82   13.99    1.254  0.20( 0.06) 0.29      60.3      24.00
     17       80.68   14.13    1.247  0.20( 0.06) 0.29      60.7      19.00
     18       79.25   15.00    1.205  0.20( 0.06) 0.29      62.3      59.00
     19       76.87   16.15    1.155  0.20( 0.06) 0.29      63.8       5.00
     20       73.65   18.16    1.080  0.20( 0.06) 0.29      66.5       8.00
     21       73.15   18.47    1.069  0.20( 0.06) 0.29      66.9       1.00
     22       72.71   18.64    1.064  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         66.90       29.00       75.(AMC II)     0.200       0.637

    TOTAL AREA (Acres) =     66.90

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.058

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.363
==========================================================================
```

```
******************************************************************************

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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                       Planning * Engineering * Surveying
            Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: WP-A.DAT
  TIME/DATE OF STUDY: 10:35 01/14/2022


******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      66.900 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.134 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.058
         LOW LOSS FRACTION = 0.363
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.997
          30-MINUTE FACTOR = 0.997
           1-HOUR FACTOR = 0.997
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  62.143



==============================================================================
                      UNIT HYDROGRAPH DETERMINATION

------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	6.866	55.549
2	43.778	298.650
3	83.351	320.167
4	96.304	104.799
5	98.837	20.497
6	99.517	5.501
7	99.807	2.345
8	99.952	1.172
9	100.000	0.391

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 3.3045
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 8.1185

==========

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	22.5	45.0	67.5	90.0
0.083	0.0007	0.09	Q	.	.	.	.
0.167	0.0048	0.60	Q	.	.	.	.
0.250	0.0127	1.15	Q	.	.	.	.
0.333	0.0219	1.33	Q	.	.	.	.
0.417	0.0313	1.37	Q	.	.	.	.
0.500	0.0408	1.38	Q	.	.	.	.
0.583	0.0504	1.39	Q	.	.	.	.
0.667	0.0600	1.40	Q	.	.	.	.
0.750	0.0697	1.40	Q	.	.	.	.
0.833	0.0794	1.41	Q	.	.	.	.
0.917	0.0891	1.41	Q	.	.	.	.
1.000	0.0989	1.42	Q	.	.	.	.
1.083	0.1087	1.42	Q	.	.	.	.
1.167	0.1185	1.43	Q	.	.	.	.
1.250	0.1284	1.43	Q	.	.	.	.
1.333	0.1383	1.44	Q	.	.	.	.
1.417	0.1482	1.44	Q	.	.	.	.
1.500	0.1582	1.45	Q	.	.	.	.
1.583	0.1682	1.45	Q	.	.	.	.
1.667	0.1782	1.46	Q	.	.	.	.
1.750	0.1883	1.46	Q	.	.	.	.
1.833	0.1984	1.47	Q	.	.	.	.
1.917	0.2085	1.47	QV	.	.	.	.
2.000	0.2187	1.48	QV	.	.	.	.
2.083	0.2289	1.48	QV	.	.	.	.
2.167	0.2392	1.49	QV	.	.	.	.
2.250	0.2495	1.50	QV	.	.	.	.
2.333	0.2599	1.50	QV	.	.	.	.
2.417	0.2702	1.51	QV	.	.	.	.
2.500	0.2806	1.51	QV	.	.	.	.
2.583	0.2911	1.52	QV	.	.	.	.
2.667	0.3016	1.52	QV	.	.	.	.
2.750	0.3121	1.53	QV	.	.	.	.
2.833	0.3227	1.54	QV	.	.	.	.
2.917	0.3333	1.54	QV	.	.	.	.
3.000	0.3440	1.55	QV	.	.	.	.
3.083	0.3547	1.55	QV	.	.	.	.
3.167	0.3655	1.56	QV	.	.	.	.
3.250	0.3762	1.57	QV	.	.	.	.
3.333	0.3871	1.57	QV	.	.	.	.
3.417	0.3980	1.58	QV	.	.	.	.
3.500	0.4089	1.59	Q V	.	.	.	.
3.583	0.4198	1.59	Q V	.	.	.	.
3.667	0.4309	1.60	Q V	.	.	.	.
3.750	0.4419	1.61	Q V	.	.	.	.
3.833	0.4530	1.61	Q V	.	.	.	.
3.917	0.4642	1.62	Q V	.	.	.	.
4.000	0.4754	1.63	Q V	.	.	.	.
4.083	0.4866	1.63	Q V	.	.	.	.
4.167	0.4979	1.64	Q V	.	.	.	.
4.250	0.5093	1.65	Q V	.	.	.	.
4.333	0.5207	1.65	Q V	.	.	.	.
4.417	0.5321	1.66	Q V	.	.	.	.
4.500	0.5436	1.67	Q V	.	.	.	.
4.583	0.5552	1.68	Q V	.	.	.	.
4.667	0.5668	1.68	Q V	.	.	.	.
4.750	0.5784	1.69	Q V	.	.	.	.
4.833	0.5901	1.70	Q V	.	.	.	.
4.917	0.6019	1.71	Q V	.	.	.	.
5.000	0.6137	1.72	Q V	.	.	.	.

5.083	0.6256	1.72	Q	V	.	.	.	.
5.167	0.6375	1.73	Q	V	.	.	.	.
5.250	0.6495	1.74	Q	V	.	.	.	.
5.333	0.6615	1.75	Q	V	.	.	.	.
5.417	0.6736	1.76	Q	V	.	.	.	.
5.500	0.6858	1.77	Q	V	.	.	.	.
5.583	0.6980	1.77	Q	V	.	.	.	.
5.667	0.7103	1.78	Q	V	.	.	.	.
5.750	0.7226	1.79	Q	V	.	.	.	.
5.833	0.7350	1.80	Q	V	.	.	.	.
5.917	0.7475	1.81	Q	V	.	.	.	.
6.000	0.7600	1.82	Q	V	.	.	.	.
6.083	0.7726	1.83	Q	V	.	.	.	.
6.167	0.7853	1.84	Q	V	.	.	.	.
6.250	0.7980	1.85	Q	V	.	.	.	.
6.333	0.8108	1.86	Q	V	.	.	.	.
6.417	0.8236	1.87	Q	V	.	.	.	.
6.500	0.8365	1.88	Q	V	.	.	.	.
6.583	0.8495	1.89	Q	V	.	.	.	.
6.667	0.8626	1.90	Q	V	.	.	.	.
6.750	0.8757	1.91	Q	V	.	.	.	.
6.833	0.8890	1.92	Q	V	.	.	.	.
6.917	0.9022	1.93	Q	V	.	.	.	.
7.000	0.9156	1.94	Q	V	.	.	.	.
7.083	0.9290	1.95	Q	V	.	.	.	.
7.167	0.9426	1.96	Q	V	.	.	.	.
7.250	0.9562	1.97	Q	V	.	.	.	.
7.333	0.9698	1.99	Q	V	.	.	.	.
7.417	0.9836	2.00	Q	V	.	.	.	.
7.500	0.9974	2.01	Q	V	.	.	.	.
7.583	1.0113	2.02	Q	V	.	.	.	.
7.667	1.0253	2.03	Q	V	.	.	.	.
7.750	1.0394	2.05	Q	V	.	.	.	.
7.833	1.0536	2.06	Q	V	.	.	.	.
7.917	1.0679	2.07	Q	V	.	.	.	.
8.000	1.0822	2.08	Q	V	.	.	.	.
8.083	1.0967	2.10	Q	V	.	.	.	.
8.167	1.1112	2.11	Q	V	.	.	.	.
8.250	1.1259	2.13	Q	V	.	.	.	.
8.333	1.1406	2.14	Q	V	.	.	.	.
8.417	1.1554	2.15	Q	V	.	.	.	.
8.500	1.1704	2.17	Q	V	.	.	.	.
8.583	1.1854	2.18	Q	V	.	.	.	.
8.667	1.2005	2.20	Q	V	.	.	.	.
8.750	1.2158	2.21	Q	V	.	.	.	.
8.833	1.2311	2.23	Q	V	.	.	.	.
8.917	1.2466	2.24	Q	V	.	.	.	.
9.000	1.2622	2.26	.Q	V	.	.	.	.
9.083	1.2778	2.28	.Q	V	.	.	.	.
9.167	1.2936	2.29	.Q	V	.	.	.	.
9.250	1.3096	2.31	.Q	V	.	.	.	.
9.333	1.3256	2.33	.Q	V	.	.	.	.
9.417	1.3418	2.35	.Q	V	.	.	.	.
9.500	1.3580	2.37	.Q	V	.	.	.	.
9.583	1.3745	2.38	.Q	V	.	.	.	.
9.667	1.3910	2.40	.Q	V	.	.	.	.
9.750	1.4077	2.42	.Q	V	.	.	.	.
9.833	1.4245	2.44	.Q	V	.	.	.	.
9.917	1.4415	2.46	.Q	V	.	.	.	.
10.000	1.4586	2.48	.Q	V	.	.	.	.
10.083	1.4758	2.50	.Q	V	.	.	.	.
10.167	1.4932	2.53	.Q	V	.	.	.	.
10.250	1.5107	2.55	.Q	V	.	.	.	.
10.333	1.5284	2.57	.Q	V	.	.	.	.
10.417	1.5463	2.59	.Q	V	.	.	.	.
10.500	1.5643	2.62	.Q	V	.	.	.	.
10.583	1.5825	2.64	.Q	V	.	.	.	.
10.667	1.6008	2.67	.Q	V	.	.	.	.
10.750	1.6194	2.69	.Q	V	.	.	.	.
10.833	1.6381	2.72	.Q	V	.	.	.	.
10.917	1.6570	2.74	.Q	V	.	.	.	.

11.000	1.6760	2.77	.Q V . . . .
11.083	1.6953	2.80	.Q V . . . .
11.167	1.7148	2.83	.Q V . . . .
11.250	1.7345	2.86	.Q V . . . .
11.333	1.7544	2.89	.Q V . . . .
11.417	1.7745	2.92	.Q V . . . .
11.500	1.7948	2.95	.Q V . . . .
11.583	1.8153	2.98	.Q V . . . .
11.667	1.8361	3.02	.Q V. . . .
11.750	1.8571	3.05	.Q V. . . .
11.833	1.8784	3.09	.Q V. . . .
11.917	1.9000	3.13	.Q V. . . .
12.000	1.9218	3.17	.Q V. . . .
12.083	1.9442	3.25	.Q V. . . .
12.167	1.9687	3.56	.Q V. . . .
12.250	1.9954	3.88	.Q V. . . .
12.333	2.0231	4.02	.Q V. . . .
12.417	2.0512	4.08	.Q V . . .
12.500	2.0797	4.14	.Q V . . .
12.583	2.1085	4.19	.Q V . . .
12.667	2.1378	4.25	.Q V . . .
12.750	2.1674	4.30	.Q V . . .
12.833	2.1974	4.36	.Q V . . .
12.917	2.2279	4.42	.Q V . . .
13.000	2.2587	4.48	.Q .V . . .
13.083	2.2900	4.55	. Q .V . . .
13.167	2.3218	4.61	. Q .V . . .
13.250	2.3541	4.68	. Q .V . . .
13.333	2.3868	4.76	. Q .V . . .
13.417	2.4201	4.83	. Q .V . . .
13.500	2.4539	4.91	. Q . V . . .
13.583	2.4884	5.00	. Q . V . . .
13.667	2.5234	5.09	. Q . V . . .
13.750	2.5591	5.18	. Q . V . . .
13.833	2.5954	5.28	. Q . V . . .
13.917	2.6325	5.38	. Q . V . . .
14.000	2.6703	5.49	. Q . V . . .
14.083	2.7091	5.62	. Q . V . . .
14.167	2.7493	5.84	. Q . V . . .
14.250	2.7910	6.06	. Q . V . . .
14.333	2.8340	6.24	. Q . V . . .
14.417	2.8780	6.39	. Q . V . . .
14.500	2.9232	6.56	. Q . V . . .
14.583	2.9696	6.74	. Q . V . . .
14.667	3.0177	6.99	. Q . V . . .
14.750	3.0679	7.29	. Q . V . . .
14.833	3.1205	7.64	. Q . V . . .
14.917	3.1757	8.02	. Q . V . . .
15.000	3.2339	8.45	. Q . V . . .
15.083	3.2953	8.92	. Q . V . . .
15.167	3.3604	9.46	. Q . V . . .
15.250	3.4297	10.05	. Q . V . . .
15.333	3.5037	10.75	. Q . V . . .
15.417	3.5820	11.37	. Q . V . . .
15.500	3.6607	11.42	. Q . V . . .
15.583	3.7404	11.57	. Q . V . . .
15.667	3.8276	12.66	. Q . V . . .
15.750	3.9267	14.39	. Q . V. . . .
15.833	4.0441	17.05	. Q . V. . . .
15.917	4.1878	20.87	. Q. V . . .
16.000	4.3782	27.65	. . Q .V . . .
16.083	4.6852	44.58	. . Q. V . . .
16.167	5.2417	80.80	. . . V . Q .
16.250	5.7746	77.37	. . . V . Q .
16.333	6.0403	38.59	. . Q . V. . .
16.417	6.1779	19.97	. Q . . V . .
16.500	6.2778	14.52	. Q . . V . .
16.583	6.3635	12.43	. Q . . .V . .
16.667	6.4378	10.79	. Q . . .V . .
16.750	6.5027	9.42	. Q . . . V . .
16.833	6.5603	8.37	. Q . . . V . .

16.917	6.6124	7.57	.	Q	.	.	.	V	.	
17.000	6.6605	6.97	.	Q	.	.	.	V	.	
17.083	6.7054	6.53	.	Q	.	.	.	V	.	
17.167	6.7475	6.11	.	Q	.	.	.	V	.	
17.250	6.7871	5.74	.	Q	.	.	.	V	.	
17.333	6.8247	5.47	.	Q	.	.	.	V	.	
17.417	6.8609	5.25	.	Q	.	.	.	V	.	
17.500	6.8958	5.06	.	Q	.	.	.	V	.	
17.583	6.9295	4.89	.	Q	.	.	.	V	.	
17.667	6.9621	4.74	.	Q	.	.	.	V	.	
17.750	6.9937	4.59	.	Q	.	.	.	V	.	
17.833	7.0245	4.46	.	Q	.	.	.	V	.	
17.917	7.0544	4.34	.	Q	.	.	.	V	.	
18.000	7.0835	4.23	.	Q	.	.	.	V	.	
18.083	7.1116	4.08	.	Q	.	.	.	V	.	
18.167	7.1372	3.72	.	Q	.	.	.	V	.	
18.250	7.1603	3.35	.	Q	.	.	.	V	.	
18.333	7.1822	3.18	.	Q	.	.	.	V	.	
18.417	7.2035	3.09	.	Q	.	.	.	V	.	
18.500	7.2242	3.01	.	Q	.	.	.	V	.	
18.583	7.2445	2.94	.	Q	.	.	.	V	.	
18.667	7.2643	2.88	.	Q	.	.	.	V	.	
18.750	7.2837	2.82	.	Q	.	.	.	V	.	
18.833	7.3027	2.76	.	Q	.	.	.	V	.	
18.917	7.3214	2.71	.	Q	.	.	.	V	.	
19.000	7.3397	2.66	.	Q	.	.	.	V	.	
19.083	7.3576	2.61	.	Q	.	.	.	V	.	
19.167	7.3753	2.56	.	Q	.	.	.	V	.	
19.250	7.3926	2.52	.	Q	.	.	.	V	.	
19.333	7.4097	2.48	.	Q	.	.	.	V	.	
19.417	7.4265	2.44	.	Q	.	.	.	V	.	
19.500	7.4430	2.40	.	Q	.	.	.	V	.	
19.583	7.4592	2.36	.	Q	.	.	.	V	.	
19.667	7.4752	2.32	.	Q	.	.	.	V	.	
19.750	7.4910	2.29	.	Q	.	.	.	V	.	
19.833	7.5065	2.26	.	Q	.	.	.	V	.	
19.917	7.5218	2.22	.	Q	.	.	.	V	.	
20.000	7.5369	2.19	.	Q	.	.	.	V	.	
20.083	7.5518	2.16	.	Q	.	.	.	V	.	
20.167	7.5665	2.13	.	Q	.	.	.	V	.	
20.250	7.5810	2.11	.	Q	.	.	.	V	.	
20.333	7.5954	2.08	.	Q	.	.	.	V	.	
20.417	7.6095	2.05	.	Q	.	.	.	V	.	
20.500	7.6235	2.03	.	Q	.	.	.	V	.	
20.583	7.6373	2.01	.	Q	.	.	.	V	.	
20.667	7.6509	1.98	.	Q	.	.	.	V	.	
20.750	7.6644	1.96	.	Q	.	.	.	V	.	
20.833	7.6778	1.94	.	Q	.	.	.	V	.	
20.917	7.6910	1.91	.	Q	.	.	.	V	.	
21.000	7.7040	1.89	.	Q	.	.	.	V	.	
21.083	7.7169	1.87	.	Q	.	.	.	V	.	
21.167	7.7297	1.85	.	Q	.	.	.	V	.	
21.250	7.7423	1.83	.	Q	.	.	.	V	.	
21.333	7.7548	1.82	.	Q	.	.	.	V	.	
21.417	7.7672	1.80	.	Q	.	.	.	V	.	
21.500	7.7794	1.78	.	Q	.	.	.	V	.	
21.583	7.7916	1.76	.	Q	.	.	.	V	.	
21.667	7.8036	1.75	.	Q	.	.	.	V	.	
21.750	7.8155	1.73	.	Q	.	.	.	V	.	
21.833	7.8273	1.71	.	Q	.	.	.	V	.	
21.917	7.8390	1.70	.	Q	.	.	.	V	.	
22.000	7.8506	1.68	.	Q	.	.	.	V	.	
22.083	7.8621	1.67	.	Q	.	.	.	V	.	
22.167	7.8734	1.65	.	Q	.	.	.	V	.	
22.250	7.8847	1.64	.	Q	.	.	.	V	.	
22.333	7.8959	1.62	.	Q	.	.	.	V	.	
22.417	7.9070	1.61	.	Q	.	.	.	V	.	
22.500	7.9180	1.60	.	Q	.	.	.	V	.	
22.583	7.9289	1.58	.	Q	.	.	.	V	.	
22.667	7.9397	1.57	.	Q	.	.	.	V	.	
22.750	7.9505	1.56	.	Q	.	.	.	V	.	

22.833	7.9611	1.55	Q	.	.	.	V.
22.917	7.9717	1.53	Q	.	.	.	V.
23.000	7.9821	1.52	Q	.	.	.	V.
23.083	7.9926	1.51	Q	.	.	.	V.
23.167	8.0029	1.50	Q	.	.	.	V.
23.250	8.0131	1.49	Q	.	.	.	V.
23.333	8.0233	1.48	Q	.	.	.	V.
23.417	8.0334	1.47	Q	.	.	.	V.
23.500	8.0434	1.46	Q	.	.	.	V.
23.583	8.0534	1.45	Q	.	.	.	V.
23.667	8.0633	1.44	Q	.	.	.	V.
23.750	8.0731	1.43	Q	.	.	.	V.
23.833	8.0828	1.42	Q	.	.	.	V.
23.917	8.0925	1.41	Q	.	.	.	V.
24.000	8.1021	1.40	Q	.	.	.	V.
24.083	8.1111	1.29	Q	.	.	.	V.
24.167	8.1164	0.78	Q	.	.	.	V.
24.250	8.1180	0.23	Q	.	.	.	V.
24.333	8.1184	0.05	Q	.	.	.	V.
24.417	8.1185	0.02	Q	.	.	.	V.
24.500	8.1185	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1470.0
10%	115.0
20%	40.0
30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                              *
 ************************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 11:26 11/09/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    57    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      1.31

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.10
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.31
 PIPE TRAVEL TIME(MIN.) =   2.85    Tc(MIN.) =   12.41
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.41
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.343
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   11.21
 EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      12.33

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.33
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   13.16
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.60      0.20     0.100    57    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   4.42   Tc(MIN.) =   11.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.427
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    1.99
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.44
  FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.17
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.03      0.20     0.900    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.93
  TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      1.93

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.93
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   2.19
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.03
  TOTAL STREAM AREA(ACRES) =       1.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.93

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.75   11.17    1.427  0.20( 0.02) 0.10       2.2       4.00
      2        1.93    5.28    2.194  0.20( 0.18) 0.90       1.0       6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.94    5.28    2.194  0.20( 0.10) 0.50       2.1       6.00
      2        3.94   11.17    1.427  0.20( 0.07) 0.36       3.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.94    Tc(MIN.) =    11.17
  EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.40
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94    5.51    2.141  0.20( 0.10) 0.50       2.1       6.00
      2        3.94   11.40    1.410  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.33   13.16    1.299  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.73    5.51    2.141  0.20( 0.10) 0.50       6.7       6.00
      2       15.62   11.40    1.410  0.20( 0.09) 0.46      12.8       4.00
      3       15.94   13.16    1.299  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       15.94  Tc(MIN.) =   13.156
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.16
  RAINFALL INTENSITY(INCH/HR) =   1.30
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.94

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.996
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    57    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   4.92   Tc(MIN.) =   11.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.429
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    1.81
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       2.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   1.43
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.97
 TOTAL STREAM AREA(ACRES) =       1.97
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.50

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.73    5.51    2.141  0.20( 0.10) 0.50       6.7       6.00
     1       15.62   11.40    1.410  0.20( 0.09) 0.46      12.8       4.00
     1       15.94   13.16    1.299  0.20( 0.09) 0.47      14.2       1.00
     2        2.50   11.14    1.429  0.20( 0.02) 0.10       2.0       9.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.59    5.51    2.141  0.20( 0.09) 0.45       7.6       6.00
     2       17.99   11.14    1.429  0.20( 0.08) 0.42      14.5       9.00
     3       18.08   11.40    1.410  0.20( 0.08) 0.42      14.7       4.00
     4       18.21   13.16    1.299  0.20( 0.08) 0.42      16.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.21    Tc(MIN.) =    13.16
 EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =       16.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     13.16
 EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
 PEAK FLOW RATE(CFS)   =      18.21

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.59    5.51    2.141  0.20( 0.09) 0.45       7.6       6.00
     2       17.99   11.14    1.429  0.20( 0.08) 0.42      14.5       9.00
     3       18.08   11.40    1.410  0.20( 0.08) 0.42      14.7       4.00
     4       18.21   13.16    1.299  0.20( 0.08) 0.42      16.2       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'B'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         16.20       42.00       75.(AMC II)     0.200       0.523

    TOTAL AREA (Acres) =     16.20

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.084

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.477
==========================================================================
```

```
******************************************************************************

              F L O O D    R O U T I N G    A N A L Y S I S
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                       Planning * Engineering * Surveying
            Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'B'                                                              *
 ************************************************************************

  FILE NAME: WP-B.DAT
  TIME/DATE OF STUDY: 10:55 01/14/2022


******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      16.200 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.176 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.084
         LOW LOSS FRACTION = 0.477
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  47.483



==============================================================================
                      UNIT HYDROGRAPH DETERMINATION

------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	4.024	7.884
2	26.902	44.823
3	63.826	72.339
4	87.472	46.327
5	96.118	16.941
6	98.490	4.647
7	99.323	1.632
8	99.729	0.795
9	99.932	0.398
10	100.000	0.133

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.0737
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.6929

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0001	0.01	Q	.	.	.	.
0.167	0.0006	0.07	Q	.	.	.	.
0.250	0.0018	0.17	Q	.	.	.	.
0.333	0.0034	0.24	Q	.	.	.	.
0.417	0.0053	0.26	Q	.	.	.	.
0.500	0.0071	0.27	Q	.	.	.	.
0.583	0.0090	0.27	Q	.	.	.	.
0.667	0.0109	0.28	Q	.	.	.	.
0.750	0.0128	0.28	Q	.	.	.	.
0.833	0.0148	0.28	Q	.	.	.	.
0.917	0.0167	0.28	Q	.	.	.	.
1.000	0.0186	0.28	Q	.	.	.	.
1.083	0.0206	0.28	Q	.	.	.	.
1.167	0.0225	0.28	Q	.	.	.	.
1.250	0.0245	0.28	Q	.	.	.	.
1.333	0.0265	0.29	Q	.	.	.	.
1.417	0.0284	0.29	Q	.	.	.	.
1.500	0.0304	0.29	Q	.	.	.	.
1.583	0.0324	0.29	Q	.	.	.	.
1.667	0.0344	0.29	Q	.	.	.	.
1.750	0.0364	0.29	Q	.	.	.	.
1.833	0.0384	0.29	Q	.	.	.	.
1.917	0.0404	0.29	Q	.	.	.	.
2.000	0.0424	0.29	QV	.	.	.	.
2.083	0.0444	0.29	QV	.	.	.	.
2.167	0.0465	0.30	QV	.	.	.	.
2.250	0.0485	0.30	QV	.	.	.	.
2.333	0.0506	0.30	QV	.	.	.	.
2.417	0.0526	0.30	QV	.	.	.	.
2.500	0.0547	0.30	QV	.	.	.	.
2.583	0.0568	0.30	QV	.	.	.	.
2.667	0.0589	0.30	QV	.	.	.	.
2.750	0.0610	0.30	QV	.	.	.	.
2.833	0.0631	0.30	QV	.	.	.	.
2.917	0.0652	0.31	QV	.	.	.	.
3.000	0.0673	0.31	QV	.	.	.	.
3.083	0.0694	0.31	QV	.	.	.	.
3.167	0.0715	0.31	QV	.	.	.	.
3.250	0.0737	0.31	QV	.	.	.	.
3.333	0.0758	0.31	QV	.	.	.	.
3.417	0.0780	0.31	QV	.	.	.	.
3.500	0.0801	0.31	QV	.	.	.	.
3.583	0.0823	0.32	QV	.	.	.	.
3.667	0.0845	0.32	QV	.	.	.	.
3.750	0.0867	0.32	Q V	.	.	.	.
3.833	0.0889	0.32	Q V	.	.	.	.
3.917	0.0911	0.32	Q V	.	.	.	.
4.000	0.0933	0.32	Q V	.	.	.	.
4.083	0.0956	0.32	Q V	.	.	.	.
4.167	0.0978	0.33	Q V	.	.	.	.
4.250	0.1001	0.33	Q V	.	.	.	.
4.333	0.1023	0.33	Q V	.	.	.	.
4.417	0.1046	0.33	Q V	.	.	.	.
4.500	0.1069	0.33	Q V	.	.	.	.
4.583	0.1092	0.33	Q V	.	.	.	.
4.667	0.1115	0.33	Q V	.	.	.	.
4.750	0.1138	0.34	Q V	.	.	.	.
4.833	0.1161	0.34	Q V	.	.	.	.
4.917	0.1184	0.34	Q V	.	.	.	.
5.000	0.1208	0.34	Q V	.	.	.	.

5.083	0.1231	0.34	Q V	.	.	.	.
5.167	0.1255	0.34	Q V	.	.	.	.
5.250	0.1279	0.35	Q V	.	.	.	.
5.333	0.1303	0.35	Q V	.	.	.	.
5.417	0.1327	0.35	Q V	.	.	.	.
5.500	0.1351	0.35	Q V	.	.	.	.
5.583	0.1375	0.35	Q V	.	.	.	.
5.667	0.1399	0.35	Q V	.	.	.	.
5.750	0.1424	0.36	Q V	.	.	.	.
5.833	0.1448	0.36	Q V	.	.	.	.
5.917	0.1473	0.36	Q V	.	.	.	.
6.000	0.1498	0.36	Q V	.	.	.	.
6.083	0.1523	0.36	Q V	.	.	.	.
6.167	0.1548	0.36	Q V	.	.	.	.
6.250	0.1573	0.37	Q V	.	.	.	.
6.333	0.1599	0.37	Q V	.	.	.	.
6.417	0.1624	0.37	Q V	.	.	.	.
6.500	0.1650	0.37	Q V	.	.	.	.
6.583	0.1675	0.37	Q V	.	.	.	.
6.667	0.1701	0.38	Q V	.	.	.	.
6.750	0.1727	0.38	Q V	.	.	.	.
6.833	0.1754	0.38	Q V	.	.	.	.
6.917	0.1780	0.38	Q V	.	.	.	.
7.000	0.1806	0.38	Q V	.	.	.	.
7.083	0.1833	0.39	Q V	.	.	.	.
7.167	0.1860	0.39	Q V	.	.	.	.
7.250	0.1887	0.39	Q V	.	.	.	.
7.333	0.1914	0.39	Q V	.	.	.	.
7.417	0.1941	0.40	Q V	.	.	.	.
7.500	0.1969	0.40	Q V	.	.	.	.
7.583	0.1996	0.40	Q V	.	.	.	.
7.667	0.2024	0.40	Q V	.	.	.	.
7.750	0.2052	0.41	Q V	.	.	.	.
7.833	0.2080	0.41	Q V	.	.	.	.
7.917	0.2108	0.41	Q V	.	.	.	.
8.000	0.2137	0.41	Q V	.	.	.	.
8.083	0.2165	0.42	Q V	.	.	.	.
8.167	0.2194	0.42	Q V	.	.	.	.
8.250	0.2223	0.42	Q V	.	.	.	.
8.333	0.2252	0.42	Q V	.	.	.	.
8.417	0.2282	0.43	Q V	.	.	.	.
8.500	0.2311	0.43	Q V	.	.	.	.
8.583	0.2341	0.43	Q V	.	.	.	.
8.667	0.2371	0.44	Q V	.	.	.	.
8.750	0.2401	0.44	Q V	.	.	.	.
8.833	0.2432	0.44	Q V	.	.	.	.
8.917	0.2462	0.44	Q V	.	.	.	.
9.000	0.2493	0.45	Q V	.	.	.	.
9.083	0.2524	0.45	Q V	.	.	.	.
9.167	0.2555	0.45	Q V	.	.	.	.
9.250	0.2587	0.46	Q V	.	.	.	.
9.333	0.2619	0.46	Q V	.	.	.	.
9.417	0.2651	0.46	Q V	.	.	.	.
9.500	0.2683	0.47	Q V	.	.	.	.
9.583	0.2715	0.47	Q V	.	.	.	.
9.667	0.2748	0.48	Q V	.	.	.	.
9.750	0.2781	0.48	Q V	.	.	.	.
9.833	0.2815	0.48	Q V	.	.	.	.
9.917	0.2848	0.49	Q V	.	.	.	.
10.000	0.2882	0.49	Q V	.	.	.	.
10.083	0.2916	0.50	Q V	.	.	.	.
10.167	0.2951	0.50	Q V	.	.	.	.
10.250	0.2985	0.50	.Q V	.	.	.	.
10.333	0.3020	0.51	.Q V	.	.	.	.
10.417	0.3056	0.51	.Q V	.	.	.	.
10.500	0.3091	0.52	.Q V	.	.	.	.
10.583	0.3127	0.52	.Q V	.	.	.	.
10.667	0.3164	0.53	.Q V	.	.	.	.
10.750	0.3200	0.53	.Q V	.	.	.	.
10.833	0.3237	0.54	.Q V	.	.	.	.
10.917	0.3275	0.54	.Q V	.	.	.	.

11.000	0.3312	0.55	.Q V . . . .
11.083	0.3350	0.55	.Q V . . . .
11.167	0.3389	0.56	.Q V . . . .
11.250	0.3428	0.56	.Q V . . . .
11.333	0.3467	0.57	.Q V . . . .
11.417	0.3507	0.58	.Q V . . . .
11.500	0.3547	0.58	.Q V . . . .
11.583	0.3588	0.59	.Q V . . . .
11.667	0.3629	0.60	.Q V . . . .
11.750	0.3670	0.60	.Q V . . . .
11.833	0.3712	0.61	.Q V . . . .
11.917	0.3755	0.62	.Q V . . . .
12.000	0.3798	0.63	.Q V . . . .
12.083	0.3842	0.64	.Q V. . . .
12.167	0.3889	0.68	.Q V. . . .
12.250	0.3940	0.74	.Q V. . . .
12.333	0.3994	0.78	.Q V. . . .
12.417	0.4049	0.80	.Q V. . . .
12.500	0.4105	0.82	.Q V. . . .
12.583	0.4162	0.83	.Q V. . . .
12.667	0.4220	0.84	.Q V. . . .
12.750	0.4278	0.85	.Q V . . .
12.833	0.4337	0.86	.Q V . . .
12.917	0.4397	0.87	.Q V . . .
13.000	0.4458	0.88	.Q V . . .
13.083	0.4520	0.90	.Q V . . .
13.167	0.4583	0.91	.Q V . . .
13.250	0.4646	0.92	.Q V . . .
13.333	0.4711	0.94	.Q .V . . .
13.417	0.4777	0.95	.Q .V . . .
13.500	0.4843	0.97	.Q .V . . .
13.583	0.4911	0.98	.Q .V . . .
13.667	0.4980	1.00	. Q .V . . .
13.750	0.5050	1.02	. Q .V . . .
13.833	0.5122	1.04	. Q . V . . .
13.917	0.5195	1.06	. Q . V . . .
14.000	0.5269	1.08	. Q . V . . .
14.083	0.5345	1.10	. Q . V . . .
14.167	0.5424	1.14	. Q . V . . .
14.250	0.5505	1.18	. Q . V . . .
14.333	0.5589	1.22	. Q . V . . .
14.417	0.5675	1.25	. Q . V . . .
14.500	0.5763	1.28	. Q . V . . .
14.583	0.5854	1.32	. Q . V . . .
14.667	0.5947	1.35	. Q . V . . .
14.750	0.6043	1.39	. Q . V . . .
14.833	0.6142	1.44	. Q . V . . .
14.917	0.6245	1.49	. Q . V . . .
15.000	0.6353	1.57	. Q . V . . .
15.083	0.6468	1.67	. Q . V . . .
15.167	0.6591	1.79	. Q . V . . .
15.250	0.6724	1.93	. Q . V . . .
15.333	0.6868	2.09	. Q . V . . .
15.417	0.7023	2.24	. Q . V . . .
15.500	0.7182	2.32	. Q . V . . .
15.583	0.7345	2.36	. Q . V . . .
15.667	0.7519	2.53	. Q . V . . .
15.750	0.7717	2.87	. Q . V . . .
15.833	0.7951	3.40	. Q . V . . .
15.917	0.8239	4.19	. Q . V. . .
16.000	0.8618	5.50	. Q V . . .
16.083	0.9204	8.51	. . Q .V . .
16.167	1.0233	14.93	. . . V Q. .
16.250	1.1488	18.23	. . . V . Q .
16.333	1.2375	12.87	. . . Q V. .
16.417	1.2854	6.97	. . Q . V .
16.500	1.3134	4.06	. Q . . .V .
16.583	1.3341	3.00	. Q . . .V .
16.667	1.3511	2.47	. Q . . .V .
16.750	1.3653	2.07	. Q . . . V .
16.833	1.3775	1.76	. Q . . . V .

16.917	1.3882	1.55	.	Q	.	.	.	V	.	
17.000	1.3980	1.43	.	Q	.	.	.	V	.	
17.083	1.4072	1.34	.	Q	.	.	.	V	.	
17.167	1.4159	1.26	.	Q	.	.	.	V	.	
17.250	1.4240	1.18	.	Q	.	.	.	V	.	
17.333	1.4317	1.12	.	Q	.	.	.	V	.	
17.417	1.4390	1.07	.	Q	.	.	.	V	.	
17.500	1.4461	1.03	.	Q	.	.	.	V	.	
17.583	1.4529	0.99	.	Q	.	.	.	V	.	
17.667	1.4595	0.96	.	Q	.	.	.	V	.	
17.750	1.4659	0.93	.	Q	.	.	.	V	.	
17.833	1.4721	0.90	.	Q	.	.	.	V	.	
17.917	1.4782	0.88	.	Q	.	.	.	V	.	
18.000	1.4840	0.85	.	Q	.	.	.	V	.	
18.083	1.4897	0.83	.	Q	.	.	.	V	.	
18.167	1.4950	0.77	.	Q	.	.	.	V	.	
18.250	1.4999	0.70	.	Q	.	.	.	V	.	
18.333	1.5044	0.65	.	Q	.	.	.	V	.	
18.417	1.5087	0.63	.	Q	.	.	.	V	.	
18.500	1.5129	0.61	.	Q	.	.	.	V	.	
18.583	1.5170	0.59	.	Q	.	.	.	V	.	
18.667	1.5210	0.58	.	Q	.	.	.	V	.	
18.750	1.5249	0.57	.	Q	.	.	.	V	.	
18.833	1.5287	0.56	.	Q	.	.	.	V	.	
18.917	1.5324	0.54	.	Q	.	.	.	V	.	
19.000	1.5361	0.53	.	Q	.	.	.	V	.	
19.083	1.5397	0.52	.	Q	.	.	.	V	.	
19.167	1.5433	0.51	.	Q	.	.	.	V	.	
19.250	1.5467	0.51	.	Q	.	.	.	V	.	
19.333	1.5502	0.50	Q	.	.	.	.	V	.	
19.417	1.5535	0.49	Q	.	.	.	.	V	.	
19.500	1.5568	0.48	Q	.	.	.	.	V	.	
19.583	1.5601	0.47	Q	.	.	.	.	V	.	
19.667	1.5633	0.47	Q	.	.	.	.	V	.	
19.750	1.5665	0.46	Q	.	.	.	.	V	.	
19.833	1.5696	0.45	Q	.	.	.	.	V	.	
19.917	1.5726	0.45	Q	.	.	.	.	V	.	
20.000	1.5757	0.44	Q	.	.	.	.	V	.	
20.083	1.5786	0.43	Q	.	.	.	.	V	.	
20.167	1.5816	0.43	Q	.	.	.	.	V	.	
20.250	1.5845	0.42	Q	.	.	.	.	V	.	
20.333	1.5874	0.42	Q	.	.	.	.	V	.	
20.417	1.5902	0.41	Q	.	.	.	.	V	.	
20.500	1.5930	0.41	Q	.	.	.	.	V	.	
20.583	1.5958	0.40	Q	.	.	.	.	V	.	
20.667	1.5985	0.40	Q	.	.	.	.	V	.	
20.750	1.6012	0.39	Q	.	.	.	.	V	.	
20.833	1.6038	0.39	Q	.	.	.	.	V	.	
20.917	1.6065	0.38	Q	.	.	.	.	V	.	
21.000	1.6091	0.38	Q	.	.	.	.	V	.	
21.083	1.6117	0.37	Q	.	.	.	.	V	.	
21.167	1.6142	0.37	Q	.	.	.	.	V	.	
21.250	1.6168	0.37	Q	.	.	.	.	V	.	
21.333	1.6193	0.36	Q	.	.	.	.	V	.	
21.417	1.6217	0.36	Q	.	.	.	.	V	.	
21.500	1.6242	0.36	Q	.	.	.	.	V	.	
21.583	1.6266	0.35	Q	.	.	.	.	V	.	
21.667	1.6290	0.35	Q	.	.	.	.	V	.	
21.750	1.6314	0.35	Q	.	.	.	.	V	.	
21.833	1.6337	0.34	Q	.	.	.	.	V	.	
21.917	1.6361	0.34	Q	.	.	.	.	V	.	
22.000	1.6384	0.34	Q	.	.	.	.	V	.	
22.083	1.6407	0.33	Q	.	.	.	.	V	.	
22.167	1.6430	0.33	Q	.	.	.	.	V	.	
22.250	1.6452	0.33	Q	.	.	.	.	V	.	
22.333	1.6474	0.32	Q	.	.	.	.	V	.	
22.417	1.6497	0.32	Q	.	.	.	.	V	.	
22.500	1.6519	0.32	Q	.	.	.	.	V	.	
22.583	1.6540	0.32	Q	.	.	.	.	V	.	
22.667	1.6562	0.31	Q	.	.	.	.	V	.	
22.750	1.6583	0.31	Q	.	.	.	.	V	.	

22.833	1.6605	0.31	Q	.	.	.	V.
22.917	1.6626	0.31	Q	.	.	.	V.
23.000	1.6647	0.30	Q	.	.	.	V.
23.083	1.6667	0.30	Q	.	.	.	V.
23.167	1.6688	0.30	Q	.	.	.	V.
23.250	1.6708	0.30	Q	.	.	.	V.
23.333	1.6729	0.29	Q	.	.	.	V.
23.417	1.6749	0.29	Q	.	.	.	V.
23.500	1.6769	0.29	Q	.	.	.	V.
23.583	1.6789	0.29	Q	.	.	.	V.
23.667	1.6809	0.29	Q	.	.	.	V.
23.750	1.6828	0.28	Q	.	.	.	V.
23.833	1.6848	0.28	Q	.	.	.	V.
23.917	1.6867	0.28	Q	.	.	.	V.
24.000	1.6886	0.28	Q	.	.	.	V.
24.083	1.6904	0.27	Q	.	.	.	V.
24.167	1.6918	0.20	Q	.	.	.	V.
24.250	1.6925	0.10	Q	.	.	.	V.
24.333	1.6928	0.03	Q	.	.	.	V.
24.417	1.6928	0.01	Q	.	.	.	V.
24.500	1.6929	0.00	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1470.0
10%	95.0
20%	40.0
30%	30.0
40%	20.0
50%	15.0
60%	15.0
70%	15.0
80%	10.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                        Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                              *
 ***********************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 10:42 01/12/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.927
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20     0.200    57    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      2.11

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.11
 PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =    8.73
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.73
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        5.21      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =    7.52
 EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =       9.31

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.73
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.09      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =    5.90
 EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      15.21
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.73
 EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =      15.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'C'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         10.50       20.00       75.(AMC II)     0.200       0.715

    TOTAL AREA (Acres) =     10.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.040

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.285
==========================================================================
```

```
**************************************************************************

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             USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
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           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'C'                                                              *
 ************************************************************************

  FILE NAME: WP-C.DAT
  TIME/DATE OF STUDY: 11:13 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      10.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.108 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.040
         LOW LOSS FRACTION = 0.285
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 1.000
          30-MINUTE FACTOR = 1.000
           1-HOUR FACTOR = 1.000
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  77.375



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	10.503	13.337
2	60.658	63.689
3	92.954	41.011
4	98.668	7.257
5	99.521	1.082
6	99.808	0.365
7	99.952	0.183
8	100.000	0.061

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.3943
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.3987

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0002	0.03	Q	.	.	.	.
0.167	0.0012	0.15	Q	.	.	.	.
0.250	0.0027	0.23	Q	.	.	.	.
0.333	0.0044	0.24	Q	.	.	.	.
0.417	0.0061	0.24	Q	.	.	.	.
0.500	0.0078	0.24	Q	.	.	.	.
0.583	0.0094	0.25	Q	.	.	.	.
0.667	0.0111	0.25	Q	.	.	.	.
0.750	0.0128	0.25	Q	.	.	.	.
0.833	0.0146	0.25	Q	.	.	.	.
0.917	0.0163	0.25	Q	.	.	.	.
1.000	0.0180	0.25	Q	.	.	.	.
1.083	0.0197	0.25	Q	.	.	.	.
1.167	0.0215	0.25	Q	.	.	.	.
1.250	0.0232	0.25	Q	.	.	.	.
1.333	0.0249	0.25	Q	.	.	.	.
1.417	0.0267	0.25	Q	.	.	.	.
1.500	0.0285	0.26	Q	.	.	.	.
1.583	0.0302	0.26	Q	.	.	.	.
1.667	0.0320	0.26	Q	.	.	.	.
1.750	0.0338	0.26	Q	.	.	.	.
1.833	0.0355	0.26	QV	.	.	.	.
1.917	0.0373	0.26	QV	.	.	.	.
2.000	0.0391	0.26	QV	.	.	.	.
2.083	0.0409	0.26	QV	.	.	.	.
2.167	0.0427	0.26	QV	.	.	.	.
2.250	0.0446	0.26	QV	.	.	.	.
2.333	0.0464	0.26	QV	.	.	.	.
2.417	0.0482	0.27	QV	.	.	.	.
2.500	0.0501	0.27	QV	.	.	.	.
2.583	0.0519	0.27	QV	.	.	.	.
2.667	0.0538	0.27	QV	.	.	.	.
2.750	0.0556	0.27	QV	.	.	.	.
2.833	0.0575	0.27	QV	.	.	.	.
2.917	0.0594	0.27	QV	.	.	.	.
3.000	0.0612	0.27	QV	.	.	.	.
3.083	0.0631	0.27	QV	.	.	.	.
3.167	0.0650	0.28	QV	.	.	.	.
3.250	0.0669	0.28	QV	.	.	.	.
3.333	0.0688	0.28	QV	.	.	.	.
3.417	0.0708	0.28	Q V	.	.	.	.
3.500	0.0727	0.28	Q V	.	.	.	.
3.583	0.0746	0.28	Q V	.	.	.	.
3.667	0.0766	0.28	Q V	.	.	.	.
3.750	0.0785	0.28	Q V	.	.	.	.
3.833	0.0805	0.28	Q V	.	.	.	.
3.917	0.0824	0.29	Q V	.	.	.	.
4.000	0.0844	0.29	Q V	.	.	.	.
4.083	0.0864	0.29	Q V	.	.	.	.
4.167	0.0884	0.29	Q V	.	.	.	.
4.250	0.0904	0.29	Q V	.	.	.	.
4.333	0.0924	0.29	Q V	.	.	.	.
4.417	0.0944	0.29	Q V	.	.	.	.
4.500	0.0964	0.29	Q V	.	.	.	.
4.583	0.0985	0.30	Q V	.	.	.	.
4.667	0.1005	0.30	Q V	.	.	.	.
4.750	0.1026	0.30	Q V	.	.	.	.
4.833	0.1047	0.30	Q V	.	.	.	.
4.917	0.1067	0.30	Q V	.	.	.	.
5.000	0.1088	0.30	Q V	.	.	.	.

5.083	0.1109	0.30	Q	V	.	.	.	.
5.167	0.1130	0.31	Q	V	.	.	.	.
5.250	0.1151	0.31	Q	V	.	.	.	.
5.333	0.1173	0.31	Q	V	.	.	.	.
5.417	0.1194	0.31	Q	V	.	.	.	.
5.500	0.1215	0.31	Q	V	.	.	.	.
5.583	0.1237	0.31	Q	V	.	.	.	.
5.667	0.1259	0.31	Q	V	.	.	.	.
5.750	0.1280	0.32	Q	V	.	.	.	.
5.833	0.1302	0.32	Q	V	.	.	.	.
5.917	0.1324	0.32	Q	V	.	.	.	.
6.000	0.1346	0.32	Q	V	.	.	.	.
6.083	0.1369	0.32	Q	V	.	.	.	.
6.167	0.1391	0.32	Q	V	.	.	.	.
6.250	0.1413	0.33	Q	V	.	.	.	.
6.333	0.1436	0.33	Q	V	.	.	.	.
6.417	0.1459	0.33	Q	V	.	.	.	.
6.500	0.1481	0.33	Q	V	.	.	.	.
6.583	0.1504	0.33	Q	V	.	.	.	.
6.667	0.1527	0.33	Q	V	.	.	.	.
6.750	0.1551	0.34	Q	V	.	.	.	.
6.833	0.1574	0.34	Q	V	.	.	.	.
6.917	0.1597	0.34	Q	V	.	.	.	.
7.000	0.1621	0.34	Q	V	.	.	.	.
7.083	0.1645	0.34	Q	V	.	.	.	.
7.167	0.1668	0.35	Q	V	.	.	.	.
7.250	0.1692	0.35	Q	V	.	.	.	.
7.333	0.1717	0.35	Q	V	.	.	.	.
7.417	0.1741	0.35	Q	V	.	.	.	.
7.500	0.1765	0.35	Q	V	.	.	.	.
7.583	0.1790	0.36	Q	V	.	.	.	.
7.667	0.1815	0.36	Q	V	.	.	.	.
7.750	0.1839	0.36	Q	V	.	.	.	.
7.833	0.1865	0.36	Q	V	.	.	.	.
7.917	0.1890	0.37	Q	V	.	.	.	.
8.000	0.1915	0.37	Q	V	.	.	.	.
8.083	0.1941	0.37	Q	V	.	.	.	.
8.167	0.1966	0.37	Q	V	.	.	.	.
8.250	0.1992	0.38	Q	V	.	.	.	.
8.333	0.2018	0.38	Q	V	.	.	.	.
8.417	0.2044	0.38	Q	V	.	.	.	.
8.500	0.2071	0.38	Q	V	.	.	.	.
8.583	0.2097	0.39	Q	V	.	.	.	.
8.667	0.2124	0.39	Q	V	.	.	.	.
8.750	0.2151	0.39	Q	V	.	.	.	.
8.833	0.2178	0.39	Q	V	.	.	.	.
8.917	0.2205	0.40	Q	V	.	.	.	.
9.000	0.2233	0.40	Q	V	.	.	.	.
9.083	0.2260	0.40	Q	V	.	.	.	.
9.167	0.2288	0.41	Q	V	.	.	.	.
9.250	0.2316	0.41	Q	V	.	.	.	.
9.333	0.2345	0.41	Q	V	.	.	.	.
9.417	0.2373	0.41	Q	V	.	.	.	.
9.500	0.2402	0.42	Q	V	.	.	.	.
9.583	0.2431	0.42	Q	V	.	.	.	.
9.667	0.2460	0.42	Q	V	.	.	.	.
9.750	0.2490	0.43	Q	V	.	.	.	.
9.833	0.2520	0.43	Q	V	.	.	.	.
9.917	0.2549	0.43	Q	V	.	.	.	.
10.000	0.2580	0.44	Q	V	.	.	.	.
10.083	0.2610	0.44	Q	V	.	.	.	.
10.167	0.2641	0.45	Q	V	.	.	.	.
10.250	0.2672	0.45	Q	V	.	.	.	.
10.333	0.2703	0.45	Q	V	.	.	.	.
10.417	0.2735	0.46	Q	V	.	.	.	.
10.500	0.2767	0.46	Q	V	.	.	.	.
10.583	0.2799	0.47	Q	V	.	.	.	.
10.667	0.2831	0.47	Q	V	.	.	.	.
10.750	0.2864	0.48	Q	V	.	.	.	.
10.833	0.2897	0.48	Q	V	.	.	.	.
10.917	0.2930	0.48	Q	V	.	.	.	.

11.000	0.2964	0.49	Q V . . . .
11.083	0.2998	0.49	Q V . . . .
11.167	0.3033	0.50	Q V . . . .
11.250	0.3067	0.50	.Q V . . . .
11.333	0.3102	0.51	.Q V . . . .
11.417	0.3138	0.52	.Q V . . . .
11.500	0.3174	0.52	.Q V. . . . .
11.583	0.3210	0.53	.Q V. . . . .
11.667	0.3247	0.53	.Q V. . . . .
11.750	0.3284	0.54	.Q V. . . . .
11.833	0.3322	0.55	.Q V. . . . .
11.917	0.3360	0.55	.Q V. . . . .
12.000	0.3399	0.56	.Q V. . . . .
12.083	0.3438	0.58	.Q V. . . . .
12.167	0.3483	0.65	.Q V. . . . .
12.250	0.3531	0.70	.Q V . . . .
12.333	0.3580	0.71	.Q V . . . .
12.417	0.3630	0.72	.Q V . . . .
12.500	0.3681	0.73	.Q V . . . .
12.583	0.3732	0.74	.Q V . . . .
12.667	0.3783	0.75	.Q V . . . .
12.750	0.3836	0.76	.Q V . . . .
12.833	0.3889	0.77	.Q .V . . . .
12.917	0.3943	0.78	.Q .V . . . .
13.000	0.3997	0.79	.Q .V . . . .
13.083	0.4053	0.80	.Q .V . . . .
13.167	0.4109	0.82	.Q .V . . . .
13.250	0.4166	0.83	.Q .V . . . .
13.333	0.4224	0.84	.Q . V . . . .
13.417	0.4283	0.86	.Q . V . . . .
13.500	0.4343	0.87	.Q . V . . . .
13.583	0.4404	0.89	.Q . V . . . .
13.667	0.4466	0.90	.Q . V . . . .
13.750	0.4529	0.92	.Q . V . . . .
13.833	0.4594	0.94	.Q . V . . . .
13.917	0.4659	0.95	.Q . V . . . .
14.000	0.4726	0.97	.Q . V . . . .
14.083	0.4795	1.00	.Q . V . . . .
14.167	0.4867	1.04	. Q . V . . . .
14.250	0.4942	1.08	. Q . V . . . .
14.333	0.5019	1.12	. Q . V . . . .
14.417	0.5099	1.16	. Q . V . . . .
14.500	0.5182	1.20	. Q . V . . . .
14.583	0.5267	1.24	. Q . V . . . .
14.667	0.5356	1.29	. Q . V . . . .
14.750	0.5449	1.34	. Q . V . . . .
14.833	0.5545	1.40	. Q . V . . . .
14.917	0.5646	1.46	. Q . V . . . .
15.000	0.5752	1.54	. Q . V . . . .
15.083	0.5863	1.61	. Q . V . . . .
15.167	0.5980	1.70	. Q . V . . . .
15.250	0.6104	1.79	. Q . V . . . .
15.333	0.6235	1.91	. Q . V . . . .
15.417	0.6373	2.00	. Q . V . . . .
15.500	0.6509	1.98	. Q . V . . . .
15.583	0.6649	2.03	. Q . V. . . .
15.667	0.6805	2.26	. Q . V. . . .
15.750	0.6980	2.55	. Q . V. . . .
15.833	0.7189	3.04	. Q . V . . .
15.917	0.7444	3.69	. Q . .V . . .
16.000	0.7786	4.98	. Q. . V . . .
16.083	0.8361	8.34	. . Q . V . . .
16.167	0.9405	15.17	. . . V Q . .
16.250	1.0140	10.66	. . .Q V . . .
16.333	1.0451	4.53	. Q. . V. . .
16.417	1.0640	2.73	. Q . . V . .
16.500	1.0796	2.28	. Q . . V . .
16.583	1.0936	2.02	. Q . . .V . .
16.667	1.1059	1.78	. Q . . .V . .
16.750	1.1168	1.59	. Q . . .V . .
16.833	1.1268	1.45	. Q . . . V . .

| | | |

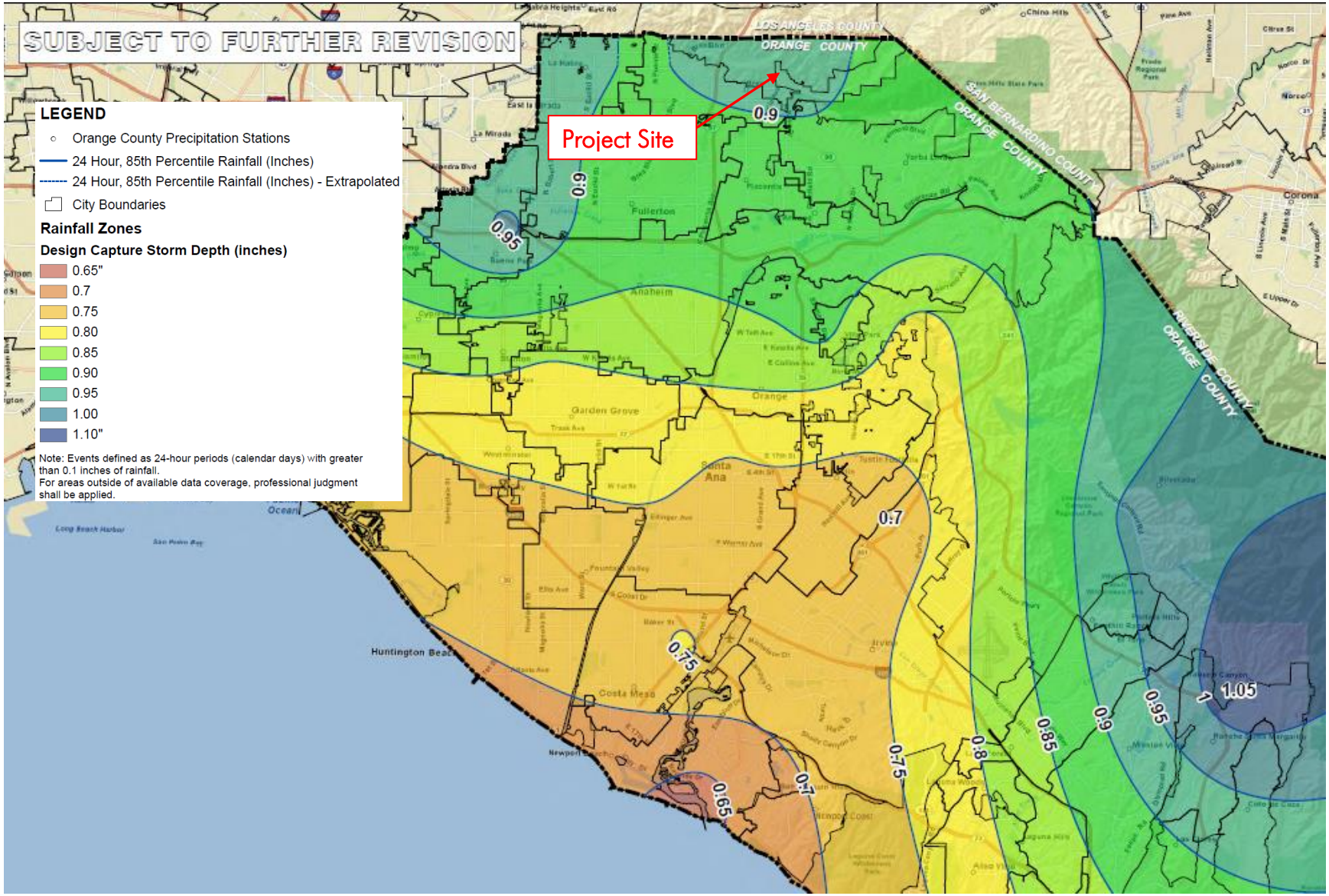
22.833	1.3716	0.27	Q	.	.	.	V.
22.917	1.3735	0.27	Q	.	.	.	V.
23.000	1.3753	0.27	Q	.	.	.	V.
23.083	1.3771	0.27	Q	.	.	.	V.
23.167	1.3789	0.26	Q	.	.	.	V.
23.250	1.3807	0.26	Q	.	.	.	V.
23.333	1.3825	0.26	Q	.	.	.	V.
23.417	1.3843	0.26	Q	.	.	.	V.
23.500	1.3861	0.26	Q	.	.	.	V.
23.583	1.3878	0.25	Q	.	.	.	V.
23.667	1.3896	0.25	Q	.	.	.	V.
23.750	1.3913	0.25	Q	.	.	.	V.
23.833	1.3930	0.25	Q	.	.	.	V.
23.917	1.3947	0.25	Q	.	.	.	V.
24.000	1.3964	0.25	Q	.	.	.	V.
24.083	1.3979	0.22	Q	.	.	.	V.
24.167	1.3986	0.10	Q	.	.	.	V.
24.250	1.3987	0.02	Q	.	.	.	V.
24.333	1.3987	0.00	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

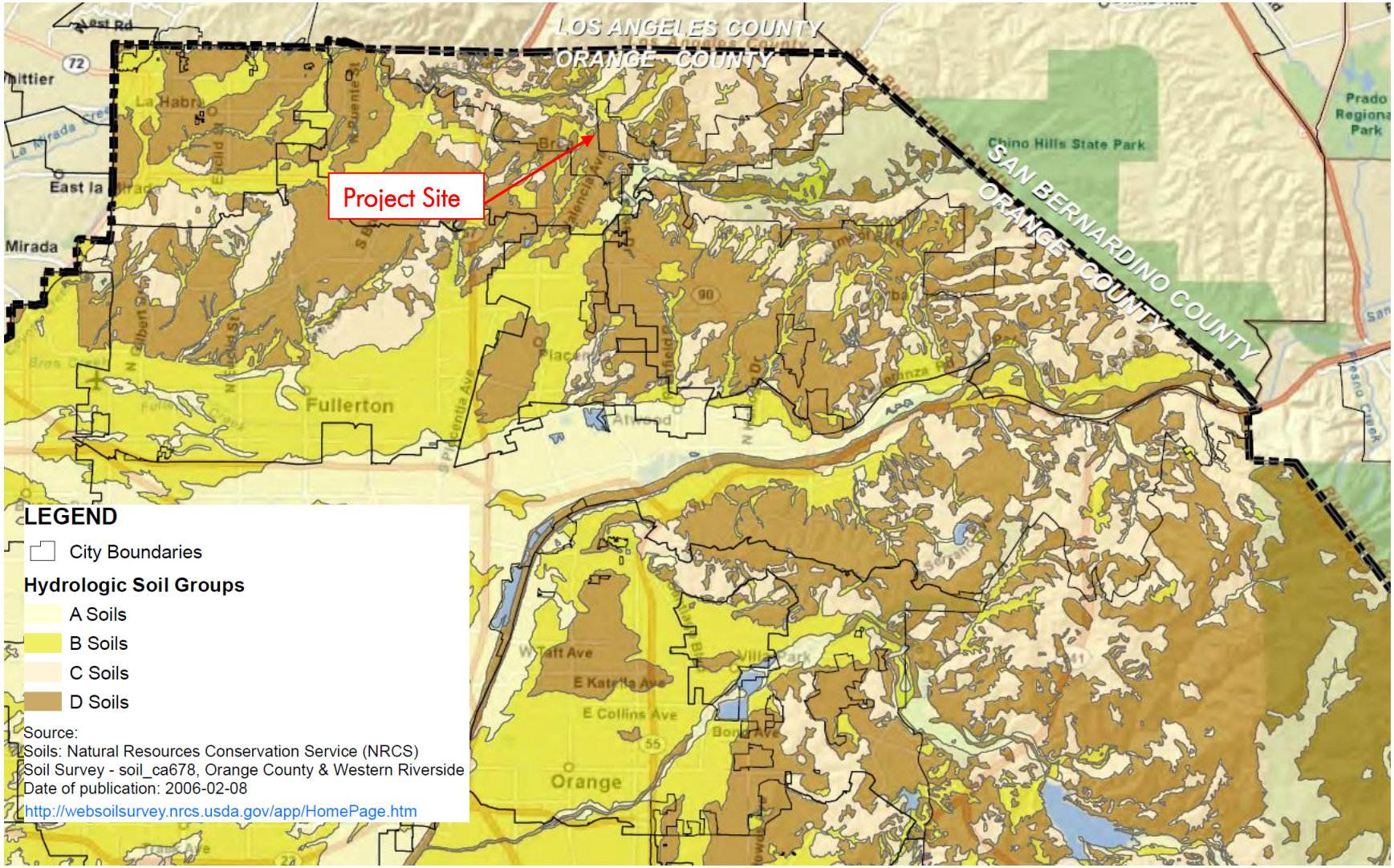
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	110.0
20%	35.0
30%	20.0
40%	15.0
50%	15.0
60%	10.0
70%	10.0
80%	5.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

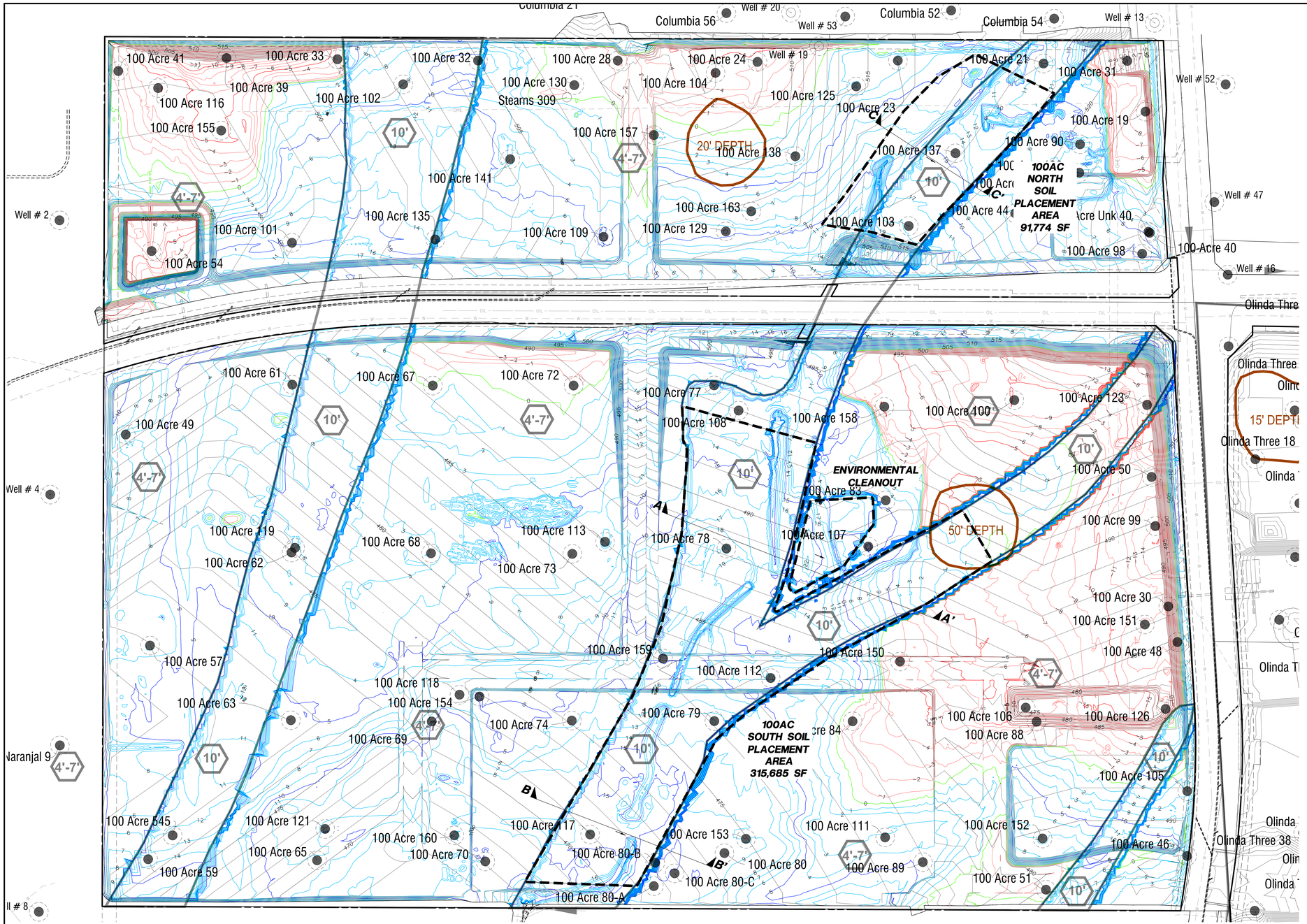
Attachment D – Supporting Project Information



Source: County of Orange TGD – Figure XVI-1 Rainfall Zones



Source: County of Orange TGD – Figure XVI-2a NRCS Hydrologic Soils Group Map



LEGEND - CUT-FILL

- FINISHED GROUND INDEX CONTOUR
- FINISHED GROUND INTERIM CONTOUR
- DELTA BETWEEN CO AND FG SURFACES (CUT), INDEX CONTOUR
- DELTA BETWEEN CO AND FG SURFACES (CUT), INTERIM CONTOUR
- DELTA BETWEEN CO AND FG SURFACES (FILL), INDEX CONTOUR
- DELTA BETWEEN CO AND FG SURFACES (FILL), INTERIM CONTOUR
- CUT/FILL LINE (ZERO CONTOUR)
- OIL WELL
- 10' — SOIL REMOVAL DEPTH
- SOIL REMOVAL LIMIT
- 5' DEPTH — AREA OF CONTAMINATED SOIL

SOIL PLACEMENT 100AC NORTH

DEPTH RANGE (ft)	VOLUME (RAW) (cys)
FG TO 10'	33990
10' TO 15'	16995
15' TO CO	2780
CO TO CO +5' DEEPER	16995

FG = FINISHED GRADE SURFACE, CO = CLEANOUT SURFACE
APPROX. SURFACE AREA OF SOIL PLACEMENT = 50,048 SF

Total Volume of soil to be placed = 28,000 cys
Total Volume 10' or more below FG, to CO = 19,775 cys
Total Volume 15' or more below FG, to CO = 2,780 cys
Total Volume CG to CO excavation, 10' depth = 21,721 cys

Volume of 29,970 cys contained from 12' below FG to CO +5' Deeper.

SOIL PLACEMENT 100AC SOUTH

DEPTH RANGE (ft)	VOLUME (RAW) (cys)
FG TO 10'	116920
10' TO 15'	58460
15' TO CO	14545
CO TO CO +5' DEEPER	58460

FG = FINISHED GRADE SURFACE, CO = CLEANOUT SURFACE
APPROX. SURFACE AREA OF SOIL PLACEMENT = 315,685 SF

Total Volume of soil to be placed = 95,500 cys
Total Volume 10' or more below FG to CO = 73,005 cys
Total Volume 15' or more below FG to CO = 58,460 cys
Total Volume CG to CO excavation, 10' depth = 122,680 cys

Volume of 96,390 cys contained from 13' below FG to CO +5' Deeper.

SOIL PLACEMENT ENVIRONMENTAL CLEANOUT

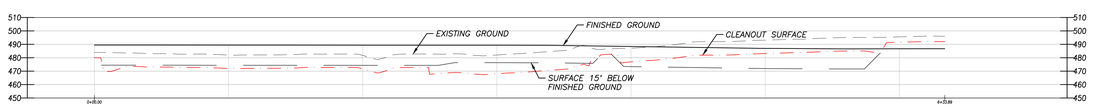
DEPTH RANGE (ft)	VOLUME (RAW) (cys)
FG TO 13'	10656
13' TO CO	3270
CO TO CO +5' DEEPER	4100

FG = FINISHED GRADE SURFACE, CO = CLEANOUT SURFACE
APPROX. SURFACE AREA OF SOIL PLACEMENT = 22,132 SF

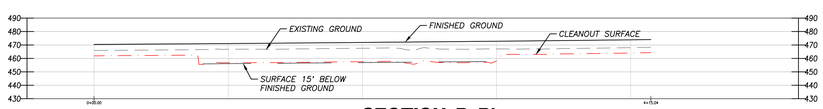
Total Volume of soil to be placed = 95,500 cys
Total Volume 10' or more below FG to CO = 5,700 cys
Total Volume CG to CO excavation, 10' depth = 11,295 cys

Volume of 7,370 cys contained from 13' below FG to CO +5' Deeper.

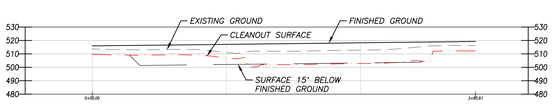
SCALE: 1"=80'
FEET
0 40 80 160
INCHES
0 1/2 1 2



SECTION A-A'
HORZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 40'



SECTION B-B'
HORZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 40'



SECTION C-C'
HORZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 40'

BREA 265 TTM, PHASE 2 (100 AC SITE)
SOIL PLACEMENT
FINISHED GROUND VS EXISTING GROUND CLEANOUT CUT-FILL MAP

DATE: Nov. 10, 2021 06:32:13 AM FILE: F:\0477\Planning\OA_Project\Exhibits\EXH_Volumes 2021-07-23 Soil Placement\TTM BREA 265 WEST - SOIL PLACEMENT CUT-FILL.dwg

Attachment E – City Plan Check Correspondence

BREA PUBLIC WORKS

MEMORANDUM

TO: **Wayne Carvalho, Senior Planner**

FROM: Ryan Chapman, PE, Principal Engineer

DATE: February 4, 2021

SUBJECT: **Brea 265 (PLN-2020-00011)**
2nd Preliminary Hydrology Analysis & P-WQMP Comments

The Public Works Department has reviewed the Preliminary Hydrology Analysis and the Preliminary/Conceptual Draft Water Quality Management Plan, dated January 14, 2022 and January 18, 2022 respectively, and has comments as provided below. Please note that additional comments may be provided upon review of subsequent submittal documents and technical studies. Please provide a comment response letter upon resubmittal.

Preliminary Hydrology Analysis Comments

1) Within the Table of Contents:
   a. List all Maps provided in Section 9.
   b. Call out Maps exactly as listed for consistency between the Table of Contents and the body of the report.
   c. Please clearly call out / identify the references used in preparing the document.

2) Methodology Section:
   a. Within the last paragraph, please clarify the following:

> SD system was approved by the City in 2006 (reviewed by Willdan Engineering) and it was designed for the 100-yr storm event of 365cfs. Few profiles on reference plans showed HGL with or without designed flow rate. Some of the reference plans only showed plan view and no profile and HGL.

The 5x8 or the double 48"?

   b. Include within the report, the exhibits that document the downstream capacities. It is stated in the report, and provided comment response, that "H&A did not investigate and/or analyze all the downstream SD Systems". Please clarify why this analysis was not performed. Add an explanation to the responses provided in response (4c).
   c. Define the term "H&A" within the report.
   d. Discuss the overflow areas for all 3 overall areas providing the following information for each:
      i. How were they determined?
      ii. Do they follow existing conditions? If not, how is the overflow mitigated?
      iii. Will the overflow remain in the street right-of-way?

iv. What is the overflow path when not in a street?
v. In the existing condition, are there issues with flooding to the School, adjacent properties, the sports park, etc.?

3) Discussion Section:
   a. Proposed Condition – SOUTHEAST: Clarify if the first sentence should be revised to 10-year instead of 100-year, correcting the report as needed.
   b. Within this section discuss the overflow areas including the following information:
      i. How were they determined?
      ii. Do they follow existing conditions?
      iii. Similar information provided as to what is noted in comment (2d) above.

4) Conclusion:
   a. Correct the punctuation in the first sentence. "…"
   b. Review this section to correct general grammar issues. For example, "and both" vs. "in that both"… Delete "for"…

5) Notes:
   a. Revise the language in the 2nd paragraph of this section as the overall locations of the Water Quality Features and Flood Control Basins that are approved within the entitlement phase of the project will need to be reflected in the construction document phase of the project. The locations of the features noted above are to be consistent between documents.

6) Section 9:
   a. Correct the spelling of "Remainding" to be "Remaining" on all 100-year maps.

Preliminary Water Quality Management Plan (P-WQMP) Comments

7) See the attached P-WQMP Redlines and the WQMP Checklist for comments. These comments are to be addressed upon resubmittal.

Water Quality Management Plan Checklist

City of Brea

The purpose of this checklist is to provide a format for uniform, comprehensive, and well-documented reviews of the Water Quality Management Plans (WQMPs) submitted by project applicants. The completed checklist should be transmitted to the project applicant with the project WQMP. A copy of the completed checklist should be retained with the project planning/permitting file. Upon acceptance of the project's Final WQMP, the property owner shall record a "Covenant and Agreement" with the County-Clerk Recorder or other instrument acceptable to the City to inform future property owners of the requirement to implement the approved project-specific WQMP. The recordation must be incorporated into the WQMP as an appendix prior to final approval.

WQMP (select one): ☒ Preliminary ☐ Final

City Planning Project Number (CD #): CD0449 (PLN-2020-00011)

Project Name: Brea 265

Project Address: Northwest, Southwest and Southeast of Lambert Road and Valencia Avenue, Brea, California

First Review

WQMP Received on: 1/21/2020

Review Completed on: 1/29/2020

Second Review

WQMP Received on: 11-22-2021

Review Completed on: 12-2-2021

Third Review

WQMP Received on: 1-21-2022

Review Completed on: 2-1-2022

Signature of Reviewer: _____ Date: _____

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Title Page			
Name of project	X		
Application and/or Tract Number	X		
Lot number(s) if site is a portion of a Tract	X		
Site address (or addresses) and planning area number	X		
Owner/Developer name	X		
Owner/Developer address & telephone number	X		
Consulting/Engineering firm that prepared WQMP	X		
Consulting/Engineering firm address & phone number	X		
Date WQMP was prepared/revised	X		
Owner's Certification			
A signed certification statement, in which the project owner acknowledges and accepts the provisions of the WQMP, follows the title page. Please provide. Will provide prior to approval		X	
Table of Contents			
A Table of Contents, including a list of all figures and attachments is included.	X		
Section 1.0, Permit Numbers and Conditions of Approval			
Lists the Discretionary Permit(s).	X		
The lot & tract/parcel map number describing the subject property.	X		
Lists, verbatim, the Water Quality Conditions, including condition requiring preparation of WQMP, if applicable.	X		
Provides applicable conditions from watershed-based plans including WIHMPs and TMDLs.	X		
Final Resolution of Approval, Conditional Use Permit, etc. is included as an Attachment to the WQMP.	X		
Section 2.0, Project Description			
For All Projects:			
Identifies planning area or community name.	X		
Does the project description completely and accurately describe where facilities will be located, what activities will be conducted and where on the site, what kinds of materials and products will be used, how and where materials will be received and stored, and what kinds of wastes will be generated?	X		
Describes all paved areas, including the type of parking areas.	X		
Describes all landscaped areas.	X		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Describes ownership of all portions of project and site. – Will any infrastructure transfer to public agencies (City, County, Caltrans, etc.)? – Will a homeowners or property owners association will be formed? – Will the association be involved in long term maintenance?	X		
Identifies the potential stormwater or urban runoff pollutants reasonably expected to be associated with the project.	X		
Identifies potential HCOCs.	X		
Identifies post development drainage characteristics.	X		
For Commercial and Industrial Projects:			
– Provides Standard Industrial Classification (SIC) Code which best describes the facilities operations?			X
– Describes the type of use (or uses) for each building or tenant space			X
– Does project include food preparation, cooking, and eating areas (specify location and type of area)			X
– Describes delivery areas and loading docks (specify location and design and if below grade and types of materials expected to be stored			X
– Describes outdoor materials storage areas (describe and depict location(s), specify type(s) of materials expected to be stored)			X
– Describes activities that will be routinely conducted outdoors			X
– Describes any activities associated with equipment or vehicle maintenance and repair, including washing or cleaning. Indicates number of service bays or number of fueling islands/fuel pumps, if applicable.			X
Residential Projects			
– Range of lot and home sizes;	X		
– Describes all community facilities such as, laundry, car wash, swimming pools, jacuzzi, parks, open spaces, tot lots, etc.	X		
Section 3.0, Site Description			
Describes project area and surrounding planning areas in sufficient detail to allow project location to be plotted on a base map.	X		
Provides site address and site size to nearest tenth acre.	X		
Identifies the zoning or land use designation.	X		
Identifies soil types and the quantity and percentage of pervious and impervious surface for pre-project and project conditions.	X		
Describes pre-project site drainage and how it ties into drainage of surrounding or adjacent areas and describes how planned project drainage and how it will tie into drainage of surrounding or adjacent areas.	X		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Identifies the watershed in which the project is located and the : – downstream receiving waters – known water quality impairments as included in the 303(d) List – applicable Total Maximum Daily Loads (TMDLs) – hydrologic conditions of concern, if any.	X		
Identifies known Environmentally Sensitive Areas (ESAs) and Areas of Special Biological Significance (ASBSs) within the vicinity and their proximity to the project.	X		
Section 4.0, Best Management Practices			
Includes applicable performance criteria for the following: hydromodification control, LID criteria, and treatment control BMPs.	X		
Do on-site BMPs include full capture certification or does a separate BMP address the full capture of trash (Connector Pipe Screen, Catch Basin Screen, or equivalent)? *Note only: 1-year, 1-hour sizing calculations and details of Trash Provision FCS BMPs will be required as part of the Final WQMP.* Comment noted.	X		
Includes narrative describing how site design concepts were considered and incorporated into project plans.	X		
Lists and describes all Routine Source Control BMPs (Non-structural and Structural).	X		
Describes the implementation frequency and identifies the entity or party responsible for implementation of each Non-Structural BMP.	X		
If applicable Routine Source Control BMPs were not included, was a reasonable explanation provided?	X		
Lists and describes appropriate Treatment Control BMPs and identifies the design basis (SQDF or SQDV) for the Treatment Control BMPs.	X		
For Routine Non-Structural BMPs N1 (Education for Property Owners, Tenants, and Occupants) and N12 (Employee Training), does the WQMP describe the concepts that will be addressed by the education and training? Is a list of educational materials that will be used provided? Are copies of the educational materials included in an Attachment to the WQMP? *Additional materials will be required in Final WQMP.* Comment noted.	X		
Lists and describes appropriate LID and Hydromodification BMPs and identifies the design basis (SQDF or SQDV) for the LID BMPs. Elaborate on hydromodification BMP sizing in Section IV.3.5 to show how the hydromodification volumes will be detained within the BMPs. For example, in Area A, identify that the 6.15 acre feet of required volume will be provided within a subsurface detention vault that is 23,000 SF in area (from hydrology report) and X' in depth (total volume of Y cubic feet) as well as a bioretention basin with Z cubic feet of capacity. Do this for Areas B and C as well. Ok. Sizing provided in section IV.3.4 of PWQMP		X	

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Describes any regional/sub-regional BMPs that will be utilized (NOC).			X
Lists and appropriately calculates any Credits that the Project may qualify for.			X
Lists and describes alternative compliance measures (Treatment Control BMPs, regional programs, Urban Runoff Fund/Mitigation Program participation described if LID BMPs do not fulfill LID and Hydromodification requirements.			X
If applicable, Waiver Request and proof of submittal to the Regional Board Executive Officer included.			X
Section 5.0, Inspection and Maintenance Responsibility for BMPs			
Identifies the entity (or entities) responsible for the long-term inspection and maintenance of all structural source control BMPs and all Treatment Control BMPs, including name, title, company, address, and phone number.	X		
Describes the minimum frequency for inspection and maintenance to ensure the effectiveness of each structural source control BMP and each Treatment Control BMP.	X		
If ownership of the Treatment Control BMPs will be transferred to a public agency, does the WQMP include an Attachment indicating the public agency's intent to accept the Treatment Control BMPs as designed?	X		
Is an appropriate mechanism for the long-term operation and maintenance, including funding, in place?	X		
Section 6.0, Location Map and Plot Plan			
Has an 11" by 17" plot plan been included?	X		
Do all figures, maps, plot plans, etc. have a legend, including a North arrow and scale?	X		
Are all facilities labeled for the intended function?	X		
Are all areas of outdoor activity labeled?	X		
Are all structural BMPs indicated (including GPS coordinates for LID BMPs)? Please add in the GPS coordinates of each BMP to the table in the exhibit. In addition, please provide typical cross section details of the detention vaults proposed in Western Drainage Area to confirm adequate hydromodification BMP capacity is provided. Comment noted. Lat/Long provided in WQMP Site Plan and Section IV.3.4		X	
Is drainage flow information, including general surface flow lines, concrete or other surface ditches or channels, as well as storm drain facilities such as catch basins and underground storm drain pipes depicted? Please show hydromodification sub-drainage areas A, B and C on the WQMP exhibit. In addition, appears DMA 34 is missing a BMP, please provide in WQMP exhibit. Comment noted. BMP Site Plan updated to include requested changes		X	

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Depicts where and how on-site drainage ties into the off-site drainage system.	X		
All BMPs proposed/shown on the WQMP exhibit are reflected in the Grading Plans.	X		
The following self-certification statement is provided on the WQMP exhibit: • Self-certifications from a State Licensed Professional Engineer or third-party certifications are required of all BMPs constructed on this plan or Final Certificate of Occupancy will not be granted from the City.			X
Other			
Grading Plans have been provided and include the following statement in the construction notes of the Grading Plans: • Self-certifications from a State Licensed Professional Engineer or third-party certifications are required of all BMPs constructed on this plan or Final Certificate of Occupancy will not be granted from the City. *Please provide as part of Final WQMP.* Comment noted			X
City of Brea "Project Specific WQMP Summary Report" form and Project WQMP Summary Exhibit included? *Please include in Final WQMP.* Comment noted.			X
Has an electronic copy (i.e. PDF) of the WQMP been provided? A scan of the hard copy WQMP is not acceptable. The PDF shall be created from the original electronic source files to minimize file size, provide better quality, and allow for keyword search. The PDF copy shall be submitted via email or via a file transfer service to both abennett@fuscoe.com and briani@ci.brea.ca.us.	X		
Is an Appendix for County recordation of the WQMP included? Recordation of Title Page, Owner Certification Page, Engineer Certification Page, and City of Brea WQMP Summary Page must be recorded before approval can be issued. *Please be sure to follow this process during Final WQMP stage.* Comment noted.	X		
Has an Appendix been provided for WQMP-related correspondence been provided? Please include email pertaining to the WQMP, previous plan check comments, or any specific instructions from plan checkers or City staff • For Final WQMP submittals, the stamped cover page of the approved Preliminary WQMP must be included in this Appendix.	X		
Is the BMP Maintenance Self-Certification Form included in the Appendix? *Include as part of Final WQMP.* Comment noted.			X

WQMP REVIEW SUMMARY

The following is a summary of major concerns relative to this WQMP submittal:

Please see below for main concerns with the current version of the Preliminary WQMP; at this time is not approvable:

- **Hydromod Conceptual BMP Sizing and Detention Detail:** Applicant needs to provide high level details of hydromodification BMP sizing to show there is adequate area for these larger BMPs. In addition, the sub-drainage areas must be shown on the WQMP exhibit. Finally, applicant must provide a typical cross section detail of the proposed detention vaults. Revised as requested.

There are other minor comments summarized in this checklist and in the red lines that must also be addressed. Comments addressed.

REQUIRED FOR ALL SUBMITTALS AND RESUBMITTALS:
Submit an electronic copy to the Planning Division and cc Briani@cityofbrea.net Electronic submittals must be original-quality PDFs submitted as an attachment* (Max 10MB) or through a file transfer service. *Scans of hard copies will not be accepted*.

FOR FINAL APPROVAL ONLY:
Submit 2 hard copies with recorded version of the following documents:

- Title Page
- Signed Owners Cert Page
- The City of Brea Project Specific WQMP Summary Report Pages

An electronic copy (PDF) is also required per the instructions indicated above. One hard copy will be returned to the owner upon City-stamped approval. Grading Permit will be approved upon submittal of the hard copy WQMPs.

PRELIMINARY/CONCEPTUAL DRAFT WATER QUALITY MANAGEMENT PLAN

Comments provided by Fuscoe Engineering on 1-31-2022.

Project Address:
South of Lambert Road and Valencia Avenue
City of Brea, CA

Prepared For:

3030 Saturn Street, Suite 101
Brea, CA 92821
(714) 577-9154

Prepared By:

Hunsaker & Associates Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949) 583-1010

WQMP Preparation Date:
May 1, 2021
Revised (November 15, 2021; January 18, 2022)

BIOTREATMENT BMP DESIGN SUMMARY						
DMA	DCV_{SIMPLE} (cu-ft)	Q_{BMP} (cfs)	BMP Alternatives	DCV_{BMP} Footprint Required (sf)[1]	Q_{BMP} Footprint Required (sf)[2]	BMP Footprint / Model Provided[4]
34	6,277.5	0.48	PROPRIETARY BIOFILTRATION	--	177.9	TBD
35	1,080.6	0.08	PROPRIETARY BIOFILTRATION	--	30.6	
36	16,911.6	1.24	BASIN WITH PROPRIETARY BIOFILTRATION	--	460.1	
37	3,415.6	0.26	PROPRIETARY BIOFILTRATION	--	96.8	
38	2,978.3	0.23	PROPRIETARY BIOFILTRATION	--	84.4	
39	4,311.2	0.33	PROPRIETARY BIOFILTRATION	--	122.2	
40	3,311.5	0.25	PROPRIETARY BIOFILTRATION	--	93.9	
41	49,299.0	3.62	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,341.3	
42	1,707.8	0.13	PROPRIETARY BIOFILTRATION	--	48.4	
43	1,166.3	0.09	PROPRIETARY BIOFILTRATION	--	33.1	

[1] *Based on 1.5' ponding depth.*
[2] *Based on 0.0027 cfs (1.0 gpm) per sf of proprietary media for flow-based BMPs. This is the typical media flow rate for systems such as Filterra, Focal Point and Modular Wetland System (MWS) units.*
[3] *Based on 0.0007 cfs (0.26 gpm) per sf of proprietary media with 48 hour draw down. This is based on MWS units configured for volume-based treatment approach.*
[4] *Minimum footprint for each BMP will be provided in each DMA. Actual manufacturer / model or footprint to be determined.*

IV.3.5 Hydromodification Control BMPs

The project is subject to hydromodification. The following BMP will be employed to address project impacts.

HYDROMODIFICATION CONTROL BMPS	
BMP Name	BMP Description
Detention Basin	2 subsurface detention vaults and 1 biofiltration basin BMP located in the project's Western Drainage will be employed to detain the difference in runoff for the 2-year event and larger storms as needed. Sizing of the proposed facilities will be provided to detain the required volume increases provided in Section II.3 as plans are further refined. Sub-Drainage Area "A" – 6.15 ac-ft Sub-Drainage Area "B" – 0.92 ac-ft Sub-Drainage Area "C" – 0.85 ac-ft

Please identify these sub-drainage area labels on the WQMP exhibit. In addition, please also summarize the hydromodification BMPs per sub-drainage area to confirm adequate capacity can be provided within area proposed. See Checklist for more detail.

Ok.

IV.3.6 Regional/Sub-Regional LID BMPs

Not applicable to project. Project is not part of any regional or sub-region will employ use of onsite LID BMPs to address project runoff.

IV.3.7 Treatment Control BMPs

The project is able to meet LID requirements onsite. Treatment control BM to the treatment BMP employed to meet current full trash capture requiren

BIOTREATMENT BMP DESIGN SUMMARY						
DMA	DCV_{SIMPLE} (cu-ft)	Q_{BMP} (cfs)	BMP Alternatives	DCV_{BMP} Footprint Required (sf)[1]	Q_{BMP} Footprint Required (sf)[2]	BMP Footprint / Model Provided[4]
1	18,901.2	1.39	BIORETENTION WITH UNDERDRAINS, PROPRIETARY BIOFILTRATION	12,600.8	514.3	TBD
2	5,341.5	0.39	PROPRIETARY BIOFILTRATION	--	145.3	
3	4,827.0	0.37	PROPRIETARY BIOFILTRATION	--	136.8	
4	27,197.8	2.00	SUBSURFACE VAULT WITH PROPRIETARY BIOFILTRATION	224.3[3]	740.0	
5	53,046.7	3.90	SUBSURFACE VAULT WITH PROPRIETARY BIOFILTRATION	438.5[3]	1,443.3	
6	94,751.2	6.96	BASIN WITH PROPRIETARY BIOFILTRATION	--	2,578.0	
7	2,006.8	0.15	PROPRIETARY BIOFILTRATION	--	56.9	
8	1,415.0	0.11	PROPRIETARY BIOFILTRATION	--	40.1	
9	668.9	0.05	PROPRIETARY BIOFILTRATION	--	19.0	
10	1,106.3	0.08	PROPRIETARY BIOFILTRATION	--	31.4	
11	2,032.5	0.16	PROPRIETARY BIOFILTRATION	--	57.6	
12	45,726.6	3.36	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,244.1	
13	88,537.3	6.50	BASIN WITH PROPRIETARY BIOFILTRATION	--	2,408.9	
14	6,039.9	0.46	PROPRIETARY BIOFILTRATION	--	171.2	
15	4,915.2	0.38	PROPRIETARY BIOFILTRATION	--	139.3	TBD
16	437.4	0.03	PROPRIETARY BIOFILTRATION	--	12.4	
17	1,687.0	0.13	PROPRIETARY BIOFILTRATION	--	47.8	
18	2,058.2	0.16	PROPRIETARY BIOFILTRATION	--	58.3	
19	849.0	0.06	PROPRIETARY BIOFILTRATION	--	24.1	
20	5,789.9	0.44	PROPRIETARY BIOFILTRATION	--	164.1	
21	1,303.5	0.10	BIORETENTION WITH UNDERDRAINS OR PROPRIETARY BIOFILTRATION	869.0	36.9	
22	2,332.6	0.18	PROPRIETARY BIOFILTRATION	--	66.1	
23	1,666.2	0.13	PROPRIETARY BIOFILTRATION	--	47.2	
24	2,999.1	0.23	PROPRIETARY BIOFILTRATION	--	85.0	
25	6,685.5	0.51	PROPRIETARY BIOFILTRATION	--	189.5	
26	2,624.2	0.20	PROPRIETARY BIOFILTRATION	--	74.4	
27	4,790.2	0.37	PROPRIETARY BIOFILTRATION	--	135.8	
28	463.1	0.04	PROPRIETARY BIOFILTRATION	--	13.1	
29	4,311.2	0.33	PROPRIETARY BIOFILTRATION	--	122.2	
30	3,915.5	0.30	PROPRIETARY BIOFILTRATION	--	111.0	
31	840.4	0.06	PROPRIETARY BIOFILTRATION	--	23.8	
32	2,401.2	0.18	PROPRIETARY BIOFILTRATION	--	68.1	
33	1,641.7	0.13	PROPRIETARY BIOFILTRATION	--	46.5	
34	6,277.5	0.48	PROPRIETARY BIOFILTRATION	--	177.9	TBD
35	1,080.6	0.08	PROPRIETARY BIOFILTRATION	--	30.6	
36	16,911.6	1.24	BASIN WITH PROPRIETARY BIOFILTRATION	--	460.1	
37	3,415.6	0.26	PROPRIETARY BIOFILTRATION	--	96.8	
38	2,978.3	0.23	PROPRIETARY BIOFILTRATION	--	84.4	
39	4,311.2	0.33	PROPRIETARY BIOFILTRATION	--	122.2	
40	3,311.5	0.25	PROPRIETARY BIOFILTRATION	--	93.9	
41	49,299.0	3.62	BASIN WITH PROPRIETARY BIOFILTRATION	--	1,341.3	
42	1,707.8	0.13	PROPRIETARY BIOFILTRATION	--	48.4	
43	1,166.3	0.09	PROPRIETARY BIOFILTRATION	--	33.1	

[1] *Based on 1.5' ponding depth.*
[2] *Based on 0.0027 cfs (1.0 gpm) per sf of proprietary media for flow-based BMPs.*
[3] *Based on 0.0007 cfs (0.26 gpm) per sf of proprietary media with 48 hour draw down.*
[4] *Minimum footprint for each BMP will be provided in each DMA. Actual model or footprint to be determined.*

BMP missing for DMA 34? Please clarify.

LEGEND

- PROJECT LIMITS
- NAP — NOT A PART
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- DMA / ACRE — DMA DESIGNATION AND ACRES
- DMA DESIGNATION AND ACRES
- DMA DESIGNATION AND ACRES
- PROJECT STORM DRAIN SYSTEM (PRIVATE)
- EXISTING/OFFSITE STORM DRAIN SYSTEM (PUBLIC)
- PROJECT CATCH BASIN WITH BMP (PRIVATE) S1 STORM DRAIN SYSTEM STENCILING/SIGNAGE
- PROJECT CATCH BASIN WITH BMPS (PRIVATE) S1 STORM DRAIN SYSTEM STENCILING/SIGNAGE BIO-7 PROPRIETARY BIOFILTRATION (BIOTREATMENT)
- EXISTING/OFFSITE CATCH BASIN (PUBLIC)
- WATER QUALITY DIVERSION STRUCTURE (PRIVATE) INCLUDES 2-YEAR STORM FOR WESTERN PROJECT AREA
- BIO-7 PROPRIETARY BIOFILTRATION (PRIVATE)
- BIO-7 BASIN WITH PROPRIETARY BIOFILTRATION MEDIA (PRIVATE)
- BIO-1 BIORETENTION WITH UNDERDRAIN (PRIVATE)
- SUBSURFACE DETENTION FACILITY (PRIVATE)
- DISCHARGE POINT



BIO-1 BIORETENTION WITH UNDERDRAIN & BIO-7 PROPRIETARY BIOTREATMENT (BASIN TYPE)
TYPICAL SECTION DETAIL
N.T.S.

N

GRAPHIC SCALE
0 125 250 500
(IN FEET)
1 INCH = 250 FT.

PRELIMINARY/CONCEPTUAL DRAFT WATER QUALITY MANAGEMENT PLAN - SITE PLAN

APPLICANT:
AERA
3030 SATURN STREET, SUITE 101
BREA, CA 92821
(714) 577-9147

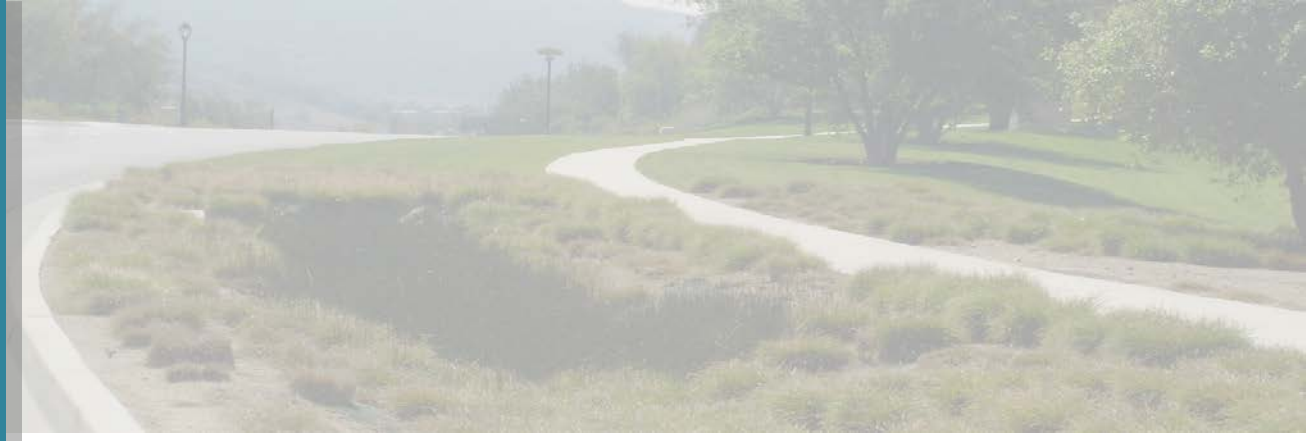
PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

"BREA 265"
SOUTH OF LAMBERT ROAD
AND VALENCIA AVENUE
CITY OF BREA, COUNTY OF ORANGE, CALIFORNIA

DRAFTED BY: TIH | DATE: 01/18/2022 | W.O. NO: 4213-3 | SHEET NO: 1 OF 1

J-241

DATE: Jan. 18, 2022 09:14:50 AM FILE: F:\0477\Planning\SY_WQ\PWQMP\Exhibits\PWQMP_SP Brea 265.dwg



Appendix K Preliminary Hydrology Analysis

Appendices

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PRELIMINARY HYDROLOGY ANALYSIS

FOR

BREA 265

City of Brea

County of Orange

PREPARED FOR:

BROOKSSTREET

1300 QUAIL STREET, SUITE 100

NEWPORT BEACH, CA 92660

(949) 833-0222

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.

3 HUGHES

IRVINE, CA 92618

(949) 583-1010

FEBRUARY 11, 2022

W.O. #4213-3

PRELIMINARY HYDROLOGY ANALYSIS

FOR

BREA 265

City of Brea

County of Orange



PREPARED UNDER THE SUPERVISION OF:

Tu Trinh, R.C.E. 71555 — Date: 2/11/2022

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SECTION 1

PROJECT LOCATION

The project site is Brea 265 in the City of Brea (City), County of Orange. The Brea 265 is divided into 3 separate areas called WEST, EAST and SOUTHEAST. The WEST is located on the west of Valencia Avenue and north of Brea Sports Park. The EAST is located on the east of Valencia Avenue and Rose Drive, and south of Carbon Canyon Road. The SOUTHEAST is located on the east of Rose Drive and north of Blake Road (see attached Vicinity Map for details).

STUDY PURPOSE

This preliminary hydrology study is to support the Preliminary/Conceptual Draft Water Quality Management Plan.

METHODOLOGY

The hydrology calculations were prepared using the *Orange County Hydrology Manual* as incorporated in the Advanced Engineering Software (AES) "RATSC" program. Flood routing analysis was prepared using the 1986 *Orange County Hydrology Manual* as incorporated in the Advanced Engineering Software (AES) "FLOODSC" program.

The Hydrologic Classification of Soils map (Soil Map) contained in the Orange County Hydrology Manual was used to determine the hydrologic soil type. Based on the Soil Map included in this section, approximate 85% of the project area, within the tract boundary, is in soil type D and approximate 15% of the project area, within the tract boundary, is a mix of soil types A and B spreading throughout the project site. Soil type D is used in this study for both existing and proposed conditions.

Land use for the existing condition is natural cover with existing road asphalt. Land use for proposed condition is based on the latest Tentative Tract Map. The impervious percentage varies from commercial (90%) for street, high density residential (80%), and low density residential (50%).

Based on the City of Brea Master Plan of Drainage (City MPD), dated December 2013, this hydrology study determines the 10-year peak storm runoffs produced from the project site in the existing and proposed conditions within the property boundary, and to detain any excess flows produced from the development.

In addition, the 100-year peak storm runoffs produced from the project site in the existing and proposed conditions within the property boundary are also studied for reference. Exit path of excess flow between the 10-yr and 100-yr storm events are shown on the hydrology maps for existing condition and also on the hydrology maps for the proposed condition (100-yr study). The over flow path was determined based on the existing and/or proposed grades, followed from high elevation to low elevation until it exits the property boundary.

Street capacity up to the right-of-way is also studied to verify that the excess flow between the 100-yr and 10-yr storm is contained in the street at or below the right-of-way. If there is no street, the over flow path will follow the existing and/or proposed v-ditch. As discussed in the group meeting today, 2/10/2022, with City staffs, these calculations will be submitted for review in the design phase.

The City MPD does not mention any issue regarding flooding to the school, sport park, etc. In 2009 – 2011 H&A prepared an improvement plan for the City, included in the reference section of the hydrology report, to repair the channel and improve the inlet to intercept runoff from upstream areas with Q50 = 569cfs.

Hunsaker and Associates (H&A) did not investigate and/or analyze all the downstream SD systems. All approved/as-built SD improvement plans immediately downstream of the proposed SD were obtained from the City used as references and included in Section 10. For instance, the double 48" RCP crossing Rose Drive and then connected to the 5'x8' RCB within the La Floresta project designed by H&A. This SD system was approved by the City in 2006 (reviewed by Willdan Engineering) and it was designed for the 100-yr storm event of 365cfs. The approved hydraulic calculation in 2006 ended at the upstream end of the 5'x8' RCB. This approved hydraulic calculation is now updated to include the double 48" RCP and will be submitted to the City for review at the design phase of improvement plans. Few profiles on reference plans showed HGL with or without designed flow rate. Some of the reference plans only showed plan view and no profile and HGL.

H&A does not have every existing SD plan for downstream areas of the proposed development within the City boundaries, for instance, the 84" RCP in Voyager Avenue. Moreover, H&A has proposed several detention basins within the project to detain the runoff produced from the development to the existing level or below the existing level and not intended to improve the capacity of existing SD systems within the City boundaries.

DISCUSSION

This hydrology study is limited within the property boundary; flows produced from the off-site areas discharged into the site would be the same in both existing and proposed conditions. Any excess flows produced from the development shall be detained within the property so that it shall not cause any negative impacts to the surrounding areas.

Existing Condition – WEST

The WEST is divided into 3 drainage areas called "A", "B" and "C" as shown on the hydrology map. Storm runoff produced from these 3 drainage areas eventually is discharged into Loftus Channel.

Drainage Area "A" has an area of 59.7ac and produced a 10-year storm runoff of 102.8cfs. This runoff is discharged into the existing 78" RCP located in Brea Sports Park (Reference SD plan in Section 10). Capacity of this SD is shown on the 10-yr summary table in this section 1.

Drainage Area "B" has an area of 20.7ac and produced a 10-year storm runoff of 41.5cfs. This runoff is discharged into the existing 24" RCP and 60" RCP located in Lambert Road (Reference SD plan in Section 10). Capacity of these SD are shown on the 10-yr summary table in this section 1.

Drainage Area "C" has an area of 16.0ac and produced a 10-year storm runoff of 28.3cfs. This runoff is discharged into the existing 60" RCP located in Bluegrass Street (Reference SD plan in Section 10). Capacity of this SD is shown on the 10-yr summary table in this section 1.

Existing Condition – EAST
This Drainage Area has an area of 134.1ac and produced a 10-year storm runoff of 214.9cfs. This runoff is discharged into the existing 2x48" RCP crossing Rose Drive and then 5'x8' RCB, and eventually is discharged into the Carbon Canyon Channel (Reference SD plan in Section 10). Capacity of this SD is shown on the 10-yr summary table in this section 1.

Existing Condition – SOUTHEAST
This Drainage Area has a total area of 49.7ac and produced a total 10-year storm runoff of 90.0cfs. Runoff produced from sub-areas B1 and B2 is discharged into Carbon Canyon Channel. Runoff produced from sub-areas B3, B4 and B5 is discharged into the existing 36" CMP that connected to Carbon Canyon Channel under Rose Drive. Runoff produced from sub-area B6 and B7 is discharged into the existing 36" RCP located in Blake Road, crossing Rose Drive, and then connected to Carbon Canyon Channel (Reference SD plan in Section 10). Capacity of these SD are shown on the 10-yr summary table in this section 1.

Proposed Condition – WEST
The WEST is also divided into 3 drainage areas called "A", "B" and "C" as shown on the hydrology map. Storm runoff produced from these 3 drainage areas eventually is discharged into Loftus Channel.

Drainage Area "A" has an area of 66.9ac and produced a 10-year storm runoff of 152.1cfs (without detention basin). This runoff is discharged into the existing 78" RCP located in Brea Sports Park. Two basins are proposed in this area to treat low flows produced from the development for water quality purpose. The basin at node 33 is also used to detain the excess 10-year storm runoff produced from the development. To detain the excess flow of 49.3cfs (152.1cfs – 102.8cfs) a flow-by basin volume needs to be approximately 0.9ac.ft. Details of all diversion structures used for water quality and 10-year peak storm shall be provided in the final design.

Drainage Area "B" has an area of 16.2ac and produced a 10-year storm runoff of 34.5cfs. This runoff is discharged into the existing 60" RCP located in Lambert Road. An open basin is proposed at the southwest corner of this area to treat low flows produced from the development for water quality purpose. A detention basin is not needed in this area, because the 10-year runoff produced from the development is lower than that of the existing condition.

Drainage Area "C" has an area of 10.5ac and produced a 10-year storm runoff of 28.2cfs. This runoff is discharged into the existing 60" RCP located in Bluegrass Street. A underground water quality basin is proposed for this area together with two Modular Wetland Units to treat the low flows produced from the site. A flood control basin is not needed in this area, because the 10-year runoff produced from the development is lower than that of the existing condition.

Proposed Condition – EAST

This Drainage Area has a total area of 136.7ac. The major area is 132.9ac and produces a 10-year storm runoff of 300.2cfs (without detention basin) discharged into the existing 2x48" RCP crossing Rose Drive. The minor area is 3.8ac and produces a 10-year storm runoff of 6.7cfs discharged into the existing 24" RCP crossing Rose Drive. Four basins are proposed in this area to treat low flows produced from the development for water quality purpose. The two basins at nodes 86 and 193 are also used to detain the excess 10-year storm runoff produced from the development. To detain the excess flow of 92.0cfs (300.2cfs + 6.7cfs – 214.9cfs), the flow-by basin at node 86 needs an approximate volume of 0.6ac.ft, and the flow-by basin at node 193 needs an approximate volume of 1.0ac.ft. Details of all diversion structures used for water quality and 10-year peak storm shall be provided in the final design. Storm runoff produced from this drainage area eventually is discharged into the Carbon Canyon Channel.

Proposed Condition – SOUTHEAST

Drainage Area "B" has a total area of 49.1ac and produced a total 10-year storm runoff of 115.3cfs (without detention basin). Runoff produced from sub-areas B1 through B17a is discharged into the existing 36" CMP crossing Rose Drive and then connected to the Carbon Canyon Channel. Runoff produced from sub-area B18 through B39 is discharged into the existing 36" RCP located in Blake Road, crossing Rose Drive, and then connected to Carbon Canyon Channel. Runoff produced from sub-areas B40 and B41 directly into Carbon Canyon Channel. A basin are proposed in this drainage area to treat low flows produced from the development for water quality purpose. The basin is also used to detain the excess 10-year storm runoff produced from the development. To detain the excess flow of 25.3cfs (115.3cfs – 90.0cfs) a flow-by basin volume needs to be approximately 0.5ac.ft. Details of all diversion structures used for water quality and 10-year peak storm shall be provided in the final design.

Notes:
A study for the 2-yr storm event is also provided for the West Area to address the Hydro-Modification, because a section of the Loftus Channel is not improved. Flow rates, time of concentration, and volume of the existing and proposed condition are summarized in a table and included in this section.

All Water Quality and Flood Control Basins presented in this preliminary hydrology report with mass grading are consistent with the approved entitlement phase; however, they are subject for minor changes regarding shapes and dimensions in the final design.

For Water Quality calculations and other related references, please see the Preliminary/Conceptual Water Quality Management Plan for more details.

Conclusion:
H&A preliminary hydrology study is generally consistent with the City MPD regarding soil type, land-use, pervious percentage, etc., in that both studied the 10-yr storm event.

H&A preliminary hydrology study also studied the proposed condition of Brea 265 project and addressed the water quality issue due to the development. Several open and underground basins are also proposed throughout the project site to detain the excess runoffs due to the development to the level of the existing condition or below, so that there won't be any negative impact to the surrounding existing structures and facilities.

W.O. #4213-3, BREA 265
2/10/2022

10-YR STUDY FOR WEST - AREAS 'A', 'B' & 'C'

				PROPOSED CONDITION			PROPOSED CONDITION						
	EXISTING CONDITION			Without Detention Basin			With Detention Basin(s)			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	66.90	16.20	10.50	7.20	-4.50	-5.50	AREA (ac)
Q (cfs)	102.80	41.50	28.30	152.10	34.50	28.20	97.60	34.50	28.20	-5.20	-7.00	-0.10	Q (cfs)

Area "A" - Discharge to existing 78" RCP - Sheets C-3.02 and C-3.07 - Brea Sport Park - As-Built Drawings 1-2009 - Unknown capacity
H&A improved the headwall per City - dated 2-28-2011 - Capacity Q50 = 569 cfs

Area "B" - Discharge to existing 24" and 60" RCP - Sheets 5 - 7 of 28 - Lambert Road imp plan - City approval 5-31-2001 - Unknown capacity

Area "C" - Discharge to existing 60" RCP - Sheet 1 of 1 - Union Oil Company Tr. 8242 Offsite - As-built 9-12-1980 - Unknown capacity

10-YR STUDY FOR EAST - AREA 'A'

		PROPOSED CONDITION	PROPOSED CONDITION		
	EXISTING CONDITION	Without Detention Basin	With Detention Basin(s)	DIFFERENCES	
AREA (ac)	134.10	136.70	136.70	2.60	AREA (ac)
Q (cfs)	214.90	306.90	208.10	-6.80	Q (cfs)

Discharge to existing double 48" RCP and 5'x8' RCB designed for Q100 = 365.1cfs
Sheet 3 of 3, T.T. 16934 - Remedial Grading, City approval 11/08/2006

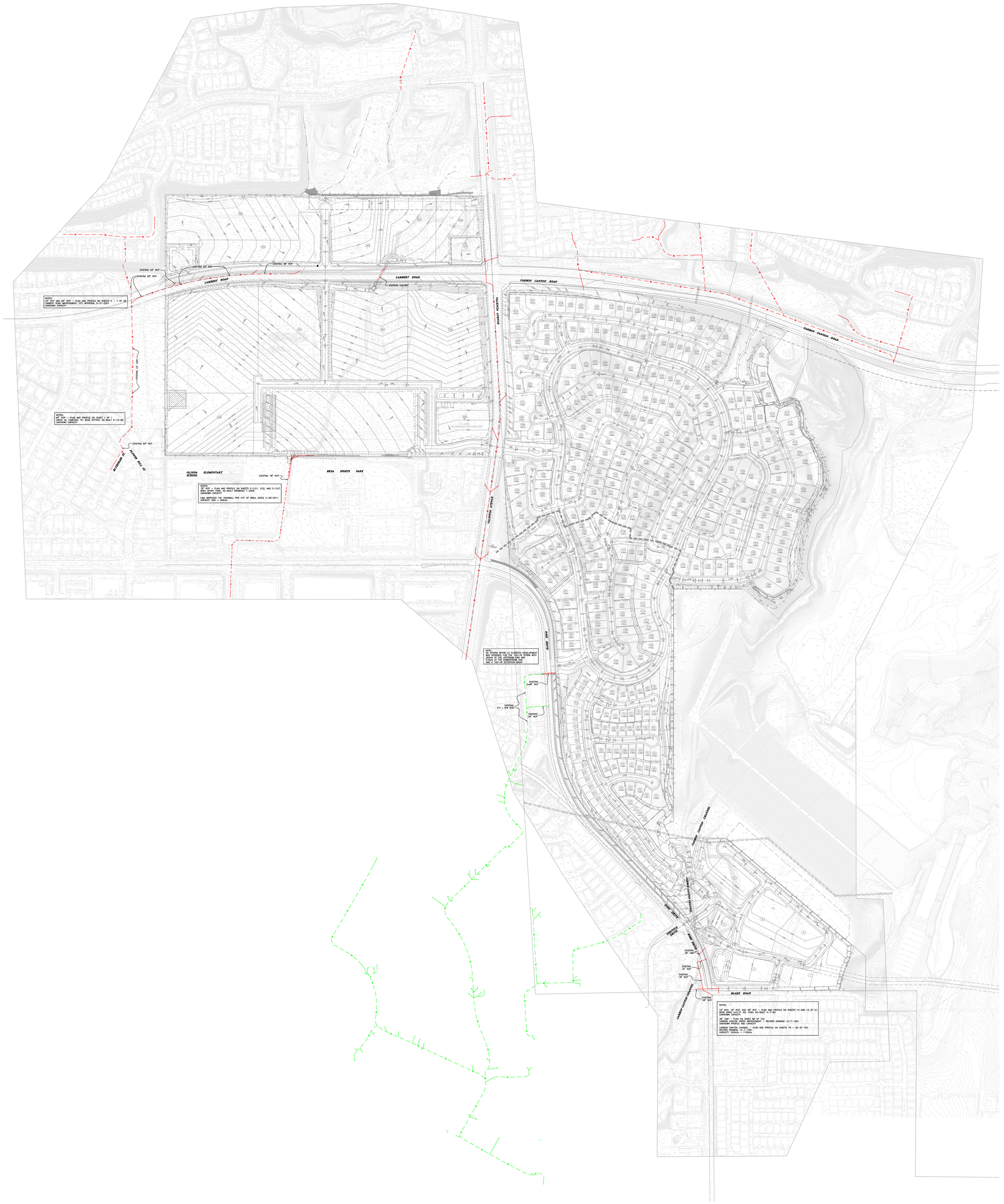
10-YR STUDY FOR SOUTHEAST - AREA 'B'

		PROPOSED CONDITION	PROPOSED CONDITION		
	EXISTING CONDITION	Without Detention Basin	With Detention Basin(s)	DIFFERENCES	
AREA (ac)	49.70	49.10	49.10	-0.60	AREA (ac)
Q (cfs)	90.00	115.30	85.30	-4.70	Q (cfs)

Discharge to existing 36" CMP, 36" RCP, 15" RCP, and Carbon Canyon Channel

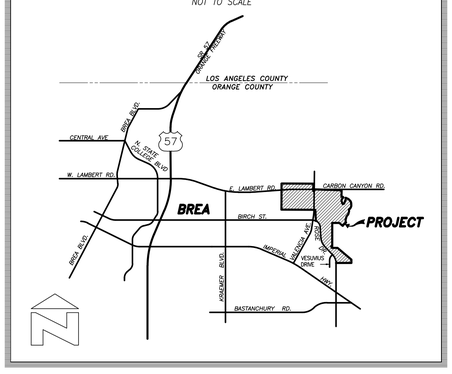
15" RCP and 36" RCP - plan and profile on sheets 14 and 15 of 21 - Blake Rd and Rose Dr. SD - As-Built 4-7-1983 - Unknown capacity

36" CMP - sheet 88 of 102 - Carbon Canyon Creek Improvement - Record Drawing 12-7-1961 - Unknown profile and capacity
Carbon Canyon Channel - Sheets 79 - 90 of 102 - Record Drawing 12-7-1961 - Capacity 1000cfs - 1100cfs



VICINITY MAP

NOT TO SCALE



LEGEND

EXISTING SD 10-YR CAPACITY PER CITY MPD

EXISTING SD 100-YR CAPACITY – LA FLORESTA DEVELOPMENT

1" = 150'

150 75 0 150 450

GRAPHIC SCALE 1"=100'

PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

PREPARED BY:

HUNSAKER & ASSOCIATES
I R V I N E , I N C .
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

BREA 265 DEVELOPMENT EXISTING SD CAPACITY IN DOWNSTREAM AREAS

WO: 4213-3

F:\0477\Engineering\SY_Hydrology\Existing SD Capacity Exhibit.dwg

W.O. #4213-3, BREA 265
2021.10.30
BASIN VOLUME CALCULATIONS

WEST - AREA 'A' - NODE 33

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
472.00		2941	0.068				
	2.00			0.105	0.211	0.211	9174
474.00		6233	0.143				
	2.00			0.184	0.368	0.579	25221
476.00		9814	0.225				
	2.00			0.270	0.539	1.118	48714
478.00		13679	0.314				
	2.00			0.373	0.746	1.864	81205
480.00		18812	0.432				
	2.00			0.492	0.985	2.849	124095
482.00		24078	0.553				
	1.00			0.588	0.588	3.436	149690
483.00		27112	0.622				

Vrequired = 41,255 cu.ft
Water Surface Elevation (max) = 478 ft
Freeboard = 5 ft

W.O. #4213-3, BREA 265
2021.10.30
BASIN VOLUME CALCULATIONS

WEST - AREA 'B'

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
485.00		5090	0.117				
	0.50			0.180	0.090	0.090	3914
485.50		10564	0.243				
	1.00			0.345	0.345	0.434	18922
486.50		19453	0.447				
	1.00			0.473	0.473	0.907	39513
487.50		21729	0.499				
	1.00			0.526	0.526	1.433	62433
488.50		24111	0.554				
	1.00			0.582	0.582	2.015	87786
489.50		26595	0.611				
	1.00			0.640	0.640	2.655	115673
490.50		29179	0.670				

Vrequired = 18,905 cuft for WQ
Water Surface Elevation (max) = 486.5 ft
Freeboard = 4 ft

EAST - NODE 86

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
439.50		3253	0.075				
	0.50			0.082	0.041	0.041	1777
440.00		3853	0.088				
	2.00			0.119	0.237	0.278	12119
442.00		6489	0.149				
	2.00			0.183	0.367	0.645	28096
444.00		9488	0.218				
	2.00			0.256	0.513	1.158	50433
446.00		12849	0.295				
	1.00			0.316	0.316	1.474	64190
447.00		14666	0.337				

Vrequired = 29,403 cuft
Water Surface Elevation (max) = 445 ft
Freeboard = 2 ft

EAST - NODE 193

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
442.00		18529	0.425				
	1.00			0.452	0.452	0.452	19673
443.00		20816	0.478				
	1.00			0.505	0.505	0.956	41661
444.00		23160	0.532				
	1.00			0.559	0.559	1.516	66021
445.00		25560	0.587				
	4.00			0.703	2.814	4.329	188591
449.00		35725	0.820				
	1.00			0.851	0.851	5.180	225657
450.00		38408	0.882				

Vrequired = 57,980 cuft
Water Surface Elevation (max) = 445 ft
Freeboard = 5 ft

W.O. #4213-3, BREA 265
2021.10.30
BASIN VOLUME CALCULATIONS

SOUTHEAST - NODE 63

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
395.00		13510.00	0.310				
	1.00			0.327	0.327	0.327	14231
396.00		14951.00	0.343				
	1.00			0.360	0.360	0.687	29930
397.00		16448.00	0.378				
	1.00			0.395	0.395	1.083	47155
398.00		18001.00	0.413				
	1.00			0.432	0.432	1.514	65961
399.00		19611.00	0.450				
	1.00			0.469	0.469	1.984	86405
400.00		21278.00	0.488				

Vrequired = 19,430 cuft
Water Surface Elevation (max) = 397 ft
Freeboard = 3 ft

W.O. #4213-3, BREA 265
1/14/2022

2-YR STUDY - WEST - AREAS 'A', 'B' & 'C'

FOR HYDRO-MODIFICATION DUE TO PART OF LOFTUS CHANNEL NOT IMPROVED

	EXISTING CONDITION			PROPOSED CONDITION			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	7.20	-4.50	-5.50	**AREA (ac)**
Q (cfs)	49.90	20.40	13.50	80.80	18.20	15.20	30.90	-2.20	1.70	**Q (cfs)**
Tc (min)	16.86	13.44	16.78	13.99	13.16	8.73	-2.87	-0.28	-8.05	**Tc (min)**
V (ac.ft)	1.97	0.76	0.55	8.12	1.69	1.40	6.15	0.93	0.85	**V (ac.ft)**

W.O. #4213-3, BREA 265
2/10/2022

100-YR STUDY FOR REFERENCE ONLY - NOT FOR DESIGN

100-YR STUDY FOR WEST - AREAS 'A', 'B' & 'C'

	EXISTING CONDITION			PROPOSED CONDITION Without Detention Basin			PROPOSED CONDITION With Detention Basin(s)			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	66.90	16.20	10.50	7.20	-4.50	-5.50	AREA (ac)
Q (cfs)	166.40	67.20	46.40	238.00	53.90	43.80	164.10	53.90	43.80	-2.30	-13.30	-2.60	Q (cfs)

Area "A" - Discharge to existing 78" RCP - Sheets C-3.02 and C-3.07 - Brea Sport Park - As-Built Drawings 1-2009 - Unknown capacity
H&A improved the headwall per City - dated 2-28-2011 - Capacity Q50 = 569 cfs

Area "B" - Discharge to existing 24" and 60" RCP - Sheets 5 - 7 of 28 - Lambert Road imp plan - City approval 5-31-2001 - Unknown capacity

Area "C" - Discharge to existing 60" RCP - Sheet 1 of 1 - Union Oil Company Tr. 8242 Offsite - As-built 9-12-1980 - Unknown capacity

100-YR STUDY FOR EAST - AREA 'A'

	EXISTING CONDITION	PROPOSED CONDITION Without Detention Basin	PROPOSED CONDITION With Detention Basin(s)	DIFFERENCES	
AREA (ac)	134.10	136.70	136.70	2.60	AREA (ac)
Q (cfs)	351.50	479.40	347.60	-3.90	Q (cfs)

Discharge to existing double 48" RCP and 5'x8' RCB designed for Q100 = 365.1cfs
Sheet 3 of 3, T.T. 16934 - Remedial Grading, City approval 11/08/2006

100-YR STUDY FOR SOUTHEAST - AREA 'B'

	EXISTING CONDITION	PROPOSED CONDITION Without Detention Basin	PROPOSED CONDITION With Detention Basin(s)	DIFFERENCES	
AREA (ac)	49.70	49.10	49.10	-0.60	AREA (ac)
Q (cfs)	146.60	180.70	144.80	-1.80	Q (cfs)

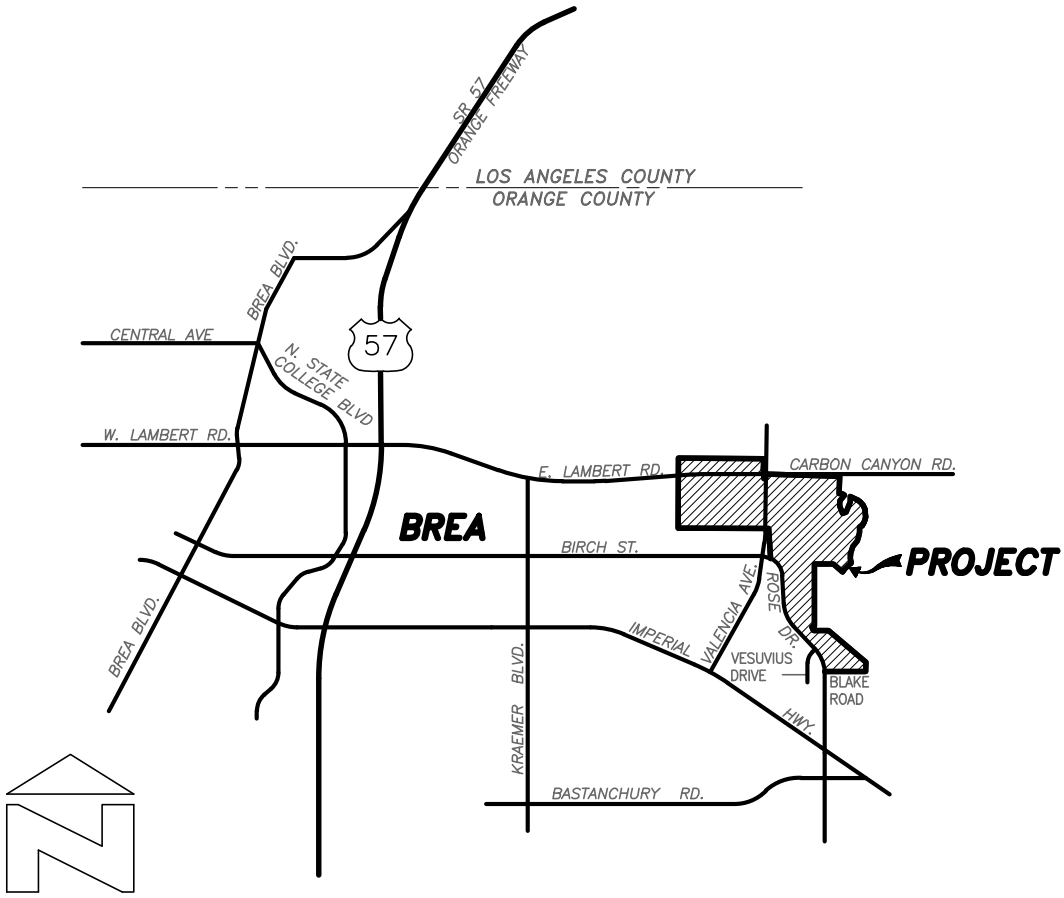
Discharge to existing 36" CMP, 36" RCP, 15" RCP, and Carbon Canyon Channel

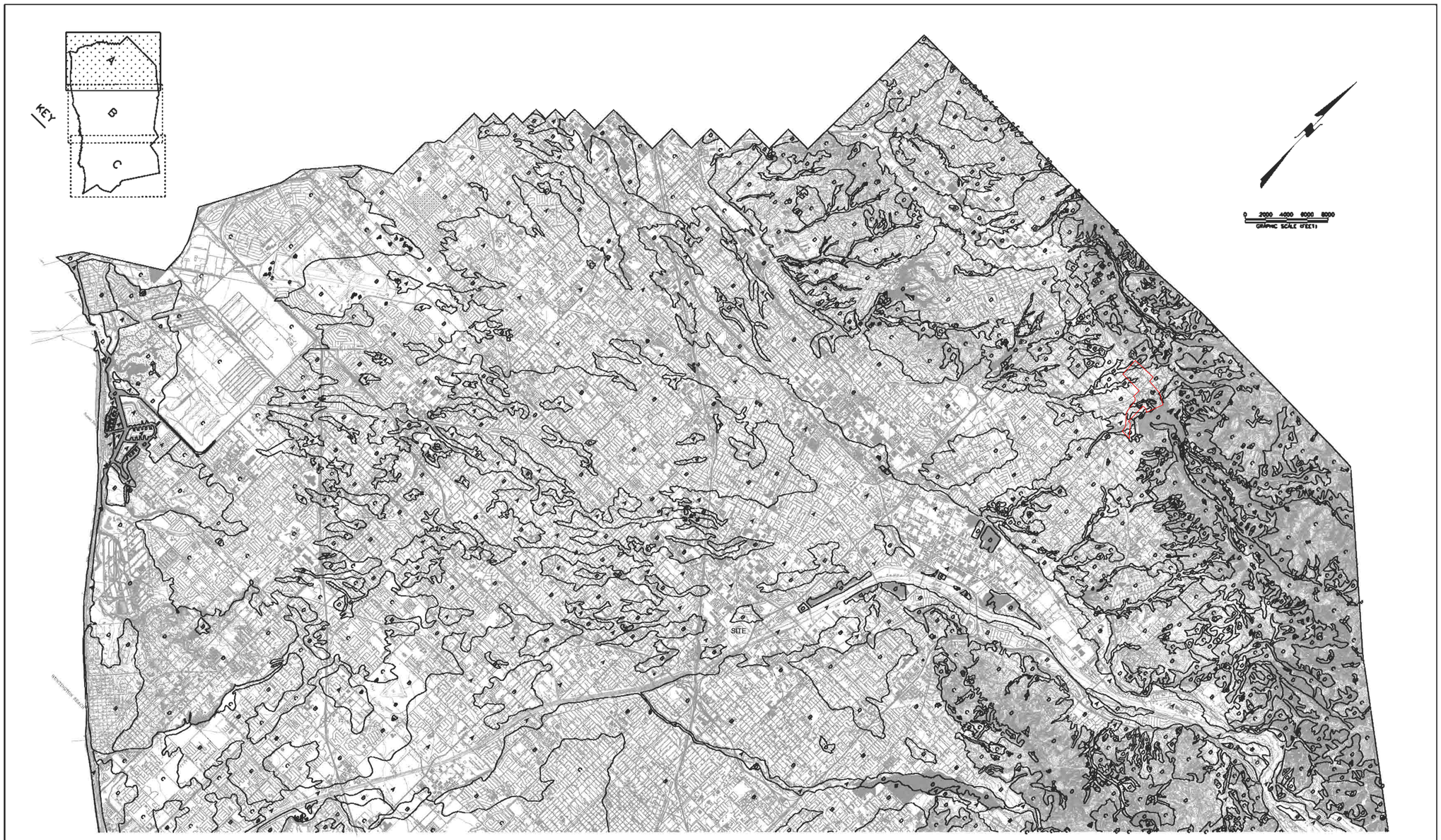
15" RCP and 36" RCP - plan and profile on sheets 14 and 15 of 21 - Blake Rd and Rose Dr. SD - As-Built 4-7-1983 - Unknown capacity

36" CMP - sheet 88 of 102 - Carbon Canyon Creek Improvement - Record Drawing 12-7-1961 - Unknown profile and capacity
Carbon Canyon Channel - Sheets 79 - 90 of 102 - Record Drawing 12-7-1961 - Capacity 1000cfs - 1100cfs

VICINITY MAP

NOT TO SCALE





ORANGE COUNTY
HYDROLOGY MANUAL

HYDROLOGIC CLASSIFICATION OF SOILS
ORANGE COUNTY, CALIFORNIA
PLATE A

SECTION 2

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST – AREAS ‘A’, ‘B’ & ‘C’

10-YR STUDY

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******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ************************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 17:54 01/08/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    93   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      2.35

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.359
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        6.99      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.26
 AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.65
 Tc(MIN.) =   12.89
 SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =   13.58
 EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      15.74

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   7.57
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS   6.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
 GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.74
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   13.11
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.16      0.20     1.000    93
 COMMERCIAL                  D        1.06      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.74
 AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.97
 Tc(MIN.) =   14.08
 SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   20.80
 EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
```

```
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      35.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.59   FLOW VELOCITY(FEET/SEC.) =   9.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.112
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       40.34      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      70.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.48
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.56
  Tc(MIN.) =   15.64
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =   69.41
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =     102.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =  11.91
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20     0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.44   Tc(MIN.) =   10.75
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.618
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =   14.04
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      14.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  19.73
  FLOW VELOCITY(FEET/SEC.) =  4.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.62
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   11.34
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.539
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =      19.68

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.80
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.68
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.93
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.467
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        8.58      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
  SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =   17.92
  EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      37.00

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.00
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   12.40
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.412
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        2.69      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    5.36
  EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      41.48

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.544
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =    8.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.048
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.25      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.56
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.600
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  D        2.57      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   2.64
  Tc(MIN.) =   10.88
  SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    5.55
  EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
  TOTAL AREA(ACRES) =        3.1          PEAK FLOW RATE(CFS) =       6.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.20
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.156
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  D       12.90      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   4.20
  Tc(MIN.) =   15.08
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   22.71
  EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
  TOTAL AREA(ACRES) =       16.0          PEAK FLOW RATE(CFS) =      28.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   4.42
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     15.08
  EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
  PEAK FLOW RATE(CFS)   =      28.28
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

EAST – AREA 'A'

10-YR STUDY

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* EXISTING - EAST - AREA 'A'                                            *
 ************************************************************************

  FILE NAME: EAST-E.DAT
  TIME/DATE OF STUDY: 10:59 01/05/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    523.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.149
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.00      0.20     1.000    93   10.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.26

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    499.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   460.00   CHANNEL SLOPE =  0.0304
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.554
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        2.55      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.11
 AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.08
 Tc(MIN.) =   11.23
 SUBAREA AREA(ACRES) =     2.55       SUBAREA RUNOFF(CFS) =    5.40
 EFFECTIVE AREA(ACRES) =      3.55     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       7.52

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   7.91
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   805.00   CHANNEL SLOPE =  0.0484
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.305
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        4.63      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.91
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.10
 AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   2.20
 Tc(MIN.) =   13.43
 SUBAREA AREA(ACRES) =     4.63       SUBAREA RUNOFF(CFS) =    8.77
 EFFECTIVE AREA(ACRES) =      8.18     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      15.50

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   6.52
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    396.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1695.00   CHANNEL SLOPE =  0.0378
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       74.55      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      75.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.93
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   4.08
  Tc(MIN.) =   17.50
  SUBAREA AREA(ACRES) =    74.55       SUBAREA RUNOFF(CFS) =  119.43
  EFFECTIVE AREA(ACRES) =     82.73     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       82.7         PEAK FLOW RATE(CFS) =     132.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   8.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       51.42      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   51.42      SUBAREA RUNOFF(CFS) =   82.38
  EFFECTIVE AREA(ACRES) =    134.15   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      134.1       PEAK FLOW RATE(CFS) =     214.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      134.1  TC(MIN.) =     17.50
  EFFECTIVE AREA(ACRES) =    134.15  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     214.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

SOUTHEAST – AREA 'B'

10-YR STUDY

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

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          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* EXISTING - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: SE-E-10.DAT
  TIME/DATE OF STUDY: 19:53 01/06/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.217
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.290
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.63      0.20     1.000    93    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.75
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.75

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    391.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1275.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.712
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       13.35      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.35
 AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.89
 Tc(MIN.) =   10.11
 SUBAREA AREA(ACRES) =    13.35       SUBAREA RUNOFF(CFS) =   30.18
 EFFECTIVE AREA(ACRES) =     13.98     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       14.0         PEAK FLOW RATE(CFS) =      31.61

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =   9.34
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                    D        2.21      0.20     1.000    93   12.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      4.29
 TOTAL AREA(ACRES) =      2.21   PEAK FLOW RATE(CFS) =      4.29

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    404.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.0094
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.946
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.49      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.59
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.10
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   5.13
  Tc(MIN.) =   18.05
  SUBAREA AREA(ACRES) =    10.49       SUBAREA RUNOFF(CFS) =   16.48
  EFFECTIVE AREA(ACRES) =     12.70     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       12.7         PEAK FLOW RATE(CFS) =      19.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   3.58
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    404.00  DOWNSTREAM(FEET) =    388.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.0225
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.818
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        7.61      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.21
  AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   2.27
  Tc(MIN.) =   20.32
  SUBAREA AREA(ACRES) =     7.61       SUBAREA RUNOFF(CFS) =   11.08
  EFFECTIVE AREA(ACRES) =     20.31     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.3         PEAK FLOW RATE(CFS) =      29.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   5.44
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.53      0.20     1.000    93    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    401.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1430.00   CHANNEL SLOPE =  0.0413
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.275
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       14.88      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   6.01
  Tc(MIN.) =   13.74
  SUBAREA AREA(ACRES) =    14.88       SUBAREA RUNOFF(CFS) =   27.79
  EFFECTIVE AREA(ACRES) =     15.41     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =      28.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   4.76
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1730.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.4  TC(MIN.) =     13.74
  EFFECTIVE AREA(ACRES) =     15.41  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      28.78
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 3

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

10-YR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 10-YR STUDY                                                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: W-A-10.DAT
  TIME/DATE OF STUDY: 18:42 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.183
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    75    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.96
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.96

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  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.96
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   11.23
  EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      14.85

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.85
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    9.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.780
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   11.24
  EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
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  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.42
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.325
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.26      0.20      0.100    75    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
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    HALFSTREET FLOOD WIDTH(FEET) =    6.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.37
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.26

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.43
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.42   10.47    2.659  0.20( 0.04) 0.20      10.3       1.00
      2        2.26    8.43    3.008  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.48    8.43    3.008  0.20( 0.04) 0.19       9.1       5.00
      2       27.42   10.47    2.659  0.20( 0.04) 0.19      11.1       1.00
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  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.42    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.42
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.58
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      27.42

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.26

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
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 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =   10.23
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.694
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    3.95
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.95
 FLOW VELOCITY(FEET/SEC.) =  3.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       25.48    8.55    2.985  0.20( 0.04) 0.19       9.1       5.00
     1       27.42   10.58    2.642  0.20( 0.04) 0.19      11.1       1.00
     2        5.66   10.23    2.694  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       30.73    8.55    2.985  0.20( 0.03) 0.17      11.1       5.00
     2       32.73   10.23    2.694  0.20( 0.04) 0.18      13.2       8.00
     3       32.96   10.58    2.642  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.96    Tc(MIN.) =    10.58
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.96
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.96

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   10.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
  FLOW VELOCITY(FEET/SEC.) =  3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.92
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.73    8.72    2.952  0.20( 0.03) 0.17      11.1       5.00
      1       32.73   10.39    2.670  0.20( 0.04) 0.18      13.2       8.00
      1       32.96   10.74    2.619  0.20( 0.04) 0.18      13.5       1.00
      2        4.89   10.92    2.595  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    8.72    2.952  0.20( 0.03) 0.16      12.8       5.00
      2       37.52   10.39    2.670  0.20( 0.03) 0.17      15.2       8.00
      3       37.82   10.74    2.619  0.20( 0.03) 0.17      15.6       1.00
      4       37.54   10.92    2.595  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.82    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.82
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.82

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.877
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.31      0.20      0.100    75    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  3.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.40

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    9.58    2.797  0.20( 0.03) 0.16      12.8       5.00
      1       37.52   11.24    2.552  0.20( 0.03) 0.17      15.2       8.00
      1       37.82   11.57    2.510  0.20( 0.03) 0.17      15.6       1.00
      1       37.54   11.78    2.485  0.20( 0.03) 0.17      15.6      11.00
      2        3.40    6.94    3.364  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       34.12    6.94    3.364  0.20( 0.03) 0.16      10.4      14.00
      2       38.00    9.58    2.797  0.20( 0.03) 0.16      13.9       5.00
      3       40.10   11.24    2.552  0.20( 0.03) 0.16      16.3       8.00
      4       40.35   11.57    2.510  0.20( 0.03) 0.16      16.7       1.00
      5       40.04   11.78    2.485  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.35    Tc(MIN.) =    11.57
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.35
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.85
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.85
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.35

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    75    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
```

```
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 D        0.29      0.20     0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.87
EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    6.96
RAINFALL INTENSITY(INCH/HR) =   3.36
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =       0.62
TOTAL STREAM AREA(ACRES) =       0.62
PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       34.12    7.24    3.283  0.20( 0.03) 0.16      10.4      14.00
    1       38.00    9.86    2.751  0.20( 0.03) 0.16      13.9       5.00
    1       40.10   11.53    2.515  0.20( 0.03) 0.16      16.3       8.00
    1       40.35   11.85    2.476  0.20( 0.03) 0.16      16.7       1.00
    1       40.04   12.06    2.451  0.20( 0.03) 0.16      16.7      11.00
    2        1.86    6.96    3.359  0.20( 0.02) 0.10       0.6      17.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       35.42    6.96    3.359  0.20( 0.03) 0.15      10.6      17.00
    2       35.94    7.24    3.283  0.20( 0.03) 0.15      11.0      14.00
    3       39.52    9.86    2.751  0.20( 0.03) 0.16      14.5       5.00
    4       41.49   11.53    2.515  0.20( 0.03) 0.16      16.9       8.00
    5       41.72   11.85    2.476  0.20( 0.03) 0.16      17.3       1.00
    6       41.40   12.06    2.451  0.20( 0.03) 0.16      17.4      11.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      41.72    Tc(MIN.) =    11.85
EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
TOTAL AREA(ACRES) =       17.4
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      41.72
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.93
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.72

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.54
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      4.54

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   10.16
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      14.43

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.19
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    7.04    3.336  0.20( 0.03) 0.15      10.6      17.00
      1       35.94    7.33    3.262  0.20( 0.03) 0.15      11.0      14.00
      1       39.52    9.94    2.738  0.20( 0.03) 0.16      14.5       5.00
      1       41.49   11.61    2.505  0.20( 0.03) 0.16      16.9       8.00
      1       41.72   11.93    2.466  0.20( 0.03) 0.16      17.3       1.00
      1       41.40   12.14    2.442  0.20( 0.03) 0.16      17.4      11.00
      2       14.43    8.19    3.059  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.96    7.04    3.336  0.20( 0.03) 0.17      15.2      17.00
      2       49.71    7.33    3.262  0.20( 0.03) 0.17      15.8      14.00
      3       51.56    8.19    3.059  0.20( 0.03) 0.17      17.5      19.00
      4       52.41    9.94    2.738  0.20( 0.03) 0.17      19.9       5.00
      5       53.27   11.61    2.505  0.20( 0.03) 0.17      22.2       8.00
      6       53.32   11.93    2.466  0.20( 0.03) 0.17      22.6       1.00
      7       52.88   12.14    2.442  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      53.32    Tc(MIN.) =    11.93
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.32
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   13.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.20
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.433
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    75    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.86

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.538
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20      0.100    75    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.96    8.35    3.026  0.20( 0.03) 0.17      15.2      17.00
      1       49.71    8.63    2.970  0.20( 0.03) 0.17      15.8      14.00
      1       51.56    9.49    2.812  0.20( 0.03) 0.17      17.5      19.00
      1       52.41   11.24    2.552  0.20( 0.03) 0.17      19.9       5.00
      1       53.27   12.87    2.361  0.20( 0.03) 0.17      22.2       8.00
      1       53.32   13.20    2.328  0.20( 0.03) 0.17      22.6       1.00
      1       52.88   13.41    2.307  0.20( 0.03) 0.17      22.7      11.00
      2        0.86    6.70    3.433  0.20( 0.02) 0.10       0.3      22.00
      3        0.82    6.36    3.538  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.36    3.538  0.20( 0.03) 0.17      12.1      40.00
      2       46.29    6.70    3.433  0.20( 0.03) 0.17      12.7      22.00
      3       50.42    8.35    3.026  0.20( 0.03) 0.17      15.7      17.00
      4       51.14    8.63    2.970  0.20( 0.03) 0.17      16.3      14.00
      5       52.91    9.49    2.812  0.20( 0.03) 0.17      18.0      19.00
      6       53.64   11.24    2.552  0.20( 0.03) 0.17      20.4       5.00
      7       54.41   12.87    2.361  0.20( 0.03) 0.17      22.8       8.00
      8       54.44   13.20    2.328  0.20( 0.03) 0.17      23.2       1.00
      9       53.99   13.41    2.307  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.44    Tc(MIN.) =    13.20
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.33
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.33
  RAINFALL INTENSITY(INCH/HR) =   2.31
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.44

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.00

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   3.42    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   19.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      20.53

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.53
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.10
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.10
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.50    3.493  0.20( 0.03) 0.17      12.1      40.00
      1       46.29    6.84    3.392  0.20( 0.03) 0.17      12.7      22.00
```

```
     1       50.42    8.48    2.999  0.20( 0.03) 0.17      15.7      17.00
     1       51.14    8.76    2.943  0.20( 0.03) 0.17      16.3      14.00
     1       52.91    9.63    2.789  0.20( 0.03) 0.17      18.0      19.00
     1       53.64   11.38    2.534  0.20( 0.03) 0.17      20.4       5.00
     1       54.41   13.01    2.347  0.20( 0.03) 0.17      22.8       8.00
     1       54.44   13.33    2.314  0.20( 0.03) 0.17      23.2       1.00
     1       53.99   13.54    2.294  0.20( 0.03) 0.17      23.2      11.00
     2       20.53    9.10    2.880  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.50    3.493  0.20( 0.03) 0.17      17.8      40.00
      2       64.50    6.84    3.392  0.20( 0.03) 0.17      18.8      22.00
      3       70.36    8.48    2.999  0.20( 0.03) 0.17      23.2      17.00
      4       71.36    8.76    2.943  0.20( 0.03) 0.17      24.0      14.00
      5       72.37    9.10    2.880  0.20( 0.03) 0.17      25.0      24.00
      6       72.78    9.63    2.789  0.20( 0.03) 0.17      26.1      19.00
      7       71.68   11.38    2.534  0.20( 0.03) 0.17      28.4       5.00
      8       71.09   13.01    2.347  0.20( 0.03) 0.17      30.8       8.00
      9       70.88   13.33    2.314  0.20( 0.03) 0.17      31.2       1.00
     10       70.29   13.54    2.294  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      72.78    Tc(MIN.) =     9.63
  EFFECTIVE AREA(ACRES) =      26.06   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.78
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.10
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.06
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.78

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.35
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    8.47
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      12.52

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.52
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    8.69
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.69
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.99    3.350  0.20( 0.03) 0.17      17.8      40.00
      1       64.50    7.33    3.259  0.20( 0.03) 0.17      18.8      22.00
      1       70.36    8.96    2.906  0.20( 0.03) 0.17      23.2      17.00
      1       71.36    9.24    2.855  0.20( 0.03) 0.17      24.0      14.00
      1       72.37    9.58    2.798  0.20( 0.03) 0.17      25.0      24.00
      1       72.78   10.10    2.713  0.20( 0.03) 0.17      26.1      19.00
      1       71.68   11.85    2.476  0.20( 0.03) 0.17      28.4       5.00
      1       71.09   13.48    2.299  0.20( 0.03) 0.17      30.8       8.00
      1       70.88   13.81    2.268  0.20( 0.03) 0.17      31.2       1.00
      1       70.29   14.02    2.249  0.20( 0.03) 0.17      31.2      11.00
      2       12.52    8.69    2.958  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.57    6.99    3.350  0.20( 0.04) 0.18      21.5      40.00
      2       76.16    7.33    3.259  0.20( 0.04) 0.18      22.6      22.00
      3       81.89    8.69    2.958  0.20( 0.04) 0.18      27.0      29.00
      4       82.65    8.96    2.906  0.20( 0.04) 0.18      27.7      17.00
      5       83.43    9.24    2.855  0.20( 0.04) 0.18      28.6      14.00
      6       84.20    9.58    2.798  0.20( 0.04) 0.18      29.5      24.00
      7       84.25   10.10    2.713  0.20( 0.04) 0.18      30.6      19.00
      8       82.13   11.85    2.476  0.20( 0.04) 0.18      33.0       5.00
      9       80.78   13.48    2.299  0.20( 0.04) 0.18      35.3       8.00
     10       80.44   13.81    2.268  0.20( 0.04) 0.18      35.7       1.00
     11       79.76   14.02    2.249  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.25    Tc(MIN.) =    10.10
  EFFECTIVE AREA(ACRES) =      30.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.25
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.14
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.25
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.60
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.25

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    5.44
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.44
  RAINFALL INTENSITY(INCH/HR) =   3.87
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       74.57    7.14    3.311  0.20( 0.04) 0.18      21.5      40.00
     1       76.16    7.48    3.223  0.20( 0.04) 0.18      22.6      22.00
     1       81.89    8.83    2.931  0.20( 0.04) 0.18      27.0      29.00
     1       82.65    9.10    2.881  0.20( 0.04) 0.18      27.7      17.00
     1       83.43    9.38    2.831  0.20( 0.04) 0.18      28.6      14.00
     1       84.20    9.71    2.775  0.20( 0.04) 0.18      29.5      24.00
     1       84.25   10.24    2.692  0.20( 0.04) 0.18      30.6      19.00
     1       82.13   11.99    2.459  0.20( 0.04) 0.18      33.0       5.00
     1       80.78   13.62    2.286  0.20( 0.04) 0.18      35.3       8.00
     1       80.44   13.95    2.255  0.20( 0.04) 0.18      35.7       1.00
     1       79.76   14.16    2.236  0.20( 0.04) 0.18      35.8      11.00
     2        2.83    5.44    3.867  0.20( 0.18) 0.90       0.8      34.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       69.36    5.44    3.867  0.20( 0.04) 0.21      17.2      34.00
     2       76.98    7.14    3.311  0.20( 0.04) 0.20      22.3      40.00
     3       78.50    7.48    3.223  0.20( 0.04) 0.20      23.4      22.00
     4       84.00    8.83    2.931  0.20( 0.04) 0.20      27.8      29.00
     5       84.72    9.10    2.881  0.20( 0.04) 0.20      28.6      17.00
     6       85.47    9.38    2.831  0.20( 0.04) 0.20      29.4      14.00
     7       86.19    9.71    2.775  0.20( 0.04) 0.20      30.4      24.00
     8       86.18   10.24    2.692  0.20( 0.04) 0.20      31.4      19.00
     9       83.87   11.99    2.459  0.20( 0.04) 0.19      33.8       5.00
    10       82.40   13.62    2.286  0.20( 0.04) 0.19      36.1       8.00
    11       82.03   13.95    2.255  0.20( 0.04) 0.19      36.5       1.00
    12       81.34   14.16    2.236  0.20( 0.04) 0.19      36.6      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      86.19    Tc(MIN.) =     9.71
 EFFECTIVE AREA(ACRES) =      30.36   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       36.6
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.67
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      86.19
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.75
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.75
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.36
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      86.19

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.88
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      5.88

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.70
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       69.36    5.48    3.851  0.20( 0.04) 0.21      17.2      34.00
      1       76.98    7.18    3.300  0.20( 0.04) 0.20      22.3      40.00
      1       78.50    7.52    3.214  0.20( 0.04) 0.20      23.4      22.00
      1       84.00    8.86    2.924  0.20( 0.04) 0.20      27.8      29.00
```

```
     1       84.72    9.14    2.874  0.20( 0.04) 0.20      28.6      17.00
     1       85.47    9.42    2.824  0.20( 0.04) 0.20      29.4      14.00
     1       86.19    9.75    2.768  0.20( 0.04) 0.20      30.4      24.00
     1       86.18   10.28    2.686  0.20( 0.04) 0.20      31.4      19.00
     1       83.87   12.03    2.454  0.20( 0.04) 0.19      33.8       5.00
     1       82.40   13.66    2.282  0.20( 0.04) 0.19      36.1       8.00
     1       82.03   13.99    2.252  0.20( 0.04) 0.19      36.5       1.00
     1       81.34   14.20    2.232  0.20( 0.04) 0.19      36.6      11.00
     2        5.88    7.70    3.170  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.46    5.48    3.851  0.20( 0.04) 0.21      18.7      34.00
      2       82.69    7.18    3.300  0.20( 0.04) 0.20      24.2      40.00
      3       84.32    7.52    3.214  0.20( 0.04) 0.20      25.4      22.00
      4       85.13    7.70    3.170  0.20( 0.04) 0.20      26.1      37.00
      5       89.42    8.86    2.924  0.20( 0.04) 0.20      29.9      29.00
      6       90.05    9.14    2.874  0.20( 0.04) 0.20      30.6      17.00
      7       90.70    9.42    2.824  0.20( 0.04) 0.20      31.5      14.00
      8       91.31    9.75    2.768  0.20( 0.04) 0.20      32.4      24.00
      9       91.15   10.28    2.686  0.20( 0.04) 0.20      33.5      19.00
     10       88.41   12.03    2.454  0.20( 0.04) 0.20      35.8       5.00
     11       86.61   13.66    2.282  0.20( 0.04) 0.19      38.2       8.00
     12       86.19   13.99    2.252  0.20( 0.04) 0.19      38.6       1.00
     13       85.46   14.20    2.232  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      91.31    Tc(MIN.) =     9.75
  EFFECTIVE AREA(ACRES) =      32.42   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.31
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.42
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      91.31

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.55      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    1.64
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.41

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.46    6.18    3.594  0.20( 0.04) 0.21      18.7      34.00
      1       82.69    7.85    3.134  0.20( 0.04) 0.20      24.2      40.00
      1       84.32    8.19    3.059  0.20( 0.04) 0.20      25.4      22.00
      1       85.13    8.38    3.021  0.20( 0.04) 0.20      26.1      37.00
      1       89.42    9.54    2.804  0.20( 0.04) 0.20      29.9      29.00
      1       90.05    9.80    2.761  0.20( 0.04) 0.20      30.6      17.00
      1       90.70   10.08    2.717  0.20( 0.04) 0.20      31.5      14.00
      1       91.31   10.41    2.667  0.20( 0.04) 0.20      32.4      24.00
      1       91.15   10.94    2.592  0.20( 0.04) 0.20      33.5      19.00
      1       88.41   12.71    2.379  0.20( 0.04) 0.20      35.8       5.00
      1       86.61   14.34    2.220  0.20( 0.04) 0.19      38.2       8.00
      1       86.19   14.66    2.192  0.20( 0.04) 0.19      38.6       1.00
      1       85.46   14.87    2.174  0.20( 0.04) 0.19      38.6      11.00
      2        2.41    7.06    3.332  0.20( 0.02) 0.10       0.8      40.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       76.74    6.18    3.594  0.20( 0.04) 0.21      19.4      34.00
      2       81.18    7.06    3.332  0.20( 0.04) 0.20      22.4      40.00
      3       84.96    7.85    3.134  0.20( 0.04) 0.20      25.0      40.00
      4       86.54    8.19    3.059  0.20( 0.04) 0.20      26.2      22.00
      5       87.31    8.38    3.021  0.20( 0.04) 0.20      26.9      37.00
      6       91.45    9.54    2.804  0.20( 0.04) 0.20      30.7      29.00
      7       92.05    9.80    2.761  0.20( 0.04) 0.20      31.4      17.00
      8       92.67   10.08    2.717  0.20( 0.04) 0.20      32.3      14.00
      9       93.24   10.41    2.667  0.20( 0.04) 0.20      33.2      24.00
     10       93.03   10.94    2.592  0.20( 0.04) 0.20      34.3      19.00
     11       90.13   12.71    2.379  0.20( 0.04) 0.19      36.6       5.00
     12       88.22   14.34    2.220  0.20( 0.04) 0.19      39.0       8.00
     13       87.77   14.66    2.192  0.20( 0.04) 0.19      39.4       1.00
     14       87.03   14.87    2.174  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.24    Tc(MIN.) =    10.41
  EFFECTIVE AREA(ACRES) =      33.23   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.62
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.24
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.23
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.24

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
```

```
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.43      0.20      0.100    75    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.31
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   3.39
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.74    6.25    3.571  0.20( 0.04) 0.21      19.4      34.00
     1       81.18    7.13    3.313  0.20( 0.04) 0.20      22.4      40.00
     1       84.96    7.92    3.119  0.20( 0.04) 0.20      25.0      40.00
     1       86.54    8.26    3.045  0.20( 0.04) 0.20      26.2      22.00
     1       87.31    8.44    3.007  0.20( 0.04) 0.20      26.9      37.00
     1       91.45    9.61    2.792  0.20( 0.04) 0.20      30.7      29.00
     1       92.05    9.86    2.750  0.20( 0.04) 0.20      31.4      17.00
     1       92.67   10.14    2.707  0.20( 0.04) 0.20      32.3      14.00
     1       93.24   10.48    2.657  0.20( 0.04) 0.20      33.2      24.00
     1       93.03   11.00    2.584  0.20( 0.04) 0.20      34.3      19.00
     1       90.13   12.77    2.372  0.20( 0.04) 0.19      36.6       5.00
     1       88.22   14.40    2.214  0.20( 0.04) 0.19      39.0       8.00
     1       87.77   14.73    2.186  0.20( 0.04) 0.19      39.4       1.00
     1       87.03   14.94    2.168  0.20( 0.04) 0.19      39.5      11.00
     2        1.31    6.83    3.394  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       78.00    6.25    3.571  0.20( 0.04) 0.21      19.8      34.00
     2       81.00    6.83    3.394  0.20( 0.04) 0.20      21.8      42.00
     3       82.46    7.13    3.313  0.20( 0.04) 0.20      22.8      40.00
     4       86.15    7.92    3.119  0.20( 0.04) 0.20      25.4      40.00
     5       87.71    8.26    3.045  0.20( 0.04) 0.20      26.7      22.00
     6       88.47    8.44    3.007  0.20( 0.04) 0.20      27.3      37.00
     7       92.52    9.61    2.792  0.20( 0.04) 0.20      31.1      29.00
     8       93.10    9.86    2.750  0.20( 0.04) 0.20      31.9      17.00
     9       93.71   10.14    2.707  0.20( 0.04) 0.19      32.7      14.00
    10       94.26   10.48    2.657  0.20( 0.04) 0.19      33.7      24.00
    11       94.02   11.00    2.584  0.20( 0.04) 0.19      34.7      19.00
    12       91.04   12.77    2.372  0.20( 0.04) 0.19      37.1       5.00
    13       89.06   14.40    2.214  0.20( 0.04) 0.19      39.4       8.00
    14       88.61   14.73    2.186  0.20( 0.04) 0.19      39.8       1.00
    15       87.86   14.94    2.168  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      94.26    Tc(MIN.) =    10.48
 EFFECTIVE AREA(ACRES) =      33.66   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
```

```
  TOTAL AREA(ACRES) =       39.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.26
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.84
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.84
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.66
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      94.26

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.424
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    8.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.090
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.16
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.72
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.18

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
```

```
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.88
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.88
  RAINFALL INTENSITY(INCH/HR) =   3.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       78.00    6.63    3.452  0.20( 0.04) 0.21      19.8      34.00
      1       81.00    7.21    3.291  0.20( 0.04) 0.20      21.8      42.00
      1       82.46    7.50    3.217  0.20( 0.04) 0.20      22.8      40.00
      1       86.15    8.30    3.037  0.20( 0.04) 0.20      25.4      40.00
      1       87.71    8.63    2.970  0.20( 0.04) 0.20      26.7      22.00
      1       88.47    8.81    2.934  0.20( 0.04) 0.20      27.3      37.00
      1       92.52    9.97    2.733  0.20( 0.04) 0.20      31.1      29.00
      1       93.10   10.23    2.694  0.20( 0.04) 0.20      31.9      17.00
      1       93.71   10.51    2.653  0.20( 0.04) 0.19      32.7      14.00
      1       94.26   10.84    2.606  0.20( 0.04) 0.19      33.7      24.00
      1       94.02   11.37    2.536  0.20( 0.04) 0.19      34.7      19.00
      1       91.04   13.14    2.334  0.20( 0.04) 0.19      37.1       5.00
      1       89.06   14.77    2.182  0.20( 0.04) 0.19      39.4       8.00
      1       88.61   15.10    2.155  0.20( 0.04) 0.19      39.8       1.00
      1       87.86   15.31    2.138  0.20( 0.04) 0.19      39.9      11.00
      2        2.18    8.05    3.090  0.20( 0.02) 0.10       0.8      44.00
      3        2.23    6.88    3.380  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.21    6.63    3.452  0.20( 0.04) 0.20      21.1      34.00
      2       83.56    6.88    3.380  0.20( 0.04) 0.20      22.0      40.00
      3       85.26    7.21    3.291  0.20( 0.04) 0.20      23.2      42.00
      4       86.70    7.50    3.217  0.20( 0.04) 0.20      24.3      40.00
      5       89.22    8.05    3.090  0.20( 0.04) 0.19      26.1      44.00
      6       90.30    8.30    3.037  0.20( 0.04) 0.19      27.0      40.00
      7       91.76    8.63    2.970  0.20( 0.04) 0.19      28.2      22.00
      8       92.48    8.81    2.934  0.20( 0.04) 0.19      28.8      37.00
      9       96.26    9.97    2.733  0.20( 0.04) 0.19      32.6      29.00
     10       96.78   10.23    2.694  0.20( 0.04) 0.19      33.4      17.00
     11       97.33   10.51    2.653  0.20( 0.04) 0.19      34.2      14.00
     12       97.82   10.84    2.606  0.20( 0.04) 0.19      35.2      24.00
     13       97.48   11.37    2.536  0.20( 0.04) 0.19      36.2      19.00
     14       94.22   13.14    2.334  0.20( 0.04) 0.19      38.6       5.00
     15       92.04   14.77    2.182  0.20( 0.04) 0.19      40.9       8.00
     16       91.55   15.10    2.155  0.20( 0.04) 0.19      41.4       1.00
     17       90.77   15.31    2.138  0.20( 0.04) 0.19      41.4      11.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      97.82    Tc(MIN.) =    10.84
  EFFECTIVE AREA(ACRES) =      35.18   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.82
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =   12.21
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.71
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.82
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   12.62
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.57
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.57

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.82
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.933
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   24.24
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.41
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.559
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    75    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.43
  FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       2.43
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.43
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    8.24
 LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.24
 RAINFALL INTENSITY(INCH/HR) =   3.05
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.88
 TOTAL STREAM AREA(ACRES) =       0.88
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.43

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.41    9.88    2.748  0.20( 0.04) 0.20      10.9      48.00
     2        2.43    8.24    3.048  0.20( 0.02) 0.10       0.9      51.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.76    8.24    3.048  0.20( 0.04) 0.19      10.0      51.00
     2       30.60    9.88    2.748  0.20( 0.04) 0.19      11.8      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      30.60    Tc(MIN.) =     9.88
 EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       11.8
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      30.60
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.26
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.26
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      11.79
 TOTAL STREAM AREA(ACRES) =      11.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.60

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.803
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20      0.100    75    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.58
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   3.80
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       28.76    8.63    2.970  0.20( 0.04) 0.19      10.0      51.00
     1       30.60   10.26    2.689  0.20( 0.04) 0.19      11.8      48.00
     2        0.58    5.60    3.803  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.57    5.60    3.803  0.20( 0.04) 0.19       6.7      53.00
     2       29.21    8.63    2.970  0.20( 0.04) 0.19      10.2      51.00
     3       31.00   10.26    2.689  0.20( 0.04) 0.19      12.0      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      31.00    Tc(MIN.) =    10.26
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.00
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20      0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   14.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    8.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =    9.26
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       9.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.39
  FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.57    6.11    3.618  0.20( 0.04) 0.19       6.7      53.00
      1       29.21    9.11    2.879  0.20( 0.04) 0.19      10.2      51.00
      1       31.00   10.74    2.620  0.20( 0.04) 0.19      12.0      48.00
      2        9.83    8.45    3.006  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.15    6.11    3.618  0.20( 0.04) 0.19       9.3      53.00
      2       38.02    8.45    3.006  0.20( 0.04) 0.19      13.1      56.00
      3       38.62    9.11    2.879  0.20( 0.04) 0.19      13.8      51.00
      4       39.55   10.74    2.620  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.55    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
```

```
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               D        1.10      0.20     0.850    75   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.29
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.29

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   14.24
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.228
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               D        8.75      0.20     0.850    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =   16.21
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      18.25

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.24
 RAINFALL INTENSITY(INCH/HR) =   2.23
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.25

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.15    6.29    3.561  0.20( 0.04) 0.19       9.3      53.00
     1       38.02    8.62    2.971  0.20( 0.04) 0.19      13.1      56.00
     1       38.62    9.28    2.848  0.20( 0.04) 0.19      13.8      51.00
     1       39.55   10.91    2.597  0.20( 0.04) 0.19      15.6      48.00
     2       18.25   14.24    2.228  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.41    6.29    3.561  0.20( 0.08) 0.40      13.7      53.00
     2       53.05    8.62    2.971  0.20( 0.08) 0.40      19.0      56.00
     3       54.09    9.28    2.848  0.20( 0.08) 0.40      20.3      51.00
     4       56.02   10.91    2.597  0.20( 0.08) 0.41      23.2      48.00
     5       52.10   14.24    2.228  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      56.02    Tc(MIN.) =    10.91
 EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.02
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   11.12
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.41    6.51    3.491  0.20( 0.08) 0.40      13.7      53.00
     2       53.05    8.83    2.930  0.20( 0.08) 0.40      19.0      56.00
     3       54.09    9.49    2.811  0.20( 0.08) 0.40      20.3      51.00
     4       56.02   11.12    2.568  0.20( 0.08) 0.41      23.2      48.00
     5       52.10   14.46    2.209  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       82.21    8.52    2.991  0.20( 0.04) 0.20      21.1      34.00
     2       83.56    8.73    2.950  0.20( 0.04) 0.20      22.0      40.00
     3       85.26    9.06    2.888  0.20( 0.04) 0.20      23.2      42.00
     4       86.70    9.34    2.837  0.20( 0.04) 0.20      24.3      40.00
     5       89.22    9.88    2.747  0.20( 0.04) 0.19      26.1      44.00
     6       90.30   10.13    2.709  0.20( 0.04) 0.19      27.0      40.00
     7       91.76   10.46    2.660  0.20( 0.04) 0.19      28.2      22.00
     8       92.48   10.64    2.634  0.20( 0.04) 0.19      28.8      37.00
     9       96.26   11.79    2.484  0.20( 0.04) 0.19      32.6      29.00
    10       96.78   12.04    2.453  0.20( 0.04) 0.19      33.4      17.00
    11       97.33   12.28    2.425  0.20( 0.04) 0.19      34.2      14.00
    12       97.82   12.62    2.389  0.20( 0.04) 0.19      35.2      24.00
    13       97.48   13.14    2.333  0.20( 0.04) 0.19      36.2      19.00
    14       94.22   14.95    2.167  0.20( 0.04) 0.19      38.6       5.00
    15       92.04   16.60    2.041  0.20( 0.04) 0.19      40.9       8.00
    16       91.55   16.92    2.019  0.20( 0.04) 0.19      41.4       1.00
    17       90.77   17.14    2.004  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      119.81    6.51    3.491  0.20( 0.06) 0.29      29.8      53.00
     2      134.36    8.52    2.991  0.20( 0.06) 0.29      39.4      34.00
     3      136.31    8.73    2.950  0.20( 0.06) 0.29      40.8      40.00
     4      137.15    8.83    2.930  0.20( 0.06) 0.29      41.4      56.00
     5      138.65    9.06    2.888  0.20( 0.06) 0.29      42.7      42.00
     6      140.55    9.34    2.837  0.20( 0.06) 0.29      44.2      40.00
     7      141.50    9.49    2.811  0.20( 0.06) 0.29      45.0      51.00
     8      143.77    9.88    2.747  0.20( 0.06) 0.29      47.1      44.00
     9      145.15   10.13    2.709  0.20( 0.06) 0.29      48.4      40.00
    10      147.00   10.46    2.660  0.20( 0.06) 0.29      50.2      22.00
    11      147.93   10.64    2.634  0.20( 0.06) 0.29      51.1      37.00
    12      150.09   11.12    2.568  0.20( 0.06) 0.28      53.6      48.00
    13      151.50   11.79    2.484  0.20( 0.06) 0.28      56.3      29.00
    14      151.73   12.04    2.453  0.20( 0.06) 0.29      57.2      17.00
    15      151.99   12.28    2.425  0.20( 0.06) 0.29      58.2      14.00
    16      152.09   12.62    2.389  0.20( 0.06) 0.29      59.4      24.00
    17      151.13   13.14    2.333  0.20( 0.06) 0.29      60.8      19.00
    18      147.22   14.46    2.209  0.20( 0.06) 0.29      63.4      59.00
    19      145.29   14.95    2.167  0.20( 0.06) 0.29      64.1       5.00
    20      140.02   16.60    2.041  0.20( 0.06) 0.29      66.4       8.00
    21      138.97   16.92    2.019  0.20( 0.06) 0.29      66.9       1.00
    22      137.84   17.14    2.004  0.20( 0.06) 0.29      66.9      11.00
  TOTAL AREA(ACRES) =        66.9
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      152.09  Tc(MIN.) =   12.617
  EFFECTIVE AREA(ACRES) =     59.40  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     12.62
  EFFECTIVE AREA(ACRES) =     59.40  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.286
  PEAK FLOW RATE(CFS)   =     152.09

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      119.81    6.51    3.491  0.20( 0.06) 0.29      29.8      53.00
      2      134.36    8.52    2.991  0.20( 0.06) 0.29      39.4      34.00
      3      136.31    8.73    2.950  0.20( 0.06) 0.29      40.8      40.00
      4      137.15    8.83    2.930  0.20( 0.06) 0.29      41.4      56.00
      5      138.65    9.06    2.888  0.20( 0.06) 0.29      42.7      42.00
      6      140.55    9.34    2.837  0.20( 0.06) 0.29      44.2      40.00
      7      141.50    9.49    2.811  0.20( 0.06) 0.29      45.0      51.00
      8      143.77    9.88    2.747  0.20( 0.06) 0.29      47.1      44.00
      9      145.15   10.13    2.709  0.20( 0.06) 0.29      48.4      40.00
     10      147.00   10.46    2.660  0.20( 0.06) 0.29      50.2      22.00
     11      147.93   10.64    2.634  0.20( 0.06) 0.29      51.1      37.00
     12      150.09   11.12    2.568  0.20( 0.06) 0.28      53.6      48.00
     13      151.50   11.79    2.484  0.20( 0.06) 0.28      56.3      29.00
     14      151.73   12.04    2.453  0.20( 0.06) 0.29      57.2      17.00
     15      151.99   12.28    2.425  0.20( 0.06) 0.29      58.2      14.00
     16      152.09   12.62    2.389  0.20( 0.06) 0.29      59.4      24.00
     17      151.13   13.14    2.333  0.20( 0.06) 0.29      60.8      19.00
     18      147.22   14.46    2.209  0.20( 0.06) 0.29      63.4      59.00
     19      145.29   14.95    2.167  0.20( 0.06) 0.29      64.1       5.00
     20      140.02   16.60    2.041  0.20( 0.06) 0.29      66.4       8.00
     21      138.97   16.92    2.019  0.20( 0.06) 0.29      66.9       1.00
     22      137.84   17.14    2.004  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 10-YR STUDY, WITH A FLOW-BY DETENTION BASIN                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: W-AB-10.DAT
  TIME/DATE OF STUDY: 18:50 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.183
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    75    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.96
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.96

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.96
 PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =    8.94
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.94
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   11.23
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      14.85

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.85
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    9.68
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.68
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.780
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   11.24
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      25.42

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.42
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.325
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.26      0.20      0.100    75    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    6.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.37
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.26

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.43
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.42   10.47    2.659  0.20( 0.04) 0.20      10.3       1.00
      2        2.26    8.43    3.008  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.48    8.43    3.008  0.20( 0.04) 0.19       9.1       5.00
      2       27.42   10.47    2.659  0.20( 0.04) 0.19      11.1       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.42    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.42
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.58
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      27.42

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.26

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =   10.23
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.694
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    3.95
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.95
 FLOW VELOCITY(FEET/SEC.) =  3.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       25.48    8.55    2.985  0.20( 0.04) 0.19       9.1       5.00
     1       27.42   10.58    2.642  0.20( 0.04) 0.19      11.1       1.00
     2        5.66   10.23    2.694  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.73    8.55    2.985  0.20( 0.03) 0.17      11.1       5.00
     2       32.73   10.23    2.694  0.20( 0.04) 0.18      13.2       8.00
     3       32.96   10.58    2.642  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.96    Tc(MIN.) =    10.58
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.96
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.96

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   10.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
  FLOW VELOCITY(FEET/SEC.) =  3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.92
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.73    8.72    2.952  0.20( 0.03) 0.17      11.1       5.00
      1       32.73   10.39    2.670  0.20( 0.04) 0.18      13.2       8.00
      1       32.96   10.74    2.619  0.20( 0.04) 0.18      13.5       1.00
      2        4.89   10.92    2.595  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    8.72    2.952  0.20( 0.03) 0.16      12.8       5.00
      2       37.52   10.39    2.670  0.20( 0.03) 0.17      15.2       8.00
      3       37.82   10.74    2.619  0.20( 0.03) 0.17      15.6       1.00
      4       37.54   10.92    2.595  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.82    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.82
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.82

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.877
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.31      0.20      0.100    75    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  3.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.40

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    9.58    2.797  0.20( 0.03) 0.16      12.8       5.00
      1       37.52   11.24    2.552  0.20( 0.03) 0.17      15.2       8.00
      1       37.82   11.57    2.510  0.20( 0.03) 0.17      15.6       1.00
      1       37.54   11.78    2.485  0.20( 0.03) 0.17      15.6      11.00
      2        3.40    6.94    3.364  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       34.12    6.94    3.364  0.20( 0.03) 0.16      10.4      14.00
      2       38.00    9.58    2.797  0.20( 0.03) 0.16      13.9       5.00
      3       40.10   11.24    2.552  0.20( 0.03) 0.16      16.3       8.00
      4       40.35   11.57    2.510  0.20( 0.03) 0.16      16.7       1.00
      5       40.04   11.78    2.485  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.35    Tc(MIN.) =    11.57
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.35
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.85
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.85
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.35

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    75    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.87
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.12    7.24    3.283  0.20( 0.03) 0.16      10.4      14.00
      1       38.00    9.86    2.751  0.20( 0.03) 0.16      13.9       5.00
      1       40.10   11.53    2.515  0.20( 0.03) 0.16      16.3       8.00
      1       40.35   11.85    2.476  0.20( 0.03) 0.16      16.7       1.00
      1       40.04   12.06    2.451  0.20( 0.03) 0.16      16.7      11.00
      2        1.86    6.96    3.359  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    6.96    3.359  0.20( 0.03) 0.15      10.6      17.00
      2       35.94    7.24    3.283  0.20( 0.03) 0.15      11.0      14.00
      3       39.52    9.86    2.751  0.20( 0.03) 0.16      14.5       5.00
      4       41.49   11.53    2.515  0.20( 0.03) 0.16      16.9       8.00
      5       41.72   11.85    2.476  0.20( 0.03) 0.16      17.3       1.00
      6       41.40   12.06    2.451  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.72    Tc(MIN.) =    11.85
  EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.72
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.93
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.72

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.54
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      4.54

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   10.16
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      14.43

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.19
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    7.04    3.336  0.20( 0.03) 0.15      10.6      17.00
      1       35.94    7.33    3.262  0.20( 0.03) 0.15      11.0      14.00
      1       39.52    9.94    2.738  0.20( 0.03) 0.16      14.5       5.00
      1       41.49   11.61    2.505  0.20( 0.03) 0.16      16.9       8.00
      1       41.72   11.93    2.466  0.20( 0.03) 0.16      17.3       1.00
      1       41.40   12.14    2.442  0.20( 0.03) 0.16      17.4      11.00
      2       14.43    8.19    3.059  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.96    7.04    3.336  0.20( 0.03) 0.17      15.2      17.00
      2       49.71    7.33    3.262  0.20( 0.03) 0.17      15.8      14.00
      3       51.56    8.19    3.059  0.20( 0.03) 0.17      17.5      19.00
      4       52.41    9.94    2.738  0.20( 0.03) 0.17      19.9       5.00
      5       53.27   11.61    2.505  0.20( 0.03) 0.17      22.2       8.00
      6       53.32   11.93    2.466  0.20( 0.03) 0.17      22.6       1.00
      7       52.88   12.14    2.442  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      53.32    Tc(MIN.) =    11.93
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.32
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   13.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.20
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.433
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    75    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.86

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.538
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20      0.100    75    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.96    8.35    3.026  0.20( 0.03) 0.17      15.2      17.00
      1       49.71    8.63    2.970  0.20( 0.03) 0.17      15.8      14.00
      1       51.56    9.49    2.812  0.20( 0.03) 0.17      17.5      19.00
      1       52.41   11.24    2.552  0.20( 0.03) 0.17      19.9       5.00
      1       53.27   12.87    2.361  0.20( 0.03) 0.17      22.2       8.00
      1       53.32   13.20    2.328  0.20( 0.03) 0.17      22.6       1.00
      1       52.88   13.41    2.307  0.20( 0.03) 0.17      22.7      11.00
      2        0.86    6.70    3.433  0.20( 0.02) 0.10       0.3      22.00
      3        0.82    6.36    3.538  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.36    3.538  0.20( 0.03) 0.17      12.1      40.00
      2       46.29    6.70    3.433  0.20( 0.03) 0.17      12.7      22.00
      3       50.42    8.35    3.026  0.20( 0.03) 0.17      15.7      17.00
      4       51.14    8.63    2.970  0.20( 0.03) 0.17      16.3      14.00
      5       52.91    9.49    2.812  0.20( 0.03) 0.17      18.0      19.00
      6       53.64   11.24    2.552  0.20( 0.03) 0.17      20.4       5.00
      7       54.41   12.87    2.361  0.20( 0.03) 0.17      22.8       8.00
      8       54.44   13.20    2.328  0.20( 0.03) 0.17      23.2       1.00
      9       53.99   13.41    2.307  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.44    Tc(MIN.) =    13.20
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.33
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.33
  RAINFALL INTENSITY(INCH/HR) =   2.31
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.44

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.00

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   3.42    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   19.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      20.53

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.53
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.10
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.10
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.50    3.493  0.20( 0.03) 0.17      12.1      40.00
      1       46.29    6.84    3.392  0.20( 0.03) 0.17      12.7      22.00
```

```
     1       50.42    8.48    2.999  0.20( 0.03) 0.17      15.7      17.00
     1       51.14    8.76    2.943  0.20( 0.03) 0.17      16.3      14.00
     1       52.91    9.63    2.789  0.20( 0.03) 0.17      18.0      19.00
     1       53.64   11.38    2.534  0.20( 0.03) 0.17      20.4       5.00
     1       54.41   13.01    2.347  0.20( 0.03) 0.17      22.8       8.00
     1       54.44   13.33    2.314  0.20( 0.03) 0.17      23.2       1.00
     1       53.99   13.54    2.294  0.20( 0.03) 0.17      23.2      11.00
     2       20.53    9.10    2.880  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.50    3.493  0.20( 0.03) 0.17      17.8      40.00
      2       64.50    6.84    3.392  0.20( 0.03) 0.17      18.8      22.00
      3       70.36    8.48    2.999  0.20( 0.03) 0.17      23.2      17.00
      4       71.36    8.76    2.943  0.20( 0.03) 0.17      24.0      14.00
      5       72.37    9.10    2.880  0.20( 0.03) 0.17      25.0      24.00
      6       72.78    9.63    2.789  0.20( 0.03) 0.17      26.1      19.00
      7       71.68   11.38    2.534  0.20( 0.03) 0.17      28.4       5.00
      8       71.09   13.01    2.347  0.20( 0.03) 0.17      30.8       8.00
      9       70.88   13.33    2.314  0.20( 0.03) 0.17      31.2       1.00
     10       70.29   13.54    2.294  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      72.78    Tc(MIN.) =     9.63
  EFFECTIVE AREA(ACRES) =      26.06   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.78
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.10
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.06
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.78

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.35
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    8.47
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      12.52

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.52
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    8.69
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.69
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.99    3.350  0.20( 0.03) 0.17      17.8      40.00
      1       64.50    7.33    3.259  0.20( 0.03) 0.17      18.8      22.00
      1       70.36    8.96    2.906  0.20( 0.03) 0.17      23.2      17.00
      1       71.36    9.24    2.855  0.20( 0.03) 0.17      24.0      14.00
      1       72.37    9.58    2.798  0.20( 0.03) 0.17      25.0      24.00
      1       72.78   10.10    2.713  0.20( 0.03) 0.17      26.1      19.00
      1       71.68   11.85    2.476  0.20( 0.03) 0.17      28.4       5.00
      1       71.09   13.48    2.299  0.20( 0.03) 0.17      30.8       8.00
      1       70.88   13.81    2.268  0.20( 0.03) 0.17      31.2       1.00
      1       70.29   14.02    2.249  0.20( 0.03) 0.17      31.2      11.00
      2       12.52    8.69    2.958  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.57    6.99    3.350  0.20( 0.04) 0.18      21.5      40.00
      2       76.16    7.33    3.259  0.20( 0.04) 0.18      22.6      22.00
      3       81.89    8.69    2.958  0.20( 0.04) 0.18      27.0      29.00
      4       82.65    8.96    2.906  0.20( 0.04) 0.18      27.7      17.00
      5       83.43    9.24    2.855  0.20( 0.04) 0.18      28.6      14.00
      6       84.20    9.58    2.798  0.20( 0.04) 0.18      29.5      24.00
      7       84.25   10.10    2.713  0.20( 0.04) 0.18      30.6      19.00
      8       82.13   11.85    2.476  0.20( 0.04) 0.18      33.0       5.00
      9       80.78   13.48    2.299  0.20( 0.04) 0.18      35.3       8.00
     10       80.44   13.81    2.268  0.20( 0.04) 0.18      35.7       1.00
     11       79.76   14.02    2.249  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.25    Tc(MIN.) =    10.10
  EFFECTIVE AREA(ACRES) =      30.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.25
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
```

```
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.20   RAINFALL INTENSITY(INCH/HR) =  2.70
  EFFECTIVE AREA(ACRES) =    10.90
  TOTAL AREA(ACRES) =    12.75        PEAK FLOW RATE(CFS) =     30.00
  AREA-AVERAGED Fm(INCH/HR) =   0.04  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.18
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.00
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.25
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      10.90
  TOTAL STREAM AREA(ACRES) =      12.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.00

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    5.44
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.44
  RAINFALL INTENSITY(INCH/HR) =   3.87
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.00   10.25    2.691  0.20( 0.04) 0.18      10.9       1.00
      2        2.83    5.44    3.867  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    5.44    3.867  0.20( 0.05) 0.27       6.6      34.00
      2       31.93   10.25    2.691  0.20( 0.05) 0.23      11.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.93    Tc(MIN.) =    10.25
  EFFECTIVE AREA(ACRES) =      11.71   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       13.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.93
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   2.68
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.23
  EFFECTIVE STREAM AREA(ACRES) =      11.71
```

```
  TOTAL STREAM AREA(ACRES) =      13.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.93

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.88
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      5.88

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.70
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    5.49    3.846  0.20( 0.05) 0.27       6.6      34.00
      1       31.93   10.30    2.683  0.20( 0.05) 0.23      11.7       1.00
      2        5.88    7.70    3.170  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       30.92    5.49    3.846  0.20( 0.05) 0.26       8.1      34.00
      2       34.50    7.70    3.170  0.20( 0.05) 0.24      11.0      37.00
      3       36.89   10.30    2.683  0.20( 0.05) 0.23      13.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.89    Tc(MIN.) =    10.30
  EFFECTIVE AREA(ACRES) =      13.77   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.89
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.23
  EFFECTIVE STREAM AREA(ACRES) =      13.77
  TOTAL STREAM AREA(ACRES) =      15.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.89

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D       0.55      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    1.64
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.41

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.92    6.35    3.540  0.20( 0.05) 0.26       8.1      34.00
      1       34.50    8.54    2.987  0.20( 0.05) 0.24      11.0      37.00
      1       36.89   11.14    2.565  0.20( 0.05) 0.23      13.8       1.00
      2        2.41    7.06    3.332  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.23    6.35    3.540  0.20( 0.05) 0.24       8.8      34.00
      2       34.49    7.06    3.332  0.20( 0.05) 0.24       9.8      40.00
      3       36.66    8.54    2.987  0.20( 0.05) 0.23      11.8      37.00
      4       38.75   11.14    2.565  0.20( 0.04) 0.22      14.6       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.75    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =      14.58   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =       16.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.75
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =      14.58
  TOTAL STREAM AREA(ACRES) =      16.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.75

********************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.43      0.20     0.100    75    6.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.31

********************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   3.39
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.23    6.44    3.513  0.20( 0.05) 0.24       8.8       34.00
      1       34.49    7.14    3.309  0.20( 0.05) 0.24       9.8       40.00
      1       36.66    8.62    2.970  0.20( 0.05) 0.23      11.8       37.00
      1       38.75   11.22    2.555  0.20( 0.04) 0.22      14.6        1.00
      2        1.31    6.83    3.394  0.20( 0.02) 0.10       0.4       42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.50    6.44    3.513  0.20( 0.05) 0.24       9.2       34.00
      2       35.25    6.83    3.394  0.20( 0.05) 0.23       9.8       42.00
      3       35.76    7.14    3.309  0.20( 0.05) 0.23      10.3       40.00
      4       37.81    8.62    2.970  0.20( 0.05) 0.23      12.2       37.00
      5       39.73   11.22    2.555  0.20( 0.04) 0.21      15.0        1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.73    Tc(MIN.) =    11.22
  EFFECTIVE AREA(ACRES) =      15.01   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       16.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.73
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.67
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =      15.01
  TOTAL STREAM AREA(ACRES) =      16.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.73

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.424
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    8.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.090
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.16
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.72
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.18

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.88
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.88
  RAINFALL INTENSITY(INCH/HR) =   3.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.50    6.90    3.374  0.20( 0.05) 0.24       9.2      34.00
      1       35.25    7.30    3.267  0.20( 0.05) 0.23       9.8      42.00
      1       35.76    7.61    3.191  0.20( 0.05) 0.23      10.3      40.00
      1       37.81    9.08    2.885  0.20( 0.05) 0.23      12.2      37.00
      1       39.73   11.67    2.498  0.20( 0.04) 0.21      15.0       1.00
      2        2.18    8.05    3.090  0.20( 0.02) 0.10       0.8      44.00
      3        2.23    6.88    3.380  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.73    6.88    3.380  0.20( 0.04) 0.22      10.6      40.00
      2       38.77    6.90    3.374  0.20( 0.04) 0.22      10.6      34.00
      3       39.50    7.30    3.267  0.20( 0.04) 0.22      11.3      42.00
      4       40.00    7.61    3.191  0.20( 0.04) 0.22      11.7      40.00
      5       40.60    8.05    3.090  0.20( 0.04) 0.21      12.4      44.00
      6       41.75    9.08    2.885  0.20( 0.04) 0.21      13.8      37.00
      7       43.14   11.67    2.498  0.20( 0.04) 0.20      16.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.14    Tc(MIN.) =    11.67
  EFFECTIVE AREA(ACRES) =      16.53   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       18.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.14
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   13.35
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.96
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.14
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   13.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.60      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.57
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.57

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    8.82
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.933
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   24.24
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.41
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.559
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    75    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.22      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.43
  FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       2.43

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.43
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.24
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.41    9.88    2.748  0.20( 0.04) 0.20      10.9      48.00
      2        2.43    8.24    3.048  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.76    8.24    3.048  0.20( 0.04) 0.19      10.0      51.00
      2       30.60    9.88    2.748  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.60    Tc(MIN.) =     9.88
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.60
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.26
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.79
  TOTAL STREAM AREA(ACRES) =      11.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.60
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.803
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20     0.100    75    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.58
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   3.80
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       28.76    8.63    2.970  0.20( 0.04) 0.19      10.0      51.00
     1       30.60   10.26    2.689  0.20( 0.04) 0.19      11.8      48.00
     2        0.58    5.60    3.803  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.57    5.60    3.803  0.20( 0.04) 0.19       6.7      53.00
     2       29.21    8.63    2.970  0.20( 0.04) 0.19      10.2      51.00
     3       31.00   10.26    2.689  0.20( 0.04) 0.19      12.0      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      31.00    Tc(MIN.) =    10.26
 EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
 FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.00
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20      0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   14.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    8.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        3.47      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     3.47      SUBAREA RUNOFF(CFS) =     9.26
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       9.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.39
  FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       24.57    6.11    3.618  0.20( 0.04) 0.19       6.7      53.00
      1       29.21    9.11    2.879  0.20( 0.04) 0.19      10.2      51.00
      1       31.00   10.74    2.620  0.20( 0.04) 0.19      12.0      48.00
      2        9.83    8.45    3.006  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.15    6.11    3.618  0.20( 0.04) 0.19       9.3      53.00
      2       38.02    8.45    3.006  0.20( 0.04) 0.19      13.1      56.00
      3       38.62    9.11    2.879  0.20( 0.04) 0.19      13.8      51.00
      4       39.55   10.74    2.620  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.55    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
```

```
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        1.10      0.20     0.850    75   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.29
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.29

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   14.24
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.228
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        8.75      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =   16.21
  EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      18.25

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.24
 RAINFALL INTENSITY(INCH/HR) =   2.23
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.25

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.15    6.29    3.561  0.20( 0.04) 0.19       9.3      53.00
     1       38.02    8.62    2.971  0.20( 0.04) 0.19      13.1      56.00
     1       38.62    9.28    2.848  0.20( 0.04) 0.19      13.8      51.00
     1       39.55   10.91    2.597  0.20( 0.04) 0.19      15.6      48.00
     2       18.25   14.24    2.228  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.41    6.29    3.561  0.20( 0.08) 0.40      13.7      53.00
     2       53.05    8.62    2.971  0.20( 0.08) 0.40      19.0      56.00
     3       54.09    9.28    2.848  0.20( 0.08) 0.40      20.3      51.00
     4       56.02   10.91    2.597  0.20( 0.08) 0.41      23.2      48.00
     5       52.10   14.24    2.228  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      56.02    Tc(MIN.) =    10.91
 EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.02
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   11.12
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       46.41    6.51    3.491  0.20( 0.08) 0.40      13.7      53.00
    2       53.05    8.83    2.930  0.20( 0.08) 0.40      19.0      56.00
    3       54.09    9.49    2.811  0.20( 0.08) 0.40      20.3      51.00
    4       56.02   11.12    2.568  0.20( 0.08) 0.41      23.2      48.00
    5       52.10   14.46    2.209  0.20( 0.09) 0.45      25.5      59.00
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       38.73    9.11    2.878  0.20( 0.04) 0.22      10.6      40.00
    2       38.77    9.14    2.874  0.20( 0.04) 0.22      10.6      34.00
    3       39.50    9.53    2.806  0.20( 0.04) 0.22      11.3      42.00
    4       40.00    9.83    2.755  0.20( 0.04) 0.22      11.7      40.00
    5       40.60   10.26    2.688  0.20( 0.04) 0.21      12.4      44.00
    6       41.75   11.28    2.546  0.20( 0.04) 0.21      13.8      37.00
    7       43.14   13.87    2.263  0.20( 0.04) 0.20      16.5       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       80.04    6.51    3.491  0.20( 0.07) 0.34      21.2      53.00
    2       91.27    8.83    2.930  0.20( 0.07) 0.33      29.3      56.00
    3       92.22    9.11    2.878  0.20( 0.07) 0.34      30.1      40.00
    4       92.30    9.14    2.874  0.20( 0.07) 0.34      30.2      34.00
    5       93.53    9.49    2.811  0.20( 0.07) 0.33      31.4      51.00
    6       93.63    9.53    2.806  0.20( 0.07) 0.33      31.6      42.00
    7       94.49    9.83    2.755  0.20( 0.07) 0.33      32.6      40.00
    8       95.60   10.26    2.688  0.20( 0.07) 0.33      34.0      44.00
    9       97.59   11.12    2.568  0.20( 0.07) 0.33      36.7      48.00
   10       97.58   11.28    2.546  0.20( 0.07) 0.34      37.1      37.00
   11       95.94   13.87    2.263  0.20( 0.07) 0.35      41.6       1.00
   12       94.20   14.46    2.209  0.20( 0.07) 0.35      42.0      59.00
    TOTAL AREA(ACRES) =        43.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       97.59  Tc(MIN.) =   11.121
  EFFECTIVE AREA(ACRES) =     36.72  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       43.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       43.9  TC(MIN.) =     11.12
  EFFECTIVE AREA(ACRES) =     36.72  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.335
  PEAK FLOW RATE(CFS)   =      97.59

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       80.04    6.51    3.491  0.20( 0.07) 0.34      21.2      53.00
    2       91.27    8.83    2.930  0.20( 0.07) 0.33      29.3      56.00
    3       92.22    9.11    2.878  0.20( 0.07) 0.34      30.1      40.00
    4       92.30    9.14    2.874  0.20( 0.07) 0.34      30.2      34.00
    5       93.53    9.49    2.811  0.20( 0.07) 0.33      31.4      51.00
    6       93.63    9.53    2.806  0.20( 0.07) 0.33      31.6      42.00
    7       94.49    9.83    2.755  0.20( 0.07) 0.33      32.6      40.00
    8       95.60   10.26    2.688  0.20( 0.07) 0.33      34.0      44.00
    9       97.59   11.12    2.568  0.20( 0.07) 0.33      36.7      48.00
   10       97.58   11.28    2.546  0.20( 0.07) 0.34      37.1      37.00
   11       95.94   13.87    2.263  0.20( 0.07) 0.35      41.6       1.00
   12       94.20   14.46    2.209  0.20( 0.07) 0.35      42.0      59.00
```

```
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                              *
 ************************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 19:09 01/08/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.799
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    75    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.43
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.43

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.43
 PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   11.96
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.96
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.463
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   21.31
 EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      23.44

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.44
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   12.60
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.60      0.20     0.100    75    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   3.94   Tc(MIN.) =   10.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.626
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    3.68
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.60
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.03      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.60
  TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      3.60

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.60
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.03
  TOTAL STREAM AREA(ACRES) =       1.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.60

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.09   10.69    2.626  0.20( 0.02) 0.10       2.2       4.00
      2        3.60    5.24    3.953  0.20( 0.18) 0.90       1.0       6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.36    5.24    3.953  0.20( 0.10) 0.49       2.1       6.00
      2        7.42   10.69    2.626  0.20( 0.07) 0.36       3.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.42    Tc(MIN.) =    10.69
  EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.36    5.43    3.872  0.20( 0.10) 0.49       2.1       6.00
      2        7.42   10.88    2.600  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.44   12.60    2.390  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.99    5.43    3.872  0.20( 0.10) 0.50       6.8       6.00
      2       29.52   10.88    2.600  0.20( 0.09) 0.46      12.7       4.00
      3       30.25   12.60    2.390  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       30.25  Tc(MIN.) =   12.600
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.60
  RAINFALL INTENSITY(INCH/HR) =   2.39
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.25

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.581
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.73
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   4.31   Tc(MIN.) =   10.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.649
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
  FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.53
  RAINFALL INTENSITY(INCH/HR) =   2.65
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.97
 TOTAL STREAM AREA(ACRES) =       1.97
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       23.99    5.43    3.872  0.20( 0.10) 0.50       6.8       6.00
     1       29.52   10.88    2.600  0.20( 0.09) 0.46      12.7       4.00
     1       30.25   12.60    2.390  0.20( 0.09) 0.47      14.2       1.00
     2        4.66   10.53    2.649  0.20( 0.02) 0.10       2.0       9.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.51    5.43    3.872  0.20( 0.09) 0.45       7.9       6.00
     2       33.82   10.53    2.649  0.20( 0.08) 0.42      14.3       9.00
     3       34.09   10.88    2.600  0.20( 0.08) 0.42      14.7       4.00
     4       34.45   12.60    2.390  0.20( 0.08) 0.42      16.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      34.45    Tc(MIN.) =    12.60
 EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =       16.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     12.60
 EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
 PEAK FLOW RATE(CFS)   =      34.45

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.51    5.43    3.872  0.20( 0.09) 0.45       7.9       6.00
     2       33.82   10.53    2.649  0.20( 0.08) 0.42      14.3       9.00
     3       34.09   10.88    2.600  0.20( 0.08) 0.42      14.7       4.00
     4       34.45   12.60    2.390  0.20( 0.08) 0.42      16.2       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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**************************************************************************
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                              *
 ************************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 18:01 01/09/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.457
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20      0.200    75    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.81
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      3.81

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.81
 PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =    8.41
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.41
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        5.21      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =   13.94
 EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      17.26

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.41
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.09      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =   10.94
 EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      28.20
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.41
 EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =      28.20
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

EAST – AREA ‘A’

10-YR STUDY

```
**************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A'                                            *
 ************************************************************************

  FILE NAME: EAST.DAT
  TIME/DATE OF STUDY: 19:29 01/04/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.77      0.20      0.600    75   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      1.71
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   12.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.38
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.19
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.12
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.95
  TOTAL STREAM AREA(ACRES) =       1.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.94

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.747
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    75    9.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =   11.58
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.508
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.85
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94   13.19    2.328  0.20( 0.12) 0.60       1.9       1.00
      2        4.45   11.58    2.508  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.19   11.58    2.508  0.20( 0.12) 0.60       3.8       4.00
      2        8.05   13.19    2.328  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.19    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =       3.78   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.19
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.63
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   10.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.634
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.87
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19   11.63    2.502  0.20( 0.12) 0.60       3.8       4.00
      1        8.05   13.24    2.323  0.20( 0.12) 0.60       4.0       1.00
      2        4.49   10.64    2.634  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.64    2.634  0.20( 0.11) 0.56       5.4       7.00
      2       12.45   11.63    2.502  0.20( 0.11) 0.57       5.8       4.00
      3       11.99   13.24    2.323  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.45    Tc(MIN.) =    11.63
  EFFECTIVE AREA(ACRES) =       5.75   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.45
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.66
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.75
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.45

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.858
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    75    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.71

********************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.669
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    1.72
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.66    2.631  0.20( 0.11) 0.56       5.4       7.00
      1       12.45   11.66    2.499  0.20( 0.11) 0.57       5.8       4.00
      1       11.99   13.26    2.321  0.20( 0.11) 0.57       6.0       1.00
      2        3.32   10.39    2.669  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.39    2.669  0.20( 0.11) 0.56       6.7      10.00
      2       15.66   10.66    2.631  0.20( 0.11) 0.56       6.9       7.00
      3       15.54   11.66    2.499  0.20( 0.11) 0.56       7.2       4.00
      4       14.86   13.26    2.321  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.66    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.66
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.94
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.66

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.62

********************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.35

********************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.68    2.629  0.20( 0.11) 0.56       6.7       10.00
      1       15.66   10.94    2.592  0.20( 0.11) 0.56       6.9        7.00
      1       15.54   11.94    2.465  0.20( 0.11) 0.56       7.2        4.00
      1       14.86   13.55    2.293  0.20( 0.11) 0.56       7.4        1.00
      2        1.35    5.00    4.060  0.20( 0.02) 0.10       0.4        6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.80    5.00    4.060  0.20( 0.10) 0.51       3.5        6.00
      2       16.45   10.68    2.629  0.20( 0.11) 0.54       7.1       10.00
      3       16.52   10.94    2.592  0.20( 0.11) 0.54       7.2        7.00
      4       16.36   11.94    2.465  0.20( 0.11) 0.54       7.6        4.00
      5       15.62   13.55    2.293  0.20( 0.11) 0.54       7.8        1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    10.94
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.97
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   3.35
  AREA-AVERAGED Fm(INCH/HR) =  0.02
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.80    5.03    4.044  0.20( 0.10) 0.51       3.5       6.00
      1       16.45   10.71    2.624  0.20( 0.11) 0.54       7.1      10.00
      1       16.52   10.97    2.587  0.20( 0.11) 0.54       7.2       7.00
      1       16.36   11.97    2.461  0.20( 0.11) 0.54       7.6       4.00
      1       15.62   13.58    2.290  0.20( 0.11) 0.54       7.8       1.00
      2        1.17    6.99    3.351  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.81    5.03    4.044  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    6.99    3.351  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.71    2.624  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   10.97    2.587  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   11.97    2.461  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.58    2.290  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.42    Tc(MIN.) =    10.97
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.42
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    75    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.76    9.03    2.893  0.20( 0.10) 0.50       0.7      16.00
      2        2.27    9.34    2.837  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.00    9.03    2.893  0.20( 0.11) 0.56       1.6      16.00
      2        4.00    9.34    2.837  0.20( 0.11) 0.56       1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.00    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.00
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.22      0.20     0.100    75    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    8.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.64
  FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.97

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.00    9.35    2.837  0.20( 0.11) 0.56       1.6      16.00
      1        4.00    9.66    2.784  0.20( 0.11) 0.56       1.6      17.00
      2        0.97    8.41    3.013  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.41    3.013  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.35    2.837  0.20( 0.09) 0.47       2.0      16.00
```

```
     3        4.89    9.66    2.784  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.92    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.88    2.920  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.82    2.758  0.20( 0.09) 0.47       2.0      16.00
      3        4.89   10.13    2.709  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.81    5.08    4.025  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    7.03    3.340  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.75    2.619  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   11.01    2.582  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   12.01    2.457  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.62    2.286  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    5.08    4.025  0.20( 0.10) 0.48       4.8       6.00
      2       19.59    7.03    3.340  0.20( 0.10) 0.48       6.6      14.00
      3       21.10    8.88    2.920  0.20( 0.10) 0.49       8.1      19.00
      4       21.75    9.82    2.758  0.20( 0.10) 0.50       8.9      16.00
      5       21.90   10.13    2.709  0.20( 0.10) 0.50       9.1      17.00
      6       22.09   10.75    2.619  0.20( 0.10) 0.51       9.5      10.00
      7       22.07   11.01    2.582  0.20( 0.10) 0.51       9.6       7.00
      8       21.64   12.01    2.457  0.20( 0.10) 0.51       9.9       4.00
      9       20.51   13.62    2.286  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.09  Tc(MIN.) =   10.746
  EFFECTIVE AREA(ACRES) =      9.48  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.09
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.94
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.48
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.09

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    75    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.61   Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.79
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       2.78

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    6.34    3.542  0.20( 0.10) 0.48       4.8       6.00
      1       19.59    8.28    3.041  0.20( 0.10) 0.48       6.6      14.00
```

```
     1       21.10   10.09    2.715  0.20( 0.10) 0.49       8.1      19.00
     1       21.75   11.01    2.582  0.20( 0.10) 0.50       8.9      16.00
     1       21.90   11.32    2.541  0.20( 0.10) 0.50       9.1      17.00
     1       22.09   11.94    2.465  0.20( 0.10) 0.51       9.5      10.00
     1       22.07   12.21    2.434  0.20( 0.10) 0.51       9.6       7.00
     1       21.64   13.21    2.327  0.20( 0.10) 0.51       9.9       4.00
     1       20.51   14.87    2.174  0.20( 0.10) 0.51      10.2       1.00
     2        2.78    9.61    2.791  0.20( 0.03) 0.16       1.1      13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.97    6.34    3.542  0.20( 0.09) 0.44       5.6       6.00
      2       22.20    8.28    3.041  0.20( 0.09) 0.44       7.5      14.00
      3       23.48    9.61    2.791  0.20( 0.09) 0.45       8.8      13.00
      4       23.80   10.09    2.715  0.20( 0.09) 0.45       9.2      19.00
      5       24.32   11.01    2.582  0.20( 0.09) 0.46      10.0      16.00
      6       24.43   11.32    2.541  0.20( 0.09) 0.47      10.2      17.00
      7       24.54   11.94    2.465  0.20( 0.09) 0.47      10.6      10.00
      8       24.49   12.21    2.434  0.20( 0.09) 0.47      10.7       7.00
      9       23.95   13.21    2.327  0.20( 0.09) 0.47      11.1       4.00
     10       22.67   14.87    2.174  0.20( 0.10) 0.48      11.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.54    Tc(MIN.) =    11.94
  EFFECTIVE AREA(ACRES) =      10.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.60
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.54

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.14      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.64      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.25
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =    5.92
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    2.02
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   3.65
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.07
  RAINFALL INTENSITY(INCH/HR) =   3.33
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.76
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.97    6.49    3.495  0.20( 0.09) 0.44       5.6       6.00
     1       22.20    8.42    3.011  0.20( 0.09) 0.44       7.5      14.00
     1       23.48    9.75    2.768  0.20( 0.09) 0.45       8.8      13.00
     1       23.80   10.23    2.694  0.20( 0.09) 0.45       9.2      19.00
     1       24.32   11.15    2.564  0.20( 0.09) 0.46      10.0      16.00
     1       24.43   11.46    2.523  0.20( 0.09) 0.47      10.2      17.00
     1       24.54   12.08    2.449  0.20( 0.09) 0.47      10.6      10.00
     1       24.49   12.35    2.418  0.20( 0.09) 0.47      10.7       7.00
     1       23.95   13.35    2.312  0.20( 0.09) 0.47      11.1       4.00
     1       22.67   15.01    2.162  0.20( 0.10) 0.48      11.3       1.00
     2        2.48    7.07    3.330  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.49    3.495  0.20( 0.09) 0.47       6.3       6.00
     2       23.11    7.07    3.330  0.20( 0.09) 0.47       6.9      25.00
     3       24.43    8.42    3.011  0.20( 0.09) 0.47       8.3      14.00
     4       25.53    9.75    2.768  0.20( 0.09) 0.47       9.6      13.00
     5       25.79   10.23    2.694  0.20( 0.10) 0.48      10.0      19.00
     6       26.20   11.15    2.564  0.20( 0.10) 0.48      10.8      16.00
     7       26.28   11.46    2.523  0.20( 0.10) 0.49      11.0      17.00
     8       26.34   12.08    2.449  0.20( 0.10) 0.49      11.4      10.00
     9       26.26   12.35    2.418  0.20( 0.10) 0.49      11.5       7.00
    10       25.64   13.35    2.312  0.20( 0.10) 0.49      11.8       4.00
    11       24.24   15.01    2.162  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      26.34    Tc(MIN.) =    12.08
 EFFECTIVE AREA(ACRES) =      11.38   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.34
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.16
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.16
 RAINFALL INTENSITY(INCH/HR) =   2.44
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      11.38
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.34

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.78   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.678
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  3.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   2.68
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.00

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.57    3.470  0.20( 0.09) 0.47       6.3       6.00
     1       23.11    7.15    3.308  0.20( 0.09) 0.47       6.9      25.00
     1       24.43    8.50    2.995  0.20( 0.09) 0.47       8.3      14.00
     1       25.53    9.83    2.755  0.20( 0.09) 0.47       9.6      13.00
     1       25.79   10.31    2.682  0.20( 0.10) 0.48      10.0      19.00
     1       26.20   11.23    2.553  0.20( 0.10) 0.48      10.8      16.00
     1       26.28   11.54    2.513  0.20( 0.10) 0.49      11.0      17.00
     1       26.34   12.16    2.440  0.20( 0.10) 0.49      11.4      10.00
     1       26.26   12.43    2.409  0.20( 0.10) 0.49      11.5       7.00
     1       25.64   13.43    2.304  0.20( 0.10) 0.49      11.8       4.00
     1       24.24   15.09    2.156  0.20( 0.10) 0.50      12.1       1.00
     2        5.00   10.34    2.678  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       26.52    6.57    3.470  0.20( 0.10) 0.50       7.7       6.00
     2       27.42    7.15    3.308  0.20( 0.10) 0.50       8.4      25.00
     3       29.05    8.50    2.995  0.20( 0.10) 0.50      10.1      14.00
     4       30.42    9.83    2.755  0.20( 0.10) 0.50      11.7      13.00
     5       30.78   10.31    2.682  0.20( 0.10) 0.50      12.2      19.00
     6       30.79   10.34    2.678  0.20( 0.10) 0.50      12.2      29.00
     7       30.95   11.23    2.553  0.20( 0.10) 0.50      12.9      16.00
     8       30.96   11.54    2.513  0.20( 0.10) 0.50      13.2      17.00
     9       30.87   12.16    2.440  0.20( 0.10) 0.51      13.6      10.00
    10       30.73   12.43    2.409  0.20( 0.10) 0.51      13.7       7.00
    11       29.90   13.43    2.304  0.20( 0.10) 0.51      14.0       4.00
    12       28.22   15.09    2.156  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      30.96    Tc(MIN.) =    11.54
 EFFECTIVE AREA(ACRES) =      13.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.89
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.96
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.89
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      13.16
  TOTAL STREAM AREA(ACRES) =      14.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.96

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.281
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.24      0.20      0.100    75    7.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.25
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.70

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.568
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.25      0.20      0.100    75    6.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   3.57
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.52    6.94    3.364  0.20( 0.10) 0.50       7.7       6.00
      1       27.42    7.51    3.215  0.20( 0.10) 0.50       8.4      25.00
      1       29.05    8.86    2.924  0.20( 0.10) 0.50      10.1      14.00
      1       30.42   10.18    2.701  0.20( 0.10) 0.50      11.7      13.00
      1       30.78   10.66    2.631  0.20( 0.10) 0.50      12.2      19.00
      1       30.79   10.68    2.628  0.20( 0.10) 0.50      12.2      29.00
      1       30.95   11.58    2.509  0.20( 0.10) 0.50      12.9      16.00
      1       30.96   11.89    2.471  0.20( 0.10) 0.50      13.2      17.00
      1       30.87   12.51    2.401  0.20( 0.10) 0.51      13.6      10.00
      1       30.73   12.77    2.372  0.20( 0.10) 0.51      13.7       7.00
      1       29.90   13.78    2.271  0.20( 0.10) 0.51      14.0       4.00
      1       28.22   15.45    2.127  0.20( 0.10) 0.51      14.2       1.00
      2        0.70    7.25    3.281  0.20( 0.02) 0.10       0.2      24.00
      3        0.80    6.26    3.568  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.26    3.568  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    6.94    3.364  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.25    3.281  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.51    3.215  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.86    2.924  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.18    2.701  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.66    2.631  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.68    2.628  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.58    2.509  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.89    2.471  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.51    2.401  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.77    2.372  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.78    2.271  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.45    2.127  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.05    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =      13.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.05
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.66
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        D        1.20      0.20      0.600    75    8.46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.11
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
 FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
 STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.33
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    8.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
 STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    9.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.855
 SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.99      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.99      SUBAREA RUNOFF(CFS) =     2.44
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  5.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.435
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.73      0.20      0.600    75    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
 STREET FLOW TRAVEL TIME(MIN.) =   0.43   Tc(MIN.) =    7.13
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.314
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.24
 EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       3.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
 FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
 LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.13
 RAINFALL INTENSITY(INCH/HR) =   3.31
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.16
 TOTAL STREAM AREA(ACRES) =       1.16
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        5.39    9.24    2.855  0.20( 0.12) 0.60       2.2      33.00
     2        3.33    7.13    3.314  0.20( 0.12) 0.60       1.2      35.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.19    7.13    3.314  0.20( 0.12) 0.60       2.8      35.00
     2        8.25    9.24    2.855  0.20( 0.12) 0.60       3.4      33.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.25    Tc(MIN.) =     9.24
 EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        3.4
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19    7.28    3.272  0.20( 0.12) 0.60       2.8      35.00
      2        8.25    9.40    2.827  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.35    3.541  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    7.02    3.341  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.34    3.259  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.59    3.195  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.95    2.908  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.26    2.689  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.74    2.620  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.76    2.616  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.66    2.499  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.97    2.462  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.59    2.392  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.86    2.363  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.86    2.263  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.54    2.120  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    6.35    3.541  0.20( 0.10) 0.50       9.9      31.00
      2       36.04    7.02    3.341  0.20( 0.10) 0.50      10.9       6.00
      3       36.56    7.28    3.272  0.20( 0.10) 0.51      11.4      35.00
      4       36.64    7.34    3.259  0.20( 0.10) 0.51      11.4      24.00
      5       37.02    7.59    3.195  0.20( 0.10) 0.51      11.8      25.00
      6       38.57    8.95    2.908  0.20( 0.10) 0.51      13.8      14.00
      7       39.02    9.40    2.827  0.20( 0.10) 0.51      14.5      33.00
      8       39.43   10.26    2.689  0.20( 0.10) 0.51      15.5      13.00
      9       39.54   10.74    2.620  0.20( 0.10) 0.51      16.0      19.00
     10       39.55   10.76    2.616  0.20( 0.10) 0.51      16.0      29.00
     11       39.29   11.66    2.499  0.20( 0.10) 0.51      16.8      16.00
     12       39.17   11.97    2.462  0.20( 0.10) 0.51      17.0      17.00
     13       38.84   12.59    2.392  0.20( 0.10) 0.51      17.4      10.00
     14       38.60   12.86    2.363  0.20( 0.10) 0.51      17.5       7.00
     15       37.42   13.86    2.263  0.20( 0.10) 0.52      17.9       4.00
     16       35.24   15.54    2.120  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       39.55  Tc(MIN.) =   10.763
  EFFECTIVE AREA(ACRES) =     16.05  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
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```
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.49
  RAINFALL INTENSITY(INCH/HR) =   2.52
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.05
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.789
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    75    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.52      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.50
  EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.75
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.46
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.86
  TOTAL STREAM AREA(ACRES) =       0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    7.09    3.324  0.20( 0.10) 0.50       9.9      31.00
      1       36.04    7.76    3.156  0.20( 0.10) 0.50      10.9       6.00
      1       36.56    8.02    3.097  0.20( 0.10) 0.51      11.4      35.00
      1       36.64    8.07    3.086  0.20( 0.10) 0.51      11.4      24.00
      1       37.02    8.33    3.031  0.20( 0.10) 0.51      11.8      25.00
      1       38.57    9.68    2.781  0.20( 0.10) 0.51      13.8      14.00
      1       39.02   10.13    2.709  0.20( 0.10) 0.51      14.5      33.00
      1       39.43   10.99    2.585  0.20( 0.10) 0.51      15.5      13.00
      1       39.54   11.46    2.523  0.20( 0.10) 0.51      16.0      19.00
      1       39.55   11.49    2.520  0.20( 0.10) 0.51      16.0      29.00
      1       39.29   12.39    2.414  0.20( 0.10) 0.51      16.8      16.00
      1       39.17   12.70    2.380  0.20( 0.10) 0.51      17.0      17.00
      1       38.84   13.32    2.316  0.20( 0.10) 0.51      17.4      10.00
      1       38.60   13.58    2.290  0.20( 0.10) 0.51      17.5       7.00
      1       37.42   14.60    2.197  0.20( 0.10) 0.52      17.9       4.00
      1       35.24   16.28    2.064  0.20( 0.10) 0.52      18.1       1.00
      2        2.48    7.46    3.227  0.20( 0.02) 0.10       0.9      38.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.06	7.09	3.324	0.20(0.09)	0.47	10.7	31.00
2	37.90	7.46	3.227	0.20(0.09)	0.47	11.3	38.00
3	38.46	7.76	3.156	0.20(0.10)	0.48	11.8	6.00
4	38.94	8.02	3.097	0.20(0.10)	0.48	12.2	35.00
5	39.01	8.07	3.086	0.20(0.10)	0.48	12.3	24.00
6	39.35	8.33	3.031	0.20(0.10)	0.48	12.7	25.00
7	40.70	9.68	2.781	0.20(0.10)	0.48	14.7	14.00
8	41.10	10.13	2.709	0.20(0.10)	0.48	15.3	33.00
9	41.41	10.99	2.585	0.20(0.10)	0.49	16.4	13.00
10	41.48	11.46	2.523	0.20(0.10)	0.49	16.9	19.00
11	41.48	11.49	2.520	0.20(0.10)	0.49	16.9	29.00
12	41.15	12.39	2.414	0.20(0.10)	0.49	17.6	16.00
13	41.00	12.70	2.380	0.20(0.10)	0.49	17.9	17.00
14	40.61	13.32	2.316	0.20(0.10)	0.49	18.3	10.00
15	40.36	13.58	2.290	0.20(0.10)	0.49	18.4	7.00
16	39.11	14.60	2.197	0.20(0.10)	0.50	18.7	4.00
17	36.82	16.28	2.064	0.20(0.10)	0.50	18.9	1.00

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.48    Tc(MIN.) =    11.49
  EFFECTIVE AREA(ACRES) =      16.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.050
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        0.84      0.20     0.700    75    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
 STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =   11.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
 STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    9.87
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.750
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    4.33
 EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
 TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.30

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
 FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.87
 RAINFALL INTENSITY(INCH/HR) =   2.75
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.63
 EFFECTIVE STREAM AREA(ACRES) =       2.67
 TOTAL STREAM AREA(ACRES) =       2.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.30

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20      0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    9.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.794
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    2.35
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.60
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.38
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.30    9.87    2.750  0.20( 0.13) 0.63       2.7      41.00
      2        5.38    9.60    2.794  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.62    9.60    2.794  0.20( 0.12) 0.60       4.8      43.00
      2       11.60    9.87    2.750  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.62    Tc(MIN.) =     9.60
  EFFECTIVE AREA(ACRES) =       4.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.62
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.00
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.83
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.62

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.21
  TOTAL STREAM AREA(ACRES) =       0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.76

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    75    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.13
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.45
  TOTAL STREAM AREA(ACRES) =       1.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.62   10.00    2.729  0.20( 0.12) 0.60       4.8      43.00
      1       11.60   10.27    2.688  0.20( 0.12) 0.60       4.9      41.00
      2        0.76    5.00    4.060  0.20( 0.02) 0.10       0.2      45.00
      3        3.85    8.13    3.072  0.20( 0.12) 0.60       1.5      46.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.00    4.060  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.13    3.072  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.00    2.729  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.27    2.688  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.54    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =       6.49   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.54
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.08    4.025  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.21    3.056  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.07    2.718  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.34    2.677  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       37.06    7.15    3.307  0.20( 0.09) 0.47      10.7      31.00
    2       37.90    7.53    3.211  0.20( 0.09) 0.47      11.3      38.00
    3       38.46    7.82    3.141  0.20( 0.10) 0.48      11.8       6.00
    4       38.94    8.08    3.083  0.20( 0.10) 0.48      12.2      35.00
    5       39.01    8.13    3.072  0.20( 0.10) 0.48      12.3      24.00
    6       39.35    8.39    3.018  0.20( 0.10) 0.48      12.7      25.00
    7       40.70    9.74    2.771  0.20( 0.10) 0.48      14.7      14.00
    8       41.10   10.19    2.700  0.20( 0.10) 0.48      15.3      33.00
    9       41.41   11.05    2.577  0.20( 0.10) 0.49      16.4      13.00
   10       41.48   11.53    2.516  0.20( 0.10) 0.49      16.9      19.00
   11       41.48   11.55    2.513  0.20( 0.10) 0.49      16.9      29.00
   12       41.15   12.45    2.407  0.20( 0.10) 0.49      17.6      16.00
   13       41.00   12.76    2.373  0.20( 0.10) 0.49      17.9      17.00
   14       40.61   13.38    2.310  0.20( 0.10) 0.49      18.3      10.00
   15       40.36   13.65    2.284  0.20( 0.10) 0.49      18.4       7.00
   16       39.11   14.66    2.192  0.20( 0.10) 0.50      18.7       4.00
   17       36.82   16.34    2.060  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       44.88    5.08    4.025  0.20( 0.10) 0.50      11.1      45.00
    2       51.29    7.15    3.307  0.20( 0.10) 0.50      15.6      31.00
    3       52.41    7.53    3.211  0.20( 0.10) 0.51      16.4      38.00
```

```
      4       53.19    7.82    3.141  0.20( 0.10) 0.51      17.1       6.00
      5       53.86    8.08    3.083  0.20( 0.10) 0.51      17.7      35.00
      6       53.97    8.13    3.072  0.20( 0.10) 0.51      17.8      24.00
      7       54.13    8.21    3.056  0.20( 0.10) 0.51      18.0      46.00
      8       54.42    8.39    3.018  0.20( 0.10) 0.51      18.4      25.00
      9       56.15    9.74    2.771  0.20( 0.10) 0.51      21.0      14.00
     10       56.53   10.07    2.718  0.20( 0.10) 0.51      21.7      43.00
     11       56.60   10.19    2.700  0.20( 0.10) 0.51      21.9      33.00
     12       56.61   10.34    2.677  0.20( 0.10) 0.51      22.1      41.00
     13       56.26   11.05    2.577  0.20( 0.10) 0.51      22.9      13.00
     14       55.96   11.53    2.516  0.20( 0.10) 0.51      23.4      19.00
     15       55.94   11.55    2.513  0.20( 0.10) 0.51      23.5      29.00
     16       54.97   12.45    2.407  0.20( 0.10) 0.52      24.2      16.00
     17       54.62   12.76    2.373  0.20( 0.10) 0.52      24.4      17.00
     18       53.85   13.38    2.310  0.20( 0.10) 0.52      24.8      10.00
     19       53.44   13.65    2.284  0.20( 0.10) 0.52      24.9       7.00
     20       51.63   14.66    2.192  0.20( 0.10) 0.52      25.3       4.00
     21       48.55   16.34    2.060  0.20( 0.10) 0.52      25.5       1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       56.61  Tc(MIN.) =   10.339
  EFFECTIVE AREA(ACRES) =     22.08  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.44
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.61
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.08
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.61

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.588
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    75    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =    9.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.888
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.49
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.06
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.85
 TOTAL STREAM AREA(ACRES) =       0.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.18

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       44.88    5.20    3.969  0.20( 0.10) 0.50      11.1      45.00
     1       51.29    7.27    3.275  0.20( 0.10) 0.50      15.6      31.00
     1       52.41    7.65    3.182  0.20( 0.10) 0.51      16.4      38.00
     1       53.19    7.94    3.114  0.20( 0.10) 0.51      17.1       6.00
     1       53.86    8.20    3.057  0.20( 0.10) 0.51      17.7      35.00
     1       53.97    8.25    3.046  0.20( 0.10) 0.51      17.8      24.00
     1       54.13    8.33    3.030  0.20( 0.10) 0.51      18.0      46.00
     1       54.42    8.51    2.993  0.20( 0.10) 0.51      18.4      25.00
     1       56.15    9.86    2.751  0.20( 0.10) 0.51      21.0      14.00
     1       56.53   10.19    2.700  0.20( 0.10) 0.51      21.7      43.00
     1       56.60   10.31    2.682  0.20( 0.10) 0.51      21.9      33.00
     1       56.61   10.46    2.660  0.20( 0.10) 0.51      22.1      41.00
     1       56.26   11.17    2.561  0.20( 0.10) 0.51      22.9      13.00
     1       55.96   11.65    2.501  0.20( 0.10) 0.51      23.4      19.00
     1       55.94   11.67    2.498  0.20( 0.10) 0.51      23.5      29.00
     1       54.97   12.57    2.394  0.20( 0.10) 0.52      24.2      16.00
     1       54.62   12.88    2.361  0.20( 0.10) 0.52      24.4      17.00
     1       53.85   13.50    2.298  0.20( 0.10) 0.52      24.8      10.00
     1       53.44   13.77    2.272  0.20( 0.10) 0.52      24.9       7.00
     1       51.63   14.78    2.182  0.20( 0.10) 0.52      25.3       4.00
     1       48.55   16.46    2.051  0.20( 0.10) 0.52      25.5       1.00
     2        2.18    9.06    2.888  0.20( 0.04) 0.20       0.9      32.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.61    5.20    3.969  0.20( 0.10) 0.49      11.6      45.00
     2       53.28    7.27    3.275  0.20( 0.10) 0.49      16.2      31.00
     3       54.44    7.65    3.182  0.20( 0.10) 0.49      17.2      38.00
     4       55.26    7.94    3.114  0.20( 0.10) 0.49      17.8       6.00
     5       55.95    8.20    3.057  0.20( 0.10) 0.50      18.5      35.00
     6       56.06    8.25    3.046  0.20( 0.10) 0.50      18.6      24.00
     7       56.23    8.33    3.030  0.20( 0.10) 0.50      18.8      46.00
     8       56.54    8.51    2.993  0.20( 0.10) 0.50      19.2      25.00
     9       57.30    9.06    2.888  0.20( 0.10) 0.50      20.3      32.00
    10       58.22    9.86    2.751  0.20( 0.10) 0.50      21.9      14.00
    11       58.56   10.19    2.700  0.20( 0.10) 0.50      22.5      43.00
    12       58.62   10.31    2.682  0.20( 0.10) 0.50      22.7      33.00
    13       58.61   10.46    2.660  0.20( 0.10) 0.50      22.9      41.00
    14       58.19   11.17    2.561  0.20( 0.10) 0.50      23.8      13.00
    15       57.84   11.65    2.501  0.20( 0.10) 0.50      24.3      19.00
    16       57.82   11.67    2.498  0.20( 0.10) 0.50      24.3      29.00
    17       56.77   12.57    2.394  0.20( 0.10) 0.50      25.0      16.00
    18       56.39   12.88    2.361  0.20( 0.10) 0.51      25.3      17.00
    19       55.58   13.50    2.298  0.20( 0.10) 0.51      25.7      10.00
    20       55.15   13.77    2.272  0.20( 0.10) 0.51      25.8       7.00
    21       53.27   14.78    2.182  0.20( 0.10) 0.51      26.1       4.00
    22       50.09   16.46    2.051  0.20( 0.10) 0.51      26.4       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      58.62    Tc(MIN.) =    10.31
 EFFECTIVE AREA(ACRES) =      22.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       26.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.19
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.62
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   2.19   Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.61
  FLOW VELOCITY(FEET/SEC.) =  2.45   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    3.58
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.74
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   12.51
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.51
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20     0.600    75    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    9.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.860
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    1.65
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  4.14   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
```

```
  EFFECTIVE STREAM AREA(ACRES) =       1.34
  TOTAL STREAM AREA(ACRES) =       1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.30

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.74   12.51    2.400  0.20( 0.10) 0.50       3.6      22.00
      2        3.30    9.21    2.860  0.20( 0.12) 0.60       1.3      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.14    9.21    2.860  0.20( 0.11) 0.53       4.0      53.00
      2       10.49   12.51    2.400  0.20( 0.11) 0.53       4.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.49    Tc(MIN.) =    12.51
  EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.49
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.54
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.54
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       4.93
  TOTAL STREAM AREA(ACRES) =       4.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.49

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    9.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    9.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.816
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.12      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  4.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.46
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.61

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       10.14    9.24    2.855  0.20( 0.11) 0.53       4.0      53.00
    1       10.49   12.54    2.397  0.20( 0.11) 0.53       4.9      22.00
    2        4.61    9.46    2.816  0.20( 0.12) 0.60       1.9      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       14.71    9.24    2.855  0.20( 0.11) 0.55       5.8      53.00
    2       14.78    9.46    2.816  0.20( 0.11) 0.55       5.9      56.00
    3       14.38   12.54    2.397  0.20( 0.11) 0.55       6.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.78    Tc(MIN.) =     9.46
  EFFECTIVE AREA(ACRES) =       5.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.78
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.52
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       5.95
  TOTAL STREAM AREA(ACRES) =       6.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.78

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.11      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.11
  TOTAL STREAM AREA(ACRES) =       0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.71    9.30    2.845  0.20( 0.11) 0.55       5.8      53.00
      1       14.78    9.52    2.807  0.20( 0.11) 0.55       5.9      56.00
      1       14.38   12.60    2.390  0.20( 0.11) 0.55       6.8      22.00
      2        0.40    5.00    4.060  0.20( 0.02) 0.10       0.1      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.82    5.00    4.060  0.20( 0.11) 0.54       3.2      59.00
      2       14.99    9.30    2.845  0.20( 0.11) 0.55       5.9      53.00
      3       15.05    9.52    2.807  0.20( 0.11) 0.55       6.1      56.00
      4       14.62   12.60    2.390  0.20( 0.11) 0.54       6.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.05    Tc(MIN.) =     9.52
  EFFECTIVE AREA(ACRES) =       6.06   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.05
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.01
  RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       6.06
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.05

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    8.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.971
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
```

```
 LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.62
 RAINFALL INTENSITY(INCH/HR) =   2.97
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.48
 TOTAL STREAM AREA(ACRES) =       1.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.82    5.51    3.839  0.20( 0.11) 0.54       3.2       59.00
     1       14.99    9.79    2.763  0.20( 0.11) 0.55       5.9       53.00
     1       15.05   10.01    2.728  0.20( 0.11) 0.55       6.1       56.00
     1       14.62   13.09    2.339  0.20( 0.11) 0.54       6.9       22.00
     2        3.80    8.62    2.971  0.20( 0.12) 0.60       1.5       61.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.51    3.839  0.20( 0.11) 0.55       4.2       59.00
     2       17.92    8.62    2.971  0.20( 0.11) 0.56       6.7       61.00
     3       18.51    9.79    2.763  0.20( 0.11) 0.56       7.4       53.00
     4       18.53   10.01    2.728  0.20( 0.11) 0.56       7.5       56.00
     5       17.57   13.09    2.339  0.20( 0.11) 0.55       8.4       22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.53    Tc(MIN.) =    10.01
 EFFECTIVE AREA(ACRES) =       7.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        8.4
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.96
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.53
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.53

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.172
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.87
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.87

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =    8.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.97
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.46
 RAINFALL INTENSITY(INCH/HR) =   3.00
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.74

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.53    3.832  0.20( 0.11) 0.55       4.2       59.00
     1       17.92    8.64    2.967  0.20( 0.11) 0.56       6.7       61.00
     1       18.51    9.80    2.760  0.20( 0.11) 0.56       7.4       53.00
     1       18.53   10.02    2.725  0.20( 0.11) 0.56       7.5       56.00
     1       17.57   13.10    2.337  0.20( 0.11) 0.55       8.4       22.00
     2        3.74    8.46    3.003  0.20( 0.12) 0.60       1.4       64.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.13    5.53    3.832  0.20( 0.11) 0.56       5.1       59.00
     2       21.49    8.46    3.003  0.20( 0.11) 0.56       8.0       64.00
     3       21.61    8.64    2.967  0.20( 0.11) 0.56       8.1       61.00
     4       21.93    9.80    2.760  0.20( 0.11) 0.56       8.9       53.00
     5       21.90   10.02    2.725  0.20( 0.11) 0.56       9.0       56.00
     6       20.45   13.10    2.337  0.20( 0.11) 0.56       9.9       22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      21.93    Tc(MIN.) =     9.80
 EFFECTIVE AREA(ACRES) =       8.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        9.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.93
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.12
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.12
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.87
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.93

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =    9.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   2.74
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.02
  TOTAL STREAM AREA(ACRES) =       1.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.15      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.13    5.86    3.706  0.20( 0.11) 0.56       5.1      59.00
      1       21.49    8.78    2.939  0.20( 0.11) 0.56       8.0      64.00
      1       21.61    8.96    2.906  0.20( 0.11) 0.56       8.1      61.00
      1       21.93   10.12    2.710  0.20( 0.11) 0.56       8.9      53.00
      1       21.90   10.35    2.676  0.20( 0.11) 0.56       9.0      56.00
      1       20.45   13.43    2.305  0.20( 0.11) 0.56       9.9      22.00
      2        2.41    9.94    2.738  0.20( 0.11) 0.56       1.0      67.00
      3        0.55    5.00    4.060  0.20( 0.02) 0.10       0.2      63.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.00    4.060  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.86    3.706  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.78    2.939  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    8.96    2.906  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.94    2.738  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.12    2.710  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.35    2.676  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.43    2.305  0.20( 0.11) 0.55      11.0      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.68    Tc(MIN.) =    10.12
  EFFECTIVE AREA(ACRES) =      10.04   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       11.0
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.68
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.05    4.034  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.91    3.687  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.83    2.930  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    9.01    2.896  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.99    2.730  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.17    2.702  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.40    2.669  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.48    2.300  0.20( 0.11) 0.55      11.0      22.00
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.61    5.26    3.943  0.20( 0.10) 0.49      11.6      45.00
      2       53.28    7.33    3.260  0.20( 0.10) 0.49      16.2      31.00
      3       54.44    7.71    3.168  0.20( 0.10) 0.49      17.2      38.00
      4       55.26    8.00    3.101  0.20( 0.10) 0.49      17.8       6.00
      5       55.95    8.26    3.045  0.20( 0.10) 0.50      18.5      35.00
      6       56.06    8.31    3.034  0.20( 0.10) 0.50      18.6      24.00
      7       56.23    8.39    3.018  0.20( 0.10) 0.50      18.8      46.00
      8       56.54    8.57    2.981  0.20( 0.10) 0.50      19.2      25.00
      9       57.30    9.11    2.878  0.20( 0.10) 0.50      20.3      32.00
     10       58.22    9.92    2.742  0.20( 0.10) 0.50      21.9      14.00
     11       58.56   10.25    2.691  0.20( 0.10) 0.50      22.5      43.00
     12       58.62   10.37    2.673  0.20( 0.10) 0.50      22.7      33.00
     13       58.61   10.52    2.651  0.20( 0.10) 0.50      22.9      41.00
```

```
    14       58.19   11.23    2.554  0.20( 0.10) 0.50      23.8      13.00
    15       57.84   11.70    2.494  0.20( 0.10) 0.50      24.3      19.00
    16       57.82   11.73    2.491  0.20( 0.10) 0.50      24.3      29.00
    17       56.77   12.63    2.388  0.20( 0.10) 0.50      25.0      16.00
    18       56.39   12.94    2.354  0.20( 0.10) 0.51      25.3      17.00
    19       55.58   13.56    2.292  0.20( 0.10) 0.51      25.7      10.00
    20       55.15   13.83    2.267  0.20( 0.10) 0.51      25.8       7.00
    21       53.27   14.84    2.177  0.20( 0.10) 0.51      26.1       4.00
    22       50.09   16.52    2.047  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.05    4.034  0.20( 0.10) 0.51      16.2      63.00
      2       66.25    5.26    3.943  0.20( 0.10) 0.51      16.8      45.00
      3       69.29    5.91    3.687  0.20( 0.10) 0.51      18.9      59.00
      4       75.61    7.33    3.260  0.20( 0.10) 0.51      23.7      31.00
      5       77.23    7.71    3.168  0.20( 0.10) 0.51      25.0      38.00
      6       78.41    8.00    3.101  0.20( 0.10) 0.51      26.0       6.00
      7       79.42    8.26    3.045  0.20( 0.10) 0.51      26.9      35.00
      8       79.60    8.31    3.034  0.20( 0.10) 0.51      27.1      24.00
      9       79.86    8.39    3.018  0.20( 0.10) 0.51      27.3      46.00
     10       80.39    8.57    2.981  0.20( 0.10) 0.51      27.9      25.00
     11       81.09    8.83    2.930  0.20( 0.10) 0.52      28.8      64.00
     12       81.47    9.01    2.896  0.20( 0.10) 0.52      29.3      61.00
     13       81.65    9.11    2.878  0.20( 0.10) 0.52      29.6      32.00
     14       82.85    9.92    2.742  0.20( 0.10) 0.52      31.7      14.00
     15       82.96    9.99    2.730  0.20( 0.10) 0.52      31.9      67.00
     16       83.17   10.17    2.702  0.20( 0.10) 0.52      32.4      53.00
     17       83.22   10.25    2.691  0.20( 0.10) 0.52      32.6      43.00
     18       83.24   10.37    2.673  0.20( 0.10) 0.52      32.8      33.00
     19       83.23   10.40    2.669  0.20( 0.10) 0.52      32.9      56.00
     20       83.16   10.52    2.651  0.20( 0.10) 0.52      33.1      41.00
     21       82.31   11.23    2.554  0.20( 0.10) 0.52      34.2      13.00
     22       81.68   11.70    2.494  0.20( 0.10) 0.52      34.8      19.00
     23       81.64   11.73    2.491  0.20( 0.10) 0.52      34.8      29.00
     24       80.05   12.63    2.388  0.20( 0.10) 0.52      35.8      16.00
     25       79.49   12.94    2.354  0.20( 0.10) 0.52      36.1      17.00
     26       78.45   13.48    2.300  0.20( 0.10) 0.52      36.6      22.00
     27       78.27   13.56    2.292  0.20( 0.10) 0.52      36.7      10.00
     28       77.57   13.83    2.267  0.20( 0.10) 0.52      36.8       7.00
     29       74.76   14.84    2.177  0.20( 0.10) 0.52      37.2       4.00
     30       70.22   16.52    2.047  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.24  Tc(MIN.) =   10.367
  EFFECTIVE AREA(ACRES) =     32.84  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.24
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      32.84
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.24

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    75    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.14    3.994  0.20( 0.10) 0.51      16.2      63.00
      1       66.25    5.35    3.905  0.20( 0.10) 0.51      16.8      45.00
      1       69.29    6.00    3.656  0.20( 0.10) 0.51      18.9      59.00
      1       75.61    7.42    3.238  0.20( 0.10) 0.51      23.7      31.00
      1       77.23    7.79    3.148  0.20( 0.10) 0.51      25.0      38.00
      1       78.41    8.09    3.081  0.20( 0.10) 0.51      26.0       6.00
      1       79.42    8.35    3.027  0.20( 0.10) 0.51      26.9      35.00
      1       79.60    8.40    3.016  0.20( 0.10) 0.51      27.1      24.00
      1       79.86    8.47    3.001  0.20( 0.10) 0.51      27.3      46.00
      1       80.39    8.66    2.964  0.20( 0.10) 0.51      27.9      25.00
      1       81.09    8.92    2.913  0.20( 0.10) 0.52      28.8      64.00
```

1	81.47	9.10	2.881	0.20(0.10)	0.52	29.3	61.00
1	81.65	9.20	2.862	0.20(0.10)	0.52	29.6	32.00
1	82.85	10.00	2.729	0.20(0.10)	0.52	31.7	14.00
1	82.96	10.08	2.717	0.20(0.10)	0.52	31.9	67.00
1	83.17	10.26	2.689	0.20(0.10)	0.52	32.4	53.00
1	83.22	10.33	2.678	0.20(0.10)	0.52	32.6	43.00
1	83.24	10.45	2.661	0.20(0.10)	0.52	32.8	33.00
1	83.23	10.48	2.656	0.20(0.10)	0.52	32.9	56.00
1	83.16	10.60	2.639	0.20(0.10)	0.52	33.1	41.00
1	82.31	11.32	2.542	0.20(0.10)	0.52	34.2	13.00
1	81.68	11.79	2.483	0.20(0.10)	0.52	34.8	19.00
1	81.64	11.82	2.480	0.20(0.10)	0.52	34.8	29.00
1	80.05	12.71	2.378	0.20(0.10)	0.52	35.8	16.00
1	79.49	13.02	2.345	0.20(0.10)	0.52	36.1	17.00
1	78.45	13.57	2.291	0.20(0.10)	0.52	36.6	22.00
1	78.27	13.64	2.284	0.20(0.10)	0.52	36.7	10.00
1	77.57	13.91	2.258	0.20(0.10)	0.52	36.8	7.00
1	74.76	14.93	2.169	0.20(0.10)	0.52	37.2	4.00
1	70.22	16.61	2.040	0.20(0.10)	0.52	37.4	1.00
2	1.34	5.27	3.938	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	66.53	5.14	3.994	0.20(0.10)	0.50	16.5	63.00
2	67.20	5.27	3.938	0.20(0.10)	0.50	17.0	47.00
3	67.58	5.35	3.905	0.20(0.10)	0.50	17.2	45.00
4	70.53	6.00	3.656	0.20(0.10)	0.50	19.3	59.00
5	76.71	7.42	3.238	0.20(0.10)	0.50	24.0	31.00
6	78.30	7.79	3.148	0.20(0.10)	0.51	25.4	38.00
7	79.46	8.09	3.081	0.20(0.10)	0.51	26.4	6.00
8	80.45	8.35	3.027	0.20(0.10)	0.51	27.3	35.00
9	80.62	8.40	3.016	0.20(0.10)	0.51	27.5	24.00
10	80.88	8.47	3.001	0.20(0.10)	0.51	27.7	46.00
11	81.40	8.66	2.964	0.20(0.10)	0.51	28.3	25.00
12	82.08	8.92	2.913	0.20(0.10)	0.51	29.1	64.00
13	82.45	9.10	2.881	0.20(0.10)	0.51	29.7	61.00
14	82.62	9.20	2.862	0.20(0.10)	0.51	30.0	32.00
15	83.78	10.00	2.729	0.20(0.10)	0.51	32.1	14.00
16	83.88	10.08	2.717	0.20(0.10)	0.51	32.3	67.00
17	84.08	10.26	2.689	0.20(0.10)	0.51	32.8	53.00
18	84.13	10.33	2.678	0.20(0.10)	0.51	33.0	43.00
19	84.15	10.45	2.661	0.20(0.10)	0.51	33.2	33.00
20	84.14	10.48	2.656	0.20(0.10)	0.51	33.3	56.00
21	84.05	10.60	2.639	0.20(0.10)	0.51	33.5	41.00
22	83.17	11.32	2.542	0.20(0.10)	0.51	34.6	13.00
23	82.52	11.79	2.483	0.20(0.10)	0.51	35.2	19.00
24	82.48	11.82	2.480	0.20(0.10)	0.51	35.2	29.00
25	80.86	12.71	2.378	0.20(0.10)	0.51	36.2	16.00
26	80.28	13.02	2.345	0.20(0.10)	0.52	36.5	17.00
27	79.22	13.57	2.291	0.20(0.10)	0.52	37.0	22.00
28	79.04	13.64	2.284	0.20(0.10)	0.52	37.1	10.00
29	78.34	13.91	2.258	0.20(0.10)	0.52	37.2	7.00
30	75.49	14.93	2.169	0.20(0.10)	0.52	37.5	4.00
31	70.91	16.61	2.040	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 84.15 Tc(MIN.) = 10.45
EFFECTIVE AREA(ACRES) = 33.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   450.00  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.15
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.932
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.13      0.20     0.600    75    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.86
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      2.86

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.670
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.58

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.960
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    75    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =   10.49
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.655
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.58
  EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  3.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.58   10.39    2.670  0.20( 0.12) 0.60       2.4      33.00
      2        4.15   10.49    2.655  0.20( 0.12) 0.60       1.8      73.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.71   10.39    2.670  0.20( 0.12) 0.60       4.2      33.00
      2        9.70   10.49    2.655  0.20( 0.12) 0.60       4.2      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.71    Tc(MIN.) =    10.39
  EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.71
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.71

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.110
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =    9.18
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.866
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     1.93
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.18
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.26

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.49      0.20      0.500    75    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.39
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    9.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    8.57
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.98
 EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.15
 FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
 LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.57
 RAINFALL INTENSITY(INCH/HR) =   2.98
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.26
 TOTAL STREAM AREA(ACRES) =       1.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.71   11.15    2.564  0.20( 0.12) 0.60       4.2      33.00
     1        9.70   11.25    2.551  0.20( 0.12) 0.60       4.2      73.00
     2        3.26    9.18    2.866  0.20( 0.12) 0.60       1.3      76.00
     3        3.25    8.57    2.982  0.20( 0.11) 0.56       1.3      78.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.17    8.57    2.982  0.20( 0.12) 0.59       5.7      78.00
     2       15.37    9.18    2.866  0.20( 0.12) 0.59       6.1      76.00
     3       15.40   11.15    2.564  0.20( 0.12) 0.59       6.8      33.00
     4       15.35   11.25    2.551  0.20( 0.12) 0.59       6.8      73.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.40    Tc(MIN.) =    11.15
 EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.40
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   11.37
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.37
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.536
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        3.28      0.20     0.900    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =    6.95
 EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
 TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      21.77

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.73    8.79    2.939  0.20( 0.14) 0.70       9.0      78.00
     2       22.61    9.40    2.828  0.20( 0.14) 0.70       9.3      76.00
     3       21.77   11.37    2.536  0.20( 0.14) 0.69      10.1      33.00
     4       21.70   11.47    2.523  0.20( 0.14) 0.69      10.1      73.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      22.73  Tc(MIN.) =    8.79
 AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.02

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
 FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.73
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.28
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.28
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.02
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.73

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.087
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    75    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.736
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.57      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.39
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  5.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.96
  RAINFALL INTENSITY(INCH/HR) =   2.74
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.470
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    7.78
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.150
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
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  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.76
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.78
  RAINFALL INTENSITY(INCH/HR) =   3.15
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.73    9.28    2.849  0.20( 0.14) 0.70       9.0      78.00
      1       22.61    9.89    2.747  0.20( 0.14) 0.70       9.3      76.00
      1       21.77   11.86    2.474  0.20( 0.14) 0.69      10.1      33.00
      1       21.70   11.96    2.462  0.20( 0.14) 0.69      10.1      73.00
      2        3.44    9.96    2.736  0.20( 0.08) 0.40       1.4      82.00
      3        5.29    7.78    3.150  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.59    7.78    3.150  0.20( 0.13) 0.65      10.6      80.00
      2       30.84    9.28    2.849  0.20( 0.13) 0.65      12.3      78.00
      3       30.62    9.89    2.747  0.20( 0.13) 0.65      12.7      76.00
      4       30.59    9.96    2.736  0.20( 0.13) 0.65      12.7      82.00
      5       28.99   11.86    2.474  0.20( 0.13) 0.65      13.5      33.00
      6       28.87   11.96    2.462  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.84    Tc(MIN.) =     9.28
  EFFECTIVE AREA(ACRES) =      12.31   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.84
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.37
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.
```

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****************************************************************************
 FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       29.59    7.88    3.129  0.20( 0.13) 0.65      10.6      80.00
     2       30.84    9.37    2.833  0.20( 0.13) 0.65      12.3      78.00
     3       30.62    9.98    2.733  0.20( 0.13) 0.65      12.7      76.00
     4       30.59   10.05    2.722  0.20( 0.13) 0.65      12.7      82.00
     5       28.99   11.95    2.464  0.20( 0.13) 0.65      13.5      33.00
     6       28.87   12.05    2.452  0.20( 0.13) 0.65      13.5      73.00
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       66.53    5.19    3.973  0.20( 0.10) 0.50      16.5      63.00
     2       67.20    5.32    3.918  0.20( 0.10) 0.50      17.0      47.00
     3       67.58    5.40    3.886  0.20( 0.10) 0.50      17.2      45.00
     4       70.53    6.05    3.640  0.20( 0.10) 0.50      19.3      59.00
     5       76.71    7.46    3.227  0.20( 0.10) 0.50      24.0      31.00
     6       78.30    7.84    3.138  0.20( 0.10) 0.51      25.4      38.00
     7       79.46    8.13    3.072  0.20( 0.10) 0.51      26.4       6.00
     8       80.45    8.39    3.018  0.20( 0.10) 0.51      27.3      35.00
     9       80.62    8.44    3.007  0.20( 0.10) 0.51      27.5      24.00
    10       80.88    8.52    2.992  0.20( 0.10) 0.51      27.7      46.00
    11       81.40    8.70    2.956  0.20( 0.10) 0.51      28.3      25.00
    12       82.08    8.97    2.905  0.20( 0.10) 0.51      29.1      64.00
    13       82.45    9.14    2.873  0.20( 0.10) 0.51      29.7      61.00
    14       82.62    9.24    2.854  0.20( 0.10) 0.51      30.0      32.00
    15       83.78   10.04    2.722  0.20( 0.10) 0.51      32.1      14.00
    16       83.88   10.12    2.710  0.20( 0.10) 0.51      32.3      67.00
    17       84.08   10.30    2.683  0.20( 0.10) 0.51      32.8      53.00
    18       84.13   10.38    2.672  0.20( 0.10) 0.51      33.0      43.00
    19       84.15   10.50    2.654  0.20( 0.10) 0.51      33.2      33.00
    20       84.14   10.52    2.650  0.20( 0.10) 0.51      33.3      56.00
    21       84.05   10.64    2.633  0.20( 0.10) 0.51      33.5      41.00
    22       83.17   11.36    2.537  0.20( 0.10) 0.51      34.6      13.00
    23       82.52   11.83    2.478  0.20( 0.10) 0.51      35.2      19.00
    24       82.48   11.86    2.475  0.20( 0.10) 0.51      35.2      29.00
    25       80.86   12.76    2.373  0.20( 0.10) 0.51      36.2      16.00
    26       80.28   13.07    2.341  0.20( 0.10) 0.52      36.5      17.00
    27       79.22   13.61    2.287  0.20( 0.10) 0.52      37.0      22.00
    28       79.04   13.69    2.280  0.20( 0.10) 0.52      37.1      10.00
    29       78.34   13.96    2.254  0.20( 0.10) 0.52      37.2       7.00
    30       75.49   14.97    2.165  0.20( 0.10) 0.52      37.5       4.00
    31       70.91   16.66    2.037  0.20( 0.10) 0.52      37.8       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       91.53    5.19    3.973  0.20( 0.11) 0.54      23.6      63.00
     2       92.44    5.32    3.918  0.20( 0.11) 0.54      24.1      47.00
     3       92.98    5.40    3.886  0.20( 0.11) 0.54      24.5      45.00
     4       97.13    6.05    3.640  0.20( 0.11) 0.55      27.5      59.00
     5      105.67    7.46    3.227  0.20( 0.11) 0.55      34.1      31.00
     6      107.84    7.84    3.138  0.20( 0.11) 0.55      35.9      38.00
     7      108.04    7.88    3.129  0.20( 0.11) 0.55      36.1      80.00
     8      109.27    8.13    3.072  0.20( 0.11) 0.55      37.3       6.00
     9      110.47    8.39    3.018  0.20( 0.11) 0.55      38.5      35.00
    10      110.69    8.44    3.007  0.20( 0.11) 0.55      38.7      24.00
    11      111.01    8.52    2.992  0.20( 0.11) 0.55      39.1      46.00
    12      111.68    8.70    2.956  0.20( 0.11) 0.55      39.9      25.00
    13      112.58    8.97    2.905  0.20( 0.11) 0.55      41.0      64.00
    14      113.10    9.14    2.873  0.20( 0.11) 0.55      41.7      61.00
```

```
    15      113.35    9.24    2.854  0.20( 0.11) 0.55      42.1      32.00
    16      113.63    9.37    2.833  0.20( 0.11) 0.55      42.6      78.00
    17      114.31    9.98    2.733  0.20( 0.11) 0.55      44.6      76.00
    18      114.37   10.04    2.722  0.20( 0.11) 0.55      44.9      14.00
    19      114.37   10.05    2.722  0.20( 0.11) 0.55      44.9      82.00
    20      114.40   10.12    2.710  0.20( 0.11) 0.55      45.1      67.00
    21      114.45   10.30    2.683  0.20( 0.11) 0.55      45.6      53.00
    22      114.44   10.38    2.672  0.20( 0.11) 0.55      45.8      43.00
    23      114.36   10.50    2.654  0.20( 0.11) 0.55      46.1      33.00
    24      114.32   10.52    2.650  0.20( 0.11) 0.55      46.2      56.00
    25      114.14   10.64    2.633  0.20( 0.11) 0.55      46.5      41.00
    26      112.66   11.36    2.537  0.20( 0.11) 0.55      47.8      13.00
    27      111.61   11.83    2.478  0.20( 0.11) 0.55      48.6      19.00
    28      111.55   11.86    2.475  0.20( 0.11) 0.55      48.7      29.00
    29      111.30   11.95    2.464  0.20( 0.11) 0.55      48.8      33.00
    30      111.00   12.05    2.452  0.20( 0.11) 0.55      48.9      73.00
    31      108.75   12.76    2.373  0.20( 0.11) 0.55      49.7      16.00
    32      107.78   13.07    2.341  0.20( 0.11) 0.55      50.0      17.00
    33      106.05   13.61    2.287  0.20( 0.11) 0.55      50.5      22.00
    34      105.78   13.69    2.280  0.20( 0.11) 0.55      50.6      10.00
    35      104.75   13.96    2.254  0.20( 0.11) 0.55      50.7       7.00
    36      100.80   14.97    2.165  0.20( 0.11) 0.55      51.0       4.00
    37       94.63   16.66    2.037  0.20( 0.11) 0.55      51.3       1.00
  TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      114.45  Tc(MIN.) =   10.302
  EFFECTIVE AREA(ACRES) =     45.63  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.45
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.41
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.45
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      45.63
  TOTAL STREAM AREA(ACRES) =      51.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     114.45

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.43      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.50

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       91.53    5.59    3.808  0.20( 0.11) 0.54      23.6      63.00
      1       92.44    5.72    3.759  0.20( 0.11) 0.54      24.1      47.00
      1       92.98    5.79    3.730  0.20( 0.11) 0.54      24.5      45.00
```

1	97.13	6.44	3.513	0.20(0.11)	0.55	27.5	59.00
1	105.67	7.85	3.136	0.20(0.11)	0.55	34.1	31.00
1	107.84	8.22	3.053	0.20(0.11)	0.55	35.9	38.00
1	108.04	8.26	3.046	0.20(0.11)	0.55	36.1	80.00
1	109.27	8.51	2.992	0.20(0.11)	0.55	37.3	6.00
1	110.47	8.77	2.942	0.20(0.11)	0.55	38.5	35.00
1	110.69	8.82	2.932	0.20(0.11)	0.55	38.7	24.00
1	111.01	8.90	2.918	0.20(0.11)	0.55	39.1	46.00
1	111.68	9.08	2.884	0.20(0.11)	0.55	39.9	25.00
1	112.58	9.34	2.837	0.20(0.11)	0.55	41.0	64.00
1	113.10	9.52	2.807	0.20(0.11)	0.55	41.7	61.00
1	113.35	9.62	2.790	0.20(0.11)	0.55	42.1	32.00
1	113.63	9.74	2.770	0.20(0.11)	0.55	42.6	78.00
1	114.31	10.36	2.675	0.20(0.11)	0.55	44.6	76.00
1	114.37	10.42	2.665	0.20(0.11)	0.55	44.9	14.00
1	114.37	10.42	2.665	0.20(0.11)	0.55	44.9	82.00
1	114.40	10.50	2.654	0.20(0.11)	0.55	45.1	67.00
1	114.45	10.68	2.628	0.20(0.11)	0.55	45.6	53.00
1	114.44	10.76	2.617	0.20(0.11)	0.55	45.8	43.00
1	114.36	10.87	2.601	0.20(0.11)	0.55	46.1	33.00
1	114.32	10.90	2.597	0.20(0.11)	0.55	46.2	56.00
1	114.14	11.02	2.581	0.20(0.11)	0.55	46.5	41.00
1	112.66	11.74	2.489	0.20(0.11)	0.55	47.8	13.00
1	111.61	12.21	2.433	0.20(0.11)	0.55	48.6	19.00
1	111.55	12.24	2.431	0.20(0.11)	0.55	48.7	29.00
1	111.30	12.33	2.420	0.20(0.11)	0.55	48.8	33.00
1	111.00	12.43	2.409	0.20(0.11)	0.55	48.9	73.00
1	108.75	13.14	2.334	0.20(0.11)	0.55	49.7	16.00
1	107.78	13.45	2.303	0.20(0.11)	0.55	50.0	17.00
1	106.05	13.99	2.251	0.20(0.11)	0.55	50.5	22.00
1	105.78	14.07	2.244	0.20(0.11)	0.55	50.6	10.00
1	104.75	14.34	2.220	0.20(0.11)	0.55	50.7	7.00
1	100.80	15.36	2.134	0.20(0.11)	0.55	51.0	4.00
1	94.63	17.06	2.010	0.20(0.11)	0.55	51.3	1.00
2	1.50	5.49	3.848	0.20(0.18)	0.90	0.4	88.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	92.35	5.49	3.848	0.20(0.11)	0.55	23.6	88.00
2	93.01	5.59	3.808	0.20(0.11)	0.55	24.0	63.00
3	93.91	5.72	3.759	0.20(0.11)	0.55	24.6	47.00
4	94.43	5.79	3.730	0.20(0.11)	0.55	24.9	45.00
5	98.50	6.44	3.513	0.20(0.11)	0.55	27.9	59.00
6	106.88	7.85	3.136	0.20(0.11)	0.55	34.6	31.00
7	109.01	8.22	3.053	0.20(0.11)	0.55	36.4	38.00
8	109.21	8.26	3.046	0.20(0.11)	0.55	36.6	80.00
9	110.42	8.51	2.992	0.20(0.11)	0.55	37.7	6.00
10	111.60	8.77	2.942	0.20(0.11)	0.55	38.9	35.00
11	111.82	8.82	2.932	0.20(0.11)	0.55	39.2	24.00
12	112.13	8.90	2.918	0.20(0.11)	0.55	39.5	46.00
13	112.79	9.08	2.884	0.20(0.11)	0.55	40.3	25.00
14	113.67	9.34	2.837	0.20(0.11)	0.56	41.4	64.00
15	114.18	9.52	2.807	0.20(0.11)	0.56	42.2	61.00
16	114.42	9.62	2.790	0.20(0.11)	0.56	42.6	32.00
17	114.69	9.74	2.770	0.20(0.11)	0.56	43.0	78.00
18	115.33	10.36	2.675	0.20(0.11)	0.56	45.1	76.00
19	115.38	10.42	2.665	0.20(0.11)	0.55	45.3	14.00
20	115.38	10.42	2.665	0.20(0.11)	0.55	45.3	82.00
21	115.42	10.50	2.654	0.20(0.11)	0.55	45.5	67.00
22	115.45	10.68	2.628	0.20(0.11)	0.55	46.1	53.00
23	115.44	10.76	2.617	0.20(0.11)	0.55	46.3	43.00
24	115.35	10.87	2.601	0.20(0.11)	0.55	46.6	33.00
25	115.31	10.90	2.597	0.20(0.11)	0.55	46.6	56.00
26	115.12	11.02	2.581	0.20(0.11)	0.55	46.9	41.00
27	113.60	11.74	2.489	0.20(0.11)	0.55	48.2	13.00
28	112.53	12.21	2.433	0.20(0.11)	0.55	49.1	19.00
29	112.47	12.24	2.431	0.20(0.11)	0.55	49.1	29.00

```
    30      112.22   12.33    2.420  0.20( 0.11) 0.55      49.2      33.00
    31      111.92   12.43    2.409  0.20( 0.11) 0.55      49.4      73.00
    32      109.64   13.14    2.334  0.20( 0.11) 0.55      50.1      16.00
    33      108.64   13.45    2.303  0.20( 0.11) 0.55      50.4      17.00
    34      106.89   13.99    2.251  0.20( 0.11) 0.55      50.9      22.00
    35      106.62   14.07    2.244  0.20( 0.11) 0.55      51.0      10.00
    36      105.59   14.34    2.220  0.20( 0.11) 0.55      51.1       7.00
    37      101.60   15.36    2.134  0.20( 0.11) 0.55      51.5       4.00
    38       95.38   17.06    2.010  0.20( 0.11) 0.55      51.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     115.45    Tc(MIN.) =    10.68
  EFFECTIVE AREA(ACRES) =      46.06   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.98
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     115.45
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.547
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20      0.100    75    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
```

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  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =    8.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.15
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.24      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.07
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =    8.04
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    3.25
  EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.96
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.77
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.56    8.15    3.069  0.20( 0.02) 0.10       0.6      85.00
      2        4.77    8.80    2.937  0.20( 0.18) 0.90       1.8      92.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.19    8.15    3.069  0.20( 0.14) 0.70        2.3      85.00
      2        6.27    8.80    2.937  0.20( 0.14) 0.71        2.4      92.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.27    Tc(MIN.) =     8.80
  EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.27
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.19    8.17    3.063  0.20( 0.14) 0.70        2.3      85.00
      2        6.27    8.82    2.932  0.20( 0.14) 0.71        2.4      92.00
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       92.35    5.63    3.794  0.20( 0.11) 0.55       23.6      88.00
      2       93.01    5.73    3.756  0.20( 0.11) 0.55       24.0      63.00
      3       93.91    5.85    3.709  0.20( 0.11) 0.55       24.6      47.00
      4       94.43    5.93    3.681  0.20( 0.11) 0.55       24.9      45.00
      5       98.50    6.57    3.471  0.20( 0.11) 0.55       27.9      59.00
      6      106.88    7.98    3.105  0.20( 0.11) 0.55       34.6      31.00
      7      109.01    8.35    3.026  0.20( 0.11) 0.55       36.4      38.00
      8      109.21    8.39    3.018  0.20( 0.11) 0.55       36.6      80.00
      9      110.42    8.64    2.966  0.20( 0.11) 0.55       37.7       6.00
     10      111.60    8.90    2.917  0.20( 0.11) 0.55       38.9      35.00
     11      111.82    8.95    2.908  0.20( 0.11) 0.55       39.2      24.00
     12      112.13    9.03    2.894  0.20( 0.11) 0.55       39.5      46.00
     13      112.79    9.21    2.861  0.20( 0.11) 0.55       40.3      25.00
     14      113.67    9.47    2.815  0.20( 0.11) 0.56       41.4      64.00
     15      114.18    9.65    2.785  0.20( 0.11) 0.56       42.2      61.00
     16      114.42    9.75    2.768  0.20( 0.11) 0.56       42.6      32.00
     17      114.69    9.87    2.749  0.20( 0.11) 0.56       43.0      78.00
     18      115.33   10.48    2.656  0.20( 0.11) 0.56       45.1      76.00
     19      115.38   10.55    2.646  0.20( 0.11) 0.55       45.3      14.00
     20      115.38   10.55    2.646  0.20( 0.11) 0.55       45.3      82.00
     21      115.42   10.63    2.635  0.20( 0.11) 0.55       45.5      67.00
     22      115.45   10.81    2.610  0.20( 0.11) 0.55       46.1      53.00
     23      115.44   10.88    2.599  0.20( 0.11) 0.55       46.3      43.00
     24      115.35   11.00    2.583  0.20( 0.11) 0.55       46.6      33.00
     25      115.31   11.03    2.579  0.20( 0.11) 0.55       46.6      56.00
     26      115.12   11.15    2.564  0.20( 0.11) 0.55       46.9      41.00
```

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    27      113.60   11.87    2.474  0.20( 0.11) 0.55      48.2      13.00
    28      112.53   12.34    2.419  0.20( 0.11) 0.55      49.1      19.00
    29      112.47   12.37    2.416  0.20( 0.11) 0.55      49.1      29.00
    30      112.22   12.46    2.405  0.20( 0.11) 0.55      49.2      33.00
    31      111.92   12.56    2.394  0.20( 0.11) 0.55      49.4      73.00
    32      109.64   13.27    2.321  0.20( 0.11) 0.55      50.1      16.00
    33      108.64   13.58    2.290  0.20( 0.11) 0.55      50.4      17.00
    34      106.89   14.13    2.239  0.20( 0.11) 0.55      50.9      22.00
    35      106.62   14.20    2.232  0.20( 0.11) 0.55      51.0      10.00
    36      105.59   14.47    2.208  0.20( 0.11) 0.55      51.1       7.00
    37      101.60   15.49    2.124  0.20( 0.11) 0.55      51.5       4.00
    38       95.38   17.19    2.001  0.20( 0.11) 0.55      51.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       97.68    5.63    3.794  0.20( 0.11) 0.56      25.1      88.00
      2       98.38    5.73    3.756  0.20( 0.11) 0.56      25.6      63.00
      3       99.32    5.85    3.709  0.20( 0.11) 0.56      26.2      47.00
      4       99.88    5.93    3.681  0.20( 0.11) 0.56      26.6      45.00
      5      104.17    6.57    3.471  0.20( 0.11) 0.56      29.7      59.00
      6      113.02    7.98    3.105  0.20( 0.11) 0.56      36.8      31.00
      7      114.18    8.17    3.063  0.20( 0.11) 0.56      37.8      85.00
      8      115.23    8.35    3.026  0.20( 0.11) 0.56      38.7      38.00
      9      115.43    8.39    3.018  0.20( 0.11) 0.56      38.9      80.00
     10      116.66    8.64    2.966  0.20( 0.11) 0.56      40.1       6.00
     11      117.50    8.82    2.932  0.20( 0.11) 0.56      40.9      92.00
     12      117.83    8.90    2.917  0.20( 0.11) 0.56      41.3      35.00
     13      118.03    8.95    2.908  0.20( 0.11) 0.56      41.6      24.00
     14      118.31    9.03    2.894  0.20( 0.11) 0.56      41.9      46.00
     15      118.89    9.21    2.861  0.20( 0.11) 0.56      42.7      25.00
     16      119.67    9.47    2.815  0.20( 0.11) 0.56      43.8      64.00
     17      120.11    9.65    2.785  0.20( 0.11) 0.56      44.6      61.00
     18      120.32    9.75    2.768  0.20( 0.11) 0.56      44.9      32.00
     19      120.55    9.87    2.749  0.20( 0.11) 0.56      45.4      78.00
     20      120.97   10.48    2.656  0.20( 0.11) 0.56      47.5      76.00
     21      121.01   10.55    2.646  0.20( 0.11) 0.56      47.7      14.00
     22      121.01   10.55    2.646  0.20( 0.11) 0.56      47.7      82.00
     23      121.02   10.63    2.635  0.20( 0.11) 0.56      47.9      67.00
     24      120.99   10.81    2.610  0.20( 0.11) 0.56      48.5      53.00
     25      120.96   10.88    2.599  0.20( 0.11) 0.56      48.7      43.00
     26      120.83   11.00    2.583  0.20( 0.11) 0.56      49.0      33.00
     27      120.78   11.03    2.579  0.20( 0.11) 0.56      49.0      56.00
     28      120.56   11.15    2.564  0.20( 0.11) 0.56      49.3      41.00
     29      118.84   11.87    2.474  0.20( 0.11) 0.56      50.6      13.00
     30      117.64   12.34    2.419  0.20( 0.11) 0.56      51.4      19.00
     31      117.58   12.37    2.416  0.20( 0.11) 0.56      51.5      29.00
     32      117.30   12.46    2.405  0.20( 0.11) 0.56      51.6      33.00
     33      116.97   12.56    2.394  0.20( 0.11) 0.56      51.7      73.00
     34      114.53   13.27    2.321  0.20( 0.11) 0.56      52.5      16.00
     35      113.47   13.58    2.290  0.20( 0.11) 0.56      52.8      17.00
     36      111.60   14.13    2.239  0.20( 0.11) 0.56      53.3      22.00
     37      111.31   14.20    2.232  0.20( 0.11) 0.56      53.4      10.00
     38      110.23   14.47    2.208  0.20( 0.11) 0.56      53.5       7.00
     39      106.05   15.49    2.124  0.20( 0.11) 0.56      53.8       4.00
     40       99.55   17.19    2.001  0.20( 0.11) 0.56      54.1       1.00
    TOTAL AREA(ACRES) =        54.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      121.02  Tc(MIN.) =   10.629
  EFFECTIVE AREA(ACRES) =     47.92  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       54.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     121.02
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.71
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.71
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      47.92
  TOTAL STREAM AREA(ACRES) =      54.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     121.02

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.14      0.20     0.900    75    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      3.03

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.063
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        5.08      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.65
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    8.18
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   13.18
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      16.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   9.97
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.14
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.25
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.14

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.95      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =   11.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.538
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.69      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    3.71
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       5.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.02
  FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.35
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       97.68    5.71    3.763  0.20( 0.11) 0.56      25.1      88.00
      1       98.38    5.81    3.725  0.20( 0.11) 0.56      25.6      63.00
      1       99.32    5.94    3.680  0.20( 0.11) 0.56      26.2      47.00
      1       99.88    6.01    3.652  0.20( 0.11) 0.56      26.6      45.00
      1      104.17    6.65    3.447  0.20( 0.11) 0.56      29.7      59.00
      1      113.02    8.06    3.088  0.20( 0.11) 0.56      36.8      31.00
      1      114.18    8.25    3.047  0.20( 0.11) 0.56      37.8      85.00
      1      115.23    8.43    3.010  0.20( 0.11) 0.56      38.7      38.00
      1      115.43    8.46    3.002  0.20( 0.11) 0.56      38.9      80.00
      1      116.66    8.72    2.951  0.20( 0.11) 0.56      40.1       6.00
```

1	117.50	8.90	2.918	0.20(0.11)	0.56	40.9	92.00
1	117.83	8.98	2.903	0.20(0.11)	0.56	41.3	35.00
1	118.03	9.03	2.893	0.20(0.11)	0.56	41.6	24.00
1	118.31	9.11	2.879	0.20(0.11)	0.56	41.9	46.00
1	118.89	9.29	2.847	0.20(0.11)	0.56	42.7	25.00
1	119.67	9.55	2.802	0.20(0.11)	0.56	43.8	64.00
1	120.11	9.73	2.772	0.20(0.11)	0.56	44.6	61.00
1	120.32	9.83	2.756	0.20(0.11)	0.56	44.9	32.00
1	120.55	9.95	2.736	0.20(0.11)	0.56	45.4	78.00
1	120.97	10.56	2.645	0.20(0.11)	0.56	47.5	76.00
1	121.01	10.63	2.635	0.20(0.11)	0.56	47.7	14.00
1	121.01	10.63	2.635	0.20(0.11)	0.56	47.7	82.00
1	121.02	10.71	2.624	0.20(0.11)	0.56	47.9	67.00
1	120.99	10.89	2.599	0.20(0.11)	0.56	48.5	53.00
1	120.96	10.96	2.589	0.20(0.11)	0.56	48.7	43.00
1	120.83	11.08	2.573	0.20(0.11)	0.56	49.0	33.00
1	120.78	11.11	2.569	0.20(0.11)	0.56	49.0	56.00
1	120.56	11.23	2.553	0.20(0.11)	0.56	49.3	41.00
1	118.84	11.95	2.464	0.20(0.11)	0.56	50.6	13.00
1	117.64	12.42	2.410	0.20(0.11)	0.56	51.4	19.00
1	117.58	12.45	2.407	0.20(0.11)	0.56	51.5	29.00
1	117.30	12.54	2.397	0.20(0.11)	0.56	51.6	33.00
1	116.97	12.64	2.386	0.20(0.11)	0.56	51.7	73.00
1	114.53	13.35	2.313	0.20(0.11)	0.56	52.5	16.00
1	113.47	13.66	2.282	0.20(0.11)	0.56	52.8	17.00
1	111.60	14.21	2.232	0.20(0.11)	0.56	53.3	22.00
1	111.31	14.28	2.225	0.20(0.11)	0.56	53.4	10.00
1	110.23	14.55	2.201	0.20(0.11)	0.56	53.5	7.00
1	106.05	15.57	2.117	0.20(0.11)	0.56	53.8	4.00
1	99.55	17.27	1.995	0.20(0.11)	0.56	54.1	1.00
2	16.14	8.25	3.047	0.20(0.18)	0.90	6.2	97.00
3	5.77	11.35	2.538	0.20(0.11)	0.54	2.6	100.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	116.00	5.71	3.763	0.20(0.12)	0.61	30.7	88.00
2	116.83	5.81	3.725	0.20(0.12)	0.61	31.3	63.00
3	117.93	5.94	3.680	0.20(0.12)	0.61	32.0	47.00
4	118.58	6.01	3.652	0.20(0.12)	0.61	32.5	45.00
5	123.65	6.65	3.447	0.20(0.12)	0.61	36.3	59.00
6	134.04	8.06	3.088	0.20(0.12)	0.61	44.7	31.00
7	135.39	8.25	3.047	0.20(0.12)	0.61	45.9	85.00
8	135.40	8.25	3.047	0.20(0.12)	0.61	45.9	97.00
9	136.28	8.43	3.010	0.20(0.12)	0.61	46.8	38.00
10	136.45	8.46	3.002	0.20(0.12)	0.61	47.0	80.00
11	137.46	8.72	2.951	0.20(0.12)	0.60	48.3	6.00
12	138.14	8.90	2.918	0.20(0.12)	0.60	49.2	92.00
13	138.41	8.98	2.903	0.20(0.12)	0.60	49.6	35.00
14	138.57	9.03	2.893	0.20(0.12)	0.60	49.9	24.00
15	138.79	9.11	2.879	0.20(0.12)	0.60	50.2	46.00
16	139.23	9.29	2.847	0.20(0.12)	0.60	51.1	25.00
17	139.81	9.55	2.802	0.20(0.12)	0.60	52.3	64.00
18	140.13	9.73	2.772	0.20(0.12)	0.60	53.0	61.00
19	140.27	9.83	2.756	0.20(0.12)	0.60	53.5	32.00
20	140.41	9.95	2.736	0.20(0.12)	0.60	53.9	78.00
21	140.46	10.56	2.645	0.20(0.12)	0.60	56.1	76.00
22	140.45	10.63	2.635	0.20(0.12)	0.60	56.4	14.00
23	140.45	10.63	2.635	0.20(0.12)	0.60	56.4	82.00
24	140.42	10.71	2.624	0.20(0.12)	0.60	56.6	67.00
25	140.29	10.89	2.599	0.20(0.12)	0.60	57.2	53.00
26	140.21	10.96	2.589	0.20(0.12)	0.60	57.4	43.00
27	140.02	11.08	2.573	0.20(0.12)	0.60	57.8	33.00
28	139.96	11.11	2.569	0.20(0.12)	0.60	57.8	56.00
29	139.67	11.23	2.553	0.20(0.12)	0.60	58.1	41.00
30	139.31	11.35	2.538	0.20(0.12)	0.60	58.4	100.00
31	137.30	11.95	2.464	0.20(0.12)	0.60	59.5	13.00
32	135.67	12.42	2.410	0.20(0.12)	0.60	60.3	19.00

```
     33      135.58   12.45    2.407  0.20( 0.12) 0.60      60.3       29.00
     34      135.22   12.54    2.397  0.20( 0.12) 0.59      60.5       33.00
     35      134.81   12.64    2.386  0.20( 0.12) 0.59      60.6       73.00
     36      131.78   13.35    2.313  0.20( 0.12) 0.59      61.4       16.00
     37      130.47   13.66    2.282  0.20( 0.12) 0.59      61.7       17.00
     38      128.20   14.21    2.232  0.20( 0.12) 0.59      62.2       22.00
     39      127.86   14.28    2.225  0.20( 0.12) 0.59      62.2       10.00
     40      126.58   14.55    2.201  0.20( 0.12) 0.59      62.4        7.00
     41      121.74   15.57    2.117  0.20( 0.12) 0.59      62.7        4.00
     42      114.26   17.27    1.995  0.20( 0.12) 0.59      62.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     140.46    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      56.14   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       62.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.66
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     140.46
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.14
  TOTAL STREAM AREA(ACRES) =      62.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     140.46

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.44      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.54

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      116.00    5.79    3.731  0.20( 0.12) 0.61      30.7      88.00
      1      116.83    5.89    3.695  0.20( 0.12) 0.61      31.3      63.00
      1      117.93    6.02    3.650  0.20( 0.12) 0.61      32.0      47.00
      1      118.58    6.10    3.623  0.20( 0.12) 0.61      32.5      45.00
      1      123.65    6.74    3.422  0.20( 0.12) 0.61      36.3      59.00
      1      134.04    8.14    3.070  0.20( 0.12) 0.61      44.7      31.00
      1      135.39    8.33    3.030  0.20( 0.12) 0.61      45.9      85.00
      1      135.40    8.33    3.030  0.20( 0.12) 0.61      45.9      97.00
      1      136.28    8.51    2.993  0.20( 0.12) 0.61      46.8      38.00
      1      136.45    8.55    2.986  0.20( 0.12) 0.61      47.0      80.00
      1      137.46    8.80    2.936  0.20( 0.12) 0.60      48.3       6.00
      1      138.14    8.98    2.903  0.20( 0.12) 0.60      49.2      92.00
      1      138.41    9.06    2.888  0.20( 0.12) 0.60      49.6      35.00
      1      138.57    9.11    2.879  0.20( 0.12) 0.60      49.9      24.00
      1      138.79    9.19    2.865  0.20( 0.12) 0.60      50.2      46.00
      1      139.23    9.37    2.833  0.20( 0.12) 0.60      51.1      25.00
      1      139.81    9.63    2.788  0.20( 0.12) 0.60      52.3      64.00
      1      140.13    9.81    2.759  0.20( 0.12) 0.60      53.0      61.00
      1      140.27    9.91    2.743  0.20( 0.12) 0.60      53.5      32.00
      1      140.41   10.03    2.724  0.20( 0.12) 0.60      53.9      78.00
      1      140.46   10.64    2.633  0.20( 0.12) 0.60      56.1      76.00
      1      140.45   10.71    2.624  0.20( 0.12) 0.60      56.4      14.00
      1      140.45   10.71    2.623  0.20( 0.12) 0.60      56.4      82.00
      1      140.42   10.79    2.613  0.20( 0.12) 0.60      56.6      67.00
      1      140.29   10.97    2.588  0.20( 0.12) 0.60      57.2      53.00
      1      140.21   11.04    2.578  0.20( 0.12) 0.60      57.4      43.00
      1      140.02   11.16    2.562  0.20( 0.12) 0.60      57.8      33.00
      1      139.96   11.19    2.559  0.20( 0.12) 0.60      57.8      56.00
      1      139.67   11.31    2.543  0.20( 0.12) 0.60      58.1      41.00
      1      139.31   11.43    2.527  0.20( 0.12) 0.60      58.4     100.00
      1      137.30   12.03    2.455  0.20( 0.12) 0.60      59.5      13.00
      1      135.67   12.50    2.401  0.20( 0.12) 0.60      60.3      19.00
      1      135.58   12.53    2.398  0.20( 0.12) 0.60      60.3      29.00
      1      135.22   12.62    2.388  0.20( 0.12) 0.59      60.5      33.00
      1      134.81   12.72    2.377  0.20( 0.12) 0.59      60.6      73.00
      1      131.78   13.43    2.305  0.20( 0.12) 0.59      61.4      16.00
      1      130.47   13.74    2.274  0.20( 0.12) 0.59      61.7      17.00
      1      128.20   14.29    2.224  0.20( 0.12) 0.59      62.2      22.00
```

1	127.86	14.37	2.217	0.20(0.12)	0.59	62.2	10.00
1	126.58	14.64	2.194	0.20(0.12)	0.59	62.4	7.00
1	121.74	15.66	2.111	0.20(0.12)	0.59	62.7	4.00
1	114.26	17.36	1.990	0.20(0.12)	0.59	62.9	1.00
2	1.54	5.28	3.937	0.20(0.18)	0.90	0.4	104.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	113.19	5.28	3.937	0.20(0.12)	0.61	28.4	104.00
2	117.45	5.79	3.731	0.20(0.12)	0.61	31.2	88.00
3	118.26	5.89	3.695	0.20(0.12)	0.61	31.7	63.00
4	119.35	6.02	3.650	0.20(0.12)	0.61	32.5	47.00
5	119.99	6.10	3.623	0.20(0.12)	0.61	32.9	45.00
6	124.98	6.74	3.422	0.20(0.12)	0.61	36.7	59.00
7	135.22	8.14	3.070	0.20(0.12)	0.61	45.2	31.00
8	136.56	8.33	3.030	0.20(0.12)	0.61	46.3	85.00
9	136.56	8.33	3.030	0.20(0.12)	0.61	46.3	97.00
10	137.43	8.51	2.993	0.20(0.12)	0.61	47.3	38.00
11	137.60	8.55	2.986	0.20(0.12)	0.61	47.5	80.00
12	138.58	8.80	2.936	0.20(0.12)	0.61	48.8	6.00
13	139.26	8.98	2.903	0.20(0.12)	0.61	49.7	92.00
14	139.52	9.06	2.888	0.20(0.12)	0.61	50.1	35.00
15	139.67	9.11	2.879	0.20(0.12)	0.61	50.3	24.00
16	139.88	9.19	2.865	0.20(0.12)	0.61	50.7	46.00
17	140.32	9.37	2.833	0.20(0.12)	0.61	51.5	25.00
18	140.88	9.63	2.788	0.20(0.12)	0.60	52.7	64.00
19	141.18	9.81	2.759	0.20(0.12)	0.60	53.5	61.00
20	141.32	9.91	2.743	0.20(0.12)	0.60	53.9	32.00
21	141.45	10.03	2.724	0.20(0.12)	0.60	54.4	78.00
22	141.46	10.64	2.633	0.20(0.12)	0.60	56.6	76.00
23	141.45	10.71	2.624	0.20(0.12)	0.60	56.8	14.00
24	141.45	10.71	2.623	0.20(0.12)	0.60	56.8	82.00
25	141.41	10.79	2.613	0.20(0.12)	0.60	57.1	67.00
26	141.28	10.97	2.588	0.20(0.12)	0.60	57.6	53.00
27	141.19	11.04	2.578	0.20(0.12)	0.60	57.9	43.00
28	140.99	11.16	2.562	0.20(0.12)	0.60	58.2	33.00
29	140.93	11.19	2.559	0.20(0.12)	0.60	58.3	56.00
30	140.63	11.31	2.543	0.20(0.12)	0.60	58.6	41.00
31	140.27	11.43	2.527	0.20(0.12)	0.60	58.8	100.00
32	138.23	12.03	2.455	0.20(0.12)	0.60	59.9	13.00
33	136.57	12.50	2.401	0.20(0.12)	0.60	60.7	19.00
34	136.49	12.53	2.398	0.20(0.12)	0.60	60.8	29.00
35	136.12	12.62	2.388	0.20(0.12)	0.60	60.9	33.00
36	135.70	12.72	2.377	0.20(0.12)	0.60	61.0	73.00
37	132.64	13.43	2.305	0.20(0.12)	0.60	61.8	16.00
38	131.33	13.74	2.274	0.20(0.12)	0.60	62.1	17.00
39	129.03	14.29	2.224	0.20(0.12)	0.60	62.6	22.00
40	128.69	14.37	2.217	0.20(0.12)	0.60	62.7	10.00
41	127.40	14.64	2.194	0.20(0.12)	0.60	62.8	7.00
42	122.53	15.66	2.111	0.20(0.12)	0.60	63.1	4.00
43	115.00	17.36	1.990	0.20(0.12)	0.60	63.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 141.46 Tc(MIN.) = 10.64
EFFECTIVE AREA(ACRES) = 56.58 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 63.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 106.00 = 3485.00 FEET.

****
FLOW PROCESS FROM NODE 106.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 420.30
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.78
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     141.46
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.58
  TOTAL STREAM AREA(ACRES) =      63.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     141.46

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.771
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20      0.100    75    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =    7.10
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.322
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.35      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   3.32
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.67
  TOTAL STREAM AREA(ACRES) =       0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      113.19    5.60    3.805  0.20( 0.12) 0.61      28.4     104.00
      1      117.45    6.11    3.618  0.20( 0.12) 0.61      31.2      88.00
      1      118.26    6.21    3.584  0.20( 0.12) 0.61      31.7      63.00
      1      119.35    6.34    3.543  0.20( 0.12) 0.61      32.5      47.00
      1      119.99    6.42    3.519  0.20( 0.12) 0.61      32.9      45.00
      1      124.98    7.06    3.333  0.20( 0.12) 0.61      36.7      59.00
      1      135.22    8.45    3.006  0.20( 0.12) 0.61      45.2      31.00
      1      136.56    8.64    2.968  0.20( 0.12) 0.61      46.3      85.00
      1      136.56    8.64    2.967  0.20( 0.12) 0.61      46.3      97.00
      1      137.43    8.82    2.933  0.20( 0.12) 0.61      47.3      38.00
      1      137.60    8.85    2.926  0.20( 0.12) 0.61      47.5      80.00
      1      138.58    9.11    2.879  0.20( 0.12) 0.61      48.8       6.00
      1      139.26    9.29    2.847  0.20( 0.12) 0.61      49.7      92.00
      1      139.52    9.37    2.833  0.20( 0.12) 0.61      50.1      35.00
      1      139.67    9.42    2.825  0.20( 0.12) 0.61      50.3      24.00
      1      139.88    9.49    2.812  0.20( 0.12) 0.61      50.7      46.00
      1      140.32    9.67    2.781  0.20( 0.12) 0.61      51.5      25.00
      1      140.88    9.94    2.739  0.20( 0.12) 0.60      52.7      64.00
      1      141.18   10.12    2.711  0.20( 0.12) 0.60      53.5      61.00
      1      141.32   10.22    2.695  0.20( 0.12) 0.60      53.9      32.00
      1      141.45   10.34    2.677  0.20( 0.12) 0.60      54.4      78.00
      1      141.46   10.95    2.591  0.20( 0.12) 0.60      56.6      76.00
      1      141.45   11.02    2.582  0.20( 0.12) 0.60      56.8      14.00
      1      141.45   11.02    2.581  0.20( 0.12) 0.60      56.8      82.00
      1      141.41   11.09    2.571  0.20( 0.12) 0.60      57.1      67.00
      1      141.28   11.27    2.548  0.20( 0.12) 0.60      57.6      53.00
      1      141.19   11.35    2.538  0.20( 0.12) 0.60      57.9      43.00
      1      140.99   11.47    2.523  0.20( 0.12) 0.60      58.2      33.00
      1      140.93   11.50    2.519  0.20( 0.12) 0.60      58.3      56.00
      1      140.63   11.62    2.504  0.20( 0.12) 0.60      58.6      41.00
      1      140.27   11.74    2.489  0.20( 0.12) 0.60      58.8     100.00
      1      138.23   12.33    2.420  0.20( 0.12) 0.60      59.9      13.00
      1      136.57   12.81    2.368  0.20( 0.12) 0.60      60.7      19.00
      1      136.49   12.84    2.365  0.20( 0.12) 0.60      60.8      29.00
      1      136.12   12.93    2.355  0.20( 0.12) 0.60      60.9      33.00
```

1	135.70	13.03	2.345	0.20(0.12)	0.60	61.0	73.00
1	132.64	13.74	2.275	0.20(0.12)	0.60	61.8	16.00
1	131.33	14.06	2.245	0.20(0.12)	0.60	62.1	17.00
1	129.03	14.61	2.196	0.20(0.12)	0.60	62.6	22.00
1	128.69	14.68	2.190	0.20(0.12)	0.60	62.7	10.00
1	127.40	14.96	2.167	0.20(0.12)	0.60	62.8	7.00
1	122.53	15.98	2.086	0.20(0.12)	0.60	63.1	4.00
1	115.00	17.68	1.969	0.20(0.12)	0.60	63.4	1.00
2	1.99	7.10	3.322	0.20(0.02)	0.10	0.7	95.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	114.99	5.60	3.805	0.20(0.12)	0.60	29.0	104.00
2	119.32	6.11	3.618	0.20(0.12)	0.60	31.8	88.00
3	120.15	6.21	3.584	0.20(0.12)	0.60	32.3	63.00
4	121.25	6.34	3.543	0.20(0.12)	0.60	33.1	47.00
5	121.90	6.42	3.519	0.20(0.12)	0.60	33.5	45.00
6	126.96	7.06	3.333	0.20(0.12)	0.60	37.4	59.00
7	127.26	7.10	3.322	0.20(0.12)	0.60	37.7	95.00
8	137.02	8.45	3.006	0.20(0.12)	0.60	45.8	31.00
9	138.34	8.64	2.968	0.20(0.12)	0.60	47.0	85.00
10	138.34	8.64	2.967	0.20(0.12)	0.60	47.0	97.00
11	139.19	8.82	2.933	0.20(0.12)	0.60	48.0	38.00
12	139.35	8.85	2.926	0.20(0.12)	0.60	48.2	80.00
13	140.31	9.11	2.879	0.20(0.12)	0.60	49.4	6.00
14	140.96	9.29	2.847	0.20(0.12)	0.60	50.3	92.00
15	141.22	9.37	2.833	0.20(0.12)	0.60	50.7	35.00
16	141.36	9.42	2.825	0.20(0.12)	0.60	51.0	24.00
17	141.57	9.49	2.812	0.20(0.12)	0.60	51.4	46.00
18	141.98	9.67	2.781	0.20(0.12)	0.60	52.2	25.00
19	142.52	9.94	2.739	0.20(0.12)	0.60	53.4	64.00
20	142.81	10.12	2.711	0.20(0.12)	0.60	54.1	61.00
21	142.93	10.22	2.695	0.20(0.12)	0.60	54.6	32.00
22	143.06	10.34	2.677	0.20(0.12)	0.60	55.1	78.00
23	143.01	10.95	2.591	0.20(0.12)	0.60	57.3	76.00
24	143.00	11.02	2.582	0.20(0.12)	0.60	57.5	14.00
25	143.00	11.02	2.581	0.20(0.12)	0.60	57.5	82.00
26	142.95	11.09	2.571	0.20(0.12)	0.60	57.7	67.00
27	142.80	11.27	2.548	0.20(0.12)	0.59	58.3	53.00
28	142.71	11.35	2.538	0.20(0.12)	0.59	58.5	43.00
29	142.50	11.47	2.523	0.20(0.12)	0.59	58.9	33.00
30	142.44	11.50	2.519	0.20(0.12)	0.59	58.9	56.00
31	142.13	11.62	2.504	0.20(0.12)	0.59	59.2	41.00
32	141.76	11.74	2.489	0.20(0.12)	0.59	59.5	100.00
33	139.68	12.33	2.420	0.20(0.12)	0.59	60.6	13.00
34	137.99	12.81	2.368	0.20(0.12)	0.59	61.4	19.00
35	137.90	12.84	2.365	0.20(0.12)	0.59	61.5	29.00
36	137.53	12.93	2.355	0.20(0.12)	0.59	61.6	33.00
37	137.11	13.03	2.345	0.20(0.12)	0.59	61.7	73.00
38	134.00	13.74	2.275	0.20(0.12)	0.59	62.5	16.00
39	132.67	14.06	2.245	0.20(0.12)	0.59	62.8	17.00
40	130.35	14.61	2.196	0.20(0.12)	0.59	63.3	22.00
41	130.00	14.68	2.190	0.20(0.12)	0.59	63.4	10.00
42	128.70	14.96	2.167	0.20(0.12)	0.59	63.5	7.00
43	123.77	15.98	2.086	0.20(0.12)	0.59	63.8	4.00
44	116.17	17.68	1.969	0.20(0.12)	0.59	64.1	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 143.06 Tc(MIN.) = 10.34
EFFECTIVE AREA(ACRES) = 55.06 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 64.1
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 108.00 = 3830.00 FEET.

****
FLOW PROCESS FROM NODE 108.00 TO NODE 140.00 IS CODE = 31

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  42.18
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     143.06
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.93      0.20     0.900    75    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.47
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.972
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.84      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.88
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    8.62
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    2.11
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =  10.48
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.45
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    75    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   10.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.609
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    0.99
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       2.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.81
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.45   10.45    2.661  0.20( 0.18) 0.90       1.8      97.00
      2        2.37   10.81    2.609  0.20( 0.10) 0.50       1.0     111.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.79   10.45    2.661  0.20( 0.15) 0.75       2.8      97.00
      2        6.73   10.81    2.609  0.20( 0.15) 0.75       2.8     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.79    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       2.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.964
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    75    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    9.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.20
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.81
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.09

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.279
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.09
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.09

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
```

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    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    8.17
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.05
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  3.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.17
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.09    9.48    2.813  0.20( 0.11) 0.56       1.3     114.00
      2        4.00    8.17    3.064  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.91    8.17    3.064  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.48    2.813  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.91    Tc(MIN.) =     8.17
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.91
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.91    8.29    3.038  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.61    2.793  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.79   10.58    2.642  0.20( 0.15) 0.75       2.8      97.00
      2        6.73   10.94    2.592  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.07    8.29    3.038  0.20( 0.13) 0.63       4.8     116.00
      2       13.28    9.61    2.793  0.20( 0.13) 0.64       5.3     114.00
      3       13.16   10.58    2.642  0.20( 0.13) 0.64       5.6      97.00
      4       12.97   10.94    2.592  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =          5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       13.28  Tc(MIN.) =    9.605
  EFFECTIVE AREA(ACRES) =      5.30  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =         5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.28
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.89
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.30
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.28

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.59

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   11.16
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.68
```

```
 FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.16
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.55
 TOTAL STREAM AREA(ACRES) =       1.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.07    8.58    2.979  0.20( 0.13) 0.63       4.8     116.00
     1       13.28    9.89    2.746  0.20( 0.13) 0.64       5.3     114.00
     1       13.16   10.87    2.602  0.20( 0.13) 0.64       5.6      97.00
     1       12.97   11.23    2.553  0.20( 0.13) 0.64       5.6     111.00
     2        3.43   11.16    2.562  0.20( 0.10) 0.50       1.5     120.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.16    8.58    2.979  0.20( 0.12) 0.60       6.0     116.00
     2       16.55    9.89    2.746  0.20( 0.12) 0.61       6.7     114.00
     3       16.56   10.87    2.602  0.20( 0.12) 0.61       7.1      97.00
     4       16.44   11.16    2.562  0.20( 0.12) 0.61       7.1     120.00
     5       16.39   11.23    2.553  0.20( 0.12) 0.61       7.1     111.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.56    Tc(MIN.) =    10.87
 EFFECTIVE AREA(ACRES) =       7.06   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
 TOTAL AREA(ACRES) =        7.1
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
 FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.86
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.56
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.06
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.06
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.06
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.56

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    75    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   3.77
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.28

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.992
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20      0.500    75    8.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.54
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       4.86

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.89
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

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 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       2.16
 TOTAL STREAM AREA(ACRES) =       2.16
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.86

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.16    8.77    2.942  0.20( 0.12) 0.60       6.0     116.00
     1       16.55   10.08    2.716  0.20( 0.12) 0.61       6.7     114.00
     1       16.56   11.06    2.576  0.20( 0.12) 0.61       7.1      97.00
     1       16.44   11.35    2.537  0.20( 0.12) 0.61       7.1     120.00
     1       16.39   11.42    2.529  0.20( 0.12) 0.61       7.1     111.00
     2        1.28    5.68    3.772  0.20( 0.02) 0.10       0.4     118.00
     3        4.86   10.89    2.598  0.20( 0.10) 0.50       2.2     123.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.56    5.68    3.772  0.20( 0.11) 0.55       5.4     118.00
     2       21.61    8.77    2.942  0.20( 0.11) 0.56       8.1     116.00
     3       22.18   10.08    2.716  0.20( 0.11) 0.56       9.1     114.00
     4       22.29   10.89    2.598  0.20( 0.11) 0.57       9.5     123.00
     5       22.24   11.06    2.576  0.20( 0.11) 0.57       9.6      97.00
     6       22.04   11.35    2.537  0.20( 0.11) 0.57       9.7     120.00
     7       21.97   11.42    2.529  0.20( 0.11) 0.57       9.7     111.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      22.29    Tc(MIN.) =    10.89
 EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =        9.7
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.29
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.92
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.54
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.29
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.23
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
```

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==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.59      0.20     0.900    75    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      1.44

******************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   10.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.589
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.34
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.45
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
------------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.62

********************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.300
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.02

********************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    8.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.89      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       4.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.59
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.62   10.96    2.589  0.20( 0.12) 0.61       2.1     127.00
      2        4.17    8.39    3.018  0.20( 0.10) 0.50       1.6     129.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.32    8.39    3.018  0.20( 0.11) 0.56       3.2     129.00
      2        8.18   10.96    2.589  0.20( 0.11) 0.56       3.7     127.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.32    Tc(MIN.) =     8.39
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.45
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        8.32    8.45    3.006  0.20( 0.11) 0.56       3.2     129.00
    2        8.18   11.02    2.581  0.20( 0.11) 0.56       3.7     127.00
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       18.56    6.04    3.642  0.20( 0.11) 0.55       5.4     118.00
    2       21.61    9.12    2.876  0.20( 0.11) 0.56       8.1     116.00
    3       22.18   10.42    2.665  0.20( 0.11) 0.56       9.1     114.00
    4       22.29   11.23    2.553  0.20( 0.11) 0.57       9.5     123.00
    5       22.24   11.40    2.532  0.20( 0.11) 0.57       9.6      97.00
    6       22.04   11.69    2.495  0.20( 0.11) 0.57       9.7     120.00
    7       21.97   11.77    2.485  0.20( 0.11) 0.57       9.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       25.82    6.04    3.642  0.20( 0.11) 0.55       7.7     118.00
    2       29.26    8.45    3.006  0.20( 0.11) 0.56      10.7     129.00
    3       29.89    9.12    2.876  0.20( 0.11) 0.56      11.4     116.00
    4       30.39   10.42    2.665  0.20( 0.11) 0.56      12.6     114.00
    5       30.44   11.02    2.581  0.20( 0.11) 0.56      13.1     127.00
    6       30.38   11.23    2.553  0.20( 0.11) 0.57      13.2     123.00
    7       30.26   11.40    2.532  0.20( 0.11) 0.57      13.3      97.00
    8       29.93   11.69    2.495  0.20( 0.11) 0.57      13.3     120.00
    9       29.83   11.77    2.485  0.20( 0.11) 0.57      13.4     111.00
  TOTAL AREA(ACRES) =        13.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       30.44  Tc(MIN.) =   11.019
 EFFECTIVE AREA(ACRES) =     13.08  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       13.4
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      30.44
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.17
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.17
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
```

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  EFFECTIVE STREAM AREA(ACRES) =      13.08
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.44

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    75    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   3.52
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    6.20    3.589  0.20( 0.11) 0.55       7.7     118.00
      1       29.26    8.60    2.976  0.20( 0.11) 0.56      10.7     129.00
      1       29.89    9.27    2.850  0.20( 0.11) 0.56      11.4     116.00
      1       30.39   10.57    2.643  0.20( 0.11) 0.56      12.6     114.00
      1       30.44   11.17    2.562  0.20( 0.11) 0.56      13.1     127.00
      1       30.38   11.38    2.534  0.20( 0.11) 0.57      13.2     123.00
      1       30.26   11.55    2.513  0.20( 0.11) 0.57      13.3      97.00
      1       29.93   11.84    2.477  0.20( 0.11) 0.57      13.3     120.00
      1       29.83   11.92    2.467  0.20( 0.11) 0.57      13.4     111.00
      2        0.98    6.40    3.523  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.79    6.20    3.589  0.20( 0.11) 0.53       8.0     118.00
      2       27.09    6.40    3.523  0.20( 0.11) 0.53       8.2     138.00
      3       30.08    8.60    2.976  0.20( 0.11) 0.54      11.0     129.00
      4       30.68    9.27    2.850  0.20( 0.11) 0.55      11.7     116.00
      5       31.13   10.57    2.643  0.20( 0.11) 0.55      12.9     114.00
      6       31.15   11.17    2.562  0.20( 0.11) 0.55      13.4     127.00
      7       31.08   11.38    2.534  0.20( 0.11) 0.55      13.5     123.00
      8       30.95   11.55    2.513  0.20( 0.11) 0.55      13.6      97.00
      9       30.62   11.84    2.477  0.20( 0.11) 0.55      13.7     120.00
```

```
    10       30.51   11.92    2.467  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.15    Tc(MIN.) =    11.17
  EFFECTIVE AREA(ACRES) =      13.39   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.15
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.040
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"         D        0.46      0.20     0.500    75    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    9.70
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.777
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.17      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    2.80
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       3.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.91

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.08

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
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  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    8.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.041
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.28
  RAINFALL INTENSITY(INCH/HR) =   3.04
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.91    9.70    2.777  0.20( 0.11) 0.57       1.6     134.00
      2        3.79    8.28    3.041  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.45    8.28    3.041  0.20( 0.11) 0.54       2.8     136.00
      2        7.35    9.70    2.777  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.45    Tc(MIN.) =     8.28
  EFFECTIVE AREA(ACRES) =       2.82   AREA-AVERAGED Fm(INCH/HR) =  0.11
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 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =        3.1
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.95
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.45
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.36
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.45    8.36    3.025  0.20( 0.11) 0.54       2.8     136.00
     2        7.35    9.78    2.764  0.20( 0.11) 0.54       3.1     134.00
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       26.79    6.96    3.358  0.20( 0.11) 0.53       8.0     118.00
     2       27.09    7.17    3.303  0.20( 0.11) 0.53       8.2     138.00
     3       30.08    9.32    2.840  0.20( 0.11) 0.54      11.0     129.00
     4       30.68   10.00    2.729  0.20( 0.11) 0.55      11.7     116.00
     5       31.13   11.30    2.545  0.20( 0.11) 0.55      12.9     114.00
     6       31.15   11.89    2.471  0.20( 0.11) 0.55      13.4     127.00
     7       31.08   12.11    2.446  0.20( 0.11) 0.55      13.5     123.00
     8       30.95   12.27    2.427  0.20( 0.11) 0.55      13.6      97.00
     9       30.62   12.57    2.394  0.20( 0.11) 0.55      13.7     120.00
    10       30.51   12.65    2.385  0.20( 0.11) 0.55      13.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.70    6.96    3.358  0.20( 0.11) 0.53      10.3     118.00
     2       34.09    7.17    3.303  0.20( 0.11) 0.53      10.6     138.00
     3       36.19    8.36    3.025  0.20( 0.11) 0.54      12.6     136.00
     4       37.47    9.32    2.840  0.20( 0.11) 0.54      14.0     129.00
     5       37.84    9.78    2.764  0.20( 0.11) 0.54      14.5     134.00
     6       37.93   10.00    2.729  0.20( 0.11) 0.54      14.8     116.00
     7       37.87   11.30    2.545  0.20( 0.11) 0.55      16.0     114.00
     8       37.69   11.89    2.471  0.20( 0.11) 0.55      16.4     127.00
     9       37.55   12.11    2.446  0.20( 0.11) 0.55      16.6     123.00
    10       37.37   12.27    2.427  0.20( 0.11) 0.55      16.6      97.00
    11       36.94   12.57    2.394  0.20( 0.11) 0.55      16.7     120.00
    12       36.82   12.65    2.385  0.20( 0.11) 0.55      16.7     111.00
   TOTAL AREA(ACRES) =        16.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       37.93  Tc(MIN.) =    9.999
 EFFECTIVE AREA(ACRES) =     14.77  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       16.7
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.93
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    7.34    3.259  0.20( 0.11) 0.53      10.3     118.00
      2       34.09    7.54    3.209  0.20( 0.11) 0.53      10.6     138.00
      3       36.19    8.73    2.951  0.20( 0.11) 0.54      12.6     136.00
      4       37.47    9.69    2.778  0.20( 0.11) 0.54      14.0     129.00
      5       37.84   10.13    2.708  0.20( 0.11) 0.54      14.5     134.00
      6       37.93   10.36    2.675  0.20( 0.11) 0.54      14.8     116.00
      7       37.87   11.66    2.500  0.20( 0.11) 0.55      16.0     114.00
      8       37.69   12.25    2.429  0.20( 0.11) 0.55      16.4     127.00
      9       37.55   12.48    2.404  0.20( 0.11) 0.55      16.6     123.00
     10       37.37   12.64    2.386  0.20( 0.11) 0.55      16.6      97.00
     11       36.94   12.94    2.354  0.20( 0.11) 0.55      16.7     120.00
     12       36.82   13.02    2.346  0.20( 0.11) 0.55      16.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      114.99    5.62    3.796  0.20( 0.12) 0.60      29.0     104.00
      2      119.32    6.14    3.610  0.20( 0.12) 0.60      31.8      88.00
      3      120.15    6.24    3.577  0.20( 0.12) 0.60      32.3      63.00
      4      121.25    6.36    3.536  0.20( 0.12) 0.60      33.1      47.00
      5      121.90    6.44    3.512  0.20( 0.12) 0.60      33.5      45.00
      6      126.96    7.08    3.327  0.20( 0.12) 0.60      37.4      59.00
      7      127.26    7.12    3.316  0.20( 0.12) 0.60      37.7      95.00
      8      137.02    8.47    3.001  0.20( 0.12) 0.60      45.8      31.00
      9      138.34    8.66    2.963  0.20( 0.12) 0.60      47.0      85.00
     10      138.34    8.66    2.963  0.20( 0.12) 0.60      47.0      97.00
     11      139.19    8.84    2.929  0.20( 0.12) 0.60      48.0      38.00
     12      139.35    8.87    2.922  0.20( 0.12) 0.60      48.2      80.00
     13      140.31    9.13    2.875  0.20( 0.12) 0.60      49.4       6.00
     14      140.96    9.31    2.843  0.20( 0.12) 0.60      50.3      92.00
     15      141.22    9.39    2.830  0.20( 0.12) 0.60      50.7      35.00
     16      141.36    9.44    2.821  0.20( 0.12) 0.60      51.0      24.00
     17      141.57    9.51    2.808  0.20( 0.12) 0.60      51.4      46.00
     18      141.98    9.70    2.778  0.20( 0.12) 0.60      52.2      25.00
     19      142.52    9.96    2.735  0.20( 0.12) 0.60      53.4      64.00
     20      142.81   10.14    2.708  0.20( 0.12) 0.60      54.1      61.00
     21      142.93   10.24    2.692  0.20( 0.12) 0.60      54.6      32.00
     22      143.06   10.36    2.674  0.20( 0.12) 0.60      55.1      78.00
     23      143.01   10.97    2.588  0.20( 0.12) 0.60      57.3      76.00
```

24	143.00	11.04	2.579	0.20(0.12)	0.60	57.5	14.00
25	143.00	11.04	2.579	0.20(0.12)	0.60	57.5	82.00
26	142.95	11.11	2.569	0.20(0.12)	0.60	57.7	67.00
27	142.80	11.30	2.545	0.20(0.12)	0.59	58.3	53.00
28	142.71	11.37	2.535	0.20(0.12)	0.59	58.5	43.00
29	142.50	11.49	2.520	0.20(0.12)	0.59	58.9	33.00
30	142.44	11.52	2.517	0.20(0.12)	0.59	58.9	56.00
31	142.13	11.64	2.502	0.20(0.12)	0.59	59.2	41.00
32	141.76	11.76	2.487	0.20(0.12)	0.59	59.5	100.00
33	139.68	12.36	2.417	0.20(0.12)	0.59	60.6	13.00
34	137.99	12.83	2.366	0.20(0.12)	0.59	61.4	19.00
35	137.90	12.86	2.363	0.20(0.12)	0.59	61.5	29.00
36	137.53	12.95	2.353	0.20(0.12)	0.59	61.6	33.00
37	137.11	13.05	2.343	0.20(0.12)	0.59	61.7	73.00
38	134.00	13.76	2.273	0.20(0.12)	0.59	62.5	16.00
39	132.67	14.08	2.243	0.20(0.12)	0.59	62.8	17.00
40	130.35	14.63	2.194	0.20(0.12)	0.59	63.3	22.00
41	130.00	14.71	2.188	0.20(0.12)	0.59	63.4	10.00
42	128.70	14.98	2.165	0.20(0.12)	0.59	63.5	7.00
43	123.77	16.00	2.085	0.20(0.12)	0.59	63.8	4.00
44	116.17	17.70	1.967	0.20(0.12)	0.59	64.1	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 140.00 = 3885.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.22	5.62	3.796	0.20(0.12)	0.59	36.9	104.00
2	150.65	6.14	3.610	0.20(0.12)	0.59	40.4	88.00
3	151.69	6.24	3.577	0.20(0.12)	0.59	41.1	63.00
4	153.05	6.36	3.536	0.20(0.12)	0.59	42.0	47.00
5	153.86	6.44	3.512	0.20(0.12)	0.59	42.6	45.00
6	160.18	7.08	3.327	0.20(0.12)	0.59	47.3	59.00
7	160.55	7.12	3.316	0.20(0.12)	0.59	47.6	95.00
8	162.53	7.34	3.259	0.20(0.12)	0.59	49.3	118.00
9	164.38	7.54	3.209	0.20(0.12)	0.59	50.8	138.00
10	172.76	8.47	3.001	0.20(0.12)	0.59	58.0	31.00
11	174.41	8.66	2.963	0.20(0.12)	0.59	59.5	85.00
12	174.42	8.66	2.963	0.20(0.12)	0.59	59.5	97.00
13	174.84	8.73	2.951	0.20(0.12)	0.59	59.9	136.00
14	175.52	8.84	2.929	0.20(0.12)	0.59	60.7	38.00
15	175.73	8.87	2.922	0.20(0.12)	0.59	60.9	80.00
16	177.03	9.13	2.875	0.20(0.12)	0.59	62.6	6.00
17	177.92	9.31	2.843	0.20(0.12)	0.59	63.7	92.00
18	178.28	9.39	2.830	0.20(0.12)	0.59	64.3	35.00
19	178.49	9.44	2.821	0.20(0.12)	0.59	64.6	24.00
20	178.80	9.51	2.808	0.20(0.12)	0.59	65.1	46.00
21	179.45	9.69	2.778	0.20(0.12)	0.59	66.1	129.00
22	179.45	9.70	2.778	0.20(0.12)	0.59	66.2	25.00
23	180.21	9.96	2.735	0.20(0.12)	0.59	67.7	64.00
24	180.64	10.13	2.708	0.20(0.12)	0.59	68.7	134.00
25	180.64	10.14	2.708	0.20(0.12)	0.59	68.7	61.00
26	180.81	10.24	2.692	0.20(0.12)	0.59	69.2	32.00
27	180.99	10.36	2.675	0.20(0.12)	0.59	69.8	116.00
28	180.99	10.36	2.674	0.20(0.12)	0.59	69.8	78.00
29	180.91	10.97	2.588	0.20(0.12)	0.59	72.6	76.00
30	180.90	11.04	2.579	0.20(0.12)	0.59	72.9	14.00
31	180.90	11.04	2.579	0.20(0.12)	0.59	72.9	82.00
32	180.85	11.11	2.569	0.20(0.12)	0.58	73.2	67.00
33	180.69	11.30	2.545	0.20(0.12)	0.58	74.0	53.00
34	180.59	11.37	2.535	0.20(0.12)	0.58	74.3	43.00
35	180.38	11.49	2.520	0.20(0.12)	0.58	74.7	33.00
36	180.31	11.52	2.517	0.20(0.12)	0.58	74.8	56.00
37	180.00	11.64	2.502	0.20(0.12)	0.58	75.2	41.00
38	179.95	11.66	2.500	0.20(0.12)	0.58	75.2	114.00
39	179.60	11.76	2.487	0.20(0.12)	0.58	75.5	100.00
40	177.74	12.25	2.429	0.20(0.12)	0.58	76.8	127.00
41	177.30	12.36	2.417	0.20(0.12)	0.58	77.1	13.00
42	176.80	12.48	2.404	0.20(0.12)	0.58	77.4	123.00
43	176.03	12.64	2.386	0.20(0.12)	0.58	77.7	97.00
44	175.09	12.83	2.366	0.20(0.12)	0.58	78.1	19.00
45	174.96	12.86	2.363	0.20(0.12)	0.58	78.1	29.00

```
     46      174.53   12.94    2.354  0.20( 0.12) 0.58      78.3     120.00
     47      174.45   12.95    2.353  0.20( 0.12) 0.58      78.3      33.00
     48      174.06   13.02    2.346  0.20( 0.12) 0.58      78.4     111.00
     49      173.87   13.05    2.343  0.20( 0.12) 0.58      78.4      73.00
     50      169.62   13.76    2.273  0.20( 0.12) 0.58      79.2      16.00
     51      167.79   14.08    2.243  0.20( 0.12) 0.58      79.5      17.00
     52      164.66   14.63    2.194  0.20( 0.12) 0.58      80.0      22.00
     53      164.21   14.71    2.188  0.20( 0.12) 0.58      80.1      10.00
     54      162.53   14.98    2.165  0.20( 0.12) 0.58      80.2       7.00
     55      156.29   16.00    2.085  0.20( 0.12) 0.58      80.5       4.00
     56      146.75   17.70    1.967  0.20( 0.12) 0.58      80.8       1.00
    TOTAL AREA(ACRES) =        80.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      180.99  Tc(MIN.) =   10.360
  EFFECTIVE AREA(ACRES) =     69.83  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       80.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     180.99
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.53
  RAINFALL INTENSITY(INCH/HR) =   2.65
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =      69.83
  TOTAL STREAM AREA(ACRES) =      80.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     180.99

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.12      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.44

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    75    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.20
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      145.22    5.80    3.727  0.20( 0.12) 0.59      36.9     104.00
      1      150.65    6.31    3.551  0.20( 0.12) 0.59      40.4      88.00
      1      151.69    6.41    3.520  0.20( 0.12) 0.59      41.1      63.00
      1      153.05    6.54    3.480  0.20( 0.12) 0.59      42.0      47.00
      1      153.86    6.62    3.457  0.20( 0.12) 0.59      42.6      45.00
      1      160.18    7.25    3.280  0.20( 0.12) 0.59      47.3      59.00
      1      160.55    7.29    3.269  0.20( 0.12) 0.59      47.6      95.00
      1      162.53    7.51    3.215  0.20( 0.12) 0.59      49.3     118.00
      1      164.38    7.71    3.166  0.20( 0.12) 0.59      50.8     138.00
      1      172.76    8.64    2.967  0.20( 0.12) 0.59      58.0      31.00
      1      174.41    8.83    2.930  0.20( 0.12) 0.59      59.5      85.00
      1      174.42    8.83    2.930  0.20( 0.12) 0.59      59.5      97.00
      1      174.84    8.90    2.918  0.20( 0.12) 0.59      59.9     136.00
      1      175.52    9.01    2.897  0.20( 0.12) 0.59      60.7      38.00
```

1	175.73	9.05	2.890	0.20(	0.12)	0.59	60.9	80.00
1	177.03	9.30	2.844	0.20(	0.12)	0.59	62.6	6.00
1	177.92	9.48	2.814	0.20(	0.12)	0.59	63.7	92.00
1	178.28	9.56	2.800	0.20(	0.12)	0.59	64.3	35.00
1	178.49	9.61	2.792	0.20(	0.12)	0.59	64.6	24.00
1	178.80	9.69	2.779	0.20(	0.12)	0.59	65.1	46.00
1	179.45	9.87	2.750	0.20(	0.12)	0.59	66.1	129.00
1	179.45	9.87	2.750	0.20(	0.12)	0.59	66.2	25.00
1	180.21	10.13	2.709	0.20(	0.12)	0.59	67.7	64.00
1	180.64	10.31	2.682	0.20(	0.12)	0.59	68.7	134.00
1	180.64	10.31	2.682	0.20(	0.12)	0.59	68.7	61.00
1	180.81	10.41	2.667	0.20(	0.12)	0.59	69.2	32.00
1	180.99	10.53	2.650	0.20(	0.12)	0.59	69.8	116.00
1	180.99	10.53	2.649	0.20(	0.12)	0.59	69.8	78.00
1	180.91	11.14	2.565	0.20(	0.12)	0.59	72.6	76.00
1	180.90	11.21	2.556	0.20(	0.12)	0.59	72.9	14.00
1	180.90	11.21	2.556	0.20(	0.12)	0.59	72.9	82.00
1	180.85	11.29	2.546	0.20(	0.12)	0.58	73.2	67.00
1	180.69	11.47	2.523	0.20(	0.12)	0.58	74.0	53.00
1	180.59	11.54	2.514	0.20(	0.12)	0.58	74.3	43.00
1	180.38	11.66	2.499	0.20(	0.12)	0.58	74.7	33.00
1	180.31	11.69	2.495	0.20(	0.12)	0.58	74.8	56.00
1	180.00	11.81	2.481	0.20(	0.12)	0.58	75.2	41.00
1	179.95	11.83	2.479	0.20(	0.12)	0.58	75.2	114.00
1	179.60	11.93	2.466	0.20(	0.12)	0.58	75.5	100.00
1	177.74	12.42	2.410	0.20(	0.12)	0.58	76.8	127.00
1	177.30	12.53	2.398	0.20(	0.12)	0.58	77.1	13.00
1	176.80	12.65	2.385	0.20(	0.12)	0.58	77.4	123.00
1	176.03	12.81	2.367	0.20(	0.12)	0.58	77.7	97.00
1	175.09	13.00	2.348	0.20(	0.12)	0.58	78.1	19.00
1	174.96	13.03	2.345	0.20(	0.12)	0.58	78.1	29.00
1	174.53	13.11	2.337	0.20(	0.12)	0.58	78.3	120.00
1	174.45	13.12	2.335	0.20(	0.12)	0.58	78.3	33.00
1	174.06	13.19	2.328	0.20(	0.12)	0.58	78.4	111.00
1	173.87	13.23	2.325	0.20(	0.12)	0.58	78.4	73.00
1	169.62	13.94	2.256	0.20(	0.12)	0.58	79.2	16.00
1	167.79	14.26	2.227	0.20(	0.12)	0.58	79.5	17.00
1	164.66	14.81	2.179	0.20(	0.12)	0.58	80.0	22.00
1	164.21	14.88	2.173	0.20(	0.12)	0.58	80.1	10.00
1	162.53	15.15	2.150	0.20(	0.12)	0.58	80.2	7.00
1	156.29	16.18	2.072	0.20(	0.12)	0.58	80.5	4.00
1	146.75	17.88	1.956	0.20(	0.12)	0.58	80.8	1.00
2	0.44	5.00	4.060	0.20(	0.02)	0.10	0.1	140.00
3	3.80	8.20	3.058	0.20(	0.04)	0.20	1.4	141.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)		Ap	Ae (ACRES)	HEADWATER NODE
1	140.15	5.00	4.060	0.20(	0.12)	0.58	32.7	140.00
2	148.91	5.80	3.727	0.20(	0.12)	0.58	38.0	104.00
3	154.44	6.31	3.551	0.20(	0.12)	0.58	41.6	88.00
4	155.50	6.41	3.520	0.20(	0.12)	0.58	42.3	63.00
5	156.88	6.54	3.480	0.20(	0.12)	0.58	43.3	47.00
6	157.71	6.62	3.457	0.20(	0.12)	0.58	43.8	45.00
7	164.14	7.25	3.280	0.20(	0.12)	0.58	48.7	59.00
8	164.53	7.29	3.269	0.20(	0.12)	0.58	49.0	95.00
9	166.55	7.51	3.215	0.20(	0.12)	0.58	50.7	118.00
10	168.43	7.71	3.166	0.20(	0.12)	0.58	52.3	138.00
11	172.85	8.20	3.058	0.20(	0.12)	0.58	56.0	141.00
12	176.76	8.64	2.967	0.20(	0.12)	0.58	59.5	31.00
13	178.37	8.83	2.930	0.20(	0.12)	0.58	61.0	85.00
14	178.37	8.83	2.930	0.20(	0.12)	0.58	61.0	97.00
15	178.78	8.90	2.918	0.20(	0.12)	0.58	61.4	136.00
16	179.43	9.01	2.897	0.20(	0.12)	0.58	62.2	38.00
17	179.64	9.05	2.890	0.20(	0.12)	0.58	62.4	80.00
18	180.87	9.30	2.844	0.20(	0.12)	0.58	64.1	6.00
19	181.72	9.48	2.814	0.20(	0.12)	0.58	65.3	92.00
20	182.06	9.56	2.800	0.20(	0.12)	0.58	65.8	35.00

```
    21      182.26    9.61    2.792  0.20( 0.12) 0.58      66.1      24.00
    22      182.55    9.69    2.779  0.20( 0.12) 0.58      66.6      46.00
    23      183.15    9.87    2.750  0.20( 0.12) 0.58      67.7     129.00
    24      183.16    9.87    2.750  0.20( 0.12) 0.58      67.7      25.00
    25      183.86   10.13    2.709  0.20( 0.12) 0.58      69.2      64.00
    26      184.25   10.31    2.682  0.20( 0.12) 0.58      70.2     134.00
    27      184.26   10.31    2.682  0.20( 0.12) 0.58      70.2      61.00
    28      184.41   10.41    2.667  0.20( 0.12) 0.58      70.7      32.00
    29      184.56   10.53    2.650  0.20( 0.12) 0.58      71.3     116.00
    30      184.56   10.53    2.649  0.20( 0.12) 0.58      71.3      78.00
    31      184.37   11.14    2.565  0.20( 0.12) 0.58      74.1      76.00
    32      184.34   11.21    2.556  0.20( 0.12) 0.58      74.4      14.00
    33      184.34   11.21    2.556  0.20( 0.12) 0.58      74.4      82.00
    34      184.28   11.29    2.546  0.20( 0.12) 0.58      74.7      67.00
    35      184.09   11.47    2.523  0.20( 0.12) 0.58      75.5      53.00
    36      183.98   11.54    2.514  0.20( 0.12) 0.58      75.8      43.00
    37      183.75   11.66    2.499  0.20( 0.12) 0.58      76.2      33.00
    38      183.67   11.69    2.495  0.20( 0.12) 0.58      76.3      56.00
    39      183.34   11.81    2.481  0.20( 0.12) 0.58      76.7      41.00
    40      183.29   11.83    2.479  0.20( 0.12) 0.58      76.8     114.00
    41      182.92   11.93    2.466  0.20( 0.12) 0.58      77.1     100.00
    42      180.98   12.42    2.410  0.20( 0.12) 0.58      78.4     127.00
    43      180.53   12.53    2.398  0.20( 0.12) 0.58      78.6      13.00
    44      180.01   12.65    2.385  0.20( 0.12) 0.58      78.9     123.00
    45      179.22   12.81    2.367  0.20( 0.12) 0.58      79.2      97.00
    46      178.25   13.00    2.348  0.20( 0.12) 0.58      79.6      19.00
    47      178.12   13.03    2.345  0.20( 0.12) 0.58      79.7      29.00
    48      177.67   13.11    2.337  0.20( 0.12) 0.58      79.8     120.00
    49      177.59   13.12    2.335  0.20( 0.12) 0.58      79.8      33.00
    50      177.19   13.19    2.328  0.20( 0.12) 0.58      79.9     111.00
    51      176.99   13.23    2.325  0.20( 0.12) 0.58      80.0      73.00
    52      172.65   13.94    2.256  0.20( 0.12) 0.58      80.7      16.00
    53      170.78   14.26    2.227  0.20( 0.12) 0.58      81.0      17.00
    54      167.59   14.81    2.179  0.20( 0.12) 0.58      81.5      22.00
    55      167.13   14.88    2.173  0.20( 0.12) 0.58      81.6      10.00
    56      165.42   15.15    2.150  0.20( 0.12) 0.58      81.7       7.00
    57      159.07   16.18    2.072  0.20( 0.12) 0.58      82.1       4.00
    58      149.37   17.88    1.956  0.20( 0.12) 0.58      82.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     184.56    Tc(MIN.) =    10.53
  EFFECTIVE AREA(ACRES) =      71.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       82.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.65
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     184.56
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.475
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.96      0.20     0.600    75   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      2.03

********************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   13.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.82      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.67
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.49
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.40
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.461
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    75   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =   13.15
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   3.80
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.05
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   15.09
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.09
  RAINFALL INTENSITY(INCH/HR) =   2.16
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.05

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.915
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   2.92
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.05   15.09    2.156  0.20( 0.18) 0.90       0.5     147.00
      2        1.56    8.91    2.915  0.20( 0.12) 0.60       0.6      10.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.42    8.91    2.915  0.20( 0.14) 0.70       0.9      10.00
      2        2.18   15.09    2.156  0.20( 0.15) 0.74       1.2     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.42    Tc(MIN.) =     8.91
  EFFECTIVE AREA(ACRES) =       0.94   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.42    9.16    2.870  0.20( 0.14) 0.70       0.9      10.00
      2        2.18   15.34    2.136  0.20( 0.15) 0.74       1.2     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.49   13.40    2.307  0.20( 0.12) 0.60       2.8     144.00
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
      2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
      3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
    TOTAL AREA(ACRES) =         3.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        7.74  Tc(MIN.) =   13.403
  EFFECTIVE AREA(ACRES) =      3.87  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
```

```
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.08      0.20     0.500    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.22

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.799
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.69      0.20      0.500    75    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.677
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.11      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   2.68
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.22   10.03    2.725  0.20( 0.10) 0.50       0.1     147.00
      2        1.86   10.34    2.677  0.20( 0.09) 0.44       0.8     152.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.06   10.03    2.725  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.34    2.677  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.08    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.08
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.06   10.08    2.716  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.39    2.669  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
      2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
      3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.11    9.16    2.870  0.20( 0.12) 0.59       3.6      10.00
      2        9.32   10.08    2.716  0.20( 0.12) 0.59       3.9     147.00
      3        9.39   10.39    2.669  0.20( 0.12) 0.59       4.0     152.00
      4        9.53   13.40    2.307  0.20( 0.12) 0.60       4.8     144.00
      5        8.89   15.34    2.136  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        9.53  Tc(MIN.) =   13.403
  EFFECTIVE AREA(ACRES) =      4.75  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.85
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.85
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.75
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.53

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.051
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    75    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.11    9.61    2.792  0.20( 0.12) 0.59       3.6      10.00
      1        9.32   10.53    2.649  0.20( 0.12) 0.59       3.9     147.00
      1        9.39   10.84    2.606  0.20( 0.12) 0.59       4.0     152.00
      1        9.53   13.85    2.265  0.20( 0.12) 0.60       4.8     144.00
      1        8.89   15.79    2.100  0.20( 0.12) 0.61       4.8     147.00
      2        0.83    5.02    4.051  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.02    4.051  0.20( 0.11) 0.55       2.1     150.00
      2        9.68    9.61    2.792  0.20( 0.11) 0.57       3.8      10.00
      3        9.86   10.53    2.649  0.20( 0.11) 0.57       4.1     147.00
      4        9.92   10.84    2.606  0.20( 0.11) 0.57       4.2     152.00
      5        9.99   13.85    2.265  0.20( 0.12) 0.58       5.0     144.00
      6        9.32   15.79    2.100  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.99    Tc(MIN.) =    13.85
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.99
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   13.88
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.88
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.98
```

```
  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.99

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.30      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.06    4.033  0.20( 0.11) 0.55       2.1     150.00
      1        9.68    9.64    2.786  0.20( 0.11) 0.57       3.8      10.00
      1        9.86   10.57    2.644  0.20( 0.11) 0.57       4.1     147.00
      1        9.92   10.88    2.600  0.20( 0.11) 0.57       4.2     152.00
      1        9.99   13.88    2.261  0.20( 0.12) 0.58       5.0     144.00
      1        9.32   15.83    2.098  0.20( 0.12) 0.59       5.1     147.00
      2        1.02    5.58    3.814  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.06    4.033  0.20( 0.10) 0.51       2.4     150.00
      2        9.06    5.58    3.814  0.20( 0.10) 0.51       2.6      14.00
      3       10.42    9.64    2.786  0.20( 0.11) 0.54       4.1      10.00
      4       10.57   10.57    2.644  0.20( 0.11) 0.55       4.4     147.00
      5       10.61   10.88    2.600  0.20( 0.11) 0.55       4.5     152.00
      6       10.59   13.88    2.261  0.20( 0.11) 0.56       5.3     144.00
      7        9.87   15.83    2.098  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.61    Tc(MIN.) =    10.88
  EFFECTIVE AREA(ACRES) =       4.55   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
```

```
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.18
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.18
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       4.55
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.61

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.823
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    75    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    6.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.462
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.26      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.58
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.60
  RAINFALL INTENSITY(INCH/HR) =   3.46
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.37    3.895  0.20( 0.10) 0.51       2.4     150.00
      1        9.06    5.89    3.696  0.20( 0.10) 0.51       2.6      14.00
      1       10.42    9.95    2.737  0.20( 0.11) 0.54       4.1      10.00
      1       10.57   10.87    2.602  0.20( 0.11) 0.55       4.4     147.00
      1       10.61   11.18    2.560  0.20( 0.11) 0.55       4.5     152.00
      1       10.59   14.19    2.233  0.20( 0.11) 0.56       5.3     144.00
      1        9.87   16.14    2.075  0.20( 0.11) 0.57       5.4     147.00
      2        1.61    6.60    3.462  0.20( 0.03) 0.15       0.5     154.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.28    5.37    3.895  0.20( 0.09) 0.46       2.8     150.00
      2       10.59    5.89    3.696  0.20( 0.09) 0.46       3.1      14.00
      3       10.90    6.60    3.462  0.20( 0.09) 0.46       3.4     154.00
      4       11.69    9.95    2.737  0.20( 0.10) 0.50       4.7      10.00
      5       11.77   10.87    2.602  0.20( 0.10) 0.51       5.0     147.00
      6       11.79   11.18    2.560  0.20( 0.10) 0.51       5.1     152.00
      7       11.62   14.19    2.233  0.20( 0.10) 0.52       5.8     144.00
```

```
      8       10.83   16.14    2.075  0.20( 0.11) 0.53       5.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.79    Tc(MIN.) =    11.18
  EFFECTIVE AREA(ACRES) =       5.07   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"         D        1.24      0.20     0.600    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.10
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      3.10

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.10

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.70

********************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.10    9.01    2.897  0.20( 0.12) 0.60       1.2     159.00
      2        1.70    8.98    2.903  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    8.98    2.903  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.01    2.897  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.80    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.80
```

```
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.21
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    9.18    2.866  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.21    2.861  0.20( 0.12) 0.60       1.9     159.00
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.28    5.46    3.861  0.20( 0.09) 0.46       2.8     150.00
      2       10.59    5.97    3.667  0.20( 0.09) 0.46       3.1      14.00
      3       10.90    6.68    3.438  0.20( 0.09) 0.46       3.4     154.00
      4       11.69   10.03    2.725  0.20( 0.10) 0.50       4.7      10.00
      5       11.77   10.95    2.591  0.20( 0.10) 0.51       5.0     147.00
      6       11.79   11.26    2.549  0.20( 0.10) 0.51       5.1     152.00
      7       11.62   14.27    2.226  0.20( 0.10) 0.52       5.8     144.00
      8       10.83   16.22    2.069  0.20( 0.11) 0.53       5.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.46    3.861  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    5.97    3.667  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.68    3.438  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.18    2.866  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.21    2.861  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.03    2.725  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   10.95    2.591  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.26    2.549  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.27    2.226  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.22    2.069  0.20( 0.11) 0.55       7.8     147.00
    TOTAL AREA(ACRES) =         7.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       16.30  Tc(MIN.) =    9.211
  EFFECTIVE AREA(ACRES) =      6.28  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.30
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    9.45
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.921
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.28      0.20      0.600    75    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.23
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.23
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.23

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.109
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.28
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      3.28

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.23    9.41    2.825  0.20( 0.12) 0.60       1.3      17.00
      2        3.28    7.97    3.109  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.29    7.97    3.109  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.41    2.825  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.29    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.29
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    8.02    3.097  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.47    2.816  0.20( 0.11) 0.55       2.5      17.00
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.70    3.767  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    6.21    3.585  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.92    3.370  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.41    2.825  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.45    2.820  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.26    2.689  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   11.19    2.559  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.50    2.519  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.51    2.205  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.46    2.051  0.20( 0.11) 0.55       7.8     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.64    5.70    3.767  0.20( 0.10) 0.51       5.6     150.00
      2       20.29    6.21    3.585  0.20( 0.10) 0.51       6.1      14.00
      3       21.05    6.92    3.370  0.20( 0.10) 0.52       6.8     154.00
      4       21.93    8.02    3.097  0.20( 0.10) 0.52       7.7      16.00
      5       22.48    9.41    2.825  0.20( 0.11) 0.53       8.7     160.00
      6       22.49    9.45    2.820  0.20( 0.11) 0.53       8.8     159.00
      7       22.49    9.47    2.816  0.20( 0.11) 0.53       8.8      17.00
      8       22.15   10.26    2.689  0.20( 0.11) 0.54       9.1      10.00
      9       21.70   11.19    2.559  0.20( 0.11) 0.54       9.4     147.00
     10       21.56   11.50    2.519  0.20( 0.11) 0.54       9.5     152.00
     11       20.11   14.51    2.205  0.20( 0.11) 0.55      10.2     144.00
     12       18.68   16.46    2.051  0.20( 0.11) 0.55      10.3     147.00
    TOTAL AREA(ACRES) =        10.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.49  Tc(MIN.) =    9.445
  EFFECTIVE AREA(ACRES) =      8.76  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       8.76
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.49

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    7.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.166
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
```

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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.60   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.06

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.039
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20      0.100    75    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.12

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.64    5.76    3.745  0.20( 0.10) 0.51       5.6     150.00
      1       20.29    6.27    3.566  0.20( 0.10) 0.51       6.1      14.00
      1       21.05    6.98    3.353  0.20( 0.10) 0.52       6.8     154.00
      1       21.93    8.07    3.085  0.20( 0.10) 0.52       7.7      16.00
      1       22.48    9.47    2.816  0.20( 0.11) 0.53       8.7     160.00
      1       22.49    9.50    2.810  0.20( 0.11) 0.53       8.8     159.00
```

```
     1       22.49    9.52    2.807  0.20( 0.11) 0.53       8.8      17.00
     1       22.15   10.32    2.680  0.20( 0.11) 0.54       9.1      10.00
     1       21.70   11.24    2.552  0.20( 0.11) 0.54       9.4     147.00
     1       21.56   11.55    2.512  0.20( 0.11) 0.54       9.5     152.00
     1       20.11   14.56    2.200  0.20( 0.11) 0.55      10.2     144.00
     1       18.68   16.52    2.047  0.20( 0.11) 0.55      10.3     147.00
     2        2.06    7.72    3.166  0.20( 0.03) 0.16       0.7      19.00
     3        1.12    5.04    4.039  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    5.04    4.039  0.20( 0.09) 0.46       5.7     161.00
      2       22.50    5.76    3.745  0.20( 0.09) 0.46       6.4     150.00
      3       23.17    6.27    3.566  0.20( 0.09) 0.46       7.0      14.00
      4       23.96    6.98    3.353  0.20( 0.09) 0.47       7.7     154.00
      5       24.58    7.72    3.166  0.20( 0.09) 0.47       8.5      19.00
      6       24.79    8.07    3.085  0.20( 0.10) 0.48       8.8      16.00
      7       25.09    9.47    2.816  0.20( 0.10) 0.49       9.8     160.00
      8       25.09    9.50    2.810  0.20( 0.10) 0.49       9.8     159.00
      9       25.09    9.52    2.807  0.20( 0.10) 0.49       9.8      17.00
     10       24.63   10.32    2.680  0.20( 0.10) 0.49      10.1      10.00
     11       24.06   11.24    2.552  0.20( 0.10) 0.50      10.4     147.00
     12       23.89   11.55    2.512  0.20( 0.10) 0.50      10.5     152.00
     13       22.14   14.56    2.200  0.20( 0.10) 0.51      11.3     144.00
     14       20.57   16.52    2.047  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.09    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       9.80   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.09
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.089
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.85      0.20      0.600    75    8.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.066
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.99      0.20      0.600    75    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.27    8.05    3.089  0.20( 0.12) 0.60       0.9     168.00
      2        2.62    8.16    3.066  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.88    8.05    3.089  0.20( 0.12) 0.60       1.8     168.00
      2        4.88    8.16    3.066  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.88    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.88
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.88    8.21    3.056  0.20( 0.12) 0.60       1.8     168.00
      2        4.88    8.32    3.033  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    5.11    4.008  0.20( 0.09) 0.46       5.7     161.00
      2       22.50    5.82    3.720  0.20( 0.09) 0.46       6.4     150.00
      3       23.17    6.34    3.544  0.20( 0.09) 0.46       7.0      14.00
      4       23.96    7.04    3.335  0.20( 0.09) 0.47       7.7     154.00
      5       24.58    7.78    3.151  0.20( 0.09) 0.47       8.5      19.00
      6       24.79    8.14    3.070  0.20( 0.10) 0.48       8.8      16.00
      7       25.09    9.53    2.805  0.20( 0.10) 0.49       9.8     160.00
      8       25.09    9.57    2.799  0.20( 0.10) 0.49       9.8     159.00
      9       25.09    9.59    2.796  0.20( 0.10) 0.49       9.8      17.00
     10       24.63   10.39    2.670  0.20( 0.10) 0.49      10.1      10.00
     11       24.06   11.31    2.543  0.20( 0.10) 0.50      10.4     147.00
     12       23.89   11.62    2.504  0.20( 0.10) 0.50      10.5     152.00
     13       22.14   14.63    2.194  0.20( 0.10) 0.51      11.3     144.00
     14       20.57   16.59    2.042  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.47    5.11    4.008  0.20( 0.10) 0.48       6.8     161.00
      2       26.75    5.82    3.720  0.20( 0.10) 0.49       7.7     150.00
      3       27.56    6.34    3.544  0.20( 0.10) 0.49       8.4      14.00
      4       28.54    7.04    3.335  0.20( 0.10) 0.49       9.3     154.00
      5       29.36    7.78    3.151  0.20( 0.10) 0.50      10.2      19.00
```

```
      6       29.66    8.14    3.070  0.20( 0.10) 0.50      10.6      16.00
      7       29.69    8.21    3.056  0.20( 0.10) 0.50      10.6     168.00
      8       29.71    8.32    3.033  0.20( 0.10) 0.50      10.7     169.00
      9       29.59    9.53    2.805  0.20( 0.10) 0.51      11.6     160.00
     10       29.58    9.57    2.799  0.20( 0.10) 0.51      11.6     159.00
     11       29.57    9.59    2.796  0.20( 0.10) 0.51      11.7      17.00
     12       28.90   10.39    2.670  0.20( 0.10) 0.51      12.0      10.00
     13       28.12   11.31    2.543  0.20( 0.10) 0.51      12.3     147.00
     14       27.88   11.62    2.504  0.20( 0.10) 0.51      12.4     152.00
     15       25.61   14.63    2.194  0.20( 0.10) 0.52      13.1     144.00
     16       23.79   16.59    2.042  0.20( 0.10) 0.52      13.2     147.00
    TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       29.71  Tc(MIN.) =    8.316
  EFFECTIVE AREA(ACRES) =     10.74  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.89
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.71
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.55
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.55
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.74
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.71

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL               D        0.28      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.47    5.35    3.906  0.20( 0.10) 0.48       6.8     161.00
      1       26.75    6.06    3.638  0.20( 0.10) 0.49       7.7     150.00
      1       27.56    6.57    3.472  0.20( 0.10) 0.49       8.4      14.00
      1       28.54    7.28    3.275  0.20( 0.10) 0.49       9.3     154.00
      1       29.36    8.01    3.099  0.20( 0.10) 0.50      10.2      19.00
      1       29.66    8.37    3.022  0.20( 0.10) 0.50      10.6      16.00
      1       29.69    8.44    3.008  0.20( 0.10) 0.50      10.6     168.00
      1       29.71    8.55    2.986  0.20( 0.10) 0.50      10.7     169.00
      1       29.59    9.76    2.767  0.20( 0.10) 0.51      11.6     160.00
      1       29.58    9.80    2.761  0.20( 0.10) 0.51      11.6     159.00
      1       29.57    9.82    2.758  0.20( 0.10) 0.51      11.7      17.00
      1       28.90   10.62    2.637  0.20( 0.10) 0.51      12.0      10.00
      1       28.12   11.54    2.514  0.20( 0.10) 0.51      12.3     147.00
      1       27.88   11.85    2.476  0.20( 0.10) 0.51      12.4     152.00
      1       25.61   14.87    2.174  0.20( 0.10) 0.52      13.1     144.00
      1       23.79   16.82    2.025  0.20( 0.10) 0.52      13.2     147.00
      2        1.02    5.00    4.060  0.20( 0.02) 0.10       0.3     170.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.79    5.00    4.060  0.20( 0.09) 0.47       6.7     170.00
      2       26.45    5.35    3.906  0.20( 0.09) 0.47       7.1     161.00
      3       27.66    6.06    3.638  0.20( 0.09) 0.47       8.0     150.00
      4       28.43    6.57    3.472  0.20( 0.10) 0.48       8.7      14.00
      5       29.37    7.28    3.275  0.20( 0.10) 0.48       9.6     154.00
      6       30.13    8.01    3.099  0.20( 0.10) 0.48      10.5      19.00
      7       30.41    8.37    3.022  0.20( 0.10) 0.49      10.9      16.00
      8       30.44    8.44    3.008  0.20( 0.10) 0.49      10.9     168.00
      9       30.45    8.55    2.986  0.20( 0.10) 0.49      11.0     169.00
     10       30.28    9.76    2.767  0.20( 0.10) 0.50      11.9     160.00
     11       30.27    9.80    2.761  0.20( 0.10) 0.50      11.9     159.00
     12       30.26    9.82    2.758  0.20( 0.10) 0.50      11.9      17.00
     13       29.56   10.62    2.637  0.20( 0.10) 0.50      12.2      10.00
     14       28.75   11.54    2.514  0.20( 0.10) 0.50      12.5     147.00
     15       28.50   11.85    2.476  0.20( 0.10) 0.50      12.6     152.00
     16       26.15   14.87    2.174  0.20( 0.10) 0.51      13.4     144.00
     17       24.30   16.82    2.025  0.20( 0.10) 0.51      13.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.45    Tc(MIN.) =     8.55
```

```
  EFFECTIVE AREA(ACRES) =      11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.45
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.677
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.81      0.20     0.200    75    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.65

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   3.68
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.813
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.65    5.94    3.677  0.20( 0.04) 0.20       0.8     173.00
      2        1.74    5.58    3.813  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.32    5.58    3.813  0.20( 0.03) 0.16       1.3     174.00
      2        4.33    5.94    3.677  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.33    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.10
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
```

```
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.32    5.74    3.752  0.20( 0.03) 0.16       1.3     174.00
      2        4.33    6.10    3.621  0.20( 0.03) 0.16       1.3     173.00
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.79    5.07    4.026  0.20( 0.09) 0.47       6.7     170.00
      2       26.45    5.42    3.877  0.20( 0.09) 0.47       7.1     161.00
      3       27.66    6.13    3.614  0.20( 0.09) 0.47       8.0     150.00
      4       28.43    6.64    3.451  0.20( 0.10) 0.48       8.7      14.00
      5       29.37    7.35    3.257  0.20( 0.10) 0.48       9.6     154.00
      6       30.13    8.08    3.083  0.20( 0.10) 0.48      10.5      19.00
      7       30.41    8.44    3.008  0.20( 0.10) 0.49      10.9      16.00
      8       30.44    8.51    2.994  0.20( 0.10) 0.49      10.9     168.00
      9       30.45    8.61    2.972  0.20( 0.10) 0.49      11.0     169.00
     10       30.28    9.83    2.755  0.20( 0.10) 0.50      11.9     160.00
     11       30.27    9.87    2.750  0.20( 0.10) 0.50      11.9     159.00
     12       30.26    9.89    2.747  0.20( 0.10) 0.50      11.9      17.00
     13       29.56   10.69    2.627  0.20( 0.10) 0.50      12.2      10.00
     14       28.75   11.61    2.505  0.20( 0.10) 0.50      12.5     147.00
     15       28.50   11.92    2.468  0.20( 0.10) 0.50      12.6     152.00
     16       26.15   14.94    2.168  0.20( 0.10) 0.51      13.4     144.00
     17       24.30   16.90    2.020  0.20( 0.10) 0.51      13.4     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.90    5.07    4.026  0.20( 0.08) 0.42       7.8     170.00
      2       30.67    5.42    3.877  0.20( 0.08) 0.42       8.3     161.00
      3       31.32    5.74    3.752  0.20( 0.09) 0.43       8.8     174.00
      4       31.95    6.10    3.621  0.20( 0.09) 0.43       9.3     173.00
      5       31.98    6.13    3.614  0.20( 0.09) 0.43       9.3     150.00
      6       32.56    6.64    3.451  0.20( 0.09) 0.43      10.0      14.00
      7       33.26    7.35    3.257  0.20( 0.09) 0.44      10.9     154.00
      8       33.81    8.08    3.083  0.20( 0.09) 0.45      11.8      19.00
      9       34.00    8.44    3.008  0.20( 0.09) 0.45      12.2      16.00
     10       34.01    8.51    2.994  0.20( 0.09) 0.45      12.2     168.00
     11       34.00    8.61    2.972  0.20( 0.09) 0.45      12.3     169.00
     12       33.57    9.83    2.755  0.20( 0.09) 0.46      13.2     160.00
     13       33.55    9.87    2.750  0.20( 0.09) 0.46      13.2     159.00
     14       33.53    9.89    2.747  0.20( 0.09) 0.46      13.3      17.00
     15       32.69   10.69    2.627  0.20( 0.09) 0.47      13.6      10.00
     16       31.73   11.61    2.505  0.20( 0.09) 0.47      13.9     147.00
     17       31.44   11.92    2.468  0.20( 0.09) 0.47      14.0     152.00
     18       28.73   14.94    2.168  0.20( 0.10) 0.48      14.7     144.00
     19       26.69   16.90    2.020  0.20( 0.10) 0.48      14.8     147.00
    TOTAL AREA(ACRES) =        14.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.01  Tc(MIN.) =    8.507
  EFFECTIVE AREA(ACRES) =     12.25  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       14.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.01
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    8.90
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.90
  RAINFALL INTENSITY(INCH/HR) =   2.92
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      12.25
  TOTAL STREAM AREA(ACRES) =      14.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.01

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.764
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20      0.100    75    5.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.70
  RAINFALL INTENSITY(INCH/HR) =   3.76
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.812
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

********************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    7.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.217
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.32
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.87
  FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.51
```

RAINFALL INTENSITY(INCH/HR) = 3.22
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.80
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.29

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	29.90	5.47	3.857	0.20(0.08)	0.42	7.8	170.00
1	30.67	5.81	3.724	0.20(0.08)	0.42	8.3	161.00
1	31.32	6.13	3.612	0.20(0.09)	0.43	8.8	174.00
1	31.95	6.50	3.494	0.20(0.09)	0.43	9.3	173.00
1	31.98	6.52	3.487	0.20(0.09)	0.43	9.3	150.00
1	32.56	7.03	3.340	0.20(0.09)	0.43	10.0	14.00
1	33.26	7.73	3.162	0.20(0.09)	0.44	10.9	154.00
1	33.81	8.47	3.001	0.20(0.09)	0.45	11.8	19.00
1	34.00	8.83	2.931	0.20(0.09)	0.45	12.2	16.00
1	34.01	8.90	2.918	0.20(0.09)	0.45	12.2	168.00
1	34.00	9.00	2.898	0.20(0.09)	0.45	12.3	169.00
1	33.57	10.22	2.695	0.20(0.09)	0.46	13.2	160.00
1	33.55	10.25	2.690	0.20(0.09)	0.46	13.2	159.00
1	33.53	10.28	2.687	0.20(0.09)	0.46	13.3	17.00
1	32.69	11.08	2.574	0.20(0.09)	0.47	13.6	10.00
1	31.73	12.00	2.458	0.20(0.09)	0.47	13.9	147.00
1	31.44	12.31	2.422	0.20(0.09)	0.47	14.0	152.00
1	28.73	15.34	2.136	0.20(0.10)	0.48	14.7	144.00
1	26.69	17.30	1.993	0.20(0.10)	0.48	14.8	147.00
2	1.45	5.70	3.764	0.20(0.02)	0.10	0.4	175.00
3	2.29	7.51	3.217	0.20(0.04)	0.20	0.8	167.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.32	5.47	3.857	0.20(0.08)	0.39	8.8	170.00
2	33.91	5.70	3.764	0.20(0.08)	0.39	9.2	175.00
3	34.16	5.81	3.724	0.20(0.08)	0.39	9.3	161.00
4	34.81	6.13	3.612	0.20(0.08)	0.40	9.9	174.00
5	35.45	6.50	3.494	0.20(0.08)	0.40	10.4	173.00
6	35.48	6.52	3.487	0.20(0.08)	0.40	10.5	150.00
7	36.07	7.03	3.340	0.20(0.08)	0.41	11.2	14.00
8	36.55	7.51	3.217	0.20(0.08)	0.41	11.9	167.00
9	36.72	7.73	3.162	0.20(0.08)	0.41	12.1	154.00
10	37.10	8.47	3.001	0.20(0.08)	0.42	13.0	19.00
11	37.21	8.83	2.931	0.20(0.09)	0.43	13.4	16.00
12	37.21	8.90	2.918	0.20(0.09)	0.43	13.5	168.00
13	37.17	9.00	2.898	0.20(0.09)	0.43	13.6	169.00
14	36.51	10.22	2.695	0.20(0.09)	0.44	14.5	160.00
15	36.49	10.25	2.690	0.20(0.09)	0.44	14.5	159.00
16	36.47	10.28	2.687	0.20(0.09)	0.44	14.5	17.00
17	35.51	11.08	2.574	0.20(0.09)	0.44	14.8	10.00
18	34.42	12.00	2.458	0.20(0.09)	0.45	15.1	147.00
19	34.08	12.31	2.422	0.20(0.09)	0.45	15.2	152.00
20	31.06	15.34	2.136	0.20(0.09)	0.46	15.9	144.00
21	28.86	17.30	1.993	0.20(0.09)	0.46	16.0	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 37.21 Tc(MIN.) = 8.83
EFFECTIVE AREA(ACRES) = 13.42 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 16.0
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 178.00 = 2300.00 FEET.

****
FLOW PROCESS FROM NODE 178.00 TO NODE 193.00 IS CODE = 31

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.40  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.38
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.21
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    75    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    9.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       1.17
  TOTAL STREAM AREA(ACRES) =       1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.84

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.13
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.06
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.84    9.50    2.810  0.20( 0.11) 0.54       1.2     179.00
      2        5.01   10.06    2.720  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.74    9.50    2.810  0.20( 0.12) 0.58       3.2     179.00
      2        7.76   10.06    2.720  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.76    Tc(MIN.) =    10.06
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.76
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.20
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.74    9.65    2.785  0.20( 0.12) 0.58       3.2     179.00
     2        7.76   10.20    2.698  0.20( 0.12) 0.58       3.3     181.00
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.32    5.53    3.830  0.20( 0.08) 0.39       8.8     170.00
     2       33.91    5.77    3.739  0.20( 0.08) 0.39       9.2     175.00
     3       34.16    5.88    3.700  0.20( 0.08) 0.39       9.3     161.00
     4       34.81    6.20    3.590  0.20( 0.08) 0.40       9.9     174.00
     5       35.45    6.56    3.474  0.20( 0.08) 0.40      10.4     173.00
     6       35.48    6.58    3.467  0.20( 0.08) 0.40      10.5     150.00
     7       36.07    7.09    3.322  0.20( 0.08) 0.41      11.2      14.00
     8       36.55    7.57    3.201  0.20( 0.08) 0.41      11.9     167.00
     9       36.72    7.80    3.146  0.20( 0.08) 0.41      12.1     154.00
    10       37.10    8.54    2.988  0.20( 0.08) 0.42      13.0      19.00
    11       37.21    8.89    2.919  0.20( 0.09) 0.43      13.4      16.00
    12       37.21    8.96    2.906  0.20( 0.09) 0.43      13.5     168.00
    13       37.17    9.07    2.886  0.20( 0.09) 0.43      13.6     169.00
    14       36.51   10.29    2.685  0.20( 0.09) 0.44      14.5     160.00
    15       36.49   10.32    2.680  0.20( 0.09) 0.44      14.5     159.00
    16       36.47   10.34    2.677  0.20( 0.09) 0.44      14.5      17.00
    17       35.51   11.14    2.565  0.20( 0.09) 0.44      14.8      10.00
    18       34.42   12.07    2.450  0.20( 0.09) 0.45      15.1     147.00
    19       34.08   12.38    2.415  0.20( 0.09) 0.45      15.2     152.00
    20       31.06   15.41    2.130  0.20( 0.09) 0.46      15.9     144.00
    21       28.86   17.37    1.989  0.20( 0.09) 0.46      16.0     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
     2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
     3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
     4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
     5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
     6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
     7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
     8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
     9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
    10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
    11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
    12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
    13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
    14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
    15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
    16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
```

```
     23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
    TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       44.72  Tc(MIN.) =    9.069
  EFFECTIVE AREA(ACRES) =     16.57  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    75    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   11.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.566
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.39
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.29
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.845
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.52
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
 STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.64
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
 STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   10.21
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.697
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    1.71
 EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.14

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
 FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
 LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.21
 RAINFALL INTENSITY(INCH/HR) =   2.70
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       1.35
 TOTAL STREAM AREA(ACRES) =       1.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.39   11.29    2.546  0.20( 0.12) 0.60       2.4     184.00
     2        3.14   10.21    2.697  0.20( 0.11) 0.55       1.4     187.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
```

```
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.33   10.21    2.697  0.20( 0.12) 0.58       3.6     187.00
      2        8.35   11.29    2.546  0.20( 0.12) 0.58       3.8     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.35    Tc(MIN.) =    11.29
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.35
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.78
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.35

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.337
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```

```
==============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    8.02
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.097
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.06
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  3.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.02
  RAINFALL INTENSITY(INCH/HR) =   3.10
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    7.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.18
  EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.46
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.00
  TOTAL STREAM AREA(ACRES) =       1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.33   10.70    2.625  0.20( 0.12) 0.58       3.6     187.00
```

```
     1        8.35   11.78    2.485  0.20( 0.12) 0.58       3.8     184.00
     2        3.51    8.02    3.097  0.20( 0.12) 0.60       1.3     190.00
     3        2.75    7.68    3.175  0.20( 0.12) 0.60       1.0     191.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.68    3.175  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.02    3.097  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.70    2.625  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.78    2.485  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.60    Tc(MIN.) =     8.02
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.73    3.162  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.07    3.085  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.76    2.617  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.83    2.478  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
      2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
      3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
      4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
      5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
      6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
      7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
      8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
      9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
     10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
     11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
     12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
     13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
     14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
     15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
     16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
```

```
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
    23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.26    5.53    3.830  0.20( 0.09) 0.47      14.0     170.00
      2       52.17    5.77    3.739  0.20( 0.09) 0.47      14.7     175.00
      3       52.55    5.88    3.700  0.20( 0.09) 0.47      15.0     161.00
      4       53.60    6.20    3.590  0.20( 0.09) 0.47      15.8     174.00
      5       54.68    6.56    3.474  0.20( 0.09) 0.47      16.7     173.00
      6       54.73    6.58    3.467  0.20( 0.09) 0.47      16.7     150.00
      7       55.92    7.09    3.322  0.20( 0.09) 0.47      18.0      14.00
      8       56.94    7.57    3.201  0.20( 0.10) 0.48      19.1     167.00
      9       57.23    7.73    3.162  0.20( 0.10) 0.48      19.4     191.10
     10       57.33    7.80    3.146  0.20( 0.10) 0.48      19.6     154.00
     11       57.66    8.07    3.085  0.20( 0.10) 0.48      20.1     190.00
     12       58.06    8.54    2.988  0.20( 0.10) 0.48      21.0      19.00
     13       58.28    8.89    2.919  0.20( 0.10) 0.49      21.6      16.00
     14       58.30    8.96    2.906  0.20( 0.10) 0.49      21.7     168.00
     15       58.30    9.07    2.886  0.20( 0.10) 0.49      21.9     169.00
     16       58.16    9.65    2.785  0.20( 0.10) 0.49      22.7     179.00
     17       57.86   10.20    2.698  0.20( 0.10) 0.49      23.4     181.00
     18       57.78   10.29    2.685  0.20( 0.10) 0.50      23.5     160.00
     19       57.74   10.32    2.680  0.20( 0.10) 0.50      23.5     159.00
     20       57.71   10.34    2.677  0.20( 0.10) 0.50      23.5      17.00
     21       57.02   10.76    2.617  0.20( 0.10) 0.50      23.8     187.00
     22       56.31   11.14    2.565  0.20( 0.10) 0.50      24.1      10.00
     23       55.07   11.83    2.478  0.20( 0.10) 0.50      24.4     184.00
     24       54.55   12.07    2.450  0.20( 0.10) 0.50      24.5     147.00
     25       53.90   12.38    2.415  0.20( 0.10) 0.50      24.6     152.00
     26       48.43   15.41    2.130  0.20( 0.10) 0.50      25.3     144.00
     27       45.01   17.37    1.989  0.20( 0.10) 0.51      25.4     147.00
    TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.30  Tc(MIN.) =    8.961
  EFFECTIVE AREA(ACRES) =     21.72  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.12
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.06
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.06
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      21.72
  TOTAL STREAM AREA(ACRES) =      25.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.30

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.22
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      4.22

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.22
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 5.31
RAINFALL INTENSITY(INCH/HR) = 3.92
AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.90
EFFECTIVE STREAM AREA(ACRES) = 1.21
TOTAL STREAM AREA(ACRES) = 1.21
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.26	5.63	3.792	0.20(0.09)	0.47	14.0	170.00
1	52.17	5.87	3.703	0.20(0.09)	0.47	14.7	175.00
1	52.55	5.98	3.665	0.20(0.09)	0.47	15.0	161.00
1	53.60	6.29	3.558	0.20(0.09)	0.47	15.8	174.00
1	54.68	6.66	3.445	0.20(0.09)	0.47	16.7	173.00
1	54.73	6.68	3.439	0.20(0.09)	0.47	16.7	150.00
1	55.92	7.19	3.296	0.20(0.09)	0.47	18.0	14.00
1	56.94	7.67	3.178	0.20(0.10)	0.48	19.1	167.00
1	57.23	7.83	3.139	0.20(0.10)	0.48	19.4	191.10
1	57.33	7.90	3.124	0.20(0.10)	0.48	19.6	154.00
1	57.66	8.17	3.064	0.20(0.10)	0.48	20.1	190.00
1	58.06	8.63	2.969	0.20(0.10)	0.48	21.0	19.00
1	58.28	8.99	2.901	0.20(0.10)	0.49	21.6	16.00
1	58.30	9.06	2.888	0.20(0.10)	0.49	21.7	168.00
1	58.30	9.16	2.869	0.20(0.10)	0.49	21.9	169.00
1	58.16	9.74	2.770	0.20(0.10)	0.49	22.7	179.00
1	57.86	10.30	2.683	0.20(0.10)	0.49	23.4	181.00
1	57.78	10.38	2.671	0.20(0.10)	0.50	23.5	160.00
1	57.74	10.42	2.666	0.20(0.10)	0.50	23.5	159.00
1	57.71	10.44	2.663	0.20(0.10)	0.50	23.5	17.00
1	57.02	10.85	2.604	0.20(0.10)	0.50	23.8	187.00
1	56.31	11.24	2.552	0.20(0.10)	0.50	24.1	10.00
1	55.07	11.93	2.467	0.20(0.10)	0.50	24.4	184.00
1	54.55	12.17	2.439	0.20(0.10)	0.50	24.5	147.00
1	53.90	12.48	2.404	0.20(0.10)	0.50	24.6	152.00
1	48.43	15.50	2.123	0.20(0.10)	0.50	25.3	144.00
1	45.01	17.47	1.982	0.20(0.10)	0.51	25.4	147.00
2	4.22	5.31	3.923	0.20(0.18)	0.90	1.2	195.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.25	5.31	3.923	0.20(0.10)	0.50	14.4	195.00
2	55.34	5.63	3.792	0.20(0.10)	0.50	15.3	170.00
3	56.14	5.87	3.703	0.20(0.10)	0.50	15.9	175.00
4	56.48	5.98	3.665	0.20(0.10)	0.50	16.2	161.00
5	57.41	6.29	3.558	0.20(0.10)	0.50	17.0	174.00
6	58.36	6.66	3.445	0.20(0.10)	0.50	17.9	173.00
7	58.41	6.68	3.439	0.20(0.10)	0.50	17.9	150.00
8	59.44	7.19	3.296	0.20(0.10)	0.50	19.2	14.00
9	60.32	7.67	3.178	0.20(0.10)	0.50	20.3	167.00
10	60.57	7.83	3.139	0.20(0.10)	0.50	20.6	191.10
11	60.65	7.90	3.124	0.20(0.10)	0.50	20.8	154.00
12	60.92	8.17	3.064	0.20(0.10)	0.50	21.3	190.00
13	61.20	8.63	2.969	0.20(0.10)	0.51	22.2	19.00
14	61.35	8.99	2.901	0.20(0.10)	0.51	22.8	16.00
15	61.35	9.06	2.888	0.20(0.10)	0.51	22.9	168.00
16	61.33	9.16	2.869	0.20(0.10)	0.51	23.1	169.00
17	61.08	9.74	2.770	0.20(0.10)	0.51	23.9	179.00
18	60.69	10.30	2.683	0.20(0.10)	0.51	24.6	181.00
19	60.59	10.38	2.671	0.20(0.10)	0.51	24.7	160.00
20	60.55	10.42	2.666	0.20(0.10)	0.52	24.7	159.00
21	60.51	10.44	2.663	0.20(0.10)	0.52	24.7	17.00
22	59.76	10.85	2.604	0.20(0.10)	0.52	25.0	187.00
23	58.98	11.24	2.552	0.20(0.10)	0.52	25.3	10.00

```
     24       57.65   11.93    2.467  0.20( 0.10) 0.52      25.6     184.00
     25       57.10   12.17    2.439  0.20( 0.10) 0.52      25.7     147.00
     26       56.41   12.48    2.404  0.20( 0.10) 0.52      25.8     152.00
     27       50.62   15.50    2.123  0.20( 0.10) 0.52      26.6     144.00
     28       47.04   17.47    1.982  0.20( 0.10) 0.52      26.6     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.35    Tc(MIN.) =     9.06
  EFFECTIVE AREA(ACRES) =      22.93   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       26.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.35
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.39
  RAINFALL INTENSITY(INCH/HR) =   2.83
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.93
  TOTAL STREAM AREA(ACRES) =      26.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.35

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.912
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    75    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 5.33
RAINFALL INTENSITY(INCH/HR) = 3.91
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 0.33
TOTAL STREAM AREA(ACRES) = 0.33
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.16

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.25	5.66	3.782	0.20(0.10)	0.50	14.4	195.00
1	55.34	5.98	3.663	0.20(0.10)	0.50	15.3	170.00
1	56.14	6.21	3.586	0.20(0.10)	0.50	15.9	175.00
1	56.48	6.32	3.550	0.20(0.10)	0.50	16.2	161.00
1	57.41	6.63	3.453	0.20(0.10)	0.50	17.0	174.00
1	58.36	7.00	3.349	0.20(0.10)	0.50	17.9	173.00
1	58.41	7.02	3.343	0.20(0.10)	0.50	17.9	150.00
1	59.44	7.53	3.211	0.20(0.10)	0.50	19.2	14.00
1	60.32	8.00	3.100	0.20(0.10)	0.50	20.3	167.00
1	60.57	8.17	3.065	0.20(0.10)	0.50	20.6	191.10
1	60.65	8.23	3.051	0.20(0.10)	0.50	20.8	154.00
1	60.92	8.50	2.994	0.20(0.10)	0.50	21.3	190.00
1	61.20	8.97	2.905	0.20(0.10)	0.51	22.2	19.00
1	61.35	9.32	2.840	0.20(0.10)	0.51	22.8	16.00
1	61.35	9.39	2.829	0.20(0.10)	0.51	22.9	168.00
1	61.33	9.50	2.810	0.20(0.10)	0.51	23.1	169.00
1	61.08	10.08	2.716	0.20(0.10)	0.51	23.9	179.00
1	60.69	10.63	2.634	0.20(0.10)	0.51	24.6	181.00
1	60.59	10.72	2.622	0.20(0.10)	0.51	24.7	160.00
1	60.55	10.75	2.618	0.20(0.10)	0.52	24.7	159.00
1	60.51	10.77	2.615	0.20(0.10)	0.52	24.7	17.00
1	59.76	11.19	2.559	0.20(0.10)	0.52	25.0	187.00
1	58.98	11.58	2.509	0.20(0.10)	0.52	25.3	10.00
1	57.65	12.27	2.427	0.20(0.10)	0.52	25.6	184.00
1	57.10	12.51	2.401	0.20(0.10)	0.52	25.7	147.00
1	56.41	12.82	2.367	0.20(0.10)	0.52	25.8	152.00
1	50.62	15.86	2.095	0.20(0.10)	0.52	26.6	144.00
1	47.04	17.83	1.959	0.20(0.10)	0.52	26.6	147.00
2	1.16	5.33	3.912	0.20(0.02)	0.10	0.3	183.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.10	5.33	3.912	0.20(0.10)	0.49	13.9	183.00
2	55.36	5.66	3.782	0.20(0.10)	0.49	14.8	195.00
3	56.42	5.98	3.663	0.20(0.10)	0.49	15.6	170.00
4	57.20	6.21	3.586	0.20(0.10)	0.49	16.2	175.00
5	57.53	6.32	3.550	0.20(0.10)	0.49	16.5	161.00
6	58.43	6.63	3.453	0.20(0.10)	0.49	17.3	174.00
7	59.35	7.00	3.349	0.20(0.10)	0.49	18.2	173.00
8	59.40	7.02	3.343	0.20(0.10)	0.49	18.3	150.00
9	60.39	7.53	3.211	0.20(0.10)	0.49	19.5	14.00
10	61.24	8.00	3.100	0.20(0.10)	0.50	20.6	167.00
11	61.48	8.17	3.065	0.20(0.10)	0.50	21.0	191.10
12	61.55	8.23	3.051	0.20(0.10)	0.50	21.1	154.00
13	61.80	8.50	2.994	0.20(0.10)	0.50	21.7	190.00
14	62.06	8.97	2.905	0.20(0.10)	0.50	22.5	19.00
15	62.19	9.32	2.840	0.20(0.10)	0.50	23.2	16.00
16	62.19	9.39	2.829	0.20(0.10)	0.50	23.3	168.00
17	62.16	9.50	2.810	0.20(0.10)	0.50	23.4	169.00
18	61.88	10.08	2.716	0.20(0.10)	0.51	24.2	179.00
19	61.47	10.63	2.634	0.20(0.10)	0.51	24.9	181.00
20	61.36	10.72	2.622	0.20(0.10)	0.51	25.0	160.00
21	61.32	10.75	2.618	0.20(0.10)	0.51	25.1	159.00

```
    22       61.28   10.77    2.615  0.20( 0.10) 0.51      25.1      17.00
    23       60.51   11.19    2.559  0.20( 0.10) 0.51      25.4     187.00
    24       59.72   11.58    2.509  0.20( 0.10) 0.51      25.6      10.00
    25       58.36   12.27    2.427  0.20( 0.10) 0.51      26.0     184.00
    26       57.80   12.51    2.401  0.20( 0.10) 0.51      26.0     147.00
    27       57.11   12.82    2.367  0.20( 0.10) 0.51      26.1     152.00
    28       51.24   15.86    2.095  0.20( 0.10) 0.52      26.9     144.00
    29       47.62   17.83    1.959  0.20( 0.10) 0.52      26.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.19    Tc(MIN.) =     9.39
  EFFECTIVE AREA(ACRES) =      23.26   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       26.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.19
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.49
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.123
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.12      0.20     0.500    75    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.05
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.05

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
```

```
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.05

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.07
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.07

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.05    7.90    3.123  0.20( 0.10) 0.50       1.1     199.00
      2        2.07    8.53    2.989  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.05    7.90    3.123  0.20( 0.11) 0.54       1.9     199.00
      2        4.98    8.53    2.989  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.05    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.05
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.05    7.99    3.102  0.20( 0.11) 0.54       1.9     199.00
      2        4.98    8.62    2.971  0.20( 0.11) 0.54       1.9     200.00
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.10    5.44    3.870  0.20( 0.10) 0.49      13.9     183.00
      2       55.36    5.76    3.744  0.20( 0.10) 0.49      14.8     195.00
      3       56.42    6.08    3.628  0.20( 0.10) 0.49      15.6     170.00
      4       57.20    6.31    3.553  0.20( 0.10) 0.49      16.2     175.00
      5       57.53    6.42    3.519  0.20( 0.10) 0.49      16.5     161.00
      6       58.43    6.73    3.423  0.20( 0.10) 0.49      17.3     174.00
      7       59.35    7.10    3.322  0.20( 0.10) 0.49      18.2     173.00
      8       59.40    7.12    3.316  0.20( 0.10) 0.49      18.3     150.00
      9       60.39    7.63    3.187  0.20( 0.10) 0.49      19.5      14.00
     10       61.24    8.10    3.078  0.20( 0.10) 0.50      20.6     167.00
     11       61.48    8.27    3.043  0.20( 0.10) 0.50      21.0     191.10
     12       61.55    8.33    3.030  0.20( 0.10) 0.50      21.1     154.00
     13       61.80    8.60    2.974  0.20( 0.10) 0.50      21.7     190.00
     14       62.06    9.07    2.887  0.20( 0.10) 0.50      22.5      19.00
     15       62.19    9.42    2.823  0.20( 0.10) 0.50      23.2      16.00
     16       62.19    9.49    2.812  0.20( 0.10) 0.50      23.3     168.00
     17       62.16    9.60    2.794  0.20( 0.10) 0.50      23.4     169.00
     18       61.88   10.18    2.701  0.20( 0.10) 0.51      24.2     179.00
     19       61.47   10.73    2.620  0.20( 0.10) 0.51      24.9     181.00
     20       61.36   10.82    2.609  0.20( 0.10) 0.51      25.0     160.00
     21       61.32   10.85    2.604  0.20( 0.10) 0.51      25.1     159.00
     22       61.28   10.87    2.601  0.20( 0.10) 0.51      25.1      17.00
     23       60.51   11.29    2.546  0.20( 0.10) 0.51      25.4     187.00
     24       59.72   11.68    2.497  0.20( 0.10) 0.51      25.6      10.00
     25       58.36   12.37    2.416  0.20( 0.10) 0.51      26.0     184.00
     26       57.80   12.61    2.390  0.20( 0.10) 0.51      26.0     147.00
     27       57.11   12.92    2.357  0.20( 0.10) 0.51      26.1     152.00
     28       51.24   15.96    2.087  0.20( 0.10) 0.52      26.9     144.00
     29       47.62   17.93    1.953  0.20( 0.10) 0.52      26.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       58.41    5.44    3.870  0.20( 0.10) 0.50      15.2     183.00
      2       59.78    5.76    3.744  0.20( 0.10) 0.50      16.1     195.00
      3       60.94    6.08    3.628  0.20( 0.10) 0.50      17.0     170.00
      4       61.79    6.31    3.553  0.20( 0.10) 0.49      17.7     175.00
      5       62.15    6.42    3.519  0.20( 0.10) 0.49      18.0     161.00
      6       63.14    6.73    3.423  0.20( 0.10) 0.49      18.9     174.00
      7       64.16    7.10    3.322  0.20( 0.10) 0.50      19.9     173.00
      8       64.22    7.12    3.316  0.20( 0.10) 0.50      19.9     150.00
      9       65.34    7.63    3.187  0.20( 0.10) 0.50      21.3      14.00
     10       66.09    7.99    3.102  0.20( 0.10) 0.50      22.2     199.00
     11       66.27    8.10    3.078  0.20( 0.10) 0.50      22.5     167.00
```

```
    12       66.50    8.27    3.043  0.20( 0.10) 0.50      22.9     191.10
    13       66.56    8.33    3.030  0.20( 0.10) 0.50      23.0     154.00
    14       66.78    8.60    2.974  0.20( 0.10) 0.50      23.6     190.00
    15       66.79    8.62    2.971  0.20( 0.10) 0.50      23.6     200.00
    16       66.89    9.07    2.887  0.20( 0.10) 0.50      24.4      19.00
    17       66.91    9.42    2.823  0.20( 0.10) 0.51      25.1      16.00
    18       66.89    9.49    2.812  0.20( 0.10) 0.51      25.2     168.00
    19       66.83    9.60    2.794  0.20( 0.10) 0.51      25.3     169.00
    20       66.39   10.18    2.701  0.20( 0.10) 0.51      26.1     179.00
    21       65.83   10.73    2.620  0.20( 0.10) 0.51      26.9     181.00
    22       65.71   10.82    2.609  0.20( 0.10) 0.51      26.9     160.00
    23       65.66   10.85    2.604  0.20( 0.10) 0.51      27.0     159.00
    24       65.62   10.87    2.601  0.20( 0.10) 0.51      27.0      17.00
    25       64.75   11.29    2.546  0.20( 0.10) 0.51      27.3     187.00
    26       63.88   11.68    2.497  0.20( 0.10) 0.51      27.5      10.00
    27       62.38   12.37    2.416  0.20( 0.10) 0.51      27.9     184.00
    28       61.77   12.61    2.390  0.20( 0.10) 0.52      28.0     147.00
    29       61.02   12.92    2.357  0.20( 0.10) 0.52      28.1     152.00
    30       54.68   15.96    2.087  0.20( 0.10) 0.52      28.8     144.00
    31       50.83   17.93    1.953  0.20( 0.10) 0.52      28.9     147.00
   TOTAL AREA(ACRES) =        28.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       66.91  Tc(MIN.) =    9.424
  EFFECTIVE AREA(ACRES) =     25.07  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       28.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.80
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.91
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.77
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.77
  RAINFALL INTENSITY(INCH/HR) =   2.76
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      25.07
  TOTAL STREAM AREA(ACRES) =      28.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.91

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.708
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.39      0.20     0.200    75    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.29

******************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    7.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.42      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.42
  RAINFALL INTENSITY(INCH/HR) =   3.24
```

AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.81
TOTAL STREAM AREA(ACRES) = 0.81
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.33

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	58.41	5.79	3.731	0.20(0.10)	0.50	15.2	183.00
1	59.78	6.12	3.617	0.20(0.10)	0.50	16.1	195.00
1	60.94	6.44	3.512	0.20(0.10)	0.50	17.0	170.00
1	61.79	6.66	3.444	0.20(0.10)	0.49	17.7	175.00
1	62.15	6.77	3.412	0.20(0.10)	0.49	18.0	161.00
1	63.14	7.09	3.324	0.20(0.10)	0.49	18.9	174.00
1	64.16	7.45	3.231	0.20(0.10)	0.50	19.9	173.00
1	64.22	7.47	3.225	0.20(0.10)	0.50	19.9	150.00
1	65.34	7.98	3.106	0.20(0.10)	0.50	21.3	14.00
1	66.09	8.35	3.027	0.20(0.10)	0.50	22.2	199.00
1	66.27	8.45	3.005	0.20(0.10)	0.50	22.5	167.00
1	66.50	8.62	2.972	0.20(0.10)	0.50	22.9	191.10
1	66.56	8.68	2.959	0.20(0.10)	0.50	23.0	154.00
1	66.78	8.95	2.907	0.20(0.10)	0.50	23.6	190.00
1	66.79	8.97	2.904	0.20(0.10)	0.50	23.6	200.00
1	66.89	9.42	2.824	0.20(0.10)	0.50	24.4	19.00
1	66.91	9.77	2.765	0.20(0.10)	0.51	25.1	16.00
1	66.89	9.84	2.754	0.20(0.10)	0.51	25.2	168.00
1	66.83	9.95	2.737	0.20(0.10)	0.51	25.3	169.00
1	66.39	10.53	2.649	0.20(0.10)	0.51	26.1	179.00
1	65.83	11.09	2.572	0.20(0.10)	0.51	26.9	181.00
1	65.71	11.17	2.561	0.20(0.10)	0.51	26.9	160.00
1	65.66	11.20	2.557	0.20(0.10)	0.51	27.0	159.00
1	65.62	11.22	2.554	0.20(0.10)	0.51	27.0	17.00
1	64.75	11.64	2.501	0.20(0.10)	0.51	27.3	187.00
1	63.88	12.03	2.455	0.20(0.10)	0.51	27.5	10.00
1	62.38	12.72	2.377	0.20(0.10)	0.51	27.9	184.00
1	61.77	12.96	2.352	0.20(0.10)	0.52	28.0	147.00
1	61.02	13.27	2.320	0.20(0.10)	0.52	28.1	152.00
1	54.68	16.33	2.060	0.20(0.10)	0.52	28.8	144.00
1	50.83	18.31	1.930	0.20(0.10)	0.52	28.9	147.00
2	2.33	7.42	3.238	0.20(0.04)	0.20	0.8	192.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.52	5.79	3.731	0.20(0.10)	0.48	15.8	183.00
2	61.93	6.12	3.617	0.20(0.10)	0.48	16.8	195.00
3	63.14	6.44	3.512	0.20(0.10)	0.48	17.7	170.00
4	64.02	6.66	3.444	0.20(0.10)	0.48	18.4	175.00
5	64.39	6.77	3.412	0.20(0.10)	0.48	18.7	161.00
6	65.42	7.09	3.324	0.20(0.10)	0.48	19.6	174.00
7	66.41	7.42	3.238	0.20(0.10)	0.48	20.6	192.00
8	66.49	7.45	3.231	0.20(0.10)	0.48	20.7	173.00
9	66.54	7.47	3.225	0.20(0.10)	0.48	20.7	150.00
10	67.58	7.98	3.106	0.20(0.10)	0.49	22.1	14.00
11	68.27	8.35	3.027	0.20(0.10)	0.49	23.0	199.00
12	68.43	8.45	3.005	0.20(0.10)	0.49	23.3	167.00
13	68.63	8.62	2.972	0.20(0.10)	0.49	23.7	191.10
14	68.69	8.68	2.959	0.20(0.10)	0.49	23.8	154.00
15	68.87	8.95	2.907	0.20(0.10)	0.49	24.4	190.00
16	68.88	8.97	2.904	0.20(0.10)	0.49	24.4	200.00
17	68.92	9.42	2.824	0.20(0.10)	0.49	25.3	19.00
18	68.90	9.77	2.765	0.20(0.10)	0.50	25.9	16.00
19	68.87	9.84	2.754	0.20(0.10)	0.50	26.0	168.00
20	68.80	9.95	2.737	0.20(0.10)	0.50	26.2	169.00
21	68.29	10.53	2.649	0.20(0.10)	0.50	27.0	179.00
22	67.68	11.09	2.572	0.20(0.10)	0.50	27.7	181.00

```
    23       67.55   11.17    2.561  0.20( 0.10) 0.50      27.8     160.00
    24       67.49   11.20    2.557  0.20( 0.10) 0.50      27.8     159.00
    25       67.45   11.22    2.554  0.20( 0.10) 0.50      27.8      17.00
    26       66.55   11.64    2.501  0.20( 0.10) 0.50      28.1     187.00
    27       65.64   12.03    2.455  0.20( 0.10) 0.50      28.3      10.00
    28       64.08   12.72    2.377  0.20( 0.10) 0.51      28.7     184.00
    29       63.46   12.96    2.352  0.20( 0.10) 0.51      28.8     147.00
    30       62.68   13.27    2.320  0.20( 0.10) 0.51      28.9     152.00
    31       56.15   16.33    2.060  0.20( 0.10) 0.51      29.6     144.00
    32       52.20   18.31    1.930  0.20( 0.10) 0.51      29.7     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      68.92    Tc(MIN.) =     9.42
  EFFECTIVE AREA(ACRES) =      25.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.7
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.92
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.46
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   10.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    4.76
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       6.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.57

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.833
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   3.83
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.57   10.61    2.638  0.20( 0.12) 0.60       2.9     184.00
      2        0.58    5.53    3.833  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.63    5.53    3.833  0.20( 0.11) 0.55       1.7      59.00
      2        6.97   10.61    2.638  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.97    Tc(MIN.) =    10.61
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.81      0.20     0.600    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.22
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.22

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.63    5.93    3.680  0.20( 0.11) 0.55       1.7      59.00
      1        6.97   11.00    2.584  0.20( 0.11) 0.57       3.1     184.00
      2        2.22    7.72    3.165  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.93    3.680  0.20( 0.11) 0.56       2.3      59.00
      2        8.32    7.72    3.165  0.20( 0.11) 0.57       3.0      64.00
      3        8.77   11.00    2.584  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.77    Tc(MIN.) =    11.00
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
```

```
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.77
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.03
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.77

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.48      0.20     0.600    75    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =   11.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.563
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.92
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.97    3.667  0.20( 0.11) 0.56       2.3      59.00
      1        8.32    7.76    3.156  0.20( 0.11) 0.57       3.0      64.00
      1        8.77   11.03    2.579  0.20( 0.12) 0.58       3.9     184.00
      2        5.19   11.15    2.563  0.20( 0.12) 0.60       2.4     208.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.66    5.97    3.667  0.20( 0.12) 0.58       3.6      59.00
      2       12.81    7.76    3.156  0.20( 0.12) 0.58       4.6      64.00
      3       13.93   11.03    2.579  0.20( 0.12) 0.59       6.2     184.00
      4       13.90   11.15    2.563  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.93    Tc(MIN.) =    11.03
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.93
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.92
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.93

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   10.95
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.591
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        2.04      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    4.54
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  5.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.17

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.036
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.45      0.20      0.500    75    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.82
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
 STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =    9.32
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.841
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    2.44
 EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.55

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
 LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.32
 RAINFALL INTENSITY(INCH/HR) =   2.84
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.66    6.90    3.375  0.20( 0.12) 0.58       3.6      59.00
     1       12.81    8.67    2.962  0.20( 0.12) 0.58       4.6      64.00
     1       13.93   11.92    2.467  0.20( 0.12) 0.59       6.2     184.00
     1       13.90   12.05    2.453  0.20( 0.12) 0.59       6.2     208.00
     2        6.17   10.95    2.591  0.20( 0.11) 0.57       2.8     211.00
     3        3.55    9.32    2.841  0.20( 0.10) 0.50       1.4     213.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.93    6.90    3.375  0.20( 0.11) 0.56       6.4      59.00
     2       21.88    8.67    2.962  0.20( 0.11) 0.57       8.2      64.00
     3       22.36    9.32    2.841  0.20( 0.11) 0.57       8.7     213.00
     4       23.00   10.95    2.591  0.20( 0.11) 0.57       9.9     211.00
     5       22.87   11.92    2.467  0.20( 0.11) 0.57      10.4     184.00
     6       22.78   12.05    2.453  0.20( 0.11) 0.57      10.5     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.00    Tc(MIN.) =    10.95
 EFFECTIVE AREA(ACRES) =       9.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
```

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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.11
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.00
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.20
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.20
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       9.95
  TOTAL STREAM AREA(ACRES) =      10.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.00

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.18      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.65

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.93    7.17    3.302  0.20( 0.11) 0.56       6.4      59.00
     1       21.88    8.93    2.911  0.20( 0.11) 0.57       8.2      64.00
     1       22.36    9.58    2.796  0.20( 0.11) 0.57       8.7     213.00
     1       23.00   11.20    2.557  0.20( 0.11) 0.57       9.9     211.00
     1       22.87   12.18    2.437  0.20( 0.11) 0.57      10.4     184.00
     1       22.78   12.30    2.423  0.20( 0.11) 0.57      10.5     208.00
     2        0.65    5.00    4.060  0.20( 0.02) 0.10       0.2     215.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.85    5.00    4.060  0.20( 0.11) 0.54       4.6     215.00
     2       20.46    7.17    3.302  0.20( 0.11) 0.55       6.6      59.00
     3       22.34    8.93    2.911  0.20( 0.11) 0.56       8.3      64.00
     4       22.81    9.58    2.796  0.20( 0.11) 0.56       8.9     213.00
     5       23.41   11.20    2.557  0.20( 0.11) 0.56      10.1     211.00
     6       23.26   12.18    2.437  0.20( 0.11) 0.56      10.6     184.00
     7       23.17   12.30    2.423  0.20( 0.11) 0.56      10.6     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.41    Tc(MIN.) =    11.20
 EFFECTIVE AREA(ACRES) =      10.13   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       10.6
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.41
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.26
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.85    5.06    4.031  0.20( 0.11) 0.54       4.6     215.00
     2       20.46    7.23    3.287  0.20( 0.11) 0.55       6.6      59.00
     3       22.34    8.99    2.901  0.20( 0.11) 0.56       8.3      64.00
     4       22.81    9.64    2.786  0.20( 0.11) 0.56       8.9     213.00
     5       23.41   11.26    2.549  0.20( 0.11) 0.56      10.1     211.00
     6       23.26   12.24    2.431  0.20( 0.11) 0.56      10.6     184.00
     7       23.17   12.36    2.417  0.20( 0.11) 0.56      10.6     208.00
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       60.52    5.84    3.715  0.20( 0.10) 0.48      15.8     183.00
```

2	61.93	6.16	3.602	0.20(0.10)	0.48	16.8	195.00
3	63.14	6.48	3.498	0.20(0.10)	0.48	17.7	170.00
4	64.02	6.71	3.430	0.20(0.10)	0.48	18.4	175.00
5	64.39	6.82	3.399	0.20(0.10)	0.48	18.7	161.00
6	65.42	7.13	3.313	0.20(0.10)	0.48	19.6	174.00
7	66.41	7.46	3.227	0.20(0.10)	0.48	20.6	192.00
8	66.49	7.49	3.220	0.20(0.10)	0.48	20.7	173.00
9	66.54	7.51	3.214	0.20(0.10)	0.48	20.7	150.00
10	67.58	8.02	3.096	0.20(0.10)	0.49	22.1	14.00
11	68.27	8.39	3.018	0.20(0.10)	0.49	23.0	199.00
12	68.43	8.50	2.996	0.20(0.10)	0.49	23.3	167.00
13	68.63	8.66	2.963	0.20(0.10)	0.49	23.7	191.10
14	68.69	8.73	2.950	0.20(0.10)	0.49	23.8	154.00
15	68.87	9.00	2.899	0.20(0.10)	0.49	24.4	190.00
16	68.88	9.02	2.896	0.20(0.10)	0.49	24.4	200.00
17	68.92	9.46	2.817	0.20(0.10)	0.49	25.3	19.00
18	68.90	9.82	2.758	0.20(0.10)	0.50	25.9	16.00
19	68.87	9.89	2.747	0.20(0.10)	0.50	26.0	168.00
20	68.80	9.99	2.730	0.20(0.10)	0.50	26.2	169.00
21	68.29	10.57	2.643	0.20(0.10)	0.50	27.0	179.00
22	67.68	11.13	2.567	0.20(0.10)	0.50	27.7	181.00
23	67.55	11.21	2.556	0.20(0.10)	0.50	27.8	160.00
24	67.49	11.25	2.551	0.20(0.10)	0.50	27.8	159.00
25	67.45	11.27	2.548	0.20(0.10)	0.50	27.8	17.00
26	66.55	11.69	2.496	0.20(0.10)	0.50	28.1	187.00
27	65.64	12.07	2.450	0.20(0.10)	0.50	28.3	10.00
28	64.08	12.77	2.373	0.20(0.10)	0.51	28.7	184.00
29	63.46	13.00	2.348	0.20(0.10)	0.51	28.8	147.00
30	62.68	13.32	2.316	0.20(0.10)	0.51	28.9	152.00
31	56.15	16.38	2.057	0.20(0.10)	0.51	29.6	144.00
32	52.20	18.36	1.927	0.20(0.10)	0.51	29.7	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 217.00 = 3025.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	74.92	5.06	4.031	0.20(0.10)	0.50	18.4	215.00
2	79.30	5.84	3.715	0.20(0.10)	0.50	21.2	183.00
3	81.10	6.16	3.602	0.20(0.10)	0.50	22.4	195.00
4	82.70	6.48	3.498	0.20(0.10)	0.50	23.6	170.00
5	83.85	6.71	3.430	0.20(0.10)	0.50	24.5	175.00
6	84.35	6.82	3.399	0.20(0.10)	0.50	24.9	161.00
7	85.76	7.13	3.313	0.20(0.10)	0.50	26.1	174.00
8	86.17	7.23	3.287	0.20(0.10)	0.50	26.5	59.00
9	87.12	7.46	3.227	0.20(0.10)	0.50	27.4	192.00
10	87.23	7.49	3.220	0.20(0.10)	0.50	27.5	173.00
11	87.30	7.51	3.214	0.20(0.10)	0.50	27.6	150.00
12	88.89	8.02	3.096	0.20(0.10)	0.50	29.4	14.00
13	89.97	8.39	3.018	0.20(0.10)	0.50	30.8	199.00
14	90.25	8.50	2.996	0.20(0.10)	0.51	31.1	167.00
15	90.62	8.66	2.963	0.20(0.10)	0.51	31.7	191.10
16	90.75	8.73	2.950	0.20(0.10)	0.51	31.9	154.00
17	91.21	8.99	2.901	0.20(0.10)	0.51	32.7	64.00
18	91.22	9.00	2.899	0.20(0.10)	0.51	32.7	190.00
19	91.24	9.02	2.896	0.20(0.10)	0.51	32.8	200.00
20	91.60	9.46	2.817	0.20(0.10)	0.51	34.0	19.00
21	91.72	9.64	2.786	0.20(0.10)	0.51	34.5	213.00
22	91.77	9.82	2.758	0.20(0.10)	0.51	34.9	16.00
23	91.77	9.89	2.747	0.20(0.10)	0.51	35.1	168.00
24	91.74	9.99	2.730	0.20(0.10)	0.51	35.3	169.00
25	91.45	10.57	2.643	0.20(0.10)	0.52	36.6	179.00
26	91.04	11.13	2.567	0.20(0.10)	0.52	37.7	181.00
27	90.94	11.21	2.556	0.20(0.10)	0.52	37.8	160.00
28	90.90	11.25	2.551	0.20(0.10)	0.52	37.9	159.00
29	90.88	11.26	2.549	0.20(0.10)	0.52	37.9	211.00
30	90.86	11.27	2.548	0.20(0.10)	0.52	37.9	17.00
31	89.89	11.69	2.496	0.20(0.10)	0.52	38.4	187.00
32	88.92	12.07	2.450	0.20(0.10)	0.52	38.8	10.00
33	88.52	12.24	2.431	0.20(0.10)	0.52	39.0	184.00
34	88.16	12.36	2.417	0.20(0.10)	0.52	39.1	208.00
35	86.80	12.77	2.373	0.20(0.10)	0.52	39.3	184.00

```
     36       85.93   13.00    2.348  0.20( 0.10) 0.52      39.4     147.00
     37       84.83   13.32    2.316  0.20( 0.10) 0.52      39.5     152.00
     38       75.70   16.38    2.057  0.20( 0.10) 0.52      40.2     144.00
     39       70.44   18.36    1.927  0.20( 0.10) 0.52      40.3     147.00
    TOTAL AREA(ACRES) =        40.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       91.77  Tc(MIN.) =    9.818
  EFFECTIVE AREA(ACRES) =     34.93  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       40.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.98
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.77
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.17
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      34.93
  TOTAL STREAM AREA(ACRES) =      40.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      91.77

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    75    7.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      2.50
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    9.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.850
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    3.42
  EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.27
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.30
  TOTAL STREAM AREA(ACRES) =       2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.92    5.43    3.870  0.20( 0.10) 0.50      18.4     215.00
      1       79.30    6.21    3.587  0.20( 0.10) 0.50      21.2     183.00
      1       81.10    6.53    3.485  0.20( 0.10) 0.50      22.4     195.00
      1       82.70    6.85    3.390  0.20( 0.10) 0.50      23.6     170.00
      1       83.85    7.07    3.328  0.20( 0.10) 0.50      24.5     175.00
      1       84.35    7.18    3.299  0.20( 0.10) 0.50      24.9     161.00
```

1	85.76	7.49	3.219	0.20(0.10)	0.50	26.1	174.00
1	86.17	7.59	3.195	0.20(0.10)	0.50	26.5	59.00
1	87.12	7.83	3.140	0.20(0.10)	0.50	27.4	192.00
1	87.23	7.86	3.133	0.20(0.10)	0.50	27.5	173.00
1	87.30	7.88	3.128	0.20(0.10)	0.50	27.6	150.00
1	88.89	8.39	3.018	0.20(0.10)	0.50	29.4	14.00
1	89.97	8.75	2.945	0.20(0.10)	0.50	30.8	199.00
1	90.25	8.86	2.925	0.20(0.10)	0.51	31.1	167.00
1	90.62	9.02	2.894	0.20(0.10)	0.51	31.7	191.10
1	90.75	9.08	2.884	0.20(0.10)	0.51	31.9	154.00
1	91.21	9.34	2.837	0.20(0.10)	0.51	32.7	64.00
1	91.22	9.35	2.836	0.20(0.10)	0.51	32.7	190.00
1	91.24	9.37	2.833	0.20(0.10)	0.51	32.8	200.00
1	91.60	9.81	2.758	0.20(0.10)	0.51	34.0	19.00
1	91.72	10.00	2.730	0.20(0.10)	0.51	34.5	213.00
1	91.77	10.17	2.703	0.20(0.10)	0.51	34.9	16.00
1	91.77	10.24	2.692	0.20(0.10)	0.51	35.1	168.00
1	91.74	10.35	2.676	0.20(0.10)	0.51	35.3	169.00
1	91.45	10.93	2.594	0.20(0.10)	0.52	36.6	179.00
1	91.04	11.48	2.521	0.20(0.10)	0.52	37.7	181.00
1	90.94	11.57	2.511	0.20(0.10)	0.52	37.8	160.00
1	90.90	11.60	2.506	0.20(0.10)	0.52	37.9	159.00
1	90.88	11.61	2.505	0.20(0.10)	0.52	37.9	211.00
1	90.86	11.62	2.504	0.20(0.10)	0.52	37.9	17.00
1	89.89	12.05	2.452	0.20(0.10)	0.52	38.4	187.00
1	88.92	12.44	2.408	0.20(0.10)	0.52	38.8	10.00
1	88.52	12.60	2.390	0.20(0.10)	0.52	39.0	184.00
1	88.16	12.72	2.377	0.20(0.10)	0.52	39.1	208.00
1	86.80	13.13	2.335	0.20(0.10)	0.52	39.3	184.00
1	85.93	13.37	2.311	0.20(0.10)	0.52	39.4	147.00
1	84.83	13.68	2.280	0.20(0.10)	0.52	39.5	152.00
1	75.70	16.75	2.031	0.20(0.10)	0.52	40.2	144.00
1	70.44	18.73	1.905	0.20(0.10)	0.52	40.3	147.00
2	5.65	9.27	2.850	0.20(0.12)	0.60	2.3	201.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.47	5.43	3.870	0.20(0.10)	0.51	19.7	215.00
2	84.10	6.21	3.587	0.20(0.10)	0.51	22.7	183.00
3	86.01	6.53	3.485	0.20(0.10)	0.51	24.0	195.00
4	87.70	6.85	3.390	0.20(0.10)	0.51	25.3	170.00
5	88.91	7.07	3.328	0.20(0.10)	0.51	26.3	175.00
6	89.45	7.18	3.299	0.20(0.10)	0.51	26.7	161.00
7	90.95	7.49	3.219	0.20(0.10)	0.51	28.0	174.00
8	91.39	7.59	3.195	0.20(0.10)	0.51	28.4	59.00
9	92.40	7.83	3.140	0.20(0.10)	0.51	29.3	192.00
10	92.52	7.86	3.133	0.20(0.10)	0.51	29.5	173.00
11	92.60	7.88	3.128	0.20(0.10)	0.51	29.5	150.00
12	94.31	8.39	3.018	0.20(0.10)	0.51	31.5	14.00
13	95.49	8.75	2.945	0.20(0.10)	0.51	32.9	199.00
14	95.80	8.86	2.925	0.20(0.10)	0.51	33.3	167.00
15	96.22	9.02	2.894	0.20(0.10)	0.51	33.9	191.10
16	96.36	9.08	2.884	0.20(0.10)	0.51	34.1	154.00
17	96.73	9.27	2.850	0.20(0.10)	0.51	34.8	201.00
18	96.83	9.34	2.837	0.20(0.10)	0.51	35.0	64.00
19	96.84	9.35	2.836	0.20(0.10)	0.51	35.0	190.00
20	96.85	9.37	2.833	0.20(0.10)	0.51	35.1	200.00
21	97.07	9.81	2.758	0.20(0.10)	0.52	36.3	19.00
22	97.12	10.00	2.730	0.20(0.10)	0.52	36.8	213.00
23	97.12	10.17	2.703	0.20(0.10)	0.52	37.2	16.00
24	97.10	10.24	2.692	0.20(0.10)	0.52	37.4	168.00
25	97.03	10.35	2.676	0.20(0.10)	0.52	37.6	169.00
26	96.57	10.93	2.594	0.20(0.10)	0.52	38.9	179.00
27	96.01	11.48	2.521	0.20(0.10)	0.52	40.0	181.00
28	95.89	11.57	2.511	0.20(0.10)	0.52	40.1	160.00
29	95.84	11.60	2.506	0.20(0.10)	0.52	40.2	159.00
30	95.81	11.61	2.505	0.20(0.10)	0.52	40.2	211.00

```
    31       95.79   11.62    2.504  0.20( 0.10) 0.52      40.2      17.00
    32       94.72   12.05    2.452  0.20( 0.10) 0.52      40.7     187.00
    33       93.66   12.44    2.408  0.20( 0.10) 0.52      41.1      10.00
    34       93.22   12.60    2.390  0.20( 0.11) 0.53      41.3     184.00
    35       92.83   12.72    2.377  0.20( 0.11) 0.53      41.4     208.00
    36       91.39   13.13    2.335  0.20( 0.11) 0.53      41.6     184.00
    37       90.46   13.37    2.311  0.20( 0.11) 0.53      41.7     147.00
    38       89.31   13.68    2.280  0.20( 0.11) 0.53      41.8     152.00
    39       79.65   16.75    2.031  0.20( 0.11) 0.53      42.5     144.00
    40       74.14   18.73    1.905  0.20( 0.11) 0.53      42.6     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      97.12    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =      36.79   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       42.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.31
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.12
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =    9.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    3.24
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.15
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.15

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.205
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    75    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.31

**************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.79   Tc(MIN.) =    8.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   3.03
```

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  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.15    9.16    2.869  0.20( 0.12) 0.60       2.1     220.00
      2        4.98    8.34    3.028  0.20( 0.10) 0.50       1.9     223.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.94    8.34    3.028  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.16    2.869  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.94    Tc(MIN.) =     8.34
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.94    8.68    2.959  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.51    2.809  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.47    5.46    3.859  0.20( 0.10) 0.51      19.7     215.00
      2       84.10    6.23    3.577  0.20( 0.10) 0.51      22.7     183.00
      3       86.01    6.56    3.476  0.20( 0.10) 0.51      24.0     195.00
      4       87.70    6.88    3.382  0.20( 0.10) 0.51      25.3     170.00
      5       88.91    7.10    3.320  0.20( 0.10) 0.51      26.3     175.00
      6       89.45    7.21    3.292  0.20( 0.10) 0.51      26.7     161.00
      7       90.95    7.52    3.212  0.20( 0.10) 0.51      28.0     174.00
      8       91.39    7.62    3.188  0.20( 0.10) 0.51      28.4      59.00
      9       92.40    7.85    3.134  0.20( 0.10) 0.51      29.3     192.00
     10       92.52    7.88    3.127  0.20( 0.10) 0.51      29.5     173.00
```

11	92.60	7.91	3.122	0.20(0.10)	0.51	29.5	150.00
12	94.31	8.41	3.013	0.20(0.10)	0.51	31.5	14.00
13	95.49	8.78	2.940	0.20(0.10)	0.51	32.9	199.00
14	95.80	8.89	2.919	0.20(0.10)	0.51	33.3	167.00
15	96.22	9.05	2.889	0.20(0.10)	0.51	33.9	191.10
16	96.36	9.11	2.879	0.20(0.10)	0.51	34.1	154.00
17	96.73	9.30	2.845	0.20(0.10)	0.51	34.8	201.00
18	96.83	9.37	2.833	0.20(0.10)	0.51	35.0	64.00
19	96.84	9.38	2.831	0.20(0.10)	0.51	35.0	190.00
20	96.85	9.40	2.828	0.20(0.10)	0.51	35.1	200.00
21	97.07	9.84	2.754	0.20(0.10)	0.52	36.3	19.00
22	97.12	10.02	2.725	0.20(0.10)	0.52	36.8	213.00
23	97.12	10.20	2.698	0.20(0.10)	0.52	37.2	16.00
24	97.10	10.27	2.688	0.20(0.10)	0.52	37.4	168.00
25	97.03	10.37	2.672	0.20(0.10)	0.52	37.6	169.00
26	96.57	10.95	2.590	0.20(0.10)	0.52	38.9	179.00
27	96.01	11.51	2.518	0.20(0.10)	0.52	40.0	181.00
28	95.89	11.59	2.507	0.20(0.10)	0.52	40.1	160.00
29	95.84	11.63	2.503	0.20(0.10)	0.52	40.2	159.00
30	95.81	11.64	2.501	0.20(0.10)	0.52	40.2	211.00
31	95.79	11.65	2.500	0.20(0.10)	0.52	40.2	17.00
32	94.72	12.08	2.449	0.20(0.10)	0.52	40.7	187.00
33	93.66	12.46	2.405	0.20(0.10)	0.52	41.1	10.00
34	93.22	12.63	2.387	0.20(0.11)	0.53	41.3	184.00
35	92.83	12.75	2.374	0.20(0.11)	0.53	41.4	208.00
36	91.39	13.16	2.332	0.20(0.11)	0.53	41.6	184.00
37	90.46	13.40	2.308	0.20(0.11)	0.53	41.7	147.00
38	89.31	13.71	2.277	0.20(0.11)	0.53	41.8	152.00
39	79.65	16.78	2.029	0.20(0.11)	0.53	42.5	144.00
40	74.14	18.76	1.903	0.20(0.11)	0.53	42.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 226.00 = 3435.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.70	5.46	3.859	0.20(0.10)	0.51	22.1	215.00
2	92.79	6.23	3.577	0.20(0.10)	0.51	25.4	183.00
3	94.87	6.56	3.476	0.20(0.10)	0.51	26.9	195.00
4	96.74	6.88	3.382	0.20(0.10)	0.51	28.3	170.00
5	98.07	7.10	3.320	0.20(0.10)	0.51	29.3	175.00
6	98.67	7.21	3.292	0.20(0.10)	0.51	29.8	161.00
7	100.33	7.52	3.212	0.20(0.10)	0.51	31.3	174.00
8	100.82	7.62	3.188	0.20(0.10)	0.51	31.7	59.00
9	101.95	7.85	3.134	0.20(0.10)	0.51	32.8	192.00
10	102.08	7.88	3.127	0.20(0.10)	0.51	32.9	173.00
11	102.17	7.91	3.122	0.20(0.10)	0.51	33.0	150.00
12	104.13	8.41	3.013	0.20(0.10)	0.51	35.2	14.00
13	105.11	8.68	2.959	0.20(0.10)	0.51	36.3	223.00
14	105.42	8.78	2.940	0.20(0.10)	0.51	36.7	199.00
15	105.72	8.89	2.919	0.20(0.10)	0.52	37.1	167.00
16	106.12	9.05	2.889	0.20(0.10)	0.52	37.8	191.10
17	106.26	9.11	2.879	0.20(0.10)	0.52	38.0	154.00
18	106.61	9.30	2.845	0.20(0.10)	0.52	38.7	201.00
19	106.71	9.37	2.833	0.20(0.10)	0.52	38.9	64.00
20	106.72	9.38	2.831	0.20(0.10)	0.52	39.0	190.00
21	106.73	9.40	2.828	0.20(0.10)	0.52	39.0	200.00
22	106.77	9.51	2.809	0.20(0.10)	0.52	39.3	220.00
23	106.73	9.84	2.754	0.20(0.10)	0.52	40.3	19.00
24	106.68	10.02	2.725	0.20(0.10)	0.52	40.8	213.00
25	106.58	10.20	2.698	0.20(0.10)	0.52	41.2	16.00
26	106.52	10.27	2.688	0.20(0.10)	0.52	41.4	168.00
27	106.39	10.37	2.672	0.20(0.10)	0.52	41.6	169.00
28	105.63	10.95	2.590	0.20(0.10)	0.52	42.8	179.00
29	104.81	11.51	2.518	0.20(0.11)	0.53	44.0	181.00
30	104.65	11.59	2.507	0.20(0.11)	0.53	44.1	160.00
31	104.58	11.63	2.503	0.20(0.11)	0.53	44.2	159.00
32	104.55	11.64	2.501	0.20(0.11)	0.53	44.2	211.00
33	104.53	11.65	2.500	0.20(0.11)	0.53	44.2	17.00
34	103.26	12.08	2.449	0.20(0.11)	0.53	44.7	187.00
35	102.04	12.46	2.405	0.20(0.11)	0.53	45.1	10.00
36	101.54	12.63	2.387	0.20(0.11)	0.53	45.3	184.00

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     37      101.10   12.75    2.374  0.20( 0.11) 0.53      45.4     208.00
     38       99.50   13.16    2.332  0.20( 0.11) 0.53      45.6     184.00
     39       98.49   13.40    2.308  0.20( 0.11) 0.53      45.7     147.00
     40       97.22   13.71    2.277  0.20( 0.11) 0.53      45.8     152.00
     41       86.66   16.78    2.029  0.20( 0.11) 0.53      46.5     144.00
     42       80.69   18.76    1.903  0.20( 0.11) 0.53      46.6     147.00
    TOTAL AREA(ACRES) =        46.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      106.77  Tc(MIN.) =    9.507
  EFFECTIVE AREA(ACRES) =     39.35  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       46.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  53.43
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.77
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       87.70    5.47    3.856  0.20( 0.10) 0.51      22.1     215.00
      2       92.79    6.24    3.575  0.20( 0.10) 0.51      25.4     183.00
      3       94.87    6.56    3.474  0.20( 0.10) 0.51      26.9     195.00
      4       96.74    6.88    3.380  0.20( 0.10) 0.51      28.3     170.00
      5       98.07    7.11    3.318  0.20( 0.10) 0.51      29.3     175.00
      6       98.67    7.22    3.290  0.20( 0.10) 0.51      29.8     161.00
      7      100.33    7.53    3.211  0.20( 0.10) 0.51      31.3     174.00
      8      100.82    7.63    3.187  0.20( 0.10) 0.51      31.7      59.00
      9      101.95    7.86    3.132  0.20( 0.10) 0.51      32.8     192.00
     10      102.08    7.89    3.126  0.20( 0.10) 0.51      32.9     173.00
     11      102.17    7.91    3.121  0.20( 0.10) 0.51      33.0     150.00
     12      104.13    8.42    3.011  0.20( 0.10) 0.51      35.2      14.00
     13      105.11    8.69    2.958  0.20( 0.10) 0.51      36.3     223.00
     14      105.42    8.79    2.939  0.20( 0.10) 0.51      36.7     199.00
     15      105.72    8.90    2.918  0.20( 0.10) 0.52      37.1     167.00
     16      106.12    9.06    2.888  0.20( 0.10) 0.52      37.8     191.10
     17      106.26    9.11    2.878  0.20( 0.10) 0.52      38.0     154.00
     18      106.61    9.30    2.844  0.20( 0.10) 0.52      38.7     201.00
     19      106.71    9.38    2.831  0.20( 0.10) 0.52      38.9      64.00
     20      106.72    9.39    2.830  0.20( 0.10) 0.52      39.0     190.00
     21      106.73    9.40    2.827  0.20( 0.10) 0.52      39.0     200.00
     22      106.77    9.51    2.808  0.20( 0.10) 0.52      39.3     220.00
     23      106.73    9.85    2.753  0.20( 0.10) 0.52      40.3      19.00
     24      106.68   10.03    2.724  0.20( 0.10) 0.52      40.8     213.00
     25      106.58   10.20    2.697  0.20( 0.10) 0.52      41.2      16.00
     26      106.52   10.27    2.687  0.20( 0.10) 0.52      41.4     168.00
```

27	106.39	10.38	2.671	0.20(0.10)	0.52	41.6	169.00
28	105.63	10.96	2.589	0.20(0.10)	0.52	42.8	179.00
29	104.81	11.52	2.517	0.20(0.11)	0.53	44.0	181.00
30	104.65	11.60	2.506	0.20(0.11)	0.53	44.1	160.00
31	104.58	11.63	2.502	0.20(0.11)	0.53	44.2	159.00
32	104.55	11.65	2.501	0.20(0.11)	0.53	44.2	211.00
33	104.53	11.65	2.500	0.20(0.11)	0.53	44.2	17.00
34	103.26	12.08	2.448	0.20(0.11)	0.53	44.7	187.00
35	102.04	12.47	2.405	0.20(0.11)	0.53	45.1	10.00
36	101.54	12.64	2.386	0.20(0.11)	0.53	45.3	184.00
37	101.10	12.76	2.373	0.20(0.11)	0.53	45.4	208.00
38	99.50	13.16	2.331	0.20(0.11)	0.53	45.6	184.00
39	98.49	13.40	2.307	0.20(0.11)	0.53	45.7	147.00
40	97.22	13.72	2.277	0.20(0.11)	0.53	45.8	152.00
41	86.66	16.78	2.028	0.20(0.11)	0.53	46.5	144.00
42	80.69	18.77	1.902	0.20(0.11)	0.53	46.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 230.00 = 3455.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.15	5.07	4.028	0.20(0.12)	0.58	32.7	140.00
2	148.91	5.87	3.702	0.20(0.12)	0.58	38.0	104.00
3	154.44	6.38	3.530	0.20(0.12)	0.58	41.6	88.00
4	155.50	6.48	3.499	0.20(0.12)	0.58	42.3	63.00
5	156.88	6.61	3.460	0.20(0.12)	0.58	43.3	47.00
6	157.71	6.68	3.437	0.20(0.12)	0.58	43.8	45.00
7	164.14	7.32	3.263	0.20(0.12)	0.58	48.7	59.00
8	164.53	7.36	3.253	0.20(0.12)	0.58	49.0	95.00
9	166.55	7.58	3.199	0.20(0.12)	0.58	50.7	118.00
10	168.43	7.78	3.151	0.20(0.12)	0.58	52.3	138.00
11	172.85	8.26	3.044	0.20(0.12)	0.58	56.0	141.00
12	176.76	8.71	2.954	0.20(0.12)	0.58	59.5	31.00
13	178.37	8.90	2.918	0.20(0.12)	0.58	61.0	85.00
14	178.37	8.90	2.918	0.20(0.12)	0.58	61.0	97.00
15	178.78	8.96	2.906	0.20(0.12)	0.58	61.4	136.00
16	179.43	9.07	2.885	0.20(0.12)	0.58	62.2	38.00
17	179.64	9.11	2.878	0.20(0.12)	0.58	62.4	80.00
18	180.87	9.37	2.833	0.20(0.12)	0.58	64.1	6.00
19	181.72	9.54	2.803	0.20(0.12)	0.58	65.3	92.00
20	182.06	9.62	2.790	0.20(0.12)	0.58	65.8	35.00
21	182.26	9.67	2.781	0.20(0.12)	0.58	66.1	24.00
22	182.55	9.75	2.769	0.20(0.12)	0.58	66.6	46.00
23	183.15	9.93	2.740	0.20(0.12)	0.58	67.7	129.00
24	183.16	9.93	2.740	0.20(0.12)	0.58	67.7	25.00
25	183.86	10.20	2.699	0.20(0.12)	0.58	69.2	64.00
26	184.25	10.37	2.673	0.20(0.12)	0.58	70.2	134.00
27	184.26	10.37	2.672	0.20(0.12)	0.58	70.2	61.00
28	184.41	10.48	2.657	0.20(0.12)	0.58	70.7	32.00
29	184.56	10.59	2.640	0.20(0.12)	0.58	71.3	116.00
30	184.56	10.60	2.640	0.20(0.12)	0.58	71.3	78.00
31	184.37	11.21	2.556	0.20(0.12)	0.58	74.1	76.00
32	184.34	11.27	2.548	0.20(0.12)	0.58	74.4	14.00
33	184.34	11.28	2.547	0.20(0.12)	0.58	74.4	82.00
34	184.28	11.35	2.538	0.20(0.12)	0.58	74.7	67.00
35	184.09	11.53	2.515	0.20(0.12)	0.58	75.5	53.00
36	183.98	11.61	2.506	0.20(0.12)	0.58	75.8	43.00
37	183.75	11.73	2.491	0.20(0.12)	0.58	76.2	33.00
38	183.67	11.75	2.487	0.20(0.12)	0.58	76.3	56.00
39	183.34	11.87	2.473	0.20(0.12)	0.58	76.7	41.00
40	183.29	11.89	2.471	0.20(0.12)	0.58	76.8	114.00
41	182.92	12.00	2.458	0.20(0.12)	0.58	77.1	100.00
42	180.98	12.49	2.403	0.20(0.12)	0.58	78.4	127.00
43	180.53	12.59	2.391	0.20(0.12)	0.58	78.6	13.00
44	180.01	12.71	2.378	0.20(0.12)	0.58	78.9	123.00
45	179.22	12.88	2.361	0.20(0.12)	0.58	79.2	97.00
46	178.25	13.07	2.341	0.20(0.12)	0.58	79.6	19.00
47	178.12	13.09	2.338	0.20(0.12)	0.58	79.7	29.00
48	177.67	13.18	2.330	0.20(0.12)	0.58	79.8	120.00
49	177.59	13.19	2.329	0.20(0.12)	0.58	79.8	33.00
50	177.19	13.26	2.322	0.20(0.12)	0.58	79.9	111.00

51	176.99	13.29	2.319	0.20(0.12)	0.58	80.0	73.00
52	172.65	14.00	2.250	0.20(0.12)	0.58	80.7	16.00
53	170.78	14.33	2.221	0.20(0.12)	0.58	81.0	17.00
54	167.59	14.87	2.174	0.20(0.12)	0.58	81.5	22.00
55	167.13	14.95	2.167	0.20(0.12)	0.58	81.6	10.00
56	165.42	15.22	2.145	0.20(0.12)	0.58	81.7	7.00
57	159.07	16.24	2.067	0.20(0.12)	0.58	82.1	4.00
58	149.37	17.95	1.951	0.20(0.12)	0.58	82.3	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 230.00 = 4035.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	225.15	5.07	4.028	0.20(0.11)	0.55	53.2	140.00
2	232.22	5.47	3.856	0.20(0.11)	0.55	57.4	215.00
3	239.27	5.87	3.702	0.20(0.11)	0.55	61.8	104.00
4	245.70	6.24	3.575	0.20(0.11)	0.55	66.0	183.00
5	248.15	6.38	3.530	0.20(0.11)	0.55	67.6	88.00
6	249.84	6.48	3.499	0.20(0.11)	0.55	68.8	63.00
7	251.26	6.56	3.474	0.20(0.11)	0.55	69.8	195.00
8	252.02	6.61	3.460	0.20(0.11)	0.55	70.3	47.00
9	253.29	6.68	3.437	0.20(0.11)	0.55	71.2	45.00
10	256.46	6.88	3.380	0.20(0.11)	0.55	73.7	170.00
11	260.07	7.11	3.318	0.20(0.11)	0.55	76.4	175.00
12	261.74	7.22	3.290	0.20(0.11)	0.55	77.7	161.00
13	263.37	7.32	3.263	0.20(0.11)	0.55	79.0	59.00
14	263.97	7.36	3.253	0.20(0.11)	0.55	79.5	95.00
15	266.42	7.53	3.211	0.20(0.11)	0.55	81.5	174.00
16	267.12	7.58	3.199	0.20(0.11)	0.55	82.1	118.00
17	267.83	7.63	3.187	0.20(0.11)	0.55	82.8	59.00
18	269.99	7.78	3.151	0.20(0.11)	0.55	84.7	138.00
19	271.11	7.86	3.132	0.20(0.11)	0.55	85.6	192.00
20	271.51	7.89	3.126	0.20(0.11)	0.55	86.0	173.00
21	271.80	7.91	3.121	0.20(0.11)	0.55	86.3	150.00
22	276.36	8.26	3.044	0.20(0.11)	0.55	90.5	141.00
23	278.37	8.42	3.011	0.20(0.11)	0.55	92.5	14.00
24	281.68	8.69	2.958	0.20(0.11)	0.55	95.6	223.00
25	281.94	8.71	2.954	0.20(0.11)	0.55	95.9	31.00
26	282.85	8.79	2.939	0.20(0.11)	0.55	96.8	199.00
27	284.07	8.90	2.918	0.20(0.11)	0.55	98.1	167.00
28	284.09	8.90	2.918	0.20(0.11)	0.55	98.1	85.00
29	284.10	8.90	2.918	0.20(0.11)	0.55	98.1	97.00
30	284.66	8.96	2.906	0.20(0.11)	0.55	98.8	136.00
31	285.46	9.06	2.888	0.20(0.11)	0.55	99.9	191.10
32	285.60	9.07	2.885	0.20(0.11)	0.55	100.0	38.00
33	285.89	9.11	2.878	0.20(0.11)	0.55	100.4	80.00
34	285.90	9.11	2.878	0.20(0.11)	0.55	100.5	154.00
35	287.17	9.30	2.844	0.20(0.11)	0.56	102.4	201.00
36	287.57	9.37	2.833	0.20(0.11)	0.56	103.0	6.00
37	287.62	9.38	2.831	0.20(0.11)	0.56	103.1	64.00
38	287.67	9.39	2.830	0.20(0.11)	0.56	103.2	190.00
39	287.76	9.40	2.827	0.20(0.11)	0.56	103.3	200.00
40	288.34	9.51	2.808	0.20(0.11)	0.56	104.4	220.00
41	288.48	9.54	2.803	0.20(0.11)	0.56	104.7	92.00
42	288.81	9.62	2.790	0.20(0.11)	0.56	105.4	35.00
43	289.00	9.67	2.781	0.20(0.11)	0.56	105.9	24.00
44	289.28	9.75	2.769	0.20(0.11)	0.56	106.6	46.00
45	289.60	9.85	2.753	0.20(0.11)	0.56	107.4	19.00
46	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	129.00
47	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	25.00
48	290.10	10.03	2.724	0.20(0.11)	0.56	109.0	213.00
49	290.44	10.20	2.699	0.20(0.11)	0.56	110.4	64.00
50	290.46	10.20	2.697	0.20(0.11)	0.56	110.4	16.00
51	290.55	10.27	2.687	0.20(0.11)	0.56	111.0	168.00
52	290.65	10.37	2.673	0.20(0.11)	0.56	111.8	134.00
53	290.66	10.37	2.672	0.20(0.11)	0.56	111.8	61.00
54	290.66	10.38	2.671	0.20(0.11)	0.56	111.8	169.00
55	290.67	10.48	2.657	0.20(0.11)	0.56	112.5	32.00
56	290.67	10.59	2.640	0.20(0.11)	0.56	113.4	116.00
57	290.67	10.60	2.640	0.20(0.11)	0.56	113.4	78.00
58	290.08	10.96	2.589	0.20(0.11)	0.56	115.8	179.00

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    59      289.64   11.21    2.556  0.20( 0.11) 0.56     117.4      76.00
    60      289.51   11.27    2.548  0.20( 0.11) 0.56     117.9      14.00
    61      289.50   11.28    2.547  0.20( 0.11) 0.56     117.9      82.00
    62      289.33   11.35    2.538  0.20( 0.11) 0.56     118.4      67.00
    63      288.91   11.52    2.517  0.20( 0.11) 0.56     119.4     181.00
    64      288.86   11.53    2.515  0.20( 0.11) 0.56     119.5      53.00
    65      288.64   11.60    2.506  0.20( 0.11) 0.56     119.8     160.00
    66      288.61   11.61    2.506  0.20( 0.11) 0.56     119.9      43.00
    67      288.51   11.63    2.502  0.20( 0.11) 0.56     120.0     159.00
    68      288.45   11.65    2.501  0.20( 0.11) 0.56     120.1     211.00
    69      288.41   11.65    2.500  0.20( 0.11) 0.56     120.1      17.00
    70      288.07   11.73    2.491  0.20( 0.11) 0.56     120.5      33.00
    71      287.91   11.75    2.487  0.20( 0.11) 0.56     120.6      56.00
    72      287.22   11.87    2.473  0.20( 0.11) 0.56     121.2      41.00
    73      287.11   11.89    2.471  0.20( 0.11) 0.56     121.2     114.00
    74      286.44   12.00    2.458  0.20( 0.11) 0.56     121.7     100.00
    75      285.84   12.08    2.448  0.20( 0.11) 0.56     122.0     187.00
    76      283.09   12.47    2.405  0.20( 0.11) 0.56     123.4      10.00
    77      282.97   12.49    2.403  0.20( 0.11) 0.56     123.5     127.00
    78      282.20   12.59    2.391  0.20( 0.11) 0.56     123.9      13.00
    79      281.88   12.64    2.386  0.20( 0.11) 0.56     124.0     184.00
    80      281.27   12.71    2.378  0.20( 0.11) 0.56     124.2     123.00
    81      280.89   12.76    2.373  0.20( 0.11) 0.56     124.4     208.00
    82      279.85   12.88    2.361  0.20( 0.11) 0.56     124.7      97.00
    83      278.13   13.07    2.341  0.20( 0.11) 0.56     125.2      19.00
    84      277.90   13.09    2.338  0.20( 0.11) 0.56     125.2      29.00
    85      277.23   13.16    2.331  0.20( 0.11) 0.56     125.4     184.00
    86      277.13   13.18    2.330  0.20( 0.11) 0.56     125.4     120.00
    87      276.99   13.19    2.329  0.20( 0.11) 0.56     125.4      33.00
    88      276.31   13.26    2.322  0.20( 0.11) 0.56     125.5     111.00
    89      275.97   13.29    2.319  0.20( 0.11) 0.56     125.6      73.00
    90      274.79   13.40    2.307  0.20( 0.11) 0.56     125.8     147.00
    91      271.62   13.72    2.277  0.20( 0.11) 0.56     126.2     152.00
    92      268.89   14.00    2.250  0.20( 0.11) 0.56     126.6      16.00
    93      265.91   14.33    2.221  0.20( 0.11) 0.56     127.0      17.00
    94      260.83   14.87    2.174  0.20( 0.11) 0.56     127.6      22.00
    95      260.11   14.95    2.167  0.20( 0.11) 0.56     127.7      10.00
    96      257.47   15.22    2.145  0.20( 0.11) 0.56     127.9       7.00
    97      247.60   16.24    2.067  0.20( 0.11) 0.56     128.4       4.00
    98      242.66   16.78    2.028  0.20( 0.11) 0.56     128.6     144.00
    99      232.51   17.95    1.951  0.20( 0.11) 0.56     128.8       1.00
    **      226.08   18.77    1.902  0.20( 0.11) 0.56     128.9     147.00
  TOTAL AREA(ACRES) =       128.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      290.67  Tc(MIN.) =   10.475
  EFFECTIVE AREA(ACRES) =    112.52  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      128.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

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  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
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  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      128.9  TC(MIN.) =     10.48
  EFFECTIVE AREA(ACRES) =    112.52  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.557
  PEAK FLOW RATE(CFS)   =     290.67

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      225.15    5.07    4.028  0.20( 0.11) 0.55      53.2     140.00
      2      232.22    5.47    3.856  0.20( 0.11) 0.55      57.4     215.00
      3      239.27    5.87    3.702  0.20( 0.11) 0.55      61.8     104.00
      4      245.70    6.24    3.575  0.20( 0.11) 0.55      66.0     183.00
      5      248.15    6.38    3.530  0.20( 0.11) 0.55      67.6      88.00
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6	249.84	6.48	3.499	0.20(0.11)	0.55	68.8	63.00
7	251.26	6.56	3.474	0.20(0.11)	0.55	69.8	195.00
8	252.02	6.61	3.460	0.20(0.11)	0.55	70.3	47.00
9	253.29	6.68	3.437	0.20(0.11)	0.55	71.2	45.00
10	256.46	6.88	3.380	0.20(0.11)	0.55	73.7	170.00
11	260.07	7.11	3.318	0.20(0.11)	0.55	76.4	175.00
12	261.74	7.22	3.290	0.20(0.11)	0.55	77.7	161.00
13	263.37	7.32	3.263	0.20(0.11)	0.55	79.0	59.00
14	263.97	7.36	3.253	0.20(0.11)	0.55	79.5	95.00
15	266.42	7.53	3.211	0.20(0.11)	0.55	81.5	174.00
16	267.12	7.58	3.199	0.20(0.11)	0.55	82.1	118.00
17	267.83	7.63	3.187	0.20(0.11)	0.55	82.8	59.00
18	269.99	7.78	3.151	0.20(0.11)	0.55	84.7	138.00
19	271.11	7.86	3.132	0.20(0.11)	0.55	85.6	192.00
20	271.51	7.89	3.126	0.20(0.11)	0.55	86.0	173.00
21	271.80	7.91	3.121	0.20(0.11)	0.55	86.3	150.00
22	276.36	8.26	3.044	0.20(0.11)	0.55	90.5	141.00
23	278.37	8.42	3.011	0.20(0.11)	0.55	92.5	14.00
24	281.68	8.69	2.958	0.20(0.11)	0.55	95.6	223.00
25	281.94	8.71	2.954	0.20(0.11)	0.55	95.9	31.00
26	282.85	8.79	2.939	0.20(0.11)	0.55	96.8	199.00
27	284.07	8.90	2.918	0.20(0.11)	0.55	98.1	167.00
28	284.09	8.90	2.918	0.20(0.11)	0.55	98.1	85.00
29	284.10	8.90	2.918	0.20(0.11)	0.55	98.1	97.00
30	284.66	8.96	2.906	0.20(0.11)	0.55	98.8	136.00
31	285.46	9.06	2.888	0.20(0.11)	0.55	99.9	191.10
32	285.60	9.07	2.885	0.20(0.11)	0.55	100.0	38.00
33	285.89	9.11	2.878	0.20(0.11)	0.55	100.4	80.00
34	285.90	9.11	2.878	0.20(0.11)	0.55	100.5	154.00
35	287.17	9.30	2.844	0.20(0.11)	0.56	102.4	201.00
36	287.57	9.37	2.833	0.20(0.11)	0.56	103.0	6.00
37	287.62	9.38	2.831	0.20(0.11)	0.56	103.1	64.00
38	287.67	9.39	2.830	0.20(0.11)	0.56	103.2	190.00
39	287.76	9.40	2.827	0.20(0.11)	0.56	103.3	200.00
40	288.34	9.51	2.808	0.20(0.11)	0.56	104.4	220.00
41	288.48	9.54	2.803	0.20(0.11)	0.56	104.7	92.00
42	288.81	9.62	2.790	0.20(0.11)	0.56	105.4	35.00
43	289.00	9.67	2.781	0.20(0.11)	0.56	105.9	24.00
44	289.28	9.75	2.769	0.20(0.11)	0.56	106.6	46.00
45	289.60	9.85	2.753	0.20(0.11)	0.56	107.4	19.00
46	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	129.00
47	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	25.00
48	290.10	10.03	2.724	0.20(0.11)	0.56	109.0	213.00
49	290.44	10.20	2.699	0.20(0.11)	0.56	110.4	64.00
50	290.46	10.20	2.697	0.20(0.11)	0.56	110.4	16.00
51	290.55	10.27	2.687	0.20(0.11)	0.56	111.0	168.00
52	290.65	10.37	2.673	0.20(0.11)	0.56	111.8	134.00
53	290.66	10.37	2.672	0.20(0.11)	0.56	111.8	61.00
54	290.66	10.38	2.671	0.20(0.11)	0.56	111.8	169.00
55	290.67	10.48	2.657	0.20(0.11)	0.56	112.5	32.00
56	290.67	10.59	2.640	0.20(0.11)	0.56	113.4	116.00
57	290.67	10.60	2.640	0.20(0.11)	0.56	113.4	78.00
58	290.08	10.96	2.589	0.20(0.11)	0.56	115.8	179.00
59	289.64	11.21	2.556	0.20(0.11)	0.56	117.4	76.00
60	289.51	11.27	2.548	0.20(0.11)	0.56	117.9	14.00
61	289.50	11.28	2.547	0.20(0.11)	0.56	117.9	82.00
62	289.33	11.35	2.538	0.20(0.11)	0.56	118.4	67.00
63	288.91	11.52	2.517	0.20(0.11)	0.56	119.4	181.00
64	288.86	11.53	2.515	0.20(0.11)	0.56	119.5	53.00
65	288.64	11.60	2.506	0.20(0.11)	0.56	119.8	160.00
66	288.61	11.61	2.506	0.20(0.11)	0.56	119.9	43.00
67	288.51	11.63	2.502	0.20(0.11)	0.56	120.0	159.00
68	288.45	11.65	2.501	0.20(0.11)	0.56	120.1	211.00
69	288.41	11.65	2.500	0.20(0.11)	0.56	120.1	17.00
70	288.07	11.73	2.491	0.20(0.11)	0.56	120.5	33.00
71	287.91	11.75	2.487	0.20(0.11)	0.56	120.6	56.00
72	287.22	11.87	2.473	0.20(0.11)	0.56	121.2	41.00
73	287.11	11.89	2.471	0.20(0.11)	0.56	121.2	114.00
74	286.44	12.00	2.458	0.20(0.11)	0.56	121.7	100.00
75	285.84	12.08	2.448	0.20(0.11)	0.56	122.0	187.00
76	283.09	12.47	2.405	0.20(0.11)	0.56	123.4	10.00

77	282.97	12.49	2.403	0.20(0.11)	0.56	123.5	127.00
78	282.20	12.59	2.391	0.20(0.11)	0.56	123.9	13.00
79	281.88	12.64	2.386	0.20(0.11)	0.56	124.0	184.00
80	281.27	12.71	2.378	0.20(0.11)	0.56	124.2	123.00
81	280.89	12.76	2.373	0.20(0.11)	0.56	124.4	208.00
82	279.85	12.88	2.361	0.20(0.11)	0.56	124.7	97.00
83	278.13	13.07	2.341	0.20(0.11)	0.56	125.2	19.00
84	277.90	13.09	2.338	0.20(0.11)	0.56	125.2	29.00
85	277.23	13.16	2.331	0.20(0.11)	0.56	125.4	184.00
86	277.13	13.18	2.330	0.20(0.11)	0.56	125.4	120.00
87	276.99	13.19	2.329	0.20(0.11)	0.56	125.4	33.00
88	276.31	13.26	2.322	0.20(0.11)	0.56	125.5	111.00
89	275.97	13.29	2.319	0.20(0.11)	0.56	125.6	73.00
90	274.79	13.40	2.307	0.20(0.11)	0.56	125.8	147.00
91	271.62	13.72	2.277	0.20(0.11)	0.56	126.2	152.00
92	268.89	14.00	2.250	0.20(0.11)	0.56	126.6	16.00
93	265.91	14.33	2.221	0.20(0.11)	0.56	127.0	17.00
94	260.83	14.87	2.174	0.20(0.11)	0.56	127.6	22.00
95	260.11	14.95	2.167	0.20(0.11)	0.56	127.7	10.00
96	257.47	15.22	2.145	0.20(0.11)	0.56	127.9	7.00
97	247.60	16.24	2.067	0.20(0.11)	0.56	128.4	4.00
98	242.66	16.78	2.028	0.20(0.11)	0.56	128.6	144.00
99	232.51	17.95	1.951	0.20(0.11)	0.56	128.8	1.00
**	226.08	18.77	1.902	0.20(0.11)	0.56	128.9	147.00

END OF RATIONAL METHOD ANALYSIS

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A' (CONTINUE)                                 *
 ************************************************************************

  FILE NAME: EAST-2.DAT
  TIME/DATE OF STUDY: 13:14 01/05/2022
================================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
================================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.48   RAINFALL INTENSITY(INCH/HR) =  2.66
  EFFECTIVE AREA(ACRES) =   112.52
  TOTAL AREA(ACRES) =   128.90        PEAK FLOW RATE(CFS) =    290.70
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.56
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  57.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.57
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     290.70
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.75
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.60      0.20     0.900    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.58
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.58

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.92      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.79
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.03
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    2.25
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       3.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   4.09
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.72

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    75    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   10.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.635
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.63
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.72   10.46    2.660  0.20( 0.18) 0.90       1.5     231.00
      2        2.21   10.63    2.635  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.46    2.660  0.20( 0.15) 0.76       2.5     231.00
      2        5.89   10.63    2.635  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.91    Tc(MIN.) =    10.46
  EFFECTIVE AREA(ACRES) =       2.47   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.47
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.403
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.76    2.616  0.20( 0.15) 0.76       2.5     231.00
      1        5.89   10.93    2.593  0.20( 0.15) 0.76       2.5     234.00
      2        1.65    6.80    3.403  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.58    6.80    3.403  0.20( 0.14) 0.72       2.1     237.00
     2        7.17   10.76    2.616  0.20( 0.15) 0.73       3.0     231.00
     3        7.14   10.93    2.593  0.20( 0.15) 0.73       3.0     234.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.17    Tc(MIN.) =    10.76
 EFFECTIVE AREA(ACRES) =       3.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
 TOTAL AREA(ACRES) =        3.0
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.17
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.78
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.78
 RAINFALL INTENSITY(INCH/HR) =   2.61
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.73
 EFFECTIVE STREAM AREA(ACRES) =       3.03
 TOTAL STREAM AREA(ACRES) =       3.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.17

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
 ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.77
 TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.58    6.82    3.397  0.20( 0.14) 0.72       2.1     237.00
      1        7.17   10.78    2.614  0.20( 0.15) 0.73       3.0     231.00
      1        7.14   10.95    2.590  0.20( 0.15) 0.73       3.0     234.00
      2        1.77    5.00    4.060  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.00    4.060  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.82    3.397  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.78    2.614  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   10.95    2.590  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.31    Tc(MIN.) =    10.78
  EFFECTIVE AREA(ACRES) =       3.52   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.05    4.038  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.87    3.384  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.83    2.607  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   11.00    2.584  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      290.70   10.75    2.619  0.20( 0.11) 0.56     112.5     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      221.39    5.05    4.038  0.20( 0.11) 0.56      54.9     219.00
      2      250.62    6.87    3.384  0.20( 0.11) 0.56      74.5     237.00
      3      299.00   10.75    2.619  0.20( 0.11) 0.56     116.0     230.00
      4      297.70   10.83    2.607  0.20( 0.11) 0.56     116.0     231.00
      5      294.98   11.00    2.584  0.20( 0.11) 0.56     116.1     234.00
    TOTAL AREA(ACRES) =       132.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      299.00  Tc(MIN.) =   10.747
  EFFECTIVE AREA(ACRES) =    116.03  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      132.4
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  58.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.74
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     299.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =     116.03
  TOTAL STREAM AREA(ACRES) =     132.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     299.00

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.573
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        0.51      0.20     0.400    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA RUNOFF(CFS) =      1.60
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.60

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.25
 RAINFALL INTENSITY(INCH/HR) =   3.57
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.60

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      221.39    5.08    4.024  0.20( 0.11) 0.56      54.9     219.00
     1      250.62    6.90    3.376  0.20( 0.11) 0.56      74.5     237.00
     1      299.00   10.77    2.615  0.20( 0.11) 0.56     116.0     230.00
     1      297.70   10.86    2.603  0.20( 0.11) 0.56     116.0     231.00
     1      294.98   11.03    2.580  0.20( 0.11) 0.56     116.1     234.00
     2        1.60    6.25    3.573  0.20( 0.08) 0.40       0.5     241.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      222.86    5.08    4.024  0.20( 0.11) 0.56      55.3     219.00
     2      241.78    6.25    3.573  0.20( 0.11) 0.56      68.0     241.00
     3      252.13    6.90    3.376  0.20( 0.11) 0.56      75.1     237.00
     4      300.16   10.77    2.615  0.20( 0.11) 0.56     116.5     230.00
     5      298.86   10.86    2.603  0.20( 0.11) 0.56     116.6     231.00
     6      296.13   11.03    2.580  0.20( 0.11) 0.56     116.6     234.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     300.16    Tc(MIN.) =    10.77
 EFFECTIVE AREA(ACRES) =     116.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =      132.9
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.194
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    75    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   8.83   Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        3.25      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    5.71
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =       6.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.19      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.32
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       6.74
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         3.8  TC(MIN.) =     16.43
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =       6.74
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A' - WITH 2 FLOW-BY DETENTION BASINS          *
 ************************************************************************

  FILE NAME: EASTB10.DAT
  TIME/DATE OF STUDY: 16:23 01/10/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.77      0.20      0.600    75   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      1.71
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  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   12.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.38
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.19
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.12
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 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.95
 TOTAL STREAM AREA(ACRES) =       1.95
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.94

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.747
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    75    9.88
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      2.46
 TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   12.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
 STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =   11.58
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.508
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    2.21
 EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.85
 FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
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  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94   13.19    2.328  0.20( 0.12) 0.60       1.9       1.00
      2        4.45   11.58    2.508  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.19   11.58    2.508  0.20( 0.12) 0.60       3.8       4.00
      2        8.05   13.19    2.328  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.19    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =       3.78   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.19
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.63
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.19
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****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   10.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.634
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.87
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
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  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19   11.63    2.502  0.20( 0.12) 0.60       3.8       4.00
      1        8.05   13.24    2.323  0.20( 0.12) 0.60       4.0       1.00
      2        4.49   10.64    2.634  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.64    2.634  0.20( 0.11) 0.56       5.4       7.00
      2       12.45   11.63    2.502  0.20( 0.11) 0.57       5.8       4.00
      3       11.99   13.24    2.323  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.45    Tc(MIN.) =    11.63
  EFFECTIVE AREA(ACRES) =       5.75   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.45
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.66
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.75
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.45

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.858
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    75    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.71

********************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.669
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    1.72
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.66    2.631  0.20( 0.11) 0.56       5.4       7.00
      1       12.45   11.66    2.499  0.20( 0.11) 0.57       5.8       4.00
      1       11.99   13.26    2.321  0.20( 0.11) 0.57       6.0       1.00
      2        3.32   10.39    2.669  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.39    2.669  0.20( 0.11) 0.56       6.7      10.00
      2       15.66   10.66    2.631  0.20( 0.11) 0.56       6.9       7.00
      3       15.54   11.66    2.499  0.20( 0.11) 0.56       7.2       4.00
      4       14.86   13.26    2.321  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.66    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.66
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.94
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.66

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.62

********************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.35

********************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.68    2.629  0.20( 0.11) 0.56       6.7       10.00
      1       15.66   10.94    2.592  0.20( 0.11) 0.56       6.9        7.00
      1       15.54   11.94    2.465  0.20( 0.11) 0.56       7.2        4.00
      1       14.86   13.55    2.293  0.20( 0.11) 0.56       7.4        1.00
      2        1.35    5.00    4.060  0.20( 0.02) 0.10       0.4        6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.80    5.00    4.060  0.20( 0.10) 0.51       3.5        6.00
      2       16.45   10.68    2.629  0.20( 0.11) 0.54       7.1       10.00
      3       16.52   10.94    2.592  0.20( 0.11) 0.54       7.2        7.00
      4       16.36   11.94    2.465  0.20( 0.11) 0.54       7.6        4.00
      5       15.62   13.55    2.293  0.20( 0.11) 0.54       7.8        1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    10.94
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.97
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   3.35
  AREA-AVERAGED Fm(INCH/HR) =  0.02
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.80    5.03    4.044  0.20( 0.10) 0.51       3.5       6.00
      1       16.45   10.71    2.624  0.20( 0.11) 0.54       7.1      10.00
      1       16.52   10.97    2.587  0.20( 0.11) 0.54       7.2       7.00
      1       16.36   11.97    2.461  0.20( 0.11) 0.54       7.6       4.00
      1       15.62   13.58    2.290  0.20( 0.11) 0.54       7.8       1.00
      2        1.17    6.99    3.351  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.81    5.03    4.044  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    6.99    3.351  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.71    2.624  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   10.97    2.587  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   11.97    2.461  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.58    2.290  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.42    Tc(MIN.) =    10.97
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.42
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    75    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.76    9.03    2.893  0.20( 0.10) 0.50       0.7      16.00
      2        2.27    9.34    2.837  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.00    9.03    2.893  0.20( 0.11) 0.56       1.6      16.00
      2        4.00    9.34    2.837  0.20( 0.11) 0.56       1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.00    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.00
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.22      0.20     0.100    75    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    8.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.64
  FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.97

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.00    9.35    2.837  0.20( 0.11) 0.56       1.6      16.00
      1        4.00    9.66    2.784  0.20( 0.11) 0.56       1.6      17.00
      2        0.97    8.41    3.013  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.41    3.013  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.35    2.837  0.20( 0.09) 0.47       2.0      16.00
```

```
     3        4.89    9.66    2.784  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.92    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.88    2.920  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.82    2.758  0.20( 0.09) 0.47       2.0      16.00
      3        4.89   10.13    2.709  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.81    5.08    4.025  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    7.03    3.340  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.75    2.619  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   11.01    2.582  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   12.01    2.457  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.62    2.286  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    5.08    4.025  0.20( 0.10) 0.48       4.8       6.00
      2       19.59    7.03    3.340  0.20( 0.10) 0.48       6.6      14.00
      3       21.10    8.88    2.920  0.20( 0.10) 0.49       8.1      19.00
      4       21.75    9.82    2.758  0.20( 0.10) 0.50       8.9      16.00
      5       21.90   10.13    2.709  0.20( 0.10) 0.50       9.1      17.00
      6       22.09   10.75    2.619  0.20( 0.10) 0.51       9.5      10.00
      7       22.07   11.01    2.582  0.20( 0.10) 0.51       9.6       7.00
      8       21.64   12.01    2.457  0.20( 0.10) 0.51       9.9       4.00
      9       20.51   13.62    2.286  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.09  Tc(MIN.) =   10.746
  EFFECTIVE AREA(ACRES) =      9.48  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.09
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.94
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.48
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.09

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    75    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.61   Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.79
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       2.78

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    6.34    3.542  0.20( 0.10) 0.48       4.8       6.00
      1       19.59    8.28    3.041  0.20( 0.10) 0.48       6.6      14.00
```

```
     1       21.10   10.09    2.715  0.20( 0.10) 0.49       8.1      19.00
     1       21.75   11.01    2.582  0.20( 0.10) 0.50       8.9      16.00
     1       21.90   11.32    2.541  0.20( 0.10) 0.50       9.1      17.00
     1       22.09   11.94    2.465  0.20( 0.10) 0.51       9.5      10.00
     1       22.07   12.21    2.434  0.20( 0.10) 0.51       9.6       7.00
     1       21.64   13.21    2.327  0.20( 0.10) 0.51       9.9       4.00
     1       20.51   14.87    2.174  0.20( 0.10) 0.51      10.2       1.00
     2        2.78    9.61    2.791  0.20( 0.03) 0.16       1.1      13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.97    6.34    3.542  0.20( 0.09) 0.44       5.6       6.00
      2       22.20    8.28    3.041  0.20( 0.09) 0.44       7.5      14.00
      3       23.48    9.61    2.791  0.20( 0.09) 0.45       8.8      13.00
      4       23.80   10.09    2.715  0.20( 0.09) 0.45       9.2      19.00
      5       24.32   11.01    2.582  0.20( 0.09) 0.46      10.0      16.00
      6       24.43   11.32    2.541  0.20( 0.09) 0.47      10.2      17.00
      7       24.54   11.94    2.465  0.20( 0.09) 0.47      10.6      10.00
      8       24.49   12.21    2.434  0.20( 0.09) 0.47      10.7       7.00
      9       23.95   13.21    2.327  0.20( 0.09) 0.47      11.1       4.00
     10       22.67   14.87    2.174  0.20( 0.10) 0.48      11.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.54    Tc(MIN.) =    11.94
  EFFECTIVE AREA(ACRES) =      10.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.60
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.54

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.14      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.64      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.25
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =    5.92
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    2.02
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   3.65
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.07
  RAINFALL INTENSITY(INCH/HR) =   3.33
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.97    6.49    3.495  0.20( 0.09) 0.44       5.6       6.00
      1       22.20    8.42    3.011  0.20( 0.09) 0.44       7.5      14.00
      1       23.48    9.75    2.768  0.20( 0.09) 0.45       8.8      13.00
      1       23.80   10.23    2.694  0.20( 0.09) 0.45       9.2      19.00
      1       24.32   11.15    2.564  0.20( 0.09) 0.46      10.0      16.00
      1       24.43   11.46    2.523  0.20( 0.09) 0.47      10.2      17.00
      1       24.54   12.08    2.449  0.20( 0.09) 0.47      10.6      10.00
      1       24.49   12.35    2.418  0.20( 0.09) 0.47      10.7       7.00
      1       23.95   13.35    2.312  0.20( 0.09) 0.47      11.1       4.00
      1       22.67   15.01    2.162  0.20( 0.10) 0.48      11.3       1.00
      2        2.48    7.07    3.330  0.20( 0.15) 0.76       0.8      25.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.36    6.49    3.495  0.20( 0.09) 0.47       6.3       6.00
      2       23.11    7.07    3.330  0.20( 0.09) 0.47       6.9      25.00
      3       24.43    8.42    3.011  0.20( 0.09) 0.47       8.3      14.00
      4       25.53    9.75    2.768  0.20( 0.09) 0.47       9.6      13.00
      5       25.79   10.23    2.694  0.20( 0.10) 0.48      10.0      19.00
      6       26.20   11.15    2.564  0.20( 0.10) 0.48      10.8      16.00
      7       26.28   11.46    2.523  0.20( 0.10) 0.49      11.0      17.00
      8       26.34   12.08    2.449  0.20( 0.10) 0.49      11.4      10.00
      9       26.26   12.35    2.418  0.20( 0.10) 0.49      11.5       7.00
     10       25.64   13.35    2.312  0.20( 0.10) 0.49      11.8       4.00
     11       24.24   15.01    2.162  0.20( 0.10) 0.50      12.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.34    Tc(MIN.) =    12.08
  EFFECTIVE AREA(ACRES) =      11.38   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.34
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.16
  RAINFALL INTENSITY(INCH/HR) =   2.44
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      11.38
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.34

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.78   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.678
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  3.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   2.68
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.00

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.57    3.470  0.20( 0.09) 0.47       6.3       6.00
     1       23.11    7.15    3.308  0.20( 0.09) 0.47       6.9      25.00
     1       24.43    8.50    2.995  0.20( 0.09) 0.47       8.3      14.00
     1       25.53    9.83    2.755  0.20( 0.09) 0.47       9.6      13.00
     1       25.79   10.31    2.682  0.20( 0.10) 0.48      10.0      19.00
     1       26.20   11.23    2.553  0.20( 0.10) 0.48      10.8      16.00
     1       26.28   11.54    2.513  0.20( 0.10) 0.49      11.0      17.00
     1       26.34   12.16    2.440  0.20( 0.10) 0.49      11.4      10.00
     1       26.26   12.43    2.409  0.20( 0.10) 0.49      11.5       7.00
     1       25.64   13.43    2.304  0.20( 0.10) 0.49      11.8       4.00
     1       24.24   15.09    2.156  0.20( 0.10) 0.50      12.1       1.00
     2        5.00   10.34    2.678  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       26.52    6.57    3.470  0.20( 0.10) 0.50       7.7       6.00
     2       27.42    7.15    3.308  0.20( 0.10) 0.50       8.4      25.00
     3       29.05    8.50    2.995  0.20( 0.10) 0.50      10.1      14.00
     4       30.42    9.83    2.755  0.20( 0.10) 0.50      11.7      13.00
     5       30.78   10.31    2.682  0.20( 0.10) 0.50      12.2      19.00
     6       30.79   10.34    2.678  0.20( 0.10) 0.50      12.2      29.00
     7       30.95   11.23    2.553  0.20( 0.10) 0.50      12.9      16.00
     8       30.96   11.54    2.513  0.20( 0.10) 0.50      13.2      17.00
     9       30.87   12.16    2.440  0.20( 0.10) 0.51      13.6      10.00
    10       30.73   12.43    2.409  0.20( 0.10) 0.51      13.7       7.00
    11       29.90   13.43    2.304  0.20( 0.10) 0.51      14.0       4.00
    12       28.22   15.09    2.156  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      30.96    Tc(MIN.) =    11.54
 EFFECTIVE AREA(ACRES) =      13.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.89
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.96
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.89
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      13.16
  TOTAL STREAM AREA(ACRES) =      14.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.96

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.281
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.24      0.20      0.100    75    7.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.25
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.70

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.568
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20      0.100    75    6.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   3.57
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.52    6.94    3.364  0.20( 0.10) 0.50       7.7       6.00
      1       27.42    7.51    3.215  0.20( 0.10) 0.50       8.4      25.00
      1       29.05    8.86    2.924  0.20( 0.10) 0.50      10.1      14.00
      1       30.42   10.18    2.701  0.20( 0.10) 0.50      11.7      13.00
      1       30.78   10.66    2.631  0.20( 0.10) 0.50      12.2      19.00
      1       30.79   10.68    2.628  0.20( 0.10) 0.50      12.2      29.00
      1       30.95   11.58    2.509  0.20( 0.10) 0.50      12.9      16.00
      1       30.96   11.89    2.471  0.20( 0.10) 0.50      13.2      17.00
      1       30.87   12.51    2.401  0.20( 0.10) 0.51      13.6      10.00
      1       30.73   12.77    2.372  0.20( 0.10) 0.51      13.7       7.00
      1       29.90   13.78    2.271  0.20( 0.10) 0.51      14.0       4.00
      1       28.22   15.45    2.127  0.20( 0.10) 0.51      14.2       1.00
      2        0.70    7.25    3.281  0.20( 0.02) 0.10       0.2      24.00
      3        0.80    6.26    3.568  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.26    3.568  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    6.94    3.364  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.25    3.281  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.51    3.215  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.86    2.924  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.18    2.701  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.66    2.631  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.68    2.628  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.58    2.509  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.89    2.471  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.51    2.401  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.77    2.372  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.78    2.271  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.45    2.127  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.05    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =      13.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.05
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.66
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        D        1.20      0.20      0.600    75    8.46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.11
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
 FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
 STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.33
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    8.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
 STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    9.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.855
 SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.99      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.99      SUBAREA RUNOFF(CFS) =     2.44
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  5.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.435
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.73      0.20      0.600    75    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
 STREET FLOW TRAVEL TIME(MIN.) =   0.43   Tc(MIN.) =    7.13
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.314
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.24
 EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       3.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
 FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
 LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.13
 RAINFALL INTENSITY(INCH/HR) =   3.31
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.16
 TOTAL STREAM AREA(ACRES) =       1.16
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        5.39    9.24    2.855  0.20( 0.12) 0.60       2.2      33.00
     2        3.33    7.13    3.314  0.20( 0.12) 0.60       1.2      35.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.19    7.13    3.314  0.20( 0.12) 0.60       2.8      35.00
     2        8.25    9.24    2.855  0.20( 0.12) 0.60       3.4      33.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.25    Tc(MIN.) =     9.24
 EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        3.4
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19    7.28    3.272  0.20( 0.12) 0.60       2.8      35.00
      2        8.25    9.40    2.827  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.35    3.541  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    7.02    3.341  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.34    3.259  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.59    3.195  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.95    2.908  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.26    2.689  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.74    2.620  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.76    2.616  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.66    2.499  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.97    2.462  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.59    2.392  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.86    2.363  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.86    2.263  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.54    2.120  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    6.35    3.541  0.20( 0.10) 0.50       9.9      31.00
      2       36.04    7.02    3.341  0.20( 0.10) 0.50      10.9       6.00
      3       36.56    7.28    3.272  0.20( 0.10) 0.51      11.4      35.00
      4       36.64    7.34    3.259  0.20( 0.10) 0.51      11.4      24.00
      5       37.02    7.59    3.195  0.20( 0.10) 0.51      11.8      25.00
      6       38.57    8.95    2.908  0.20( 0.10) 0.51      13.8      14.00
      7       39.02    9.40    2.827  0.20( 0.10) 0.51      14.5      33.00
      8       39.43   10.26    2.689  0.20( 0.10) 0.51      15.5      13.00
      9       39.54   10.74    2.620  0.20( 0.10) 0.51      16.0      19.00
     10       39.55   10.76    2.616  0.20( 0.10) 0.51      16.0      29.00
     11       39.29   11.66    2.499  0.20( 0.10) 0.51      16.8      16.00
     12       39.17   11.97    2.462  0.20( 0.10) 0.51      17.0      17.00
     13       38.84   12.59    2.392  0.20( 0.10) 0.51      17.4      10.00
     14       38.60   12.86    2.363  0.20( 0.10) 0.51      17.5       7.00
     15       37.42   13.86    2.263  0.20( 0.10) 0.52      17.9       4.00
     16       35.24   15.54    2.120  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       39.55  Tc(MIN.) =   10.763
  EFFECTIVE AREA(ACRES) =     16.05  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
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```
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.49
  RAINFALL INTENSITY(INCH/HR) =   2.52
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.05
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.789
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    75    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.52      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.50
  EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.75
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.46
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.86
  TOTAL STREAM AREA(ACRES) =       0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    7.09    3.324  0.20( 0.10) 0.50       9.9      31.00
      1       36.04    7.76    3.156  0.20( 0.10) 0.50      10.9       6.00
      1       36.56    8.02    3.097  0.20( 0.10) 0.51      11.4      35.00
      1       36.64    8.07    3.086  0.20( 0.10) 0.51      11.4      24.00
      1       37.02    8.33    3.031  0.20( 0.10) 0.51      11.8      25.00
      1       38.57    9.68    2.781  0.20( 0.10) 0.51      13.8      14.00
      1       39.02   10.13    2.709  0.20( 0.10) 0.51      14.5      33.00
      1       39.43   10.99    2.585  0.20( 0.10) 0.51      15.5      13.00
      1       39.54   11.46    2.523  0.20( 0.10) 0.51      16.0      19.00
      1       39.55   11.49    2.520  0.20( 0.10) 0.51      16.0      29.00
      1       39.29   12.39    2.414  0.20( 0.10) 0.51      16.8      16.00
      1       39.17   12.70    2.380  0.20( 0.10) 0.51      17.0      17.00
      1       38.84   13.32    2.316  0.20( 0.10) 0.51      17.4      10.00
      1       38.60   13.58    2.290  0.20( 0.10) 0.51      17.5       7.00
      1       37.42   14.60    2.197  0.20( 0.10) 0.52      17.9       4.00
      1       35.24   16.28    2.064  0.20( 0.10) 0.52      18.1       1.00
      2        2.48    7.46    3.227  0.20( 0.02) 0.10       0.9      38.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.06	7.09	3.324	0.20(0.09)	0.47	10.7	31.00
2	37.90	7.46	3.227	0.20(0.09)	0.47	11.3	38.00
3	38.46	7.76	3.156	0.20(0.10)	0.48	11.8	6.00
4	38.94	8.02	3.097	0.20(0.10)	0.48	12.2	35.00
5	39.01	8.07	3.086	0.20(0.10)	0.48	12.3	24.00
6	39.35	8.33	3.031	0.20(0.10)	0.48	12.7	25.00
7	40.70	9.68	2.781	0.20(0.10)	0.48	14.7	14.00
8	41.10	10.13	2.709	0.20(0.10)	0.48	15.3	33.00
9	41.41	10.99	2.585	0.20(0.10)	0.49	16.4	13.00
10	41.48	11.46	2.523	0.20(0.10)	0.49	16.9	19.00
11	41.48	11.49	2.520	0.20(0.10)	0.49	16.9	29.00
12	41.15	12.39	2.414	0.20(0.10)	0.49	17.6	16.00
13	41.00	12.70	2.380	0.20(0.10)	0.49	17.9	17.00
14	40.61	13.32	2.316	0.20(0.10)	0.49	18.3	10.00
15	40.36	13.58	2.290	0.20(0.10)	0.49	18.4	7.00
16	39.11	14.60	2.197	0.20(0.10)	0.50	18.7	4.00
17	36.82	16.28	2.064	0.20(0.10)	0.50	18.9	1.00

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.48    Tc(MIN.) =    11.49
  EFFECTIVE AREA(ACRES) =      16.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.050
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        0.84      0.20     0.700    75    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
 STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =   11.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
 STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    9.87
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.750
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    4.33
 EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
 TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.30

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
 FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.87
 RAINFALL INTENSITY(INCH/HR) =   2.75
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.63
 EFFECTIVE STREAM AREA(ACRES) =       2.67
 TOTAL STREAM AREA(ACRES) =       2.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.30

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20      0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    9.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.794
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    2.35
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.60
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.38
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.30    9.87    2.750  0.20( 0.13) 0.63       2.7      41.00
     2        5.38    9.60    2.794  0.20( 0.11) 0.56       2.2      43.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.62    9.60    2.794  0.20( 0.12) 0.60       4.8      43.00
     2       11.60    9.87    2.750  0.20( 0.12) 0.60       4.9      41.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      11.62    Tc(MIN.) =     9.60
 EFFECTIVE AREA(ACRES) =       4.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
 FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.62
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.00
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.00
 RAINFALL INTENSITY(INCH/HR) =   2.73
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       4.83
 TOTAL STREAM AREA(ACRES) =       4.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.62

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
 ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.21      0.20     0.100    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.21
  TOTAL STREAM AREA(ACRES) =       0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.76

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    75    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.13
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.45
  TOTAL STREAM AREA(ACRES) =       1.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.62   10.00    2.729  0.20( 0.12) 0.60       4.8      43.00
      1       11.60   10.27    2.688  0.20( 0.12) 0.60       4.9      41.00
      2        0.76    5.00    4.060  0.20( 0.02) 0.10       0.2      45.00
      3        3.85    8.13    3.072  0.20( 0.12) 0.60       1.5      46.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.00    4.060  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.13    3.072  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.00    2.729  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.27    2.688  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.54    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =       6.49   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.54
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.08    4.025  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.21    3.056  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.07    2.718  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.34    2.677  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       37.06    7.15    3.307  0.20( 0.09) 0.47      10.7      31.00
    2       37.90    7.53    3.211  0.20( 0.09) 0.47      11.3      38.00
    3       38.46    7.82    3.141  0.20( 0.10) 0.48      11.8       6.00
    4       38.94    8.08    3.083  0.20( 0.10) 0.48      12.2      35.00
    5       39.01    8.13    3.072  0.20( 0.10) 0.48      12.3      24.00
    6       39.35    8.39    3.018  0.20( 0.10) 0.48      12.7      25.00
    7       40.70    9.74    2.771  0.20( 0.10) 0.48      14.7      14.00
    8       41.10   10.19    2.700  0.20( 0.10) 0.48      15.3      33.00
    9       41.41   11.05    2.577  0.20( 0.10) 0.49      16.4      13.00
   10       41.48   11.53    2.516  0.20( 0.10) 0.49      16.9      19.00
   11       41.48   11.55    2.513  0.20( 0.10) 0.49      16.9      29.00
   12       41.15   12.45    2.407  0.20( 0.10) 0.49      17.6      16.00
   13       41.00   12.76    2.373  0.20( 0.10) 0.49      17.9      17.00
   14       40.61   13.38    2.310  0.20( 0.10) 0.49      18.3      10.00
   15       40.36   13.65    2.284  0.20( 0.10) 0.49      18.4       7.00
   16       39.11   14.66    2.192  0.20( 0.10) 0.50      18.7       4.00
   17       36.82   16.34    2.060  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       44.88    5.08    4.025  0.20( 0.10) 0.50      11.1      45.00
    2       51.29    7.15    3.307  0.20( 0.10) 0.50      15.6      31.00
    3       52.41    7.53    3.211  0.20( 0.10) 0.51      16.4      38.00
```

```
      4       53.19    7.82    3.141  0.20( 0.10) 0.51      17.1       6.00
      5       53.86    8.08    3.083  0.20( 0.10) 0.51      17.7      35.00
      6       53.97    8.13    3.072  0.20( 0.10) 0.51      17.8      24.00
      7       54.13    8.21    3.056  0.20( 0.10) 0.51      18.0      46.00
      8       54.42    8.39    3.018  0.20( 0.10) 0.51      18.4      25.00
      9       56.15    9.74    2.771  0.20( 0.10) 0.51      21.0      14.00
     10       56.53   10.07    2.718  0.20( 0.10) 0.51      21.7      43.00
     11       56.60   10.19    2.700  0.20( 0.10) 0.51      21.9      33.00
     12       56.61   10.34    2.677  0.20( 0.10) 0.51      22.1      41.00
     13       56.26   11.05    2.577  0.20( 0.10) 0.51      22.9      13.00
     14       55.96   11.53    2.516  0.20( 0.10) 0.51      23.4      19.00
     15       55.94   11.55    2.513  0.20( 0.10) 0.51      23.5      29.00
     16       54.97   12.45    2.407  0.20( 0.10) 0.52      24.2      16.00
     17       54.62   12.76    2.373  0.20( 0.10) 0.52      24.4      17.00
     18       53.85   13.38    2.310  0.20( 0.10) 0.52      24.8      10.00
     19       53.44   13.65    2.284  0.20( 0.10) 0.52      24.9       7.00
     20       51.63   14.66    2.192  0.20( 0.10) 0.52      25.3       4.00
     21       48.55   16.34    2.060  0.20( 0.10) 0.52      25.5       1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       56.61  Tc(MIN.) =   10.339
  EFFECTIVE AREA(ACRES) =     22.08  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.44
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.61
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.08
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.61

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.588
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    75    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =    9.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.888
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.49
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.06
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.85
TOTAL STREAM AREA(ACRES) = 0.85
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.18

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.88	5.20	3.969	0.20(0.10)	0.50	11.1	45.00
1	51.29	7.27	3.275	0.20(0.10)	0.50	15.6	31.00
1	52.41	7.65	3.182	0.20(0.10)	0.51	16.4	38.00
1	53.19	7.94	3.114	0.20(0.10)	0.51	17.1	6.00
1	53.86	8.20	3.057	0.20(0.10)	0.51	17.7	35.00
1	53.97	8.25	3.046	0.20(0.10)	0.51	17.8	24.00
1	54.13	8.33	3.030	0.20(0.10)	0.51	18.0	46.00
1	54.42	8.51	2.993	0.20(0.10)	0.51	18.4	25.00
1	56.15	9.86	2.751	0.20(0.10)	0.51	21.0	14.00
1	56.53	10.19	2.700	0.20(0.10)	0.51	21.7	43.00
1	56.60	10.31	2.682	0.20(0.10)	0.51	21.9	33.00
1	56.61	10.46	2.660	0.20(0.10)	0.51	22.1	41.00
1	56.26	11.17	2.561	0.20(0.10)	0.51	22.9	13.00
1	55.96	11.65	2.501	0.20(0.10)	0.51	23.4	19.00
1	55.94	11.67	2.498	0.20(0.10)	0.51	23.5	29.00
1	54.97	12.57	2.394	0.20(0.10)	0.52	24.2	16.00
1	54.62	12.88	2.361	0.20(0.10)	0.52	24.4	17.00
1	53.85	13.50	2.298	0.20(0.10)	0.52	24.8	10.00
1	53.44	13.77	2.272	0.20(0.10)	0.52	24.9	7.00
1	51.63	14.78	2.182	0.20(0.10)	0.52	25.3	4.00
1	48.55	16.46	2.051	0.20(0.10)	0.52	25.5	1.00
2	2.18	9.06	2.888	0.20(0.04)	0.20	0.9	32.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.61	5.20	3.969	0.20(0.10)	0.49	11.6	45.00
2	53.28	7.27	3.275	0.20(0.10)	0.49	16.2	31.00
3	54.44	7.65	3.182	0.20(0.10)	0.49	17.2	38.00
4	55.26	7.94	3.114	0.20(0.10)	0.49	17.8	6.00
5	55.95	8.20	3.057	0.20(0.10)	0.50	18.5	35.00
6	56.06	8.25	3.046	0.20(0.10)	0.50	18.6	24.00
7	56.23	8.33	3.030	0.20(0.10)	0.50	18.8	46.00
8	56.54	8.51	2.993	0.20(0.10)	0.50	19.2	25.00
9	57.30	9.06	2.888	0.20(0.10)	0.50	20.3	32.00
10	58.22	9.86	2.751	0.20(0.10)	0.50	21.9	14.00
11	58.56	10.19	2.700	0.20(0.10)	0.50	22.5	43.00
12	58.62	10.31	2.682	0.20(0.10)	0.50	22.7	33.00
13	58.61	10.46	2.660	0.20(0.10)	0.50	22.9	41.00
14	58.19	11.17	2.561	0.20(0.10)	0.50	23.8	13.00
15	57.84	11.65	2.501	0.20(0.10)	0.50	24.3	19.00
16	57.82	11.67	2.498	0.20(0.10)	0.50	24.3	29.00
17	56.77	12.57	2.394	0.20(0.10)	0.50	25.0	16.00
18	56.39	12.88	2.361	0.20(0.10)	0.51	25.3	17.00
19	55.58	13.50	2.298	0.20(0.10)	0.51	25.7	10.00
20	55.15	13.77	2.272	0.20(0.10)	0.51	25.8	7.00
21	53.27	14.78	2.182	0.20(0.10)	0.51	26.1	4.00
22	50.09	16.46	2.051	0.20(0.10)	0.51	26.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 58.62 Tc(MIN.) = 10.31
EFFECTIVE AREA(ACRES) = 22.71 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 26.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 50.00 = 2585.00 FEET.

****
FLOW PROCESS FROM NODE 50.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.19
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.62
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   2.19   Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.61
  FLOW VELOCITY(FEET/SEC.) =  2.45   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    3.58
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.74
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   12.51
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.51
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.67      0.20     0.600    75    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    9.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.860
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.67      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    1.65
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  4.14   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
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 EFFECTIVE STREAM AREA(ACRES) =       1.34
 TOTAL STREAM AREA(ACRES) =       1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.30

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        7.74   12.51    2.400  0.20( 0.10) 0.50       3.6      22.00
     2        3.30    9.21    2.860  0.20( 0.12) 0.60       1.3      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       10.14    9.21    2.860  0.20( 0.11) 0.53       4.0      53.00
     2       10.49   12.51    2.400  0.20( 0.11) 0.53       4.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.49    Tc(MIN.) =    12.51
 EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.49
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.54
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.54
 RAINFALL INTENSITY(INCH/HR) =   2.40
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       4.93
 TOTAL STREAM AREA(ACRES) =       4.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.49

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
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```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    9.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    9.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.816
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.12      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  4.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.46
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.61

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       10.14    9.24    2.855  0.20( 0.11) 0.53       4.0      53.00
    1       10.49   12.54    2.397  0.20( 0.11) 0.53       4.9      22.00
    2        4.61    9.46    2.816  0.20( 0.12) 0.60       1.9      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       14.71    9.24    2.855  0.20( 0.11) 0.55       5.8      53.00
    2       14.78    9.46    2.816  0.20( 0.11) 0.55       5.9      56.00
    3       14.38   12.54    2.397  0.20( 0.11) 0.55       6.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.78    Tc(MIN.) =     9.46
  EFFECTIVE AREA(ACRES) =       5.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.78
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.52
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       5.95
  TOTAL STREAM AREA(ACRES) =       6.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.78

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.11      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.11
  TOTAL STREAM AREA(ACRES) =       0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.71    9.30    2.845  0.20( 0.11) 0.55       5.8      53.00
      1       14.78    9.52    2.807  0.20( 0.11) 0.55       5.9      56.00
      1       14.38   12.60    2.390  0.20( 0.11) 0.55       6.8      22.00
      2        0.40    5.00    4.060  0.20( 0.02) 0.10       0.1      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.82    5.00    4.060  0.20( 0.11) 0.54       3.2      59.00
      2       14.99    9.30    2.845  0.20( 0.11) 0.55       5.9      53.00
      3       15.05    9.52    2.807  0.20( 0.11) 0.55       6.1      56.00
      4       14.62   12.60    2.390  0.20( 0.11) 0.54       6.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.05    Tc(MIN.) =     9.52
  EFFECTIVE AREA(ACRES) =       6.06   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.05
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.01
  RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       6.06
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.05

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    8.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.971
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
```

```
 LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.62
 RAINFALL INTENSITY(INCH/HR) =   2.97
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.48
 TOTAL STREAM AREA(ACRES) =       1.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.82    5.51    3.839  0.20( 0.11) 0.54       3.2      59.00
     1       14.99    9.79    2.763  0.20( 0.11) 0.55       5.9      53.00
     1       15.05   10.01    2.728  0.20( 0.11) 0.55       6.1      56.00
     1       14.62   13.09    2.339  0.20( 0.11) 0.54       6.9      22.00
     2        3.80    8.62    2.971  0.20( 0.12) 0.60       1.5      61.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.51    3.839  0.20( 0.11) 0.55       4.2      59.00
     2       17.92    8.62    2.971  0.20( 0.11) 0.56       6.7      61.00
     3       18.51    9.79    2.763  0.20( 0.11) 0.56       7.4      53.00
     4       18.53   10.01    2.728  0.20( 0.11) 0.56       7.5      56.00
     5       17.57   13.09    2.339  0.20( 0.11) 0.55       8.4      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.53    Tc(MIN.) =    10.01
 EFFECTIVE AREA(ACRES) =       7.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        8.4
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.96
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.53
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.53

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.172
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.87
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.87

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =    8.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.97
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.46
 RAINFALL INTENSITY(INCH/HR) =   3.00
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.74

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.53    3.832  0.20( 0.11) 0.55       4.2       59.00
     1       17.92    8.64    2.967  0.20( 0.11) 0.56       6.7       61.00
     1       18.51    9.80    2.760  0.20( 0.11) 0.56       7.4       53.00
     1       18.53   10.02    2.725  0.20( 0.11) 0.56       7.5       56.00
     1       17.57   13.10    2.337  0.20( 0.11) 0.55       8.4       22.00
     2        3.74    8.46    3.003  0.20( 0.12) 0.60       1.4       64.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.13    5.53    3.832  0.20( 0.11) 0.56       5.1       59.00
     2       21.49    8.46    3.003  0.20( 0.11) 0.56       8.0       64.00
     3       21.61    8.64    2.967  0.20( 0.11) 0.56       8.1       61.00
     4       21.93    9.80    2.760  0.20( 0.11) 0.56       8.9       53.00
     5       21.90   10.02    2.725  0.20( 0.11) 0.56       9.0       56.00
     6       20.45   13.10    2.337  0.20( 0.11) 0.56       9.9       22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      21.93    Tc(MIN.) =     9.80
 EFFECTIVE AREA(ACRES) =       8.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        9.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.93
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.12
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.12
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.87
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.93

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =    9.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   2.74
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.02
  TOTAL STREAM AREA(ACRES) =       1.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.15      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.13    5.86    3.706  0.20( 0.11) 0.56       5.1      59.00
      1       21.49    8.78    2.939  0.20( 0.11) 0.56       8.0      64.00
      1       21.61    8.96    2.906  0.20( 0.11) 0.56       8.1      61.00
      1       21.93   10.12    2.710  0.20( 0.11) 0.56       8.9      53.00
      1       21.90   10.35    2.676  0.20( 0.11) 0.56       9.0      56.00
      1       20.45   13.43    2.305  0.20( 0.11) 0.56       9.9      22.00
      2        2.41    9.94    2.738  0.20( 0.11) 0.56       1.0      67.00
      3        0.55    5.00    4.060  0.20( 0.02) 0.10       0.2      63.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.00    4.060  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.86    3.706  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.78    2.939  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    8.96    2.906  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.94    2.738  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.12    2.710  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.35    2.676  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.43    2.305  0.20( 0.11) 0.55      11.0      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.68    Tc(MIN.) =    10.12
  EFFECTIVE AREA(ACRES) =      10.04   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       11.0
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.68
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.05    4.034  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.91    3.687  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.83    2.930  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    9.01    2.896  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.99    2.730  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.17    2.702  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.40    2.669  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.48    2.300  0.20( 0.11) 0.55      11.0      22.00
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.61    5.26    3.943  0.20( 0.10) 0.49      11.6      45.00
      2       53.28    7.33    3.260  0.20( 0.10) 0.49      16.2      31.00
      3       54.44    7.71    3.168  0.20( 0.10) 0.49      17.2      38.00
      4       55.26    8.00    3.101  0.20( 0.10) 0.49      17.8       6.00
      5       55.95    8.26    3.045  0.20( 0.10) 0.50      18.5      35.00
      6       56.06    8.31    3.034  0.20( 0.10) 0.50      18.6      24.00
      7       56.23    8.39    3.018  0.20( 0.10) 0.50      18.8      46.00
      8       56.54    8.57    2.981  0.20( 0.10) 0.50      19.2      25.00
      9       57.30    9.11    2.878  0.20( 0.10) 0.50      20.3      32.00
     10       58.22    9.92    2.742  0.20( 0.10) 0.50      21.9      14.00
     11       58.56   10.25    2.691  0.20( 0.10) 0.50      22.5      43.00
     12       58.62   10.37    2.673  0.20( 0.10) 0.50      22.7      33.00
     13       58.61   10.52    2.651  0.20( 0.10) 0.50      22.9      41.00
```

```
    14       58.19   11.23    2.554  0.20( 0.10) 0.50      23.8      13.00
    15       57.84   11.70    2.494  0.20( 0.10) 0.50      24.3      19.00
    16       57.82   11.73    2.491  0.20( 0.10) 0.50      24.3      29.00
    17       56.77   12.63    2.388  0.20( 0.10) 0.50      25.0      16.00
    18       56.39   12.94    2.354  0.20( 0.10) 0.51      25.3      17.00
    19       55.58   13.56    2.292  0.20( 0.10) 0.51      25.7      10.00
    20       55.15   13.83    2.267  0.20( 0.10) 0.51      25.8       7.00
    21       53.27   14.84    2.177  0.20( 0.10) 0.51      26.1       4.00
    22       50.09   16.52    2.047  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.05    4.034  0.20( 0.10) 0.51      16.2      63.00
      2       66.25    5.26    3.943  0.20( 0.10) 0.51      16.8      45.00
      3       69.29    5.91    3.687  0.20( 0.10) 0.51      18.9      59.00
      4       75.61    7.33    3.260  0.20( 0.10) 0.51      23.7      31.00
      5       77.23    7.71    3.168  0.20( 0.10) 0.51      25.0      38.00
      6       78.41    8.00    3.101  0.20( 0.10) 0.51      26.0       6.00
      7       79.42    8.26    3.045  0.20( 0.10) 0.51      26.9      35.00
      8       79.60    8.31    3.034  0.20( 0.10) 0.51      27.1      24.00
      9       79.86    8.39    3.018  0.20( 0.10) 0.51      27.3      46.00
     10       80.39    8.57    2.981  0.20( 0.10) 0.51      27.9      25.00
     11       81.09    8.83    2.930  0.20( 0.10) 0.52      28.8      64.00
     12       81.47    9.01    2.896  0.20( 0.10) 0.52      29.3      61.00
     13       81.65    9.11    2.878  0.20( 0.10) 0.52      29.6      32.00
     14       82.85    9.92    2.742  0.20( 0.10) 0.52      31.7      14.00
     15       82.96    9.99    2.730  0.20( 0.10) 0.52      31.9      67.00
     16       83.17   10.17    2.702  0.20( 0.10) 0.52      32.4      53.00
     17       83.22   10.25    2.691  0.20( 0.10) 0.52      32.6      43.00
     18       83.24   10.37    2.673  0.20( 0.10) 0.52      32.8      33.00
     19       83.23   10.40    2.669  0.20( 0.10) 0.52      32.9      56.00
     20       83.16   10.52    2.651  0.20( 0.10) 0.52      33.1      41.00
     21       82.31   11.23    2.554  0.20( 0.10) 0.52      34.2      13.00
     22       81.68   11.70    2.494  0.20( 0.10) 0.52      34.8      19.00
     23       81.64   11.73    2.491  0.20( 0.10) 0.52      34.8      29.00
     24       80.05   12.63    2.388  0.20( 0.10) 0.52      35.8      16.00
     25       79.49   12.94    2.354  0.20( 0.10) 0.52      36.1      17.00
     26       78.45   13.48    2.300  0.20( 0.10) 0.52      36.6      22.00
     27       78.27   13.56    2.292  0.20( 0.10) 0.52      36.7      10.00
     28       77.57   13.83    2.267  0.20( 0.10) 0.52      36.8       7.00
     29       74.76   14.84    2.177  0.20( 0.10) 0.52      37.2       4.00
     30       70.22   16.52    2.047  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.24  Tc(MIN.) =   10.367
  EFFECTIVE AREA(ACRES) =     32.84  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.24
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      32.84
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.24

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    75    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.14    3.994  0.20( 0.10) 0.51      16.2      63.00
      1       66.25    5.35    3.905  0.20( 0.10) 0.51      16.8      45.00
      1       69.29    6.00    3.656  0.20( 0.10) 0.51      18.9      59.00
      1       75.61    7.42    3.238  0.20( 0.10) 0.51      23.7      31.00
      1       77.23    7.79    3.148  0.20( 0.10) 0.51      25.0      38.00
      1       78.41    8.09    3.081  0.20( 0.10) 0.51      26.0       6.00
      1       79.42    8.35    3.027  0.20( 0.10) 0.51      26.9      35.00
      1       79.60    8.40    3.016  0.20( 0.10) 0.51      27.1      24.00
      1       79.86    8.47    3.001  0.20( 0.10) 0.51      27.3      46.00
      1       80.39    8.66    2.964  0.20( 0.10) 0.51      27.9      25.00
      1       81.09    8.92    2.913  0.20( 0.10) 0.52      28.8      64.00
```

1	81.47	9.10	2.881	0.20(0.10)	0.52	29.3	61.00
1	81.65	9.20	2.862	0.20(0.10)	0.52	29.6	32.00
1	82.85	10.00	2.729	0.20(0.10)	0.52	31.7	14.00
1	82.96	10.08	2.717	0.20(0.10)	0.52	31.9	67.00
1	83.17	10.26	2.689	0.20(0.10)	0.52	32.4	53.00
1	83.22	10.33	2.678	0.20(0.10)	0.52	32.6	43.00
1	83.24	10.45	2.661	0.20(0.10)	0.52	32.8	33.00
1	83.23	10.48	2.656	0.20(0.10)	0.52	32.9	56.00
1	83.16	10.60	2.639	0.20(0.10)	0.52	33.1	41.00
1	82.31	11.32	2.542	0.20(0.10)	0.52	34.2	13.00
1	81.68	11.79	2.483	0.20(0.10)	0.52	34.8	19.00
1	81.64	11.82	2.480	0.20(0.10)	0.52	34.8	29.00
1	80.05	12.71	2.378	0.20(0.10)	0.52	35.8	16.00
1	79.49	13.02	2.345	0.20(0.10)	0.52	36.1	17.00
1	78.45	13.57	2.291	0.20(0.10)	0.52	36.6	22.00
1	78.27	13.64	2.284	0.20(0.10)	0.52	36.7	10.00
1	77.57	13.91	2.258	0.20(0.10)	0.52	36.8	7.00
1	74.76	14.93	2.169	0.20(0.10)	0.52	37.2	4.00
1	70.22	16.61	2.040	0.20(0.10)	0.52	37.4	1.00
2	1.34	5.27	3.938	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	66.53	5.14	3.994	0.20(0.10)	0.50	16.5	63.00
2	67.20	5.27	3.938	0.20(0.10)	0.50	17.0	47.00
3	67.58	5.35	3.905	0.20(0.10)	0.50	17.2	45.00
4	70.53	6.00	3.656	0.20(0.10)	0.50	19.3	59.00
5	76.71	7.42	3.238	0.20(0.10)	0.50	24.0	31.00
6	78.30	7.79	3.148	0.20(0.10)	0.51	25.4	38.00
7	79.46	8.09	3.081	0.20(0.10)	0.51	26.4	6.00
8	80.45	8.35	3.027	0.20(0.10)	0.51	27.3	35.00
9	80.62	8.40	3.016	0.20(0.10)	0.51	27.5	24.00
10	80.88	8.47	3.001	0.20(0.10)	0.51	27.7	46.00
11	81.40	8.66	2.964	0.20(0.10)	0.51	28.3	25.00
12	82.08	8.92	2.913	0.20(0.10)	0.51	29.1	64.00
13	82.45	9.10	2.881	0.20(0.10)	0.51	29.7	61.00
14	82.62	9.20	2.862	0.20(0.10)	0.51	30.0	32.00
15	83.78	10.00	2.729	0.20(0.10)	0.51	32.1	14.00
16	83.88	10.08	2.717	0.20(0.10)	0.51	32.3	67.00
17	84.08	10.26	2.689	0.20(0.10)	0.51	32.8	53.00
18	84.13	10.33	2.678	0.20(0.10)	0.51	33.0	43.00
19	84.15	10.45	2.661	0.20(0.10)	0.51	33.2	33.00
20	84.14	10.48	2.656	0.20(0.10)	0.51	33.3	56.00
21	84.05	10.60	2.639	0.20(0.10)	0.51	33.5	41.00
22	83.17	11.32	2.542	0.20(0.10)	0.51	34.6	13.00
23	82.52	11.79	2.483	0.20(0.10)	0.51	35.2	19.00
24	82.48	11.82	2.480	0.20(0.10)	0.51	35.2	29.00
25	80.86	12.71	2.378	0.20(0.10)	0.51	36.2	16.00
26	80.28	13.02	2.345	0.20(0.10)	0.52	36.5	17.00
27	79.22	13.57	2.291	0.20(0.10)	0.52	37.0	22.00
28	79.04	13.64	2.284	0.20(0.10)	0.52	37.1	10.00
29	78.34	13.91	2.258	0.20(0.10)	0.52	37.2	7.00
30	75.49	14.93	2.169	0.20(0.10)	0.52	37.5	4.00
31	70.91	16.61	2.040	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 84.15 Tc(MIN.) = 10.45
EFFECTIVE AREA(ACRES) = 33.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   450.00  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.15
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.932
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    75    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.86
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      2.86

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.670
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.58

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.960
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    75    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =   10.49
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.655
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.58
  EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  3.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.58   10.39    2.670  0.20( 0.12) 0.60       2.4      33.00
      2        4.15   10.49    2.655  0.20( 0.12) 0.60       1.8      73.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.71   10.39    2.670  0.20( 0.12) 0.60       4.2      33.00
      2        9.70   10.49    2.655  0.20( 0.12) 0.60       4.2      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.71    Tc(MIN.) =    10.39
  EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.71
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.71

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.110
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =    9.18
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.866
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     1.93
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.18
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.26

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.49      0.20      0.500    75    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.39
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    9.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    8.57
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.98
 EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.15
 FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
 LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.57
 RAINFALL INTENSITY(INCH/HR) =   2.98
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.26
 TOTAL STREAM AREA(ACRES) =       1.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.71   11.15    2.564  0.20( 0.12) 0.60       4.2      33.00
     1        9.70   11.25    2.551  0.20( 0.12) 0.60       4.2      73.00
     2        3.26    9.18    2.866  0.20( 0.12) 0.60       1.3      76.00
     3        3.25    8.57    2.982  0.20( 0.11) 0.56       1.3      78.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.17    8.57    2.982  0.20( 0.12) 0.59       5.7      78.00
     2       15.37    9.18    2.866  0.20( 0.12) 0.59       6.1      76.00
     3       15.40   11.15    2.564  0.20( 0.12) 0.59       6.8      33.00
     4       15.35   11.25    2.551  0.20( 0.12) 0.59       6.8      73.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.40    Tc(MIN.) =    11.15
 EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.40
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   11.37
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.37
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.536
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        3.28      0.20     0.900    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =    6.95
 EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
 TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      21.77

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.73    8.79    2.939  0.20( 0.14) 0.70       9.0      78.00
     2       22.61    9.40    2.828  0.20( 0.14) 0.70       9.3      76.00
     3       21.77   11.37    2.536  0.20( 0.14) 0.69      10.1      33.00
     4       21.70   11.47    2.523  0.20( 0.14) 0.69      10.1      73.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      22.73  Tc(MIN.) =    8.79
 AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.02

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
 FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.73
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.28
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.28
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.02
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.73

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.087
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    75    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.736
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.57      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.39
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  5.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.96
 RAINFALL INTENSITY(INCH/HR) =   2.74
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

****************************************************************************
 FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.470
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.58
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.69
 TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
 FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
 STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    7.78
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.150
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.76
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.78
  RAINFALL INTENSITY(INCH/HR) =   3.15
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.73    9.28    2.849  0.20( 0.14) 0.70       9.0      78.00
      1       22.61    9.89    2.747  0.20( 0.14) 0.70       9.3      76.00
      1       21.77   11.86    2.474  0.20( 0.14) 0.69      10.1      33.00
      1       21.70   11.96    2.462  0.20( 0.14) 0.69      10.1      73.00
      2        3.44    9.96    2.736  0.20( 0.08) 0.40       1.4      82.00
      3        5.29    7.78    3.150  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.59    7.78    3.150  0.20( 0.13) 0.65      10.6      80.00
      2       30.84    9.28    2.849  0.20( 0.13) 0.65      12.3      78.00
      3       30.62    9.89    2.747  0.20( 0.13) 0.65      12.7      76.00
      4       30.59    9.96    2.736  0.20( 0.13) 0.65      12.7      82.00
      5       28.99   11.86    2.474  0.20( 0.13) 0.65      13.5      33.00
      6       28.87   11.96    2.462  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.84    Tc(MIN.) =     9.28
  EFFECTIVE AREA(ACRES) =      12.31   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.84
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.37
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.59    7.88    3.129  0.20( 0.13) 0.65      10.6      80.00
      2       30.84    9.37    2.833  0.20( 0.13) 0.65      12.3      78.00
      3       30.62    9.98    2.733  0.20( 0.13) 0.65      12.7      76.00
      4       30.59   10.05    2.722  0.20( 0.13) 0.65      12.7      82.00
      5       28.99   11.95    2.464  0.20( 0.13) 0.65      13.5      33.00
      6       28.87   12.05    2.452  0.20( 0.13) 0.65      13.5      73.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       66.53    5.19    3.973  0.20( 0.10) 0.50      16.5      63.00
      2       67.20    5.32    3.918  0.20( 0.10) 0.50      17.0      47.00
      3       67.58    5.40    3.886  0.20( 0.10) 0.50      17.2      45.00
      4       70.53    6.05    3.640  0.20( 0.10) 0.50      19.3      59.00
      5       76.71    7.46    3.227  0.20( 0.10) 0.50      24.0      31.00
      6       78.30    7.84    3.138  0.20( 0.10) 0.51      25.4      38.00
      7       79.46    8.13    3.072  0.20( 0.10) 0.51      26.4       6.00
      8       80.45    8.39    3.018  0.20( 0.10) 0.51      27.3      35.00
      9       80.62    8.44    3.007  0.20( 0.10) 0.51      27.5      24.00
     10       80.88    8.52    2.992  0.20( 0.10) 0.51      27.7      46.00
     11       81.40    8.70    2.956  0.20( 0.10) 0.51      28.3      25.00
     12       82.08    8.97    2.905  0.20( 0.10) 0.51      29.1      64.00
     13       82.45    9.14    2.873  0.20( 0.10) 0.51      29.7      61.00
     14       82.62    9.24    2.854  0.20( 0.10) 0.51      30.0      32.00
     15       83.78   10.04    2.722  0.20( 0.10) 0.51      32.1      14.00
     16       83.88   10.12    2.710  0.20( 0.10) 0.51      32.3      67.00
     17       84.08   10.30    2.683  0.20( 0.10) 0.51      32.8      53.00
     18       84.13   10.38    2.672  0.20( 0.10) 0.51      33.0      43.00
     19       84.15   10.50    2.654  0.20( 0.10) 0.51      33.2      33.00
     20       84.14   10.52    2.650  0.20( 0.10) 0.51      33.3      56.00
     21       84.05   10.64    2.633  0.20( 0.10) 0.51      33.5      41.00
     22       83.17   11.36    2.537  0.20( 0.10) 0.51      34.6      13.00
     23       82.52   11.83    2.478  0.20( 0.10) 0.51      35.2      19.00
     24       82.48   11.86    2.475  0.20( 0.10) 0.51      35.2      29.00
     25       80.86   12.76    2.373  0.20( 0.10) 0.51      36.2      16.00
     26       80.28   13.07    2.341  0.20( 0.10) 0.52      36.5      17.00
     27       79.22   13.61    2.287  0.20( 0.10) 0.52      37.0      22.00
     28       79.04   13.69    2.280  0.20( 0.10) 0.52      37.1      10.00
     29       78.34   13.96    2.254  0.20( 0.10) 0.52      37.2       7.00
     30       75.49   14.97    2.165  0.20( 0.10) 0.52      37.5       4.00
     31       70.91   16.66    2.037  0.20( 0.10) 0.52      37.8       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       91.53    5.19    3.973  0.20( 0.11) 0.54      23.6      63.00
      2       92.44    5.32    3.918  0.20( 0.11) 0.54      24.1      47.00
      3       92.98    5.40    3.886  0.20( 0.11) 0.54      24.5      45.00
      4       97.13    6.05    3.640  0.20( 0.11) 0.55      27.5      59.00
      5      105.67    7.46    3.227  0.20( 0.11) 0.55      34.1      31.00
      6      107.84    7.84    3.138  0.20( 0.11) 0.55      35.9      38.00
      7      108.04    7.88    3.129  0.20( 0.11) 0.55      36.1      80.00
      8      109.27    8.13    3.072  0.20( 0.11) 0.55      37.3       6.00
      9      110.47    8.39    3.018  0.20( 0.11) 0.55      38.5      35.00
     10      110.69    8.44    3.007  0.20( 0.11) 0.55      38.7      24.00
     11      111.01    8.52    2.992  0.20( 0.11) 0.55      39.1      46.00
     12      111.68    8.70    2.956  0.20( 0.11) 0.55      39.9      25.00
     13      112.58    8.97    2.905  0.20( 0.11) 0.55      41.0      64.00
     14      113.10    9.14    2.873  0.20( 0.11) 0.55      41.7      61.00
```

```
    15      113.35    9.24    2.854  0.20( 0.11) 0.55      42.1      32.00
    16      113.63    9.37    2.833  0.20( 0.11) 0.55      42.6      78.00
    17      114.31    9.98    2.733  0.20( 0.11) 0.55      44.6      76.00
    18      114.37   10.04    2.722  0.20( 0.11) 0.55      44.9      14.00
    19      114.37   10.05    2.722  0.20( 0.11) 0.55      44.9      82.00
    20      114.40   10.12    2.710  0.20( 0.11) 0.55      45.1      67.00
    21      114.45   10.30    2.683  0.20( 0.11) 0.55      45.6      53.00
    22      114.44   10.38    2.672  0.20( 0.11) 0.55      45.8      43.00
    23      114.36   10.50    2.654  0.20( 0.11) 0.55      46.1      33.00
    24      114.32   10.52    2.650  0.20( 0.11) 0.55      46.2      56.00
    25      114.14   10.64    2.633  0.20( 0.11) 0.55      46.5      41.00
    26      112.66   11.36    2.537  0.20( 0.11) 0.55      47.8      13.00
    27      111.61   11.83    2.478  0.20( 0.11) 0.55      48.6      19.00
    28      111.55   11.86    2.475  0.20( 0.11) 0.55      48.7      29.00
    29      111.30   11.95    2.464  0.20( 0.11) 0.55      48.8      33.00
    30      111.00   12.05    2.452  0.20( 0.11) 0.55      48.9      73.00
    31      108.75   12.76    2.373  0.20( 0.11) 0.55      49.7      16.00
    32      107.78   13.07    2.341  0.20( 0.11) 0.55      50.0      17.00
    33      106.05   13.61    2.287  0.20( 0.11) 0.55      50.5      22.00
    34      105.78   13.69    2.280  0.20( 0.11) 0.55      50.6      10.00
    35      104.75   13.96    2.254  0.20( 0.11) 0.55      50.7       7.00
    36      100.80   14.97    2.165  0.20( 0.11) 0.55      51.0       4.00
    37       94.63   16.66    2.037  0.20( 0.11) 0.55      51.3       1.00
  TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      114.45  Tc(MIN.) =   10.302
  EFFECTIVE AREA(ACRES) =     45.63  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.45
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.31   RAINFALL INTENSITY(INCH/HR) =  2.68
  EFFECTIVE AREA(ACRES) =    26.50
  TOTAL AREA(ACRES) =    29.79        PEAK FLOW RATE(CFS) =     66.50
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.55
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.52
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.50
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.73
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      26.50
  TOTAL STREAM AREA(ACRES) =      29.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.50

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.43      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
```

```
 RAINFALL INTENSITY(INCH/HR) =   3.85
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.50

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       66.50   10.73    2.621  0.20( 0.11) 0.55      26.5       1.00
     2        1.50    5.49    3.848  0.20( 0.18) 0.90       0.4      88.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.15    5.49    3.848  0.20( 0.11) 0.56      14.0      88.00
     2       67.50   10.73    2.621  0.20( 0.11) 0.56      26.9       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      67.50    Tc(MIN.) =    10.73
 EFFECTIVE AREA(ACRES) =      26.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       30.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      67.50
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.88
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.547
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.29      0.20      0.100    75    6.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.92
 TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.92
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =    8.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.15
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20      0.900    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.24      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.07
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =    8.04
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    3.25
  EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.96
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.77
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
```

```
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.77

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.56    8.15    3.069  0.20( 0.02) 0.10       0.6      85.00
     2        4.77    8.80    2.937  0.20( 0.18) 0.90       1.8      92.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.19    8.15    3.069  0.20( 0.14) 0.70       2.3      85.00
     2        6.27    8.80    2.937  0.20( 0.14) 0.71       2.4      92.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.27    Tc(MIN.) =     8.80
 EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =        2.4
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.72
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.27
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.82
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.19    8.17    3.063  0.20( 0.14) 0.70       2.3      85.00
     2        6.27    8.82    2.932  0.20( 0.14) 0.71       2.4      92.00
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.15    5.65    3.786  0.20( 0.11) 0.56      14.0      88.00
     2       67.50   10.88    2.601  0.20( 0.11) 0.56      26.9       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       57.49    5.65    3.786  0.20( 0.11) 0.57      15.5      88.00
     2       65.76    8.17    3.063  0.20( 0.11) 0.57      22.5      85.00
     3       67.73    8.82    2.932  0.20( 0.11) 0.57      24.2      92.00
     4       73.02   10.88    2.601  0.20( 0.11) 0.57      29.3       1.00
   TOTAL AREA(ACRES) =        32.6
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       73.02  Tc(MIN.) =   10.876
  EFFECTIVE AREA(ACRES) =     29.32  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       32.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.26
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.02
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      29.32
  TOTAL STREAM AREA(ACRES) =      32.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      73.02

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.14      0.20     0.900    75    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      3.03

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.063
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        5.08      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.65
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    8.18
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   13.18
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2          PEAK FLOW RATE(CFS) =      16.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   9.97
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.14
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.25
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.14

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.95      0.20      0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =   11.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.538
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.69      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    3.71
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       5.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.02
  FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.35
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.77

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       57.49    5.74    3.751  0.20( 0.11) 0.57      15.5      88.00
    1       65.76    8.26    3.044  0.20( 0.11) 0.57      22.5      85.00
    1       67.73    8.91    2.916  0.20( 0.11) 0.57      24.2      92.00
    1       73.02   10.96    2.589  0.20( 0.11) 0.57      29.3       1.00
    2       16.14    8.25    3.047  0.20( 0.18) 0.90       6.2      97.00
    3        5.77   11.35    2.538  0.20( 0.11) 0.54       2.6     100.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       75.85    5.74    3.751  0.20( 0.13) 0.64      21.2      88.00
    2       86.93    8.25    3.047  0.20( 0.13) 0.64      30.6      97.00
    3       86.96    8.26    3.044  0.20( 0.13) 0.64      30.6      85.00
    4       88.37    8.91    2.916  0.20( 0.13) 0.63      32.5      92.00
    5       92.27   10.96    2.589  0.20( 0.12) 0.62      38.1       1.00
    6       90.56   11.35    2.538  0.20( 0.12) 0.62      38.2     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      92.27    Tc(MIN.) =    10.96
  EFFECTIVE AREA(ACRES) =      38.09   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       41.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.82
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.27
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.05
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      38.09
  TOTAL STREAM AREA(ACRES) =      41.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      92.27

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.44      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.54

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       75.85    5.83    3.716  0.20( 0.13) 0.64      21.2      88.00
      1       86.93    8.34    3.028  0.20( 0.13) 0.64      30.6      97.00
      1       86.96    8.35    3.025  0.20( 0.13) 0.64      30.6      85.00
      1       88.37    9.00    2.899  0.20( 0.13) 0.63      32.5      92.00
      1       92.27   11.05    2.577  0.20( 0.12) 0.62      38.1       1.00
      1       90.56   11.44    2.526  0.20( 0.12) 0.62      38.2     100.00
      2        1.54    5.28    3.937  0.20( 0.18) 0.90       0.4     104.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       74.35    5.28    3.937  0.20( 0.13) 0.64      19.6     104.00
      2       77.30    5.83    3.716  0.20( 0.13) 0.64      21.6      88.00
      3       88.09    8.34    3.028  0.20( 0.13) 0.64      31.0      97.00
      4       88.12    8.35    3.025  0.20( 0.13) 0.64      31.1      85.00
      5       89.48    9.00    2.899  0.20( 0.13) 0.64      33.0      92.00
      6       93.26   11.05    2.577  0.20( 0.12) 0.62      38.5       1.00
      7       91.52   11.44    2.526  0.20( 0.12) 0.62      38.6     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.26    Tc(MIN.) =    11.05
  EFFECTIVE AREA(ACRES) =      38.53   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       41.9
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   420.30
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.93
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.26
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.39
  RAINFALL INTENSITY(INCH/HR) =   2.53
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      38.53
  TOTAL STREAM AREA(ACRES) =      41.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.26

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.771
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    6.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.55
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =    7.10
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.322
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.35      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.04
 EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
 FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.10
 RAINFALL INTENSITY(INCH/HR) =   3.32
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.67
 TOTAL STREAM AREA(ACRES) =       0.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       74.35    5.64    3.791  0.20( 0.13) 0.64      19.6     104.00
     1       77.30    6.19    3.592  0.20( 0.13) 0.64      21.6      88.00
     1       88.09    8.68    2.959  0.20( 0.13) 0.64      31.0      97.00
     1       88.12    8.70    2.956  0.20( 0.13) 0.64      31.1      85.00
     1       89.48    9.34    2.838  0.20( 0.13) 0.64      33.0      92.00
     1       93.26   11.39    2.532  0.20( 0.12) 0.62      38.5       1.00
     1       91.52   11.78    2.484  0.20( 0.12) 0.62      38.6     100.00
     2        1.99    7.10    3.322  0.20( 0.02) 0.10       0.7      95.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.15    5.64    3.791  0.20( 0.13) 0.63      20.2     104.00
     2       79.18    6.19    3.592  0.20( 0.13) 0.63      22.2      88.00
     3       83.20    7.10    3.322  0.20( 0.13) 0.63      25.7      95.00
     4       89.87    8.68    2.959  0.20( 0.13) 0.63      31.7      97.00
     5       89.89    8.70    2.956  0.20( 0.13) 0.63      31.7      85.00
     6       91.18    9.34    2.838  0.20( 0.13) 0.63      33.6      92.00
     7       94.77   11.39    2.532  0.20( 0.12) 0.61      39.2       1.00
     8       93.00   11.78    2.484  0.20( 0.12) 0.61      39.3     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      94.77    Tc(MIN.) =    11.39
  EFFECTIVE AREA(ACRES) =      39.20   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       42.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.62
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.77
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.93      0.20     0.900    75    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.47
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.972
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.84      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.88
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    8.62
```

```
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    2.11
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =  10.48
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.45
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    75    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
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  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   10.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.609
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    0.99
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.81
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.45   10.45    2.661  0.20( 0.18) 0.90       1.8      97.00
      2        2.37   10.81    2.609  0.20( 0.10) 0.50       1.0     111.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.79   10.45    2.661  0.20( 0.15) 0.75       2.8      97.00
      2        6.73   10.81    2.609  0.20( 0.15) 0.75       2.8     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.79    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       2.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.964
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    75    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    9.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.20
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.81
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.09

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.279
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.09
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.09

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    8.17
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.05
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  3.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.17
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.09    9.48    2.813  0.20( 0.11) 0.56       1.3     114.00
      2        4.00    8.17    3.064  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.91    8.17    3.064  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.48    2.813  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.91    Tc(MIN.) =     8.17
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.91
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.91    8.29    3.038  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.61    2.793  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.79   10.58    2.642  0.20( 0.15) 0.75       2.8      97.00
      2        6.73   10.94    2.592  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.07    8.29    3.038  0.20( 0.13) 0.63       4.8     116.00
      2       13.28    9.61    2.793  0.20( 0.13) 0.64       5.3     114.00
      3       13.16   10.58    2.642  0.20( 0.13) 0.64       5.6      97.00
      4       12.97   10.94    2.592  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =         5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       13.28  Tc(MIN.) =    9.605
  EFFECTIVE AREA(ACRES) =      5.30  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.28
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.89
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.30
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.28

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.59

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   11.16
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.68
  FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.16
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.55
  TOTAL STREAM AREA(ACRES) =       1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.07    8.58    2.979  0.20( 0.13) 0.63       4.8     116.00
      1       13.28    9.89    2.746  0.20( 0.13) 0.64       5.3     114.00
      1       13.16   10.87    2.602  0.20( 0.13) 0.64       5.6      97.00
      1       12.97   11.23    2.553  0.20( 0.13) 0.64       5.6     111.00
      2        3.43   11.16    2.562  0.20( 0.10) 0.50       1.5     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.16    8.58    2.979  0.20( 0.12) 0.60       6.0     116.00
      2       16.55    9.89    2.746  0.20( 0.12) 0.61       6.7     114.00
      3       16.56   10.87    2.602  0.20( 0.12) 0.61       7.1      97.00
      4       16.44   11.16    2.562  0.20( 0.12) 0.61       7.1     120.00
      5       16.39   11.23    2.553  0.20( 0.12) 0.61       7.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.56    Tc(MIN.) =    10.87
  EFFECTIVE AREA(ACRES) =       7.06   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.86
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.56
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.06
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.06
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.06
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.56

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20     0.100    75    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   3.77
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.28

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.992
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    8.52
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.54
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       4.86

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.89
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.16
  TOTAL STREAM AREA(ACRES) =       2.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.16    8.77    2.942  0.20( 0.12) 0.60       6.0     116.00
      1       16.55   10.08    2.716  0.20( 0.12) 0.61       6.7     114.00
      1       16.56   11.06    2.576  0.20( 0.12) 0.61       7.1      97.00
      1       16.44   11.35    2.537  0.20( 0.12) 0.61       7.1     120.00
      1       16.39   11.42    2.529  0.20( 0.12) 0.61       7.1     111.00
      2        1.28    5.68    3.772  0.20( 0.02) 0.10       0.4     118.00
      3        4.86   10.89    2.598  0.20( 0.10) 0.50       2.2     123.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.56    5.68    3.772  0.20( 0.11) 0.55       5.4     118.00
      2       21.61    8.77    2.942  0.20( 0.11) 0.56       8.1     116.00
      3       22.18   10.08    2.716  0.20( 0.11) 0.56       9.1     114.00
      4       22.29   10.89    2.598  0.20( 0.11) 0.57       9.5     123.00
      5       22.24   11.06    2.576  0.20( 0.11) 0.57       9.6      97.00
      6       22.04   11.35    2.537  0.20( 0.11) 0.57       9.7     120.00
      7       21.97   11.42    2.529  0.20( 0.11) 0.57       9.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.29    Tc(MIN.) =    10.89
  EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.29
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.92
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.54
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.29
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.23
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.59      0.20     0.900    75    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   10.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.589
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.34
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.62
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.45
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.62

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.300
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    8.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.89      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       4.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.59
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.62   10.96    2.589  0.20( 0.12) 0.61       2.1     127.00
      2        4.17    8.39    3.018  0.20( 0.10) 0.50       1.6     129.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.32    8.39    3.018  0.20( 0.11) 0.56       3.2     129.00
      2        8.18   10.96    2.589  0.20( 0.11) 0.56       3.7     127.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.32    Tc(MIN.) =     8.39
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.45
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.32    8.45    3.006  0.20( 0.11) 0.56       3.2     129.00
      2        8.18   11.02    2.581  0.20( 0.11) 0.56       3.7     127.00
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.56    6.04    3.642  0.20( 0.11) 0.55       5.4     118.00
      2       21.61    9.12    2.876  0.20( 0.11) 0.56       8.1     116.00
      3       22.18   10.42    2.665  0.20( 0.11) 0.56       9.1     114.00
      4       22.29   11.23    2.553  0.20( 0.11) 0.57       9.5     123.00
      5       22.24   11.40    2.532  0.20( 0.11) 0.57       9.6      97.00
      6       22.04   11.69    2.495  0.20( 0.11) 0.57       9.7     120.00
      7       21.97   11.77    2.485  0.20( 0.11) 0.57       9.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.82    6.04    3.642  0.20( 0.11) 0.55       7.7     118.00
      2       29.26    8.45    3.006  0.20( 0.11) 0.56      10.7     129.00
      3       29.89    9.12    2.876  0.20( 0.11) 0.56      11.4     116.00
      4       30.39   10.42    2.665  0.20( 0.11) 0.56      12.6     114.00
      5       30.44   11.02    2.581  0.20( 0.11) 0.56      13.1     127.00
      6       30.38   11.23    2.553  0.20( 0.11) 0.57      13.2     123.00
      7       30.26   11.40    2.532  0.20( 0.11) 0.57      13.3      97.00
      8       29.93   11.69    2.495  0.20( 0.11) 0.57      13.3     120.00
      9       29.83   11.77    2.485  0.20( 0.11) 0.57      13.4     111.00
    TOTAL AREA(ACRES) =        13.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       30.44  Tc(MIN.) =   11.019
  EFFECTIVE AREA(ACRES) =     13.08  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.44
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.17
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      13.08
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.44

********************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    75    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.98

********************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   3.52
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    6.20    3.589  0.20( 0.11) 0.55       7.7     118.00
      1       29.26    8.60    2.976  0.20( 0.11) 0.56      10.7     129.00
      1       29.89    9.27    2.850  0.20( 0.11) 0.56      11.4     116.00
      1       30.39   10.57    2.643  0.20( 0.11) 0.56      12.6     114.00
      1       30.44   11.17    2.562  0.20( 0.11) 0.56      13.1     127.00
      1       30.38   11.38    2.534  0.20( 0.11) 0.57      13.2     123.00
      1       30.26   11.55    2.513  0.20( 0.11) 0.57      13.3      97.00
      1       29.93   11.84    2.477  0.20( 0.11) 0.57      13.3     120.00
      1       29.83   11.92    2.467  0.20( 0.11) 0.57      13.4     111.00
      2        0.98    6.40    3.523  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       26.79    6.20    3.589  0.20( 0.11) 0.53       8.0     118.00
      2       27.09    6.40    3.523  0.20( 0.11) 0.53       8.2     138.00
      3       30.08    8.60    2.976  0.20( 0.11) 0.54      11.0     129.00
      4       30.68    9.27    2.850  0.20( 0.11) 0.55      11.7     116.00
      5       31.13   10.57    2.643  0.20( 0.11) 0.55      12.9     114.00
      6       31.15   11.17    2.562  0.20( 0.11) 0.55      13.4     127.00
      7       31.08   11.38    2.534  0.20( 0.11) 0.55      13.5     123.00
      8       30.95   11.55    2.513  0.20( 0.11) 0.55      13.6      97.00
      9       30.62   11.84    2.477  0.20( 0.11) 0.55      13.7     120.00
     10       30.51   11.92    2.467  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.15    Tc(MIN.) =    11.17
  EFFECTIVE AREA(ACRES) =      13.39   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.15
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.040
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.46      0.20     0.500    75    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    9.70
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.777
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.17      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    2.80
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       3.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.91

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.08
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    8.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.041
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.28
  RAINFALL INTENSITY(INCH/HR) =   3.04
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.91    9.70    2.777  0.20( 0.11) 0.57       1.6     134.00
      2        3.79    8.28    3.041  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.45    8.28    3.041  0.20( 0.11) 0.54       2.8     136.00
      2        7.35    9.70    2.777  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.45    Tc(MIN.) =     8.28
  EFFECTIVE AREA(ACRES) =       2.82   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.45
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.36
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.45    8.36    3.025  0.20( 0.11) 0.54       2.8     136.00
      2        7.35    9.78    2.764  0.20( 0.11) 0.54       3.1     134.00
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.79    6.96    3.358  0.20( 0.11) 0.53       8.0     118.00
      2       27.09    7.17    3.303  0.20( 0.11) 0.53       8.2     138.00
      3       30.08    9.32    2.840  0.20( 0.11) 0.54      11.0     129.00
      4       30.68   10.00    2.729  0.20( 0.11) 0.55      11.7     116.00
      5       31.13   11.30    2.545  0.20( 0.11) 0.55      12.9     114.00
      6       31.15   11.89    2.471  0.20( 0.11) 0.55      13.4     127.00
      7       31.08   12.11    2.446  0.20( 0.11) 0.55      13.5     123.00
      8       30.95   12.27    2.427  0.20( 0.11) 0.55      13.6      97.00
      9       30.62   12.57    2.394  0.20( 0.11) 0.55      13.7     120.00
     10       30.51   12.65    2.385  0.20( 0.11) 0.55      13.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.70    6.96    3.358  0.20( 0.11) 0.53      10.3     118.00
      2       34.09    7.17    3.303  0.20( 0.11) 0.53      10.6     138.00
      3       36.19    8.36    3.025  0.20( 0.11) 0.54      12.6     136.00
      4       37.47    9.32    2.840  0.20( 0.11) 0.54      14.0     129.00
      5       37.84    9.78    2.764  0.20( 0.11) 0.54      14.5     134.00
      6       37.93   10.00    2.729  0.20( 0.11) 0.54      14.8     116.00
      7       37.87   11.30    2.545  0.20( 0.11) 0.55      16.0     114.00
      8       37.69   11.89    2.471  0.20( 0.11) 0.55      16.4     127.00
      9       37.55   12.11    2.446  0.20( 0.11) 0.55      16.6     123.00
     10       37.37   12.27    2.427  0.20( 0.11) 0.55      16.6      97.00
     11       36.94   12.57    2.394  0.20( 0.11) 0.55      16.7     120.00
```

```
    12       36.82   12.65    2.385  0.20( 0.11) 0.55      16.7     111.00
   TOTAL AREA(ACRES) =        16.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       37.93  Tc(MIN.) =    9.999
  EFFECTIVE AREA(ACRES) =     14.77  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.93
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.70    7.34    3.259  0.20( 0.11) 0.53      10.3     118.00
      2       34.09    7.54    3.209  0.20( 0.11) 0.53      10.6     138.00
      3       36.19    8.73    2.951  0.20( 0.11) 0.54      12.6     136.00
      4       37.47    9.69    2.778  0.20( 0.11) 0.54      14.0     129.00
      5       37.84   10.13    2.708  0.20( 0.11) 0.54      14.5     134.00
      6       37.93   10.36    2.675  0.20( 0.11) 0.54      14.8     116.00
      7       37.87   11.66    2.500  0.20( 0.11) 0.55      16.0     114.00
      8       37.69   12.25    2.429  0.20( 0.11) 0.55      16.4     127.00
      9       37.55   12.48    2.404  0.20( 0.11) 0.55      16.6     123.00
     10       37.37   12.64    2.386  0.20( 0.11) 0.55      16.6      97.00
     11       36.94   12.94    2.354  0.20( 0.11) 0.55      16.7     120.00
     12       36.82   13.02    2.346  0.20( 0.11) 0.55      16.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       76.15    5.66    3.781  0.20( 0.13) 0.63      20.2     104.00
      2       79.18    6.22    3.584  0.20( 0.13) 0.63      22.2      88.00
      3       83.20    7.12    3.315  0.20( 0.13) 0.63      25.7      95.00
      4       89.87    8.71    2.954  0.20( 0.13) 0.63      31.7      97.00
      5       89.89    8.72    2.952  0.20( 0.13) 0.63      31.7      85.00
      6       91.18    9.36    2.834  0.20( 0.13) 0.63      33.6      92.00
      7       94.77   11.42    2.529  0.20( 0.12) 0.61      39.2       1.00
      8       93.00   11.81    2.481  0.20( 0.12) 0.61      39.3     100.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      106.46    5.66    3.781  0.20( 0.12) 0.60      28.1     104.00
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```
      2      110.67    6.22    3.584  0.20( 0.12) 0.60      31.0      88.00
      3      116.50    7.12    3.315  0.20( 0.12) 0.60      35.7      95.00
      4      117.81    7.34    3.259  0.20( 0.12) 0.60      36.8     118.00
      5      119.05    7.54    3.209  0.20( 0.12) 0.60      37.9     138.00
      6      126.02    8.71    2.954  0.20( 0.12) 0.60      44.2      97.00
      7      126.07    8.72    2.952  0.20( 0.12) 0.60      44.3      85.00
      8      126.09    8.73    2.951  0.20( 0.12) 0.60      44.3     136.00
      9      128.21    9.36    2.834  0.20( 0.12) 0.60      47.1      92.00
     10      129.22    9.69    2.778  0.20( 0.12) 0.60      48.5     129.00
     11      130.36   10.13    2.708  0.20( 0.12) 0.60      50.3     134.00
     12      130.85   10.36    2.675  0.20( 0.12) 0.60      51.1     116.00
     13      132.65   11.42    2.529  0.20( 0.12) 0.60      55.0       1.00
     14      131.55   11.66    2.500  0.20( 0.12) 0.60      55.2     114.00
     15      130.83   11.81    2.481  0.20( 0.12) 0.60      55.4     100.00
     16      128.64   12.25    2.429  0.20( 0.12) 0.60      55.7     127.00
     17      127.50   12.48    2.404  0.20( 0.12) 0.60      55.9     123.00
     18      126.61   12.64    2.386  0.20( 0.12) 0.60      55.9      97.00
     19      124.94   12.94    2.354  0.20( 0.12) 0.60      56.0     120.00
     20      124.48   13.02    2.346  0.20( 0.12) 0.60      56.0     111.00
    TOTAL AREA(ACRES) =        59.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      132.65  Tc(MIN.) =   11.416
  EFFECTIVE AREA(ACRES) =     54.95  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       59.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.49
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     132.65
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   11.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.60
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      54.95
  TOTAL STREAM AREA(ACRES) =      59.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     132.65

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.44

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    75    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      106.46    5.86    3.708  0.20( 0.12) 0.60      28.1     104.00
      1      110.67    6.41    3.522  0.20( 0.12) 0.60      31.0      88.00
      1      116.50    7.31    3.265  0.20( 0.12) 0.60      35.7      95.00
      1      117.81    7.53    3.212  0.20( 0.12) 0.60      36.8     118.00
      1      119.05    7.73    3.163  0.20( 0.12) 0.60      37.9     138.00
      1      126.02    8.90    2.918  0.20( 0.12) 0.60      44.2      97.00
```

```
     1      126.07    8.91    2.915  0.20( 0.12) 0.60      44.3      85.00
     1      126.09    8.92    2.914  0.20( 0.12) 0.60      44.3     136.00
     1      128.21    9.55    2.801  0.20( 0.12) 0.60      47.1      92.00
     1      129.22    9.88    2.748  0.20( 0.12) 0.60      48.5     129.00
     1      130.36   10.32    2.680  0.20( 0.12) 0.60      50.3     134.00
     1      130.85   10.54    2.648  0.20( 0.12) 0.60      51.1     116.00
     1      132.65   11.60    2.506  0.20( 0.12) 0.60      55.0       1.00
     1      131.55   11.84    2.477  0.20( 0.12) 0.60      55.2     114.00
     1      130.83   11.99    2.459  0.20( 0.12) 0.60      55.4     100.00
     1      128.64   12.44    2.408  0.20( 0.12) 0.60      55.7     127.00
     1      127.50   12.67    2.383  0.20( 0.12) 0.60      55.9     123.00
     1      126.61   12.83    2.366  0.20( 0.12) 0.60      55.9      97.00
     1      124.94   13.13    2.335  0.20( 0.12) 0.60      56.0     120.00
     1      124.48   13.21    2.327  0.20( 0.12) 0.60      56.0     111.00
     2        0.44    5.00    4.060  0.20( 0.02) 0.10       0.1     140.00
     3        3.80    8.20    3.058  0.20( 0.04) 0.20       1.4     141.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      103.32    5.00    4.060  0.20( 0.12) 0.59      25.0     140.00
      2      110.16    5.86    3.708  0.20( 0.12) 0.59      29.2     104.00
      3      114.48    6.41    3.522  0.20( 0.12) 0.59      32.2      88.00
      4      120.48    7.31    3.265  0.20( 0.12) 0.59      37.1      95.00
      5      121.83    7.53    3.212  0.20( 0.12) 0.59      38.2     118.00
      6      123.10    7.73    3.163  0.20( 0.12) 0.59      39.4     138.00
      7      125.97    8.20    3.058  0.20( 0.12) 0.59      42.0     141.00
      8      129.96    8.90    2.918  0.20( 0.12) 0.59      45.8      97.00
      9      130.01    8.91    2.915  0.20( 0.12) 0.59      45.8      85.00
     10      130.03    8.92    2.914  0.20( 0.12) 0.59      45.8     136.00
     11      131.99    9.55    2.801  0.20( 0.12) 0.59      48.6      92.00
     12      132.93    9.88    2.748  0.20( 0.12) 0.59      50.0     129.00
     13      133.98   10.32    2.680  0.20( 0.12) 0.59      51.8     134.00
     14      134.42   10.54    2.648  0.20( 0.12) 0.59      52.6     116.00
     15      136.03   11.60    2.506  0.20( 0.12) 0.58      56.5       1.00
     16      134.89   11.84    2.477  0.20( 0.12) 0.58      56.8     114.00
     17      134.14   11.99    2.459  0.20( 0.12) 0.58      56.9     100.00
     18      131.88   12.44    2.408  0.20( 0.12) 0.58      57.3     127.00
     19      130.71   12.67    2.383  0.20( 0.12) 0.58      57.4     123.00
     20      129.79   12.83    2.366  0.20( 0.12) 0.58      57.5      97.00
     21      128.08   13.13    2.335  0.20( 0.12) 0.58      57.5     120.00
     22      127.61   13.21    2.327  0.20( 0.12) 0.58      57.5     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     136.03    Tc(MIN.) =    11.60
  EFFECTIVE AREA(ACRES) =      56.47   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       60.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.83
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     136.03
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
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```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.475
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.96      0.20     0.600    75   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      2.03

********************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   13.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.82      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.67
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.49
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.40
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.461
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    75   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =   13.15
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   3.80
```

```
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.05
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   15.09
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.09
  RAINFALL INTENSITY(INCH/HR) =   2.16
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.05

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.915
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   2.92
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.05   15.09    2.156  0.20( 0.18) 0.90       0.5     147.00
     2        1.56    8.91    2.915  0.20( 0.12) 0.60       0.6      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.42    8.91    2.915  0.20( 0.14) 0.70       0.9      10.00
     2        2.18   15.09    2.156  0.20( 0.15) 0.74       1.2     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       2.42    Tc(MIN.) =     8.91
 EFFECTIVE AREA(ACRES) =       0.94   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
 TOTAL AREA(ACRES) =        1.2
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.42
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.16
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.42    9.16    2.870  0.20( 0.14) 0.70       0.9      10.00
     2        2.18   15.34    2.136  0.20( 0.15) 0.74       1.2     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.49   13.40    2.307  0.20( 0.12) 0.60       2.8     144.00
 LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
     2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
     3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
   TOTAL AREA(ACRES) =         3.9

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        7.74  Tc(MIN.) =   13.403
 EFFECTIVE AREA(ACRES) =      3.87  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
```

```
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.08      0.20      0.500    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.22

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
```

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.799
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    75    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.68

******************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.677
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   2.68
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.22   10.03    2.725  0.20( 0.10) 0.50       0.1     147.00
      2        1.86   10.34    2.677  0.20( 0.09) 0.44       0.8     152.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.06   10.03    2.725  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.34    2.677  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.08    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.08
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.06   10.08    2.716  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.39    2.669  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
      2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
      3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
      1        9.11    9.16    2.870  0.20( 0.12) 0.59       3.6      10.00
      2        9.32   10.08    2.716  0.20( 0.12) 0.59       3.9     147.00
      3        9.39   10.39    2.669  0.20( 0.12) 0.59       4.0     152.00
      4        9.53   13.40    2.307  0.20( 0.12) 0.60       4.8     144.00
      5        8.89   15.34    2.136  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        9.53  Tc(MIN.) =   13.403
  EFFECTIVE AREA(ACRES) =      4.75  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.85
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.85
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.75
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.53

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.051
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    75    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.83
```

```
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.11    9.61    2.792  0.20( 0.12) 0.59       3.6      10.00
      1        9.32   10.53    2.649  0.20( 0.12) 0.59       3.9     147.00
      1        9.39   10.84    2.606  0.20( 0.12) 0.59       4.0     152.00
      1        9.53   13.85    2.265  0.20( 0.12) 0.60       4.8     144.00
      1        8.89   15.79    2.100  0.20( 0.12) 0.61       4.8     147.00
      2        0.83    5.02    4.051  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.02    4.051  0.20( 0.11) 0.55       2.1     150.00
      2        9.68    9.61    2.792  0.20( 0.11) 0.57       3.8      10.00
      3        9.86   10.53    2.649  0.20( 0.11) 0.57       4.1     147.00
      4        9.92   10.84    2.606  0.20( 0.11) 0.57       4.2     152.00
      5        9.99   13.85    2.265  0.20( 0.12) 0.58       5.0     144.00
      6        9.32   15.79    2.100  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.99    Tc(MIN.) =    13.85
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.99
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   13.88
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.88
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.98
  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.99

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"         D        0.30      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.06    4.033  0.20( 0.11) 0.55       2.1     150.00
      1        9.68    9.64    2.786  0.20( 0.11) 0.57       3.8      10.00
      1        9.86   10.57    2.644  0.20( 0.11) 0.57       4.1     147.00
      1        9.92   10.88    2.600  0.20( 0.11) 0.57       4.2     152.00
      1        9.99   13.88    2.261  0.20( 0.12) 0.58       5.0     144.00
      1        9.32   15.83    2.098  0.20( 0.12) 0.59       5.1     147.00
      2        1.02    5.58    3.814  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.06    4.033  0.20( 0.10) 0.51       2.4     150.00
      2        9.06    5.58    3.814  0.20( 0.10) 0.51       2.6      14.00
      3       10.42    9.64    2.786  0.20( 0.11) 0.54       4.1      10.00
      4       10.57   10.57    2.644  0.20( 0.11) 0.55       4.4     147.00
      5       10.61   10.88    2.600  0.20( 0.11) 0.55       4.5     152.00
```

```
      6       10.59   13.88    2.261  0.20( 0.11) 0.56       5.3     144.00
      7        9.87   15.83    2.098  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.61    Tc(MIN.) =    10.88
  EFFECTIVE AREA(ACRES) =       4.55   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.18
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.18
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       4.55
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.61

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.823
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    75    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
```

```
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    6.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.462
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.26      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.58
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.60
  RAINFALL INTENSITY(INCH/HR) =   3.46
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.37    3.895  0.20( 0.10) 0.51       2.4     150.00
      1        9.06    5.89    3.696  0.20( 0.10) 0.51       2.6      14.00
      1       10.42    9.95    2.737  0.20( 0.11) 0.54       4.1      10.00
      1       10.57   10.87    2.602  0.20( 0.11) 0.55       4.4     147.00
      1       10.61   11.18    2.560  0.20( 0.11) 0.55       4.5     152.00
      1       10.59   14.19    2.233  0.20( 0.11) 0.56       5.3     144.00
      1        9.87   16.14    2.075  0.20( 0.11) 0.57       5.4     147.00
      2        1.61    6.60    3.462  0.20( 0.03) 0.15       0.5     154.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       10.28    5.37    3.895  0.20( 0.09) 0.46       2.8      150.00
      2       10.59    5.89    3.696  0.20( 0.09) 0.46       3.1       14.00
      3       10.90    6.60    3.462  0.20( 0.09) 0.46       3.4      154.00
      4       11.69    9.95    2.737  0.20( 0.10) 0.50       4.7       10.00
      5       11.77   10.87    2.602  0.20( 0.10) 0.51       5.0      147.00
      6       11.79   11.18    2.560  0.20( 0.10) 0.51       5.1      152.00
      7       11.62   14.19    2.233  0.20( 0.10) 0.52       5.8      144.00
      8       10.83   16.14    2.075  0.20( 0.11) 0.53       5.9      147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.79    Tc(MIN.) =    11.18
  EFFECTIVE AREA(ACRES) =       5.07   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.24      0.20     0.600    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.10
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      3.10

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
```

```
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.10

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.10    9.01    2.897  0.20( 0.12) 0.60       1.2     159.00
      2        1.70    8.98    2.903  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    8.98    2.903  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.01    2.897  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.80    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.80
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.21
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    9.18    2.866  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.21    2.861  0.20( 0.12) 0.60       1.9     159.00
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.28    5.46    3.861  0.20( 0.09) 0.46       2.8     150.00
      2       10.59    5.97    3.667  0.20( 0.09) 0.46       3.1      14.00
      3       10.90    6.68    3.438  0.20( 0.09) 0.46       3.4     154.00
      4       11.69   10.03    2.725  0.20( 0.10) 0.50       4.7      10.00
      5       11.77   10.95    2.591  0.20( 0.10) 0.51       5.0     147.00
      6       11.79   11.26    2.549  0.20( 0.10) 0.51       5.1     152.00
      7       11.62   14.27    2.226  0.20( 0.10) 0.52       5.8     144.00
      8       10.83   16.22    2.069  0.20( 0.11) 0.53       5.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.46    3.861  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    5.97    3.667  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.68    3.438  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.18    2.866  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.21    2.861  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.03    2.725  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   10.95    2.591  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.26    2.549  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.27    2.226  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.22    2.069  0.20( 0.11) 0.55       7.8     147.00
    TOTAL AREA(ACRES) =         7.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       16.30  Tc(MIN.) =    9.211
  EFFECTIVE AREA(ACRES) =      6.28  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
```

```
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.30
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    9.45
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.921
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.28      0.20     0.600    75    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.23
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.23
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.23

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.109
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.28
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      3.28

********************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.23    9.41    2.825  0.20( 0.12) 0.60       1.3      17.00
      2        3.28    7.97    3.109  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    7.97    3.109  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.41    2.825  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.29    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.29
```

```
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    8.02    3.097  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.47    2.816  0.20( 0.11) 0.55       2.5      17.00
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.70    3.767  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    6.21    3.585  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.92    3.370  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.41    2.825  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.45    2.820  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.26    2.689  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   11.19    2.559  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.50    2.519  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.51    2.205  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.46    2.051  0.20( 0.11) 0.55       7.8     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.64    5.70    3.767  0.20( 0.10) 0.51       5.6     150.00
      2       20.29    6.21    3.585  0.20( 0.10) 0.51       6.1      14.00
      3       21.05    6.92    3.370  0.20( 0.10) 0.52       6.8     154.00
      4       21.93    8.02    3.097  0.20( 0.10) 0.52       7.7      16.00
      5       22.48    9.41    2.825  0.20( 0.11) 0.53       8.7     160.00
      6       22.49    9.45    2.820  0.20( 0.11) 0.53       8.8     159.00
      7       22.49    9.47    2.816  0.20( 0.11) 0.53       8.8      17.00
      8       22.15   10.26    2.689  0.20( 0.11) 0.54       9.1      10.00
      9       21.70   11.19    2.559  0.20( 0.11) 0.54       9.4     147.00
     10       21.56   11.50    2.519  0.20( 0.11) 0.54       9.5     152.00
     11       20.11   14.51    2.205  0.20( 0.11) 0.55      10.2     144.00
     12       18.68   16.46    2.051  0.20( 0.11) 0.55      10.3     147.00
    TOTAL AREA(ACRES) =        10.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.49  Tc(MIN.) =    9.445
  EFFECTIVE AREA(ACRES) =      8.76  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.97
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       8.76
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.49

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    7.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.166
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.60   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.06

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.039
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.31      0.20     0.100    75    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.12

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       19.64    5.76    3.745  0.20( 0.10) 0.51       5.6     150.00
    1       20.29    6.27    3.566  0.20( 0.10) 0.51       6.1      14.00
    1       21.05    6.98    3.353  0.20( 0.10) 0.52       6.8     154.00
    1       21.93    8.07    3.085  0.20( 0.10) 0.52       7.7      16.00
    1       22.48    9.47    2.816  0.20( 0.11) 0.53       8.7     160.00
    1       22.49    9.50    2.810  0.20( 0.11) 0.53       8.8     159.00
    1       22.49    9.52    2.807  0.20( 0.11) 0.53       8.8      17.00
    1       22.15   10.32    2.680  0.20( 0.11) 0.54       9.1      10.00
    1       21.70   11.24    2.552  0.20( 0.11) 0.54       9.4     147.00
    1       21.56   11.55    2.512  0.20( 0.11) 0.54       9.5     152.00
    1       20.11   14.56    2.200  0.20( 0.11) 0.55      10.2     144.00
    1       18.68   16.52    2.047  0.20( 0.11) 0.55      10.3     147.00
    2        2.06    7.72    3.166  0.20( 0.03) 0.16       0.7      19.00
    3        1.12    5.04    4.039  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.44    5.04    4.039  0.20( 0.09) 0.46       5.7     161.00
    2       22.50    5.76    3.745  0.20( 0.09) 0.46       6.4     150.00
    3       23.17    6.27    3.566  0.20( 0.09) 0.46       7.0      14.00
    4       23.96    6.98    3.353  0.20( 0.09) 0.47       7.7     154.00
    5       24.58    7.72    3.166  0.20( 0.09) 0.47       8.5      19.00
    6       24.79    8.07    3.085  0.20( 0.10) 0.48       8.8      16.00
    7       25.09    9.47    2.816  0.20( 0.10) 0.49       9.8     160.00
    8       25.09    9.50    2.810  0.20( 0.10) 0.49       9.8     159.00
    9       25.09    9.52    2.807  0.20( 0.10) 0.49       9.8      17.00
   10       24.63   10.32    2.680  0.20( 0.10) 0.49      10.1      10.00
   11       24.06   11.24    2.552  0.20( 0.10) 0.50      10.4     147.00
   12       23.89   11.55    2.512  0.20( 0.10) 0.50      10.5     152.00
   13       22.14   14.56    2.200  0.20( 0.10) 0.51      11.3     144.00
   14       20.57   16.52    2.047  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.09    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       9.80   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.09
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.089
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.85      0.20     0.600    75    8.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.066
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    75    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.62
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.27    8.05    3.089  0.20( 0.12) 0.60       0.9     168.00
     2        2.62    8.16    3.066  0.20( 0.12) 0.60       1.0     169.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.88    8.05    3.089  0.20( 0.12) 0.60       1.8     168.00
     2        4.88    8.16    3.066  0.20( 0.12) 0.60       1.8     169.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.88    Tc(MIN.) =     8.05
 EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.8
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.88
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.21
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.88    8.21    3.056  0.20( 0.12) 0.60       1.8     168.00
     2        4.88    8.32    3.033  0.20( 0.12) 0.60       1.8     169.00
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.44    5.11    4.008  0.20( 0.09) 0.46       5.7     161.00
     2       22.50    5.82    3.720  0.20( 0.09) 0.46       6.4     150.00
     3       23.17    6.34    3.544  0.20( 0.09) 0.46       7.0      14.00
     4       23.96    7.04    3.335  0.20( 0.09) 0.47       7.7     154.00
     5       24.58    7.78    3.151  0.20( 0.09) 0.47       8.5      19.00
     6       24.79    8.14    3.070  0.20( 0.10) 0.48       8.8      16.00
     7       25.09    9.53    2.805  0.20( 0.10) 0.49       9.8     160.00
     8       25.09    9.57    2.799  0.20( 0.10) 0.49       9.8     159.00
     9       25.09    9.59    2.796  0.20( 0.10) 0.49       9.8      17.00
    10       24.63   10.39    2.670  0.20( 0.10) 0.49      10.1      10.00
    11       24.06   11.31    2.543  0.20( 0.10) 0.50      10.4     147.00
    12       23.89   11.62    2.504  0.20( 0.10) 0.50      10.5     152.00
    13       22.14   14.63    2.194  0.20( 0.10) 0.51      11.3     144.00
    14       20.57   16.59    2.042  0.20( 0.10) 0.51      11.3     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

 ** PEAK FLOW RATE TABLE **
```

```
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       25.47    5.11    4.008  0.20( 0.10) 0.48        6.8     161.00
      2       26.75    5.82    3.720  0.20( 0.10) 0.49        7.7     150.00
      3       27.56    6.34    3.544  0.20( 0.10) 0.49        8.4      14.00
      4       28.54    7.04    3.335  0.20( 0.10) 0.49        9.3     154.00
      5       29.36    7.78    3.151  0.20( 0.10) 0.50       10.2      19.00
      6       29.66    8.14    3.070  0.20( 0.10) 0.50       10.6      16.00
      7       29.69    8.21    3.056  0.20( 0.10) 0.50       10.6     168.00
      8       29.71    8.32    3.033  0.20( 0.10) 0.50       10.7     169.00
      9       29.59    9.53    2.805  0.20( 0.10) 0.51       11.6     160.00
     10       29.58    9.57    2.799  0.20( 0.10) 0.51       11.6     159.00
     11       29.57    9.59    2.796  0.20( 0.10) 0.51       11.7      17.00
     12       28.90   10.39    2.670  0.20( 0.10) 0.51       12.0      10.00
     13       28.12   11.31    2.543  0.20( 0.10) 0.51       12.3     147.00
     14       27.88   11.62    2.504  0.20( 0.10) 0.51       12.4     152.00
     15       25.61   14.63    2.194  0.20( 0.10) 0.52       13.1     144.00
     16       23.79   16.59    2.042  0.20( 0.10) 0.52       13.2     147.00
    TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       29.71  Tc(MIN.) =    8.316
  EFFECTIVE AREA(ACRES) =     10.74  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.89
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.71
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.55
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.55
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.74
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.71

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.28      0.20     0.100    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.02
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
 FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   4.06
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.28
 TOTAL STREAM AREA(ACRES) =       0.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       25.47    5.35    3.906  0.20( 0.10) 0.48       6.8     161.00
     1       26.75    6.06    3.638  0.20( 0.10) 0.49       7.7     150.00
     1       27.56    6.57    3.472  0.20( 0.10) 0.49       8.4      14.00
     1       28.54    7.28    3.275  0.20( 0.10) 0.49       9.3     154.00
     1       29.36    8.01    3.099  0.20( 0.10) 0.50      10.2      19.00
     1       29.66    8.37    3.022  0.20( 0.10) 0.50      10.6      16.00
     1       29.69    8.44    3.008  0.20( 0.10) 0.50      10.6     168.00
     1       29.71    8.55    2.986  0.20( 0.10) 0.50      10.7     169.00
     1       29.59    9.76    2.767  0.20( 0.10) 0.51      11.6     160.00
     1       29.58    9.80    2.761  0.20( 0.10) 0.51      11.6     159.00
     1       29.57    9.82    2.758  0.20( 0.10) 0.51      11.7      17.00
     1       28.90   10.62    2.637  0.20( 0.10) 0.51      12.0      10.00
     1       28.12   11.54    2.514  0.20( 0.10) 0.51      12.3     147.00
     1       27.88   11.85    2.476  0.20( 0.10) 0.51      12.4     152.00
     1       25.61   14.87    2.174  0.20( 0.10) 0.52      13.1     144.00
     1       23.79   16.82    2.025  0.20( 0.10) 0.52      13.2     147.00
     2        1.02    5.00    4.060  0.20( 0.02) 0.10       0.3     170.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       25.79    5.00    4.060  0.20( 0.09) 0.47       6.7     170.00
     2       26.45    5.35    3.906  0.20( 0.09) 0.47       7.1     161.00
     3       27.66    6.06    3.638  0.20( 0.09) 0.47       8.0     150.00
     4       28.43    6.57    3.472  0.20( 0.10) 0.48       8.7      14.00
     5       29.37    7.28    3.275  0.20( 0.10) 0.48       9.6     154.00
     6       30.13    8.01    3.099  0.20( 0.10) 0.48      10.5      19.00
     7       30.41    8.37    3.022  0.20( 0.10) 0.49      10.9      16.00
     8       30.44    8.44    3.008  0.20( 0.10) 0.49      10.9     168.00
     9       30.45    8.55    2.986  0.20( 0.10) 0.49      11.0     169.00
    10       30.28    9.76    2.767  0.20( 0.10) 0.50      11.9     160.00
    11       30.27    9.80    2.761  0.20( 0.10) 0.50      11.9     159.00
    12       30.26    9.82    2.758  0.20( 0.10) 0.50      11.9      17.00
    13       29.56   10.62    2.637  0.20( 0.10) 0.50      12.2      10.00
```

```
    14       28.75   11.54    2.514  0.20( 0.10) 0.50      12.5     147.00
    15       28.50   11.85    2.476  0.20( 0.10) 0.50      12.6     152.00
    16       26.15   14.87    2.174  0.20( 0.10) 0.51      13.4     144.00
    17       24.30   16.82    2.025  0.20( 0.10) 0.51      13.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.45    Tc(MIN.) =     8.55
  EFFECTIVE AREA(ACRES) =      11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.45
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.677
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.81      0.20     0.200    75    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.65

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   3.68
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.813
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.65    5.94    3.677  0.20( 0.04) 0.20       0.8     173.00
      2        1.74    5.58    3.813  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.32    5.58    3.813  0.20( 0.03) 0.16       1.3     174.00
      2        4.33    5.94    3.677  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.33    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.79
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.33
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.10
 LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.32    5.74    3.752  0.20( 0.03) 0.16       1.3     174.00
     2        4.33    6.10    3.621  0.20( 0.03) 0.16       1.3     173.00
 LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       25.79    5.07    4.026  0.20( 0.09) 0.47       6.7     170.00
     2       26.45    5.42    3.877  0.20( 0.09) 0.47       7.1     161.00
     3       27.66    6.13    3.614  0.20( 0.09) 0.47       8.0     150.00
     4       28.43    6.64    3.451  0.20( 0.10) 0.48       8.7      14.00
     5       29.37    7.35    3.257  0.20( 0.10) 0.48       9.6     154.00
     6       30.13    8.08    3.083  0.20( 0.10) 0.48      10.5      19.00
     7       30.41    8.44    3.008  0.20( 0.10) 0.49      10.9      16.00
     8       30.44    8.51    2.994  0.20( 0.10) 0.49      10.9     168.00
     9       30.45    8.61    2.972  0.20( 0.10) 0.49      11.0     169.00
    10       30.28    9.83    2.755  0.20( 0.10) 0.50      11.9     160.00
    11       30.27    9.87    2.750  0.20( 0.10) 0.50      11.9     159.00
    12       30.26    9.89    2.747  0.20( 0.10) 0.50      11.9      17.00
    13       29.56   10.69    2.627  0.20( 0.10) 0.50      12.2      10.00
    14       28.75   11.61    2.505  0.20( 0.10) 0.50      12.5     147.00
    15       28.50   11.92    2.468  0.20( 0.10) 0.50      12.6     152.00
    16       26.15   14.94    2.168  0.20( 0.10) 0.51      13.4     144.00
    17       24.30   16.90    2.020  0.20( 0.10) 0.51      13.4     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       29.90    5.07    4.026  0.20( 0.08) 0.42       7.8     170.00
     2       30.67    5.42    3.877  0.20( 0.08) 0.42       8.3     161.00
     3       31.32    5.74    3.752  0.20( 0.09) 0.43       8.8     174.00
     4       31.95    6.10    3.621  0.20( 0.09) 0.43       9.3     173.00
     5       31.98    6.13    3.614  0.20( 0.09) 0.43       9.3     150.00
     6       32.56    6.64    3.451  0.20( 0.09) 0.43      10.0      14.00
     7       33.26    7.35    3.257  0.20( 0.09) 0.44      10.9     154.00
     8       33.81    8.08    3.083  0.20( 0.09) 0.45      11.8      19.00
     9       34.00    8.44    3.008  0.20( 0.09) 0.45      12.2      16.00
    10       34.01    8.51    2.994  0.20( 0.09) 0.45      12.2     168.00
    11       34.00    8.61    2.972  0.20( 0.09) 0.45      12.3     169.00
    12       33.57    9.83    2.755  0.20( 0.09) 0.46      13.2     160.00
    13       33.55    9.87    2.750  0.20( 0.09) 0.46      13.2     159.00
    14       33.53    9.89    2.747  0.20( 0.09) 0.46      13.3      17.00
    15       32.69   10.69    2.627  0.20( 0.09) 0.47      13.6      10.00
    16       31.73   11.61    2.505  0.20( 0.09) 0.47      13.9     147.00
    17       31.44   11.92    2.468  0.20( 0.09) 0.47      14.0     152.00
    18       28.73   14.94    2.168  0.20( 0.10) 0.48      14.7     144.00
    19       26.69   16.90    2.020  0.20( 0.10) 0.48      14.8     147.00
   TOTAL AREA(ACRES) =        14.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       34.01  Tc(MIN.) =    8.507
 EFFECTIVE AREA(ACRES) =     12.25  AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       14.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
 FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.51
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.01
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    8.90
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.90
 RAINFALL INTENSITY(INCH/HR) =   2.92
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.45
 EFFECTIVE STREAM AREA(ACRES) =      12.25
 TOTAL STREAM AREA(ACRES) =      14.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.01

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.764
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.43      0.20      0.100    75    5.70
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.45
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
 FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.70
 RAINFALL INTENSITY(INCH/HR) =   3.76
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
```

```
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.812
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    7.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.217
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.32
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.87
  FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.51
  RAINFALL INTENSITY(INCH/HR) =   3.22
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.90    5.47    3.857  0.20( 0.08) 0.42       7.8     170.00
      1       30.67    5.81    3.724  0.20( 0.08) 0.42       8.3     161.00
      1       31.32    6.13    3.612  0.20( 0.09) 0.43       8.8     174.00
      1       31.95    6.50    3.494  0.20( 0.09) 0.43       9.3     173.00
      1       31.98    6.52    3.487  0.20( 0.09) 0.43       9.3     150.00
      1       32.56    7.03    3.340  0.20( 0.09) 0.43      10.0      14.00
      1       33.26    7.73    3.162  0.20( 0.09) 0.44      10.9     154.00
      1       33.81    8.47    3.001  0.20( 0.09) 0.45      11.8      19.00
      1       34.00    8.83    2.931  0.20( 0.09) 0.45      12.2      16.00
      1       34.01    8.90    2.918  0.20( 0.09) 0.45      12.2     168.00
      1       34.00    9.00    2.898  0.20( 0.09) 0.45      12.3     169.00
      1       33.57   10.22    2.695  0.20( 0.09) 0.46      13.2     160.00
      1       33.55   10.25    2.690  0.20( 0.09) 0.46      13.2     159.00
      1       33.53   10.28    2.687  0.20( 0.09) 0.46      13.3      17.00
      1       32.69   11.08    2.574  0.20( 0.09) 0.47      13.6      10.00
      1       31.73   12.00    2.458  0.20( 0.09) 0.47      13.9     147.00
      1       31.44   12.31    2.422  0.20( 0.09) 0.47      14.0     152.00
      1       28.73   15.34    2.136  0.20( 0.10) 0.48      14.7     144.00
      1       26.69   17.30    1.993  0.20( 0.10) 0.48      14.8     147.00
      2        1.45    5.70    3.764  0.20( 0.02) 0.10       0.4     175.00
      3        2.29    7.51    3.217  0.20( 0.04) 0.20       0.8     167.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.32    5.47    3.857  0.20( 0.08) 0.39       8.8     170.00
      2       33.91    5.70    3.764  0.20( 0.08) 0.39       9.2     175.00
      3       34.16    5.81    3.724  0.20( 0.08) 0.39       9.3     161.00
      4       34.81    6.13    3.612  0.20( 0.08) 0.40       9.9     174.00
      5       35.45    6.50    3.494  0.20( 0.08) 0.40      10.4     173.00
      6       35.48    6.52    3.487  0.20( 0.08) 0.40      10.5     150.00
      7       36.07    7.03    3.340  0.20( 0.08) 0.41      11.2      14.00
      8       36.55    7.51    3.217  0.20( 0.08) 0.41      11.9     167.00
      9       36.72    7.73    3.162  0.20( 0.08) 0.41      12.1     154.00
     10       37.10    8.47    3.001  0.20( 0.08) 0.42      13.0      19.00
     11       37.21    8.83    2.931  0.20( 0.09) 0.43      13.4      16.00
     12       37.21    8.90    2.918  0.20( 0.09) 0.43      13.5     168.00
     13       37.17    9.00    2.898  0.20( 0.09) 0.43      13.6     169.00
     14       36.51   10.22    2.695  0.20( 0.09) 0.44      14.5     160.00
     15       36.49   10.25    2.690  0.20( 0.09) 0.44      14.5     159.00
     16       36.47   10.28    2.687  0.20( 0.09) 0.44      14.5      17.00
     17       35.51   11.08    2.574  0.20( 0.09) 0.44      14.8      10.00
     18       34.42   12.00    2.458  0.20( 0.09) 0.45      15.1     147.00
     19       34.08   12.31    2.422  0.20( 0.09) 0.45      15.2     152.00
     20       31.06   15.34    2.136  0.20( 0.09) 0.46      15.9     144.00
     21       28.86   17.30    1.993  0.20( 0.09) 0.46      16.0     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.21    Tc(MIN.) =     8.83
  EFFECTIVE AREA(ACRES) =      13.42   AREA-AVERAGED Fm(INCH/HR) =  0.09
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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       16.0
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.40  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.38
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.21
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    75    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    9.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       2.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       1.17
  TOTAL STREAM AREA(ACRES) =       1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.84

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.06
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.84    9.50    2.810  0.20( 0.11) 0.54       1.2     179.00
      2        5.01   10.06    2.720  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.74    9.50    2.810  0.20( 0.12) 0.58       3.2     179.00
      2        7.76   10.06    2.720  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.76    Tc(MIN.) =    10.06
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.76
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.20
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.74    9.65    2.785  0.20( 0.12) 0.58       3.2     179.00
     2        7.76   10.20    2.698  0.20( 0.12) 0.58       3.3     181.00
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.32    5.53    3.830  0.20( 0.08) 0.39       8.8     170.00
     2       33.91    5.77    3.739  0.20( 0.08) 0.39       9.2     175.00
     3       34.16    5.88    3.700  0.20( 0.08) 0.39       9.3     161.00
     4       34.81    6.20    3.590  0.20( 0.08) 0.40       9.9     174.00
     5       35.45    6.56    3.474  0.20( 0.08) 0.40      10.4     173.00
     6       35.48    6.58    3.467  0.20( 0.08) 0.40      10.5     150.00
     7       36.07    7.09    3.322  0.20( 0.08) 0.41      11.2      14.00
     8       36.55    7.57    3.201  0.20( 0.08) 0.41      11.9     167.00
     9       36.72    7.80    3.146  0.20( 0.08) 0.41      12.1     154.00
    10       37.10    8.54    2.988  0.20( 0.08) 0.42      13.0      19.00
    11       37.21    8.89    2.919  0.20( 0.09) 0.43      13.4      16.00
    12       37.21    8.96    2.906  0.20( 0.09) 0.43      13.5     168.00
    13       37.17    9.07    2.886  0.20( 0.09) 0.43      13.6     169.00
    14       36.51   10.29    2.685  0.20( 0.09) 0.44      14.5     160.00
    15       36.49   10.32    2.680  0.20( 0.09) 0.44      14.5     159.00
    16       36.47   10.34    2.677  0.20( 0.09) 0.44      14.5      17.00
    17       35.51   11.14    2.565  0.20( 0.09) 0.44      14.8      10.00
    18       34.42   12.07    2.450  0.20( 0.09) 0.45      15.1     147.00
    19       34.08   12.38    2.415  0.20( 0.09) 0.45      15.2     152.00
    20       31.06   15.41    2.130  0.20( 0.09) 0.46      15.9     144.00
    21       28.86   17.37    1.989  0.20( 0.09) 0.46      16.0     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
     2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
     3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
     4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
     5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
     6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
     7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
     8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
     9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
    10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
    11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
    12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
    13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
    14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
    15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
```

```
    16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
    23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
   TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       44.72  Tc(MIN.) =    9.069
  EFFECTIVE AREA(ACRES) =     16.57  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    75    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   11.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.566
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.39
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.29
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.845
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   10.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.697
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
    1        5.39   11.29    2.546  0.20( 0.12) 0.60       2.4     184.00
    2        3.14   10.21    2.697  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.33   10.21    2.697  0.20( 0.12) 0.58       3.6     187.00
      2        8.35   11.29    2.546  0.20( 0.12) 0.58       3.8     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.35    Tc(MIN.) =    11.29
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.35
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.78
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.35

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.337
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
```

```
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    8.02
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.097
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.06
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  3.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.02
  RAINFALL INTENSITY(INCH/HR) =   3.10
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20      0.600    75    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    7.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.18
  EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.46
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.00
```

```
  TOTAL STREAM AREA(ACRES) =       1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.33   10.70    2.625  0.20( 0.12) 0.58       3.6     187.00
      1        8.35   11.78    2.485  0.20( 0.12) 0.58       3.8     184.00
      2        3.51    8.02    3.097  0.20( 0.12) 0.60       1.3     190.00
      3        2.75    7.68    3.175  0.20( 0.12) 0.60       1.0     191.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.68    3.175  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.02    3.097  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.70    2.625  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.78    2.485  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.60    Tc(MIN.) =     8.02
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.73    3.162  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.07    3.085  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.76    2.617  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.83    2.478  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
      2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
      3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
      4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
      5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
      6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
      7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
      8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
      9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
```

```
    10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
    11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
    12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
    13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
    14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
    15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
    16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
    23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.26    5.53    3.830  0.20( 0.09) 0.47      14.0     170.00
      2       52.17    5.77    3.739  0.20( 0.09) 0.47      14.7     175.00
      3       52.55    5.88    3.700  0.20( 0.09) 0.47      15.0     161.00
      4       53.60    6.20    3.590  0.20( 0.09) 0.47      15.8     174.00
      5       54.68    6.56    3.474  0.20( 0.09) 0.47      16.7     173.00
      6       54.73    6.58    3.467  0.20( 0.09) 0.47      16.7     150.00
      7       55.92    7.09    3.322  0.20( 0.09) 0.47      18.0      14.00
      8       56.94    7.57    3.201  0.20( 0.10) 0.48      19.1     167.00
      9       57.23    7.73    3.162  0.20( 0.10) 0.48      19.4     191.10
     10       57.33    7.80    3.146  0.20( 0.10) 0.48      19.6     154.00
     11       57.66    8.07    3.085  0.20( 0.10) 0.48      20.1     190.00
     12       58.06    8.54    2.988  0.20( 0.10) 0.48      21.0      19.00
     13       58.28    8.89    2.919  0.20( 0.10) 0.49      21.6      16.00
     14       58.30    8.96    2.906  0.20( 0.10) 0.49      21.7     168.00
     15       58.30    9.07    2.886  0.20( 0.10) 0.49      21.9     169.00
     16       58.16    9.65    2.785  0.20( 0.10) 0.49      22.7     179.00
     17       57.86   10.20    2.698  0.20( 0.10) 0.49      23.4     181.00
     18       57.78   10.29    2.685  0.20( 0.10) 0.50      23.5     160.00
     19       57.74   10.32    2.680  0.20( 0.10) 0.50      23.5     159.00
     20       57.71   10.34    2.677  0.20( 0.10) 0.50      23.5      17.00
     21       57.02   10.76    2.617  0.20( 0.10) 0.50      23.8     187.00
     22       56.31   11.14    2.565  0.20( 0.10) 0.50      24.1      10.00
     23       55.07   11.83    2.478  0.20( 0.10) 0.50      24.4     184.00
     24       54.55   12.07    2.450  0.20( 0.10) 0.50      24.5     147.00
     25       53.90   12.38    2.415  0.20( 0.10) 0.50      24.6     152.00
     26       48.43   15.41    2.130  0.20( 0.10) 0.50      25.3     144.00
     27       45.01   17.37    1.989  0.20( 0.10) 0.51      25.4     147.00
    TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.30  Tc(MIN.) =    8.961
  EFFECTIVE AREA(ACRES) =     21.72  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    194.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =    9.04   RAINFALL INTENSITY(INCH/HR) =  2.89
  EFFECTIVE AREA(ACRES) =     3.73
  TOTAL AREA(ACRES) =     4.36        PEAK FLOW RATE(CFS) =     10.00
  AREA-AVERAGED Fm(INCH/HR) =   0.10  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.49
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.07
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.07
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =       3.73
  TOTAL STREAM AREA(ACRES) =       4.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.00

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.22
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      4.22

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.22
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.31
 LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.31
 RAINFALL INTENSITY(INCH/HR) =   3.92
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       1.21
 TOTAL STREAM AREA(ACRES) =       1.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.22

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       10.00    9.07    2.886  0.20( 0.10) 0.49       3.7     147.00
     2        4.22    5.31    3.923  0.20( 0.18) 0.90       1.2     195.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.25    5.31    3.923  0.20( 0.13) 0.64       3.4     195.00
     2       13.05    9.07    2.886  0.20( 0.12) 0.59       4.9     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.05    Tc(MIN.) =     9.07
 EFFECTIVE AREA(ACRES) =       4.94   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =        5.6
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
 FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.43
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.05
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.56
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   2.80
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.94
  TOTAL STREAM AREA(ACRES) =       5.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.05

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.912
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    75    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.25    5.80    3.727  0.20( 0.13) 0.64       3.4     195.00
      1       13.05    9.56    2.800  0.20( 0.12) 0.59       4.9     147.00
      2        1.16    5.33    3.912  0.20( 0.02) 0.10       0.3     183.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.00    5.33    3.912  0.20( 0.12) 0.58       3.4     183.00
      2       13.35    5.80    3.727  0.20( 0.12) 0.59       3.7     195.00
      3       13.88    9.56    2.800  0.20( 0.11) 0.56       5.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.88    Tc(MIN.) =     9.56
```

```
  EFFECTIVE AREA(ACRES) =       5.27   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.88
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.71
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.123
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.12      0.20     0.500    75    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.05
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.05

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.05

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.07
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.07

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.05    7.90    3.123  0.20( 0.10) 0.50       1.1     199.00
      2        2.07    8.53    2.989  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.05    7.90    3.123  0.20( 0.11) 0.54       1.9     199.00
      2        4.98    8.53    2.989  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.05    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.05
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.05    7.99    3.102  0.20( 0.11) 0.54       1.9     199.00
     2        4.98    8.62    2.971  0.20( 0.11) 0.54       1.9     200.00
 LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.00    5.48    3.852  0.20( 0.12) 0.58       3.4     183.00
     2       13.35    5.95    3.675  0.20( 0.12) 0.59       3.7     195.00
     3       13.88    9.71    2.776  0.20( 0.11) 0.56       5.3     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.32    5.48    3.852  0.20( 0.11) 0.57       4.7     183.00
     2       17.83    5.95    3.675  0.20( 0.12) 0.58       5.1     195.00
     3       18.69    7.99    3.102  0.20( 0.11) 0.56       6.4     199.00
     4       18.71    8.62    2.971  0.20( 0.11) 0.56       6.7     200.00
     5       18.52    9.71    2.776  0.20( 0.11) 0.55       7.2     147.00
   TOTAL AREA(ACRES) =         7.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       18.71  Tc(MIN.) =    8.621
 EFFECTIVE AREA(ACRES) =      6.74  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        7.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.12
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.71
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    9.10
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.10
 RAINFALL INTENSITY(INCH/HR) =   2.88
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       6.74
```

```
  TOTAL STREAM AREA(ACRES) =       7.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.71

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.708
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    75    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    7.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.42      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.42
  RAINFALL INTENSITY(INCH/HR) =   3.24
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.32    5.96    3.670  0.20( 0.11) 0.57       4.7     183.00
      1       17.83    6.43    3.515  0.20( 0.12) 0.58       5.1     195.00
      1       18.69    8.47    3.001  0.20( 0.11) 0.56       6.4     199.00
      1       18.71    9.10    2.881  0.20( 0.11) 0.56       6.7     200.00
      1       18.52   10.19    2.700  0.20( 0.11) 0.55       7.2     147.00
      2        2.33    7.42    3.238  0.20( 0.04) 0.20       0.8     192.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.45    5.96    3.670  0.20( 0.11) 0.53       5.4     183.00
      2       20.03    6.43    3.515  0.20( 0.11) 0.53       5.8     195.00
      3       20.58    7.42    3.238  0.20( 0.10) 0.52       6.6     192.00
      4       20.85    8.47    3.001  0.20( 0.10) 0.52       7.2     199.00
      5       20.78    9.10    2.881  0.20( 0.10) 0.52       7.6     200.00
      6       20.46   10.19    2.700  0.20( 0.10) 0.52       8.0     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.85    Tc(MIN.) =     8.47
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.88
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.85
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.53
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.97

**************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   10.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    4.76
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       6.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.12
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  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.57

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.833
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.17      0.20      0.100    75    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   3.83
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.57   10.61    2.638  0.20( 0.12) 0.60       2.9     184.00
      2        0.58    5.53    3.833  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.63    5.53    3.833  0.20( 0.11) 0.55       1.7      59.00
      2        6.97   10.61    2.638  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.97    Tc(MIN.) =    10.61
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.81      0.20     0.600    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.22
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.22

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.63    5.93    3.680  0.20( 0.11) 0.55       1.7      59.00
      1        6.97   11.00    2.584  0.20( 0.11) 0.57       3.1     184.00
```

```
     2        2.22    7.72    3.165  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.93    3.680  0.20( 0.11) 0.56       2.3      59.00
      2        8.32    7.72    3.165  0.20( 0.11) 0.57       3.0      64.00
      3        8.77   11.00    2.584  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.77    Tc(MIN.) =    11.00
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.77
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.03
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.77

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.48      0.20     0.600    75    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.15
```

```
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =   11.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.563
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.92
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.97    3.667  0.20( 0.11) 0.56       2.3      59.00
      1        8.32    7.76    3.156  0.20( 0.11) 0.57       3.0      64.00
      1        8.77   11.03    2.579  0.20( 0.12) 0.58       3.9     184.00
      2        5.19   11.15    2.563  0.20( 0.12) 0.60       2.4     208.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.66    5.97    3.667  0.20( 0.12) 0.58       3.6      59.00
      2       12.81    7.76    3.156  0.20( 0.12) 0.58       4.6      64.00
      3       13.93   11.03    2.579  0.20( 0.12) 0.59       6.2     184.00
      4       13.90   11.15    2.563  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.93    Tc(MIN.) =    11.03
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.93
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.92
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.93

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.78
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   10.95
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.591
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.04      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    4.54
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  5.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.17

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.036
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    75    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =    9.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.32
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.66    6.90    3.375  0.20( 0.12) 0.58       3.6      59.00
     1       12.81    8.67    2.962  0.20( 0.12) 0.58       4.6      64.00
     1       13.93   11.92    2.467  0.20( 0.12) 0.59       6.2     184.00
     1       13.90   12.05    2.453  0.20( 0.12) 0.59       6.2     208.00
     2        6.17   10.95    2.591  0.20( 0.11) 0.57       2.8     211.00
     3        3.55    9.32    2.841  0.20( 0.10) 0.50       1.4     213.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.93    6.90    3.375  0.20( 0.11) 0.56       6.4      59.00
     2       21.88    8.67    2.962  0.20( 0.11) 0.57       8.2      64.00
     3       22.36    9.32    2.841  0.20( 0.11) 0.57       8.7     213.00
     4       23.00   10.95    2.591  0.20( 0.11) 0.57       9.9     211.00
     5       22.87   11.92    2.467  0.20( 0.11) 0.57      10.4     184.00
     6       22.78   12.05    2.453  0.20( 0.11) 0.57      10.5     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.00    Tc(MIN.) =    10.95
 EFFECTIVE AREA(ACRES) =       9.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       10.5
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.11
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.00
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.20
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.20
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.57
 EFFECTIVE STREAM AREA(ACRES) =       9.95
 TOTAL STREAM AREA(ACRES) =      10.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.00

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
 ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.18      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.93    7.17    3.302  0.20( 0.11) 0.56       6.4      59.00
      1       21.88    8.93    2.911  0.20( 0.11) 0.57       8.2      64.00
      1       22.36    9.58    2.796  0.20( 0.11) 0.57       8.7     213.00
      1       23.00   11.20    2.557  0.20( 0.11) 0.57       9.9     211.00
      1       22.87   12.18    2.437  0.20( 0.11) 0.57      10.4     184.00
      1       22.78   12.30    2.423  0.20( 0.11) 0.57      10.5     208.00
      2        0.65    5.00    4.060  0.20( 0.02) 0.10       0.2     215.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.85    5.00    4.060  0.20( 0.11) 0.54       4.6     215.00
      2       20.46    7.17    3.302  0.20( 0.11) 0.55       6.6      59.00
      3       22.34    8.93    2.911  0.20( 0.11) 0.56       8.3      64.00
      4       22.81    9.58    2.796  0.20( 0.11) 0.56       8.9     213.00
      5       23.41   11.20    2.557  0.20( 0.11) 0.56      10.1     211.00
      6       23.26   12.18    2.437  0.20( 0.11) 0.56      10.6     184.00
      7       23.17   12.30    2.423  0.20( 0.11) 0.56      10.6     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.41    Tc(MIN.) =    11.20
  EFFECTIVE AREA(ACRES) =      10.13   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       10.6
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.41
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.85    5.06    4.031  0.20( 0.11) 0.54       4.6     215.00
      2       20.46    7.23    3.287  0.20( 0.11) 0.55       6.6      59.00
      3       22.34    8.99    2.901  0.20( 0.11) 0.56       8.3      64.00
      4       22.81    9.64    2.786  0.20( 0.11) 0.56       8.9     213.00
      5       23.41   11.26    2.549  0.20( 0.11) 0.56      10.1     211.00
      6       23.26   12.24    2.431  0.20( 0.11) 0.56      10.6     184.00
      7       23.17   12.36    2.417  0.20( 0.11) 0.56      10.6     208.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.45    6.02    3.649  0.20( 0.11) 0.53       5.4     183.00
      2       20.03    6.49    3.496  0.20( 0.11) 0.53       5.8     195.00
      3       20.58    7.48    3.224  0.20( 0.10) 0.52       6.6     192.00
      4       20.85    8.53    2.989  0.20( 0.10) 0.52       7.2     199.00
      5       20.78    9.16    2.870  0.20( 0.10) 0.52       7.6     200.00
      6       20.46   10.24    2.691  0.20( 0.10) 0.52       8.0     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.96    5.06    4.031  0.20( 0.11) 0.54       9.1     215.00
      2       38.46    6.02    3.649  0.20( 0.11) 0.54      10.9     183.00
      3       39.59    6.49    3.496  0.20( 0.11) 0.54      11.7     195.00
      4       40.90    7.23    3.287  0.20( 0.11) 0.54      12.9      59.00
      5       41.30    7.48    3.224  0.20( 0.11) 0.54      13.4     192.00
      6       42.70    8.53    2.989  0.20( 0.11) 0.54      15.1     199.00
      7       43.14    8.99    2.901  0.20( 0.11) 0.54      15.8      64.00
      8       43.24    9.16    2.870  0.20( 0.11) 0.54      16.0     200.00
      9       43.45    9.64    2.786  0.20( 0.11) 0.54      16.7     213.00
     10       43.49   10.24    2.691  0.20( 0.11) 0.54      17.4     147.00
     11       42.74   11.26    2.549  0.20( 0.11) 0.54      18.1     211.00
     12       41.65   12.24    2.431  0.20( 0.11) 0.54      18.6     184.00
     13       41.45   12.36    2.417  0.20( 0.11) 0.54      18.6     208.00
    TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       43.49  Tc(MIN.) =   10.244
  EFFECTIVE AREA(ACRES) =     17.37  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.89
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.49
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.67
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.67
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      17.37
  TOTAL STREAM AREA(ACRES) =      19.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.49

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    75    7.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.93
```

```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
 STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    9.27
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.850
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    3.42
 EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.65

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
 FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.27
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.30
 TOTAL STREAM AREA(ACRES) =       2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.65

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       35.96    5.51    3.838  0.20( 0.11) 0.54       9.1     215.00
     1       38.46    6.47    3.501  0.20( 0.11) 0.54      10.9     183.00
     1       39.59    6.92    3.369  0.20( 0.11) 0.54      11.7     195.00
     1       40.90    7.66    3.180  0.20( 0.11) 0.54      12.9      59.00
     1       41.30    7.91    3.122  0.20( 0.11) 0.54      13.4     192.00
     1       42.70    8.96    2.907  0.20( 0.11) 0.54      15.1     199.00
     1       43.14    9.42    2.825  0.20( 0.11) 0.54      15.8      64.00
     1       43.24    9.58    2.796  0.20( 0.11) 0.54      16.0     200.00
     1       43.45   10.07    2.718  0.20( 0.11) 0.54      16.7     213.00
     1       43.49   10.67    2.629  0.20( 0.11) 0.54      17.4     147.00
     1       42.74   11.69    2.496  0.20( 0.11) 0.54      18.1     211.00
     1       41.65   12.67    2.383  0.20( 0.11) 0.54      18.6     184.00
     1       41.45   12.79    2.370  0.20( 0.11) 0.54      18.6     208.00
     2        5.65    9.27    2.850  0.20( 0.12) 0.60       2.3     201.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       40.54    5.51    3.838  0.20( 0.11) 0.54      10.5     215.00
     2       43.34    6.47    3.501  0.20( 0.11) 0.55      12.5     183.00
     3       44.62    6.92    3.369  0.20( 0.11) 0.55      13.4     195.00
     4       46.13    7.66    3.180  0.20( 0.11) 0.55      14.8      59.00
     5       46.60    7.91    3.122  0.20( 0.11) 0.55      15.3     192.00
     6       48.28    8.96    2.907  0.20( 0.11) 0.55      17.3     199.00
     7       48.65    9.27    2.850  0.20( 0.11) 0.55      17.9     201.00
     8       48.74    9.42    2.825  0.20( 0.11) 0.55      18.1      64.00
     9       48.78    9.58    2.796  0.20( 0.11) 0.55      18.3     200.00
    10       48.83   10.07    2.718  0.20( 0.11) 0.55      19.0     213.00
```

```
    11       48.69   10.67    2.629  0.20( 0.11) 0.55      19.7     147.00
    12       47.66   11.69    2.496  0.20( 0.11) 0.55      20.4     211.00
    13       46.34   12.67    2.383  0.20( 0.11) 0.55      20.9     184.00
    14       46.11   12.79    2.370  0.20( 0.11) 0.55      20.9     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.83    Tc(MIN.) =    10.07
  EFFECTIVE AREA(ACRES) =      18.97   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       21.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.29
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.83
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =    9.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    3.24
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.15
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.15

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.205
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    75    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.79   Tc(MIN.) =    8.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   3.03
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.98
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.15    9.16    2.869  0.20( 0.12) 0.60       2.1     220.00
      2        4.98    8.34    3.028  0.20( 0.10) 0.50       1.9     223.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.94    8.34    3.028  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.16    2.869  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.94    Tc(MIN.) =     8.34
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.94    8.68    2.959  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.51    2.809  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.54    5.55    3.824  0.20( 0.11) 0.54      10.5     215.00
      2       43.34    6.51    3.491  0.20( 0.11) 0.55      12.5     183.00
      3       44.62    6.96    3.360  0.20( 0.11) 0.55      13.4     195.00
      4       46.13    7.69    3.172  0.20( 0.11) 0.55      14.8      59.00
      5       46.60    7.94    3.115  0.20( 0.11) 0.55      15.3     192.00
      6       48.28    8.99    2.901  0.20( 0.11) 0.55      17.3     199.00
      7       48.65    9.30    2.845  0.20( 0.11) 0.55      17.9     201.00
      8       48.74    9.45    2.819  0.20( 0.11) 0.55      18.1      64.00
      9       48.78    9.62    2.791  0.20( 0.11) 0.55      18.3     200.00
     10       48.83   10.10    2.713  0.20( 0.11) 0.55      19.0     213.00
     11       48.69   10.70    2.625  0.20( 0.11) 0.55      19.7     147.00
     12       47.66   11.72    2.492  0.20( 0.11) 0.55      20.4     211.00
     13       46.34   12.70    2.380  0.20( 0.11) 0.55      20.9     184.00
     14       46.11   12.82    2.367  0.20( 0.11) 0.55      20.9     208.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.82    5.55    3.824  0.20( 0.11) 0.55      12.9     215.00
      2       52.18    6.51    3.491  0.20( 0.11) 0.55      15.3     183.00
      3       53.70    6.96    3.360  0.20( 0.11) 0.55      16.5     195.00
      4       55.59    7.69    3.172  0.20( 0.11) 0.55      18.2      59.00
      5       56.19    7.94    3.115  0.20( 0.11) 0.55      18.8     192.00
      6       57.72    8.68    2.959  0.20( 0.11) 0.55      20.5     223.00
      7       58.19    8.99    2.901  0.20( 0.11) 0.55      21.2     199.00
      8       58.53    9.30    2.845  0.20( 0.11) 0.55      21.8     201.00
      9       58.61    9.45    2.819  0.20( 0.11) 0.55      22.0      64.00
     10       58.62    9.51    2.809  0.20( 0.11) 0.55      22.1     220.00
     11       58.58    9.62    2.791  0.20( 0.11) 0.55      22.3     200.00
     12       58.34   10.10    2.713  0.20( 0.11) 0.55      22.9     213.00
     13       57.87   10.70    2.625  0.20( 0.11) 0.55      23.6     147.00
     14       56.36   11.72    2.492  0.20( 0.11) 0.55      24.4     211.00
     15       54.63   12.70    2.380  0.20( 0.11) 0.55      24.9     184.00
     16       54.36   12.82    2.367  0.20( 0.11) 0.55      24.9     208.00
    TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.62  Tc(MIN.) =    9.507
  EFFECTIVE AREA(ACRES) =     22.14  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  46.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.62
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.82    5.56    3.822  0.20( 0.11) 0.55      12.9     215.00
      2       52.18    6.51    3.489  0.20( 0.11) 0.55      15.3     183.00
      3       53.70    6.96    3.358  0.20( 0.11) 0.55      16.5     195.00
      4       55.59    7.70    3.170  0.20( 0.11) 0.55      18.2      59.00
      5       56.19    7.95    3.113  0.20( 0.11) 0.55      18.8     192.00
      6       57.72    8.69    2.958  0.20( 0.11) 0.55      20.5     223.00
      7       58.19    9.00    2.899  0.20( 0.11) 0.55      21.2     199.00
      8       58.53    9.31    2.843  0.20( 0.11) 0.55      21.8     201.00
      9       58.61    9.46    2.818  0.20( 0.11) 0.55      22.0      64.00
     10       58.62    9.51    2.808  0.20( 0.11) 0.55      22.1     220.00
     11       58.58    9.62    2.790  0.20( 0.11) 0.55      22.3     200.00
     12       58.34   10.11    2.712  0.20( 0.11) 0.55      22.9     213.00
     13       57.87   10.71    2.624  0.20( 0.11) 0.55      23.6     147.00
```

14	56.36	11.73	2.491	0.20(0.11)	0.55	24.4	211.00
15	54.63	12.71	2.379	0.20(0.11)	0.55	24.9	184.00
16	54.36	12.83	2.366	0.20(0.11)	0.55	24.9	208.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 230.00 = 3455.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	103.32	5.07	4.025	0.20(0.12)	0.59	25.0	140.00
2	110.16	5.93	3.681	0.20(0.12)	0.59	29.2	104.00
3	114.48	6.48	3.499	0.20(0.12)	0.59	32.2	88.00
4	120.48	7.38	3.247	0.20(0.12)	0.59	37.1	95.00
5	121.83	7.60	3.194	0.20(0.12)	0.59	38.2	118.00
6	123.10	7.80	3.146	0.20(0.12)	0.59	39.4	138.00
7	125.97	8.27	3.043	0.20(0.12)	0.59	42.0	141.00
8	129.96	8.97	2.905	0.20(0.12)	0.59	45.8	97.00
9	130.01	8.98	2.902	0.20(0.12)	0.59	45.8	85.00
10	130.03	8.99	2.901	0.20(0.12)	0.59	45.8	136.00
11	131.99	9.62	2.790	0.20(0.12)	0.59	48.6	92.00
12	132.93	9.95	2.737	0.20(0.12)	0.59	50.0	129.00
13	133.98	10.39	2.670	0.20(0.12)	0.59	51.8	134.00
14	134.42	10.61	2.638	0.20(0.12)	0.59	52.6	116.00
15	136.03	11.67	2.498	0.20(0.12)	0.58	56.5	1.00
16	134.89	11.91	2.469	0.20(0.12)	0.58	56.8	114.00
17	134.14	12.06	2.451	0.20(0.12)	0.58	56.9	100.00
18	131.88	12.51	2.400	0.20(0.12)	0.58	57.3	127.00
19	130.71	12.74	2.376	0.20(0.12)	0.58	57.4	123.00
20	129.79	12.90	2.358	0.20(0.12)	0.58	57.5	97.00
21	128.08	13.20	2.328	0.20(0.12)	0.58	57.5	120.00
22	127.61	13.28	2.319	0.20(0.12)	0.58	57.5	111.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 230.00 = 4035.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	150.36	5.07	4.025	0.20(0.11)	0.57	36.8	140.00
2	155.99	5.56	3.822	0.20(0.11)	0.57	40.3	215.00
3	160.31	5.93	3.681	0.20(0.11)	0.57	43.1	104.00
4	166.55	6.48	3.499	0.20(0.11)	0.57	47.4	88.00
5	166.89	6.51	3.489	0.20(0.11)	0.57	47.7	183.00
6	171.39	6.96	3.358	0.20(0.11)	0.57	51.3	195.00
7	175.26	7.38	3.247	0.20(0.11)	0.57	54.5	95.00
8	177.16	7.60	3.194	0.20(0.11)	0.57	56.2	118.00
9	178.06	7.70	3.170	0.20(0.11)	0.57	57.0	59.00
10	178.94	7.80	3.146	0.20(0.11)	0.57	57.8	138.00
11	180.19	7.95	3.113	0.20(0.11)	0.57	59.0	192.00
12	182.82	8.27	3.043	0.20(0.11)	0.57	61.5	141.00
13	186.08	8.69	2.958	0.20(0.12)	0.58	64.8	223.00
14	188.11	8.97	2.905	0.20(0.12)	0.58	66.9	97.00
15	188.17	8.98	2.902	0.20(0.12)	0.58	67.0	85.00
16	188.20	8.99	2.901	0.20(0.12)	0.58	67.0	136.00
17	188.25	9.00	2.899	0.20(0.12)	0.58	67.1	199.00
18	189.55	9.31	2.843	0.20(0.12)	0.58	69.1	201.00
19	190.08	9.46	2.818	0.20(0.12)	0.58	70.0	64.00
20	190.27	9.51	2.808	0.20(0.12)	0.58	70.3	220.00
21	190.56	9.62	2.790	0.20(0.12)	0.58	70.9	200.00
22	190.57	9.62	2.790	0.20(0.12)	0.58	70.9	92.00
23	191.35	9.95	2.737	0.20(0.12)	0.58	72.7	129.00
24	191.65	10.11	2.712	0.20(0.12)	0.58	73.6	213.00
25	192.10	10.39	2.670	0.20(0.11)	0.57	75.0	134.00
26	192.37	10.61	2.638	0.20(0.11)	0.57	76.1	116.00
27	192.44	10.71	2.624	0.20(0.11)	0.57	76.6	147.00
28	192.48	11.67	2.498	0.20(0.11)	0.57	80.8	1.00
29	192.11	11.73	2.491	0.20(0.11)	0.57	80.9	211.00
30	190.93	11.91	2.469	0.20(0.11)	0.57	81.2	114.00
31	189.91	12.06	2.451	0.20(0.11)	0.57	81.5	100.00
32	186.86	12.51	2.400	0.20(0.11)	0.57	82.0	127.00
33	185.50	12.71	2.379	0.20(0.11)	0.57	82.2	184.00
34	185.27	12.74	2.376	0.20(0.11)	0.57	82.3	123.00
35	184.56	12.83	2.366	0.20(0.11)	0.57	82.3	208.00
36	183.96	12.90	2.358	0.20(0.11)	0.57	82.3	97.00

```
    37      181.52   13.20    2.328  0.20( 0.11) 0.57      82.4     120.00
    38      180.85   13.28    2.319  0.20( 0.11) 0.57      82.4     111.00
   TOTAL AREA(ACRES) =        86.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      192.48  Tc(MIN.) =   11.670
  EFFECTIVE AREA(ACRES) =     80.82  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       86.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       86.3  TC(MIN.) =     11.67
  EFFECTIVE AREA(ACRES) =     80.82  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.574
  PEAK FLOW RATE(CFS)   =     192.48

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      150.36    5.07    4.025  0.20( 0.11) 0.57      36.8     140.00
      2      155.99    5.56    3.822  0.20( 0.11) 0.57      40.3     215.00
      3      160.31    5.93    3.681  0.20( 0.11) 0.57      43.1     104.00
      4      166.55    6.48    3.499  0.20( 0.11) 0.57      47.4      88.00
      5      166.89    6.51    3.489  0.20( 0.11) 0.57      47.7     183.00
      6      171.39    6.96    3.358  0.20( 0.11) 0.57      51.3     195.00
      7      175.26    7.38    3.247  0.20( 0.11) 0.57      54.5      95.00
      8      177.16    7.60    3.194  0.20( 0.11) 0.57      56.2     118.00
      9      178.06    7.70    3.170  0.20( 0.11) 0.57      57.0      59.00
     10      178.94    7.80    3.146  0.20( 0.11) 0.57      57.8     138.00
     11      180.19    7.95    3.113  0.20( 0.11) 0.57      59.0     192.00
     12      182.82    8.27    3.043  0.20( 0.11) 0.57      61.5     141.00
     13      186.08    8.69    2.958  0.20( 0.12) 0.58      64.8     223.00
     14      188.11    8.97    2.905  0.20( 0.12) 0.58      66.9      97.00
     15      188.17    8.98    2.902  0.20( 0.12) 0.58      67.0      85.00
     16      188.20    8.99    2.901  0.20( 0.12) 0.58      67.0     136.00
     17      188.25    9.00    2.899  0.20( 0.12) 0.58      67.1     199.00
     18      189.55    9.31    2.843  0.20( 0.12) 0.58      69.1     201.00
     19      190.08    9.46    2.818  0.20( 0.12) 0.58      70.0      64.00
     20      190.27    9.51    2.808  0.20( 0.12) 0.58      70.3     220.00
     21      190.56    9.62    2.790  0.20( 0.12) 0.58      70.9     200.00
     22      190.57    9.62    2.790  0.20( 0.12) 0.58      70.9      92.00
     23      191.35    9.95    2.737  0.20( 0.12) 0.58      72.7     129.00
     24      191.65   10.11    2.712  0.20( 0.12) 0.58      73.6     213.00
     25      192.10   10.39    2.670  0.20( 0.11) 0.57      75.0     134.00
     26      192.37   10.61    2.638  0.20( 0.11) 0.57      76.1     116.00
     27      192.44   10.71    2.624  0.20( 0.11) 0.57      76.6     147.00
     28      192.48   11.67    2.498  0.20( 0.11) 0.57      80.8       1.00
     29      192.11   11.73    2.491  0.20( 0.11) 0.57      80.9     211.00
     30      190.93   11.91    2.469  0.20( 0.11) 0.57      81.2     114.00
     31      189.91   12.06    2.451  0.20( 0.11) 0.57      81.5     100.00
     32      186.86   12.51    2.400  0.20( 0.11) 0.57      82.0     127.00
     33      185.50   12.71    2.379  0.20( 0.11) 0.57      82.2     184.00
     34      185.27   12.74    2.376  0.20( 0.11) 0.57      82.3     123.00
     35      184.56   12.83    2.366  0.20( 0.11) 0.57      82.3     208.00
     36      183.96   12.90    2.358  0.20( 0.11) 0.57      82.3      97.00
     37      181.52   13.20    2.328  0.20( 0.11) 0.57      82.4     120.00
     38      180.85   13.28    2.319  0.20( 0.11) 0.57      82.4     111.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A' (CONTINUE) - WITH 2 FLOW-BY DETENTION BASINS  *
 ************************************************************************

  FILE NAME: EASTB210.DAT
  TIME/DATE OF STUDY: 17:10 01/10/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   11.67   RAINFALL INTENSITY(INCH/HR) =  2.50
  EFFECTIVE AREA(ACRES) =    80.82
  TOTAL AREA(ACRES) =    86.30        PEAK FLOW RATE(CFS) =    192.50
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.57
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  50.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.33
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     192.50
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.97
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.58
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.58

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.79
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.03
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    2.25
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       3.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   4.09
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.72

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    75    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   10.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.635
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.63
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.72   10.46    2.660  0.20( 0.18) 0.90       1.5     231.00
      2        2.21   10.63    2.635  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.46    2.660  0.20( 0.15) 0.76       2.5     231.00
      2        5.89   10.63    2.635  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.91    Tc(MIN.) =    10.46
  EFFECTIVE AREA(ACRES) =       2.47   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.47
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.403
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.76    2.616  0.20( 0.15) 0.76       2.5     231.00
      1        5.89   10.93    2.593  0.20( 0.15) 0.76       2.5     234.00
      2        1.65    6.80    3.403  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.58    6.80    3.403  0.20( 0.14) 0.72       2.1     237.00
     2        7.17   10.76    2.616  0.20( 0.15) 0.73       3.0     231.00
     3        7.14   10.93    2.593  0.20( 0.15) 0.73       3.0     234.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.17    Tc(MIN.) =    10.76
 EFFECTIVE AREA(ACRES) =       3.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
 TOTAL AREA(ACRES) =        3.0
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.17
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.78
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.78
 RAINFALL INTENSITY(INCH/HR) =   2.61
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.73
 EFFECTIVE STREAM AREA(ACRES) =       3.03
 TOTAL STREAM AREA(ACRES) =       3.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.17

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
 ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.77
 TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.58    6.82    3.397  0.20( 0.14) 0.72       2.1     237.00
      1        7.17   10.78    2.614  0.20( 0.15) 0.73       3.0     231.00
      1        7.14   10.95    2.590  0.20( 0.15) 0.73       3.0     234.00
      2        1.77    5.00    4.060  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.00    4.060  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.82    3.397  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.78    2.614  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   10.95    2.590  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.31    Tc(MIN.) =    10.78
  EFFECTIVE AREA(ACRES) =       3.52   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.05    4.038  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.87    3.384  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.83    2.607  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   11.00    2.584  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      192.50   11.97    2.462  0.20( 0.11) 0.57      80.8     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      143.26    5.05    4.038  0.20( 0.12) 0.58      36.1     219.00
      2      161.96    6.87    3.384  0.20( 0.12) 0.58      49.0     237.00
      3      193.25   10.83    2.607  0.20( 0.12) 0.58      76.6     231.00
      4      194.36   11.00    2.584  0.20( 0.12) 0.58      77.8     234.00
      5      200.35   11.97    2.462  0.20( 0.12) 0.58      84.4     230.00
    TOTAL AREA(ACRES) =        89.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      200.35  Tc(MIN.) =   11.968
  EFFECTIVE AREA(ACRES) =     84.36  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  48.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.71
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     200.35
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.00
  RAINFALL INTENSITY(INCH/HR) =   2.46
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =      84.36
  TOTAL STREAM AREA(ACRES) =      89.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     200.35

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.573
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        0.51      0.20     0.400    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA RUNOFF(CFS) =      1.60
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.60

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.25
 RAINFALL INTENSITY(INCH/HR) =   3.57
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.60

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      143.26    5.08    4.022  0.20( 0.12) 0.58      36.1     219.00
     1      161.96    6.90    3.375  0.20( 0.12) 0.58      49.0     237.00
     1      193.25   10.86    2.603  0.20( 0.12) 0.58      76.6     231.00
     1      194.36   11.03    2.580  0.20( 0.12) 0.58      77.8     234.00
     1      200.35   12.00    2.458  0.20( 0.12) 0.58      84.4     230.00
     2        1.60    6.25    3.573  0.20( 0.08) 0.40       0.5     241.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      144.73    5.08    4.022  0.20( 0.11) 0.57      36.5     219.00
     2      156.85    6.25    3.573  0.20( 0.11) 0.57      44.9     241.00
     3      163.47    6.90    3.375  0.20( 0.11) 0.57      49.5     237.00
     4      194.41   10.86    2.603  0.20( 0.12) 0.58      77.2     231.00
     5      195.50   11.03    2.580  0.20( 0.12) 0.58      78.3     234.00
     6      201.44   12.00    2.458  0.20( 0.12) 0.58      84.9     230.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     201.44    Tc(MIN.) =    12.00
 EFFECTIVE AREA(ACRES) =      84.87   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       90.4
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.194
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    75    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   8.83   Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        3.25      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    5.71
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =       6.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.19      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.32
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       6.74
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         3.8  TC(MIN.) =     16.43
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =       6.74
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

SOUTHEAST – AREA 'B'

10-YR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: SE-10.DAT
  TIME/DATE OF STUDY: 19:54 01/06/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.20

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.83
  Tc(MIN.) =    6.83
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =    8.10
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       9.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   7.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.10
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.23
  RAINFALL INTENSITY(INCH/HR) =   3.29
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.10

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    75    9.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =   11.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.53
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.11
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =       1.80
  TOTAL STREAM AREA(ACRES) =       1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.02
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.10    7.23    3.285  0.20( 0.16) 0.82       3.1       1.00
      2        4.02   11.11    2.570  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.48    7.23    3.285  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   11.11    2.570  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.48    Tc(MIN.) =     7.23
  EFFECTIVE AREA(ACRES) =       4.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.48
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    75    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   10.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.84
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.49
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.90

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.639
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    75    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.54
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   3.64
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        1.90   10.49    2.655  0.20( 0.07) 0.36       0.8       7.00
     2        2.54    6.05    3.639  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.06    6.05    3.639  0.20( 0.04) 0.20       1.2      10.00
     2        3.75   10.49    2.655  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.06    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.06
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.21
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.21
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20     0.100    75    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.74
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.74

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.06    6.21    3.584  0.20( 0.04) 0.20       1.2      10.00
      1        3.75   10.66    2.631  0.20( 0.05) 0.23       1.6       7.00
      2        4.74    6.39    3.528  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1        8.74    6.21    3.584  0.20( 0.03) 0.14       2.7       10.00
      2        8.78    6.39    3.528  0.20( 0.03) 0.14       2.8       12.00
      3        7.28   10.66    2.631  0.20( 0.03) 0.17       3.1        7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.78    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.76   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   3.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.14
  EFFECTIVE STREAM AREA(ACRES) =       2.76
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.757
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    75    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.38
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
 TIME OF CONCENTRATION(MIN.) =    5.72
 RAINFALL INTENSITY(INCH/HR) =   3.76
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.41
 TOTAL STREAM AREA(ACRES) =       0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.38

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.74    6.28    3.562  0.20( 0.03) 0.14       2.7      10.00
     1        8.78    6.45    3.507  0.20( 0.03) 0.14       2.8      12.00
     1        7.28   10.73    2.621  0.20( 0.03) 0.17       3.1       7.00
     2        1.38    5.72    3.757  0.20( 0.02) 0.10       0.4      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        9.78    5.72    3.757  0.20( 0.03) 0.14       2.9      14.00
     2       10.05    6.28    3.562  0.20( 0.03) 0.14       3.1      10.00
     3       10.07    6.45    3.507  0.20( 0.03) 0.14       3.2      12.00
     4        8.24   10.73    2.621  0.20( 0.03) 0.16       3.5       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.07    Tc(MIN.) =     6.45
 EFFECTIVE AREA(ACRES) =       3.17   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        3.5
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.07
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    6.94
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        9.78    6.21    3.586  0.20( 0.03) 0.14       2.9      14.00
     2       10.05    6.76    3.414  0.20( 0.03) 0.14       3.1      10.00
     3       10.07    6.94    3.365  0.20( 0.03) 0.14       3.2      12.00
     4        8.24   11.23    2.554  0.20( 0.03) 0.16       3.5       7.00
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.48    8.30    3.036  0.20( 0.14) 0.71       4.3       1.00
     2       11.04   12.20    2.435  0.20( 0.14) 0.68       4.9       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.21    3.586  0.20( 0.09) 0.44       6.1      14.00
      2       21.54    6.76    3.414  0.20( 0.09) 0.44       6.6      10.00
      3       21.68    6.94    3.365  0.20( 0.09) 0.44       6.8      12.00
      4       21.96    8.30    3.036  0.20( 0.09) 0.47       7.6       1.00
      5       19.64   11.23    2.554  0.20( 0.09) 0.46       8.3       7.00
      6       18.89   12.20    2.435  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       21.96  Tc(MIN.) =    8.302
  EFFECTIVE AREA(ACRES) =      7.58  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.96
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.58
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.96

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.638
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   3.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.71    3.429  0.20( 0.09) 0.44       6.1      14.00
      1       21.54    7.27    3.277  0.20( 0.09) 0.44       6.6      10.00
      1       21.68    7.44    3.233  0.20( 0.09) 0.44       6.8      12.00
      1       21.96    8.80    2.936  0.20( 0.09) 0.47       7.6       1.00
      1       19.64   11.75    2.488  0.20( 0.09) 0.46       8.3       7.00
      1       18.89   12.73    2.377  0.20( 0.09) 0.46       8.4       4.00
      2        1.49    6.05    3.638  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.50    6.05    3.638  0.20( 0.08) 0.42       6.0      16.00
      2       22.29    6.71    3.429  0.20( 0.08) 0.42       6.6      14.00
      3       22.88    7.27    3.277  0.20( 0.09) 0.43       7.1      10.00
      4       23.00    7.44    3.233  0.20( 0.09) 0.43       7.2      12.00
      5       23.16    8.80    2.936  0.20( 0.09) 0.45       8.0       1.00
      6       20.65   11.75    2.488  0.20( 0.09) 0.45       8.7       7.00
      7       19.86   12.73    2.377  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.16    Tc(MIN.) =     8.80
  EFFECTIVE AREA(ACRES) =       8.04   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.16
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.571
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        0.34      0.20      0.200    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.08
 TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
 FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.08
 PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.68
 RAINFALL INTENSITY(INCH/HR) =   3.17
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20     0.900    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.08    7.68    3.173  0.20( 0.04) 0.20       0.3      18.00
      2        0.78    7.72    3.165  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.86    7.68    3.173  0.20( 0.10) 0.52       0.6      18.00
      2        1.86    7.72    3.165  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.86    Tc(MIN.) =     7.68
  EFFECTIVE AREA(ACRES) =       0.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.63
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    6.26
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       7.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    4.05
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      11.37

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.38
 RAINFALL INTENSITY(INCH/HR) =   3.02
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.59
 EFFECTIVE STREAM AREA(ACRES) =       4.35
 TOTAL STREAM AREA(ACRES) =       4.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.37

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.86    9.25    2.854  0.20( 0.10) 0.52       0.6      18.00
     1        1.86    9.28    2.848  0.20( 0.10) 0.52       0.6      18.00
     2       11.37    8.38    3.020  0.20( 0.12) 0.59       4.4      21.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.15    8.38    3.020  0.20( 0.12) 0.58       4.9      21.00
     2       12.57    9.25    2.854  0.20( 0.12) 0.58       5.0      18.00
     3       12.55    9.28    2.848  0.20( 0.12) 0.58       5.0      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.15    Tc(MIN.) =     8.38
 EFFECTIVE AREA(ACRES) =       4.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        5.0
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.15
 PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    9.33
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.33
 RAINFALL INTENSITY(INCH/HR) =   2.84
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =       4.92
 TOTAL STREAM AREA(ACRES) =       4.98
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.15
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.405
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.13

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.341
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    75    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.40
 TOTAL STREAM AREA(ACRES) =       0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.15    9.33    2.839  0.20( 0.12) 0.58       4.9      21.00
     1       12.57   10.21    2.697  0.20( 0.12) 0.58       5.0      18.00
     1       12.55   10.24    2.691  0.20( 0.12) 0.58       5.0      18.00
     2        1.13    6.80    3.405  0.20( 0.02) 0.10       0.4      26.00
     3        1.20    7.02    3.341  0.20( 0.02) 0.10       0.4      27.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.87    6.80    3.405  0.20( 0.10) 0.49       4.3      26.00
     2       14.02    7.02    3.341  0.20( 0.10) 0.50       4.5      27.00
     3       15.11    9.33    2.839  0.20( 0.10) 0.51       5.7      21.00
     4       14.43   10.21    2.697  0.20( 0.10) 0.51       5.7      18.00
     5       14.40   10.24    2.691  0.20( 0.10) 0.51       5.8      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.11    Tc(MIN.) =     9.33
 EFFECTIVE AREA(ACRES) =       5.69   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =        5.8
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.11
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.41
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.87    6.88    3.381  0.20( 0.10) 0.49       4.3      26.00
     2       14.02    7.11    3.319  0.20( 0.10) 0.50       4.5      27.00
     3       15.11    9.41    2.825  0.20( 0.10) 0.51       5.7      21.00
     4       14.43   10.29    2.684  0.20( 0.10) 0.51       5.7      18.00
     5       14.40   10.33    2.679  0.20( 0.10) 0.51       5.8      18.00
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.50    6.15    3.607  0.20( 0.08) 0.42       6.0      16.00
     2       22.29    6.80    3.403  0.20( 0.08) 0.42       6.6      14.00
     3       22.88    7.36    3.254  0.20( 0.09) 0.43       7.1      10.00
     4       23.00    7.53    3.211  0.20( 0.09) 0.43       7.2      12.00
     5       23.16    8.89    2.919  0.20( 0.09) 0.45       8.0       1.00
```

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     6       20.65   11.84    2.477  0.20( 0.09) 0.45       8.7       7.00
     7       19.86   12.82    2.367  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.15    3.607  0.20( 0.09) 0.45       9.8      16.00
     2       36.10    6.80    3.403  0.20( 0.09) 0.45      10.8      14.00
     3       36.24    6.88    3.381  0.20( 0.09) 0.45      11.0      26.00
     4       36.63    7.11    3.319  0.20( 0.09) 0.45      11.3      27.00
     5       37.01    7.36    3.254  0.20( 0.09) 0.45      11.7      10.00
     6       37.22    7.53    3.211  0.20( 0.09) 0.46      11.9      12.00
     7       38.02    8.89    2.919  0.20( 0.09) 0.47      13.5       1.00
     8       37.82    9.41    2.825  0.20( 0.10) 0.48      13.9      21.00
     9       36.40   10.29    2.684  0.20( 0.10) 0.48      14.1      18.00
    10       36.34   10.33    2.679  0.20( 0.10) 0.48      14.1      18.00
    11       33.92   11.84    2.477  0.20( 0.09) 0.47      14.5       7.00
    12       32.51   12.82    2.367  0.20( 0.09) 0.47      14.6       4.00
   TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       38.02  Tc(MIN.) =    8.891
  EFFECTIVE AREA(ACRES) =     13.45  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.45
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.02

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.03
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.75    6.75    3.419  0.20( 0.09) 0.45       9.8      16.00
      1       36.10    7.40    3.243  0.20( 0.09) 0.45      10.8      14.00
      1       36.24    7.48    3.224  0.20( 0.09) 0.45      11.0      26.00
      1       36.63    7.70    3.169  0.20( 0.09) 0.45      11.3      27.00
      1       37.01    7.95    3.112  0.20( 0.09) 0.45      11.7      10.00
      1       37.22    8.12    3.074  0.20( 0.09) 0.46      11.9      12.00
      1       38.02    9.48    2.813  0.20( 0.09) 0.47      13.5       1.00
```

```
     1       37.82   10.01    2.728  0.20( 0.10) 0.48      13.9      21.00
     1       36.40   10.89    2.599  0.20( 0.10) 0.48      14.1      18.00
     1       36.34   10.92    2.594  0.20( 0.10) 0.48      14.1      18.00
     1       33.92   12.45    2.407  0.20( 0.09) 0.47      14.5       7.00
     1       32.51   13.43    2.305  0.20( 0.09) 0.47      14.6       4.00
     2        2.03    5.29    3.929  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.47    5.29    3.929  0.20( 0.10) 0.48       8.3      31.00
      2       36.50    6.75    3.419  0.20( 0.10) 0.48      10.4      16.00
      3       37.75    7.40    3.243  0.20( 0.09) 0.47      11.4      14.00
      4       37.89    7.48    3.224  0.20( 0.09) 0.47      11.5      26.00
      5       38.25    7.70    3.169  0.20( 0.09) 0.47      11.9      27.00
      6       38.60    7.95    3.112  0.20( 0.10) 0.48      12.3      10.00
      7       38.78    8.12    3.074  0.20( 0.10) 0.48      12.5      12.00
      8       39.44    9.48    2.813  0.20( 0.10) 0.49      14.0       1.00
      9       39.20   10.01    2.728  0.20( 0.10) 0.49      14.4      21.00
     10       37.71   10.89    2.599  0.20( 0.10) 0.49      14.7      18.00
     11       37.65   10.92    2.594  0.20( 0.10) 0.49      14.7      18.00
     12       35.12   12.45    2.407  0.20( 0.10) 0.49      15.1       7.00
     13       33.66   13.43    2.305  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.44    Tc(MIN.) =     9.48
  EFFECTIVE AREA(ACRES) =      14.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.399
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.01      0.20     1.000    93   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.98
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      3.98

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.952
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
```

```
  "BARREN"                   D        3.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   5.42
  Tc(MIN.) =   17.94
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =       8.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.14
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.70
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   19.25
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.25
  RAINFALL INTENSITY(INCH/HR) =   1.87
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.70

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.15      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =    8.88
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       9.56

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.75

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.70   19.25    1.875  0.20( 0.20) 1.00       5.5      37.00
      2       10.75    7.06    3.331  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.06    3.331  0.20( 0.18) 0.90       5.8      40.00
      2       14.50   19.25    1.875  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.72    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
```

```
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.72
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.63
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.80
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.72

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.63      0.20     1.000    93    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.00      0.20     1.000    93
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.43
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.66
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   11.83
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      13.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   5.28
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.32
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.61
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.63    3.186  0.20( 0.18) 0.90       5.8      40.00
      1       14.50   19.84    1.843  0.20( 0.19) 0.94       9.3      37.00
      2       13.32    9.61    2.792  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.91    7.63    3.186  0.20( 0.19) 0.94      10.3      40.00
      2       29.69    9.61    2.792  0.20( 0.19) 0.95      12.0      42.00
      3       22.95   19.84    1.843  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.69    Tc(MIN.) =     9.61
  EFFECTIVE AREA(ACRES) =      12.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.69
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   2.65
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =      12.00
  TOTAL STREAM AREA(ACRES) =      14.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.69

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.252
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    75    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    8.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.934
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.58

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    75    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
```

```
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    9.75
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.768
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.99      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    4.89
  EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.57
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.75
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.91    8.53    2.988  0.20( 0.19) 0.94      10.3      40.00
      1       29.69   10.51    2.652  0.20( 0.19) 0.95      12.0      42.00
      1       22.95   20.80    1.794  0.20( 0.19) 0.96      14.9      37.00
      2        4.58    8.81    2.934  0.20( 0.04) 0.20       1.8      46.00
      3        6.70    9.75    2.768  0.20( 0.04) 0.20       2.7      48.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.77    8.53    2.988  0.20( 0.15) 0.73      14.4      40.00
      2       40.03    8.81    2.934  0.20( 0.15) 0.73      14.7      46.00
```

```
     3       40.43    9.75    2.768  0.20( 0.15) 0.74      15.8      48.00
     4       40.24   10.51    2.652  0.20( 0.15) 0.75      16.5      42.00
     5       30.04   20.80    1.794  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.43    Tc(MIN.) =     9.75
  EFFECTIVE AREA(ACRES) =      15.83   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.43
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"         D        0.64      0.20     0.200    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.12   Tc(MIN.) =    9.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.75
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.289
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    75    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.89
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      3.89

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.188
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    4.25
  EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =       8.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.62
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.83
  TOTAL STREAM AREA(ACRES) =       2.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.37    9.09    2.883  0.20( 0.04) 0.20       2.1      14.00
      2        8.02    7.62    3.188  0.20( 0.04) 0.20       2.8      52.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.01    7.62    3.188  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.09    2.883  0.20( 0.04) 0.20       4.9      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.01    Tc(MIN.) =     7.62
  EFFECTIVE AREA(ACRES) =       4.59   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
```

```
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.01
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.01    8.50    2.994  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.97    2.733  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.77    8.60    2.975  0.20( 0.15) 0.73      14.4      40.00
      2       40.03    8.88    2.921  0.20( 0.15) 0.73      14.7      46.00
      3       40.43    9.82    2.757  0.20( 0.15) 0.74      15.8      48.00
      4       40.24   10.58    2.642  0.20( 0.15) 0.75      16.5      42.00
      5       30.04   20.87    1.790  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.50    2.994  0.20( 0.12) 0.60      18.8      52.00
      2       52.76    8.60    2.975  0.20( 0.12) 0.60      19.0      40.00
      3       52.94    8.88    2.921  0.20( 0.12) 0.60      19.4      46.00
      4       53.08    9.82    2.757  0.20( 0.12) 0.61      20.7      48.00
      5       53.01    9.97    2.733  0.20( 0.12) 0.61      20.9      14.00
      6       52.43   10.58    2.642  0.20( 0.12) 0.62      21.4      42.00
      7       38.24   20.87    1.790  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       53.08  Tc(MIN.) =    9.820
  EFFECTIVE AREA(ACRES) =     20.72  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.72
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.08

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.875
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        0.88      0.20     0.900    75    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      2.13
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.13

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.767
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D        0.25      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.43
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.22
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.63
 Tc(MIN.) =    9.76
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.60
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1          PEAK FLOW RATE(CFS) =       2.65

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   4.34
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.65
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.91    2.915  0.20( 0.12) 0.60      18.8      52.00
      1       52.76    9.01    2.896  0.20( 0.12) 0.60      19.0      40.00
      1       52.94    9.29    2.846  0.20( 0.12) 0.60      19.4      46.00
      1       53.08   10.23    2.693  0.20( 0.12) 0.61      20.7      48.00
      1       53.01   10.38    2.671  0.20( 0.12) 0.61      20.9      14.00
      1       52.43   10.99    2.585  0.20( 0.12) 0.62      21.4      42.00
      1       38.24   21.31    1.769  0.20( 0.13) 0.67      24.4      37.00
      2        2.65   10.69    2.627  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.07    8.91    2.915  0.20( 0.12) 0.61      19.7      52.00
      2       55.24    9.01    2.896  0.20( 0.12) 0.61      19.9      40.00
      3       55.45    9.29    2.846  0.20( 0.12) 0.61      20.4      46.00
      4       55.69   10.23    2.693  0.20( 0.12) 0.62      21.8      48.00
      5       55.63   10.38    2.671  0.20( 0.12) 0.62      22.0      14.00
      6       55.37   10.69    2.627  0.20( 0.13) 0.63      22.3      56.00
      7       55.03   10.99    2.585  0.20( 0.13) 0.63      22.6      42.00
      8       39.96   21.31    1.769  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.69    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      21.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.69
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      21.81
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.69

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.531
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.095
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =    9.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.749
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  1.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.18
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.07    9.35    2.836  0.20( 0.12) 0.61      19.7      52.00
      1       55.24    9.45    2.819  0.20( 0.12) 0.61      19.9      40.00
      1       55.45    9.72    2.774  0.20( 0.12) 0.61      20.4      46.00
      1       55.69   10.66    2.631  0.20( 0.12) 0.62      21.8      48.00
      1       55.63   10.81    2.610  0.20( 0.12) 0.62      22.0      14.00
      1       55.37   11.12    2.567  0.20( 0.13) 0.63      22.3      56.00
      1       55.03   11.43    2.528  0.20( 0.13) 0.63      22.6      42.00
      1       39.96   21.77    1.747  0.20( 0.13) 0.67      25.5      37.00
      2        1.61    6.38    3.531  0.20( 0.02) 0.10       0.5      60.00
      3        1.18    9.87    2.749  0.20( 0.02) 0.10       0.5      58.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       49.78    6.38    3.531  0.20( 0.12) 0.58      14.3      60.00
      2       57.52    9.35    2.836  0.20( 0.12) 0.59      20.7      52.00
      3       57.68    9.45    2.819  0.20( 0.12) 0.59      20.9      40.00
      4       57.88    9.72    2.774  0.20( 0.12) 0.59      21.4      46.00
      5       57.92    9.87    2.749  0.20( 0.12) 0.59      21.6      58.00
      6       58.02   10.66    2.631  0.20( 0.12) 0.60      22.8      48.00
      7       57.93   10.81    2.610  0.20( 0.12) 0.60      23.0      14.00
      8       57.64   11.12    2.567  0.20( 0.12) 0.60      23.3      56.00
      9       57.27   11.43    2.528  0.20( 0.12) 0.61      23.5      42.00
     10       41.50   21.77    1.747  0.20( 0.13) 0.65      26.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.02    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =      22.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       26.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.02
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.59
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.02
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.90
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.90
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      22.80
  TOTAL STREAM AREA(ACRES) =      26.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.02

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.79
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       49.78    6.64    3.452  0.20( 0.12) 0.58      14.3      60.00
      1       57.52    9.61    2.792  0.20( 0.12) 0.59      20.7      52.00
```

1	57.68	9.71	2.776	0.20(0.12)	0.59	20.9	40.00
1	57.88	9.96	2.734	0.20(0.12)	0.59	21.4	46.00
1	57.92	10.12	2.711	0.20(0.12)	0.59	21.6	58.00
1	58.02	10.90	2.597	0.20(0.12)	0.60	22.8	48.00
1	57.93	11.06	2.576	0.20(0.12)	0.60	23.0	14.00
1	57.64	11.38	2.534	0.20(0.12)	0.60	23.3	56.00
1	57.27	11.68	2.496	0.20(0.12)	0.61	23.5	42.00
1	41.50	22.04	1.735	0.20(0.13)	0.65	26.5	37.00
2	2.79	5.29	3.931	0.20(0.18)	0.90	0.8	64.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.17	5.29	3.931	0.20(0.12)	0.60	12.2	64.00
2	52.21	6.64	3.452	0.20(0.12)	0.60	15.1	60.00
3	59.46	9.61	2.792	0.20(0.12)	0.60	21.5	52.00
4	59.61	9.71	2.776	0.20(0.12)	0.60	21.7	40.00
5	59.78	9.96	2.734	0.20(0.12)	0.60	22.2	46.00
6	59.80	10.12	2.711	0.20(0.12)	0.60	22.4	58.00
7	59.82	10.90	2.597	0.20(0.12)	0.61	23.6	48.00
8	59.72	11.06	2.576	0.20(0.12)	0.61	23.8	14.00
9	59.39	11.38	2.534	0.20(0.12)	0.61	24.1	56.00
10	58.99	11.68	2.496	0.20(0.12)	0.62	24.3	42.00
11	42.66	22.04	1.735	0.20(0.13)	0.66	27.3	37.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 59.82 Tc(MIN.) = 10.90
EFFECTIVE AREA(ACRES) = 23.60 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 27.3
LONGEST FLOWPATH FROM NODE 37.00 TO NODE 66.00 = 2325.00 FEET.

****
FLOW PROCESS FROM NODE 67.00 TO NODE 68.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==
INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.00
ELEVATION DATA: UPSTREAM(FEET) = 406.00 DOWNSTREAM(FEET) = 400.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.509
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.490
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	D	0.55	0.20	0.100	75	6.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.72
TOTAL AREA(ACRES) = 0.55 PEAK FLOW RATE(CFS) = 1.72

****
FLOW PROCESS FROM NODE 81.00 TO NODE 82.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==
INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.00
ELEVATION DATA: UPSTREAM(FEET) = 499.00 DOWNSTREAM(FEET) = 445.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.244
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.283
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)

```
  NATURAL POOR COVER
  "BARREN"                    D        0.62      0.20     1.000    93    7.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.15
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   12.92
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   7.73
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.39
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      14.38
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - SOUTHEAST - AREA 'B' - WITH A FLOW-BY DETENTION BASIN      *
 ************************************************************************

  FILE NAME: SE-B-10.DAT
  TIME/DATE OF STUDY: 19:03 01/10/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.20

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.83
  Tc(MIN.) =    6.83
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =    8.10
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       9.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   7.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.10
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.23
  RAINFALL INTENSITY(INCH/HR) =   3.29
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.10

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    75    9.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =   11.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.53
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.11
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =       1.80
  TOTAL STREAM AREA(ACRES) =       1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.02
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.10    7.23    3.285  0.20( 0.16) 0.82       3.1       1.00
      2        4.02   11.11    2.570  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.48    7.23    3.285  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   11.11    2.570  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.48    Tc(MIN.) =     7.23
  EFFECTIVE AREA(ACRES) =       4.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.48
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    75    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==============================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   10.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.84
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.49
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.90

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.639
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    75    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.54
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   3.64
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        1.90   10.49    2.655  0.20( 0.07) 0.36       0.8       7.00
     2        2.54    6.05    3.639  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.06    6.05    3.639  0.20( 0.04) 0.20       1.2      10.00
     2        3.75   10.49    2.655  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.06    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.06
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.21
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.21
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20     0.100    75    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.74
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.74

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.06    6.21    3.584  0.20( 0.04) 0.20       1.2      10.00
      1        3.75   10.66    2.631  0.20( 0.05) 0.23       1.6       7.00
      2        4.74    6.39    3.528  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1        8.74    6.21    3.584  0.20( 0.03) 0.14       2.7       10.00
      2        8.78    6.39    3.528  0.20( 0.03) 0.14       2.8       12.00
      3        7.28   10.66    2.631  0.20( 0.03) 0.17       3.1        7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.78    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.76   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   3.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.14
  EFFECTIVE STREAM AREA(ACRES) =       2.76
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.757
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    75    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.38
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.72
  RAINFALL INTENSITY(INCH/HR) =   3.76
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.41
  TOTAL STREAM AREA(ACRES) =       0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.74    6.28    3.562  0.20( 0.03) 0.14       2.7      10.00
      1        8.78    6.45    3.507  0.20( 0.03) 0.14       2.8      12.00
      1        7.28   10.73    2.621  0.20( 0.03) 0.17       3.1       7.00
      2        1.38    5.72    3.757  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.78    5.72    3.757  0.20( 0.03) 0.14       2.9      14.00
      2       10.05    6.28    3.562  0.20( 0.03) 0.14       3.1      10.00
      3       10.07    6.45    3.507  0.20( 0.03) 0.14       3.2      12.00
      4        8.24   10.73    2.621  0.20( 0.03) 0.16       3.5       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.07    Tc(MIN.) =     6.45
  EFFECTIVE AREA(ACRES) =       3.17   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.07
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.78    6.21    3.586  0.20( 0.03) 0.14       2.9      14.00
      2       10.05    6.76    3.414  0.20( 0.03) 0.14       3.1      10.00
      3       10.07    6.94    3.365  0.20( 0.03) 0.14       3.2      12.00
      4        8.24   11.23    2.554  0.20( 0.03) 0.16       3.5       7.00
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.48    8.30    3.036  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   12.20    2.435  0.20( 0.14) 0.68       4.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.21    3.586  0.20( 0.09) 0.44       6.1      14.00
      2       21.54    6.76    3.414  0.20( 0.09) 0.44       6.6      10.00
      3       21.68    6.94    3.365  0.20( 0.09) 0.44       6.8      12.00
      4       21.96    8.30    3.036  0.20( 0.09) 0.47       7.6       1.00
      5       19.64   11.23    2.554  0.20( 0.09) 0.46       8.3       7.00
      6       18.89   12.20    2.435  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       21.96  Tc(MIN.) =    8.302
  EFFECTIVE AREA(ACRES) =      7.58  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.96
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.58
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.96

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.638
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   3.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.71    3.429  0.20( 0.09) 0.44       6.1      14.00
      1       21.54    7.27    3.277  0.20( 0.09) 0.44       6.6      10.00
      1       21.68    7.44    3.233  0.20( 0.09) 0.44       6.8      12.00
      1       21.96    8.80    2.936  0.20( 0.09) 0.47       7.6       1.00
      1       19.64   11.75    2.488  0.20( 0.09) 0.46       8.3       7.00
      1       18.89   12.73    2.377  0.20( 0.09) 0.46       8.4       4.00
      2        1.49    6.05    3.638  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.50    6.05    3.638  0.20( 0.08) 0.42       6.0      16.00
      2       22.29    6.71    3.429  0.20( 0.08) 0.42       6.6      14.00
      3       22.88    7.27    3.277  0.20( 0.09) 0.43       7.1      10.00
      4       23.00    7.44    3.233  0.20( 0.09) 0.43       7.2      12.00
      5       23.16    8.80    2.936  0.20( 0.09) 0.45       8.0       1.00
      6       20.65   11.75    2.488  0.20( 0.09) 0.45       8.7       7.00
      7       19.86   12.73    2.377  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.16    Tc(MIN.) =     8.80
  EFFECTIVE AREA(ACRES) =       8.04   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.16
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.571
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        0.34      0.20      0.200    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.08
 TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
 FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.08
 PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.68
 RAINFALL INTENSITY(INCH/HR) =   3.17
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20     0.900    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.08    7.68    3.173  0.20( 0.04) 0.20       0.3      18.00
      2        0.78    7.72    3.165  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.86    7.68    3.173  0.20( 0.10) 0.52       0.6      18.00
      2        1.86    7.72    3.165  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.86    Tc(MIN.) =     7.68
  EFFECTIVE AREA(ACRES) =       0.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.63
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    6.26
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       7.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    4.05
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      11.37

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.38
 RAINFALL INTENSITY(INCH/HR) =   3.02
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.59
 EFFECTIVE STREAM AREA(ACRES) =       4.35
 TOTAL STREAM AREA(ACRES) =       4.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.37

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.86    9.25    2.854  0.20( 0.10) 0.52       0.6      18.00
     1        1.86    9.28    2.848  0.20( 0.10) 0.52       0.6      18.00
     2       11.37    8.38    3.020  0.20( 0.12) 0.59       4.4      21.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.15    8.38    3.020  0.20( 0.12) 0.58       4.9      21.00
     2       12.57    9.25    2.854  0.20( 0.12) 0.58       5.0      18.00
     3       12.55    9.28    2.848  0.20( 0.12) 0.58       5.0      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.15    Tc(MIN.) =     8.38
 EFFECTIVE AREA(ACRES) =       4.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        5.0
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.15
 PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    9.33
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.33
 RAINFALL INTENSITY(INCH/HR) =   2.84
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =       4.92
 TOTAL STREAM AREA(ACRES) =       4.98
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.15
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.405
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.13

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.341
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    75    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.40
  TOTAL STREAM AREA(ACRES) =       0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.15    9.33    2.839  0.20( 0.12) 0.58       4.9      21.00
      1       12.57   10.21    2.697  0.20( 0.12) 0.58       5.0      18.00
      1       12.55   10.24    2.691  0.20( 0.12) 0.58       5.0      18.00
      2        1.13    6.80    3.405  0.20( 0.02) 0.10       0.4      26.00
      3        1.20    7.02    3.341  0.20( 0.02) 0.10       0.4      27.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.87    6.80    3.405  0.20( 0.10) 0.49       4.3      26.00
      2       14.02    7.02    3.341  0.20( 0.10) 0.50       4.5      27.00
      3       15.11    9.33    2.839  0.20( 0.10) 0.51       5.7      21.00
      4       14.43   10.21    2.697  0.20( 0.10) 0.51       5.7      18.00
      5       14.40   10.24    2.691  0.20( 0.10) 0.51       5.8      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.11    Tc(MIN.) =     9.33
  EFFECTIVE AREA(ACRES) =       5.69   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.8
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.11
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.87    6.88    3.381  0.20( 0.10) 0.49       4.3      26.00
      2       14.02    7.11    3.319  0.20( 0.10) 0.50       4.5      27.00
      3       15.11    9.41    2.825  0.20( 0.10) 0.51       5.7      21.00
      4       14.43   10.29    2.684  0.20( 0.10) 0.51       5.7      18.00
      5       14.40   10.33    2.679  0.20( 0.10) 0.51       5.8      18.00
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.50    6.15    3.607  0.20( 0.08) 0.42       6.0      16.00
      2       22.29    6.80    3.403  0.20( 0.08) 0.42       6.6      14.00
      3       22.88    7.36    3.254  0.20( 0.09) 0.43       7.1      10.00
      4       23.00    7.53    3.211  0.20( 0.09) 0.43       7.2      12.00
      5       23.16    8.89    2.919  0.20( 0.09) 0.45       8.0       1.00
```

```
     6       20.65   11.84    2.477  0.20( 0.09) 0.45       8.7       7.00
     7       19.86   12.82    2.367  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.15    3.607  0.20( 0.09) 0.45       9.8      16.00
     2       36.10    6.80    3.403  0.20( 0.09) 0.45      10.8      14.00
     3       36.24    6.88    3.381  0.20( 0.09) 0.45      11.0      26.00
     4       36.63    7.11    3.319  0.20( 0.09) 0.45      11.3      27.00
     5       37.01    7.36    3.254  0.20( 0.09) 0.45      11.7      10.00
     6       37.22    7.53    3.211  0.20( 0.09) 0.46      11.9      12.00
     7       38.02    8.89    2.919  0.20( 0.09) 0.47      13.5       1.00
     8       37.82    9.41    2.825  0.20( 0.10) 0.48      13.9      21.00
     9       36.40   10.29    2.684  0.20( 0.10) 0.48      14.1      18.00
    10       36.34   10.33    2.679  0.20( 0.10) 0.48      14.1      18.00
    11       33.92   11.84    2.477  0.20( 0.09) 0.47      14.5       7.00
    12       32.51   12.82    2.367  0.20( 0.09) 0.47      14.6       4.00
   TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       38.02  Tc(MIN.) =    8.891
  EFFECTIVE AREA(ACRES) =     13.45  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.45
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.02

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.03
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.75    6.75    3.419  0.20( 0.09) 0.45       9.8      16.00
      1       36.10    7.40    3.243  0.20( 0.09) 0.45      10.8      14.00
      1       36.24    7.48    3.224  0.20( 0.09) 0.45      11.0      26.00
      1       36.63    7.70    3.169  0.20( 0.09) 0.45      11.3      27.00
      1       37.01    7.95    3.112  0.20( 0.09) 0.45      11.7      10.00
      1       37.22    8.12    3.074  0.20( 0.09) 0.46      11.9      12.00
      1       38.02    9.48    2.813  0.20( 0.09) 0.47      13.5       1.00
```

```
     1       37.82   10.01    2.728  0.20( 0.10) 0.48      13.9      21.00
     1       36.40   10.89    2.599  0.20( 0.10) 0.48      14.1      18.00
     1       36.34   10.92    2.594  0.20( 0.10) 0.48      14.1      18.00
     1       33.92   12.45    2.407  0.20( 0.09) 0.47      14.5       7.00
     1       32.51   13.43    2.305  0.20( 0.09) 0.47      14.6       4.00
     2        2.03    5.29    3.929  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.47    5.29    3.929  0.20( 0.10) 0.48       8.3      31.00
      2       36.50    6.75    3.419  0.20( 0.10) 0.48      10.4      16.00
      3       37.75    7.40    3.243  0.20( 0.09) 0.47      11.4      14.00
      4       37.89    7.48    3.224  0.20( 0.09) 0.47      11.5      26.00
      5       38.25    7.70    3.169  0.20( 0.09) 0.47      11.9      27.00
      6       38.60    7.95    3.112  0.20( 0.10) 0.48      12.3      10.00
      7       38.78    8.12    3.074  0.20( 0.10) 0.48      12.5      12.00
      8       39.44    9.48    2.813  0.20( 0.10) 0.49      14.0       1.00
      9       39.20   10.01    2.728  0.20( 0.10) 0.49      14.4      21.00
     10       37.71   10.89    2.599  0.20( 0.10) 0.49      14.7      18.00
     11       37.65   10.92    2.594  0.20( 0.10) 0.49      14.7      18.00
     12       35.12   12.45    2.407  0.20( 0.10) 0.49      15.1       7.00
     13       33.66   13.43    2.305  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.44    Tc(MIN.) =     9.48
  EFFECTIVE AREA(ACRES) =      14.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.399
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.01      0.20     1.000    93   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.98
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      3.98

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.952
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
```

```
  "BARREN"                  D        3.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   5.42
  Tc(MIN.) =   17.94
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =       8.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.14
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.70
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   19.25
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.25
  RAINFALL INTENSITY(INCH/HR) =   1.87
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.70

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.15      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =    8.88
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       9.56

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.75

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.70   19.25    1.875  0.20( 0.20) 1.00       5.5      37.00
      2       10.75    7.06    3.331  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.06    3.331  0.20( 0.18) 0.90       5.8      40.00
      2       14.50   19.25    1.875  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.72    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
```

```
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.72
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    7.63
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.63
 RAINFALL INTENSITY(INCH/HR) =   3.19
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       5.80
 TOTAL STREAM AREA(ACRES) =       9.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.72

****************************************************************************
 FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                    D        0.63      0.20     1.000    93    7.73
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      1.68
 TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        5.00      0.20     1.000    93
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.43
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.66
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   11.83
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      13.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   5.28
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.32
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.61
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.63    3.186  0.20( 0.18) 0.90       5.8      40.00
      1       14.50   19.84    1.843  0.20( 0.19) 0.94       9.3      37.00
      2       13.32    9.61    2.792  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.91    7.63    3.186  0.20( 0.19) 0.94      10.3      40.00
      2       29.69    9.61    2.792  0.20( 0.19) 0.95      12.0      42.00
      3       22.95   19.84    1.843  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.69    Tc(MIN.) =     9.61
  EFFECTIVE AREA(ACRES) =      12.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.69
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   2.65
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =      12.00
  TOTAL STREAM AREA(ACRES) =      14.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.69

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.252
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    75    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    8.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.934
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.58

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    75    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
```

```
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    9.75
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.768
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.99      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    4.89
  EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.57
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.75
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.91    8.53    2.988  0.20( 0.19) 0.94      10.3      40.00
      1       29.69   10.51    2.652  0.20( 0.19) 0.95      12.0      42.00
      1       22.95   20.80    1.794  0.20( 0.19) 0.96      14.9      37.00
      2        4.58    8.81    2.934  0.20( 0.04) 0.20       1.8      46.00
      3        6.70    9.75    2.768  0.20( 0.04) 0.20       2.7      48.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.77    8.53    2.988  0.20( 0.15) 0.73      14.4      40.00
      2       40.03    8.81    2.934  0.20( 0.15) 0.73      14.7      46.00
```

```
     3       40.43    9.75    2.768  0.20( 0.15) 0.74      15.8      48.00
     4       40.24   10.51    2.652  0.20( 0.15) 0.75      16.5      42.00
     5       30.04   20.80    1.794  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.43    Tc(MIN.) =     9.75
  EFFECTIVE AREA(ACRES) =      15.83   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.43
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"         D        0.64      0.20     0.200    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.12   Tc(MIN.) =    9.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.75
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.289
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    75    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.89
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      3.89

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.188
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    4.25
  EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =       8.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.62
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.83
  TOTAL STREAM AREA(ACRES) =       2.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.37    9.09    2.883  0.20( 0.04) 0.20       2.1      14.00
      2        8.02    7.62    3.188  0.20( 0.04) 0.20       2.8      52.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.01    7.62    3.188  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.09    2.883  0.20( 0.04) 0.20       4.9      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.01    Tc(MIN.) =     7.62
  EFFECTIVE AREA(ACRES) =       4.59   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
```

```
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.01
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.01    8.50    2.994  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.97    2.733  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.77    8.60    2.975  0.20( 0.15) 0.73      14.4      40.00
      2       40.03    8.88    2.921  0.20( 0.15) 0.73      14.7      46.00
      3       40.43    9.82    2.757  0.20( 0.15) 0.74      15.8      48.00
      4       40.24   10.58    2.642  0.20( 0.15) 0.75      16.5      42.00
      5       30.04   20.87    1.790  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.50    2.994  0.20( 0.12) 0.60      18.8      52.00
      2       52.76    8.60    2.975  0.20( 0.12) 0.60      19.0      40.00
      3       52.94    8.88    2.921  0.20( 0.12) 0.60      19.4      46.00
      4       53.08    9.82    2.757  0.20( 0.12) 0.61      20.7      48.00
      5       53.01    9.97    2.733  0.20( 0.12) 0.61      20.9      14.00
      6       52.43   10.58    2.642  0.20( 0.12) 0.62      21.4      42.00
      7       38.24   20.87    1.790  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       53.08  Tc(MIN.) =    9.820
  EFFECTIVE AREA(ACRES) =     20.72  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.72
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.08

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.875
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        0.88      0.20     0.900    75    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      2.13
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.13

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.767
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D        0.25      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.43
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.22
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.63
 Tc(MIN.) =    9.76
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.60
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1          PEAK FLOW RATE(CFS) =       2.65

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   4.34
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.65
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.91    2.915  0.20( 0.12) 0.60      18.8      52.00
      1       52.76    9.01    2.896  0.20( 0.12) 0.60      19.0      40.00
      1       52.94    9.29    2.846  0.20( 0.12) 0.60      19.4      46.00
      1       53.08   10.23    2.693  0.20( 0.12) 0.61      20.7      48.00
      1       53.01   10.38    2.671  0.20( 0.12) 0.61      20.9      14.00
      1       52.43   10.99    2.585  0.20( 0.12) 0.62      21.4      42.00
      1       38.24   21.31    1.769  0.20( 0.13) 0.67      24.4      37.00
      2        2.65   10.69    2.627  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.07    8.91    2.915  0.20( 0.12) 0.61      19.7      52.00
      2       55.24    9.01    2.896  0.20( 0.12) 0.61      19.9      40.00
      3       55.45    9.29    2.846  0.20( 0.12) 0.61      20.4      46.00
      4       55.69   10.23    2.693  0.20( 0.12) 0.62      21.8      48.00
      5       55.63   10.38    2.671  0.20( 0.12) 0.62      22.0      14.00
      6       55.37   10.69    2.627  0.20( 0.13) 0.63      22.3      56.00
      7       55.03   10.99    2.585  0.20( 0.13) 0.63      22.6      42.00
      8       39.96   21.31    1.769  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.69    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      21.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.69
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      21.81
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.69

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.531
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.095
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =    9.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.749
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  1.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.18
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       55.07    9.35    2.836  0.20( 0.12) 0.61      19.7      52.00
     1       55.24    9.45    2.819  0.20( 0.12) 0.61      19.9      40.00
     1       55.45    9.72    2.774  0.20( 0.12) 0.61      20.4      46.00
     1       55.69   10.66    2.631  0.20( 0.12) 0.62      21.8      48.00
     1       55.63   10.81    2.610  0.20( 0.12) 0.62      22.0      14.00
     1       55.37   11.12    2.567  0.20( 0.13) 0.63      22.3      56.00
     1       55.03   11.43    2.528  0.20( 0.13) 0.63      22.6      42.00
     1       39.96   21.77    1.747  0.20( 0.13) 0.67      25.5      37.00
     2        1.61    6.38    3.531  0.20( 0.02) 0.10       0.5      60.00
     3        1.18    9.87    2.749  0.20( 0.02) 0.10       0.5      58.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       49.78    6.38    3.531  0.20( 0.12) 0.58      14.3      60.00
     2       57.52    9.35    2.836  0.20( 0.12) 0.59      20.7      52.00
     3       57.68    9.45    2.819  0.20( 0.12) 0.59      20.9      40.00
     4       57.88    9.72    2.774  0.20( 0.12) 0.59      21.4      46.00
     5       57.92    9.87    2.749  0.20( 0.12) 0.59      21.6      58.00
     6       58.02   10.66    2.631  0.20( 0.12) 0.60      22.8      48.00
     7       57.93   10.81    2.610  0.20( 0.12) 0.60      23.0      14.00
     8       57.64   11.12    2.567  0.20( 0.12) 0.60      23.3      56.00
     9       57.27   11.43    2.528  0.20( 0.12) 0.61      23.5      42.00
    10       41.50   21.77    1.747  0.20( 0.13) 0.65      26.5      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      58.02    Tc(MIN.) =    10.66
 EFFECTIVE AREA(ACRES) =      22.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       26.5
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      58.02
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.88
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN.) =   10.88   RAINFALL INTENSITY(INCH/HR) =  2.60
 EFFECTIVE AREA(ACRES) =    11.01
 TOTAL AREA(ACRES) =    12.79        PEAK FLOW RATE(CFS) =     28.00
 AREA-AVERAGED Fm(INCH/HR) =   0.12  AREA-AVERAGED Fp(INCH/HR) =   0.20
 AREA-AVERAGED Ap =  0.60
 NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
       CONFLUENCE ANALYSES.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      11.01
  TOTAL STREAM AREA(ACRES) =      12.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.00

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.79
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.00   10.91    2.596  0.20( 0.12) 0.60      11.0      37.00
      2        2.79    5.29    3.931  0.20( 0.18) 0.90       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.69    5.29    3.931  0.20( 0.13) 0.64       6.1      64.00
      2       29.80   10.91    2.596  0.20( 0.12) 0.62      11.8      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.80    Tc(MIN.) =    10.91
  EFFECTIVE AREA(ACRES) =      11.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       13.6
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.490
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.55      0.20     0.100    75    6.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.283
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.62      0.20     1.000    93    7.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

```
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.15
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   12.92
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   7.73
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.39
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      14.38
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 4

DETENTION BASIN CALCULATIONS

WEST - AREA ‘A’

10-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  WEST AREA - NODE 33
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         35.80       18.00            75.       0.200       0.838

    TOTAL AREA (Acres) =     35.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.036

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.162
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 33, WEST AREA                                                    *
 ************************************************************************

  FILE NAME: W-33-10.DAT
  TIME/DATE OF STUDY: 19:38 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      35.800 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.126 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.036
         LOW LOSS FRACTION = 0.162
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  66.190


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.769	33.638
2	48.524	176.451
3	86.696	165.269
4	97.295	45.889
5	99.144	8.004
6	99.658	2.224
7	99.914	1.112
8	100.000	0.371

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.3282
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 9.6447

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 22.5 45.0 67.5 90.0
14.000	3.3914	7.22	. Q . V . . .
14.083	3.4423	7.39	. Q . V . . .
14.167	3.4946	7.59	. Q . V . . .
14.250	3.5484	7.80	. Q . V . . .
14.333	3.6036	8.02	. Q . V . . .
14.417	3.6604	8.25	. Q . V . . .
14.500	3.7189	8.49	. Q . V . . .
14.583	3.7792	8.76	. Q . V . . .
14.667	3.8415	9.05	. Q . V . . .
14.750	3.9059	9.35	. Q . V . . .
14.833	3.9727	9.70	. Q . V . . .
14.917	4.0420	10.07	. Q . V . . .
15.000	4.1142	10.49	. Q . V . . .
15.083	4.1896	10.94	. Q . V . . .
15.167	4.2685	11.46	. Q . V . . .
15.250	4.3514	12.04	. Q . V . . .
15.333	4.4390	12.72	. Q . V . . .
15.417	4.5306	13.30	. Q . V . . .
15.500	4.6218	13.25	. Q . V . . .
15.583	4.7141	13.40	. Q . V . . .
15.667	4.8142	14.53	. Q . V . . .
15.750	4.9263	16.27	. Q . V . . .
15.833	5.0581	19.14	. Q . V . . .
15.917	5.2172	23.10	. Q . V . . .
16.000	5.4243	30.08	. Q . V . . .
16.083	5.7513	47.48	. Q V . . .
16.167	6.3321	84.33	. V . Q .
16.250	6.8459	74.61	. V . Q .
16.333	7.0947	36.12	. Q . V . .
16.417	7.2334	20.14	. Q . V . .
16.500	7.3421	15.78	. Q . V . .
16.583	7.4387	14.04	. Q . V . .
16.667	7.5245	12.46	. Q . .V . .
16.750	7.6016	11.19	. Q . .V . .
16.833	7.6722	10.26	. Q . .V . .
16.917	7.7377	9.51	. Q . . V . .
17.000	7.7989	8.88	. Q . . V . .
17.083	7.8564	8.35	. Q . . V . .
17.167	7.9107	7.88	. Q . . V . .
17.250	7.9621	7.47	. Q . . . V .
17.333	8.0112	7.12	. Q . . . V .
17.417	8.0581	6.81	. Q . . . V .
17.500	8.1032	6.56	. Q . . . V .
17.583	8.1469	6.34	. Q . . . V .
17.667	8.1892	6.14	. Q . . . V .
17.750	8.2303	5.96	. Q . . . V .
17.833	8.2702	5.80	. Q . . . V .
17.917	8.3091	5.65	. Q . . . V .
18.000	8.3470	5.50	. Q . . . V .

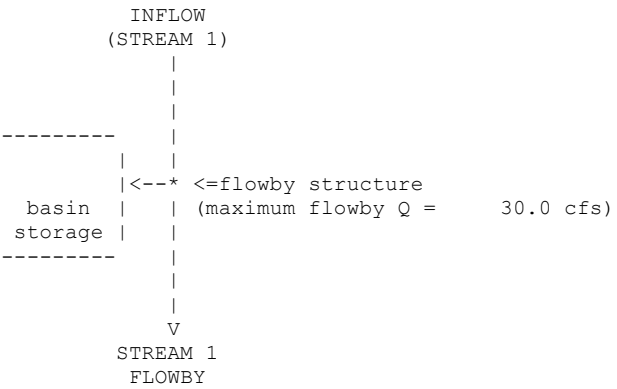
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	155.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
----------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
30.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.13	0.13	0.000
0.167	0.84	0.84	0.000
0.250	1.50	1.50	0.000
0.333	1.68	1.68	0.000
0.417	1.72	1.72	0.000
0.500	1.74	1.74	0.000
0.583	1.75	1.75	0.000
0.667	1.75	1.75	0.000
0.750	1.76	1.76	0.000
0.833	1.76	1.76	0.000
0.917	1.77	1.77	0.000
1.000	1.78	1.78	0.000
1.083	1.78	1.78	0.000
1.167	1.79	1.79	0.000
1.250	1.80	1.80	0.000
1.333	1.80	1.80	0.000
1.417	1.81	1.81	0.000
1.500	1.81	1.81	0.000
1.583	1.82	1.82	0.000
1.667	1.83	1.83	0.000
1.750	1.83	1.83	0.000

1.833	1.84	1.84	0.000
1.917	1.85	1.85	0.000
2.000	1.85	1.85	0.000
2.083	1.86	1.86	0.000
2.167	1.87	1.87	0.000
2.250	1.88	1.88	0.000
2.333	1.88	1.88	0.000
2.417	1.89	1.89	0.000
2.500	1.90	1.90	0.000
2.583	1.90	1.90	0.000
2.667	1.91	1.91	0.000
2.750	1.92	1.92	0.000
2.833	1.93	1.93	0.000
2.917	1.93	1.93	0.000
3.000	1.94	1.94	0.000
3.083	1.95	1.95	0.000
3.167	1.96	1.96	0.000
3.250	1.96	1.96	0.000
3.333	1.97	1.97	0.000
3.417	1.98	1.98	0.000
3.500	1.99	1.99	0.000
3.583	2.00	2.00	0.000
3.667	2.01	2.01	0.000
3.750	2.01	2.01	0.000
3.833	2.02	2.02	0.000
3.917	2.03	2.03	0.000
4.000	2.04	2.04	0.000
4.083	2.05	2.05	0.000
4.167	2.06	2.06	0.000
4.250	2.07	2.07	0.000
4.333	2.08	2.08	0.000
4.417	2.09	2.09	0.000
4.500	2.09	2.09	0.000
4.583	2.10	2.10	0.000
4.667	2.11	2.11	0.000
4.750	2.12	2.12	0.000
4.833	2.13	2.13	0.000
4.917	2.14	2.14	0.000
5.000	2.15	2.15	0.000
5.083	2.16	2.16	0.000
5.167	2.17	2.17	0.000
5.250	2.18	2.18	0.000
5.333	2.19	2.19	0.000
5.417	2.20	2.20	0.000
5.500	2.22	2.22	0.000
5.583	2.23	2.23	0.000
5.667	2.24	2.24	0.000
5.750	2.25	2.25	0.000
5.833	2.26	2.26	0.000
5.917	2.27	2.27	0.000
6.000	2.28	2.28	0.000
6.083	2.29	2.29	0.000
6.167	2.31	2.31	0.000
6.250	2.32	2.32	0.000
6.333	2.33	2.33	0.000
6.417	2.34	2.34	0.000
6.500	2.36	2.36	0.000
6.583	2.37	2.37	0.000
6.667	2.38	2.38	0.000
6.750	2.40	2.40	0.000
6.833	2.41	2.41	0.000
6.917	2.42	2.42	0.000
7.000	2.44	2.44	0.000
7.083	2.45	2.45	0.000
7.167	2.46	2.46	0.000
7.250	2.48	2.48	0.000
7.333	2.49	2.49	0.000
7.417	2.51	2.51	0.000
7.500	2.52	2.52	0.000
7.583	2.54	2.54	0.000
7.667	2.55	2.55	0.000

7.750	2.57	2.57	0.000
7.833	2.59	2.59	0.000
7.917	2.60	2.60	0.000
8.000	2.62	2.62	0.000
8.083	2.64	2.64	0.000
8.167	2.65	2.65	0.000
8.250	2.67	2.67	0.000
8.333	2.69	2.69	0.000
8.417	2.71	2.71	0.000
8.500	2.72	2.72	0.000
8.583	2.74	2.74	0.000
8.667	2.76	2.76	0.000
8.750	2.78	2.78	0.000
8.833	2.80	2.80	0.000
8.917	2.82	2.82	0.000
9.000	2.84	2.84	0.000
9.083	2.86	2.86	0.000
9.167	2.88	2.88	0.000
9.250	2.91	2.91	0.000
9.333	2.93	2.93	0.000
9.417	2.95	2.95	0.000
9.500	2.97	2.97	0.000
9.583	3.00	3.00	0.000
9.667	3.02	3.02	0.000
9.750	3.05	3.05	0.000
9.833	3.07	3.07	0.000
9.917	3.10	3.10	0.000
10.000	3.12	3.12	0.000
10.083	3.15	3.15	0.000
10.167	3.18	3.18	0.000
10.250	3.20	3.20	0.000
10.333	3.23	3.23	0.000
10.417	3.26	3.26	0.000
10.500	3.29	3.29	0.000
10.583	3.32	3.32	0.000
10.667	3.35	3.35	0.000
10.750	3.39	3.39	0.000
10.833	3.42	3.42	0.000
10.917	3.45	3.45	0.000
11.000	3.49	3.49	0.000
11.083	3.52	3.52	0.000
11.167	3.56	3.56	0.000
11.250	3.60	3.60	0.000
11.333	3.64	3.64	0.000
11.417	3.67	3.67	0.000
11.500	3.72	3.72	0.000
11.583	3.76	3.76	0.000
11.667	3.80	3.80	0.000
11.750	3.85	3.85	0.000
11.833	3.89	3.89	0.000
11.917	3.94	3.94	0.000
12.000	3.99	3.99	0.000
12.083	4.12	4.12	0.000
12.167	4.62	4.62	0.000
12.250	5.08	5.08	0.000
12.333	5.26	5.26	0.000
12.417	5.34	5.34	0.000
12.500	5.41	5.41	0.000
12.583	5.48	5.48	0.000
12.667	5.55	5.55	0.000
12.750	5.62	5.62	0.000
12.833	5.69	5.69	0.000
12.917	5.77	5.77	0.000
13.000	5.85	5.85	0.000
13.083	5.93	5.93	0.000
13.167	6.02	6.02	0.000
13.250	6.10	6.10	0.000
13.333	6.20	6.20	0.000
13.417	6.30	6.30	0.000
13.500	6.40	6.40	0.000
13.583	6.51	6.51	0.000

13.667	6.62	6.62	0.000
13.750	6.75	6.75	0.000
13.833	6.89	6.89	0.000
13.917	7.05	7.05	0.000
14.000	7.22	7.22	0.000
14.083	7.39	7.39	0.000
14.167	7.59	7.59	0.000
14.250	7.80	7.80	0.000
14.333	8.02	8.02	0.000
14.417	8.25	8.25	0.000
14.500	8.49	8.49	0.000
14.583	8.76	8.76	0.000
14.667	9.05	9.05	0.000
14.750	9.35	9.35	0.000
14.833	9.70	9.70	0.000
14.917	10.07	10.07	0.000
15.000	10.49	10.49	0.000
15.083	10.94	10.94	0.000
15.167	11.46	11.46	0.000
15.250	12.04	12.04	0.000
15.333	12.72	12.72	0.000
15.417	13.30	13.30	0.000
15.500	13.25	13.25	0.000
15.583	13.40	13.40	0.000
15.667	14.53	14.53	0.000
15.750	16.27	16.27	0.000
15.833	19.14	19.14	0.000
15.917	23.10	23.10	0.000
16.000	30.08	30.00	0.001
16.083	47.48	30.00	0.121
16.167	84.33	30.00	0.495
16.250	74.61	30.00	0.802
16.333	36.12	30.00	0.844
16.417	20.14	20.14	0.844
16.500	15.78	15.78	0.844
16.583	14.04	14.04	0.844
16.667	12.46	12.46	0.844
16.750	11.19	11.19	0.844
16.833	10.26	10.26	0.844
16.917	9.51	9.51	0.844
17.000	8.88	8.88	0.844
17.083	8.35	8.35	0.844
17.167	7.88	7.88	0.844
17.250	7.47	7.47	0.844
17.333	7.12	7.12	0.844
17.417	6.81	6.81	0.844
17.500	6.56	6.56	0.844
17.583	6.34	6.34	0.844
17.667	6.14	6.14	0.844
17.750	5.96	5.96	0.844
17.833	5.80	5.80	0.844
17.917	5.65	5.65	0.844
18.000	5.50	5.50	0.844
18.083	5.29	5.29	0.844
18.167	4.73	4.73	0.844
18.250	4.20	4.20	0.844
18.333	3.99	3.99	0.844
18.417	3.87	3.87	0.844
18.500	3.78	3.78	0.844
18.583	3.69	3.69	0.844
18.667	3.61	3.61	0.844
18.750	3.54	3.54	0.844
18.833	3.46	3.46	0.844
18.917	3.40	3.40	0.844
19.000	3.33	3.33	0.844
19.083	3.27	3.27	0.844
19.167	3.21	3.21	0.844
19.250	3.16	3.16	0.844
19.333	3.11	3.11	0.844
19.417	3.05	3.05	0.844
19.500	3.01	3.01	0.844

19.583	2.96	2.96	0.844
19.667	2.91	2.91	0.844
19.750	2.87	2.87	0.844
19.833	2.83	2.83	0.844
19.917	2.79	2.79	0.844
20.000	2.75	2.75	0.844
20.083	2.71	2.71	0.844
20.167	2.68	2.68	0.844
20.250	2.64	2.64	0.844
20.333	2.61	2.61	0.844
20.417	2.58	2.58	0.844
20.500	2.54	2.54	0.844
20.583	2.51	2.51	0.844
20.667	2.48	2.48	0.844
20.750	2.45	2.45	0.844
20.833	2.43	2.43	0.844
20.917	2.40	2.40	0.844
21.000	2.37	2.37	0.844
21.083	2.35	2.35	0.844
21.167	2.32	2.32	0.844
21.250	2.30	2.30	0.844
21.333	2.28	2.28	0.844
21.417	2.25	2.25	0.844
21.500	2.23	2.23	0.844
21.583	2.21	2.21	0.844
21.667	2.19	2.19	0.844
21.750	2.17	2.17	0.844
21.833	2.15	2.15	0.844
21.917	2.13	2.13	0.844
22.000	2.11	2.11	0.844
22.083	2.09	2.09	0.844
22.167	2.07	2.07	0.844
22.250	2.05	2.05	0.844
22.333	2.03	2.03	0.844
22.417	2.02	2.02	0.844
22.500	2.00	2.00	0.844
22.583	1.98	1.98	0.844
22.667	1.97	1.97	0.844
22.750	1.95	1.95	0.844
22.833	1.94	1.94	0.844
22.917	1.92	1.92	0.844
23.000	1.91	1.91	0.844
23.083	1.89	1.89	0.844
23.167	1.88	1.88	0.844
23.250	1.86	1.86	0.844
23.333	1.85	1.85	0.844
23.417	1.84	1.84	0.844
23.500	1.82	1.82	0.844
23.583	1.81	1.81	0.844
23.667	1.80	1.80	0.844
23.750	1.78	1.78	0.844
23.833	1.77	1.77	0.844
23.917	1.76	1.76	0.844
24.000	1.75	1.75	0.844

END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

EAST – AREA ‘A’

10-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                             Analysis prepared by:

                             HUNSAKER & ASSOCIATES
                                   Irvine,Inc
                         Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  NODE 86 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         51.30       55.00            75.       0.200       0.635

    TOTAL AREA (Acres) =     51.30

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.110

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.365
==========================================================================
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**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 86, EAST AREA                                                    *
 ************************************************************************

  FILE NAME: E-86-10.DAT
  TIME/DATE OF STUDY: 16:36 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      51.300 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.129 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.110
         LOW LOSS FRACTION = 0.365
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  64.499


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.384	45.811
2	46.559	243.048
3	85.380	240.850
4	96.933	71.674
5	99.028	12.997
6	99.611	3.618
7	99.903	1.809
8	100.000	0.603

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 4.6322
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 11.0925

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	3.6791	7.74	.Q . V . . .
14.083	3.7335	7.90	.Q . V . . .
14.167	3.7892	8.09	.Q . V . . .
14.250	3.8462	8.28	.Q . V . . .
14.333	3.9046	8.48	.Q . V . . .
14.417	3.9644	8.68	.Q . V . . .
14.500	4.0258	8.91	.Q . V . . .
14.583	4.0888	9.15	.Q . V . . .
14.667	4.1536	9.41	.Q . V . . .
14.750	4.2204	9.70	.Q . V . . .
14.833	4.2901	10.11	. Q . V . . .
14.917	4.3631	10.60	. Q . V . . .
15.000	4.4401	11.19	. Q . V . . .
15.083	4.5217	11.83	. Q . V . . .
15.167	4.6083	12.58	. Q . V . . .
15.250	4.7006	13.40	. Q . V . . .
15.333	4.7996	14.37	. Q . V . . .
15.417	4.9043	15.20	. Q . V . . .
15.500	5.0087	15.17	. Q . V . . .
15.583	5.1145	15.35	. Q . V . . .
15.667	5.2309	16.90	. Q . V . . .
15.750	5.3643	19.37	. Q . V. . .
15.833	5.5254	23.40	. Q . V. . .
15.917	5.7253	29.02	. Q . V . . .
16.000	5.9924	38.79	. Q . .V . . .
16.083	6.4264	63.02	. . Q . V . . .
16.167	7.2151	114.52	. . . Q V . . .
16.250	7.9344	104.44	. . Q V . . .
16.333	8.2779	49.88	. Q. . V. . .
16.417	8.4553	25.75	. Q . . V . .
16.500	8.5864	19.05	. Q . . V . .
16.583	8.6997	16.45	. Q . . .V . .
16.667	8.7971	14.14	. Q . . .V . .
16.750	8.8817	12.29	. Q . . . V . .
16.833	8.9572	10.96	. Q . . . V . .
16.917	9.0261	10.00	.Q . . . V . .
17.000	9.0904	9.33	.Q . . . V . .
17.083	9.1511	8.82	.Q . . . V . .
17.167	9.2088	8.38	.Q . . . V . .
17.250	9.2639	8.00	.Q . . . V . .
17.333	9.3167	7.67	.Q . . . V . .
17.417	9.3676	7.38	.Q . . . V . .
17.500	9.4166	7.12	.Q . . . V . .
17.583	9.4641	6.89	.Q . . . V . .
17.667	9.5101	6.68	.Q . . . V . .
17.750	9.5547	6.48	.Q . . . V . .
17.833	9.5981	6.30	.Q . . . V . .
17.917	9.6404	6.14	.Q . . . V . .
18.000	9.6816	5.98	.Q . . . V . .

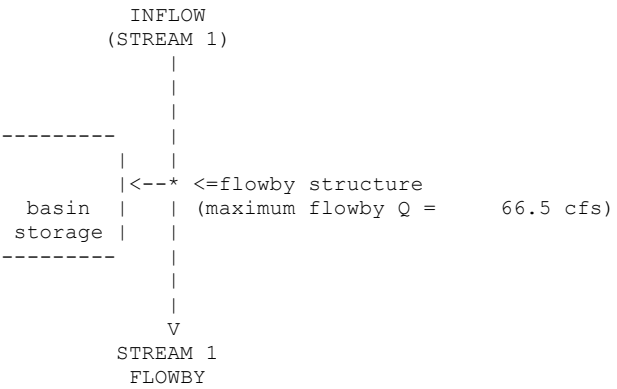
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	105.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

```
*******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-------------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
66.5 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.14	0.14	0.000
0.167	0.87	0.87	0.000
0.250	1.60	1.60	0.000
0.333	1.82	1.82	0.000
0.417	1.87	1.87	0.000
0.500	1.88	1.88	0.000
0.583	1.89	1.89	0.000
0.667	1.90	1.90	0.000
0.750	1.91	1.91	0.000
0.833	1.92	1.92	0.000
0.917	1.92	1.92	0.000
1.000	1.93	1.93	0.000
1.083	1.94	1.94	0.000
1.167	1.94	1.94	0.000
1.250	1.95	1.95	0.000
1.333	1.96	1.96	0.000
1.417	1.96	1.96	0.000
1.500	1.97	1.97	0.000
1.583	1.98	1.98	0.000
1.667	1.98	1.98	0.000
1.750	1.99	1.99	0.000

1.833	2.00	2.00	0.000
1.917	2.01	2.01	0.000
2.000	2.01	2.01	0.000
2.083	2.02	2.02	0.000
2.167	2.03	2.03	0.000
2.250	2.04	2.04	0.000
2.333	2.04	2.04	0.000
2.417	2.05	2.05	0.000
2.500	2.06	2.06	0.000
2.583	2.07	2.07	0.000
2.667	2.07	2.07	0.000
2.750	2.08	2.08	0.000
2.833	2.09	2.09	0.000
2.917	2.10	2.10	0.000
3.000	2.11	2.11	0.000
3.083	2.12	2.12	0.000
3.167	2.12	2.12	0.000
3.250	2.13	2.13	0.000
3.333	2.14	2.14	0.000
3.417	2.15	2.15	0.000
3.500	2.16	2.16	0.000
3.583	2.17	2.17	0.000
3.667	2.18	2.18	0.000
3.750	2.19	2.19	0.000
3.833	2.20	2.20	0.000
3.917	2.21	2.21	0.000
4.000	2.21	2.21	0.000
4.083	2.22	2.22	0.000
4.167	2.23	2.23	0.000
4.250	2.24	2.24	0.000
4.333	2.25	2.25	0.000
4.417	2.26	2.26	0.000
4.500	2.27	2.27	0.000
4.583	2.28	2.28	0.000
4.667	2.29	2.29	0.000
4.750	2.30	2.30	0.000
4.833	2.32	2.32	0.000
4.917	2.33	2.33	0.000
5.000	2.34	2.34	0.000
5.083	2.35	2.35	0.000
5.167	2.36	2.36	0.000
5.250	2.37	2.37	0.000
5.333	2.38	2.38	0.000
5.417	2.39	2.39	0.000
5.500	2.41	2.41	0.000
5.583	2.42	2.42	0.000
5.667	2.43	2.43	0.000
5.750	2.44	2.44	0.000
5.833	2.45	2.45	0.000
5.917	2.47	2.47	0.000
6.000	2.48	2.48	0.000
6.083	2.49	2.49	0.000
6.167	2.50	2.50	0.000
6.250	2.52	2.52	0.000
6.333	2.53	2.53	0.000
6.417	2.54	2.54	0.000
6.500	2.56	2.56	0.000
6.583	2.57	2.57	0.000
6.667	2.59	2.59	0.000
6.750	2.60	2.60	0.000
6.833	2.61	2.61	0.000
6.917	2.63	2.63	0.000
7.000	2.64	2.64	0.000
7.083	2.66	2.66	0.000
7.167	2.68	2.68	0.000
7.250	2.69	2.69	0.000
7.333	2.71	2.71	0.000
7.417	2.72	2.72	0.000
7.500	2.74	2.74	0.000
7.583	2.76	2.76	0.000
7.667	2.77	2.77	0.000

7.750	2.79	2.79	0.000
7.833	2.81	2.81	0.000
7.917	2.82	2.82	0.000
8.000	2.84	2.84	0.000
8.083	2.86	2.86	0.000
8.167	2.88	2.88	0.000
8.250	2.90	2.90	0.000
8.333	2.92	2.92	0.000
8.417	2.94	2.94	0.000
8.500	2.96	2.96	0.000
8.583	2.98	2.98	0.000
8.667	3.00	3.00	0.000
8.750	3.02	3.02	0.000
8.833	3.04	3.04	0.000
8.917	3.06	3.06	0.000
9.000	3.09	3.09	0.000
9.083	3.11	3.11	0.000
9.167	3.13	3.13	0.000
9.250	3.15	3.15	0.000
9.333	3.18	3.18	0.000
9.417	3.20	3.20	0.000
9.500	3.23	3.23	0.000
9.583	3.25	3.25	0.000
9.667	3.28	3.28	0.000
9.750	3.31	3.31	0.000
9.833	3.33	3.33	0.000
9.917	3.36	3.36	0.000
10.000	3.39	3.39	0.000
10.083	3.42	3.42	0.000
10.167	3.45	3.45	0.000
10.250	3.48	3.48	0.000
10.333	3.51	3.51	0.000
10.417	3.54	3.54	0.000
10.500	3.57	3.57	0.000
10.583	3.61	3.61	0.000
10.667	3.64	3.64	0.000
10.750	3.67	3.67	0.000
10.833	3.71	3.71	0.000
10.917	3.75	3.75	0.000
11.000	3.79	3.79	0.000
11.083	3.82	3.82	0.000
11.167	3.86	3.86	0.000
11.250	3.90	3.90	0.000
11.333	3.95	3.95	0.000
11.417	3.99	3.99	0.000
11.500	4.03	4.03	0.000
11.583	4.08	4.08	0.000
11.667	4.13	4.13	0.000
11.750	4.17	4.17	0.000
11.833	4.22	4.22	0.000
11.917	4.27	4.27	0.000
12.000	4.33	4.33	0.000
12.083	4.47	4.47	0.000
12.167	4.99	4.99	0.000
12.250	5.50	5.50	0.000
12.333	5.70	5.70	0.000
12.417	5.79	5.79	0.000
12.500	5.87	5.87	0.000
12.583	5.94	5.94	0.000
12.667	6.02	6.02	0.000
12.750	6.10	6.10	0.000
12.833	6.18	6.18	0.000
12.917	6.26	6.26	0.000
13.000	6.35	6.35	0.000
13.083	6.43	6.43	0.000
13.167	6.53	6.53	0.000
13.250	6.62	6.62	0.000
13.333	6.73	6.73	0.000
13.417	6.83	6.83	0.000
13.500	6.94	6.94	0.000
13.583	7.06	7.06	0.000

13.667	7.18	7.18	0.000
13.750	7.31	7.31	0.000
13.833	7.45	7.45	0.000
13.917	7.59	7.59	0.000
14.000	7.74	7.74	0.000
14.083	7.90	7.90	0.000
14.167	8.09	8.09	0.000
14.250	8.28	8.28	0.000
14.333	8.48	8.48	0.000
14.417	8.68	8.68	0.000
14.500	8.91	8.91	0.000
14.583	9.15	9.15	0.000
14.667	9.41	9.41	0.000
14.750	9.70	9.70	0.000
14.833	10.11	10.11	0.000
14.917	10.60	10.60	0.000
15.000	11.19	11.19	0.000
15.083	11.83	11.83	0.000
15.167	12.58	12.58	0.000
15.250	13.40	13.40	0.000
15.333	14.37	14.37	0.000
15.417	15.20	15.20	0.000
15.500	15.17	15.17	0.000
15.583	15.35	15.35	0.000
15.667	16.90	16.90	0.000
15.750	19.37	19.37	0.000
15.833	23.40	23.40	0.000
15.917	29.02	29.02	0.000
16.000	38.79	38.79	0.000
16.083	63.02	63.02	0.000
16.167	114.52	66.50	0.331
16.250	104.44	66.50	0.592
16.333	49.88	49.88	0.592
16.417	25.75	25.75	0.592
16.500	19.05	19.05	0.592
16.583	16.45	16.45	0.592
16.667	14.14	14.14	0.592
16.750	12.29	12.29	0.592
16.833	10.96	10.96	0.592
16.917	10.00	10.00	0.592
17.000	9.33	9.33	0.592
17.083	8.82	8.82	0.592
17.167	8.38	8.38	0.592
17.250	8.00	8.00	0.592
17.333	7.67	7.67	0.592
17.417	7.38	7.38	0.592
17.500	7.12	7.12	0.592
17.583	6.89	6.89	0.592
17.667	6.68	6.68	0.592
17.750	6.48	6.48	0.592
17.833	6.30	6.30	0.592
17.917	6.14	6.14	0.592
18.000	5.98	5.98	0.592
18.083	5.75	5.75	0.592
18.167	5.16	5.16	0.592
18.250	4.58	4.58	0.592
18.333	4.34	4.34	0.592
18.417	4.21	4.21	0.592
18.500	4.11	4.11	0.592
18.583	4.01	4.01	0.592
18.667	3.92	3.92	0.592
18.750	3.84	3.84	0.592
18.833	3.77	3.77	0.592
18.917	3.69	3.69	0.592
19.000	3.62	3.62	0.592
19.083	3.56	3.56	0.592
19.167	3.49	3.49	0.592
19.250	3.43	3.43	0.592
19.333	3.37	3.37	0.592
19.417	3.32	3.32	0.592
19.500	3.27	3.27	0.592

19.583	3.21	3.21	0.592
19.667	3.17	3.17	0.592
19.750	3.12	3.12	0.592
19.833	3.07	3.07	0.592
19.917	3.03	3.03	0.592
20.000	2.99	2.99	0.592
20.083	2.95	2.95	0.592
20.167	2.91	2.91	0.592
20.250	2.87	2.87	0.592
20.333	2.83	2.83	0.592
20.417	2.80	2.80	0.592
20.500	2.76	2.76	0.592
20.583	2.73	2.73	0.592
20.667	2.70	2.70	0.592
20.750	2.67	2.67	0.592
20.833	2.64	2.64	0.592
20.917	2.61	2.61	0.592
21.000	2.58	2.58	0.592
21.083	2.55	2.55	0.592
21.167	2.52	2.52	0.592
21.250	2.50	2.50	0.592
21.333	2.47	2.47	0.592
21.417	2.45	2.45	0.592
21.500	2.42	2.42	0.592
21.583	2.40	2.40	0.592
21.667	2.38	2.38	0.592
21.750	2.35	2.35	0.592
21.833	2.33	2.33	0.592
21.917	2.31	2.31	0.592
22.000	2.29	2.29	0.592
22.083	2.27	2.27	0.592
22.167	2.25	2.25	0.592
22.250	2.23	2.23	0.592
22.333	2.21	2.21	0.592
22.417	2.19	2.19	0.592
22.500	2.17	2.17	0.592
22.583	2.15	2.15	0.592
22.667	2.14	2.14	0.592
22.750	2.12	2.12	0.592
22.833	2.10	2.10	0.592
22.917	2.09	2.09	0.592
23.000	2.07	2.07	0.592
23.083	2.05	2.05	0.592
23.167	2.04	2.04	0.592
23.250	2.02	2.02	0.592
23.333	2.01	2.01	0.592
23.417	1.99	1.99	0.592
23.500	1.98	1.98	0.592
23.583	1.97	1.97	0.592
23.667	1.95	1.95	0.592
23.750	1.94	1.94	0.592
23.833	1.93	1.93	0.592
23.917	1.91	1.91	0.592
24.000	1.90	1.90	0.592

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  NODE 193 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         25.40       49.00            75.       0.200       0.668

    TOTAL AREA (Acres) =     25.40

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.098

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.332
==========================================================================
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**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 193, EAST AREA                                                   *
 ************************************************************************

  FILE NAME: E-193-10.DAT
  TIME/DATE OF STUDY: 17:05 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      25.400 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.126 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.098
         LOW LOSS FRACTION = 0.332
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  66.243


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.782	23.904
2	48.585	125.340
3	86.735	117.190
4	97.306	32.470
5	99.147	5.657
6	99.659	1.572
7	99.915	0.786
8	100.000	0.262

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.0766
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.7094

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 15.0 30.0 45.0 60.0
14.000	1.9174	4.04	. Q . V . . .
14.083	1.9458	4.12	. Q . V . . .
14.167	1.9748	4.21	. Q . V . . .
14.250	2.0045	4.31	. Q . V . . .
14.333	2.0349	4.41	. Q . V . . .
14.417	2.0660	4.52	. Q . V . . .
14.500	2.0980	4.64	. Q . V . . .
14.583	2.1307	4.76	. Q . V . . .
14.667	2.1645	4.90	. Q . V . . .
14.750	2.1994	5.07	. Q . V . . .
14.833	2.2359	5.30	. Q . V . . .
14.917	2.2741	5.55	. Q . V . . .
15.000	2.3144	5.85	. Q . V . . .
15.083	2.3569	6.17	. Q . V . . .
15.167	2.4020	6.54	. Q . V . . .
15.250	2.4498	6.95	. Q . V . . .
15.333	2.5010	7.44	. Q . V . . .
15.417	2.5551	7.84	. Q . V . . .
15.500	2.6089	7.81	. Q . V . . .
15.583	2.6635	7.93	. Q . V . . .
15.667	2.7236	8.73	. Q . V. . .
15.750	2.7922	9.96	. Q . V. . .
15.833	2.8749	12.00	. Q . V . .
15.917	2.9769	14.82	. Q. V . .
16.000	3.1130	19.77	. . Q .V . .
16.083	3.3343	32.13	. . .Q V . .
16.167	3.7359	58.31	. . . V . Q .
16.250	4.0895	51.35	. . . V . Q .
16.333	4.2550	24.03	. . Q . V. .
16.417	4.3424	12.70	. Q . V . .
16.500	4.4086	9.61	. Q . V . .
16.583	4.4662	8.37	. Q . .V . .
16.667	4.5161	7.25	. Q . .V . .
16.750	4.5598	6.35	. Q . .V . .
16.833	4.5990	5.69	. Q . . V . .
16.917	4.6348	5.20	. Q . . V . .
17.000	4.6682	4.84	. Q . . V . .
17.083	4.6997	4.57	. Q . . V . .
17.167	4.7297	4.35	. Q . . . V . .
17.250	4.7583	4.16	. Q . . . V . .
17.333	4.7857	3.99	. Q . . . V . .
17.417	4.8122	3.84	. Q . . . V . .
17.500	4.8377	3.70	. Q . . . V . .
17.583	4.8624	3.58	. Q . . . V . .
17.667	4.8863	3.47	. Q . . . V . .
17.750	4.9095	3.37	. Q . . . V . .
17.833	4.9321	3.28	. Q . . . V . .
17.917	4.9541	3.19	. Q . . . V . .
18.000	4.9755	3.11	. Q . . . V . .

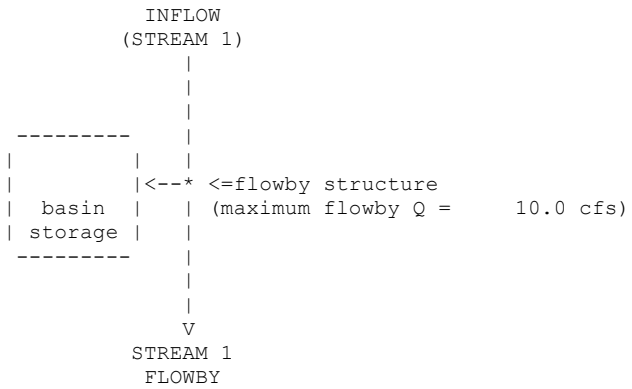
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	110.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

```
*******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-------------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
10.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.08	0.08	0.000
0.167	0.47	0.47	0.000
0.250	0.85	0.85	0.000
0.333	0.95	0.95	0.000
0.417	0.97	0.97	0.000
0.500	0.98	0.98	0.000
0.583	0.99	0.99	0.000
0.667	0.99	0.99	0.000
0.750	0.99	0.99	0.000
0.833	1.00	1.00	0.000
0.917	1.00	1.00	0.000
1.000	1.00	1.00	0.000
1.083	1.01	1.01	0.000
1.167	1.01	1.01	0.000
1.250	1.02	1.02	0.000
1.333	1.02	1.02	0.000
1.417	1.02	1.02	0.000
1.500	1.03	1.03	0.000
1.583	1.03	1.03	0.000
1.667	1.03	1.03	0.000
1.750	1.04	1.04	0.000

1.833	1.04	1.04	0.000
1.917	1.04	1.04	0.000
2.000	1.05	1.05	0.000
2.083	1.05	1.05	0.000
2.167	1.06	1.06	0.000
2.250	1.06	1.06	0.000
2.333	1.06	1.06	0.000
2.417	1.07	1.07	0.000
2.500	1.07	1.07	0.000
2.583	1.08	1.08	0.000
2.667	1.08	1.08	0.000
2.750	1.09	1.09	0.000
2.833	1.09	1.09	0.000
2.917	1.09	1.09	0.000
3.000	1.10	1.10	0.000
3.083	1.10	1.10	0.000
3.167	1.11	1.11	0.000
3.250	1.11	1.11	0.000
3.333	1.12	1.12	0.000
3.417	1.12	1.12	0.000
3.500	1.13	1.13	0.000
3.583	1.13	1.13	0.000
3.667	1.13	1.13	0.000
3.750	1.14	1.14	0.000
3.833	1.14	1.14	0.000
3.917	1.15	1.15	0.000
4.000	1.15	1.15	0.000
4.083	1.16	1.16	0.000
4.167	1.16	1.16	0.000
4.250	1.17	1.17	0.000
4.333	1.17	1.17	0.000
4.417	1.18	1.18	0.000
4.500	1.18	1.18	0.000
4.583	1.19	1.19	0.000
4.667	1.20	1.20	0.000
4.750	1.20	1.20	0.000
4.833	1.21	1.21	0.000
4.917	1.21	1.21	0.000
5.000	1.22	1.22	0.000
5.083	1.22	1.22	0.000
5.167	1.23	1.23	0.000
5.250	1.23	1.23	0.000
5.333	1.24	1.24	0.000
5.417	1.25	1.25	0.000
5.500	1.25	1.25	0.000
5.583	1.26	1.26	0.000
5.667	1.27	1.27	0.000
5.750	1.27	1.27	0.000
5.833	1.28	1.28	0.000
5.917	1.28	1.28	0.000
6.000	1.29	1.29	0.000
6.083	1.30	1.30	0.000
6.167	1.30	1.30	0.000
6.250	1.31	1.31	0.000
6.333	1.32	1.32	0.000
6.417	1.33	1.33	0.000
6.500	1.33	1.33	0.000
6.583	1.34	1.34	0.000
6.667	1.35	1.35	0.000
6.750	1.35	1.35	0.000
6.833	1.36	1.36	0.000
6.917	1.37	1.37	0.000
7.000	1.38	1.38	0.000
7.083	1.39	1.39	0.000
7.167	1.39	1.39	0.000
7.250	1.40	1.40	0.000
7.333	1.41	1.41	0.000
7.417	1.42	1.42	0.000
7.500	1.43	1.43	0.000
7.583	1.44	1.44	0.000
7.667	1.44	1.44	0.000

7.750	1.45	1.45	0.000
7.833	1.46	1.46	0.000
7.917	1.47	1.47	0.000
8.000	1.48	1.48	0.000
8.083	1.49	1.49	0.000
8.167	1.50	1.50	0.000
8.250	1.51	1.51	0.000
8.333	1.52	1.52	0.000
8.417	1.53	1.53	0.000
8.500	1.54	1.54	0.000
8.583	1.55	1.55	0.000
8.667	1.56	1.56	0.000
8.750	1.57	1.57	0.000
8.833	1.58	1.58	0.000
8.917	1.60	1.60	0.000
9.000	1.61	1.61	0.000
9.083	1.62	1.62	0.000
9.167	1.63	1.63	0.000
9.250	1.64	1.64	0.000
9.333	1.66	1.66	0.000
9.417	1.67	1.67	0.000
9.500	1.68	1.68	0.000
9.583	1.69	1.69	0.000
9.667	1.71	1.71	0.000
9.750	1.72	1.72	0.000
9.833	1.74	1.74	0.000
9.917	1.75	1.75	0.000
10.000	1.77	1.77	0.000
10.083	1.78	1.78	0.000
10.167	1.80	1.80	0.000
10.250	1.81	1.81	0.000
10.333	1.83	1.83	0.000
10.417	1.84	1.84	0.000
10.500	1.86	1.86	0.000
10.583	1.88	1.88	0.000
10.667	1.90	1.90	0.000
10.750	1.91	1.91	0.000
10.833	1.93	1.93	0.000
10.917	1.95	1.95	0.000
11.000	1.97	1.97	0.000
11.083	1.99	1.99	0.000
11.167	2.01	2.01	0.000
11.250	2.03	2.03	0.000
11.333	2.06	2.06	0.000
11.417	2.08	2.08	0.000
11.500	2.10	2.10	0.000
11.583	2.13	2.13	0.000
11.667	2.15	2.15	0.000
11.750	2.17	2.17	0.000
11.833	2.20	2.20	0.000
11.917	2.23	2.23	0.000
12.000	2.26	2.26	0.000
12.083	2.33	2.33	0.000
12.167	2.61	2.61	0.000
12.250	2.88	2.88	0.000
12.333	2.97	2.97	0.000
12.417	3.02	3.02	0.000
12.500	3.06	3.06	0.000
12.583	3.10	3.10	0.000
12.667	3.14	3.14	0.000
12.750	3.18	3.18	0.000
12.833	3.22	3.22	0.000
12.917	3.26	3.26	0.000
13.000	3.31	3.31	0.000
13.083	3.35	3.35	0.000
13.167	3.40	3.40	0.000
13.250	3.45	3.45	0.000
13.333	3.51	3.51	0.000
13.417	3.56	3.56	0.000
13.500	3.62	3.62	0.000
13.583	3.68	3.68	0.000

13.667	3.74	3.74	0.000
13.750	3.81	3.81	0.000
13.833	3.88	3.88	0.000
13.917	3.96	3.96	0.000
14.000	4.04	4.04	0.000
14.083	4.12	4.12	0.000
14.167	4.21	4.21	0.000
14.250	4.31	4.31	0.000
14.333	4.41	4.41	0.000
14.417	4.52	4.52	0.000
14.500	4.64	4.64	0.000
14.583	4.76	4.76	0.000
14.667	4.90	4.90	0.000
14.750	5.07	5.07	0.000
14.833	5.30	5.30	0.000
14.917	5.55	5.55	0.000
15.000	5.85	5.85	0.000
15.083	6.17	6.17	0.000
15.167	6.54	6.54	0.000
15.250	6.95	6.95	0.000
15.333	7.44	7.44	0.000
15.417	7.84	7.84	0.000
15.500	7.81	7.81	0.000
15.583	7.93	7.93	0.000
15.667	8.73	8.73	0.000
15.750	9.96	9.96	0.000
15.833	12.00	10.00	0.014
15.917	14.82	10.00	0.047
16.000	19.77	10.00	0.114
16.083	32.13	10.00	0.267
16.167	58.31	10.00	0.599
16.250	51.35	10.00	0.884
16.333	24.03	10.00	0.981
16.417	12.70	10.00	0.999
16.500	9.61	9.61	0.999
16.583	8.37	8.37	0.999
16.667	7.25	7.25	0.999
16.750	6.35	6.35	0.999
16.833	5.69	5.69	0.999
16.917	5.20	5.20	0.999
17.000	4.84	4.84	0.999
17.083	4.57	4.57	0.999
17.167	4.35	4.35	0.999
17.250	4.16	4.16	0.999
17.333	3.99	3.99	0.999
17.417	3.84	3.84	0.999
17.500	3.70	3.70	0.999
17.583	3.58	3.58	0.999
17.667	3.47	3.47	0.999
17.750	3.37	3.37	0.999
17.833	3.28	3.28	0.999
17.917	3.19	3.19	0.999
18.000	3.11	3.11	0.999
18.083	2.99	2.99	0.999
18.167	2.67	2.67	0.999
18.250	2.38	2.38	0.999
18.333	2.25	2.25	0.999
18.417	2.19	2.19	0.999
18.500	2.14	2.14	0.999
18.583	2.09	2.09	0.999
18.667	2.04	2.04	0.999
18.750	2.00	2.00	0.999
18.833	1.96	1.96	0.999
18.917	1.92	1.92	0.999
19.000	1.89	1.89	0.999
19.083	1.85	1.85	0.999
19.167	1.82	1.82	0.999
19.250	1.79	1.79	0.999
19.333	1.76	1.76	0.999
19.417	1.73	1.73	0.999
19.500	1.70	1.70	0.999

19.583	1.67	1.67	0.999
19.667	1.65	1.65	0.999
19.750	1.62	1.62	0.999
19.833	1.60	1.60	0.999
19.917	1.58	1.58	0.999
20.000	1.56	1.56	0.999
20.083	1.53	1.53	0.999
20.167	1.51	1.51	0.999
20.250	1.49	1.49	0.999
20.333	1.47	1.47	0.999
20.417	1.46	1.46	0.999
20.500	1.44	1.44	0.999
20.583	1.42	1.42	0.999
20.667	1.40	1.40	0.999
20.750	1.39	1.39	0.999
20.833	1.37	1.37	0.999
20.917	1.36	1.36	0.999
21.000	1.34	1.34	0.999
21.083	1.33	1.33	0.999
21.167	1.31	1.31	0.999
21.250	1.30	1.30	0.999
21.333	1.29	1.29	0.999
21.417	1.27	1.27	0.999
21.500	1.26	1.26	0.999
21.583	1.25	1.25	0.999
21.667	1.24	1.24	0.999
21.750	1.23	1.23	0.999
21.833	1.21	1.21	0.999
21.917	1.20	1.20	0.999
22.000	1.19	1.19	0.999
22.083	1.18	1.18	0.999
22.167	1.17	1.17	0.999
22.250	1.16	1.16	0.999
22.333	1.15	1.15	0.999
22.417	1.14	1.14	0.999
22.500	1.13	1.13	0.999
22.583	1.12	1.12	0.999
22.667	1.11	1.11	0.999
22.750	1.10	1.10	0.999
22.833	1.10	1.10	0.999
22.917	1.09	1.09	0.999
23.000	1.08	1.08	0.999
23.083	1.07	1.07	0.999
23.167	1.06	1.06	0.999
23.250	1.05	1.05	0.999
23.333	1.05	1.05	0.999
23.417	1.04	1.04	0.999
23.500	1.03	1.03	0.999
23.583	1.02	1.02	0.999
23.667	1.02	1.02	0.999
23.750	1.01	1.01	0.999
23.833	1.00	1.00	0.999
23.917	1.00	1.00	0.999
24.000	0.99	0.99	0.999

==========

END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

SOUTHEAST – AREA 'B'

10-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  SOUTHEAST - AREA 'B' - NODE 63
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         26.50       60.00            75.       0.200       0.608

    TOTAL AREA (Acres) =     26.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.120

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.392
==========================================================================
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**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 63, SOUTHEAST AREA                                               *
 ************************************************************************

  FILE NAME: SE-63-10.DAT
  TIME/DATE OF STUDY: 19:13 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      26.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.132 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.120
         LOW LOSS FRACTION = 0.392
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  63.275


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.112	22.794
2	45.120	121.810
3	84.354	125.737
4	96.628	39.336
5	98.932	7.387
6	99.524	1.896
7	99.810	0.915
8	99.952	0.458
9	100.000	0.153

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.5780
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.5454

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 15.0 30.0 45.0 60.0
14.000	1.8187	3.83	. Q . V . . .
14.083	1.8456	3.91	. Q . V . . .
14.167	1.8731	3.99	. Q . V . . .
14.250	1.9013	4.09	. Q . V . . .
14.333	1.9301	4.18	. Q . V . . .
14.417	1.9596	4.29	. Q . V . . .
14.500	1.9899	4.40	. Q . V . . .
14.583	2.0210	4.51	. Q . V . . .
14.667	2.0529	4.64	. Q . V . . .
14.750	2.0859	4.79	. Q . V . . .
14.833	2.1201	4.97	. Q . V . . .
14.917	2.1559	5.20	. Q . V . . .
15.000	2.1938	5.49	. Q . V . . .
15.083	2.2339	5.83	. Q . V . . .
15.167	2.2767	6.21	. Q . V . . .
15.250	2.3223	6.63	. Q . V . . .
15.333	2.3714	7.13	. Q . V . . .
15.417	2.4235	7.57	. Q . V . . .
15.500	2.4757	7.57	. Q . V . . .
15.583	2.5285	7.66	. Q . V . . .
15.667	2.5867	8.45	. Q . V . . .
15.750	2.6535	9.71	. Q . V. . .
15.833	2.7346	11.76	. Q . V. . .
15.917	2.8355	14.65	. Q. V . .
16.000	2.9706	19.62	. . Q .V . .
16.083	3.1903	31.90	. . .Q V . .
16.167	3.5899	58.02	. . . V . Q .
16.250	3.9634	54.23	. . . V . Q .
16.333	4.1445	26.30	. . Q . V. .
16.417	4.2364	13.35	. Q . . V .
16.500	4.3028	9.64	. Q . . .V .
16.583	4.3597	8.27	. Q . . .V .
16.667	4.4087	7.11	. Q . . .V .
16.750	4.4511	6.15	. Q . . . V .
16.833	4.4884	5.42	. Q . . . V .
16.917	4.5224	4.94	. Q . . . V .
17.000	4.5542	4.61	. Q . . . V .
17.083	4.5842	4.36	. Q . . . V .
17.167	4.6128	4.15	. Q . . . V .
17.250	4.6401	3.96	. Q . . . V .
17.333	4.6663	3.80	. Q . . . V .
17.417	4.6914	3.66	. Q . . . V .
17.500	4.7157	3.53	. Q . . . V .
17.583	4.7392	3.41	. Q . . . V .
17.667	4.7620	3.31	. Q . . . V .
17.750	4.7841	3.21	. Q . . . V .
17.833	4.8056	3.12	. Q . . . V .
17.917	4.8265	3.04	. Q . . . V .
18.000	4.8469	2.96	.Q . . . V .

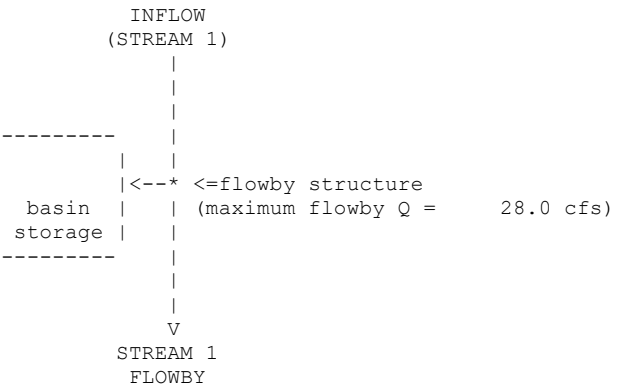
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	105.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

```
*******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-------------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
28.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.07	0.07	0.000
0.167	0.42	0.42	0.000
0.250	0.78	0.78	0.000
0.333	0.90	0.90	0.000
0.417	0.92	0.92	0.000
0.500	0.93	0.93	0.000
0.583	0.94	0.94	0.000
0.667	0.94	0.94	0.000
0.750	0.94	0.94	0.000
0.833	0.95	0.95	0.000
0.917	0.95	0.95	0.000
1.000	0.95	0.95	0.000
1.083	0.96	0.96	0.000
1.167	0.96	0.96	0.000
1.250	0.96	0.96	0.000
1.333	0.97	0.97	0.000
1.417	0.97	0.97	0.000
1.500	0.97	0.97	0.000
1.583	0.98	0.98	0.000
1.667	0.98	0.98	0.000
1.750	0.98	0.98	0.000

1.833	0.99	0.99	0.000
1.917	0.99	0.99	0.000
2.000	1.00	1.00	0.000
2.083	1.00	1.00	0.000
2.167	1.00	1.00	0.000
2.250	1.01	1.01	0.000
2.333	1.01	1.01	0.000
2.417	1.01	1.01	0.000
2.500	1.02	1.02	0.000
2.583	1.02	1.02	0.000
2.667	1.03	1.03	0.000
2.750	1.03	1.03	0.000
2.833	1.03	1.03	0.000
2.917	1.04	1.04	0.000
3.000	1.04	1.04	0.000
3.083	1.05	1.05	0.000
3.167	1.05	1.05	0.000
3.250	1.05	1.05	0.000
3.333	1.06	1.06	0.000
3.417	1.06	1.06	0.000
3.500	1.07	1.07	0.000
3.583	1.07	1.07	0.000
3.667	1.08	1.08	0.000
3.750	1.08	1.08	0.000
3.833	1.09	1.09	0.000
3.917	1.09	1.09	0.000
4.000	1.10	1.10	0.000
4.083	1.10	1.10	0.000
4.167	1.10	1.10	0.000
4.250	1.11	1.11	0.000
4.333	1.11	1.11	0.000
4.417	1.12	1.12	0.000
4.500	1.12	1.12	0.000
4.583	1.13	1.13	0.000
4.667	1.13	1.13	0.000
4.750	1.14	1.14	0.000
4.833	1.15	1.15	0.000
4.917	1.15	1.15	0.000
5.000	1.16	1.16	0.000
5.083	1.16	1.16	0.000
5.167	1.17	1.17	0.000
5.250	1.17	1.17	0.000
5.333	1.18	1.18	0.000
5.417	1.18	1.18	0.000
5.500	1.19	1.19	0.000
5.583	1.20	1.20	0.000
5.667	1.20	1.20	0.000
5.750	1.21	1.21	0.000
5.833	1.21	1.21	0.000
5.917	1.22	1.22	0.000
6.000	1.23	1.23	0.000
6.083	1.23	1.23	0.000
6.167	1.24	1.24	0.000
6.250	1.24	1.24	0.000
6.333	1.25	1.25	0.000
6.417	1.26	1.26	0.000
6.500	1.27	1.27	0.000
6.583	1.27	1.27	0.000
6.667	1.28	1.28	0.000
6.750	1.29	1.29	0.000
6.833	1.29	1.29	0.000
6.917	1.30	1.30	0.000
7.000	1.31	1.31	0.000
7.083	1.32	1.32	0.000
7.167	1.32	1.32	0.000
7.250	1.33	1.33	0.000
7.333	1.34	1.34	0.000
7.417	1.35	1.35	0.000
7.500	1.35	1.35	0.000
7.583	1.36	1.36	0.000
7.667	1.37	1.37	0.000

7.750	1.38	1.38	0.000
7.833	1.39	1.39	0.000
7.917	1.40	1.40	0.000
8.000	1.41	1.41	0.000
8.083	1.41	1.41	0.000
8.167	1.42	1.42	0.000
8.250	1.43	1.43	0.000
8.333	1.44	1.44	0.000
8.417	1.45	1.45	0.000
8.500	1.46	1.46	0.000
8.583	1.47	1.47	0.000
8.667	1.48	1.48	0.000
8.750	1.49	1.49	0.000
8.833	1.50	1.50	0.000
8.917	1.51	1.51	0.000
9.000	1.53	1.53	0.000
9.083	1.54	1.54	0.000
9.167	1.55	1.55	0.000
9.250	1.56	1.56	0.000
9.333	1.57	1.57	0.000
9.417	1.58	1.58	0.000
9.500	1.60	1.60	0.000
9.583	1.61	1.61	0.000
9.667	1.62	1.62	0.000
9.750	1.63	1.63	0.000
9.833	1.65	1.65	0.000
9.917	1.66	1.66	0.000
10.000	1.68	1.68	0.000
10.083	1.69	1.69	0.000
10.167	1.70	1.70	0.000
10.250	1.72	1.72	0.000
10.333	1.73	1.73	0.000
10.417	1.75	1.75	0.000
10.500	1.77	1.77	0.000
10.583	1.78	1.78	0.000
10.667	1.80	1.80	0.000
10.750	1.82	1.82	0.000
10.833	1.83	1.83	0.000
10.917	1.85	1.85	0.000
11.000	1.87	1.87	0.000
11.083	1.89	1.89	0.000
11.167	1.91	1.91	0.000
11.250	1.93	1.93	0.000
11.333	1.95	1.95	0.000
11.417	1.97	1.97	0.000
11.500	1.99	1.99	0.000
11.583	2.02	2.02	0.000
11.667	2.04	2.04	0.000
11.750	2.06	2.06	0.000
11.833	2.09	2.09	0.000
11.917	2.11	2.11	0.000
12.000	2.14	2.14	0.000
12.083	2.21	2.21	0.000
12.167	2.46	2.46	0.000
12.250	2.71	2.71	0.000
12.333	2.82	2.82	0.000
12.417	2.86	2.86	0.000
12.500	2.90	2.90	0.000
12.583	2.94	2.94	0.000
12.667	2.98	2.98	0.000
12.750	3.01	3.01	0.000
12.833	3.05	3.05	0.000
12.917	3.09	3.09	0.000
13.000	3.14	3.14	0.000
13.083	3.18	3.18	0.000
13.167	3.23	3.23	0.000
13.250	3.27	3.27	0.000
13.333	3.33	3.33	0.000
13.417	3.38	3.38	0.000
13.500	3.43	3.43	0.000
13.583	3.49	3.49	0.000

13.667	3.55	3.55	0.000
13.750	3.61	3.61	0.000
13.833	3.68	3.68	0.000
13.917	3.75	3.75	0.000
14.000	3.83	3.83	0.000
14.083	3.91	3.91	0.000
14.167	3.99	3.99	0.000
14.250	4.09	4.09	0.000
14.333	4.18	4.18	0.000
14.417	4.29	4.29	0.000
14.500	4.40	4.40	0.000
14.583	4.51	4.51	0.000
14.667	4.64	4.64	0.000
14.750	4.79	4.79	0.000
14.833	4.97	4.97	0.000
14.917	5.20	5.20	0.000
15.000	5.49	5.49	0.000
15.083	5.83	5.83	0.000
15.167	6.21	6.21	0.000
15.250	6.63	6.63	0.000
15.333	7.13	7.13	0.000
15.417	7.57	7.57	0.000
15.500	7.57	7.57	0.000
15.583	7.66	7.66	0.000
15.667	8.45	8.45	0.000
15.750	9.71	9.71	0.000
15.833	11.76	11.76	0.000
15.917	14.65	14.65	0.000
16.000	19.62	19.62	0.000
16.083	31.90	28.00	0.027
16.167	58.02	28.00	0.234
16.250	54.23	28.00	0.414
16.333	26.30	26.30	0.414
16.417	13.35	13.35	0.414
16.500	9.64	9.64	0.414
16.583	8.27	8.27	0.414
16.667	7.11	7.11	0.414
16.750	6.15	6.15	0.414
16.833	5.42	5.42	0.414
16.917	4.94	4.94	0.414
17.000	4.61	4.61	0.414
17.083	4.36	4.36	0.414
17.167	4.15	4.15	0.414
17.250	3.96	3.96	0.414
17.333	3.80	3.80	0.414
17.417	3.66	3.66	0.414
17.500	3.53	3.53	0.414
17.583	3.41	3.41	0.414
17.667	3.31	3.31	0.414
17.750	3.21	3.21	0.414
17.833	3.12	3.12	0.414
17.917	3.04	3.04	0.414
18.000	2.96	2.96	0.414
18.083	2.85	2.85	0.414
18.167	2.56	2.56	0.414
18.250	2.28	2.28	0.414
18.333	2.15	2.15	0.414
18.417	2.08	2.08	0.414
18.500	2.03	2.03	0.414
18.583	1.99	1.99	0.414
18.667	1.94	1.94	0.414
18.750	1.90	1.90	0.414
18.833	1.86	1.86	0.414
18.917	1.83	1.83	0.414
19.000	1.79	1.79	0.414
19.083	1.76	1.76	0.414
19.167	1.73	1.73	0.414
19.250	1.70	1.70	0.414
19.333	1.67	1.67	0.414
19.417	1.64	1.64	0.414
19.500	1.62	1.62	0.414

19.583	1.59	1.59	0.414
19.667	1.57	1.57	0.414
19.750	1.54	1.54	0.414
19.833	1.52	1.52	0.414
19.917	1.50	1.50	0.414
20.000	1.48	1.48	0.414
20.083	1.46	1.46	0.414
20.167	1.44	1.44	0.414
20.250	1.42	1.42	0.414
20.333	1.40	1.40	0.414
20.417	1.38	1.38	0.414
20.500	1.37	1.37	0.414
20.583	1.35	1.35	0.414
20.667	1.34	1.34	0.414
20.750	1.32	1.32	0.414
20.833	1.30	1.30	0.414
20.917	1.29	1.29	0.414
21.000	1.28	1.28	0.414
21.083	1.26	1.26	0.414
21.167	1.25	1.25	0.414
21.250	1.24	1.24	0.414
21.333	1.22	1.22	0.414
21.417	1.21	1.21	0.414
21.500	1.20	1.20	0.414
21.583	1.19	1.19	0.414
21.667	1.18	1.18	0.414
21.750	1.16	1.16	0.414
21.833	1.15	1.15	0.414
21.917	1.14	1.14	0.414
22.000	1.13	1.13	0.414
22.083	1.12	1.12	0.414
22.167	1.11	1.11	0.414
22.250	1.10	1.10	0.414
22.333	1.09	1.09	0.414
22.417	1.08	1.08	0.414
22.500	1.07	1.07	0.414
22.583	1.07	1.07	0.414
22.667	1.06	1.06	0.414
22.750	1.05	1.05	0.414
22.833	1.04	1.04	0.414
22.917	1.03	1.03	0.414
23.000	1.02	1.02	0.414
23.083	1.02	1.02	0.414
23.167	1.01	1.01	0.414
23.250	1.00	1.00	0.414
23.333	0.99	0.99	0.414
23.417	0.99	0.99	0.414
23.500	0.98	0.98	0.414
23.583	0.97	0.97	0.414
23.667	0.97	0.97	0.414
23.750	0.96	0.96	0.414
23.833	0.95	0.95	0.414
23.917	0.95	0.95	0.414
24.000	0.94	0.94	0.414

==========

END OF FLOODSCx ROUTING ANALYSIS

SECTION 5

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST – AREAS ‘A’, ‘B’ & ‘C’

100-YR STUDY

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******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
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           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ************************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 18:35 11/06/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.890
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    98   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.69
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      3.69

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.634
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        6.99      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.50
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.31
 AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   1.41
 Tc(MIN.) =   12.65
 SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =   21.61
 EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      25.04

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   8.80
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS   7.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.74
 GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.04
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   12.85
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.475
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.16      0.20     1.000    98
 COMMERCIAL                  D        1.06      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.15
 AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   0.84
 Tc(MIN.) =   13.68
 SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   33.24
 EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
```

```
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      57.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =  11.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       40.34      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     113.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.38
  AVERAGE FLOW DEPTH(FEET) =   0.79   TRAVEL TIME(MIN.) =   1.32
  Tc(MIN.) =   15.00
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =  112.42
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =     166.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =  14.05
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20      0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   3.96   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.097
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    91
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =   22.56
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      23.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  25.32
  FLOW VELOCITY(FEET/SEC.) =  4.78   DEPTH*VELOCITY(FT*FT/SEC.) =   2.55
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  980.0 FT WITH ELEVATION-DROP =  19.5 FT, IS   22.3 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     13.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.47
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.981
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    91
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    8.93
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =      31.71

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 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.97
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.71
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   11.33
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.33
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.873
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.19      0.20     0.100    91
 NATURAL POOR COVER
 "BARREN"                   D        8.58      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
 SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =   29.02
 EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
 TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      59.84

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      59.84
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   11.75
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.793
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                   D        2.69      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    8.70
 EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      67.23

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.402
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    91    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.40

********************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.698
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.25      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    1.05
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.27
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
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 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        2.57      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
 AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   2.34
 Tc(MIN.) =   10.43
 SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    8.93
 EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
 TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =      10.89

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.85   FLOW VELOCITY(FEET/SEC.) =   4.75
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.416
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       12.90      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.45
 AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   3.67
 Tc(MIN.) =   14.10
 SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   37.34
 EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
 TOTAL AREA(ACRES) =       16.0         PEAK FLOW RATE(CFS) =      46.43

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   5.07
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     14.10
 EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
 PEAK FLOW RATE(CFS)   =      46.43
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

EAST – AREA ‘A’

100-YR STUDY

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
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          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* EXISTING - EAST - AREA 'A'                                            *
 ************************************************************************

  FILE NAME: EAST-E.DAT
  TIME/DATE OF STUDY: 11:00 10/30/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    523.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.149
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.124
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.00      0.20     1.000    98   10.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.53
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.53

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    499.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   460.00   CHANNEL SLOPE =  0.0304
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.916
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        2.55      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.80
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.98
 AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.96
 Tc(MIN.) =   11.11
 SUBAREA AREA(ACRES) =     2.55       SUBAREA RUNOFF(CFS) =    8.53
 EFFECTIVE AREA(ACRES) =      3.55     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =      11.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   8.84
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   805.00   CHANNEL SLOPE =  0.0484
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.570
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        4.63      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.90
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.89
 AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   1.95
 Tc(MIN.) =   13.06
 SUBAREA AREA(ACRES) =     4.63       SUBAREA RUNOFF(CFS) =   14.04
 EFFECTIVE AREA(ACRES) =      8.18     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      24.81

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   7.40
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    396.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1695.00   CHANNEL SLOPE =  0.0378
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       74.55      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     122.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.98
  AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   3.54
  Tc(MIN.) =   16.60
  SUBAREA AREA(ACRES) =    74.55       SUBAREA RUNOFF(CFS) =  195.33
  EFFECTIVE AREA(ACRES) =     82.73     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       82.7         PEAK FLOW RATE(CFS) =     216.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =   9.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       51.42      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   51.42      SUBAREA RUNOFF(CFS) =  134.73
  EFFECTIVE AREA(ACRES) =    134.15   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      134.1       PEAK FLOW RATE(CFS) =     351.49
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      134.1  TC(MIN.) =     16.60
  EFFECTIVE AREA(ACRES) =    134.15  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     351.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

SOUTHEAST – AREA 'B'

100-YR STUDY

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* EXISTING - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: S-EAST-E.DAT
  TIME/DATE OF STUDY: 12:43 11/04/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.217
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.014
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.63      0.20     1.000    98    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.73

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    391.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1275.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.253
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       13.35      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.27
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.85
 AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.40
 Tc(MIN.) =    9.62
 SUBAREA AREA(ACRES) =    13.35       SUBAREA RUNOFF(CFS) =   48.70
 EFFECTIVE AREA(ACRES) =     13.98     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       14.0          PEAK FLOW RATE(CFS) =      51.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =  11.26
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.593
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                    D        2.21      0.20     1.000    98   12.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      6.75
 TOTAL AREA(ACRES) =      2.21   PEAK FLOW RATE(CFS) =      6.75

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    404.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.0094
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.032
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.49      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.19
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.58
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   4.45
  Tc(MIN.) =   17.36
  SUBAREA AREA(ACRES) =    10.49       SUBAREA RUNOFF(CFS) =   26.74
  EFFECTIVE AREA(ACRES) =     12.70     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       12.7         PEAK FLOW RATE(CFS) =      32.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   4.12
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    404.00  DOWNSTREAM(FEET) =    388.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.0225
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.851
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        7.61      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.02
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   1.97
  Tc(MIN.) =   19.33
  SUBAREA AREA(ACRES) =     7.61       SUBAREA RUNOFF(CFS) =   18.16
  EFFECTIVE AREA(ACRES) =     20.31     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.3         PEAK FLOW RATE(CFS) =      48.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   6.32
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.820
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.53      0.20     1.000    98    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    401.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1430.00   CHANNEL SLOPE =  0.0413
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.597
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       14.88      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.62
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   5.15
  Tc(MIN.) =   12.89
  SUBAREA AREA(ACRES) =    14.88       SUBAREA RUNOFF(CFS) =   45.49
  EFFECTIVE AREA(ACRES) =     15.41     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =      47.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1730.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.4  TC(MIN.) =     12.89
  EFFECTIVE AREA(ACRES) =     15.41  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      47.11
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 6

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST

Areas “A”, “B” & “C”

100-YEAR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 100-YR STUDY                                                           *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: WEST-A.DAT
  TIME/DATE OF STUDY: 18:21 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.851
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    91    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.06
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      6.06

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.06
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    8.81
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.81
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.472
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   17.35
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      22.93

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.93
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    9.48
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.48
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.289
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   17.44
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      39.42

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.42
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.069
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.18
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.37
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.75
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.01
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.48

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.32
  RAINFALL INTENSITY(INCH/HR) =   4.62
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.42   10.19    4.114  0.20( 0.04) 0.20      10.3       1.00
      2        3.48    8.32    4.621  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.67    8.32    4.621  0.20( 0.04) 0.19       9.3       5.00
      2       42.52   10.19    4.114  0.20( 0.04) 0.19      11.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      42.52    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.52
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.29
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      42.52

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.45
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      3.45

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.55
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
 STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =    9.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.197
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    6.17
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.68
 FLOW VELOCITY(FEET/SEC.) =  3.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       39.67    8.42    4.589  0.20( 0.04) 0.19       9.3       5.00
     1       42.52   10.29    4.091  0.20( 0.04) 0.19      11.1       1.00
     2        8.83    9.84    4.197  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       47.94    8.42    4.589  0.20( 0.03) 0.17      11.3       5.00
     2       50.67    9.84    4.197  0.20( 0.04) 0.18      13.0       8.00
     3       51.13   10.29    4.091  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.13    Tc(MIN.) =    10.29
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.13
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.96
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      2.96

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =   10.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.032
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.62
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.03
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       47.94    8.57    4.542  0.20( 0.03) 0.17      11.3       5.00
      1       50.67    9.99    4.161  0.20( 0.04) 0.18      13.0       8.00
      1       51.13   10.44    4.057  0.20( 0.04) 0.18      13.5       1.00
      2        7.62   10.56    4.032  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    8.57    4.542  0.20( 0.03) 0.16      13.0       5.00
      2       58.11    9.99    4.161  0.20( 0.03) 0.17      15.0       8.00
      3       58.71   10.44    4.057  0.20( 0.03) 0.17      15.6       1.00
      4       58.42   10.56    4.032  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.71    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      15.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.62
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.71
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.59
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.71

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.908
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.64
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.64

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.31
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       5.25

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   5.18
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    9.33    4.328  0.20( 0.03) 0.16      13.0       5.00
      1       58.11   10.74    3.992  0.20( 0.03) 0.17      15.0       8.00
      1       58.71   11.19    3.900  0.20( 0.03) 0.17      15.6       1.00
      1       58.42   11.31    3.877  0.20( 0.03) 0.17      15.6      11.00
      2        5.25    6.82    5.181  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    6.82    5.181  0.20( 0.03) 0.16      10.6      14.00
```

```
      2       59.30    9.33    4.328  0.20( 0.03) 0.16      14.1        5.00
      3       62.15   10.74    3.992  0.20( 0.03) 0.16      16.2        8.00
      4       62.66   11.19    3.900  0.20( 0.03) 0.16      16.7        1.00
      5       62.34   11.31    3.877  0.20( 0.03) 0.16      16.7       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.72   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.66
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.72
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      62.66

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.33
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   5.12
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    7.08    5.071  0.20( 0.03) 0.16      10.6      14.00
      1       59.30    9.59    4.261  0.20( 0.03) 0.16      14.1       5.00
      1       62.15   11.00    3.939  0.20( 0.03) 0.16      16.2       8.00
      1       62.66   11.45    3.849  0.20( 0.03) 0.16      16.7       1.00
      1       62.34   11.56    3.827  0.20( 0.03) 0.16      16.7      11.00
      2        2.85    6.96    5.120  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    6.96    5.120  0.20( 0.03) 0.15      11.1      17.00
      2       56.15    7.08    5.071  0.20( 0.03) 0.15      11.2      14.00
      3       61.66    9.59    4.261  0.20( 0.03) 0.16      14.7       5.00
      4       64.34   11.00    3.939  0.20( 0.03) 0.16      16.8       8.00
      5       64.79   11.45    3.849  0.20( 0.03) 0.16      17.3       1.00
      6       64.47   11.56    3.827  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.79    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =      17.34   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.79
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.52
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.52
 RAINFALL INTENSITY(INCH/HR) =   3.84
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.16
 EFFECTIVE STREAM AREA(ACRES) =      17.34
 TOTAL STREAM AREA(ACRES) =      17.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.79

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    91    7.35
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      6.96
 TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      6.96

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
 FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.96
 PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    8.10
 LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.692
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   15.66
```

```
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      22.23

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   4.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    7.03    5.089  0.20( 0.03) 0.15      11.1      17.00
      1       56.15    7.15    5.041  0.20( 0.03) 0.15      11.2      14.00
      1       61.66    9.66    4.242  0.20( 0.03) 0.16      14.7       5.00
      1       64.34   11.07    3.924  0.20( 0.03) 0.16      16.8       8.00
      1       64.79   11.52    3.835  0.20( 0.03) 0.16      17.3       1.00
      1       64.47   11.64    3.813  0.20( 0.03) 0.16      17.4      11.00
      2       22.23    8.10    4.692  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       76.74    7.03    5.089  0.20( 0.03) 0.17      15.7      17.00
      2       77.24    7.15    5.041  0.20( 0.03) 0.17      15.9      14.00
      3       80.47    8.10    4.692  0.20( 0.03) 0.17      17.9      19.00
      4       81.75    9.66    4.242  0.20( 0.03) 0.17      20.0       5.00
      5       82.90   11.07    3.924  0.20( 0.03) 0.17      22.1       8.00
      6       82.93   11.52    3.835  0.20( 0.03) 0.17      22.6       1.00
      7       82.50   11.64    3.813  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      82.93    Tc(MIN.) =    11.52
  EFFECTIVE AREA(ACRES) =      22.65   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      82.93
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.67
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.65
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.93

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.232
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20     0.100    91    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   5.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.392
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.26
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.26
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.36
 RAINFALL INTENSITY(INCH/HR) =   5.39
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.26
 TOTAL STREAM AREA(ACRES) =       0.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.74    8.19    4.663  0.20( 0.03) 0.17      15.7      17.00
     1       77.24    8.31    4.625  0.20( 0.03) 0.17      15.9      14.00
     1       80.47    9.26    4.348  0.20( 0.03) 0.17      17.9      19.00
     1       81.75   10.81    3.977  0.20( 0.03) 0.17      20.0       5.00
     1       82.90   12.22    3.707  0.20( 0.03) 0.17      22.1       8.00
     1       82.93   12.67    3.631  0.20( 0.03) 0.17      22.6       1.00
     1       82.50   12.79    3.613  0.20( 0.03) 0.17      22.7      11.00
     2        1.31    6.70    5.232  0.20( 0.02) 0.10       0.3      22.00
     3        1.26    6.36    5.392  0.20( 0.02) 0.10       0.3      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       71.48    6.36    5.392  0.20( 0.03) 0.17      12.7      40.00
     2       73.02    6.70    5.232  0.20( 0.03) 0.17      13.4      22.00
     3       79.00    8.19    4.663  0.20( 0.03) 0.17      16.2      17.00
     4       79.48    8.31    4.625  0.20( 0.03) 0.17      16.5      14.00
     5       82.58    9.26    4.348  0.20( 0.03) 0.17      18.4      19.00
     6       83.67   10.81    3.977  0.20( 0.03) 0.17      20.6       5.00
     7       84.69   12.22    3.707  0.20( 0.03) 0.17      22.6       8.00
     8       84.69   12.67    3.631  0.20( 0.03) 0.17      23.2       1.00
     9       84.25   12.79    3.613  0.20( 0.03) 0.17      23.2      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      84.69    Tc(MIN.) =    12.22
 EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
 TOTAL AREA(ACRES) =       23.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      84.69
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   12.34
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.34
  RAINFALL INTENSITY(INCH/HR) =   3.69
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.69

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.78
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.805
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       3.07

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.07
  PIPE TRAVEL TIME(MIN.) =   3.04    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.527
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   30.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      32.40

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.64
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.64
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       71.48    6.48    5.332  0.20( 0.03) 0.17      12.7      40.00
      1       73.02    6.82    5.177  0.20( 0.03) 0.17      13.4      22.00
      1       79.00    8.32    4.623  0.20( 0.03) 0.17      16.2      17.00
      1       79.48    8.43    4.586  0.20( 0.03) 0.17      16.5      14.00
```

```
     1       82.58    9.38    4.316  0.20( 0.03) 0.17      18.4       19.00
     1       83.67   10.93    3.952  0.20( 0.03) 0.17      20.6        5.00
     1       84.69   12.34    3.687  0.20( 0.03) 0.17      22.6        8.00
     1       84.69   12.79    3.612  0.20( 0.03) 0.17      23.2        1.00
     1       84.25   12.91    3.593  0.20( 0.03) 0.17      23.2       11.00
     2       32.40    8.64    4.523  0.20( 0.04) 0.19       8.0       24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.48    5.332  0.20( 0.03) 0.17      18.7       40.00
      2      102.35    6.82    5.177  0.20( 0.03) 0.17      19.7       22.00
      3      110.88    8.32    4.623  0.20( 0.03) 0.17      23.9       17.00
      4      111.56    8.43    4.586  0.20( 0.03) 0.17      24.3       14.00
      5      112.56    8.64    4.523  0.20( 0.03) 0.17      24.9       24.00
      6      113.48    9.38    4.316  0.20( 0.03) 0.17      26.4       19.00
      7      111.94   10.93    3.952  0.20( 0.03) 0.17      28.6        5.00
      8      111.05   12.34    3.687  0.20( 0.03) 0.17      30.7        8.00
      9      110.50   12.79    3.612  0.20( 0.03) 0.17      31.2        1.00
     10      109.93   12.91    3.593  0.20( 0.03) 0.17      31.2       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     113.48    Tc(MIN.) =     9.38
  EFFECTIVE AREA(ACRES) =      26.43   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.48
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.80
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.43
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     113.48

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20      0.200    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.67
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      6.67

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    7.89
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.765
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20      0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =   13.05
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      19.31

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.31
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
 TIME OF CONCENTRATION(MIN.) =    8.49
 RAINFALL INTENSITY(INCH/HR) =   4.57
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       4.54
 TOTAL STREAM AREA(ACRES) =       4.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      100.18    6.92    5.135  0.20( 0.03) 0.17      18.7      40.00
     1      102.35    7.26    4.995  0.20( 0.03) 0.17      19.7      22.00
     1      110.88    8.74    4.492  0.20( 0.03) 0.17      23.9      17.00
     1      111.56    8.86    4.458  0.20( 0.03) 0.17      24.3      14.00
     1      112.56    9.06    4.400  0.20( 0.03) 0.17      24.9      24.00
     1      113.48    9.80    4.207  0.20( 0.03) 0.17      26.4      19.00
     1      111.94   11.36    3.866  0.20( 0.03) 0.17      28.6       5.00
     1      111.05   12.77    3.616  0.20( 0.03) 0.17      30.7       8.00
     1      110.50   13.22    3.545  0.20( 0.03) 0.17      31.2       1.00
     1      109.93   13.33    3.527  0.20( 0.03) 0.17      31.2      11.00
     2       19.31    8.49    4.567  0.20( 0.04) 0.20       4.5      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.88    6.92    5.135  0.20( 0.04) 0.18      22.4      40.00
     2      120.42    7.26    4.995  0.20( 0.04) 0.18      23.6      22.00
     3      128.75    8.49    4.567  0.20( 0.04) 0.18      27.8      29.00
     4      129.87    8.74    4.492  0.20( 0.04) 0.18      28.5      17.00
     5      130.40    8.86    4.458  0.20( 0.04) 0.18      28.8      14.00
     6      131.15    9.06    4.400  0.20( 0.04) 0.18      29.4      24.00
     7      131.25    9.80    4.207  0.20( 0.04) 0.18      31.0      19.00
     8      128.26   11.36    3.866  0.20( 0.04) 0.18      33.1       5.00
     9      126.29   12.77    3.616  0.20( 0.04) 0.18      35.2       8.00
    10      125.45   13.22    3.545  0.20( 0.04) 0.18      35.7       1.00
    11      124.80   13.33    3.527  0.20( 0.04) 0.18      35.8      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     131.25    Tc(MIN.) =     9.80
 EFFECTIVE AREA(ACRES) =      30.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       35.8
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.39
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     131.25
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.89
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
```

```
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.25
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.93
  RAINFALL INTENSITY(INCH/HR) =   4.18
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.97
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     131.25

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.40
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.40
  RAINFALL INTENSITY(INCH/HR) =   5.92
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.88    7.05    5.081  0.20( 0.04) 0.18      22.4      40.00
     1      120.42    7.39    4.945  0.20( 0.04) 0.18      23.6      22.00
     1      128.75    8.62    4.529  0.20( 0.04) 0.18      27.8      29.00
     1      129.87    8.87    4.456  0.20( 0.04) 0.18      28.5      17.00
     1      130.40    8.99    4.422  0.20( 0.04) 0.18      28.8      14.00
     1      131.15    9.19    4.366  0.20( 0.04) 0.18      29.4      24.00
     1      131.25    9.93    4.177  0.20( 0.04) 0.18      31.0      19.00
     1      128.26   11.48    3.842  0.20( 0.04) 0.18      33.1       5.00
     1      126.29   12.89    3.595  0.20( 0.04) 0.18      35.2       8.00
     1      125.45   13.34    3.526  0.20( 0.04) 0.18      35.7       1.00
     1      124.80   13.46    3.508  0.20( 0.04) 0.18      35.8      11.00
     2        4.38    5.40    5.922  0.20( 0.18) 0.90       0.8      34.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      109.65    5.40    5.922  0.20( 0.04) 0.21      18.0      34.00
     2      121.62    7.05    5.081  0.20( 0.04) 0.20      23.2      40.00
     3      124.05    7.39    4.945  0.20( 0.04) 0.20      24.4      22.00
     4      132.07    8.62    4.529  0.20( 0.04) 0.20      28.6      29.00
     5      133.13    8.87    4.456  0.20( 0.04) 0.20      29.3      17.00
     6      133.63    8.99    4.422  0.20( 0.04) 0.20      29.6      14.00
     7      134.34    9.19    4.366  0.20( 0.04) 0.20      30.3      24.00
     8      134.30    9.93    4.177  0.20( 0.04) 0.20      31.8      19.00
     9      131.05   11.48    3.842  0.20( 0.04) 0.19      34.0       5.00
    10      128.90   12.89    3.595  0.20( 0.04) 0.19      36.0       8.00
    11      128.00   13.34    3.526  0.20( 0.04) 0.19      36.6       1.00
    12      127.34   13.46    3.508  0.20( 0.04) 0.19      36.6      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     134.34    Tc(MIN.) =     9.19
 EFFECTIVE AREA(ACRES) =      30.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       36.6
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     134.34
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.22
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.22
 RAINFALL INTENSITY(INCH/HR) =   4.36
 AREA-AVERAGED Fm(INCH/HR) =  0.04
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.25
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     134.34

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.00
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      9.00

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.00
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.84
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      109.65    5.43    5.900  0.20( 0.04) 0.21      18.0      34.00
      1      121.62    7.09    5.067  0.20( 0.04) 0.20      23.2      40.00
      1      124.05    7.43    4.932  0.20( 0.04) 0.20      24.4      22.00
      1      132.07    8.65    4.518  0.20( 0.04) 0.20      28.6      29.00
      1      133.13    8.90    4.446  0.20( 0.04) 0.20      29.3      17.00
      1      133.63    9.02    4.413  0.20( 0.04) 0.20      29.6      14.00
      1      134.34    9.22    4.356  0.20( 0.04) 0.20      30.3      24.00
```

```
     1      134.30    9.96    4.168  0.20( 0.04) 0.20      31.8      19.00
     1      131.05   11.52    3.835  0.20( 0.04) 0.19      34.0       5.00
     1      128.90   12.93    3.590  0.20( 0.04) 0.19      36.0       8.00
     1      128.00   13.38    3.520  0.20( 0.04) 0.19      36.6       1.00
     1      127.34   13.50    3.503  0.20( 0.04) 0.19      36.6      11.00
     2        9.00    7.68    4.838  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.43    5.43    5.900  0.20( 0.04) 0.21      19.4      34.00
     2      130.32    7.09    5.067  0.20( 0.04) 0.20      25.1      40.00
     3      132.93    7.43    4.932  0.20( 0.04) 0.20      26.4      22.00
     4      134.70    7.68    4.838  0.20( 0.04) 0.20      27.3      37.00
     5      140.47    8.65    4.518  0.20( 0.04) 0.20      30.6      29.00
     6      141.40    8.90    4.446  0.20( 0.04) 0.20      31.3      17.00
     7      141.84    9.02    4.413  0.20( 0.04) 0.20      31.7      14.00
     8      142.44    9.22    4.356  0.20( 0.04) 0.20      32.3      24.00
     9      142.04    9.96    4.168  0.20( 0.04) 0.20      33.8      19.00
    10      138.17   11.52    3.835  0.20( 0.04) 0.20      36.0       5.00
    11      135.56   12.93    3.590  0.20( 0.04) 0.19      38.1       8.00
    12      134.53   13.38    3.520  0.20( 0.04) 0.19      38.6       1.00
    13      133.84   13.50    3.503  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     142.44    Tc(MIN.) =     9.22
  EFFECTIVE AREA(ACRES) =      32.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  50.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     142.44
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.82
  RAINFALL INTENSITY(INCH/HR) =   4.20
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.31
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     142.44

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.26      0.20     0.100    91    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.18
 TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  D        0.55      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    2.50
 EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.69

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.06
 RAINFALL INTENSITY(INCH/HR) =   5.08
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.43    6.06    5.541  0.20( 0.04) 0.21      19.4      34.00
     1      130.32    7.70    4.833  0.20( 0.04) 0.20      25.1      40.00
     1      132.93    8.04    4.714  0.20( 0.04) 0.20      26.4      22.00
     1      134.70    8.29    4.631  0.20( 0.04) 0.20      27.3      37.00
     1      140.47    9.25    4.350  0.20( 0.04) 0.20      30.6      29.00
     1      141.40    9.49    4.285  0.20( 0.04) 0.20      31.3      17.00
     1      141.84    9.61    4.255  0.20( 0.04) 0.20      31.7      14.00
     1      142.44    9.82    4.204  0.20( 0.04) 0.20      32.3      24.00
     1      142.04   10.55    4.033  0.20( 0.04) 0.20      33.8      19.00
     1      138.17   12.11    3.726  0.20( 0.04) 0.20      36.0       5.00
     1      135.56   13.53    3.498  0.20( 0.04) 0.19      38.1       8.00
     1      134.53   13.99    3.432  0.20( 0.04) 0.19      38.6       1.00
     1      133.84   14.10    3.415  0.20( 0.04) 0.19      38.6      11.00
     2        3.69    7.06    5.078  0.20( 0.02) 0.10       0.8      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      120.88    6.06    5.541  0.20( 0.04) 0.21      20.1      34.00
      2      128.98    7.06    5.078  0.20( 0.04) 0.20      23.7      40.00
      3      133.83    7.70    4.833  0.20( 0.04) 0.20      25.9      40.00
      4      136.35    8.04    4.714  0.20( 0.04) 0.20      27.2      22.00
      5      138.07    8.29    4.631  0.20( 0.04) 0.20      28.1      37.00
      6      143.63    9.25    4.350  0.20( 0.04) 0.20      31.4      29.00
      7      144.51    9.49    4.285  0.20( 0.04) 0.20      32.1      17.00
      8      144.92    9.61    4.255  0.20( 0.04) 0.20      32.5      14.00
      9      145.49    9.82    4.204  0.20( 0.04) 0.20      33.1      24.00
     10      144.97   10.55    4.033  0.20( 0.04) 0.19      34.6      19.00
     11      140.88   12.11    3.726  0.20( 0.04) 0.19      36.8       5.00
     12      138.09   13.53    3.498  0.20( 0.04) 0.19      38.9       8.00
     13      137.02   13.99    3.432  0.20( 0.04) 0.19      39.4       1.00
     14      136.31   14.10    3.415  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     145.49    Tc(MIN.) =     9.82
  EFFECTIVE AREA(ACRES) =      33.12   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     145.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.12
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     145.49

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.173
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
 COMMERCIAL                 D        0.43      0.20     0.100    91    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.99
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   5.17
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      120.88    6.12    5.508  0.20( 0.04) 0.21      20.1      34.00
     1      128.98    7.12    5.053  0.20( 0.04) 0.20      23.7      40.00
     1      133.83    7.76    4.811  0.20( 0.04) 0.20      25.9      40.00
     1      136.35    8.10    4.694  0.20( 0.04) 0.20      27.2      22.00
     1      138.07    8.35    4.612  0.20( 0.04) 0.20      28.1      37.00
     1      143.63    9.31    4.334  0.20( 0.04) 0.20      31.4      29.00
     1      144.51    9.55    4.269  0.20( 0.04) 0.20      32.1      17.00
     1      144.92    9.67    4.240  0.20( 0.04) 0.20      32.5      14.00
     1      145.49    9.87    4.189  0.20( 0.04) 0.20      33.1      24.00
     1      144.97   10.61    4.020  0.20( 0.04) 0.19      34.6      19.00
     1      140.88   12.17    3.716  0.20( 0.04) 0.19      36.8       5.00
     1      138.09   13.59    3.489  0.20( 0.04) 0.19      38.9       8.00
     1      137.02   14.05    3.423  0.20( 0.04) 0.19      39.4       1.00
     1      136.31   14.16    3.407  0.20( 0.04) 0.19      39.5      11.00
     2        1.99    6.83    5.173  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      122.79    6.12    5.508  0.20( 0.04) 0.20      20.5      34.00
     2      128.66    6.83    5.173  0.20( 0.04) 0.20      23.1      42.00
     3      130.93    7.12    5.053  0.20( 0.04) 0.20      24.1      40.00
     4      135.69    7.76    4.811  0.20( 0.04) 0.20      26.4      40.00
     5      138.16    8.10    4.694  0.20( 0.04) 0.20      27.6      22.00
     6      139.84    8.35    4.612  0.20( 0.04) 0.20      28.5      37.00
     7      145.30    9.31    4.334  0.20( 0.04) 0.20      31.9      29.00
     8      146.15    9.55    4.269  0.20( 0.04) 0.19      32.6      17.00
     9      146.56    9.67    4.240  0.20( 0.04) 0.19      32.9      14.00
    10      147.10    9.87    4.189  0.20( 0.04) 0.19      33.6      24.00
    11      146.52   10.61    4.020  0.20( 0.04) 0.19      35.1      19.00
    12      142.31   12.17    3.716  0.20( 0.04) 0.19      37.3       5.00
    13      139.44   13.59    3.489  0.20( 0.04) 0.19      39.3       8.00
    14      138.34   14.05    3.423  0.20( 0.04) 0.19      39.9       1.00
    15      137.62   14.16    3.407  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     147.10    Tc(MIN.) =     9.87
 EFFECTIVE AREA(ACRES) =      33.55   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       39.9
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  53.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     147.10
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.20
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.55
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     147.10

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.218
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    91    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.73
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.750
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.54
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.36

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.41
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.87
 LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.87
 RAINFALL INTENSITY(INCH/HR) =   5.16
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.73
 TOTAL STREAM AREA(ACRES) =       0.73
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.41

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      122.79    6.47    5.340  0.20( 0.04) 0.20      20.5      34.00
     1      128.66    7.17    5.031  0.20( 0.04) 0.20      23.1      42.00
     1      130.93    7.45    4.922  0.20( 0.04) 0.20      24.1      40.00
     1      135.69    8.09    4.697  0.20( 0.04) 0.20      26.4      40.00
     1      138.16    8.43    4.588  0.20( 0.04) 0.20      27.6      22.00
     1      139.84    8.68    4.511  0.20( 0.04) 0.20      28.5      37.00
     1      145.30    9.64    4.249  0.20( 0.04) 0.20      31.9      29.00
     1      146.15    9.88    4.187  0.20( 0.04) 0.19      32.6      17.00
     1      146.56   10.00    4.159  0.20( 0.04) 0.19      32.9      14.00
     1      147.10   10.20    4.111  0.20( 0.04) 0.19      33.6      24.00
     1      146.52   10.94    3.950  0.20( 0.04) 0.19      35.1      19.00
     1      142.31   12.50    3.659  0.20( 0.04) 0.19      37.3       5.00
     1      139.44   13.92    3.442  0.20( 0.04) 0.19      39.3       8.00
     1      138.34   14.38    3.378  0.20( 0.04) 0.19      39.9       1.00
     1      137.62   14.50    3.362  0.20( 0.04) 0.19      39.9      11.00
     2        3.36    7.93    4.750  0.20( 0.02) 0.10       0.8      44.00
     3        3.41    6.87    5.159  0.20( 0.02) 0.10       0.7      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      129.19    6.47    5.340  0.20( 0.04) 0.20      21.8      34.00
     2      132.68    6.87    5.159  0.20( 0.04) 0.20      23.4      40.00
     3      135.21    7.17    5.031  0.20( 0.04) 0.20      24.5      42.00
     4      137.46    7.45    4.922  0.20( 0.04) 0.19      25.6      40.00
     5      141.02    7.93    4.750  0.20( 0.04) 0.19      27.3      44.00
     6      142.11    8.09    4.697  0.20( 0.04) 0.19      27.9      40.00
     7      144.44    8.43    4.588  0.20( 0.04) 0.19      29.1      22.00
     8      146.01    8.68    4.511  0.20( 0.04) 0.19      30.1      37.00
     9      151.11    9.64    4.249  0.20( 0.04) 0.19      33.4      29.00
    10      151.88    9.88    4.187  0.20( 0.04) 0.19      34.1      17.00
    11      152.25   10.00    4.159  0.20( 0.04) 0.19      34.5      14.00
    12      152.73   10.20    4.111  0.20( 0.04) 0.19      35.1      24.00
    13      151.92   10.94    3.950  0.20( 0.04) 0.19      36.6      19.00
    14      147.31   12.50    3.659  0.20( 0.04) 0.19      38.8       5.00
    15      144.14   13.92    3.442  0.20( 0.04) 0.19      40.8       8.00
    16      142.95   14.38    3.378  0.20( 0.04) 0.19      41.4       1.00
    17      142.22   14.50    3.362  0.20( 0.04) 0.19      41.4      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     152.73    Tc(MIN.) =    10.20
 EFFECTIVE AREA(ACRES) =      35.07   AREA-AVERAGED Fm(INCH/HR) =  0.04
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.90
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     152.73
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   11.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.72
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     152.73
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.99
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      6.99

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.99
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   37.46
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.90
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    9.64
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.64
  RAINFALL INTENSITY(INCH/HR) =   4.25
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.424
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.20      0.20     0.100    91    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.22      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.94
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.13
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.96
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.76

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.06
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.90    9.64    4.248  0.20( 0.04) 0.20      10.9      48.00
      2        3.76    8.06    4.708  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.46    8.06    4.708  0.20( 0.04) 0.19      10.0      51.00
      2       47.29    9.64    4.248  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.29    Tc(MIN.) =     9.64
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.29
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.99
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.79
  TOTAL STREAM AREA(ACRES) =      11.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.29

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.796
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    91    5.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.88

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.60
  RAINFALL INTENSITY(INCH/HR) =   5.80
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       44.46    8.41    4.595  0.20( 0.04) 0.19      10.0      51.00
      1       47.29    9.99    4.162  0.20( 0.04) 0.19      11.8      48.00
      2        0.88    5.60    5.796  0.20( 0.02) 0.10       0.2      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       38.34    5.60    5.796  0.20( 0.04) 0.19       6.8      53.00
      2       45.15    8.41    4.595  0.20( 0.04) 0.19      10.2      51.00
      3       47.92    9.99    4.162  0.20( 0.04) 0.19      12.0      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.92    Tc(MIN.) =     9.99
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
```

```
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.92
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.92

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20      0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.18
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   17.10
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.28
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =   14.35
 EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =      15.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  20.00
 FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.28
 RAINFALL INTENSITY(INCH/HR) =   4.63
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =       3.68
 TOTAL STREAM AREA(ACRES) =       3.68
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.22

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       38.34    6.05    5.545  0.20( 0.04) 0.19       6.8      53.00
     1       45.15    8.85    4.462  0.20( 0.04) 0.19      10.2      51.00
     1       47.92   10.41    4.064  0.20( 0.04) 0.19      12.0      48.00
     2       15.22    8.28    4.634  0.20( 0.04) 0.19       3.7      56.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       51.67    6.05    5.545  0.20( 0.04) 0.19       9.5      53.00
     2       59.00    8.28    4.634  0.20( 0.04) 0.19      13.2      56.00
     3       59.80    8.85    4.462  0.20( 0.04) 0.19      13.8      51.00
     4       61.25   10.41    4.064  0.20( 0.04) 0.19      15.6      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      61.25    Tc(MIN.) =    10.41
 EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       15.6
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.25
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.03
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.25

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.790
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               D        1.10      0.20     0.850    91   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      3.58
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.58

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.58
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   13.95
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   13.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.436
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        8.75      0.20     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =   25.72
  EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      28.96

********************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.95
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       9.85
  TOTAL STREAM AREA(ACRES) =       9.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.67    6.21    5.465  0.20( 0.04) 0.19       9.5      53.00
      1       59.00    8.43    4.585  0.20( 0.04) 0.19      13.2      56.00
      1       59.80    9.00    4.419  0.20( 0.04) 0.19      13.8      51.00
      1       61.25   10.56    4.031  0.20( 0.04) 0.19      15.6      48.00
      2       28.96   13.95    3.436  0.20( 0.17) 0.85       9.9      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.56    6.21    5.465  0.20( 0.08) 0.40      13.9      53.00
      2       82.65    8.43    4.585  0.20( 0.08) 0.40      19.1      56.00
      3       84.09    9.00    4.419  0.20( 0.08) 0.40      20.2      51.00
      4       87.16   10.56    4.031  0.20( 0.08) 0.40      23.1      48.00
      5       81.09   13.95    3.436  0.20( 0.09) 0.45      25.5      59.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.16    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      23.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      87.16
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.75
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       72.56    6.41    5.368  0.20( 0.08) 0.40      13.9      53.00
     2       82.65    8.63    4.526  0.20( 0.08) 0.40      19.1      56.00
     3       84.09    9.19    4.365  0.20( 0.08) 0.40      20.2      51.00
     4       87.16   10.75    3.990  0.20( 0.08) 0.40      23.1      48.00
     5       81.09   14.15    3.409  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      129.19    8.15    4.677  0.20( 0.04) 0.20      21.8      34.00
     2      132.68    8.52    4.560  0.20( 0.04) 0.20      23.4      40.00
     3      135.21    8.82    4.469  0.20( 0.04) 0.20      24.5      42.00
     4      137.46    9.10    4.391  0.20( 0.04) 0.19      25.6      40.00
     5      141.02    9.57    4.265  0.20( 0.04) 0.19      27.3      44.00
     6      142.11    9.73    4.226  0.20( 0.04) 0.19      27.9      40.00
     7      144.44   10.06    4.144  0.20( 0.04) 0.19      29.1      22.00
     8      146.01   10.32    4.086  0.20( 0.04) 0.19      30.1      37.00
     9      151.11   11.23    3.891  0.20( 0.04) 0.19      33.4      29.00
    10      151.88   11.48    3.843  0.20( 0.04) 0.19      34.1      17.00
    11      152.25   11.60    3.821  0.20( 0.04) 0.19      34.5      14.00
    12      152.73   11.80    3.783  0.20( 0.04) 0.19      35.1      24.00
    13      151.92   12.54    3.654  0.20( 0.04) 0.19      36.6      19.00
    14      147.31   14.13    3.411  0.20( 0.04) 0.19      38.8       5.00
    15      144.14   15.55    3.229  0.20( 0.04) 0.19      40.8       8.00
    16      142.95   16.02    3.175  0.20( 0.04) 0.19      41.4       1.00
    17      142.22   16.13    3.162  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      189.26    6.41    5.368  0.20( 0.06) 0.29      31.1      53.00
     2      209.67    8.15    4.677  0.20( 0.06) 0.29      39.8      34.00
     3      214.83    8.52    4.560  0.20( 0.06) 0.29      42.3      40.00
     4      216.26    8.63    4.526  0.20( 0.06) 0.29      42.9      56.00
     5      218.35    8.82    4.469  0.20( 0.06) 0.28      44.0      42.00
     6      221.30    9.10    4.391  0.20( 0.06) 0.28      45.6      40.00
     7      222.27    9.19    4.365  0.20( 0.06) 0.28      46.2      51.00
     8      225.86    9.57    4.265  0.20( 0.06) 0.28      48.2      44.00
     9      227.25    9.73    4.226  0.20( 0.06) 0.28      49.1      40.00
    10      230.24   10.06    4.144  0.20( 0.06) 0.28      51.0      22.00
    11      232.32   10.32    4.086  0.20( 0.06) 0.28      52.3      37.00
    12      235.60   10.75    3.990  0.20( 0.06) 0.28      54.7      48.00
    13      237.41   11.23    3.891  0.20( 0.06) 0.28      56.8      29.00
    14      237.74   11.48    3.843  0.20( 0.06) 0.28      57.7      17.00
    15      237.89   11.60    3.821  0.20( 0.06) 0.28      58.2      14.00
    16      238.01   11.80    3.783  0.20( 0.06) 0.28      58.9      24.00
    17      235.88   12.54    3.654  0.20( 0.06) 0.28      61.0      19.00
    18      228.43   14.13    3.411  0.20( 0.06) 0.29      64.3       5.00
    19      228.36   14.15    3.409  0.20( 0.06) 0.29      64.3      59.00
    20      220.83   15.55    3.229  0.20( 0.06) 0.29      66.3       8.00
    21      218.33   16.02    3.175  0.20( 0.06) 0.29      66.9       1.00
    22      217.27   16.13    3.162  0.20( 0.06) 0.29      66.9      11.00
   TOTAL AREA(ACRES) =        66.9

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      238.01  Tc(MIN.) =   11.800
```

```
  EFFECTIVE AREA(ACRES) =     58.91  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     11.80
  EFFECTIVE AREA(ACRES) =     58.91  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.282
  PEAK FLOW RATE(CFS)   =     238.01

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      189.26    6.41    5.368  0.20( 0.06) 0.29      31.1      53.00
      2      209.67    8.15    4.677  0.20( 0.06) 0.29      39.8      34.00
      3      214.83    8.52    4.560  0.20( 0.06) 0.29      42.3      40.00
      4      216.26    8.63    4.526  0.20( 0.06) 0.29      42.9      56.00
      5      218.35    8.82    4.469  0.20( 0.06) 0.28      44.0      42.00
      6      221.30    9.10    4.391  0.20( 0.06) 0.28      45.6      40.00
      7      222.27    9.19    4.365  0.20( 0.06) 0.28      46.2      51.00
      8      225.86    9.57    4.265  0.20( 0.06) 0.28      48.2      44.00
      9      227.25    9.73    4.226  0.20( 0.06) 0.28      49.1      40.00
     10      230.24   10.06    4.144  0.20( 0.06) 0.28      51.0      22.00
     11      232.32   10.32    4.086  0.20( 0.06) 0.28      52.3      37.00
     12      235.60   10.75    3.990  0.20( 0.06) 0.28      54.7      48.00
     13      237.41   11.23    3.891  0.20( 0.06) 0.28      56.8      29.00
     14      237.74   11.48    3.843  0.20( 0.06) 0.28      57.7      17.00
     15      237.89   11.60    3.821  0.20( 0.06) 0.28      58.2      14.00
     16      238.01   11.80    3.783  0.20( 0.06) 0.28      58.9      24.00
     17      235.88   12.54    3.654  0.20( 0.06) 0.28      61.0      19.00
     18      228.43   14.13    3.411  0.20( 0.06) 0.29      64.3       5.00
     19      228.36   14.15    3.409  0.20( 0.06) 0.29      64.3      59.00
     20      220.83   15.55    3.229  0.20( 0.06) 0.29      66.3       8.00
     21      218.33   16.02    3.175  0.20( 0.06) 0.29      66.9       1.00
     22      217.27   16.13    3.162  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 100-YR STUDY WITH A FLOW-BY DETENTION BASIN                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: WEST-AB.DAT
  TIME/DATE OF STUDY: 18:25 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.851
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    91    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.06
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      6.06

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.06
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    8.81
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.81
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.472
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   17.35
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      22.93

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.93
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    9.48
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.48
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.289
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   17.44
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      39.42

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.42
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.069
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.18
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.37
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.75
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.01
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.48

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.32
  RAINFALL INTENSITY(INCH/HR) =   4.62
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.42   10.19    4.114  0.20( 0.04) 0.20      10.3       1.00
      2        3.48    8.32    4.621  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.67    8.32    4.621  0.20( 0.04) 0.19       9.3       5.00
      2       42.52   10.19    4.114  0.20( 0.04) 0.19      11.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      42.52    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.52
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.29
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      42.52

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.45
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      3.45

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =    9.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.197
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.64      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    6.17
  EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.68
  FLOW VELOCITY(FEET/SEC.) =  3.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.84
  RAINFALL INTENSITY(INCH/HR) =   4.20
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.35
  TOTAL STREAM AREA(ACRES) =       2.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.67    8.42    4.589  0.20( 0.04) 0.19       9.3       5.00
      1       42.52   10.29    4.091  0.20( 0.04) 0.19      11.1       1.00
      2        8.83    9.84    4.197  0.20( 0.02) 0.10       2.3       8.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       47.94    8.42    4.589  0.20( 0.03) 0.17      11.3       5.00
      2       50.67    9.84    4.197  0.20( 0.04) 0.18      13.0       8.00
      3       51.13   10.29    4.091  0.20( 0.04) 0.18      13.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.13    Tc(MIN.) =    10.29
  EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.13
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.96
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      2.96

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =   10.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.032
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.62
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.03
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       47.94    8.57    4.542  0.20( 0.03) 0.17      11.3       5.00
      1       50.67    9.99    4.161  0.20( 0.04) 0.18      13.0       8.00
      1       51.13   10.44    4.057  0.20( 0.04) 0.18      13.5       1.00
      2        7.62   10.56    4.032  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    8.57    4.542  0.20( 0.03) 0.16      13.0       5.00
      2       58.11    9.99    4.161  0.20( 0.03) 0.17      15.0       8.00
      3       58.71   10.44    4.057  0.20( 0.03) 0.17      15.6       1.00
      4       58.42   10.56    4.032  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.71    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      15.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.62
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.71
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.59
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.71

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.908
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.64
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.64

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.31
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       5.25

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   5.18
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    9.33    4.328  0.20( 0.03) 0.16      13.0       5.00
      1       58.11   10.74    3.992  0.20( 0.03) 0.17      15.0       8.00
      1       58.71   11.19    3.900  0.20( 0.03) 0.17      15.6       1.00
      1       58.42   11.31    3.877  0.20( 0.03) 0.17      15.6      11.00
      2        5.25    6.82    5.181  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    6.82    5.181  0.20( 0.03) 0.16      10.6      14.00
```

```
      2       59.30    9.33    4.328  0.20( 0.03) 0.16      14.1        5.00
      3       62.15   10.74    3.992  0.20( 0.03) 0.16      16.2        8.00
      4       62.66   11.19    3.900  0.20( 0.03) 0.16      16.7        1.00
      5       62.34   11.31    3.877  0.20( 0.03) 0.16      16.7       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.72   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.66
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.72
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      62.66

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.33
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   5.12
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    7.08    5.071  0.20( 0.03) 0.16      10.6      14.00
      1       59.30    9.59    4.261  0.20( 0.03) 0.16      14.1       5.00
      1       62.15   11.00    3.939  0.20( 0.03) 0.16      16.2       8.00
      1       62.66   11.45    3.849  0.20( 0.03) 0.16      16.7       1.00
      1       62.34   11.56    3.827  0.20( 0.03) 0.16      16.7      11.00
      2        2.85    6.96    5.120  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    6.96    5.120  0.20( 0.03) 0.15      11.1      17.00
      2       56.15    7.08    5.071  0.20( 0.03) 0.15      11.2      14.00
      3       61.66    9.59    4.261  0.20( 0.03) 0.16      14.7       5.00
      4       64.34   11.00    3.939  0.20( 0.03) 0.16      16.8       8.00
      5       64.79   11.45    3.849  0.20( 0.03) 0.16      17.3       1.00
      6       64.47   11.56    3.827  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.79    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =      17.34   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.79
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.52
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.52
 RAINFALL INTENSITY(INCH/HR) =   3.84
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.16
 EFFECTIVE STREAM AREA(ACRES) =      17.34
 TOTAL STREAM AREA(ACRES) =      17.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.79

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    91    7.35
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      6.96
 TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      6.96

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
 FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.96
 PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    8.10
 LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.692
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   15.66
```

```
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      22.23

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   4.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    7.03    5.089  0.20( 0.03) 0.15      11.1      17.00
      1       56.15    7.15    5.041  0.20( 0.03) 0.15      11.2      14.00
      1       61.66    9.66    4.242  0.20( 0.03) 0.16      14.7       5.00
      1       64.34   11.07    3.924  0.20( 0.03) 0.16      16.8       8.00
      1       64.79   11.52    3.835  0.20( 0.03) 0.16      17.3       1.00
      1       64.47   11.64    3.813  0.20( 0.03) 0.16      17.4      11.00
      2       22.23    8.10    4.692  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       76.74    7.03    5.089  0.20( 0.03) 0.17      15.7      17.00
      2       77.24    7.15    5.041  0.20( 0.03) 0.17      15.9      14.00
      3       80.47    8.10    4.692  0.20( 0.03) 0.17      17.9      19.00
      4       81.75    9.66    4.242  0.20( 0.03) 0.17      20.0       5.00
      5       82.90   11.07    3.924  0.20( 0.03) 0.17      22.1       8.00
      6       82.93   11.52    3.835  0.20( 0.03) 0.17      22.6       1.00
      7       82.50   11.64    3.813  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      82.93    Tc(MIN.) =    11.52
  EFFECTIVE AREA(ACRES) =      22.65   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      82.93
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.67
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.65
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.93

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.232
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20     0.100    91    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   5.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.392
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.26
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.26
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.36
 RAINFALL INTENSITY(INCH/HR) =   5.39
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.26
 TOTAL STREAM AREA(ACRES) =       0.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.74    8.19    4.663  0.20( 0.03) 0.17      15.7      17.00
     1       77.24    8.31    4.625  0.20( 0.03) 0.17      15.9      14.00
     1       80.47    9.26    4.348  0.20( 0.03) 0.17      17.9      19.00
     1       81.75   10.81    3.977  0.20( 0.03) 0.17      20.0       5.00
     1       82.90   12.22    3.707  0.20( 0.03) 0.17      22.1       8.00
     1       82.93   12.67    3.631  0.20( 0.03) 0.17      22.6       1.00
     1       82.50   12.79    3.613  0.20( 0.03) 0.17      22.7      11.00
     2        1.31    6.70    5.232  0.20( 0.02) 0.10       0.3      22.00
     3        1.26    6.36    5.392  0.20( 0.02) 0.10       0.3      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       71.48    6.36    5.392  0.20( 0.03) 0.17      12.7      40.00
     2       73.02    6.70    5.232  0.20( 0.03) 0.17      13.4      22.00
     3       79.00    8.19    4.663  0.20( 0.03) 0.17      16.2      17.00
     4       79.48    8.31    4.625  0.20( 0.03) 0.17      16.5      14.00
     5       82.58    9.26    4.348  0.20( 0.03) 0.17      18.4      19.00
     6       83.67   10.81    3.977  0.20( 0.03) 0.17      20.6       5.00
     7       84.69   12.22    3.707  0.20( 0.03) 0.17      22.6       8.00
     8       84.69   12.67    3.631  0.20( 0.03) 0.17      23.2       1.00
     9       84.25   12.79    3.613  0.20( 0.03) 0.17      23.2      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      84.69    Tc(MIN.) =    12.22
 EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
 TOTAL AREA(ACRES) =       23.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      84.69
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   12.34
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.34
  RAINFALL INTENSITY(INCH/HR) =   3.69
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.69

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.78
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.805
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       3.07

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.07
  PIPE TRAVEL TIME(MIN.) =   3.04    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.527
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   30.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      32.40

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.64
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.64
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       71.48    6.48    5.332  0.20( 0.03) 0.17      12.7      40.00
      1       73.02    6.82    5.177  0.20( 0.03) 0.17      13.4      22.00
      1       79.00    8.32    4.623  0.20( 0.03) 0.17      16.2      17.00
      1       79.48    8.43    4.586  0.20( 0.03) 0.17      16.5      14.00
```

```
     1       82.58    9.38    4.316  0.20( 0.03) 0.17      18.4       19.00
     1       83.67   10.93    3.952  0.20( 0.03) 0.17      20.6        5.00
     1       84.69   12.34    3.687  0.20( 0.03) 0.17      22.6        8.00
     1       84.69   12.79    3.612  0.20( 0.03) 0.17      23.2        1.00
     1       84.25   12.91    3.593  0.20( 0.03) 0.17      23.2       11.00
     2       32.40    8.64    4.523  0.20( 0.04) 0.19       8.0       24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.48    5.332  0.20( 0.03) 0.17      18.7       40.00
      2      102.35    6.82    5.177  0.20( 0.03) 0.17      19.7       22.00
      3      110.88    8.32    4.623  0.20( 0.03) 0.17      23.9       17.00
      4      111.56    8.43    4.586  0.20( 0.03) 0.17      24.3       14.00
      5      112.56    8.64    4.523  0.20( 0.03) 0.17      24.9       24.00
      6      113.48    9.38    4.316  0.20( 0.03) 0.17      26.4       19.00
      7      111.94   10.93    3.952  0.20( 0.03) 0.17      28.6        5.00
      8      111.05   12.34    3.687  0.20( 0.03) 0.17      30.7        8.00
      9      110.50   12.79    3.612  0.20( 0.03) 0.17      31.2        1.00
     10      109.93   12.91    3.593  0.20( 0.03) 0.17      31.2       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     113.48    Tc(MIN.) =     9.38
  EFFECTIVE AREA(ACRES) =      26.43   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.48
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.80
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.43
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     113.48

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20      0.200    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.67
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      6.67

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    7.89
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.765
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20      0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =   13.05
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      19.31

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.31
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    8.49
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.92    5.135  0.20( 0.03) 0.17      18.7      40.00
      1      102.35    7.26    4.995  0.20( 0.03) 0.17      19.7      22.00
      1      110.88    8.74    4.492  0.20( 0.03) 0.17      23.9      17.00
      1      111.56    8.86    4.458  0.20( 0.03) 0.17      24.3      14.00
      1      112.56    9.06    4.400  0.20( 0.03) 0.17      24.9      24.00
      1      113.48    9.80    4.207  0.20( 0.03) 0.17      26.4      19.00
      1      111.94   11.36    3.866  0.20( 0.03) 0.17      28.6       5.00
      1      111.05   12.77    3.616  0.20( 0.03) 0.17      30.7       8.00
      1      110.50   13.22    3.545  0.20( 0.03) 0.17      31.2       1.00
      1      109.93   13.33    3.527  0.20( 0.03) 0.17      31.2      11.00
      2       19.31    8.49    4.567  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      117.88    6.92    5.135  0.20( 0.04) 0.18      22.4      40.00
      2      120.42    7.26    4.995  0.20( 0.04) 0.18      23.6      22.00
      3      128.75    8.49    4.567  0.20( 0.04) 0.18      27.8      29.00
      4      129.87    8.74    4.492  0.20( 0.04) 0.18      28.5      17.00
      5      130.40    8.86    4.458  0.20( 0.04) 0.18      28.8      14.00
      6      131.15    9.06    4.400  0.20( 0.04) 0.18      29.4      24.00
      7      131.25    9.80    4.207  0.20( 0.04) 0.18      31.0      19.00
      8      128.26   11.36    3.866  0.20( 0.04) 0.18      33.1       5.00
      9      126.29   12.77    3.616  0.20( 0.04) 0.18      35.2       8.00
     10      125.45   13.22    3.545  0.20( 0.04) 0.18      35.7       1.00
     11      124.80   13.33    3.527  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.25    Tc(MIN.) =     9.80
  EFFECTIVE AREA(ACRES) =      30.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.39
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.25
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =    9.90   RAINFALL INTENSITY(INCH/HR) =  4.18
```

```
  EFFECTIVE AREA(ACRES) =    14.16
  TOTAL AREA(ACRES) =    16.37        PEAK FLOW RATE(CFS) =     60.00
  AREA-AVERAGED Fm(INCH/HR) =   0.04  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.18
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.00
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   4.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      14.16
  TOTAL STREAM AREA(ACRES) =      16.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      60.00

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.40
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.40
  RAINFALL INTENSITY(INCH/HR) =   5.92
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       60.00    9.94    4.173  0.20( 0.04) 0.18      14.2       1.00
      2        4.38    5.40    5.922  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       50.72    5.40    5.922  0.20( 0.05) 0.25       8.5      34.00
      2       63.05    9.94    4.173  0.20( 0.04) 0.22      15.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.05    Tc(MIN.) =     9.94
  EFFECTIVE AREA(ACRES) =      14.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =       17.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.05
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.98
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =      14.97
  TOTAL STREAM AREA(ACRES) =      17.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      63.05
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    91    7.52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      9.00
 TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      9.00

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.00
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.68
 RAINFALL INTENSITY(INCH/HR) =   4.84
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       2.06
 TOTAL STREAM AREA(ACRES) =       2.06
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.00

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       50.72    5.44    5.895  0.20( 0.05) 0.25       8.5      34.00
     1       63.05    9.98    4.163  0.20( 0.04) 0.22      15.0       1.00
     2        9.00    7.68    4.838  0.20( 0.04) 0.20       2.1      37.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       58.50    5.44    5.895  0.20( 0.05) 0.24      10.0      34.00
     2       65.80    7.68    4.838  0.20( 0.05) 0.23      13.7      37.00
     3       70.78    9.98    4.163  0.20( 0.04) 0.22      17.0       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      70.78    Tc(MIN.) =     9.98
  EFFECTIVE AREA(ACRES) =      17.03   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =       19.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.78
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   4.00
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =      17.03
  TOTAL STREAM AREA(ACRES) =      19.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      70.78

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.18
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.55      0.20     0.100    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.69

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.08
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       58.50    6.18    5.482  0.20( 0.05) 0.24      10.0      34.00
      1       65.80    8.39    4.599  0.20( 0.05) 0.23      13.7      37.00
      1       70.78   10.69    4.004  0.20( 0.04) 0.22      17.0       1.00
      2        3.69    7.06    5.078  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.99    6.18    5.482  0.20( 0.05) 0.23      10.7      34.00
      2       65.10    7.06    5.078  0.20( 0.05) 0.23      12.3      40.00
      3       69.14    8.39    4.599  0.20( 0.04) 0.22      14.6      37.00
      4       73.69   10.69    4.004  0.20( 0.04) 0.21      17.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      73.69    Tc(MIN.) =    10.69
  EFFECTIVE AREA(ACRES) =      17.84   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       20.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.12
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.69
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =      17.84
  TOTAL STREAM AREA(ACRES) =      20.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      73.69

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.173
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20     0.100    91    6.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.99
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.99    6.25    5.445  0.20( 0.05) 0.23      10.7      34.00
      1       65.10    7.13    5.048  0.20( 0.05) 0.23      12.3      40.00
      1       69.14    8.46    4.577  0.20( 0.04) 0.22      14.6      37.00
      1       73.69   10.76    3.989  0.20( 0.04) 0.21      17.8       1.00
      2        1.99    6.83    5.173  0.20( 0.02) 0.10       0.4      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.91    6.25    5.445  0.20( 0.05) 0.23      11.1      34.00
      2       66.04    6.83    5.173  0.20( 0.04) 0.22      12.2      42.00
      3       67.04    7.13    5.048  0.20( 0.04) 0.22      12.7      40.00
      4       70.90    8.46    4.577  0.20( 0.04) 0.22      15.0      37.00
      5       75.22   10.76    3.989  0.20( 0.04) 0.21      18.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      75.22    Tc(MIN.) =    10.76
```

```
  EFFECTIVE AREA(ACRES) =      18.27   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       20.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.22
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =      18.27
  TOTAL STREAM AREA(ACRES) =      20.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      75.22

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.218
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20      0.100    91    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.73
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.750
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20      0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.54
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.36

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20      0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.41
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.87
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.87
  RAINFALL INTENSITY(INCH/HR) =   5.16
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       63.91    6.65    5.256  0.20( 0.05) 0.23      11.1      34.00
      1       66.04    7.23    5.009  0.20( 0.04) 0.22      12.2      42.00
      1       67.04    7.53    4.895  0.20( 0.04) 0.22      12.7      40.00
      1       70.90    8.85    4.460  0.20( 0.04) 0.22      15.0      37.00
      1       75.22   11.14    3.910  0.20( 0.04) 0.21      18.3       1.00
      2        3.36    7.93    4.750  0.20( 0.02) 0.10       0.8      44.00
      3        3.41    6.87    5.159  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       70.39    6.65    5.256  0.20( 0.04) 0.21      12.4      34.00
      2       71.29    6.87    5.159  0.20( 0.04) 0.21      12.9      40.00
      3       72.59    7.23    5.009  0.20( 0.04) 0.21      13.6      42.00
      4       73.57    7.53    4.895  0.20( 0.04) 0.21      14.2      40.00
      5       74.72    7.93    4.750  0.20( 0.04) 0.21      14.9      44.00
      6       77.00    8.85    4.460  0.20( 0.04) 0.21      16.5      37.00
      7       80.57   11.14    3.910  0.20( 0.04) 0.20      19.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      80.57    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =      19.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       22.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      80.57
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.57
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.03
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.99
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      6.99

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.99
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        9.31      0.20      0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     9.31      SUBAREA RUNOFF(CFS) =   37.46
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.90
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    9.64
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.64
  RAINFALL INTENSITY(INCH/HR) =   4.25
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.424
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.20      0.20      0.100    91    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.94
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.13
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.96
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.76

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.06
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.90    9.64    4.248  0.20( 0.04) 0.20      10.9      48.00
      2        3.76    8.06    4.708  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.46    8.06    4.708  0.20( 0.04) 0.19      10.0      51.00
      2       47.29    9.64    4.248  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.29    Tc(MIN.) =     9.64
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.29
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.99
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.79
  TOTAL STREAM AREA(ACRES) =      11.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.29

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.796
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20      0.100    91    5.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.88

********************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.60
  RAINFALL INTENSITY(INCH/HR) =   5.80
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.46    8.41    4.595  0.20( 0.04) 0.19      10.0      51.00
      1       47.29    9.99    4.162  0.20( 0.04) 0.19      11.8      48.00
      2        0.88    5.60    5.796  0.20( 0.02) 0.10       0.2      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.34    5.60    5.796  0.20( 0.04) 0.19       6.8      53.00
      2       45.15    8.41    4.595  0.20( 0.04) 0.19      10.2      51.00
      3       47.92    9.99    4.162  0.20( 0.04) 0.19      12.0      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.92    Tc(MIN.) =     9.99
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.92
```

```
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.92

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   17.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =   14.35
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =      15.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  20.00
  FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.28
  RAINFALL INTENSITY(INCH/HR) =   4.63
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.34    6.05    5.545  0.20( 0.04) 0.19       6.8      53.00
      1       45.15    8.85    4.462  0.20( 0.04) 0.19      10.2      51.00
      1       47.92   10.41    4.064  0.20( 0.04) 0.19      12.0      48.00
      2       15.22    8.28    4.634  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.67    6.05    5.545  0.20( 0.04) 0.19       9.5      53.00
      2       59.00    8.28    4.634  0.20( 0.04) 0.19      13.2      56.00
      3       59.80    8.85    4.462  0.20( 0.04) 0.19      13.8      51.00
      4       61.25   10.41    4.064  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.25    Tc(MIN.) =    10.41
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.25
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.56
 RAINFALL INTENSITY(INCH/HR) =   4.03
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      15.64
 TOTAL STREAM AREA(ACRES) =      15.64
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.25

****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
 ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.790
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 PUBLIC PARK               D        1.10      0.20     0.850    91   11.76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA RUNOFF(CFS) =      3.58
 TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.58

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
 FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.58
 PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   13.95
 LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.95
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.436
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               D        8.75      0.20     0.850    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =     8.75      SUBAREA RUNOFF(CFS) =   25.72
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      28.96
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   13.95
 RAINFALL INTENSITY(INCH/HR) =   3.44
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       51.67    6.21    5.465  0.20( 0.04) 0.19       9.5      53.00
     1       59.00    8.43    4.585  0.20( 0.04) 0.19      13.2      56.00
     1       59.80    9.00    4.419  0.20( 0.04) 0.19      13.8      51.00
     1       61.25   10.56    4.031  0.20( 0.04) 0.19      15.6      48.00
     2       28.96   13.95    3.436  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       72.56    6.21    5.465  0.20( 0.08) 0.40      13.9      53.00
     2       82.65    8.43    4.585  0.20( 0.08) 0.40      19.1      56.00
     3       84.09    9.00    4.419  0.20( 0.08) 0.40      20.2      51.00
     4       87.16   10.56    4.031  0.20( 0.08) 0.40      23.1      48.00
     5       81.09   13.95    3.436  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      87.16    Tc(MIN.) =    10.56
 EFFECTIVE AREA(ACRES) =      23.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      87.16
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.75
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       72.56    6.41    5.368  0.20( 0.08) 0.40      13.9      53.00
     2       82.65    8.63    4.526  0.20( 0.08) 0.40      19.1      56.00
```

```
     3       84.09    9.19    4.365  0.20( 0.08) 0.40      20.2       51.00
     4       87.16   10.75    3.990  0.20( 0.08) 0.40      23.1       48.00
     5       81.09   14.15    3.409  0.20( 0.09) 0.45      25.5       59.00
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       70.39    8.57    4.542  0.20( 0.04) 0.21      12.4       34.00
     2       71.29    8.79    4.478  0.20( 0.04) 0.21      12.9       40.00
     3       72.59    9.15    4.377  0.20( 0.04) 0.21      13.6       42.00
     4       73.57    9.44    4.298  0.20( 0.04) 0.21      14.2       40.00
     5       74.72    9.84    4.197  0.20( 0.04) 0.21      14.9       44.00
     6       77.00   10.76    3.988  0.20( 0.04) 0.21      16.5       37.00
     7       80.57   13.03    3.574  0.20( 0.04) 0.20      19.8        1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      134.80    6.41    5.368  0.20( 0.06) 0.32      23.2       53.00
     2      152.80    8.57    4.542  0.20( 0.06) 0.32      31.4       34.00
     3      153.27    8.63    4.526  0.20( 0.06) 0.32      31.7       56.00
     4      154.35    8.79    4.478  0.20( 0.06) 0.32      32.3       40.00
     5      156.57    9.15    4.377  0.20( 0.06) 0.32      33.7       42.00
     6      156.82    9.19    4.365  0.20( 0.06) 0.32      33.9       51.00
     7      158.15    9.44    4.298  0.20( 0.06) 0.32      34.9       40.00
     8      160.10    9.84    4.197  0.20( 0.06) 0.32      36.3       44.00
     9      164.14   10.75    3.990  0.20( 0.06) 0.32      39.6       48.00
    10      164.14   10.76    3.988  0.20( 0.06) 0.32      39.6       37.00
    11      163.66   13.03    3.574  0.20( 0.07) 0.33      44.5        1.00
    12      157.89   14.15    3.409  0.20( 0.07) 0.34      45.3       59.00
    TOTAL AREA(ACRES) =        47.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      164.14  Tc(MIN.) =   10.761
  EFFECTIVE AREA(ACRES) =     39.61  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       47.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       47.5  TC(MIN.) =     10.76
  EFFECTIVE AREA(ACRES) =     39.61  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.322
  PEAK FLOW RATE(CFS)   =     164.14

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      134.80    6.41    5.368  0.20( 0.06) 0.32      23.2       53.00
     2      152.80    8.57    4.542  0.20( 0.06) 0.32      31.4       34.00
     3      153.27    8.63    4.526  0.20( 0.06) 0.32      31.7       56.00
     4      154.35    8.79    4.478  0.20( 0.06) 0.32      32.3       40.00
     5      156.57    9.15    4.377  0.20( 0.06) 0.32      33.7       42.00
     6      156.82    9.19    4.365  0.20( 0.06) 0.32      33.9       51.00
     7      158.15    9.44    4.298  0.20( 0.06) 0.32      34.9       40.00
     8      160.10    9.84    4.197  0.20( 0.06) 0.32      36.3       44.00
     9      164.14   10.75    3.990  0.20( 0.06) 0.32      39.6       48.00
    10      164.14   10.76    3.988  0.20( 0.06) 0.32      39.6       37.00
    11      163.66   13.03    3.574  0.20( 0.07) 0.33      44.5        1.00
    12      157.89   14.15    3.409  0.20( 0.07) 0.34      45.3       59.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                              *
 ***********************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 12:50 11/07/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.266
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    91    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.75
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.75

******************************************************************************
```

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.75
  PIPE TRAVEL TIME(MIN.) =   2.12    Tc(MIN.) =   11.69
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.804
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   33.40
  EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      36.74

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.76
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.74
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.60      0.20     0.100    91    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.80
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.80

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   13.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   3.58   Tc(MIN.) =   10.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.081
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    5.74
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       7.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  15.33
  FLOW VELOCITY(FEET/SEC.) =  3.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.93

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.03      0.20      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.57
  TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      5.57

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.57
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.21
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.21
  RAINFALL INTENSITY(INCH/HR) =   6.04
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.03
  TOTAL STREAM AREA(ACRES) =       1.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.57

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.93   10.34    4.081  0.20( 0.02) 0.10       2.2       4.00
      2        5.57    5.21    6.042  0.20( 0.18) 0.90       1.0       6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.50    5.21    6.042  0.20( 0.10) 0.49       2.1       6.00
      2       11.64   10.34    4.081  0.20( 0.07) 0.36       3.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.64    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.64
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.50    5.39    5.929  0.20( 0.10) 0.49       2.1       6.00
      2       11.64   10.51    4.042  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.74   12.27    3.700  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       37.62    5.39    5.929  0.20( 0.10) 0.50       7.0       6.00
      2       46.11   10.51    4.042  0.20( 0.09) 0.46      12.6       4.00
      3       47.37   12.27    3.700  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       47.37  Tc(MIN.) =   12.268
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.27
  RAINFALL INTENSITY(INCH/HR) =   3.70
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.37

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.457
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    91    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.28
  STREET FLOW TRAVEL TIME(MIN.) =   3.96   Tc(MIN.) =   10.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.117
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.62
  FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.49
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.02
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.97
 TOTAL STREAM AREA(ACRES) =       1.97
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       37.62    5.39    5.929  0.20( 0.10) 0.50       7.0       6.00
     1       46.11   10.51    4.042  0.20( 0.09) 0.46      12.6       4.00
     1       47.37   12.27    3.700  0.20( 0.09) 0.47      14.2       1.00
     2        7.26   10.18    4.117  0.20( 0.02) 0.10       2.0       9.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.16    5.39    5.929  0.20( 0.09) 0.44       8.0       6.00
     2       52.83   10.18    4.117  0.20( 0.08) 0.42      14.2       9.00
     3       53.24   10.51    4.042  0.20( 0.08) 0.41      14.6       4.00
     4       53.89   12.27    3.700  0.20( 0.08) 0.42      16.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      53.89    Tc(MIN.) =    12.27
 EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =       16.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     12.27
 EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
 PEAK FLOW RATE(CFS)   =      53.89

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.16    5.39    5.929  0.20( 0.09) 0.44       8.0       6.00
     2       52.83   10.18    4.117  0.20( 0.08) 0.42      14.2       9.00
     3       53.24   10.51    4.042  0.20( 0.08) 0.41      14.6       4.00
     4       53.89   12.27    3.700  0.20( 0.08) 0.42      16.2       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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******************************************************************************
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                              *
 ***********************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 18:14 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.270
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20     0.200    91    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.84
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      5.84

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.84
 PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =    8.23
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.652
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        5.21      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =   21.63
 EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      26.77

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.652
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        4.09      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =   16.98
 EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      43.75
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.23
 EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =      43.75
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

EAST – AREA ‘A’

100-YR STUDY

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A'                                            *
 ************************************************************************

  FILE NAME: EAST.DAT
  TIME/DATE OF STUDY: 10:57 10/31/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.940
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.77      0.20      0.600    91   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.65
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   12.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.633
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  15.84
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.16
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.97
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.95
  TOTAL STREAM AREA(ACRES) =       1.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.16

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    91    9.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.81
  TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      3.81

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.14
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =   11.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.857
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       6.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.66
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   3.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.16   12.97    3.583  0.20( 0.12) 0.60       1.9       1.00
      2        6.96   11.41    3.857  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.41    3.857  0.20( 0.12) 0.60       3.8       4.00
      2       12.62   12.97    3.583  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.81    Tc(MIN.) =    11.41
  EFFECTIVE AREA(ACRES) =       3.79   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.81
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.79
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.81

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    91    8.94
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.77
 TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.77

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
 STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   10.46
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.053
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.48
 EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.43
 FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.45    3.848  0.20( 0.12) 0.60       3.8       4.00
      1       12.62   13.02    3.576  0.20( 0.12) 0.60       4.0       1.00
      2        7.01   10.46    4.053  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.36   10.46    4.053  0.20( 0.11) 0.56       5.4       7.00
      2       19.46   11.45    3.848  0.20( 0.11) 0.57       5.8       4.00
      3       18.78   13.02    3.576  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.46    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =       5.76   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.46
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   3.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.76
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.46

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.356
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20      0.500    91    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.64

**************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  3.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   4.10
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36   10.48    4.048  0.20( 0.11) 0.56       5.4       7.00
      1       19.46   11.47    3.844  0.20( 0.11) 0.57       5.8       4.00
      1       18.78   13.04    3.573  0.20( 0.11) 0.57       6.0       1.00
      2        5.17   10.27    4.096  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.36   10.27    4.096  0.20( 0.11) 0.56       6.8      10.00
      2       24.46   10.48    4.048  0.20( 0.11) 0.56       6.9       7.00
      3       24.30   11.47    3.844  0.20( 0.11) 0.56       7.2       4.00
      4       23.27   13.04    3.573  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.46    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.46
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.46

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20     0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.94
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.20      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.11
 EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.05

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.37
 TOTAL STREAM AREA(ACRES) =       0.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.36   10.53    4.039  0.20( 0.11) 0.56       6.8       10.00
     1       24.46   10.74    3.993  0.20( 0.11) 0.56       6.9        7.00
     1       24.30   11.73    3.796  0.20( 0.11) 0.56       7.2        4.00
     1       23.27   13.29    3.533  0.20( 0.11) 0.56       7.4        1.00
     2        2.05    5.00    6.187  0.20( 0.02) 0.10       0.4        6.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.96    5.00    6.187  0.20( 0.10) 0.51       3.6        6.00
     2       25.70   10.53    4.039  0.20( 0.11) 0.54       7.1       10.00
     3       25.78   10.74    3.993  0.20( 0.11) 0.54       7.2        7.00
     4       25.55   11.73    3.796  0.20( 0.11) 0.54       7.6        4.00
     5       24.44   13.29    3.533  0.20( 0.11) 0.54       7.8        1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.78    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.89
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.78
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.107
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20      0.100    91    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.96    5.03    6.166  0.20( 0.10) 0.51       3.6       6.00
      1       25.70   10.55    4.033  0.20( 0.11) 0.54       7.1      10.00
      1       25.78   10.77    3.987  0.20( 0.11) 0.54       7.2       7.00
      1       25.55   11.76    3.791  0.20( 0.11) 0.54       7.6       4.00
      1       24.44   13.32    3.529  0.20( 0.11) 0.54       7.8       1.00
      2        1.79    6.99    5.107  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.03    6.166  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    6.99    5.107  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.55    4.033  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.77    3.987  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.76    3.791  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.32    3.529  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.17    Tc(MIN.) =    10.77
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.17
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.409
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.324
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    91    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.52
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.52

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.71    9.03    4.409  0.20( 0.10) 0.50       0.7      16.00
      2        3.52    9.34    4.324  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1         6.18    9.03    4.409  0.20( 0.11) 0.56       1.6      16.00
      2         6.18    9.34    4.324  0.20( 0.11) 0.56       1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.18    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.18
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.31
  RAINFALL INTENSITY(INCH/HR) =   4.33
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.18

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.861
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.22      0.20     0.100    91    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
```

```
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    8.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.612
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.17
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.35
  RAINFALL INTENSITY(INCH/HR) =   4.61
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.18    9.31    4.332  0.20( 0.11) 0.56       1.6      16.00
      1        6.18    9.62    4.251  0.20( 0.11) 0.56       1.6      17.00
      2        1.49    8.35    4.612  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.35    4.612  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.31    4.332  0.20( 0.09) 0.47       2.0      16.00
      3        7.55    9.62    4.251  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       7.58    Tc(MIN.) =     9.31
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.58
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.77    4.483  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.74    4.224  0.20( 0.09) 0.47       2.0      16.00
      3        7.55   10.05    4.148  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.07    6.139  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    7.03    5.091  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.59    4.025  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.80    3.979  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.79    3.784  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.36    3.523  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.40    5.07    6.139  0.20( 0.10) 0.48       4.9       6.00
      2       30.52    7.03    5.091  0.20( 0.10) 0.48       6.7      14.00
      3       32.81    8.77    4.483  0.20( 0.10) 0.49       8.1      19.00
      4       33.89    9.74    4.224  0.20( 0.10) 0.50       8.9      16.00
      5       34.15   10.05    4.148  0.20( 0.10) 0.50       9.2      17.00
      6       34.43   10.59    4.025  0.20( 0.10) 0.51       9.5      10.00
      7       34.41   10.80    3.979  0.20( 0.10) 0.51       9.6       7.00
      8       33.75   11.79    3.784  0.20( 0.10) 0.51       9.9       4.00
      9       32.06   13.36    3.523  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.43  Tc(MIN.) =   10.589
  EFFECTIVE AREA(ACRES) =      9.51  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.88
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.43
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.51
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.43

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.727
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    91    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =   10.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.22
 EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.75

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
 FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.40      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.54
 EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       4.29

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.47
 RAINFALL INTENSITY(INCH/HR) =   4.29
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.16
 EFFECTIVE STREAM AREA(ACRES) =       1.12
 TOTAL STREAM AREA(ACRES) =       1.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.29

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.40    6.23    5.455  0.20( 0.10) 0.48       4.9       6.00
     1       30.52    8.13    4.682  0.20( 0.10) 0.48       6.7      14.00
     1       32.81    9.87    4.191  0.20( 0.10) 0.49       8.1      19.00
     1       33.89   10.83    3.974  0.20( 0.10) 0.50       8.9      16.00
     1       34.15   11.14    3.910  0.20( 0.10) 0.50       9.2      17.00
```

```
     1       34.43   11.68    3.805  0.20( 0.10) 0.51       9.5       10.00
     1       34.41   11.89    3.766  0.20( 0.10) 0.51       9.6        7.00
     1       33.75   12.88    3.597  0.20( 0.10) 0.51       9.9        4.00
     1       32.06   14.46    3.368  0.20( 0.10) 0.51      10.2        1.00
     2        4.29    9.47    4.290  0.20( 0.03) 0.16       1.1       13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.99    6.23    5.455  0.20( 0.09) 0.44       5.6        6.00
      2       34.55    8.13    4.682  0.20( 0.09) 0.44       7.6       14.00
      3       36.58    9.47    4.290  0.20( 0.09) 0.45       8.9       13.00
      4       37.00    9.87    4.191  0.20( 0.09) 0.45       9.3       19.00
      5       37.86   10.83    3.974  0.20( 0.09) 0.46      10.0       16.00
      6       38.06   11.14    3.910  0.20( 0.09) 0.47      10.3       17.00
      7       38.23   11.68    3.805  0.20( 0.09) 0.47      10.6       10.00
      8       38.17   11.89    3.766  0.20( 0.09) 0.47      10.7        7.00
      9       37.34   12.88    3.597  0.20( 0.09) 0.47      11.1        4.00
     10       35.42   14.46    3.368  0.20( 0.10) 0.48      11.3        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.23    Tc(MIN.) =    11.68
  EFFECTIVE AREA(ACRES) =      10.63   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.81
  RAINFALL INTENSITY(INCH/HR) =   3.78
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.63
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.23

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.14      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.670
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.64      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.64
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    5.82
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.14
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.87
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
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 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.87

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.99    6.36    5.390  0.20( 0.09) 0.44       5.6       6.00
     1       34.55    8.26    4.640  0.20( 0.09) 0.44       7.6      14.00
     1       36.58    9.60    4.257  0.20( 0.09) 0.45       8.9      13.00
     1       37.00   10.00    4.160  0.20( 0.09) 0.45       9.3      19.00
     1       37.86   10.96    3.947  0.20( 0.09) 0.46      10.0      16.00
     1       38.06   11.27    3.884  0.20( 0.09) 0.47      10.3      17.00
     1       38.23   11.81    3.781  0.20( 0.09) 0.47      10.6      10.00
     1       38.17   12.02    3.743  0.20( 0.09) 0.47      10.7       7.00
     1       37.34   13.01    3.577  0.20( 0.09) 0.47      11.1       4.00
     1       35.42   14.59    3.350  0.20( 0.10) 0.48      11.3       1.00
     2        3.87    6.83    5.174  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.36    5.390  0.20( 0.09) 0.47       6.4       6.00
     2       35.74    6.83    5.174  0.20( 0.10) 0.48       6.9      25.00
     3       38.01    8.26    4.640  0.20( 0.09) 0.47       8.4      14.00
     4       39.75    9.60    4.257  0.20( 0.10) 0.48       9.7      13.00
     5       40.09   10.00    4.160  0.20( 0.10) 0.48      10.0      19.00
     6       40.79   10.96    3.947  0.20( 0.10) 0.48      10.8      16.00
     7       40.94   11.27    3.884  0.20( 0.10) 0.49      11.1      17.00
     8       41.03   11.81    3.781  0.20( 0.10) 0.49      11.4      10.00
     9       40.94   12.02    3.743  0.20( 0.10) 0.49      11.5       7.00
    10       39.99   13.01    3.577  0.20( 0.10) 0.49      11.8       4.00
    11       37.89   14.59    3.350  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      41.03    Tc(MIN.) =    11.81
 EFFECTIVE AREA(ACRES) =      11.41   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      41.03
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.88
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.88
 RAINFALL INTENSITY(INCH/HR) =   3.77
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.49
```

```
  EFFECTIVE STREAM AREA(ACRES) =      11.41
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.03

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   10.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.123
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.26
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       7.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.44    5.354  0.20( 0.09) 0.47       6.4       6.00
     1       35.74    6.91    5.142  0.20( 0.10) 0.48       6.9      25.00
     1       38.01    8.34    4.616  0.20( 0.09) 0.47       8.4      14.00
     1       39.75    9.67    4.239  0.20( 0.10) 0.48       9.7      13.00
     1       40.09   10.07    4.143  0.20( 0.10) 0.48      10.0      19.00
     1       40.79   11.03    3.933  0.20( 0.10) 0.48      10.8      16.00
     1       40.94   11.34    3.870  0.20( 0.10) 0.49      11.1      17.00
     1       41.03   11.88    3.768  0.20( 0.10) 0.49      11.4      10.00
     1       40.94   12.09    3.730  0.20( 0.10) 0.49      11.5       7.00
     1       39.99   13.08    3.565  0.20( 0.10) 0.49      11.8       4.00
     1       37.89   14.66    3.341  0.20( 0.10) 0.50      12.1       1.00
     2        7.82   10.15    4.123  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.23    6.44    5.354  0.20( 0.10) 0.50       7.7       6.00
     2       42.42    6.91    5.142  0.20( 0.10) 0.50       8.4      25.00
     3       45.22    8.34    4.616  0.20( 0.10) 0.50      10.2      14.00
     4       47.41    9.67    4.239  0.20( 0.10) 0.50      11.8      13.00
     5       47.88   10.07    4.143  0.20( 0.10) 0.50      12.2      19.00
     6       47.97   10.15    4.123  0.20( 0.10) 0.50      12.3      29.00
     7       48.24   11.03    3.933  0.20( 0.10) 0.50      13.0      16.00
     8       48.26   11.34    3.870  0.20( 0.10) 0.51      13.2      17.00
     9       48.15   11.88    3.768  0.20( 0.10) 0.51      13.6      10.00
    10       47.99   12.09    3.730  0.20( 0.10) 0.51      13.7       7.00
    11       46.71   13.08    3.565  0.20( 0.10) 0.51      14.0       4.00
    12       44.18   14.66    3.341  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      48.26    Tc(MIN.) =    11.34
 EFFECTIVE AREA(ACRES) =      13.23   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.74
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      48.26
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.65
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.65
 RAINFALL INTENSITY(INCH/HR) =   3.81
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.51
 EFFECTIVE STREAM AREA(ACRES) =      13.23
 TOTAL STREAM AREA(ACRES) =      14.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.26

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
 ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.001
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.24      0.20     0.100    91    7.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.08
 TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.25
 RAINFALL INTENSITY(INCH/HR) =   5.00
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.24
 TOTAL STREAM AREA(ACRES) =       0.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
 ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.439
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.25      0.20     0.100    91    6.26
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   5.44
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.23    6.76    5.205  0.20( 0.10) 0.50       7.7       6.00
      1       42.42    7.23    5.009  0.20( 0.10) 0.50       8.4      25.00
      1       45.22    8.66    4.518  0.20( 0.10) 0.50      10.2      14.00
      1       47.41    9.99    4.162  0.20( 0.10) 0.50      11.8      13.00
      1       47.88   10.39    4.070  0.20( 0.10) 0.50      12.2      19.00
      1       47.97   10.47    4.051  0.20( 0.10) 0.50      12.3      29.00
      1       48.24   11.34    3.869  0.20( 0.10) 0.50      13.0      16.00
      1       48.26   11.65    3.810  0.20( 0.10) 0.51      13.2      17.00
      1       48.15   12.20    3.712  0.20( 0.10) 0.51      13.6      10.00
      1       47.99   12.41    3.675  0.20( 0.10) 0.51      13.7       7.00
      1       46.71   13.40    3.517  0.20( 0.10) 0.51      14.0       4.00
      1       44.18   14.98    3.300  0.20( 0.10) 0.51      14.2       1.00
      2        1.08    7.25    5.001  0.20( 0.02) 0.10       0.2      24.00
      3        1.22    6.26    5.439  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.26    5.439  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.76    5.205  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.23    5.009  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.25    5.001  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.66    4.518  0.20( 0.10) 0.48      10.7      14.00
      6       49.24    9.99    4.162  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.39    4.070  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.47    4.051  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.34    3.869  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.65    3.810  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.20    3.712  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.41    3.675  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.40    3.517  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   14.98    3.300  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      49.93    Tc(MIN.) =    11.34
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.93
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.578
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.20      0.20     0.600    91    8.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.81
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.81

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    9.16
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.372
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  6.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   4.37
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.236
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.73      0.20     0.600    91    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.36
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.36

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.32
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   0.39   Tc(MIN.) =    7.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.070
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  5.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.08
  RAINFALL INTENSITY(INCH/HR) =   5.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.16
  TOTAL STREAM AREA(ACRES) =       1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.38    9.16    4.372  0.20( 0.12) 0.60       2.2      33.00
      2        5.17    7.08    5.070  0.20( 0.12) 0.60       1.2      35.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.70    7.08    5.070  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.16    4.372  0.20( 0.12) 0.60       3.4      33.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.82    Tc(MIN.) =     9.16
  EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.82
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.22    5.012  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.31    4.334  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.34    5.401  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.84    5.172  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.30    4.980  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.33    4.971  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.73    4.496  0.20( 0.10) 0.48      10.7      14.00
      6       49.24   10.06    4.144  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.46    4.053  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.54    4.035  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.42    3.855  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.73    3.796  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.27    3.699  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.48    3.663  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.48    3.506  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   15.05    3.290  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.21    6.34    5.401  0.20( 0.10) 0.50      10.1      31.00
      2       55.86    6.84    5.172  0.20( 0.10) 0.51      10.9       6.00
      3       57.11    7.22    5.012  0.20( 0.10) 0.51      11.6      35.00
      4       57.32    7.30    4.980  0.20( 0.10) 0.51      11.7      25.00
      5       57.36    7.33    4.971  0.20( 0.10) 0.51      11.8      24.00
      6       59.99    8.73    4.496  0.20( 0.10) 0.51      13.9      14.00
      7       60.90    9.31    4.334  0.20( 0.10) 0.51      14.7      33.00
      8       61.48   10.06    4.144  0.20( 0.10) 0.51      15.6      13.00
      9       61.64   10.46    4.053  0.20( 0.10) 0.51      16.0      19.00
     10       61.66   10.54    4.035  0.20( 0.10) 0.51      16.1      29.00
     11       61.30   11.42    3.855  0.20( 0.10) 0.51      16.8      16.00
     12       61.12   11.73    3.796  0.20( 0.10) 0.51      17.1      17.00
     13       60.67   12.27    3.699  0.20( 0.10) 0.51      17.4      10.00
     14       60.39   12.48    3.663  0.20( 0.10) 0.51      17.5       7.00
     15       58.56   13.48    3.506  0.20( 0.10) 0.52      17.9       4.00
     16       55.27   15.05    3.290  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       61.66  Tc(MIN.) =   10.545
  EFFECTIVE AREA(ACRES) =     16.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.66
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.12
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.66

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.776
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    91    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.76

******************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    8.34
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
 STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    7.33
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.971
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.52      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.32
 EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.51
 FLOW VELOCITY(FEET/SEC.) =  4.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
 LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.33
 RAINFALL INTENSITY(INCH/HR) =   4.97
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.86
 TOTAL STREAM AREA(ACRES) =       0.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       54.21    7.01    5.099  0.20( 0.10) 0.50      10.1      31.00
     1       55.86    7.50    4.903  0.20( 0.10) 0.51      10.9       6.00
     1       57.11    7.89    4.765  0.20( 0.10) 0.51      11.6      35.00
     1       57.32    7.97    4.737  0.20( 0.10) 0.51      11.7      25.00
     1       57.36    7.99    4.729  0.20( 0.10) 0.51      11.8      24.00
     1       59.99    9.39    4.311  0.20( 0.10) 0.51      13.9      14.00
     1       60.90    9.95    4.171  0.20( 0.10) 0.51      14.7      33.00
     1       61.48   10.71    4.000  0.20( 0.10) 0.51      15.6      13.00
     1       61.64   11.10    3.918  0.20( 0.10) 0.51      16.0      19.00
     1       61.66   11.19    3.900  0.20( 0.10) 0.51      16.1      29.00
     1       61.30   12.06    3.736  0.20( 0.10) 0.51      16.8      16.00
     1       61.12   12.37    3.682  0.20( 0.10) 0.51      17.1      17.00
     1       60.67   12.94    3.589  0.20( 0.10) 0.51      17.4      10.00
     1       60.39   13.15    3.555  0.20( 0.10) 0.51      17.5       7.00
     1       58.56   14.14    3.410  0.20( 0.10) 0.52      17.9       4.00
     1       55.27   15.72    3.209  0.20( 0.10) 0.52      18.1       1.00
     2        3.83    7.33    4.971  0.20( 0.02) 0.10       0.9      38.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       57.97    7.01    5.099  0.20( 0.09) 0.47      10.9      31.00
```

```
      2       59.10    7.33    4.971  0.20( 0.09) 0.47      11.5       38.00
      3       59.64    7.50    4.903  0.20( 0.10) 0.48      11.8        6.00
      4       60.78    7.89    4.765  0.20( 0.10) 0.48      12.5       35.00
      5       60.97    7.97    4.737  0.20( 0.10) 0.48      12.6       25.00
      6       61.01    7.99    4.729  0.20( 0.10) 0.48      12.6       24.00
      7       63.31    9.39    4.311  0.20( 0.10) 0.48      14.7       14.00
      8       64.12    9.95    4.171  0.20( 0.10) 0.48      15.6       33.00
      9       64.56   10.71    4.000  0.20( 0.10) 0.49      16.5       13.00
     10       64.65   11.10    3.918  0.20( 0.10) 0.49      16.9       19.00
     11       64.66   11.19    3.900  0.20( 0.10) 0.49      17.0       29.00
     12       64.17   12.06    3.736  0.20( 0.10) 0.49      17.7       16.00
     13       63.95   12.37    3.682  0.20( 0.10) 0.49      17.9       17.00
     14       63.43   12.94    3.589  0.20( 0.10) 0.49      18.3       10.00
     15       63.12   13.15    3.555  0.20( 0.10) 0.49      18.4        7.00
     16       61.18   14.14    3.410  0.20( 0.10) 0.50      18.7        4.00
     17       57.73   15.72    3.209  0.20( 0.10) 0.50      18.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.98   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.66
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.649
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        0.84      0.20     0.700    91    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.232
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    6.77
  EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       9.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  4.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.67
  TOTAL STREAM AREA(ACRES) =       2.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.87

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.02
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      5.02

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    9.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.284
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    3.65
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   4.28
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
    1        9.87    9.70    4.232  0.20( 0.13) 0.63       2.7      41.00
    2        8.37    9.50    4.284  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.16    9.50    4.284  0.20( 0.12) 0.60       4.8      43.00
      2       18.14    9.70    4.232  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.16    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       4.84   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.16
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.84
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.16

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.21      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      1.17
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.21
  TOTAL STREAM AREA(ACRES) =       0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.682
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    91    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.95
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.13
  RAINFALL INTENSITY(INCH/HR) =   4.68
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.45
  TOTAL STREAM AREA(ACRES) =       1.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.95

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.16    9.85    4.194  0.20( 0.12) 0.60       4.8      43.00
      1       18.14   10.06    4.146  0.20( 0.12) 0.60       4.9      41.00
      2        1.17    5.00    6.187  0.20( 0.02) 0.10       0.2      45.00
      3        5.95    8.13    4.682  0.20( 0.12) 0.60       1.5      46.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.75    5.00    6.187  0.20( 0.11) 0.57       3.6      45.00
      2       23.46    8.13    4.682  0.20( 0.12) 0.58       5.7      46.00
```

```
     3       24.26    9.85    4.194  0.20( 0.12) 0.58       6.5      43.00
     4       24.17   10.06    4.146  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.26    Tc(MIN.) =     9.85
  EFFECTIVE AREA(ACRES) =       6.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.26
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.92
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.75    5.07    6.139  0.20( 0.11) 0.57       3.6      45.00
      2       23.46    8.20    4.660  0.20( 0.12) 0.58       5.7      46.00
      3       24.26    9.92    4.178  0.20( 0.12) 0.58       6.5      43.00
      4       24.17   10.12    4.130  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       57.97    7.07    5.075  0.20( 0.09) 0.47      10.9      31.00
      2       59.10    7.38    4.949  0.20( 0.09) 0.47      11.5      38.00
      3       59.64    7.56    4.882  0.20( 0.10) 0.48      11.8       6.00
      4       60.78    7.94    4.745  0.20( 0.10) 0.48      12.5      35.00
      5       60.97    8.03    4.717  0.20( 0.10) 0.48      12.6      25.00
      6       61.01    8.05    4.710  0.20( 0.10) 0.48      12.6      24.00
      7       63.31    9.45    4.296  0.20( 0.10) 0.48      14.7      14.00
      8       64.12   10.00    4.158  0.20( 0.10) 0.48      15.6      33.00
      9       64.56   10.76    3.988  0.20( 0.10) 0.49      16.5      13.00
     10       64.65   11.16    3.907  0.20( 0.10) 0.49      16.9      19.00
     11       64.66   11.24    3.890  0.20( 0.10) 0.49      17.0      29.00
     12       64.17   12.11    3.726  0.20( 0.10) 0.49      17.7      16.00
     13       63.95   12.43    3.673  0.20( 0.10) 0.49      17.9      17.00
     14       63.43   12.99    3.580  0.20( 0.10) 0.49      18.3      10.00
     15       63.12   13.20    3.547  0.20( 0.10) 0.49      18.4       7.00
     16       61.18   14.20    3.403  0.20( 0.10) 0.50      18.7       4.00
     17       57.73   15.78    3.202  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       70.22    5.07    6.139  0.20( 0.10) 0.50      11.4      45.00
      2       80.08    7.07    5.075  0.20( 0.10) 0.51      15.8      31.00
      3       81.59    7.38    4.949  0.20( 0.10) 0.51      16.6      38.00
      4       82.34    7.56    4.882  0.20( 0.10) 0.51      17.0       6.00
      5       83.94    7.94    4.745  0.20( 0.10) 0.51      18.0      35.00
      6       84.23    8.03    4.717  0.20( 0.10) 0.51      18.1      25.00
```

```
      7       84.29    8.05    4.710  0.20( 0.10) 0.51      18.2      24.00
      8       84.72    8.20    4.660  0.20( 0.10) 0.51      18.5      46.00
      9       87.35    9.45    4.296  0.20( 0.10) 0.51      21.0      14.00
     10       88.26    9.92    4.178  0.20( 0.10) 0.51      22.0      43.00
     11       88.34   10.00    4.158  0.20( 0.10) 0.51      22.1      33.00
     12       88.36   10.12    4.130  0.20( 0.10) 0.51      22.3      41.00
     13       87.87   10.76    3.988  0.20( 0.10) 0.51      23.0      13.00
     14       87.48   11.16    3.907  0.20( 0.10) 0.51      23.5      19.00
     15       87.39   11.24    3.890  0.20( 0.10) 0.51      23.5      29.00
     16       85.91   12.11    3.726  0.20( 0.10) 0.52      24.3      16.00
     17       85.37   12.43    3.673  0.20( 0.10) 0.52      24.5      17.00
     18       84.29   12.99    3.580  0.20( 0.10) 0.52      24.8      10.00
     19       83.78   13.20    3.547  0.20( 0.10) 0.52      24.9       7.00
     20       80.97   14.20    3.403  0.20( 0.10) 0.52      25.3       4.00
     21       76.32   15.78    3.202  0.20( 0.10) 0.52      25.5       1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       88.36  Tc(MIN.) =   10.123
  EFFECTIVE AREA(ACRES) =     22.27  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.36
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.27
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      88.36

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.468
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    91    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.60   Tc(MIN.) =    8.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.476
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  4.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	70.22	5.18	6.063	0.20(0.10)	0.50	11.4	45.00
1	80.08	7.18	5.030	0.20(0.10)	0.51	15.8	31.00
1	81.59	7.49	4.908	0.20(0.10)	0.51	16.6	38.00
1	82.34	7.67	4.843	0.20(0.10)	0.51	17.0	6.00
1	83.94	8.05	4.709	0.20(0.10)	0.51	18.0	35.00
1	84.23	8.13	4.682	0.20(0.10)	0.51	18.1	25.00
1	84.29	8.16	4.675	0.20(0.10)	0.51	18.2	24.00
1	84.72	8.31	4.626	0.20(0.10)	0.51	18.5	46.00
1	87.35	9.56	4.269	0.20(0.10)	0.51	21.0	14.00
1	88.26	10.03	4.153	0.20(0.10)	0.51	22.0	43.00
1	88.34	10.11	4.133	0.20(0.10)	0.51	22.1	33.00
1	88.36	10.23	4.106	0.20(0.10)	0.51	22.3	41.00
1	87.87	10.87	3.966	0.20(0.10)	0.51	23.0	13.00
1	87.48	11.26	3.885	0.20(0.10)	0.51	23.5	19.00
1	87.39	11.35	3.869	0.20(0.10)	0.51	23.5	29.00
1	85.91	12.22	3.708	0.20(0.10)	0.52	24.3	16.00
1	85.37	12.53	3.655	0.20(0.10)	0.52	24.5	17.00
1	84.29	13.10	3.563	0.20(0.10)	0.52	24.8	10.00
1	83.78	13.31	3.531	0.20(0.10)	0.52	24.9	7.00
1	80.97	14.30	3.388	0.20(0.10)	0.52	25.3	4.00
1	76.32	15.89	3.190	0.20(0.10)	0.52	25.5	1.00
2	3.39	8.80	4.476	0.20(0.04)	0.20	0.9	32.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.18	6.063	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.18	5.030	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.49	4.908	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.67	4.843	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.05	4.709	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.13	4.682	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.16	4.675	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.31	4.626	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.80	4.476	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.56	4.269	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.03	4.153	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.11	4.133	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.23	4.106	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.87	3.966	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.26	3.885	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.35	3.869	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.22	3.708	0.20(0.10)	0.51	25.1	16.00
18	88.13	12.53	3.655	0.20(0.10)	0.51	25.3	17.00
19	86.99	13.10	3.563	0.20(0.10)	0.51	25.7	10.00
20	86.45	13.31	3.531	0.20(0.10)	0.51	25.8	7.00
21	83.53	14.30	3.388	0.20(0.10)	0.51	26.1	4.00
22	78.73	15.89	3.190	0.20(0.10)	0.51	26.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 91.47 Tc(MIN.) = 10.11
EFFECTIVE AREA(ACRES) = 22.95 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 26.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 50.00 = 2585.00 FEET.

****
FLOW PROCESS FROM NODE 50.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 457.00 DOWNSTREAM(FEET) = 454.50

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.49
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.47
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    4.08
```

```
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.31
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    5.60
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.592
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.70
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.70

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =    9.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.380
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.80
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   4.38
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.34
  TOTAL STREAM AREA(ACRES) =       1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.14
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.10   12.20    3.711  0.20( 0.10) 0.50       3.6      22.00
     2        5.14    9.14    4.380  0.20( 0.12) 0.60       1.3      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.88    9.14    4.380  0.20( 0.11) 0.53       4.0      53.00
     2       16.43   12.20    3.711  0.20( 0.11) 0.53       4.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.43    Tc(MIN.) =    12.20
 EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.43
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.23
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.23
 RAINFALL INTENSITY(INCH/HR) =   3.71
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       4.93
 TOTAL STREAM AREA(ACRES) =       4.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.43

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.602
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91    8.38
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.47
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    9.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.322
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  5.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.88    9.16    4.373  0.20( 0.11) 0.53       4.0      53.00
      1       16.43   12.23    3.707  0.20( 0.11) 0.53       4.9      22.00
```

```
     2        7.19    9.35    4.322  0.20( 0.12) 0.60       1.9      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.00    9.16    4.373  0.20( 0.11) 0.55       5.9      53.00
      2       23.10    9.35    4.322  0.20( 0.11) 0.55       6.0      56.00
      3       22.57   12.23    3.707  0.20( 0.11) 0.55       6.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.10    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       5.98   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.10
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.40
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       5.98
  TOTAL STREAM AREA(ACRES) =       6.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.10

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.11      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.11
 TOTAL STREAM AREA(ACRES) =       0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.61

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       23.00    9.22    4.359  0.20( 0.11) 0.55       5.9      53.00
     1       23.10    9.40    4.308  0.20( 0.11) 0.55       6.0      56.00
     1       22.57   12.28    3.698  0.20( 0.11) 0.55       6.8      22.00
     2        0.61    5.00    6.187  0.20( 0.02) 0.10       0.1      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       18.47    5.00    6.187  0.20( 0.11) 0.54       3.3      59.00
     2       23.43    9.22    4.359  0.20( 0.11) 0.55       6.0      53.00
     3       23.52    9.40    4.308  0.20( 0.11) 0.55       6.1      56.00
     4       22.93   12.28    3.698  0.20( 0.11) 0.54       6.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.52    Tc(MIN.) =     9.40
 EFFECTIVE AREA(ACRES) =       6.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        6.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.57
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.52
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.84
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       6.09
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```
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.52

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    8.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.558
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    3.43
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.27
  FLOW VELOCITY(FEET/SEC.) =  4.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.48
  TOTAL STREAM AREA(ACRES) =       1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.47    5.47    5.878  0.20( 0.11) 0.54       3.3      59.00
      1       23.43    9.65    4.245  0.20( 0.11) 0.55       6.0      53.00
      1       23.52    9.84    4.198  0.20( 0.11) 0.55       6.1      56.00
      1       22.93   12.72    3.624  0.20( 0.11) 0.54       6.9      22.00
      2        5.91    8.52    4.558  0.20( 0.12) 0.60       1.5      61.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.47    5.878  0.20( 0.11) 0.55       4.3      59.00
      2       28.01    8.52    4.558  0.20( 0.11) 0.56       6.8      61.00
      3       28.93    9.65    4.245  0.20( 0.11) 0.56       7.5      53.00
      4       28.96    9.84    4.198  0.20( 0.11) 0.56       7.6      56.00
      5       27.60   12.72    3.624  0.20( 0.11) 0.55       8.4      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.96    Tc(MIN.) =     9.84
  EFFECTIVE AREA(ACRES) =       7.57   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.96
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.57
```

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  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    91    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.89
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.89

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.597
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    3.06
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.40
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.48    5.869  0.20( 0.11) 0.55       4.3      59.00
      1       28.01    8.54    4.553  0.20( 0.11) 0.56       6.8      61.00
      1       28.93    9.67    4.241  0.20( 0.11) 0.56       7.5      53.00
      1       28.96    9.85    4.195  0.20( 0.11) 0.56       7.6      56.00
      1       27.60   12.73    3.622  0.20( 0.11) 0.55       8.4      22.00
      2        5.80    8.40    4.597  0.20( 0.12) 0.60       1.4      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.25    5.48    5.869  0.20( 0.11) 0.56       5.2      59.00
      2       33.59    8.40    4.597  0.20( 0.11) 0.56       8.1      64.00
      3       33.75    8.54    4.553  0.20( 0.11) 0.56       8.2      61.00
      4       34.27    9.67    4.241  0.20( 0.11) 0.56       8.9      53.00
      5       34.24    9.85    4.195  0.20( 0.11) 0.56       9.0      56.00
      6       32.14   12.73    3.622  0.20( 0.11) 0.56       9.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.27    Tc(MIN.) =     9.67
  EFFECTIVE AREA(ACRES) =       8.92   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        9.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.27
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.95
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.95
  RAINFALL INTENSITY(INCH/HR) =   4.17
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.92
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.27

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.608
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.30
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.30

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    9.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.209
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.32
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.79
 RAINFALL INTENSITY(INCH/HR) =   4.21
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.02
 TOTAL STREAM AREA(ACRES) =       1.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
 ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.15      0.20     0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.83
 TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.15
 TOTAL STREAM AREA(ACRES) =       0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       28.25    5.78    5.692  0.20( 0.11) 0.56       5.2      59.00
     1       33.59    8.68    4.510  0.20( 0.11) 0.56       8.1      64.00
     1       33.75    8.82    4.468  0.20( 0.11) 0.56       8.2      61.00
     1       34.27    9.95    4.171  0.20( 0.11) 0.56       8.9      53.00
     1       34.24   10.14    4.127  0.20( 0.11) 0.56       9.0      56.00
     1       32.14   13.03    3.574  0.20( 0.11) 0.56       9.9      22.00
     2        3.76    9.79    4.209  0.20( 0.11) 0.56       1.0      67.00
     3        0.83    5.00    6.187  0.20( 0.02) 0.10       0.2      63.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	30.27	5.00	6.187	0.20(0.11)	0.55	5.2	63.00
2	32.04	5.78	5.692	0.20(0.11)	0.55	5.9	59.00
3	37.78	8.68	4.510	0.20(0.11)	0.56	9.1	64.00
4	37.96	8.82	4.468	0.20(0.11)	0.56	9.3	61.00
5	38.53	9.79	4.209	0.20(0.11)	0.56	10.0	67.00
6	38.56	9.95	4.171	0.20(0.11)	0.56	10.1	53.00
7	38.48	10.14	4.127	0.20(0.11)	0.56	10.2	56.00
8	35.80	13.03	3.574	0.20(0.11)	0.55	11.0	22.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 38.56 Tc(MIN.) = 9.95
EFFECTIVE AREA(ACRES) = 10.09 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 11.0
LONGEST FLOWPATH FROM NODE 22.00 TO NODE 69.00 = 1725.00 FEET.

****
FLOW PROCESS FROM NODE 69.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 454.50
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.28
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.56
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 9.99
LONGEST FLOWPATH FROM NODE 22.00 TO NODE 70.00 = 1755.00 FEET.

****
FLOW PROCESS FROM NODE 70.00 TO NODE 70.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	30.27	5.05	6.154	0.20(0.11)	0.55	5.2	63.00
2	32.04	5.83	5.666	0.20(0.11)	0.55	5.9	59.00
3	37.78	8.73	4.497	0.20(0.11)	0.56	9.1	64.00
4	37.96	8.87	4.455	0.20(0.11)	0.56	9.3	61.00
5	38.53	9.84	4.198	0.20(0.11)	0.56	10.0	67.00
6	38.56	9.99	4.161	0.20(0.11)	0.56	10.1	53.00
7	38.48	10.18	4.117	0.20(0.11)	0.56	10.2	56.00
8	35.80	13.07	3.567	0.20(0.11)	0.55	11.0	22.00

LONGEST FLOWPATH FROM NODE 22.00 TO NODE 70.00 = 1755.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.23	6.027	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.23	5.009	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.54	4.889	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.72	4.824	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.10	4.692	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.19	4.665	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.21	4.658	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.36	4.609	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.85	4.461	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.61	4.256	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.08	4.141	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.16	4.121	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.28	4.094	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.92	3.955	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.31	3.875	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.40	3.859	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.27	3.699	0.20(0.10)	0.51	25.1	16.00

```
    18       88.13   12.58    3.646  0.20( 0.10) 0.51      25.3      17.00
    19       86.99   13.15    3.555  0.20( 0.10) 0.51      25.7      10.00
    20       86.45   13.36    3.523  0.20( 0.10) 0.51      25.8       7.00
    21       83.53   14.36    3.381  0.20( 0.10) 0.51      26.1       4.00
    22       78.73   15.95    3.183  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.05    6.154  0.20( 0.10) 0.51      16.6      63.00
      2      103.63    5.23    6.027  0.20( 0.10) 0.51      17.3      45.00
      3      108.03    5.83    5.666  0.20( 0.10) 0.51      19.2      59.00
      4      118.01    7.23    5.009  0.20( 0.10) 0.51      24.0      31.00
      5      120.19    7.54    4.889  0.20( 0.10) 0.51      25.2      38.00
      6      121.33    7.72    4.824  0.20( 0.10) 0.51      25.8       6.00
      7      123.75    8.10    4.692  0.20( 0.10) 0.51      27.2      35.00
      8      124.21    8.19    4.665  0.20( 0.10) 0.51      27.5      25.00
      9      124.33    8.21    4.658  0.20( 0.10) 0.51      27.5      24.00
     10      125.08    8.36    4.609  0.20( 0.10) 0.51      28.1      46.00
     11      126.65    8.73    4.497  0.20( 0.10) 0.52      29.2      64.00
     12      127.08    8.85    4.461  0.20( 0.10) 0.52      29.6      32.00
     13      127.14    8.87    4.455  0.20( 0.10) 0.52      29.7      61.00
     14      128.98    9.61    4.256  0.20( 0.10) 0.52      31.7      14.00
     15      129.52    9.84    4.198  0.20( 0.10) 0.52      32.3      67.00
     16      129.82    9.99    4.161  0.20( 0.10) 0.52      32.7      53.00
     17      129.92   10.08    4.141  0.20( 0.10) 0.52      32.9      43.00
     18      129.96   10.16    4.121  0.20( 0.10) 0.52      33.1      33.00
     19      129.95   10.18    4.117  0.20( 0.10) 0.52      33.2      56.00
     20      129.85   10.28    4.094  0.20( 0.10) 0.52      33.3      41.00
     21      128.67   10.92    3.955  0.20( 0.10) 0.52      34.3      13.00
     22      127.85   11.31    3.875  0.20( 0.10) 0.52      34.8      19.00
     23      127.66   11.40    3.859  0.20( 0.10) 0.52      34.9      29.00
     24      125.26   12.27    3.699  0.20( 0.10) 0.52      35.9      16.00
     25      124.38   12.58    3.646  0.20( 0.10) 0.52      36.2      17.00
     26      122.94   13.07    3.567  0.20( 0.10) 0.52      36.7      22.00
     27      122.66   13.15    3.555  0.20( 0.10) 0.52      36.7      10.00
     28      121.79   13.36    3.523  0.20( 0.10) 0.52      36.8       7.00
     29      117.40   14.36    3.381  0.20( 0.10) 0.52      37.2       4.00
     30      110.55   15.95    3.183  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      129.96  Tc(MIN.) =   10.161
  EFFECTIVE AREA(ACRES) =     33.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.63
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.96
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   4.10
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      33.12
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     129.96

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    91    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.05
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   6.00
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.13    6.098  0.20( 0.10) 0.51      16.6      63.00
      1      103.63    5.32    5.973  0.20( 0.10) 0.51      17.3      45.00
      1      108.03    5.91    5.623  0.20( 0.10) 0.51      19.2      59.00
      1      118.01    7.31    4.979  0.20( 0.10) 0.51      24.0      31.00
      1      120.19    7.62    4.860  0.20( 0.10) 0.51      25.2      38.00
      1      121.33    7.80    4.797  0.20( 0.10) 0.51      25.8       6.00
      1      123.75    8.18    4.667  0.20( 0.10) 0.51      27.2      35.00
      1      124.21    8.26    4.640  0.20( 0.10) 0.51      27.5      25.00
      1      124.33    8.28    4.633  0.20( 0.10) 0.51      27.5      24.00
      1      125.08    8.44    4.585  0.20( 0.10) 0.51      28.1      46.00
      1      126.65    8.80    4.474  0.20( 0.10) 0.52      29.2      64.00
      1      127.08    8.93    4.439  0.20( 0.10) 0.52      29.6      32.00
      1      127.14    8.95    4.433  0.20( 0.10) 0.52      29.7      61.00
      1      128.98    9.68    4.236  0.20( 0.10) 0.52      31.7      14.00
      1      129.52    9.92    4.179  0.20( 0.10) 0.52      32.3      67.00
```

1	129.82	10.07	4.142	0.20(0.10)	0.52	32.7	53.00
1	129.92	10.15	4.123	0.20(0.10)	0.52	32.9	43.00
1	129.96	10.24	4.104	0.20(0.10)	0.52	33.1	33.00
1	129.95	10.26	4.099	0.20(0.10)	0.52	33.2	56.00
1	129.85	10.36	4.076	0.20(0.10)	0.52	33.3	41.00
1	128.67	10.99	3.939	0.20(0.10)	0.52	34.3	13.00
1	127.85	11.39	3.860	0.20(0.10)	0.52	34.8	19.00
1	127.66	11.48	3.844	0.20(0.10)	0.52	34.9	29.00
1	125.26	12.35	3.685	0.20(0.10)	0.52	35.9	16.00
1	124.38	12.66	3.633	0.20(0.10)	0.52	36.2	17.00
1	122.94	13.15	3.555	0.20(0.10)	0.52	36.7	22.00
1	122.66	13.23	3.543	0.20(0.10)	0.52	36.7	10.00
1	121.79	13.44	3.511	0.20(0.10)	0.52	36.8	7.00
1	117.40	14.43	3.370	0.20(0.10)	0.52	37.2	4.00
1	110.55	16.02	3.174	0.20(0.10)	0.52	37.4	1.00
2	2.05	5.27	6.003	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.13	6.098	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.27	6.003	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.32	5.973	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.91	5.623	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.31	4.979	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.62	4.860	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.80	4.797	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.18	4.667	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.26	4.640	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.28	4.633	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.44	4.585	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.80	4.474	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.93	4.439	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.95	4.433	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.68	4.236	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.92	4.179	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.07	4.142	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.15	4.123	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.24	4.104	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.26	4.099	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.36	4.076	0.20(0.10)	0.51	33.7	41.00
22	130.01	10.99	3.939	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.39	3.860	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.48	3.844	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.35	3.685	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.66	3.633	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.15	3.555	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.23	3.543	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.44	3.511	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.43	3.370	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.02	3.174	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 131.35 Tc(MIN.) = 10.24
EFFECTIVE AREA(ACRES) = 33.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 448.00
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.3 INCHES

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.15
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.35
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.469
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.42
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.107
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.66
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
```

```
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.22
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    91    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.73

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   10.34
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.081
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    4.03
 EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
 FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
 LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   4.08
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.72   10.22    4.107  0.20( 0.12) 0.60       2.4      33.00
     2        6.49   10.34    4.081  0.20( 0.12) 0.60       1.8      73.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.18   10.22    4.107  0.20( 0.12) 0.60       4.2      33.00
     2       15.15   10.34    4.081  0.20( 0.12) 0.60       4.2      73.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.18    Tc(MIN.) =    10.22
 EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.30
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.18
 PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.91
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.96
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.18

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.740
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    91    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    9.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.403
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.956
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    91    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.14
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.14

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    8.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.582
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.09
  EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   4.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.26
  TOTAL STREAM AREA(ACRES) =       1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.18   10.91    3.958  0.20( 0.12) 0.60       4.2      33.00
      1       15.15   11.02    3.935  0.20( 0.12) 0.60       4.2      73.00
      2        5.09    9.05    4.403  0.20( 0.12) 0.60       1.3      76.00
      3        5.07    8.45    4.582  0.20( 0.11) 0.56       1.3      78.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.68    8.45    4.582  0.20( 0.12) 0.59       5.8      78.00
      2       24.02    9.05    4.403  0.20( 0.12) 0.59       6.1      76.00
      3       24.10   10.91    3.958  0.20( 0.12) 0.59       6.8      33.00
      4       24.02   11.02    3.935  0.20( 0.12) 0.59       6.8      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.10    Tc(MIN.) =    10.91
  EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.10
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.918
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        3.28      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =   11.03
  EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      34.32

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.68    8.64    4.522  0.20( 0.14) 0.70       9.0      78.00
      2       35.51    9.25    4.350  0.20( 0.14) 0.70       9.4      76.00
      3       34.32   11.10    3.918  0.20( 0.14) 0.69      10.1      33.00
      4       34.18   11.21    3.895  0.20( 0.14) 0.69      10.1      73.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      35.68  Tc(MIN.) =    8.64
  AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.05

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.68
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.05
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.68
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.706
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    91    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.59
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      3.59

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    9.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.217
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.57      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    2.15
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  5.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.36

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.288
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.60
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.60

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.86
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       8.23
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  6.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.69
  RAINFALL INTENSITY(INCH/HR) =   4.83
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.68    9.08    4.395  0.20( 0.14) 0.70       9.0      78.00
      1       35.51    9.69    4.236  0.20( 0.14) 0.70       9.4      76.00
      1       34.32   11.54    3.831  0.20( 0.14) 0.69      10.1      33.00
      1       34.18   11.66    3.810  0.20( 0.14) 0.69      10.1      73.00
      2        5.36    9.76    4.217  0.20( 0.08) 0.40       1.4      82.00
      3        8.23    7.69    4.835  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.42    7.69    4.835  0.20( 0.13) 0.65      10.7      80.00
      2       48.35    9.08    4.395  0.20( 0.13) 0.65      12.3      78.00
      3       48.04    9.69    4.236  0.20( 0.13) 0.65      12.7      76.00
      4       47.98    9.76    4.217  0.20( 0.13) 0.65      12.8      82.00
      5       45.66   11.54    3.831  0.20( 0.13) 0.65      13.5      33.00
      6       45.46   11.66    3.810  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.35    Tc(MIN.) =     9.08
  EFFECTIVE AREA(ACRES) =      12.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.44
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.35
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
```

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.42	7.77	4.806	0.20(0.13)	0.65	10.7	80.00
2	48.35	9.16	4.373	0.20(0.13)	0.65	12.3	78.00
3	48.04	9.77	4.216	0.20(0.13)	0.65	12.7	76.00
4	47.98	9.84	4.198	0.20(0.13)	0.65	12.8	82.00
5	45.66	11.62	3.816	0.20(0.13)	0.65	13.5	33.00
6	45.46	11.74	3.795	0.20(0.13)	0.65	13.5	73.00

LONGEST FLOWPATH FROM NODE 33.00 TO NODE 86.00 = 1770.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.17	6.069	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.31	5.976	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.36	5.947	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.95	5.600	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.35	4.963	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.66	4.846	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.84	4.782	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.22	4.653	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.30	4.627	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.33	4.620	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.48	4.573	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.84	4.462	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.97	4.427	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.99	4.422	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.72	4.227	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.96	4.170	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.11	4.133	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.19	4.114	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.28	4.095	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.30	4.090	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.40	4.068	0.20(0.10)	0.51	33.7	41.00
22	130.01	11.03	3.931	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.43	3.853	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.51	3.836	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.39	3.679	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.70	3.627	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.19	3.549	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.27	3.537	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.48	3.505	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.48	3.365	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.07	3.170	0.20(0.10)	0.52	37.8	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 86.00 = 2795.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	143.35	5.17	6.069	0.20(0.11)	0.54	24.2	63.00
2	144.99	5.31	5.976	0.20(0.11)	0.54	24.8	47.00
3	145.48	5.36	5.947	0.20(0.11)	0.54	25.0	45.00
4	151.53	5.95	5.600	0.20(0.11)	0.55	27.8	59.00
5	165.06	7.35	4.963	0.20(0.11)	0.55	34.6	31.00
6	167.99	7.66	4.846	0.20(0.11)	0.55	36.1	38.00
7	168.96	7.77	4.806	0.20(0.11)	0.55	36.6	80.00
8	169.47	7.84	4.782	0.20(0.11)	0.55	37.0	6.00
9	172.38	8.22	4.653	0.20(0.11)	0.55	38.8	35.00
10	172.95	8.30	4.627	0.20(0.11)	0.55	39.2	25.00
11	173.09	8.33	4.620	0.20(0.11)	0.55	39.3	24.00
12	174.04	8.48	4.573	0.20(0.11)	0.55	40.0	46.00
13	176.08	8.84	4.462	0.20(0.11)	0.55	41.6	64.00
14	176.67	8.97	4.427	0.20(0.11)	0.55	42.1	32.00
15	176.75	8.99	4.422	0.20(0.11)	0.55	42.2	61.00
16	177.42	9.16	4.373	0.20(0.11)	0.55	42.9	78.00
17	178.48	9.72	4.227	0.20(0.11)	0.55	44.8	14.00
18	178.56	9.77	4.216	0.20(0.11)	0.55	44.9	76.00

```
     19      178.66    9.84    4.198  0.20( 0.11) 0.55      45.2      82.00
     20      178.77    9.96    4.170  0.20( 0.11) 0.55      45.5      67.00
     21      178.85   10.11    4.133  0.20( 0.11) 0.55      46.0      53.00
     22      178.85   10.19    4.114  0.20( 0.11) 0.55      46.2      43.00
     23      178.76   10.28    4.095  0.20( 0.11) 0.55      46.5      33.00
     24      178.73   10.30    4.090  0.20( 0.11) 0.55      46.5      56.00
     25      178.49   10.40    4.068  0.20( 0.11) 0.55      46.7      41.00
     26      176.44   11.03    3.931  0.20( 0.11) 0.55      47.9      13.00
     27      175.07   11.43    3.853  0.20( 0.11) 0.55      48.6      19.00
     28      174.77   11.51    3.836  0.20( 0.11) 0.55      48.7      29.00
     29      174.33   11.62    3.816  0.20( 0.11) 0.55      48.9      33.00
     30      173.81   11.74    3.795  0.20( 0.11) 0.55      49.0      73.00
     31      170.53   12.39    3.679  0.20( 0.11) 0.55      49.8      16.00
     32      168.99   12.70    3.627  0.20( 0.11) 0.55      50.1      17.00
     33      166.55   13.19    3.549  0.20( 0.11) 0.55      50.5      22.00
     34      166.13   13.27    3.537  0.20( 0.11) 0.55      50.6      10.00
     35      164.85   13.48    3.505  0.20( 0.11) 0.55      50.7       7.00
     36      158.67   14.48    3.365  0.20( 0.11) 0.55      51.0       4.00
     37      149.34   16.07    3.170  0.20( 0.11) 0.55      51.3       1.00
   TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      178.85  Tc(MIN.) =   10.110
  EFFECTIVE AREA(ACRES) =     45.99  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.85
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.61
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.85
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      45.99
  TOTAL STREAM AREA(ACRES) =      51.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     178.85

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.43      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    5.43
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.43
  RAINFALL INTENSITY(INCH/HR) =   5.90
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      143.35    5.53    5.840  0.20( 0.11) 0.54      24.2      63.00
      1      144.99    5.67    5.756  0.20( 0.11) 0.54      24.8      47.00
      1      145.48    5.72    5.730  0.20( 0.11) 0.54      25.0      45.00
      1      151.53    6.30    5.421  0.20( 0.11) 0.55      27.8      59.00
      1      165.06    7.69    4.834  0.20( 0.11) 0.55      34.6      31.00
      1      167.99    8.00    4.725  0.20( 0.11) 0.55      36.1      38.00
      1      168.96    8.11    4.688  0.20( 0.11) 0.55      36.6      80.00
```

1	169.47	8.18	4.666	0.20(0.11)	0.55	37.0	6.00
1	172.38	8.56	4.545	0.20(0.11)	0.55	38.8	35.00
1	172.95	8.65	4.520	0.20(0.11)	0.55	39.2	25.00
1	173.09	8.67	4.514	0.20(0.11)	0.55	39.3	24.00
1	174.04	8.82	4.470	0.20(0.11)	0.55	40.0	46.00
1	176.08	9.18	4.369	0.20(0.11)	0.55	41.6	64.00
1	176.67	9.30	4.336	0.20(0.11)	0.55	42.1	32.00
1	176.75	9.32	4.331	0.20(0.11)	0.55	42.2	61.00
1	177.42	9.50	4.284	0.20(0.11)	0.55	42.9	78.00
1	178.48	10.06	4.146	0.20(0.11)	0.55	44.8	14.00
1	178.56	10.10	4.135	0.20(0.11)	0.55	44.9	76.00
1	178.66	10.17	4.118	0.20(0.11)	0.55	45.2	82.00
1	178.77	10.29	4.092	0.20(0.11)	0.55	45.5	67.00
1	178.85	10.44	4.057	0.20(0.11)	0.55	46.0	53.00
1	178.85	10.53	4.038	0.20(0.11)	0.55	46.2	43.00
1	178.76	10.61	4.020	0.20(0.11)	0.55	46.5	33.00
1	178.73	10.63	4.016	0.20(0.11)	0.55	46.5	56.00
1	178.49	10.73	3.995	0.20(0.11)	0.55	46.7	41.00
1	176.44	11.37	3.864	0.20(0.11)	0.55	47.9	13.00
1	175.07	11.76	3.789	0.20(0.11)	0.55	48.6	19.00
1	174.77	11.86	3.772	0.20(0.11)	0.55	48.7	29.00
1	174.33	11.97	3.753	0.20(0.11)	0.55	48.9	33.00
1	173.81	12.08	3.732	0.20(0.11)	0.55	49.0	73.00
1	170.53	12.73	3.621	0.20(0.11)	0.55	49.8	16.00
1	168.99	13.05	3.571	0.20(0.11)	0.55	50.1	17.00
1	166.55	13.54	3.497	0.20(0.11)	0.55	50.5	22.00
1	166.13	13.61	3.486	0.20(0.11)	0.55	50.6	10.00
1	164.85	13.82	3.455	0.20(0.11)	0.55	50.7	7.00
1	158.67	14.82	3.320	0.20(0.11)	0.55	51.0	4.00
1	149.34	16.41	3.131	0.20(0.11)	0.55	51.3	1.00
2	2.32	5.43	5.899	0.20(0.18)	0.90	0.4	88.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	144.64	5.43	5.899	0.20(0.11)	0.55	24.2	88.00
2	145.66	5.53	5.840	0.20(0.11)	0.55	24.6	63.00
3	147.25	5.67	5.756	0.20(0.11)	0.55	25.3	47.00
4	147.74	5.72	5.730	0.20(0.11)	0.55	25.5	45.00
5	153.66	6.30	5.421	0.20(0.11)	0.55	28.3	59.00
6	166.96	7.69	4.834	0.20(0.11)	0.55	35.0	31.00
7	169.84	8.00	4.725	0.20(0.11)	0.55	36.5	38.00
8	170.79	8.11	4.688	0.20(0.11)	0.55	37.1	80.00
9	171.30	8.18	4.666	0.20(0.11)	0.55	37.4	6.00
10	174.16	8.56	4.545	0.20(0.11)	0.55	39.2	35.00
11	174.72	8.65	4.520	0.20(0.11)	0.55	39.6	25.00
12	174.85	8.67	4.514	0.20(0.11)	0.55	39.7	24.00
13	175.78	8.82	4.470	0.20(0.11)	0.55	40.4	46.00
14	177.78	9.18	4.369	0.20(0.11)	0.55	42.0	64.00
15	178.36	9.30	4.336	0.20(0.11)	0.56	42.5	32.00
16	178.44	9.32	4.331	0.20(0.11)	0.56	42.6	61.00
17	179.09	9.50	4.284	0.20(0.11)	0.56	43.3	78.00
18	180.10	10.06	4.146	0.20(0.11)	0.55	45.2	14.00
19	180.17	10.10	4.135	0.20(0.11)	0.55	45.4	76.00
20	180.26	10.17	4.118	0.20(0.11)	0.55	45.6	82.00
21	180.36	10.29	4.092	0.20(0.11)	0.55	46.0	67.00
22	180.43	10.44	4.057	0.20(0.11)	0.55	46.4	53.00
23	180.41	10.53	4.038	0.20(0.11)	0.55	46.7	43.00
24	180.33	10.61	4.020	0.20(0.11)	0.55	46.9	33.00
25	180.29	10.63	4.016	0.20(0.11)	0.55	46.9	56.00
26	180.05	10.73	3.995	0.20(0.11)	0.55	47.1	41.00
27	177.94	11.37	3.864	0.20(0.11)	0.55	48.3	13.00
28	176.54	11.76	3.789	0.20(0.11)	0.55	49.0	19.00
29	176.23	11.86	3.772	0.20(0.11)	0.55	49.2	29.00
30	175.78	11.97	3.753	0.20(0.11)	0.55	49.3	33.00
31	175.25	12.08	3.732	0.20(0.11)	0.55	49.5	73.00
32	171.93	12.73	3.621	0.20(0.11)	0.55	50.2	16.00
33	170.37	13.05	3.571	0.20(0.11)	0.55	50.5	17.00

```
    34      167.90   13.54    3.497  0.20( 0.11) 0.55      51.0      22.00
    35      167.47   13.61    3.486  0.20( 0.11) 0.55      51.0      10.00
    36      166.18   13.82    3.455  0.20( 0.11) 0.55      51.1       7.00
    37      159.95   14.82    3.320  0.20( 0.11) 0.55      51.5       4.00
    38      150.54   16.41    3.131  0.20( 0.11) 0.55      51.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     180.43    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      46.42   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.94
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     180.43
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.406
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20      0.100    91    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    7.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    91    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        1.24      0.20     0.900    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.00
 AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   0.62
 Tc(MIN.) =    7.97
 SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    5.09
 EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
 TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       7.46

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   9.92
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
 FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.46
 PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    8.65
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.65
 RAINFALL INTENSITY(INCH/HR) =   4.52
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.46

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.42    7.97    4.735  0.20( 0.02) 0.10       0.6      85.00
     2        7.46    8.65    4.520  0.20( 0.18) 0.90       1.8      92.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.64    7.97    4.735  0.20( 0.14) 0.70       2.2      85.00
     2        9.77    8.65    4.520  0.20( 0.14) 0.71       2.4      92.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.77    Tc(MIN.) =     8.65
  EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.77
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.67
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.64    8.00    4.728  0.20( 0.14) 0.70       2.2      85.00
      2        9.77    8.67    4.513  0.20( 0.14) 0.71       2.4      92.00
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      144.64    5.56    5.824  0.20( 0.11) 0.55      24.2      88.00
      2      145.66    5.65    5.767  0.20( 0.11) 0.55      24.6      63.00
      3      147.25    5.80    5.685  0.20( 0.11) 0.55      25.3      47.00
      4      147.74    5.84    5.660  0.20( 0.11) 0.55      25.5      45.00
      5      153.66    6.42    5.361  0.20( 0.11) 0.55      28.3      59.00
      6      166.96    7.81    4.792  0.20( 0.11) 0.55      35.0      31.00
      7      169.84    8.12    4.686  0.20( 0.11) 0.55      36.5      38.00
      8      170.79    8.23    4.650  0.20( 0.11) 0.55      37.1      80.00
      9      171.30    8.30    4.628  0.20( 0.11) 0.55      37.4       6.00
     10      174.16    8.68    4.510  0.20( 0.11) 0.55      39.2      35.00
     11      174.72    8.76    4.486  0.20( 0.11) 0.55      39.6      25.00
     12      174.85    8.79    4.479  0.20( 0.11) 0.55      39.7      24.00
     13      175.78    8.94    4.436  0.20( 0.11) 0.55      40.4      46.00
     14      177.78    9.30    4.337  0.20( 0.11) 0.55      42.0      64.00
     15      178.36    9.42    4.305  0.20( 0.11) 0.56      42.5      32.00
     16      178.44    9.44    4.300  0.20( 0.11) 0.56      42.6      61.00
     17      179.09    9.61    4.254  0.20( 0.11) 0.56      43.3      78.00
     18      180.10   10.17    4.118  0.20( 0.11) 0.55      45.2      14.00
     19      180.17   10.22    4.108  0.20( 0.11) 0.55      45.4      76.00
     20      180.26   10.29    4.091  0.20( 0.11) 0.55      45.6      82.00
     21      180.36   10.41    4.066  0.20( 0.11) 0.55      46.0      67.00
     22      180.43   10.56    4.031  0.20( 0.11) 0.55      46.4      53.00
     23      180.41   10.64    4.013  0.20( 0.11) 0.55      46.7      43.00
     24      180.33   10.73    3.995  0.20( 0.11) 0.55      46.9      33.00
     25      180.29   10.75    3.991  0.20( 0.11) 0.55      46.9      56.00
     26      180.05   10.85    3.970  0.20( 0.11) 0.55      47.1      41.00
     27      177.94   11.49    3.842  0.20( 0.11) 0.55      48.3      13.00
     28      176.54   11.88    3.768  0.20( 0.11) 0.55      49.0      19.00
     29      176.23   11.98    3.751  0.20( 0.11) 0.55      49.2      29.00
     30      175.78   12.08    3.732  0.20( 0.11) 0.55      49.3      33.00
     31      175.25   12.20    3.712  0.20( 0.11) 0.55      49.5      73.00
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    32      171.93   12.85    3.602  0.20( 0.11) 0.55      50.2      16.00
    33      170.37   13.16    3.553  0.20( 0.11) 0.55      50.5      17.00
    34      167.90   13.65    3.479  0.20( 0.11) 0.55      51.0      22.00
    35      167.47   13.73    3.468  0.20( 0.11) 0.55      51.0      10.00
    36      166.18   13.94    3.438  0.20( 0.11) 0.55      51.1       7.00
    37      159.95   14.94    3.304  0.20( 0.11) 0.55      51.5       4.00
    38      150.54   16.54    3.118  0.20( 0.11) 0.55      51.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      152.94    5.56    5.824  0.20( 0.11) 0.56      25.7      88.00
      2      154.02    5.65    5.767  0.20( 0.11) 0.56      26.2      63.00
      3      155.70    5.80    5.685  0.20( 0.11) 0.56      26.9      47.00
      4      156.21    5.84    5.660  0.20( 0.11) 0.56      27.1      45.00
      5      162.47    6.42    5.361  0.20( 0.11) 0.56      30.1      59.00
      6      176.51    7.81    4.792  0.20( 0.11) 0.56      37.2      31.00
      7      178.32    8.00    4.728  0.20( 0.11) 0.56      38.2      85.00
      8      179.51    8.12    4.686  0.20( 0.11) 0.56      38.8      38.00
      9      180.48    8.23    4.650  0.20( 0.11) 0.56      39.4      80.00
     10      181.00    8.30    4.628  0.20( 0.11) 0.56      39.7       6.00
     11      183.84    8.67    4.513  0.20( 0.11) 0.56      41.6      92.00
     12      183.92    8.68    4.510  0.20( 0.11) 0.56      41.6      35.00
     13      184.43    8.76    4.486  0.20( 0.11) 0.56      42.0      25.00
     14      184.55    8.79    4.479  0.20( 0.11) 0.56      42.1      24.00
     15      185.38    8.94    4.436  0.20( 0.11) 0.56      42.8      46.00
     16      187.16    9.30    4.337  0.20( 0.11) 0.56      44.4      64.00
     17      187.67    9.42    4.305  0.20( 0.11) 0.56      44.9      32.00
     18      187.73    9.44    4.300  0.20( 0.11) 0.56      45.0      61.00
     19      188.28    9.61    4.254  0.20( 0.11) 0.56      45.7      78.00
     20      188.98   10.17    4.118  0.20( 0.11) 0.56      47.6      14.00
     21      189.03   10.22    4.108  0.20( 0.11) 0.56      47.8      76.00
     22      189.09   10.29    4.091  0.20( 0.11) 0.56      48.0      82.00
     23      189.13   10.41    4.066  0.20( 0.11) 0.56      48.3      67.00
     24      189.12   10.56    4.031  0.20( 0.11) 0.56      48.8      53.00
     25      189.07   10.64    4.013  0.20( 0.11) 0.56      49.1      43.00
     26      188.94   10.73    3.995  0.20( 0.11) 0.56      49.3      33.00
     27      188.89   10.75    3.991  0.20( 0.11) 0.56      49.3      56.00
     28      188.60   10.85    3.970  0.20( 0.11) 0.56      49.5      41.00
     29      186.21   11.49    3.842  0.20( 0.11) 0.56      50.7      13.00
     30      184.64   11.88    3.768  0.20( 0.11) 0.56      51.4      19.00
     31      184.30   11.98    3.751  0.20( 0.11) 0.56      51.6      29.00
     32      183.80   12.08    3.732  0.20( 0.11) 0.56      51.7      33.00
     33      183.23   12.20    3.712  0.20( 0.11) 0.56      51.9      73.00
     34      179.66   12.85    3.602  0.20( 0.11) 0.56      52.6      16.00
     35      177.99   13.16    3.553  0.20( 0.11) 0.56      52.9      17.00
     36      175.36   13.65    3.479  0.20( 0.11) 0.56      53.4      22.00
     37      174.91   13.73    3.468  0.20( 0.11) 0.56      53.4      10.00
     38      173.55   13.94    3.438  0.20( 0.11) 0.56      53.5       7.00
     39      167.02   14.94    3.304  0.20( 0.11) 0.56      53.8       4.00
     40      157.19   16.54    3.118  0.20( 0.11) 0.56      54.1       1.00
    TOTAL AREA(ACRES) =        54.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      189.13  Tc(MIN.) =   10.406
  EFFECTIVE AREA(ACRES) =     48.35  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       54.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.29
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     189.13
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      48.35
  TOTAL STREAM AREA(ACRES) =      54.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     189.13

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.782
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.14      0.20     0.900    91    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.72
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      4.72

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.08      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.78
  AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =    8.14
```

```
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   20.58
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      25.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =  11.15
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.20
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   4.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.20

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.95      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   16.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   11.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.924
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.69      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    5.82
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       9.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  17.95
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.07
  RAINFALL INTENSITY(INCH/HR) =   3.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      152.94    5.63    5.780  0.20( 0.11) 0.56      25.7      88.00
      1      154.02    5.73    5.725  0.20( 0.11) 0.56      26.2      63.00
      1      155.70    5.87    5.645  0.20( 0.11) 0.56      26.9      47.00
      1      156.21    5.91    5.620  0.20( 0.11) 0.56      27.1      45.00
      1      162.47    6.49    5.327  0.20( 0.11) 0.56      30.1      59.00
      1      176.51    7.88    4.768  0.20( 0.11) 0.56      37.2      31.00
      1      178.32    8.07    4.704  0.20( 0.11) 0.56      38.2      85.00
      1      179.51    8.19    4.663  0.20( 0.11) 0.56      38.8      38.00
      1      180.48    8.30    4.627  0.20( 0.11) 0.56      39.4      80.00
      1      181.00    8.37    4.606  0.20( 0.11) 0.56      39.7       6.00
      1      183.84    8.74    4.493  0.20( 0.11) 0.56      41.6      92.00
      1      183.92    8.75    4.489  0.20( 0.11) 0.56      41.6      35.00
      1      184.43    8.83    4.465  0.20( 0.11) 0.56      42.0      25.00
      1      184.55    8.86    4.459  0.20( 0.11) 0.56      42.1      24.00
      1      185.38    9.01    4.416  0.20( 0.11) 0.56      42.8      46.00
      1      187.16    9.37    4.318  0.20( 0.11) 0.56      44.4      64.00
```

1	187.67	9.49	4.286	0.20(0.11)	0.56	44.9	32.00
1	187.73	9.51	4.282	0.20(0.11)	0.56	45.0	61.00
1	188.28	9.68	4.237	0.20(0.11)	0.56	45.7	78.00
1	188.98	10.24	4.102	0.20(0.11)	0.56	47.6	14.00
1	189.03	10.29	4.092	0.20(0.11)	0.56	47.8	76.00
1	189.09	10.36	4.075	0.20(0.11)	0.56	48.0	82.00
1	189.13	10.48	4.050	0.20(0.11)	0.56	48.3	67.00
1	189.12	10.63	4.016	0.20(0.11)	0.56	48.8	53.00
1	189.07	10.71	3.998	0.20(0.11)	0.56	49.1	43.00
1	188.94	10.80	3.980	0.20(0.11)	0.56	49.3	33.00
1	188.89	10.82	3.976	0.20(0.11)	0.56	49.3	56.00
1	188.60	10.92	3.955	0.20(0.11)	0.56	49.5	41.00
1	186.21	11.56	3.828	0.20(0.11)	0.56	50.7	13.00
1	184.64	11.95	3.755	0.20(0.11)	0.56	51.4	19.00
1	184.30	12.05	3.739	0.20(0.11)	0.56	51.6	29.00
1	183.80	12.15	3.719	0.20(0.11)	0.56	51.7	33.00
1	183.23	12.27	3.700	0.20(0.11)	0.56	51.9	73.00
1	179.66	12.92	3.591	0.20(0.11)	0.56	52.6	16.00
1	177.99	13.23	3.542	0.20(0.11)	0.56	52.9	17.00
1	175.36	13.72	3.469	0.20(0.11)	0.56	53.4	22.00
1	174.91	13.80	3.458	0.20(0.11)	0.56	53.4	10.00
1	173.55	14.01	3.428	0.20(0.11)	0.56	53.5	7.00
1	167.02	15.01	3.295	0.20(0.11)	0.56	53.8	4.00
1	157.19	16.61	3.110	0.20(0.11)	0.56	54.1	1.00
2	25.20	8.20	4.659	0.20(0.18)	0.90	6.2	97.00
3	9.07	11.07	3.924	0.20(0.11)	0.54	2.6	100.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	181.42	5.63	5.780	0.20(0.12)	0.61	31.3	88.00
2	182.69	5.73	5.725	0.20(0.12)	0.61	31.9	63.00
3	184.67	5.87	5.645	0.20(0.12)	0.60	32.7	47.00
4	185.27	5.91	5.620	0.20(0.12)	0.60	33.0	45.00
5	192.67	6.49	5.327	0.20(0.12)	0.60	36.5	59.00
6	209.18	7.88	4.768	0.20(0.12)	0.60	45.0	31.00
7	211.30	8.07	4.704	0.20(0.12)	0.60	46.2	85.00
8	212.70	8.19	4.663	0.20(0.12)	0.61	47.0	38.00
9	212.82	8.20	4.659	0.20(0.12)	0.61	47.1	97.00
10	213.55	8.30	4.627	0.20(0.12)	0.60	47.6	80.00
11	213.98	8.37	4.606	0.20(0.12)	0.60	47.9	6.00
12	216.33	8.74	4.493	0.20(0.12)	0.60	49.9	92.00
13	216.40	8.75	4.489	0.20(0.12)	0.60	49.9	35.00
14	216.80	8.83	4.465	0.20(0.12)	0.60	50.3	25.00
15	216.89	8.86	4.459	0.20(0.12)	0.60	50.4	24.00
16	217.54	9.01	4.416	0.20(0.12)	0.60	51.2	46.00
17	218.91	9.37	4.318	0.20(0.12)	0.60	52.9	64.00
18	219.28	9.49	4.286	0.20(0.12)	0.60	53.4	32.00
19	219.33	9.51	4.282	0.20(0.12)	0.60	53.5	61.00
20	219.69	9.68	4.237	0.20(0.12)	0.60	54.2	78.00
21	219.83	10.24	4.102	0.20(0.12)	0.60	56.3	14.00
22	219.84	10.29	4.092	0.20(0.12)	0.60	56.4	76.00
23	219.83	10.36	4.075	0.20(0.12)	0.60	56.7	82.00
24	219.76	10.48	4.050	0.20(0.12)	0.60	57.1	67.00
25	219.62	10.63	4.016	0.20(0.12)	0.60	57.6	53.00
26	219.49	10.71	3.998	0.20(0.12)	0.60	57.8	43.00
27	219.29	10.80	3.980	0.20(0.12)	0.60	58.1	33.00
28	219.23	10.82	3.976	0.20(0.12)	0.60	58.1	56.00
29	218.86	10.92	3.955	0.20(0.12)	0.60	58.4	41.00
30	218.16	11.07	3.924	0.20(0.12)	0.60	58.7	100.00
31	215.57	11.56	3.828	0.20(0.12)	0.60	59.6	13.00
32	213.43	11.95	3.755	0.20(0.12)	0.60	60.3	19.00
33	212.95	12.05	3.739	0.20(0.12)	0.60	60.4	29.00
34	212.30	12.15	3.719	0.20(0.12)	0.59	60.6	33.00
35	211.57	12.27	3.700	0.20(0.12)	0.59	60.7	73.00
36	207.13	12.92	3.591	0.20(0.12)	0.59	61.5	16.00
37	205.07	13.23	3.542	0.20(0.12)	0.59	61.8	17.00
38	201.85	13.72	3.469	0.20(0.12)	0.59	62.2	22.00

```
     39      201.31   13.80    3.458  0.20( 0.12) 0.59      62.3       10.00
     40      199.71   14.01    3.428  0.20( 0.12) 0.59      62.4        7.00
     41      192.12   15.01    3.295  0.20( 0.12) 0.59      62.7        4.00
     42      180.81   16.61    3.110  0.20( 0.12) 0.59      62.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     219.84    Tc(MIN.) =    10.29
  EFFECTIVE AREA(ACRES) =      56.42   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       62.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.59
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     219.84
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.36
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.42
  TOTAL STREAM AREA(ACRES) =      62.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     219.84

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.44      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.38
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
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  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.38
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   6.02
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      181.42    5.71    5.736  0.20( 0.12) 0.61      31.3      88.00
      1      182.69    5.80    5.681  0.20( 0.12) 0.61      31.9      63.00
      1      184.67    5.94    5.603  0.20( 0.12) 0.60      32.7      47.00
      1      185.27    5.99    5.579  0.20( 0.12) 0.60      33.0      45.00
      1      192.67    6.57    5.292  0.20( 0.12) 0.60      36.5      59.00
      1      209.18    7.95    4.742  0.20( 0.12) 0.60      45.0      31.00
      1      211.30    8.14    4.680  0.20( 0.12) 0.60      46.2      85.00
      1      212.70    8.27    4.639  0.20( 0.12) 0.61      47.0      38.00
      1      212.82    8.28    4.635  0.20( 0.12) 0.61      47.1      97.00
      1      213.55    8.37    4.604  0.20( 0.12) 0.60      47.6      80.00
      1      213.98    8.44    4.583  0.20( 0.12) 0.60      47.9       6.00
      1      216.33    8.81    4.471  0.20( 0.12) 0.60      49.9      92.00
      1      216.40    8.82    4.468  0.20( 0.12) 0.60      49.9      35.00
      1      216.80    8.91    4.444  0.20( 0.12) 0.60      50.3      25.00
      1      216.89    8.93    4.438  0.20( 0.12) 0.60      50.4      24.00
      1      217.54    9.08    4.396  0.20( 0.12) 0.60      51.2      46.00
      1      218.91    9.44    4.299  0.20( 0.12) 0.60      52.9      64.00
      1      219.28    9.56    4.268  0.20( 0.12) 0.60      53.4      32.00
      1      219.33    9.58    4.263  0.20( 0.12) 0.60      53.5      61.00
      1      219.69    9.76    4.219  0.20( 0.12) 0.60      54.2      78.00
      1      219.83   10.32    4.086  0.20( 0.12) 0.60      56.3      14.00
      1      219.84   10.36    4.076  0.20( 0.12) 0.60      56.4      76.00
      1      219.83   10.43    4.059  0.20( 0.12) 0.60      56.7      82.00
      1      219.76   10.55    4.034  0.20( 0.12) 0.60      57.1      67.00
      1      219.62   10.70    4.000  0.20( 0.12) 0.60      57.6      53.00
      1      219.49   10.79    3.982  0.20( 0.12) 0.60      57.8      43.00
      1      219.29   10.87    3.965  0.20( 0.12) 0.60      58.1      33.00
      1      219.23   10.89    3.961  0.20( 0.12) 0.60      58.1      56.00
      1      218.86   10.99    3.940  0.20( 0.12) 0.60      58.4      41.00
      1      218.16   11.14    3.909  0.20( 0.12) 0.60      58.7     100.00
      1      215.57   11.63    3.815  0.20( 0.12) 0.60      59.6      13.00
      1      213.43   12.02    3.742  0.20( 0.12) 0.60      60.3      19.00
      1      212.95   12.12    3.726  0.20( 0.12) 0.60      60.4      29.00
      1      212.30   12.23    3.707  0.20( 0.12) 0.59      60.6      33.00
      1      211.57   12.34    3.687  0.20( 0.12) 0.59      60.7      73.00
      1      207.13   13.00    3.579  0.20( 0.12) 0.59      61.5      16.00
      1      205.07   13.31    3.531  0.20( 0.12) 0.59      61.8      17.00
      1      201.85   13.80    3.459  0.20( 0.12) 0.59      62.2      22.00
      1      201.31   13.87    3.448  0.20( 0.12) 0.59      62.3      10.00
      1      199.71   14.09    3.418  0.20( 0.12) 0.59      62.4       7.00
      1      192.12   15.09    3.286  0.20( 0.12) 0.59      62.7       4.00
      1      180.81   16.69    3.102  0.20( 0.12) 0.59      62.9       1.00
      2        2.38    5.24    6.021  0.20( 0.18) 0.90       0.4     104.00
```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	177.54	5.24	6.021	0.20(0.12)	0.61	29.2	104.00
2	183.69	5.71	5.736	0.20(0.12)	0.61	31.8	88.00
3	184.93	5.80	5.681	0.20(0.12)	0.61	32.3	63.00
4	186.87	5.94	5.603	0.20(0.12)	0.61	33.2	47.00
5	187.47	5.99	5.579	0.20(0.12)	0.61	33.5	45.00
6	194.75	6.57	5.292	0.20(0.12)	0.61	37.0	59.00
7	211.04	7.95	4.742	0.20(0.12)	0.61	45.5	31.00
8	213.13	8.14	4.680	0.20(0.12)	0.61	46.6	85.00
9	214.52	8.27	4.639	0.20(0.12)	0.61	47.4	38.00
10	214.64	8.28	4.635	0.20(0.12)	0.61	47.5	97.00
11	215.35	8.37	4.604	0.20(0.12)	0.61	48.0	80.00
12	215.77	8.44	4.583	0.20(0.12)	0.61	48.4	6.00
13	218.08	8.81	4.471	0.20(0.12)	0.61	50.3	92.00
14	218.14	8.82	4.468	0.20(0.12)	0.61	50.4	35.00
15	218.53	8.91	4.444	0.20(0.12)	0.61	50.8	25.00
16	218.63	8.93	4.438	0.20(0.12)	0.61	50.9	24.00
17	219.26	9.08	4.396	0.20(0.12)	0.61	51.6	46.00
18	220.58	9.44	4.299	0.20(0.12)	0.60	53.3	64.00
19	220.94	9.56	4.268	0.20(0.12)	0.60	53.8	32.00
20	220.99	9.58	4.263	0.20(0.12)	0.60	53.9	61.00
21	221.33	9.76	4.219	0.20(0.12)	0.60	54.6	78.00
22	221.42	10.32	4.086	0.20(0.12)	0.60	56.7	14.00
23	221.43	10.36	4.076	0.20(0.12)	0.60	56.9	76.00
24	221.41	10.43	4.059	0.20(0.12)	0.60	57.1	82.00
25	221.33	10.55	4.034	0.20(0.12)	0.60	57.5	67.00
26	221.18	10.70	4.000	0.20(0.12)	0.60	58.0	53.00
27	221.04	10.79	3.982	0.20(0.12)	0.60	58.3	43.00
28	220.84	10.87	3.965	0.20(0.12)	0.60	58.5	33.00
29	220.77	10.89	3.961	0.20(0.12)	0.60	58.6	56.00
30	220.39	10.99	3.940	0.20(0.12)	0.60	58.8	41.00
31	219.68	11.14	3.909	0.20(0.12)	0.60	59.1	100.00
32	217.05	11.63	3.815	0.20(0.12)	0.60	60.0	13.00
33	214.88	12.02	3.742	0.20(0.12)	0.60	60.7	19.00
34	214.39	12.12	3.726	0.20(0.12)	0.60	60.9	29.00
35	213.73	12.23	3.707	0.20(0.12)	0.60	61.0	33.00
36	213.00	12.34	3.687	0.20(0.12)	0.60	61.2	73.00
37	208.51	13.00	3.579	0.20(0.12)	0.60	61.9	16.00
38	206.44	13.31	3.531	0.20(0.12)	0.60	62.2	17.00
39	203.19	13.80	3.459	0.20(0.12)	0.60	62.7	22.00
40	202.65	13.87	3.448	0.20(0.12)	0.60	62.7	10.00
41	201.03	14.09	3.418	0.20(0.12)	0.60	62.8	7.00
42	193.38	15.09	3.286	0.20(0.12)	0.60	63.1	4.00
43	182.00	16.69	3.102	0.20(0.12)	0.60	63.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 221.43 Tc(MIN.) = 10.36
EFFECTIVE AREA(ACRES) = 56.86 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 63.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 106.00 = 3485.00 FEET.

****
FLOW PROCESS FROM NODE 106.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 420.30
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.72
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 221.43
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 108.00 = 3830.00 FEET.

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.86
  TOTAL STREAM AREA(ACRES) =      63.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     221.43

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.748
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.32      0.20     0.100    91    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    6.98
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.112
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.35      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.60
  EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.67
  TOTAL STREAM AREA(ACRES) =       0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      177.54    5.53    5.838  0.20( 0.12) 0.61      29.2     104.00
      1      183.69    6.00    5.575  0.20( 0.12) 0.61      31.8      88.00
      1      184.93    6.09    5.525  0.20( 0.12) 0.61      32.3      63.00
      1      186.87    6.23    5.452  0.20( 0.12) 0.61      33.2      47.00
      1      187.47    6.28    5.430  0.20( 0.12) 0.61      33.5      45.00
      1      194.75    6.85    5.167  0.20( 0.12) 0.61      37.0      59.00
      1      211.04    8.23    4.650  0.20( 0.12) 0.61      45.5      31.00
      1      213.13    8.42    4.591  0.20( 0.12) 0.61      46.6      85.00
      1      214.52    8.54    4.552  0.20( 0.12) 0.61      47.4      38.00
      1      214.64    8.56    4.548  0.20( 0.12) 0.61      47.5      97.00
      1      215.35    8.65    4.519  0.20( 0.12) 0.61      48.0      80.00
      1      215.77    8.72    4.499  0.20( 0.12) 0.61      48.4       6.00
      1      218.08    9.09    4.393  0.20( 0.12) 0.61      50.3      92.00
      1      218.14    9.10    4.389  0.20( 0.12) 0.61      50.4      35.00
      1      218.53    9.19    4.367  0.20( 0.12) 0.61      50.8      25.00
      1      218.63    9.21    4.361  0.20( 0.12) 0.61      50.9      24.00
      1      219.26    9.36    4.321  0.20( 0.12) 0.61      51.6      46.00
      1      220.58    9.72    4.228  0.20( 0.12) 0.60      53.3      64.00
      1      220.94    9.84    4.198  0.20( 0.12) 0.60      53.8      32.00
      1      220.99    9.86    4.194  0.20( 0.12) 0.60      53.9      61.00
      1      221.33   10.03    4.151  0.20( 0.12) 0.60      54.6      78.00
      1      221.42   10.59    4.024  0.20( 0.12) 0.60      56.7      14.00
      1      221.43   10.64    4.014  0.20( 0.12) 0.60      56.9      76.00
      1      221.41   10.71    3.998  0.20( 0.12) 0.60      57.1      82.00
      1      221.33   10.83    3.974  0.20( 0.12) 0.60      57.5      67.00
      1      221.18   10.98    3.942  0.20( 0.12) 0.60      58.0      53.00
      1      221.04   11.06    3.925  0.20( 0.12) 0.60      58.3      43.00
      1      220.84   11.15    3.908  0.20( 0.12) 0.60      58.5      33.00
      1      220.77   11.17    3.904  0.20( 0.12) 0.60      58.6      56.00
      1      220.39   11.27    3.884  0.20( 0.12) 0.60      58.8      41.00
      1      219.68   11.42    3.854  0.20( 0.12) 0.60      59.1     100.00
      1      217.05   11.91    3.763  0.20( 0.12) 0.60      60.0      13.00
      1      214.88   12.30    3.693  0.20( 0.12) 0.60      60.7      19.00
      1      214.39   12.40    3.677  0.20( 0.12) 0.60      60.9      29.00
      1      213.73   12.51    3.659  0.20( 0.12) 0.60      61.0      33.00
      1      213.00   12.62    3.640  0.20( 0.12) 0.60      61.2      73.00
      1      208.51   13.27    3.536  0.20( 0.12) 0.60      61.9      16.00
      1      206.44   13.59    3.489  0.20( 0.12) 0.60      62.2      17.00
      1      203.19   14.08    3.419  0.20( 0.12) 0.60      62.7      22.00
      1      202.65   14.15    3.409  0.20( 0.12) 0.60      62.7      10.00
      1      201.03   14.37    3.379  0.20( 0.12) 0.60      62.8       7.00
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     1      193.38   15.37    3.251  0.20( 0.12) 0.60       63.1        4.00
     1      182.00   16.98    3.071  0.20( 0.12) 0.60       63.4        1.00
     2        3.07    6.98    5.112  0.20( 0.02) 0.10        0.7       95.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      180.32    5.53    5.838  0.20( 0.12) 0.60       29.8     104.00
      2      186.57    6.00    5.575  0.20( 0.12) 0.60       32.4      88.00
      3      187.83    6.09    5.525  0.20( 0.12) 0.60       32.9      63.00
      4      189.80    6.23    5.452  0.20( 0.12) 0.60       33.8      47.00
      5      190.40    6.28    5.430  0.20( 0.12) 0.60       34.1      45.00
      6      197.79    6.85    5.167  0.20( 0.12) 0.60       37.6      59.00
      7      199.32    6.98    5.112  0.20( 0.12) 0.60       38.4      95.00
      8      213.83    8.23    4.650  0.20( 0.12) 0.60       46.1      31.00
      9      215.89    8.42    4.591  0.20( 0.12) 0.60       47.3      85.00
     10      217.25    8.54    4.552  0.20( 0.12) 0.60       48.1      38.00
     11      217.37    8.56    4.548  0.20( 0.12) 0.60       48.2      97.00
     12      218.06    8.65    4.519  0.20( 0.12) 0.60       48.7      80.00
     13      218.47    8.72    4.499  0.20( 0.12) 0.60       49.0       6.00
     14      220.72    9.09    4.393  0.20( 0.12) 0.60       51.0      92.00
     15      220.78    9.10    4.389  0.20( 0.12) 0.60       51.0      35.00
     16      221.16    9.19    4.367  0.20( 0.12) 0.60       51.5      25.00
     17      221.24    9.21    4.361  0.20( 0.12) 0.60       51.6      24.00
     18      221.85    9.36    4.321  0.20( 0.12) 0.60       52.3      46.00
     19      223.12    9.72    4.228  0.20( 0.12) 0.60       54.0      64.00
     20      223.46    9.84    4.198  0.20( 0.12) 0.60       54.5      32.00
     21      223.51    9.86    4.194  0.20( 0.12) 0.60       54.6      61.00
     22      223.82   10.03    4.151  0.20( 0.12) 0.60       55.3      78.00
     23      223.84   10.59    4.024  0.20( 0.12) 0.60       57.4      14.00
     24      223.84   10.64    4.014  0.20( 0.12) 0.60       57.5      76.00
     25      223.81   10.71    3.998  0.20( 0.12) 0.59       57.8      82.00
     26      223.72   10.83    3.974  0.20( 0.12) 0.59       58.2      67.00
     27      223.54   10.98    3.942  0.20( 0.12) 0.59       58.7      53.00
     28      223.40   11.06    3.925  0.20( 0.12) 0.59       58.9      43.00
     29      223.18   11.15    3.908  0.20( 0.12) 0.59       59.2      33.00
     30      223.11   11.17    3.904  0.20( 0.12) 0.59       59.2      56.00
     31      222.72   11.27    3.884  0.20( 0.12) 0.59       59.5      41.00
     32      221.99   11.42    3.854  0.20( 0.12) 0.59       59.8     100.00
     33      219.31   11.91    3.763  0.20( 0.12) 0.59       60.7      13.00
     34      217.09   12.30    3.693  0.20( 0.12) 0.59       61.4      19.00
     35      216.60   12.40    3.677  0.20( 0.12) 0.59       61.5      29.00
     36      215.93   12.51    3.659  0.20( 0.12) 0.59       61.7      33.00
     37      215.18   12.62    3.640  0.20( 0.12) 0.59       61.8      73.00
     38      210.63   13.27    3.536  0.20( 0.12) 0.59       62.6      16.00
     39      208.53   13.59    3.489  0.20( 0.12) 0.59       62.9      17.00
     40      205.24   14.08    3.419  0.20( 0.12) 0.59       63.3      22.00
     41      204.69   14.15    3.409  0.20( 0.12) 0.59       63.4      10.00
     42      203.06   14.37    3.379  0.20( 0.12) 0.59       63.5       7.00
     43      195.33   15.37    3.251  0.20( 0.12) 0.59       63.8       4.00
     44      183.84   16.98    3.071  0.20( 0.12) 0.59       64.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     223.84    Tc(MIN.) =    10.59
  EFFECTIVE AREA(ACRES) =      57.37   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       64.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
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```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  47.82
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     223.84
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.775
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.93      0.20     0.900    91    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.554
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.84      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.05
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.68
  Tc(MIN.) =    8.54
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       6.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =  11.75
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.342
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    91    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.005
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.55
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.97   10.19    4.116  0.20( 0.18) 0.90       1.8      97.00
      2        3.69   10.68    4.005  0.20( 0.10) 0.50       1.0     111.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.59   10.19    4.116  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.68    4.005  0.20( 0.15) 0.75       2.8     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.59    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.59
```

```
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.518
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"         D        0.78      0.20     0.600    91    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.09

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    9.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.304
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"         D        0.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       4.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.42
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.997
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.22
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.22

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  4.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   4.70
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.42    4.304  0.20( 0.11) 0.56       1.3     114.00
      2        6.21    8.08    4.701  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.08    4.701  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.42    4.304  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.71    Tc(MIN.) =     8.08
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.71
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
```

```
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.71    8.18    4.665  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.53    4.276  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.59   10.30    4.088  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.80    3.980  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.18    4.665  0.20( 0.13) 0.63       4.8     116.00
      2       20.72    9.53    4.276  0.20( 0.13) 0.64       5.3     114.00
      3       20.58   10.30    4.088  0.20( 0.13) 0.64       5.5      97.00
      4       20.19   10.80    3.980  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =          5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       20.72  Tc(MIN.) =    9.527
  EFFECTIVE AREA(ACRES) =      5.33  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.72
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.78
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.33
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.72
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    91    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =   10.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.952
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  2.60   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.93
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.55
  TOTAL STREAM AREA(ACRES) =       1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.44    4.584  0.20( 0.13) 0.63       4.8     116.00
      1       20.72    9.78    4.212  0.20( 0.13) 0.64       5.3     114.00
      1       20.58   10.56    4.032  0.20( 0.13) 0.64       5.5      97.00
      1       20.19   11.05    3.927  0.20( 0.13) 0.64       5.6     111.00
      2        5.37   10.93    3.952  0.20( 0.10) 0.50       1.5     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.18    8.44    4.584  0.20( 0.12) 0.61       6.0     116.00
      2       25.86    9.78    4.212  0.20( 0.12) 0.61       6.7     114.00
      3       25.88   10.56    4.032  0.20( 0.12) 0.61       7.0      97.00
      4       25.66   10.93    3.952  0.20( 0.12) 0.61       7.1     120.00
      5       25.53   11.05    3.927  0.20( 0.12) 0.61       7.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.88    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =       7.04   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.88
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.73
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.04
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.88
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.749
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20     0.100    91    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.96
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.96

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   5.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.96

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.560
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    8.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
```

```
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.98
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       7.61

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.16
  TOTAL STREAM AREA(ACRES) =       2.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       25.18    8.61    4.531  0.20( 0.12) 0.61       6.0     116.00
     1       25.86    9.95    4.171  0.20( 0.12) 0.61       6.7     114.00
     1       25.88   10.73    3.995  0.20( 0.12) 0.61       7.0      97.00
     1       25.66   11.11    3.917  0.20( 0.12) 0.61       7.1     120.00
     1       25.53   11.23    3.893  0.20( 0.12) 0.61       7.1     111.00
     2        1.96    5.68    5.749  0.20( 0.02) 0.10       0.4     118.00
     3        7.61   10.64    4.013  0.20( 0.10) 0.50       2.2     123.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       29.03    5.68    5.749  0.20( 0.11) 0.55       5.5     118.00
     2       33.69    8.61    4.531  0.20( 0.11) 0.56       8.1     116.00
     3       34.67    9.95    4.171  0.20( 0.11) 0.56       9.1     114.00
     4       34.85   10.64    4.013  0.20( 0.11) 0.57       9.5     123.00
     5       34.81   10.73    3.995  0.20( 0.11) 0.57       9.6      97.00
     6       34.41   11.11    3.917  0.20( 0.11) 0.57       9.7     120.00
     7       34.22   11.23    3.893  0.20( 0.11) 0.57       9.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.85    Tc(MIN.) =    10.64
  EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.396
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.59      0.20     0.900    91    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      2.24

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.979
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    5.20
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.22

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.029
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.11
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    8.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.637
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.89      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    3.63
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.27
 RAINFALL INTENSITY(INCH/HR) =   4.64
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.59
 TOTAL STREAM AREA(ACRES) =       1.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        7.22   10.80    3.979  0.20( 0.12) 0.61       2.1     127.00
     2        6.49    8.27    4.637  0.20( 0.10) 0.50       1.6     129.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.96    8.27    4.637  0.20( 0.11) 0.56       3.2     129.00
     2       12.77   10.80    3.979  0.20( 0.11) 0.56       3.7     127.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.96    Tc(MIN.) =     8.27
 EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        3.7
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.12
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.96
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.32
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.96    8.32    4.621  0.20( 0.11) 0.56       3.2     129.00
     2       12.77   10.85    3.968  0.20( 0.11) 0.56       3.7     127.00
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
      1       29.03    6.01    5.567  0.20( 0.11) 0.55       5.5     118.00
      2       33.69    8.92    4.440  0.20( 0.11) 0.56       8.1     116.00
      3       34.67   10.26    4.098  0.20( 0.11) 0.56       9.1     114.00
      4       34.85   10.95    3.948  0.20( 0.11) 0.57       9.5     123.00
      5       34.81   11.04    3.930  0.20( 0.11) 0.57       9.6      97.00
      6       34.41   11.41    3.855  0.20( 0.11) 0.57       9.7     120.00
      7       34.22   11.53    3.832  0.20( 0.11) 0.57       9.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.36    6.01    5.567  0.20( 0.11) 0.55       7.8     118.00
      2       45.69    8.32    4.621  0.20( 0.11) 0.56      10.8     129.00
      3       46.61    8.92    4.440  0.20( 0.11) 0.56      11.4     116.00
      4       47.49   10.26    4.098  0.20( 0.11) 0.56      12.7     114.00
      5       47.59   10.85    3.968  0.20( 0.11) 0.57      13.2     127.00
      6       47.55   10.95    3.948  0.20( 0.11) 0.57      13.2     123.00
      7       47.45   11.04    3.930  0.20( 0.11) 0.57      13.2      97.00
      8       46.80   11.41    3.855  0.20( 0.11) 0.57      13.3     120.00
      9       46.54   11.53    3.832  0.20( 0.11) 0.57      13.4     111.00
    TOTAL AREA(ACRES) =        13.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       47.59  Tc(MIN.) =   10.855
  EFFECTIVE AREA(ACRES) =     13.15  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.59
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.99
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.99
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      13.15
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.59

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.370
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.49

********************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   5.37
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.36    6.15    5.494  0.20( 0.11) 0.55       7.8     118.00
      1       45.69    8.46    4.579  0.20( 0.11) 0.56      10.8     129.00
      1       46.61    9.05    4.403  0.20( 0.11) 0.56      11.4     116.00
      1       47.49   10.39    4.068  0.20( 0.11) 0.56      12.7     114.00
      1       47.59   10.99    3.941  0.20( 0.11) 0.57      13.2     127.00
      1       47.55   11.09    3.921  0.20( 0.11) 0.57      13.2     123.00
      1       47.45   11.17    3.903  0.20( 0.11) 0.57      13.2      97.00
      1       46.80   11.55    3.830  0.20( 0.11) 0.57      13.3     120.00
      1       46.54   11.67    3.807  0.20( 0.11) 0.57      13.4     111.00
      2        1.49    6.40    5.370  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.83    6.15    5.494  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    6.40    5.370  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    8.46    4.579  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.05    4.403  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   10.39    4.068  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   10.99    3.941  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.09    3.921  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.17    3.903  0.20( 0.11) 0.56      13.6      97.00
      9       47.87   11.55    3.830  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   11.67    3.807  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.69    Tc(MIN.) =    10.99
  EFFECTIVE AREA(ACRES) =      13.46   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.69
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   11.64
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.46      0.20     0.500    91    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.28   Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.17      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    4.37
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.62
  FLOW VELOCITY(FEET/SEC.) =  4.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   4.27
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.09

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.980
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.73      0.20      0.500    91    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.21
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =    8.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.666
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.09    9.56    4.268  0.20( 0.11) 0.57       1.6     134.00
      2        5.88    8.18    4.666  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.59    8.18    4.666  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.56    4.268  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.59    Tc(MIN.) =     8.18
  EFFECTIVE AREA(ACRES) =       2.83   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.59
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.59    8.25    4.643  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.63    4.251  0.20( 0.11) 0.54       3.1     134.00
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       41.83    6.83    5.175  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    7.08    5.069  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    9.11    4.388  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.70    4.231  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   11.04    3.929  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   11.64    3.813  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.73    3.795  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.82    3.779  0.20( 0.11) 0.56      13.6      97.00
      9       47.87   12.20    3.712  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   12.32    3.691  0.20( 0.11) 0.55      13.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       52.55    6.83    5.175  0.20( 0.11) 0.53      10.4     118.00
      2       53.32    7.08    5.069  0.20( 0.11) 0.53      10.8     138.00
      3       56.65    8.25    4.643  0.20( 0.11) 0.54      12.8     136.00
      4       58.47    9.11    4.388  0.20( 0.11) 0.54      14.0     129.00
      5       59.18    9.63    4.251  0.20( 0.11) 0.54      14.7     134.00
      6       59.23    9.70    4.231  0.20( 0.11) 0.54      14.8     116.00
      7       59.19   11.04    3.929  0.20( 0.11) 0.55      16.0     114.00
      8       58.94   11.64    3.813  0.20( 0.11) 0.55      16.5     127.00
      9       58.84   11.73    3.795  0.20( 0.11) 0.55      16.6     123.00
     10       58.69   11.82    3.779  0.20( 0.11) 0.55      16.6      97.00
     11       57.83   12.20    3.712  0.20( 0.11) 0.55      16.7     120.00
     12       57.51   12.32    3.691  0.20( 0.11) 0.55      16.7     111.00
    TOTAL AREA(ACRES) =        16.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       59.23  Tc(MIN.) =    9.704
  EFFECTIVE AREA(ACRES) =     14.78  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
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```
 FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
 FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      59.23
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.55    7.16    5.035  0.20( 0.11) 0.53      10.4     118.00
     2       53.32    7.41    4.937  0.20( 0.11) 0.53      10.8     138.00
     3       56.65    8.58    4.540  0.20( 0.11) 0.54      12.8     136.00
     4       58.47    9.44    4.300  0.20( 0.11) 0.54      14.0     129.00
     5       59.18    9.95    4.171  0.20( 0.11) 0.54      14.7     134.00
     6       59.23   10.02    4.153  0.20( 0.11) 0.54      14.8     116.00
     7       59.19   11.36    3.865  0.20( 0.11) 0.55      16.0     114.00
     8       58.94   11.96    3.754  0.20( 0.11) 0.55      16.5     127.00
     9       58.84   12.05    3.737  0.20( 0.11) 0.55      16.6     123.00
    10       58.69   12.15    3.720  0.20( 0.11) 0.55      16.6      97.00
    11       57.83   12.53    3.655  0.20( 0.11) 0.55      16.7     120.00
    12       57.51   12.65    3.635  0.20( 0.11) 0.55      16.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      180.32    5.55    5.825  0.20( 0.12) 0.60      29.8     104.00
     2      186.57    6.02    5.564  0.20( 0.12) 0.60      32.4      88.00
     3      187.83    6.11    5.514  0.20( 0.12) 0.60      32.9      63.00
     4      189.80    6.25    5.442  0.20( 0.12) 0.60      33.8      47.00
     5      190.40    6.30    5.420  0.20( 0.12) 0.60      34.1      45.00
     6      197.79    6.87    5.158  0.20( 0.12) 0.60      37.6      59.00
     7      199.32    7.00    5.104  0.20( 0.12) 0.60      38.4      95.00
     8      213.83    8.25    4.644  0.20( 0.12) 0.60      46.1      31.00
     9      215.89    8.44    4.585  0.20( 0.12) 0.60      47.3      85.00
    10      217.25    8.56    4.546  0.20( 0.12) 0.60      48.1      38.00
    11      217.37    8.57    4.542  0.20( 0.12) 0.60      48.2      97.00
    12      218.06    8.67    4.513  0.20( 0.12) 0.60      48.7      80.00
    13      218.47    8.74    4.493  0.20( 0.12) 0.60      49.0       6.00
    14      220.72    9.11    4.387  0.20( 0.12) 0.60      51.0      92.00
    15      220.78    9.12    4.384  0.20( 0.12) 0.60      51.0      35.00
    16      221.16    9.20    4.362  0.20( 0.12) 0.60      51.5      25.00
    17      221.24    9.23    4.356  0.20( 0.12) 0.60      51.6      24.00
    18      221.85    9.38    4.316  0.20( 0.12) 0.60      52.3      46.00
    19      223.12    9.74    4.224  0.20( 0.12) 0.60      54.0      64.00
    20      223.46    9.86    4.194  0.20( 0.12) 0.60      54.5      32.00
    21      223.51    9.88    4.189  0.20( 0.12) 0.60      54.6      61.00
    22      223.82   10.05    4.147  0.20( 0.12) 0.60      55.3      78.00
    23      223.84   10.61    4.020  0.20( 0.12) 0.60      57.4      14.00
    24      223.84   10.66    4.010  0.20( 0.12) 0.60      57.5      76.00
    25      223.81   10.73    3.994  0.20( 0.12) 0.59      57.8      82.00
    26      223.72   10.85    3.970  0.20( 0.12) 0.59      58.2      67.00
    27      223.54   11.00    3.938  0.20( 0.12) 0.59      58.7      53.00
    28      223.40   11.08    3.921  0.20( 0.12) 0.59      58.9      43.00
    29      223.18   11.17    3.904  0.20( 0.12) 0.59      59.2      33.00
    30      223.11   11.19    3.900  0.20( 0.12) 0.59      59.2      56.00
    31      222.72   11.29    3.881  0.20( 0.12) 0.59      59.5      41.00
```

32	221.99	11.44	3.851	0.20(0.12)	0.59	59.8	100.00
33	219.31	11.93	3.760	0.20(0.12)	0.59	60.7	13.00
34	217.09	12.32	3.690	0.20(0.12)	0.59	61.4	19.00
35	216.60	12.42	3.674	0.20(0.12)	0.59	61.5	29.00
36	215.93	12.52	3.656	0.20(0.12)	0.59	61.7	33.00
37	215.18	12.64	3.637	0.20(0.12)	0.59	61.8	73.00
38	210.63	13.29	3.533	0.20(0.12)	0.59	62.6	16.00
39	208.53	13.61	3.486	0.20(0.12)	0.59	62.9	17.00
40	205.24	14.10	3.416	0.20(0.12)	0.59	63.3	22.00
41	204.69	14.17	3.406	0.20(0.12)	0.59	63.4	10.00
42	203.06	14.39	3.377	0.20(0.12)	0.59	63.5	7.00
43	195.33	15.39	3.249	0.20(0.12)	0.59	63.8	4.00
44	183.84	17.00	3.069	0.20(0.12)	0.59	64.1	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 140.00 = 3885.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	227.60	5.55	5.825	0.20(0.12)	0.59	37.9	104.00
2	235.44	6.02	5.564	0.20(0.12)	0.59	41.1	88.00
3	237.03	6.11	5.514	0.20(0.12)	0.59	41.8	63.00
4	239.47	6.25	5.442	0.20(0.12)	0.59	42.9	47.00
5	240.22	6.30	5.420	0.20(0.12)	0.59	43.2	45.00
6	249.43	6.87	5.158	0.20(0.12)	0.59	47.6	59.00
7	251.35	7.00	5.104	0.20(0.12)	0.59	48.6	95.00
8	253.81	7.16	5.035	0.20(0.12)	0.59	49.9	118.00
9	257.46	7.41	4.937	0.20(0.12)	0.59	51.8	138.00
10	269.53	8.25	4.644	0.20(0.12)	0.59	58.4	31.00
11	272.12	8.44	4.585	0.20(0.12)	0.59	59.8	85.00
12	273.84	8.56	4.546	0.20(0.12)	0.59	60.8	38.00
13	273.99	8.57	4.542	0.20(0.12)	0.59	60.9	97.00
14	274.07	8.58	4.540	0.20(0.12)	0.59	61.0	136.00
15	274.90	8.67	4.513	0.20(0.12)	0.59	61.6	80.00
16	275.45	8.74	4.493	0.20(0.12)	0.59	62.0	6.00
17	278.49	9.11	4.387	0.20(0.12)	0.59	64.5	92.00
18	278.57	9.12	4.384	0.20(0.12)	0.59	64.6	35.00
19	279.13	9.20	4.362	0.20(0.12)	0.59	65.1	25.00
20	279.27	9.23	4.356	0.20(0.12)	0.59	65.3	24.00
21	280.19	9.38	4.316	0.20(0.12)	0.59	66.2	46.00
22	280.54	9.44	4.300	0.20(0.12)	0.59	66.6	129.00
23	282.00	9.74	4.224	0.20(0.12)	0.59	68.4	64.00
24	282.51	9.86	4.194	0.20(0.12)	0.59	69.1	32.00
25	282.58	9.88	4.189	0.20(0.12)	0.59	69.2	61.00
26	282.81	9.95	4.171	0.20(0.12)	0.59	69.6	134.00
27	283.01	10.02	4.153	0.20(0.12)	0.59	70.0	116.00
28	283.05	10.05	4.147	0.20(0.12)	0.59	70.1	78.00
29	283.05	10.61	4.020	0.20(0.12)	0.59	72.7	14.00
30	283.05	10.66	4.010	0.20(0.12)	0.58	72.9	76.00
31	283.02	10.73	3.994	0.20(0.12)	0.58	73.2	82.00
32	282.92	10.85	3.970	0.20(0.12)	0.58	73.7	67.00
33	282.74	11.00	3.938	0.20(0.12)	0.58	74.4	53.00
34	282.59	11.08	3.921	0.20(0.12)	0.58	74.7	43.00
35	282.37	11.17	3.904	0.20(0.12)	0.58	75.0	33.00
36	282.30	11.19	3.900	0.20(0.12)	0.58	75.1	56.00
37	281.91	11.29	3.881	0.20(0.12)	0.58	75.4	41.00
38	281.54	11.36	3.865	0.20(0.12)	0.58	75.7	114.00
39	281.15	11.44	3.851	0.20(0.12)	0.58	75.9	100.00
40	278.26	11.93	3.760	0.20(0.12)	0.58	77.2	13.00
41	278.08	11.96	3.754	0.20(0.12)	0.58	77.3	127.00
42	277.43	12.05	3.737	0.20(0.12)	0.58	77.5	123.00
43	276.74	12.15	3.720	0.20(0.12)	0.58	77.7	97.00
44	275.39	12.32	3.690	0.20(0.12)	0.58	78.0	19.00
45	274.69	12.42	3.674	0.20(0.12)	0.58	78.2	29.00
46	273.77	12.52	3.656	0.20(0.12)	0.58	78.4	33.00
47	273.74	12.53	3.655	0.20(0.12)	0.58	78.4	120.00
48	272.72	12.64	3.637	0.20(0.12)	0.58	78.6	73.00
49	272.61	12.65	3.635	0.20(0.12)	0.58	78.6	111.00
50	266.48	13.29	3.533	0.20(0.12)	0.58	79.3	16.00
51	263.61	13.61	3.486	0.20(0.12)	0.58	79.6	17.00
52	259.18	14.10	3.416	0.20(0.12)	0.58	80.1	22.00
53	258.46	14.17	3.406	0.20(0.12)	0.58	80.1	10.00

```
     54      256.35   14.39    3.377  0.20( 0.12) 0.58      80.2       7.00
     55      246.54   15.39    3.249  0.20( 0.12) 0.58      80.5       4.00
     56      232.11   17.00    3.069  0.20( 0.12) 0.58      80.8       1.00
    TOTAL AREA(ACRES) =        80.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      283.05  Tc(MIN.) =   10.052
  EFFECTIVE AREA(ACRES) =     70.12  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       80.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  56.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.43
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     283.05
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.21
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =      70.12
  TOTAL STREAM AREA(ACRES) =      80.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     283.05

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.12      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.67

****************************************************************************
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```
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.67

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.455
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    91    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    8.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.19
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.98
  FLOW VELOCITY(FEET/SEC.) =  3.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       5.89

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.03
  RAINFALL INTENSITY(INCH/HR) =   4.72
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      227.60    5.72    5.730  0.20( 0.12) 0.59      37.9     104.00
      1      235.44    6.18    5.481  0.20( 0.12) 0.59      41.1      88.00
      1      237.03    6.27    5.433  0.20( 0.12) 0.59      41.8      63.00
      1      239.47    6.42    5.364  0.20( 0.12) 0.59      42.9      47.00
      1      240.22    6.46    5.342  0.20( 0.12) 0.59      43.2      45.00
      1      249.43    7.03    5.091  0.20( 0.12) 0.59      47.6      59.00
      1      251.35    7.15    5.039  0.20( 0.12) 0.59      48.6      95.00
      1      253.81    7.32    4.973  0.20( 0.12) 0.59      49.9     118.00
      1      257.46    7.57    4.878  0.20( 0.12) 0.59      51.8     138.00
      1      269.53    8.41    4.594  0.20( 0.12) 0.59      58.4      31.00
      1      272.12    8.59    4.537  0.20( 0.12) 0.59      59.8      85.00
      1      273.84    8.72    4.499  0.20( 0.12) 0.59      60.8      38.00
      1      273.99    8.73    4.496  0.20( 0.12) 0.59      60.9      97.00
      1      274.07    8.74    4.493  0.20( 0.12) 0.59      61.0     136.00
      1      274.90    8.83    4.467  0.20( 0.12) 0.59      61.6      80.00
      1      275.45    8.90    4.447  0.20( 0.12) 0.59      62.0       6.00
      1      278.49    9.26    4.345  0.20( 0.12) 0.59      64.5      92.00
      1      278.57    9.28    4.342  0.20( 0.12) 0.59      64.6      35.00
      1      279.13    9.36    4.320  0.20( 0.12) 0.59      65.1      25.00
      1      279.27    9.38    4.315  0.20( 0.12) 0.59      65.3      24.00
      1      280.19    9.53    4.276  0.20( 0.12) 0.59      66.2      46.00
      1      280.54    9.59    4.260  0.20( 0.12) 0.59      66.6     129.00
```

1	282.00	9.89	4.186	0.20(0.12)	0.59	68.4	64.00
1	282.51	10.01	4.157	0.20(0.12)	0.59	69.1	32.00
1	282.58	10.03	4.152	0.20(0.12)	0.59	69.2	61.00
1	282.81	10.10	4.135	0.20(0.12)	0.59	69.6	134.00
1	283.01	10.18	4.117	0.20(0.12)	0.59	70.0	116.00
1	283.05	10.21	4.111	0.20(0.12)	0.59	70.1	78.00
1	283.05	10.77	3.987	0.20(0.12)	0.59	72.7	14.00
1	283.05	10.81	3.977	0.20(0.12)	0.58	72.9	76.00
1	283.02	10.88	3.962	0.20(0.12)	0.58	73.2	82.00
1	282.92	11.00	3.939	0.20(0.12)	0.58	73.7	67.00
1	282.74	11.15	3.907	0.20(0.12)	0.58	74.4	53.00
1	282.59	11.24	3.890	0.20(0.12)	0.58	74.7	43.00
1	282.37	11.32	3.874	0.20(0.12)	0.58	75.0	33.00
1	282.30	11.34	3.870	0.20(0.12)	0.58	75.1	56.00
1	281.91	11.44	3.851	0.20(0.12)	0.58	75.4	41.00
1	281.54	11.52	3.836	0.20(0.12)	0.58	75.7	114.00
1	281.15	11.59	3.821	0.20(0.12)	0.58	75.9	100.00
1	278.26	12.08	3.733	0.20(0.12)	0.58	77.2	13.00
1	278.08	12.11	3.727	0.20(0.12)	0.58	77.3	127.00
1	277.43	12.21	3.710	0.20(0.12)	0.58	77.5	123.00
1	276.74	12.31	3.693	0.20(0.12)	0.58	77.7	97.00
1	275.39	12.48	3.664	0.20(0.12)	0.58	78.0	19.00
1	274.69	12.57	3.648	0.20(0.12)	0.58	78.2	29.00
1	273.77	12.68	3.630	0.20(0.12)	0.58	78.4	33.00
1	273.74	12.69	3.629	0.20(0.12)	0.58	78.4	120.00
1	272.72	12.79	3.612	0.20(0.12)	0.58	78.6	73.00
1	272.61	12.81	3.610	0.20(0.12)	0.58	78.6	111.00
1	266.48	13.45	3.510	0.20(0.12)	0.58	79.3	16.00
1	263.61	13.76	3.464	0.20(0.12)	0.58	79.6	17.00
1	259.18	14.25	3.395	0.20(0.12)	0.58	80.1	22.00
1	258.46	14.33	3.384	0.20(0.12)	0.58	80.1	10.00
1	256.35	14.54	3.356	0.20(0.12)	0.58	80.2	7.00
1	246.54	15.55	3.230	0.20(0.12)	0.58	80.5	4.00
1	232.11	17.16	3.053	0.20(0.12)	0.58	80.8	1.00
2	0.67	5.00	6.187	0.20(0.02)	0.10	0.1	140.00
3	5.89	8.03	4.716	0.20(0.04)	0.20	1.4	141.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.77	5.00	6.187	0.20(0.11)	0.57	34.1	140.00
2	233.32	5.72	5.730	0.20(0.12)	0.58	39.0	104.00
3	241.31	6.18	5.481	0.20(0.12)	0.58	42.3	88.00
4	242.93	6.27	5.433	0.20(0.11)	0.57	43.0	63.00
5	245.41	6.42	5.364	0.20(0.11)	0.57	44.1	47.00
6	246.17	6.46	5.342	0.20(0.11)	0.57	44.5	45.00
7	255.55	7.03	5.091	0.20(0.11)	0.57	49.0	59.00
8	257.51	7.15	5.039	0.20(0.12)	0.58	50.0	95.00
9	260.01	7.32	4.973	0.20(0.12)	0.58	51.3	118.00
10	263.73	7.57	4.878	0.20(0.12)	0.58	53.3	138.00
11	270.49	8.03	4.716	0.20(0.12)	0.58	57.0	141.00
12	275.76	8.41	4.594	0.20(0.12)	0.58	59.9	31.00
13	278.27	8.59	4.537	0.20(0.12)	0.58	61.4	85.00
14	279.94	8.72	4.499	0.20(0.12)	0.58	62.4	38.00
15	280.09	8.73	4.496	0.20(0.12)	0.58	62.4	97.00
16	280.17	8.74	4.493	0.20(0.12)	0.58	62.5	136.00
17	280.96	8.83	4.467	0.20(0.12)	0.58	63.1	80.00
18	281.48	8.90	4.447	0.20(0.12)	0.58	63.6	6.00
19	284.38	9.26	4.345	0.20(0.12)	0.58	66.1	92.00
20	284.46	9.28	4.342	0.20(0.12)	0.58	66.1	35.00
21	284.99	9.36	4.320	0.20(0.12)	0.58	66.7	25.00
22	285.12	9.38	4.315	0.20(0.12)	0.58	66.8	24.00
23	285.99	9.53	4.276	0.20(0.12)	0.58	67.7	46.00
24	286.31	9.59	4.260	0.20(0.12)	0.58	68.1	129.00
25	287.68	9.89	4.186	0.20(0.12)	0.58	69.9	64.00
26	288.15	10.01	4.157	0.20(0.12)	0.58	70.6	32.00
27	288.21	10.03	4.152	0.20(0.12)	0.58	70.7	61.00
28	288.42	10.10	4.135	0.20(0.12)	0.58	71.1	134.00

```
    29      288.59   10.18    4.117  0.20( 0.12) 0.58      71.5     116.00
    30      288.63   10.21    4.111  0.20( 0.12) 0.58      71.6      78.00
    31      288.45   10.77    3.987  0.20( 0.12) 0.58      74.2      14.00
    32      288.44   10.81    3.977  0.20( 0.12) 0.58      74.4      76.00
    33      288.39   10.88    3.962  0.20( 0.12) 0.58      74.8      82.00
    34      288.26   11.00    3.939  0.20( 0.12) 0.58      75.2      67.00
    35      288.04   11.15    3.907  0.20( 0.12) 0.58      75.9      53.00
    36      287.86   11.24    3.890  0.20( 0.12) 0.58      76.2      43.00
    37      287.62   11.32    3.874  0.20( 0.12) 0.58      76.6      33.00
    38      287.54   11.34    3.870  0.20( 0.12) 0.58      76.6      56.00
    39      287.13   11.44    3.851  0.20( 0.12) 0.58      77.0      41.00
    40      286.74   11.52    3.836  0.20( 0.12) 0.58      77.2     114.00
    41      286.32   11.59    3.821  0.20( 0.12) 0.58      77.4     100.00
    42      283.32   12.08    3.733  0.20( 0.12) 0.58      78.7      13.00
    43      283.12   12.11    3.727  0.20( 0.12) 0.58      78.8     127.00
    44      282.45   12.21    3.710  0.20( 0.12) 0.58      79.0     123.00
    45      281.74   12.31    3.693  0.20( 0.12) 0.58      79.2      97.00
    46      280.35   12.48    3.664  0.20( 0.12) 0.58      79.6      19.00
    47      279.63   12.57    3.648  0.20( 0.12) 0.58      79.7      29.00
    48      278.69   12.68    3.630  0.20( 0.12) 0.58      79.9      33.00
    49      278.65   12.69    3.629  0.20( 0.12) 0.58      79.9     120.00
    50      277.61   12.79    3.612  0.20( 0.12) 0.58      80.1      73.00
    51      277.49   12.81    3.610  0.20( 0.12) 0.58      80.1     111.00
    52      271.23   13.45    3.510  0.20( 0.12) 0.58      80.8      16.00
    53      268.30   13.76    3.464  0.20( 0.12) 0.58      81.1      17.00
    54      263.77   14.25    3.395  0.20( 0.12) 0.58      81.6      22.00
    55      263.03   14.33    3.384  0.20( 0.12) 0.58      81.6      10.00
    56      260.89   14.54    3.356  0.20( 0.12) 0.58      81.7       7.00
    57      250.90   15.55    3.230  0.20( 0.12) 0.58      82.1       4.00
    58      236.23   17.16    3.053  0.20( 0.12) 0.58      82.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     288.63    Tc(MIN.) =    10.21
  EFFECTIVE AREA(ACRES) =      71.64   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       82.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  55.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.86
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     288.63
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.96      0.20      0.600    91   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   13.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.546
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.82      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    5.61
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       8.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.60
  FLOW VELOCITY(FEET/SEC.) =  3.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.26
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
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```
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    91   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.87

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.574
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   13.03
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.82
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   4.27
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
```

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  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   14.73
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.73
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.443
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65   14.73    3.331  0.20( 0.18) 0.90       0.5     147.00
      2        2.41    8.91    4.443  0.20( 0.12) 0.60       0.6      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.76    8.91    4.443  0.20( 0.14) 0.70       0.9      10.00
```

```
     2        3.44   14.73    3.331  0.20( 0.15) 0.74       1.2     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.76    Tc(MIN.) =     8.91
  EFFECTIVE AREA(ACRES) =       0.95   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.13
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.76    9.13    4.382  0.20( 0.14) 0.70       0.9      10.00
      2        3.44   14.95    3.303  0.20( 0.15) 0.74       1.2     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.57   13.26    3.539  0.20( 0.12) 0.60       2.8     144.00
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
    TOTAL AREA(ACRES) =         3.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       12.11  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      3.88  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.08      0.20     0.500    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   2.10    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.74
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.34

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.266
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.57
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.59

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =   10.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.095
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.34    9.74    4.222  0.20( 0.10) 0.50       0.1     147.00
      2        2.88   10.28    4.095  0.20( 0.09) 0.44       0.8     152.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.16    9.74    4.222  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.28    4.095  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.22    Tc(MIN.) =    10.28
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.22
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.16    9.79    4.210  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.33    4.083  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.19    9.13    4.382  0.20( 0.12) 0.59       3.6      10.00
      2       14.44    9.79    4.210  0.20( 0.12) 0.59       3.9     147.00
      3       14.62   10.33    4.083  0.20( 0.12) 0.59       4.0     152.00
      4       14.88   13.26    3.539  0.20( 0.12) 0.60       4.8     144.00
      5       14.01   14.95    3.303  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       14.88  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      4.76  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.88
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.66
  RAINFALL INTENSITY(INCH/HR) =   3.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.76
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.88

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.175
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    91    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   6.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.19    9.53    4.275  0.20( 0.12) 0.59       3.6      10.00
      1       14.44   10.19    4.114  0.20( 0.12) 0.59       3.9     147.00
      1       14.62   10.73    3.996  0.20( 0.12) 0.59       4.0     152.00
      1       14.88   13.66    3.479  0.20( 0.12) 0.60       4.8     144.00
      1       14.01   15.36    3.253  0.20( 0.12) 0.61       4.8     147.00
      2        1.27    5.02    6.175  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.16    5.02    6.175  0.20( 0.11) 0.55       2.1     150.00
      2       15.07    9.53    4.275  0.20( 0.11) 0.57       3.9      10.00
      3       15.29   10.19    4.114  0.20( 0.11) 0.57       4.1     147.00
      4       15.44   10.73    3.996  0.20( 0.11) 0.57       4.3     152.00
      5       15.60   13.66    3.479  0.20( 0.12) 0.58       5.0     144.00
      6       14.67   15.36    3.253  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.60    Tc(MIN.) =    13.66
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.60
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.69
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.69
  RAINFALL INTENSITY(INCH/HR) =   3.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.99
  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.60

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.813
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.30      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.16    5.05    6.150  0.20( 0.11) 0.55       2.1     150.00
      1       15.07    9.57    4.266  0.20( 0.11) 0.57       3.9      10.00
      1       15.29   10.23    4.106  0.20( 0.11) 0.57       4.1     147.00
      1       15.44   10.76    3.988  0.20( 0.11) 0.57       4.3     152.00
      1       15.60   13.69    3.474  0.20( 0.12) 0.58       5.0     144.00
      1       14.67   15.39    3.249  0.20( 0.12) 0.59       5.1     147.00
      2        1.56    5.58    5.813  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.65    5.05    6.150  0.20( 0.10) 0.51       2.4     150.00
      2       14.05    5.58    5.813  0.20( 0.10) 0.51       2.6      14.00
      3       16.21    9.57    4.266  0.20( 0.11) 0.54       4.2      10.00
      4       16.38   10.23    4.106  0.20( 0.11) 0.55       4.4     147.00
      5       16.51   10.76    3.988  0.20( 0.11) 0.55       4.6     152.00
      6       16.52   13.69    3.474  0.20( 0.11) 0.56       5.3     144.00
      7       15.54   15.39    3.249  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    13.69
  EFFECTIVE AREA(ACRES) =       5.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   13.97
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.97
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       5.29
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.826
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    91    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    6.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.314
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.26      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.52
  RAINFALL INTENSITY(INCH/HR) =   5.31
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.47

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.65    5.34    5.959  0.20( 0.10) 0.51       2.4     150.00
      1       14.05    5.86    5.649  0.20( 0.10) 0.51       2.6      14.00
      1       16.21    9.84    4.197  0.20( 0.11) 0.54       4.2      10.00
      1       16.38   10.50    4.044  0.20( 0.11) 0.55       4.4     147.00
      1       16.51   11.04    3.931  0.20( 0.11) 0.55       4.6     152.00
      1       16.52   13.97    3.434  0.20( 0.11) 0.56       5.3     144.00
      1       15.54   15.67    3.215  0.20( 0.11) 0.57       5.4     147.00
      2        2.47    6.52    5.314  0.20( 0.03) 0.15       0.5     154.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.92    5.34    5.959  0.20( 0.09) 0.46       2.8     150.00
      2       16.42    5.86    5.649  0.20( 0.09) 0.46       3.1      14.00
      3       16.88    6.52    5.314  0.20( 0.09) 0.46       3.4     154.00
      4       18.16    9.84    4.197  0.20( 0.10) 0.50       4.7      10.00
      5       18.26   10.50    4.044  0.20( 0.10) 0.50       4.9     147.00
      6       18.33   11.04    3.931  0.20( 0.10) 0.51       5.1     152.00
      7       18.12   13.97    3.434  0.20( 0.10) 0.52       5.8     144.00
      8       17.03   15.67    3.215  0.20( 0.11) 0.53       5.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.33    Tc(MIN.) =    11.04
  EFFECTIVE AREA(ACRES) =       5.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.33
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.415
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.24      0.20     0.600    91    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.79
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      4.79

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.425
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.68      0.20      0.600    91    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.63
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.63

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.63

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.79    9.01    4.415  0.20( 0.12) 0.60       1.2     159.00
      2        2.63    8.98    4.425  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.42    8.98    4.425  0.20( 0.12) 0.60       1.9     160.00
      2        7.42    9.01    4.415  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.42    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.19
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        7.42    9.16    4.374  0.20( 0.12) 0.60       1.9     160.00
    2        7.42    9.19    4.365  0.20( 0.12) 0.60       1.9     159.00
 LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       15.92    5.41    5.912  0.20( 0.09) 0.46       2.8     150.00
    2       16.42    5.93    5.609  0.20( 0.09) 0.46       3.1      14.00
    3       16.88    6.59    5.280  0.20( 0.09) 0.46       3.4     154.00
    4       18.16    9.92    4.179  0.20( 0.10) 0.50       4.7      10.00
    5       18.26   10.58    4.028  0.20( 0.10) 0.50       4.9     147.00
    6       18.33   11.11    3.916  0.20( 0.10) 0.51       5.1     152.00
    7       18.12   14.04    3.424  0.20( 0.10) 0.52       5.8     144.00
    8       17.03   15.74    3.207  0.20( 0.11) 0.53       5.9     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.90    5.41    5.912  0.20( 0.10) 0.50       4.0     150.00
    2       22.62    5.93    5.609  0.20( 0.10) 0.50       4.4      14.00
    3       23.37    6.59    5.280  0.20( 0.10) 0.50       4.8     154.00
    4       25.29    9.16    4.374  0.20( 0.10) 0.52       6.3     160.00
    5       25.30    9.19    4.365  0.20( 0.11) 0.53       6.3     159.00
    6       25.26    9.92    4.179  0.20( 0.11) 0.53       6.6      10.00
    7       25.09   10.58    4.028  0.20( 0.11) 0.53       6.8     147.00
    8       24.97   11.11    3.916  0.20( 0.11) 0.53       7.0     152.00
    9       23.89   14.04    3.424  0.20( 0.11) 0.54       7.7     144.00
   10       22.43   15.74    3.207  0.20( 0.11) 0.55       7.8     147.00
  TOTAL AREA(ACRES) =         7.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       25.30  Tc(MIN.) =    9.190
 EFFECTIVE AREA(ACRES) =      6.33  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        7.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.25
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.30
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.40
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.452
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.28      0.20     0.600    91    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.99

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.738
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      5.05
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      5.05
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.99    9.36    4.321  0.20( 0.12) 0.60       1.3      17.00
      2        5.05    7.97    4.738  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.72    7.97    4.738  0.20( 0.11) 0.55       2.3      16.00
      2        9.59    9.36    4.321  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.72    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.01
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.72    8.01    4.723  0.20( 0.11) 0.55       2.3      16.00
      2        9.59    9.40    4.309  0.20( 0.11) 0.55       2.5      17.00
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.90    5.63    5.781  0.20( 0.10) 0.50       4.0     150.00
    2       22.62    6.15    5.496  0.20( 0.10) 0.50       4.4      14.00
    3       23.37    6.81    5.185  0.20( 0.10) 0.50       4.8     154.00
    4       25.29    9.37    4.318  0.20( 0.10) 0.52       6.3     160.00
    5       25.30    9.40    4.309  0.20( 0.11) 0.53       6.3     159.00
    6       25.26   10.13    4.129  0.20( 0.11) 0.53       6.6      10.00
    7       25.09   10.79    3.983  0.20( 0.11) 0.53       6.8     147.00
    8       24.97   11.32    3.874  0.20( 0.11) 0.53       7.0     152.00
    9       23.89   14.25    3.395  0.20( 0.11) 0.54       7.7     144.00
   10       22.43   15.96    3.182  0.20( 0.11) 0.55       7.8     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       30.30    5.63    5.781  0.20( 0.10) 0.51       5.6     150.00
    2       31.33    6.15    5.496  0.20( 0.10) 0.51       6.1      14.00
    3       32.45    6.81    5.185  0.20( 0.10) 0.52       6.8     154.00
    4       33.99    8.01    4.723  0.20( 0.10) 0.52       7.8      16.00
    5       34.88    9.37    4.318  0.20( 0.11) 0.53       8.8     160.00
    6       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8     159.00
    7       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8      17.00
    8       34.43   10.13    4.129  0.20( 0.11) 0.54       9.1      10.00
    9       33.94   10.79    3.983  0.20( 0.11) 0.54       9.3     147.00
   10       33.56   11.32    3.874  0.20( 0.11) 0.54       9.5     152.00
   11       31.39   14.25    3.395  0.20( 0.11) 0.55      10.2     144.00
   12       29.44   15.96    3.182  0.20( 0.11) 0.55      10.3     147.00
  TOTAL AREA(ACRES) =        10.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       34.89  Tc(MIN.) =    9.400
 EFFECTIVE AREA(ACRES) =      8.82  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       10.3
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.66
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.89
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.45
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.45
 RAINFALL INTENSITY(INCH/HR) =   4.30
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       8.82
```

```
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.89

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.521
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    91    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.863
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  3.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.17

********************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.157
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.71

********************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   6.16
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.30    5.68    5.750  0.20( 0.10) 0.51       5.6     150.00
      1       31.33    6.20    5.469  0.20( 0.10) 0.51       6.1      14.00
      1       32.45    6.86    5.162  0.20( 0.10) 0.52       6.8     154.00
      1       33.99    8.06    4.706  0.20( 0.10) 0.52       7.8      16.00
      1       34.88    9.42    4.305  0.20( 0.11) 0.53       8.8     160.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53       8.8     159.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53       8.8      17.00
      1       34.43   10.18    4.117  0.20( 0.11) 0.54       9.1      10.00
      1       33.94   10.84    3.972  0.20( 0.11) 0.54       9.3     147.00
      1       33.56   11.37    3.864  0.20( 0.11) 0.54       9.5     152.00
      1       31.39   14.31    3.388  0.20( 0.11) 0.55      10.2     144.00
      1       29.44   16.01    3.176  0.20( 0.11) 0.55      10.3     147.00
      2        3.17    7.61    4.863  0.20( 0.03) 0.16       0.7      19.00
      3        1.71    5.04    6.157  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.20    5.04    6.157  0.20( 0.09) 0.46       5.8     161.00
     2       34.70    5.68    5.750  0.20( 0.09) 0.46       6.4     150.00
     3       35.76    6.20    5.469  0.20( 0.09) 0.47       7.0      14.00
     4       36.93    6.86    5.162  0.20( 0.09) 0.47       7.7     154.00
     5       37.94    7.61    4.863  0.20( 0.09) 0.47       8.5      19.00
     6       38.37    8.06    4.706  0.20( 0.10) 0.48       8.9      16.00
     7       38.88    9.42    4.305  0.20( 0.10) 0.49       9.8     160.00
     8       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9     159.00
     9       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9      17.00
    10       38.26   10.18    4.117  0.20( 0.10) 0.50      10.1      10.00
    11       37.63   10.84    3.972  0.20( 0.10) 0.50      10.4     147.00
    12       37.15   11.37    3.864  0.20( 0.10) 0.50      10.5     152.00
    13       34.54   14.31    3.388  0.20( 0.10) 0.51      11.3     144.00
    14       32.39   16.01    3.176  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.89    Tc(MIN.) =     9.45
  EFFECTIVE AREA(ACRES) =       9.86   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.01
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.89
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.709
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.85      0.20     0.600    91    8.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.51
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      3.51

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.673
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.51    8.05    4.709  0.20( 0.12) 0.60       0.9     168.00
      2        4.06    8.16    4.673  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.54    8.05    4.709  0.20( 0.12) 0.60       1.8     168.00
      2        7.54    8.16    4.673  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.54    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.54    8.19    4.663  0.20( 0.12) 0.60       1.8     168.00
      2        7.54    8.30    4.628  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.20    5.11    6.113  0.20( 0.09) 0.46       5.8     161.00
      2       34.70    5.74    5.715  0.20( 0.09) 0.46       6.4     150.00
      3       35.76    6.26    5.439  0.20( 0.09) 0.47       7.0      14.00
      4       36.93    6.92    5.136  0.20( 0.09) 0.47       7.7     154.00
      5       37.94    7.67    4.842  0.20( 0.09) 0.47       8.5      19.00
      6       38.37    8.12    4.686  0.20( 0.10) 0.48       8.9      16.00
      7       38.88    9.48    4.289  0.20( 0.10) 0.49       9.8     160.00
      8       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9     159.00
      9       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9      17.00
     10       38.26   10.24    4.104  0.20( 0.10) 0.50      10.1      10.00
     11       37.63   10.90    3.960  0.20( 0.10) 0.50      10.4     147.00
     12       37.15   11.43    3.852  0.20( 0.10) 0.50      10.5     152.00
     13       34.54   14.37    3.380  0.20( 0.10) 0.51      11.3     144.00
     14       32.39   16.08    3.169  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.41    5.11    6.113  0.20( 0.10) 0.48       6.9     161.00
      2       41.21    5.74    5.715  0.20( 0.10) 0.49       7.7     150.00
      3       42.52    6.26    5.439  0.20( 0.10) 0.49       8.4      14.00
      4       43.96    6.92    5.136  0.20( 0.10) 0.49       9.3     154.00
      5       45.28    7.67    4.842  0.20( 0.10) 0.50      10.2      19.00
      6       45.89    8.12    4.686  0.20( 0.10) 0.50      10.7      16.00
      7       45.94    8.19    4.663  0.20( 0.10) 0.50      10.7     168.00
      8       45.98    8.30    4.628  0.20( 0.10) 0.50      10.8     169.00
      9       45.86    9.48    4.289  0.20( 0.10) 0.51      11.7     160.00
     10       45.85    9.51    4.281  0.20( 0.10) 0.51      11.7     159.00
     11       45.84    9.51    4.281  0.20( 0.10) 0.51      11.7      17.00
     12       44.92   10.24    4.104  0.20( 0.10) 0.51      12.0      10.00
     13       44.05   10.90    3.960  0.20( 0.10) 0.51      12.2     147.00
     14       43.39   11.43    3.852  0.20( 0.10) 0.51      12.4     152.00
     15       39.99   14.37    3.380  0.20( 0.10) 0.52      13.1     144.00
     16       37.49   16.08    3.169  0.20( 0.10) 0.52      13.2     147.00
```

```
    TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       45.98  Tc(MIN.) =    8.299
  EFFECTIVE AREA(ACRES) =     10.82  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.98
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.98
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.50
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.82
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.98

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.55
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.55

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.41    5.32    5.973  0.20( 0.10) 0.48       6.9     161.00
      1       41.21    5.95    5.599  0.20( 0.10) 0.49       7.7     150.00
      1       42.52    6.47    5.337  0.20( 0.10) 0.49       8.4      14.00
      1       43.96    7.13    5.049  0.20( 0.10) 0.49       9.3     154.00
      1       45.28    7.87    4.770  0.20( 0.10) 0.50      10.2      19.00
      1       45.89    8.32    4.621  0.20( 0.10) 0.50      10.7      16.00
      1       45.94    8.39    4.599  0.20( 0.10) 0.50      10.7     168.00
      1       45.98    8.50    4.565  0.20( 0.10) 0.50      10.8     169.00
      1       45.86    9.68    4.238  0.20( 0.10) 0.51      11.7     160.00
      1       45.85    9.71    4.230  0.20( 0.10) 0.51      11.7     159.00
      1       45.84    9.71    4.230  0.20( 0.10) 0.51      11.7      17.00
      1       44.92   10.45    4.056  0.20( 0.10) 0.51      12.0      10.00
      1       44.05   11.11    3.917  0.20( 0.10) 0.51      12.2     147.00
      1       43.39   11.64    3.812  0.20( 0.10) 0.51      12.4     152.00
      1       39.99   14.58    3.351  0.20( 0.10) 0.52      13.1     144.00
      1       37.49   16.29    3.145  0.20( 0.10) 0.52      13.2     147.00
      2        1.55    5.00    6.187  0.20( 0.02) 0.10       0.3     170.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.96    5.00    6.187  0.20( 0.09) 0.47       6.8     170.00
      2       40.91    5.32    5.973  0.20( 0.09) 0.47       7.2     161.00
      3       42.62    5.95    5.599  0.20( 0.09) 0.47       8.0     150.00
      4       43.86    6.47    5.337  0.20( 0.10) 0.48       8.7      14.00
      5       45.23    7.13    5.049  0.20( 0.10) 0.48       9.5     154.00
      6       46.48    7.87    4.770  0.20( 0.10) 0.48      10.4      19.00
      7       47.05    8.32    4.621  0.20( 0.10) 0.49      10.9      16.00
      8       47.10    8.39    4.599  0.20( 0.10) 0.49      11.0     168.00
      9       47.12    8.50    4.565  0.20( 0.10) 0.49      11.1     169.00
     10       46.92    9.68    4.238  0.20( 0.10) 0.50      12.0     160.00
     11       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0     159.00
     12       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0      17.00
     13       45.94   10.45    4.056  0.20( 0.10) 0.50      12.3      10.00
     14       45.03   11.11    3.917  0.20( 0.10) 0.50      12.5     147.00
     15       44.35   11.64    3.812  0.20( 0.10) 0.50      12.7     152.00
     16       40.83   14.58    3.351  0.20( 0.10) 0.51      13.4     144.00
     17       38.27   16.29    3.145  0.20( 0.10) 0.51      13.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.12    Tc(MIN.) =     8.50
  EFFECTIVE AREA(ACRES) =      11.10   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.12
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.81      0.20     0.200    91    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   5.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.812
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.51      0.20     0.100    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.66

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.66

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.06    5.94    5.604  0.20( 0.04) 0.20       0.8     173.00
      2        2.66    5.58    5.812  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.61    5.58    5.812  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    5.94    5.604  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.62    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.62
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.61    5.72    5.728  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    6.09    5.528  0.20( 0.03) 0.16       1.3     173.00
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.
```

```
  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.96    5.06    6.142  0.20( 0.09) 0.47       6.8     170.00
      2       40.91    5.38    5.932  0.20( 0.09) 0.47       7.2     161.00
      3       42.62    6.02    5.564  0.20( 0.09) 0.47       8.0     150.00
      4       43.86    6.54    5.307  0.20( 0.10) 0.48       8.7      14.00
      5       45.23    7.19    5.024  0.20( 0.10) 0.48       9.5     154.00
      6       46.48    7.94    4.748  0.20( 0.10) 0.48      10.4      19.00
      7       47.05    8.38    4.601  0.20( 0.10) 0.49      10.9      16.00
      8       47.10    8.46    4.579  0.20( 0.10) 0.49      11.0     168.00
      9       47.12    8.56    4.546  0.20( 0.10) 0.49      11.1     169.00
     10       46.92    9.74    4.222  0.20( 0.10) 0.50      12.0     160.00
     11       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0     159.00
     12       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0      17.00
     13       45.94   10.51    4.042  0.20( 0.10) 0.50      12.3      10.00
     14       45.03   11.17    3.904  0.20( 0.10) 0.50      12.5     147.00
     15       44.35   11.71    3.800  0.20( 0.10) 0.50      12.7     152.00
     16       40.83   14.64    3.343  0.20( 0.10) 0.51      13.4     144.00
     17       38.27   16.35    3.138  0.20( 0.10) 0.51      13.4     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.24    5.06    6.142  0.20( 0.08) 0.42       7.9     170.00
      2       47.35    5.38    5.932  0.20( 0.08) 0.42       8.4     161.00
      3       48.42    5.72    5.728  0.20( 0.09) 0.43       8.9     174.00
      4       49.24    6.02    5.564  0.20( 0.09) 0.43       9.3     150.00
      5       49.40    6.09    5.528  0.20( 0.09) 0.43       9.4     173.00
      6       50.21    6.54    5.307  0.20( 0.09) 0.43      10.0      14.00
      7       51.24    7.19    5.024  0.20( 0.09) 0.44      10.9     154.00
      8       52.16    7.94    4.748  0.20( 0.09) 0.45      11.8      19.00
      9       52.55    8.38    4.601  0.20( 0.09) 0.45      12.3      16.00
     10       52.57    8.46    4.579  0.20( 0.09) 0.45      12.3     168.00
     11       52.56    8.56    4.546  0.20( 0.09) 0.46      12.4     169.00
     12       51.97    9.74    4.222  0.20( 0.09) 0.47      13.3     160.00
     13       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3     159.00
     14       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3      17.00
     15       50.77   10.51    4.042  0.20( 0.09) 0.47      13.6      10.00
     16       49.69   11.17    3.904  0.20( 0.09) 0.47      13.8     147.00
     17       48.89   11.71    3.800  0.20( 0.09) 0.47      14.0     152.00
     18       44.82   14.64    3.343  0.20( 0.10) 0.48      14.7     144.00
     19       42.01   16.35    3.138  0.20( 0.10) 0.48      14.8     147.00
    TOTAL AREA(ACRES) =        14.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       52.57  Tc(MIN.) =    8.455
  EFFECTIVE AREA(ACRES) =     12.33  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       14.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.28
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.57
```

```
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      12.33
  TOTAL STREAM AREA(ACRES) =      14.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      52.57

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20     0.100    91    5.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.21
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.70
  RAINFALL INTENSITY(INCH/HR) =   5.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.810
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =    7.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.966
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   4.97
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       46.24    5.42    5.905  0.20( 0.08) 0.42       7.9     170.00
     1       47.35    5.74    5.716  0.20( 0.08) 0.42       8.4     161.00
     1       48.42    6.08    5.533  0.20( 0.09) 0.43       8.9     174.00
     1       49.24    6.37    5.383  0.20( 0.09) 0.43       9.3     150.00
     1       49.40    6.44    5.350  0.20( 0.09) 0.43       9.4     173.00
     1       50.21    6.89    5.148  0.20( 0.09) 0.43      10.0      14.00
     1       51.24    7.55    4.886  0.20( 0.09) 0.44      10.9     154.00
     1       52.16    8.28    4.634  0.20( 0.09) 0.45      11.8      19.00
     1       52.55    8.73    4.496  0.20( 0.09) 0.45      12.3      16.00
     1       52.57    8.80    4.476  0.20( 0.09) 0.45      12.3     168.00
     1       52.56    8.91    4.444  0.20( 0.09) 0.46      12.4     169.00
     1       51.97   10.09    4.139  0.20( 0.09) 0.47      13.3     160.00
     1       51.94   10.12    4.131  0.20( 0.09) 0.47      13.3     159.00
     1       51.94   10.12    4.131  0.20( 0.09) 0.47      13.3      17.00
     1       50.77   10.87    3.966  0.20( 0.09) 0.47      13.6      10.00
     1       49.69   11.53    3.834  0.20( 0.09) 0.47      13.8     147.00
     1       48.89   12.06    3.735  0.20( 0.09) 0.47      14.0     152.00
     1       44.82   15.00    3.297  0.20( 0.10) 0.48      14.7     144.00
     1       42.01   16.72    3.098  0.20( 0.10) 0.48      14.8     147.00
     2        2.21    5.70    5.737  0.20( 0.02) 0.10       0.4     175.00
     3        3.55    7.34    4.966  0.20( 0.04) 0.20       0.8     167.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.52    5.42    5.905  0.20( 0.08) 0.39       8.9     170.00
      2       52.62    5.70    5.737  0.20( 0.08) 0.39       9.4     175.00
      3       52.75    5.74    5.716  0.20( 0.08) 0.40       9.4     161.00
      4       53.83    6.08    5.533  0.20( 0.08) 0.40      10.0     174.00
      5       54.65    6.37    5.383  0.20( 0.08) 0.40      10.4     150.00
      6       54.82    6.44    5.350  0.20( 0.08) 0.40      10.6     173.00
      7       55.65    6.89    5.148  0.20( 0.08) 0.41      11.2      14.00
      8       56.37    7.34    4.966  0.20( 0.08) 0.41      11.8     167.00
      9       56.61    7.55    4.886  0.20( 0.08) 0.41      12.1     154.00
     10       57.26    8.28    4.634  0.20( 0.08) 0.42      13.0      19.00
     11       57.49    8.73    4.496  0.20( 0.09) 0.43      13.5      16.00
     12       57.49    8.80    4.476  0.20( 0.09) 0.43      13.6     168.00
     13       57.44    8.91    4.444  0.20( 0.09) 0.43      13.7     169.00
     14       56.51   10.09    4.139  0.20( 0.09) 0.44      14.5     160.00
     15       56.48   10.12    4.131  0.20( 0.09) 0.44      14.5     159.00
     16       56.48   10.12    4.131  0.20( 0.09) 0.44      14.5      17.00
     17       55.13   10.87    3.966  0.20( 0.09) 0.44      14.8      10.00
     18       53.90   11.53    3.834  0.20( 0.09) 0.45      15.0     147.00
     19       52.99   12.06    3.735  0.20( 0.09) 0.45      15.2     152.00
     20       48.43   15.00    3.297  0.20( 0.09) 0.46      15.9     144.00
     21       45.41   16.72    3.098  0.20( 0.09) 0.46      16.0     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      57.49    Tc(MIN.) =     8.73
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       16.0
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.40  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.84
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.
```

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****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.661
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    91    8.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.75
 TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =   10.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
 STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    9.38
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.315
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.89
 EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.50
 FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
```

```
 LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.38
 RAINFALL INTENSITY(INCH/HR) =   4.31
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.54
 EFFECTIVE STREAM AREA(ACRES) =       1.17
 TOTAL STREAM AREA(ACRES) =       1.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.43

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.618
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91    8.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      4.53
 TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.53

****************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
 STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.40
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.20
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.188
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.43    9.38    4.315  0.20( 0.11) 0.54       1.2     179.00
      2        7.83    9.88    4.188  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.10    9.38    4.315  0.20( 0.12) 0.58       3.2     179.00
      2       12.13    9.88    4.188  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.13    Tc(MIN.) =     9.88
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.13
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	12.10	9.52	4.279	0.20(0.12)	0.58	3.2	179.00
2	12.13	10.02	4.155	0.20(0.12)	0.58	3.3	181.00

LONGEST FLOWPATH FROM NODE 181.00 TO NODE 193.00 = 670.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.52	5.48	5.868	0.20(0.08)	0.39	8.9	170.00
2	52.62	5.76	5.703	0.20(0.08)	0.39	9.4	175.00
3	52.75	5.80	5.683	0.20(0.08)	0.40	9.4	161.00
4	53.83	6.14	5.502	0.20(0.08)	0.40	10.0	174.00
5	54.65	6.43	5.355	0.20(0.08)	0.40	10.4	150.00
6	54.82	6.50	5.322	0.20(0.08)	0.40	10.6	173.00
7	55.65	6.95	5.123	0.20(0.08)	0.41	11.2	14.00
8	56.37	7.40	4.943	0.20(0.08)	0.41	11.8	167.00
9	56.61	7.61	4.864	0.20(0.08)	0.41	12.1	154.00
10	57.26	8.34	4.615	0.20(0.08)	0.42	13.0	19.00
11	57.49	8.79	4.479	0.20(0.09)	0.43	13.5	16.00
12	57.49	8.86	4.458	0.20(0.09)	0.43	13.6	168.00
13	57.44	8.97	4.428	0.20(0.09)	0.43	13.7	169.00
14	56.51	10.14	4.125	0.20(0.09)	0.44	14.5	160.00
15	56.48	10.18	4.117	0.20(0.09)	0.44	14.5	159.00
16	56.48	10.18	4.117	0.20(0.09)	0.44	14.5	17.00
17	55.13	10.93	3.953	0.20(0.09)	0.44	14.8	10.00
18	53.90	11.59	3.823	0.20(0.09)	0.45	15.0	147.00
19	52.99	12.12	3.725	0.20(0.09)	0.45	15.2	152.00
20	48.43	15.06	3.289	0.20(0.09)	0.46	15.9	144.00
21	45.41	16.78	3.092	0.20(0.09)	0.46	16.0	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 193.00 = 2360.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.16	5.48	5.868	0.20(0.09)	0.43	10.7	170.00
2	62.46	5.76	5.703	0.20(0.09)	0.43	11.3	175.00
3	62.61	5.80	5.683	0.20(0.09)	0.43	11.4	161.00
4	63.93	6.14	5.502	0.20(0.09)	0.43	12.0	174.00
5	64.95	6.43	5.355	0.20(0.09)	0.43	12.6	150.00
6	65.16	6.50	5.322	0.20(0.09)	0.43	12.7	173.00
7	66.28	6.95	5.123	0.20(0.09)	0.44	13.5	14.00
8	67.28	7.40	4.943	0.20(0.09)	0.44	14.3	167.00
9	67.65	7.61	4.864	0.20(0.09)	0.44	14.7	154.00
10	68.71	8.34	4.615	0.20(0.09)	0.45	15.8	19.00
11	69.20	8.79	4.479	0.20(0.09)	0.45	16.5	16.00
12	69.24	8.86	4.458	0.20(0.09)	0.46	16.5	168.00
13	69.25	8.97	4.428	0.20(0.09)	0.46	16.7	169.00
14	69.11	9.52	4.279	0.20(0.09)	0.46	17.3	179.00
15	68.74	10.02	4.155	0.20(0.09)	0.46	17.7	181.00
16	68.55	10.14	4.125	0.20(0.09)	0.47	17.8	160.00
17	68.50	10.18	4.117	0.20(0.09)	0.47	17.8	159.00
18	68.50	10.18	4.117	0.20(0.09)	0.47	17.8	17.00
19	66.65	10.93	3.953	0.20(0.09)	0.47	18.1	10.00
20	65.03	11.59	3.823	0.20(0.09)	0.47	18.3	147.00
21	63.82	12.12	3.725	0.20(0.09)	0.47	18.5	152.00
22	57.96	15.06	3.289	0.20(0.10)	0.48	19.2	144.00
23	54.34	16.78	3.092	0.20(0.10)	0.48	19.3	147.00

TOTAL AREA(ACRES) = 19.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 69.25 Tc(MIN.) = 8.966
EFFECTIVE AREA(ACRES) = 16.67 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 19.3
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 193.00 = 2360.00 FEET.

****

```
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.210
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    91    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.82
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      4.82

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.937
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.42
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  16.07
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.42
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.42

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.336
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.35

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   10.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.129
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.13
  RAINFALL INTENSITY(INCH/HR) =   4.13
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.42   11.14    3.910  0.20( 0.12) 0.60       2.4     184.00
      2        4.88   10.13    4.129  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.98   10.13    4.129  0.20( 0.12) 0.58       3.6     187.00
      2       13.04   11.14    3.910  0.20( 0.12) 0.58       3.8     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.04    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.04
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   3.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.086
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    91    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.752
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.91
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.46

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.152
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.58
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.58

****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
 STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    9.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    7.61
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.864
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.84
 EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       4.27

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
 FLOW VELOCITY(FEET/SEC.) =  4.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
 LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.61
 RAINFALL INTENSITY(INCH/HR) =   4.86
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.00
 TOTAL STREAM AREA(ACRES) =       1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.27

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.98   10.57    4.029  0.20( 0.12) 0.58       3.6     187.00
     1       13.04   11.58    3.824  0.20( 0.12) 0.58       3.8     184.00
     2        5.46    7.93    4.752  0.20( 0.12) 0.60       1.3     190.00
     3        4.27    7.61    4.864  0.20( 0.12) 0.60       1.0     191.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       20.98    7.61    4.864  0.20( 0.12) 0.59       4.8     191.10
     2       21.16    7.93    4.752  0.20( 0.12) 0.59       5.0     190.00
```

```
     3       21.11   10.57    4.029  0.20( 0.12) 0.59       5.9     187.00
     4       20.74   11.58    3.824  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.16    Tc(MIN.) =     7.93
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.98    7.66    4.846  0.20( 0.12) 0.59       4.8     191.10
      2       21.16    7.98    4.735  0.20( 0.12) 0.59       5.0     190.00
      3       21.11   10.62    4.018  0.20( 0.12) 0.59       5.9     187.00
      4       20.74   11.63    3.815  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
      2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
      3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
      4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
      5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
      6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
      7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
      8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
      9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
     10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
     11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
     12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
     13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
     14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
     15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
     16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
     17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
     18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
     19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
     20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
     21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
     22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
     23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       79.42    5.48    5.868  0.20( 0.09) 0.47      14.2     170.00
      2       81.11    5.76    5.703  0.20( 0.09) 0.47      14.9     175.00
      3       81.31    5.80    5.683  0.20( 0.09) 0.47      15.0     161.00
      4       83.07    6.14    5.502  0.20( 0.09) 0.47      15.9     174.00
      5       84.47    6.43    5.355  0.20( 0.09) 0.47      16.7     150.00
      6       84.77    6.50    5.322  0.20( 0.09) 0.47      16.8     173.00
      7       86.43    6.95    5.123  0.20( 0.09) 0.47      17.9      14.00
      8       87.96    7.40    4.943  0.20( 0.10) 0.48      19.0     167.00
      9       88.57    7.61    4.864  0.20( 0.10) 0.48      19.5     154.00
     10       88.70    7.66    4.846  0.20( 0.10) 0.48      19.6     191.10
     11       89.34    7.98    4.735  0.20( 0.10) 0.48      20.2     190.00
     12       89.87    8.34    4.615  0.20( 0.10) 0.48      20.9      19.00
     13       90.34    8.79    4.479  0.20( 0.10) 0.49      21.7      16.00
     14       90.38    8.86    4.458  0.20( 0.10) 0.49      21.8     168.00
     15       90.39    8.97    4.428  0.20( 0.10) 0.49      22.0     169.00
     16       90.23    9.52    4.279  0.20( 0.10) 0.49      22.8     179.00
     17       89.86   10.02    4.155  0.20( 0.10) 0.49      23.4     181.00
     18       89.67   10.14    4.125  0.20( 0.10) 0.50      23.5     160.00
     19       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6     159.00
     20       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6      17.00
     21       88.51   10.62    4.018  0.20( 0.10) 0.50      23.9     187.00
     22       87.64   10.93    3.953  0.20( 0.10) 0.50      24.1      10.00
     23       85.78   11.59    3.823  0.20( 0.10) 0.50      24.4     147.00
     24       85.67   11.63    3.815  0.20( 0.10) 0.50      24.5     184.00
     25       84.06   12.12    3.725  0.20( 0.10) 0.50      24.6     152.00
     26       75.75   15.06    3.289  0.20( 0.10) 0.50      25.3     144.00
     27       71.02   16.78    3.092  0.20( 0.10) 0.51      25.4     147.00
   TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       90.39  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     22.00  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.39
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  41.26
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.39
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      22.00
  TOTAL STREAM AREA(ACRES) =      25.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.39

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.54
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      6.54

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   6.00
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

1	79.42	5.57	5.814	0.20(0.09)	0.47	14.2	170.00
1	81.11	5.85	5.652	0.20(0.09)	0.47	14.9	175.00
1	81.31	5.89	5.633	0.20(0.09)	0.47	15.0	161.00
1	83.07	6.22	5.458	0.20(0.09)	0.47	15.9	174.00
1	84.47	6.52	5.314	0.20(0.09)	0.47	16.7	150.00
1	84.77	6.59	5.282	0.20(0.09)	0.47	16.8	173.00
1	86.43	7.04	5.087	0.20(0.09)	0.47	17.9	14.00
1	87.96	7.48	4.911	0.20(0.10)	0.48	19.0	167.00
1	88.57	7.69	4.833	0.20(0.10)	0.48	19.5	154.00
1	88.70	7.75	4.815	0.20(0.10)	0.48	19.6	191.10
1	89.34	8.06	4.706	0.20(0.10)	0.48	20.2	190.00
1	89.87	8.42	4.589	0.20(0.10)	0.48	20.9	19.00
1	90.34	8.87	4.454	0.20(0.10)	0.49	21.7	16.00
1	90.38	8.94	4.434	0.20(0.10)	0.49	21.8	168.00
1	90.39	9.05	4.404	0.20(0.10)	0.49	22.0	169.00
1	90.23	9.60	4.257	0.20(0.10)	0.49	22.8	179.00
1	89.86	10.10	4.135	0.20(0.10)	0.49	23.4	181.00
1	89.67	10.23	4.105	0.20(0.10)	0.50	23.5	160.00
1	89.61	10.26	4.098	0.20(0.10)	0.50	23.6	159.00
1	89.61	10.26	4.098	0.20(0.10)	0.50	23.6	17.00
1	88.51	10.71	4.000	0.20(0.10)	0.50	23.9	187.00
1	87.64	11.01	3.936	0.20(0.10)	0.50	24.1	10.00
1	85.78	11.67	3.807	0.20(0.10)	0.50	24.4	147.00
1	85.67	11.71	3.799	0.20(0.10)	0.50	24.5	184.00
1	84.06	12.21	3.710	0.20(0.10)	0.50	24.6	152.00
1	75.75	15.15	3.278	0.20(0.10)	0.50	25.3	144.00
1	71.02	16.87	3.082	0.20(0.10)	0.51	25.4	147.00
2	6.54	5.28	5.999	0.20(0.18)	0.90	1.2	195.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	84.17	5.28	5.999	0.20(0.10)	0.50	14.6	195.00
2	85.76	5.57	5.814	0.20(0.10)	0.50	15.4	170.00
3	87.26	5.85	5.652	0.20(0.10)	0.50	16.2	175.00
4	87.44	5.89	5.633	0.20(0.10)	0.50	16.3	161.00
5	89.00	6.22	5.458	0.20(0.10)	0.50	17.1	174.00
6	90.24	6.52	5.314	0.20(0.10)	0.50	17.9	150.00
7	90.50	6.59	5.282	0.20(0.10)	0.50	18.1	173.00
8	91.95	7.04	5.087	0.20(0.10)	0.50	19.1	14.00
9	93.27	7.48	4.911	0.20(0.10)	0.50	20.2	167.00
10	93.80	7.69	4.833	0.20(0.10)	0.50	20.7	154.00
11	93.91	7.75	4.815	0.20(0.10)	0.50	20.8	191.10
12	94.43	8.06	4.706	0.20(0.10)	0.50	21.4	190.00
13	94.82	8.42	4.589	0.20(0.10)	0.51	22.1	19.00
14	95.15	8.87	4.454	0.20(0.10)	0.51	22.9	16.00
15	95.16	8.94	4.434	0.20(0.10)	0.51	23.0	168.00
16	95.14	9.05	4.404	0.20(0.10)	0.51	23.2	169.00
17	94.82	9.60	4.257	0.20(0.10)	0.51	24.0	179.00
18	94.31	10.10	4.135	0.20(0.10)	0.51	24.6	181.00
19	94.08	10.23	4.105	0.20(0.10)	0.52	24.8	160.00
20	94.02	10.26	4.098	0.20(0.10)	0.52	24.8	159.00
21	94.02	10.26	4.098	0.20(0.10)	0.52	24.8	17.00
22	92.80	10.71	4.000	0.20(0.10)	0.52	25.1	187.00
23	91.87	11.01	3.936	0.20(0.10)	0.52	25.3	10.00
24	89.86	11.67	3.807	0.20(0.10)	0.52	25.7	147.00
25	89.74	11.71	3.799	0.20(0.10)	0.52	25.7	184.00
26	88.02	12.21	3.710	0.20(0.10)	0.52	25.8	152.00
27	79.23	15.15	3.278	0.20(0.10)	0.52	26.6	144.00
28	74.29	16.87	3.082	0.20(0.10)	0.52	26.6	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 95.16 Tc(MIN.) = 8.94
EFFECTIVE AREA(ACRES) = 23.04 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 26.6
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 197.00 = 2485.00 FEET.

```
****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.16
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      23.04
  TOTAL STREAM AREA(ACRES) =      26.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      95.16

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    91    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   5.96
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	84.17	5.59	5.807	0.20(0.10)	0.50	14.6	195.00
1	85.76	5.88	5.637	0.20(0.10)	0.50	15.4	170.00
1	87.26	6.16	5.489	0.20(0.10)	0.50	16.2	175.00
1	87.44	6.20	5.471	0.20(0.10)	0.50	16.3	161.00
1	89.00	6.53	5.310	0.20(0.10)	0.50	17.1	174.00
1	90.24	6.83	5.176	0.20(0.10)	0.50	17.9	150.00
1	90.50	6.90	5.147	0.20(0.10)	0.50	18.1	173.00
1	91.95	7.34	4.964	0.20(0.10)	0.50	19.1	14.00
1	93.27	7.79	4.800	0.20(0.10)	0.50	20.2	167.00
1	93.80	8.00	4.727	0.20(0.10)	0.50	20.7	154.00
1	93.91	8.05	4.709	0.20(0.10)	0.50	20.8	191.10
1	94.43	8.37	4.607	0.20(0.10)	0.50	21.4	190.00
1	94.82	8.73	4.496	0.20(0.10)	0.51	22.1	19.00
1	95.15	9.18	4.369	0.20(0.10)	0.51	22.9	16.00
1	95.16	9.25	4.350	0.20(0.10)	0.51	23.0	168.00
1	95.14	9.36	4.321	0.20(0.10)	0.51	23.2	169.00
1	94.82	9.91	4.182	0.20(0.10)	0.51	24.0	179.00
1	94.31	10.41	4.065	0.20(0.10)	0.51	24.6	181.00
1	94.08	10.53	4.037	0.20(0.10)	0.52	24.8	160.00
1	94.02	10.57	4.030	0.20(0.10)	0.52	24.8	159.00
1	94.02	10.57	4.030	0.20(0.10)	0.52	24.8	17.00
1	92.80	11.01	3.936	0.20(0.10)	0.52	25.1	187.00
1	91.87	11.32	3.875	0.20(0.10)	0.52	25.3	10.00
1	89.86	11.98	3.751	0.20(0.10)	0.52	25.7	147.00
1	89.74	12.02	3.743	0.20(0.10)	0.52	25.7	184.00
1	88.02	12.52	3.657	0.20(0.10)	0.52	25.8	152.00
1	79.23	15.47	3.239	0.20(0.10)	0.52	26.6	144.00
1	74.29	17.19	3.049	0.20(0.10)	0.52	26.6	147.00
2	1.76	5.33	5.962	0.20(0.02)	0.10	0.3	183.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)		Ap	Ae (ACRES)	HEADWATER NODE
1	84.33	5.33	5.962	0.20(0.10)		0.49	14.3	183.00
2	85.89	5.59	5.807	0.20(0.10)		0.49	15.0	195.00
3	87.42	5.88	5.637	0.20(0.10)		0.49	15.7	170.00
4	88.88	6.16	5.489	0.20(0.10)		0.49	16.5	175.00
5	89.06	6.20	5.471	0.20(0.10)		0.49	16.6	161.00
6	90.57	6.53	5.310	0.20(0.10)		0.49	17.5	174.00
7	91.77	6.83	5.176	0.20(0.10)		0.49	18.2	150.00
8	92.03	6.90	5.147	0.20(0.10)		0.49	18.4	173.00
9	93.42	7.34	4.964	0.20(0.10)		0.49	19.5	14.00
10	94.69	7.79	4.800	0.20(0.10)		0.50	20.5	167.00
11	95.19	8.00	4.727	0.20(0.10)		0.50	21.0	154.00
12	95.30	8.05	4.709	0.20(0.10)		0.50	21.1	191.10
13	95.79	8.37	4.607	0.20(0.10)		0.50	21.8	190.00
14	96.15	8.73	4.496	0.20(0.10)		0.50	22.5	19.00
15	96.44	9.18	4.369	0.20(0.10)		0.50	23.3	16.00
16	96.45	9.25	4.350	0.20(0.10)		0.50	23.4	168.00
17	96.41	9.36	4.321	0.20(0.10)		0.50	23.5	169.00
18	96.05	9.91	4.182	0.20(0.10)		0.51	24.3	179.00
19	95.51	10.41	4.065	0.20(0.10)		0.51	25.0	181.00
20	95.27	10.53	4.037	0.20(0.10)		0.51	25.1	160.00
21	95.21	10.57	4.030	0.20(0.10)		0.51	25.1	159.00
22	95.21	10.57	4.030	0.20(0.10)		0.51	25.1	17.00
23	93.97	11.01	3.936	0.20(0.10)		0.51	25.4	187.00
24	93.01	11.32	3.875	0.20(0.10)		0.51	25.6	10.00
25	90.97	11.98	3.751	0.20(0.10)		0.51	26.0	147.00
26	90.85	12.02	3.743	0.20(0.10)		0.51	26.0	184.00
27	89.11	12.52	3.657	0.20(0.10)		0.51	26.2	152.00
28	80.18	15.47	3.239	0.20(0.10)		0.52	26.9	144.00
29	75.19	17.19	3.049	0.20(0.10)		0.52	26.9	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 96.45 Tc(MIN.) = 9.25
EFFECTIVE AREA(ACRES) = 23.37 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50

```
  TOTAL AREA(ACRES) =       26.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.52
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.45
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.760
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.12      0.20     0.500    91    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      4.70
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   4.76
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.70

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.556
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.80      0.20      0.600    91    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.19
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.19

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.70    7.90    4.760  0.20( 0.10) 0.50       1.1     199.00
      2        3.19    8.53    4.556  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.79    7.90    4.760  0.20( 0.11) 0.54       1.9     199.00
      2        7.69    8.53    4.556  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.79    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
```

>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.79	7.98	4.732	0.20(0.11)	0.54	1.9	199.00
2	7.69	8.61	4.532	0.20(0.11)	0.54	1.9	200.00

LONGEST FLOWPATH FROM NODE 199.00 TO NODE 202.00 = 365.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	84.33	5.43	5.904	0.20(0.10)	0.49	14.3	183.00
2	85.89	5.68	5.753	0.20(0.10)	0.49	15.0	195.00
3	87.42	5.97	5.588	0.20(0.10)	0.49	15.7	170.00
4	88.88	6.25	5.443	0.20(0.10)	0.49	16.5	175.00
5	89.06	6.29	5.426	0.20(0.10)	0.49	16.6	161.00
6	90.57	6.62	5.268	0.20(0.10)	0.49	17.5	174.00
7	91.77	6.91	5.138	0.20(0.10)	0.49	18.2	150.00
8	92.03	6.98	5.109	0.20(0.10)	0.49	18.4	173.00
9	93.42	7.43	4.930	0.20(0.10)	0.49	19.5	14.00
10	94.69	7.88	4.769	0.20(0.10)	0.50	20.5	167.00
11	95.19	8.09	4.697	0.20(0.10)	0.50	21.0	154.00
12	95.30	8.14	4.680	0.20(0.10)	0.50	21.1	191.10
13	95.79	8.45	4.579	0.20(0.10)	0.50	21.8	190.00
14	96.15	8.82	4.470	0.20(0.10)	0.50	22.5	19.00
15	96.44	9.27	4.345	0.20(0.10)	0.50	23.3	16.00
16	96.45	9.34	4.326	0.20(0.10)	0.50	23.4	168.00
17	96.41	9.44	4.298	0.20(0.10)	0.50	23.5	169.00
18	96.05	9.99	4.161	0.20(0.10)	0.51	24.3	179.00
19	95.51	10.50	4.045	0.20(0.10)	0.51	25.0	181.00
20	95.27	10.62	4.018	0.20(0.10)	0.51	25.1	160.00
21	95.21	10.66	4.010	0.20(0.10)	0.51	25.1	159.00
22	95.21	10.66	4.010	0.20(0.10)	0.51	25.1	17.00
23	93.97	11.10	3.918	0.20(0.10)	0.51	25.4	187.00
24	93.01	11.41	3.857	0.20(0.10)	0.51	25.6	10.00
25	90.97	12.07	3.735	0.20(0.10)	0.51	26.0	147.00
26	90.85	12.11	3.727	0.20(0.10)	0.51	26.0	184.00
27	89.11	12.61	3.642	0.20(0.10)	0.51	26.2	152.00
28	80.18	15.56	3.228	0.20(0.10)	0.52	26.9	144.00
29	75.19	17.29	3.040	0.20(0.10)	0.52	26.9	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 202.00 = 2690.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	90.97	5.43	5.904	0.20(0.10)	0.50	15.6	183.00
2	92.65	5.68	5.753	0.20(0.10)	0.50	16.3	195.00
3	94.33	5.97	5.588	0.20(0.10)	0.50	17.1	170.00
4	95.92	6.25	5.443	0.20(0.10)	0.49	17.9	175.00
5	96.11	6.29	5.426	0.20(0.10)	0.49	18.0	161.00
6	97.78	6.62	5.268	0.20(0.10)	0.49	19.0	174.00
7	99.11	6.91	5.138	0.20(0.10)	0.50	19.8	150.00
8	99.40	6.98	5.109	0.20(0.10)	0.50	20.0	173.00
9	100.98	7.43	4.930	0.20(0.10)	0.50	21.2	14.00
10	102.44	7.88	4.769	0.20(0.10)	0.50	22.4	167.00
11	102.74	7.98	4.732	0.20(0.10)	0.50	22.6	199.00
12	102.97	8.09	4.697	0.20(0.10)	0.50	22.9	154.00
13	103.07	8.14	4.680	0.20(0.10)	0.50	23.0	191.10
14	103.50	8.45	4.579	0.20(0.10)	0.50	23.7	190.00
15	103.63	8.61	4.532	0.20(0.10)	0.50	24.0	200.00
16	103.73	8.82	4.470	0.20(0.10)	0.50	24.4	19.00
17	103.80	9.27	4.345	0.20(0.10)	0.51	25.2	16.00
18	103.77	9.34	4.326	0.20(0.10)	0.51	25.3	168.00
19	103.69	9.44	4.298	0.20(0.10)	0.51	25.5	169.00
20	103.10	9.99	4.161	0.20(0.10)	0.51	26.2	179.00
21	102.35	10.50	4.045	0.20(0.10)	0.51	26.9	181.00
22	102.07	10.62	4.018	0.20(0.10)	0.51	27.0	160.00
23	101.99	10.66	4.010	0.20(0.10)	0.51	27.0	159.00
24	101.99	10.66	4.010	0.20(0.10)	0.51	27.0	17.00

```
     25      100.59   11.10    3.918  0.20( 0.10) 0.51      27.4     187.00
     26       99.52   11.41    3.857  0.20( 0.10) 0.51      27.5      10.00
     27       97.27   12.07    3.735  0.20( 0.10) 0.51      27.9     147.00
     28       97.14   12.11    3.727  0.20( 0.10) 0.52      27.9     184.00
     29       95.25   12.61    3.642  0.20( 0.10) 0.52      28.1     152.00
     30       85.60   15.56    3.228  0.20( 0.10) 0.52      28.8     144.00
     31       80.28   17.29    3.040  0.20( 0.10) 0.52      28.9     147.00
    TOTAL AREA(ACRES) =        28.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      103.80  Tc(MIN.) =    9.266
  EFFECTIVE AREA(ACRES) =     25.18  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       28.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.41
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     103.80
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.58
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   4.26
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      25.18
  TOTAL STREAM AREA(ACRES) =      28.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     103.80

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.652
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"         D        0.39      0.20     0.200    91    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    7.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.991
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.42      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.28
  RAINFALL INTENSITY(INCH/HR) =   4.99
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       90.97    5.76    5.708  0.20( 0.10) 0.50      15.6     183.00
      1       92.65    6.00    5.576  0.20( 0.10) 0.50      16.3     195.00
      1       94.33    6.29    5.424  0.20( 0.10) 0.50      17.1     170.00
```

1	95.92	6.57	5.291	0.20(0.10)	0.49	17.9	175.00
1	96.11	6.61	5.275	0.20(0.10)	0.49	18.0	161.00
1	97.78	6.94	5.129	0.20(0.10)	0.49	19.0	174.00
1	99.11	7.23	5.009	0.20(0.10)	0.50	19.8	150.00
1	99.40	7.30	4.981	0.20(0.10)	0.50	20.0	173.00
1	100.98	7.75	4.815	0.20(0.10)	0.50	21.2	14.00
1	102.44	8.19	4.663	0.20(0.10)	0.50	22.4	167.00
1	102.74	8.30	4.629	0.20(0.10)	0.50	22.6	199.00
1	102.97	8.40	4.596	0.20(0.10)	0.50	22.9	154.00
1	103.07	8.45	4.580	0.20(0.10)	0.50	23.0	191.10
1	103.50	8.77	4.485	0.20(0.10)	0.50	23.7	190.00
1	103.63	8.92	4.440	0.20(0.10)	0.50	24.0	200.00
1	103.73	9.13	4.382	0.20(0.10)	0.50	24.4	19.00
1	103.80	9.58	4.263	0.20(0.10)	0.51	25.2	16.00
1	103.77	9.65	4.245	0.20(0.10)	0.51	25.3	168.00
1	103.69	9.76	4.218	0.20(0.10)	0.51	25.5	169.00
1	103.10	10.31	4.088	0.20(0.10)	0.51	26.2	179.00
1	102.35	10.81	3.978	0.20(0.10)	0.51	26.9	181.00
1	102.07	10.94	3.951	0.20(0.10)	0.51	27.0	160.00
1	101.99	10.97	3.944	0.20(0.10)	0.51	27.0	159.00
1	101.99	10.97	3.944	0.20(0.10)	0.51	27.0	17.00
1	100.59	11.41	3.856	0.20(0.10)	0.51	27.4	187.00
1	99.52	11.72	3.797	0.20(0.10)	0.51	27.5	10.00
1	97.27	12.38	3.680	0.20(0.10)	0.51	27.9	147.00
1	97.14	12.43	3.673	0.20(0.10)	0.52	27.9	184.00
1	95.25	12.92	3.591	0.20(0.10)	0.52	28.1	152.00
1	85.60	15.89	3.189	0.20(0.10)	0.52	28.8	144.00
1	80.28	17.62	3.007	0.20(0.10)	0.52	28.9	147.00
2	3.61	7.28	4.991	0.20(0.04)	0.20	0.8	192.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	94.24	5.76	5.708	0.20(0.10)	0.48	16.2	183.00
2	95.98	6.00	5.576	0.20(0.10)	0.48	17.0	195.00
3	97.73	6.29	5.424	0.20(0.10)	0.48	17.8	170.00
4	99.38	6.57	5.291	0.20(0.10)	0.48	18.7	175.00
5	99.58	6.61	5.275	0.20(0.10)	0.48	18.8	161.00
6	101.32	6.94	5.129	0.20(0.10)	0.48	19.8	174.00
7	102.71	7.23	5.009	0.20(0.10)	0.48	20.6	150.00
8	102.91	7.28	4.991	0.20(0.10)	0.48	20.8	192.00
9	103.00	7.30	4.981	0.20(0.10)	0.48	20.8	173.00
10	104.46	7.75	4.815	0.20(0.10)	0.49	22.0	14.00
11	105.81	8.19	4.663	0.20(0.10)	0.49	23.2	167.00
12	106.09	8.30	4.629	0.20(0.10)	0.49	23.4	199.00
13	106.29	8.40	4.596	0.20(0.10)	0.49	23.7	154.00
14	106.38	8.45	4.580	0.20(0.10)	0.49	23.8	191.10
15	106.75	8.77	4.485	0.20(0.10)	0.49	24.5	190.00
16	106.84	8.92	4.440	0.20(0.10)	0.49	24.8	200.00
17	106.90	9.13	4.382	0.20(0.10)	0.49	25.2	19.00
18	106.88	9.58	4.263	0.20(0.10)	0.50	26.0	16.00
19	106.84	9.65	4.245	0.20(0.10)	0.50	26.1	168.00
20	106.74	9.76	4.218	0.20(0.10)	0.50	26.3	169.00
21	106.05	10.31	4.088	0.20(0.10)	0.50	27.0	179.00
22	105.22	10.81	3.978	0.20(0.10)	0.50	27.7	181.00
23	104.92	10.94	3.951	0.20(0.10)	0.50	27.8	160.00
24	104.83	10.97	3.944	0.20(0.10)	0.50	27.9	159.00
25	104.83	10.97	3.944	0.20(0.10)	0.50	27.9	17.00
26	103.37	11.41	3.856	0.20(0.10)	0.50	28.2	187.00
27	102.26	11.72	3.797	0.20(0.10)	0.50	28.3	10.00
28	99.92	12.38	3.680	0.20(0.10)	0.51	28.7	147.00
29	99.78	12.43	3.673	0.20(0.10)	0.51	28.7	184.00
30	97.83	12.92	3.591	0.20(0.10)	0.51	28.9	152.00
31	87.90	15.89	3.189	0.20(0.10)	0.51	29.6	144.00
32	82.44	17.62	3.007	0.20(0.10)	0.51	29.7	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 106.90 Tc(MIN.) = 9.13

```
  EFFECTIVE AREA(ACRES) =      25.19   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.7
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.09
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.90
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.343
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    91    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.04
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.04

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   10.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.049
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.43
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      10.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.54
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.73
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.25

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.842
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    91    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   5.84
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.25   10.48    4.049  0.20( 0.12) 0.60       2.9     184.00
      2        0.89    5.53    5.842  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.77    5.53    5.842  0.20( 0.11) 0.55       1.7      59.00
      2       10.87   10.48    4.049  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.87    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.87
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.87

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.81      0.20      0.600    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.77    5.89    5.634  0.20( 0.11) 0.55       1.7      59.00
      1       10.87   10.82    3.975  0.20( 0.11) 0.57       3.1     184.00
      2        3.43    7.72    4.825  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.83    5.89    5.634  0.20( 0.11) 0.56       2.3      59.00
      2       12.98    7.72    4.825  0.20( 0.11) 0.57       3.0      64.00
      3       13.68   10.82    3.975  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.68    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.68
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.86
  RAINFALL INTENSITY(INCH/HR) =   3.97
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.68

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.243
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.48      0.20     0.600    91    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    6.46
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.11
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  13.14
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.83    5.92    5.615  0.20( 0.11) 0.56       2.3      59.00
      1       12.98    7.75    4.812  0.20( 0.11) 0.57       3.0      64.00
      1       13.68   10.86    3.968  0.20( 0.12) 0.58       3.9     184.00
      2        8.11   11.00    3.938  0.20( 0.12) 0.60       2.4     208.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    5.92    5.615  0.20( 0.12) 0.58       3.6      59.00
      2       20.00    7.75    4.812  0.20( 0.12) 0.58       4.7      64.00
      3       21.75   10.86    3.968  0.20( 0.12) 0.59       6.2     184.00
      4       21.68   11.00    3.938  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.75    Tc(MIN.) =    10.86
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.75
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   11.65
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.75

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.75
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =   10.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.04      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    7.08
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       9.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  5.96   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.63

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.627
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    9.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.354
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.23
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.51

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    6.77    5.200  0.20( 0.12) 0.58       3.6      59.00
      1       20.00    8.60    4.536  0.20( 0.12) 0.58       4.7      64.00
      1       21.75   11.65    3.810  0.20( 0.12) 0.59       6.2     184.00
      1       21.68   11.80    3.783  0.20( 0.12) 0.59       6.2     208.00
      2        9.63   10.82    3.976  0.20( 0.11) 0.57       2.8     211.00
      3        5.51    9.23    4.354  0.20( 0.10) 0.50       1.4     213.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    6.77    5.200  0.20( 0.11) 0.56       6.4      59.00
      2       34.11    8.60    4.536  0.20( 0.11) 0.57       8.2      64.00
      3       34.88    9.23    4.354  0.20( 0.11) 0.57       8.8     213.00
      4       35.92   10.82    3.976  0.20( 0.11) 0.57      10.0     211.00
      5       35.77   11.65    3.810  0.20( 0.11) 0.57      10.4     184.00
      6       35.60   11.80    3.783  0.20( 0.11) 0.57      10.5     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.92    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =      10.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.92
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.05
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      10.00
  TOTAL STREAM AREA(ACRES) =      10.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.92

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.18      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    7.02    5.096  0.20( 0.11) 0.56       6.4      59.00
      1       34.11    8.83    4.467  0.20( 0.11) 0.57       8.2      64.00
      1       34.88    9.46    4.293  0.20( 0.11) 0.57       8.8     213.00
      1       35.92   11.05    3.929  0.20( 0.11) 0.57      10.0     211.00
      1       35.77   11.88    3.767  0.20( 0.11) 0.57      10.4     184.00
      1       35.60   12.03    3.741  0.20( 0.11) 0.57      10.5     208.00
      2        1.00    5.00    6.187  0.20( 0.02) 0.10       0.2     215.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       27.85    5.00    6.187  0.20( 0.11) 0.55       4.7     215.00
      2       31.72    7.02    5.096  0.20( 0.11) 0.55       6.6      59.00
      3       34.83    8.83    4.467  0.20( 0.11) 0.56       8.4      64.00
      4       35.58    9.46    4.293  0.20( 0.11) 0.56       9.0     213.00
      5       36.55   11.05    3.929  0.20( 0.11) 0.56      10.2     211.00
      6       36.37   11.88    3.767  0.20( 0.11) 0.56      10.6     184.00
      7       36.20   12.03    3.741  0.20( 0.11) 0.56      10.6     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.55    Tc(MIN.) =    11.05
  EFFECTIVE AREA(ACRES) =      10.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       10.6
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.55
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       27.85    5.06    6.147  0.20( 0.11) 0.55       4.7     215.00
      2       31.72    7.07    5.074  0.20( 0.11) 0.55       6.6      59.00
      3       34.83    8.88    4.452  0.20( 0.11) 0.56       8.4      64.00
      4       35.58    9.51    4.279  0.20( 0.11) 0.56       9.0     213.00
      5       36.55   11.10    3.918  0.20( 0.11) 0.56      10.2     211.00
      6       36.37   11.94    3.758  0.20( 0.11) 0.56      10.6     184.00
      7       36.20   12.08    3.732  0.20( 0.11) 0.56      10.6     208.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       94.24    5.80    5.685  0.20( 0.10) 0.48      16.2     183.00
      2       95.98    6.04    5.555  0.20( 0.10) 0.48      17.0     195.00
      3       97.73    6.33    5.405  0.20( 0.10) 0.48      17.8     170.00
      4       99.38    6.61    5.273  0.20( 0.10) 0.48      18.7     175.00
      5       99.58    6.64    5.257  0.20( 0.10) 0.48      18.8     161.00
      6      101.32    6.98    5.112  0.20( 0.10) 0.48      19.8     174.00
      7      102.71    7.27    4.993  0.20( 0.10) 0.48      20.6     150.00
      8      102.91    7.31    4.975  0.20( 0.10) 0.48      20.8     192.00
      9      103.00    7.34    4.966  0.20( 0.10) 0.48      20.8     173.00
     10      104.46    7.79    4.801  0.20( 0.10) 0.49      22.0      14.00
     11      105.81    8.23    4.650  0.20( 0.10) 0.49      23.2     167.00
     12      106.09    8.34    4.616  0.20( 0.10) 0.49      23.4     199.00
     13      106.29    8.44    4.584  0.20( 0.10) 0.49      23.7     154.00
     14      106.38    8.49    4.568  0.20( 0.10) 0.49      23.8     191.10
```

15	106.75	8.81	4.473	0.20(0.10)	0.49	24.5	190.00
16	106.84	8.96	4.428	0.20(0.10)	0.49	24.8	200.00
17	106.90	9.17	4.371	0.20(0.10)	0.49	25.2	19.00
18	106.88	9.62	4.253	0.20(0.10)	0.50	26.0	16.00
19	106.84	9.69	4.235	0.20(0.10)	0.50	26.1	168.00
20	106.74	9.80	4.208	0.20(0.10)	0.50	26.3	169.00
21	106.05	10.35	4.079	0.20(0.10)	0.50	27.0	179.00
22	105.22	10.85	3.969	0.20(0.10)	0.50	27.7	181.00
23	104.92	10.98	3.943	0.20(0.10)	0.50	27.8	160.00
24	104.83	11.01	3.936	0.20(0.10)	0.50	27.9	159.00
25	104.83	11.01	3.936	0.20(0.10)	0.50	27.9	17.00
26	103.37	11.45	3.848	0.20(0.10)	0.50	28.2	187.00
27	102.26	11.76	3.790	0.20(0.10)	0.50	28.3	10.00
28	99.92	12.42	3.673	0.20(0.10)	0.51	28.7	147.00
29	99.78	12.47	3.666	0.20(0.10)	0.51	28.7	184.00
30	97.83	12.96	3.584	0.20(0.10)	0.51	28.9	152.00
31	87.90	15.93	3.185	0.20(0.10)	0.51	29.6	144.00
32	82.44	17.66	3.002	0.20(0.10)	0.51	29.7	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 217.00 = 3025.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	116.87	5.06	6.147	0.20(0.10)	0.50	18.9	215.00
2	123.51	5.80	5.685	0.20(0.10)	0.50	21.6	183.00
3	125.71	6.04	5.555	0.20(0.10)	0.50	22.6	195.00
4	128.03	6.33	5.405	0.20(0.10)	0.50	23.7	170.00
5	130.22	6.61	5.273	0.20(0.10)	0.50	24.8	175.00
6	130.48	6.64	5.257	0.20(0.10)	0.50	25.0	161.00
7	132.87	6.98	5.112	0.20(0.10)	0.50	26.2	174.00
8	133.48	7.07	5.074	0.20(0.10)	0.50	26.6	59.00
9	134.78	7.27	4.993	0.20(0.10)	0.50	27.4	150.00
10	135.05	7.31	4.975	0.20(0.10)	0.50	27.6	192.00
11	135.19	7.34	4.966	0.20(0.10)	0.50	27.7	173.00
12	137.41	7.79	4.801	0.20(0.10)	0.50	29.3	14.00
13	139.53	8.23	4.650	0.20(0.10)	0.50	30.9	167.00
14	139.99	8.34	4.616	0.20(0.10)	0.51	31.3	199.00
15	140.37	8.44	4.584	0.20(0.10)	0.51	31.6	154.00
16	140.54	8.49	4.568	0.20(0.10)	0.51	31.8	191.10
17	141.45	8.81	4.473	0.20(0.10)	0.51	32.8	190.00
18	141.62	8.88	4.452	0.20(0.10)	0.51	33.0	64.00
19	141.77	8.96	4.428	0.20(0.10)	0.51	33.3	200.00
20	142.07	9.17	4.371	0.20(0.10)	0.51	33.9	19.00
21	142.46	9.51	4.279	0.20(0.10)	0.51	34.8	213.00
22	142.52	9.62	4.253	0.20(0.10)	0.51	35.0	16.00
23	142.52	9.69	4.235	0.20(0.10)	0.51	35.2	168.00
24	142.49	9.80	4.208	0.20(0.10)	0.51	35.5	169.00
25	142.13	10.35	4.079	0.20(0.10)	0.52	36.7	179.00
26	141.62	10.85	3.969	0.20(0.10)	0.52	37.7	181.00
27	141.39	10.98	3.943	0.20(0.10)	0.52	37.9	160.00
28	141.33	11.01	3.936	0.20(0.10)	0.52	38.0	159.00
29	141.33	11.01	3.936	0.20(0.10)	0.52	38.0	17.00
30	141.09	11.10	3.918	0.20(0.10)	0.52	38.1	211.00
31	139.84	11.45	3.848	0.20(0.10)	0.52	38.5	187.00
32	138.68	11.76	3.790	0.20(0.10)	0.52	38.9	10.00
33	138.01	11.94	3.758	0.20(0.10)	0.52	39.0	184.00
34	137.33	12.08	3.732	0.20(0.10)	0.52	39.2	208.00
35	135.54	12.42	3.673	0.20(0.10)	0.52	39.3	147.00
36	135.33	12.47	3.666	0.20(0.10)	0.52	39.4	184.00
37	132.56	12.96	3.584	0.20(0.10)	0.52	39.5	152.00
38	118.63	15.93	3.185	0.20(0.10)	0.52	40.2	144.00
39	111.35	17.66	3.002	0.20(0.10)	0.52	40.3	147.00

TOTAL AREA(ACRES) = 40.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 142.52 Tc(MIN.) = 9.690
EFFECTIVE AREA(ACRES) = 35.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 40.3
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 217.00 = 3025.00 FEET.

```
****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.02
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     142.52
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.01
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.01
 RAINFALL INTENSITY(INCH/HR) =   4.16
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.51
 EFFECTIVE STREAM AREA(ACRES) =      35.22
 TOTAL STREAM AREA(ACRES) =      40.31
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     142.52

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.839
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    91    7.68
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.86
 TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      3.86

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
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  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    9.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.383
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    5.33
  EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.13
  RAINFALL INTENSITY(INCH/HR) =   4.38
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.30
  TOTAL STREAM AREA(ACRES) =       2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      116.87    5.39    5.927  0.20( 0.10) 0.50      18.9     215.00
      1      123.51    6.13    5.508  0.20( 0.10) 0.50      21.6     183.00
      1      125.71    6.36    5.389  0.20( 0.10) 0.50      22.6     195.00
      1      128.03    6.66    5.251  0.20( 0.10) 0.50      23.7     170.00
      1      130.22    6.94    5.129  0.20( 0.10) 0.50      24.8     175.00
      1      130.48    6.97    5.114  0.20( 0.10) 0.50      25.0     161.00
      1      132.87    7.30    4.980  0.20( 0.10) 0.50      26.2     174.00
      1      133.48    7.40    4.944  0.20( 0.10) 0.50      26.6      59.00
      1      134.78    7.60    4.869  0.20( 0.10) 0.50      27.4     150.00
      1      135.05    7.64    4.853  0.20( 0.10) 0.50      27.6     192.00
      1      135.19    7.66    4.844  0.20( 0.10) 0.50      27.7     173.00
      1      137.41    8.11    4.689  0.20( 0.10) 0.50      29.3      14.00
      1      139.53    8.56    4.548  0.20( 0.10) 0.50      30.9     167.00
      1      139.99    8.66    4.516  0.20( 0.10) 0.51      31.3     199.00
      1      140.37    8.77    4.485  0.20( 0.10) 0.51      31.6     154.00
      1      140.54    8.82    4.470  0.20( 0.10) 0.51      31.8     191.10
      1      141.45    9.13    4.381  0.20( 0.10) 0.51      32.8     190.00
      1      141.62    9.20    4.363  0.20( 0.10) 0.51      33.0      64.00
      1      141.77    9.28    4.341  0.20( 0.10) 0.51      33.3     200.00
```

1	142.07	9.49	4.287	0.20(0.10)	0.51	33.9	19.00
1	142.46	9.83	4.200	0.20(0.10)	0.51	34.8	213.00
1	142.52	9.93	4.175	0.20(0.10)	0.51	35.0	16.00
1	142.52	10.01	4.158	0.20(0.10)	0.51	35.2	168.00
1	142.49	10.11	4.132	0.20(0.10)	0.51	35.5	169.00
1	142.13	10.66	4.009	0.20(0.10)	0.52	36.7	179.00
1	141.62	11.17	3.904	0.20(0.10)	0.52	37.7	181.00
1	141.39	11.30	3.877	0.20(0.10)	0.52	37.9	160.00
1	141.33	11.34	3.871	0.20(0.10)	0.52	38.0	159.00
1	141.33	11.34	3.871	0.20(0.10)	0.52	38.0	17.00
1	141.09	11.43	3.853	0.20(0.10)	0.52	38.1	211.00
1	139.84	11.78	3.787	0.20(0.10)	0.52	38.5	187.00
1	138.68	12.09	3.731	0.20(0.10)	0.52	38.9	10.00
1	138.01	12.26	3.700	0.20(0.10)	0.52	39.0	184.00
1	137.33	12.41	3.675	0.20(0.10)	0.52	39.2	208.00
1	135.54	12.75	3.619	0.20(0.10)	0.52	39.3	147.00
1	135.33	12.79	3.612	0.20(0.10)	0.52	39.4	184.00
1	132.56	13.29	3.534	0.20(0.10)	0.52	39.5	152.00
1	118.63	16.27	3.147	0.20(0.10)	0.52	40.2	144.00
1	111.35	18.00	2.969	0.20(0.10)	0.52	40.3	147.00
2	8.82	9.13	4.383	0.20(0.12)	0.60	2.3	201.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.97	5.39	5.927	0.20(0.10)	0.51	20.2	215.00
2	131.00	6.13	5.508	0.20(0.10)	0.51	23.2	183.00
3	133.31	6.36	5.389	0.20(0.10)	0.51	24.2	195.00
4	135.78	6.66	5.251	0.20(0.10)	0.51	25.4	170.00
5	138.10	6.94	5.129	0.20(0.10)	0.51	26.6	175.00
6	138.38	6.97	5.114	0.20(0.10)	0.51	26.7	161.00
7	140.92	7.30	4.980	0.20(0.10)	0.51	28.1	174.00
8	141.58	7.40	4.944	0.20(0.10)	0.51	28.5	59.00
9	142.96	7.60	4.869	0.20(0.10)	0.51	29.3	150.00
10	143.25	7.64	4.853	0.20(0.10)	0.51	29.5	192.00
11	143.40	7.66	4.844	0.20(0.10)	0.51	29.6	173.00
12	145.82	8.11	4.689	0.20(0.10)	0.51	31.3	14.00
13	148.12	8.56	4.548	0.20(0.10)	0.51	33.1	167.00
14	148.62	8.66	4.516	0.20(0.10)	0.51	33.5	199.00
15	149.05	8.77	4.485	0.20(0.10)	0.51	33.8	154.00
16	149.24	8.82	4.470	0.20(0.10)	0.51	34.0	191.10
17	150.26	9.13	4.383	0.20(0.10)	0.51	35.1	201.00
18	150.27	9.13	4.381	0.20(0.10)	0.51	35.1	190.00
19	150.41	9.20	4.363	0.20(0.10)	0.51	35.3	64.00
20	150.51	9.28	4.341	0.20(0.10)	0.51	35.6	200.00
21	150.69	9.49	4.287	0.20(0.10)	0.52	36.2	19.00
22	150.90	9.83	4.200	0.20(0.10)	0.52	37.1	213.00
23	150.91	9.93	4.175	0.20(0.10)	0.52	37.3	16.00
24	150.88	10.01	4.158	0.20(0.10)	0.52	37.5	168.00
25	150.79	10.11	4.132	0.20(0.10)	0.52	37.8	169.00
26	150.18	10.66	4.009	0.20(0.10)	0.52	39.0	179.00
27	149.45	11.17	3.904	0.20(0.10)	0.52	40.0	181.00
28	149.17	11.30	3.877	0.20(0.10)	0.52	40.2	160.00
29	149.09	11.34	3.871	0.20(0.10)	0.52	40.3	159.00
30	149.09	11.34	3.871	0.20(0.10)	0.52	40.3	17.00
31	148.82	11.43	3.853	0.20(0.10)	0.52	40.4	211.00
32	147.43	11.78	3.787	0.20(0.10)	0.52	40.8	187.00
33	146.15	12.09	3.731	0.20(0.10)	0.52	41.2	10.00
34	145.42	12.26	3.700	0.20(0.11)	0.53	41.3	184.00
35	144.68	12.41	3.675	0.20(0.11)	0.53	41.5	208.00
36	142.78	12.75	3.619	0.20(0.11)	0.53	41.6	147.00
37	142.56	12.79	3.612	0.20(0.11)	0.53	41.7	184.00
38	139.63	13.29	3.534	0.20(0.11)	0.53	41.8	152.00
39	124.90	16.27	3.147	0.20(0.11)	0.53	42.5	144.00
40	117.25	18.00	2.969	0.20(0.11)	0.53	42.6	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 150.91 Tc(MIN.) = 9.93

```
  EFFECTIVE AREA(ACRES) =      37.35   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       42.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.39
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     150.91
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.56
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
  STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    9.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.418
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    5.03
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.55
  FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.01
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.01

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.884
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    91    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.640
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    5.80
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  14.08
  FLOW VELOCITY(FEET/SEC.) =  4.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.26
  RAINFALL INTENSITY(INCH/HR) =   4.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.01    9.08    4.396  0.20( 0.12) 0.60       2.1     220.00
      2        7.72    8.26    4.640  0.20( 0.10) 0.50       1.9     223.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.43    8.26    4.640  0.20( 0.11) 0.55       3.8     223.00
      2       15.31    9.08    4.396  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.43    Tc(MIN.) =     8.26
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.43
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    8.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.43    8.58    4.542  0.20( 0.11) 0.55       3.8     223.00
      2       15.31    9.39    4.311  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      123.97    5.42    5.911  0.20( 0.10) 0.51      20.2     215.00
      2      131.00    6.15    5.494  0.20( 0.10) 0.51      23.2     183.00
      3      133.31    6.39    5.376  0.20( 0.10) 0.51      24.2     195.00
      4      135.78    6.68    5.239  0.20( 0.10) 0.51      25.4     170.00
      5      138.10    6.96    5.118  0.20( 0.10) 0.51      26.6     175.00
      6      138.38    7.00    5.103  0.20( 0.10) 0.51      26.7     161.00
      7      140.92    7.33    4.970  0.20( 0.10) 0.51      28.1     174.00
      8      141.58    7.42    4.934  0.20( 0.10) 0.51      28.5      59.00
      9      142.96    7.62    4.860  0.20( 0.10) 0.51      29.3     150.00
     10      143.25    7.67    4.844  0.20( 0.10) 0.51      29.5     192.00
     11      143.40    7.69    4.835  0.20( 0.10) 0.51      29.6     173.00
     12      145.82    8.14    4.681  0.20( 0.10) 0.51      31.3      14.00
     13      148.12    8.58    4.541  0.20( 0.10) 0.51      33.1     167.00
     14      148.62    8.69    4.508  0.20( 0.10) 0.51      33.5     199.00
     15      149.05    8.79    4.478  0.20( 0.10) 0.51      33.8     154.00
     16      149.24    8.84    4.463  0.20( 0.10) 0.51      34.0     191.10
     17      150.26    9.15    4.376  0.20( 0.10) 0.51      35.1     201.00
     18      150.27    9.16    4.374  0.20( 0.10) 0.51      35.1     190.00
     19      150.41    9.22    4.357  0.20( 0.10) 0.51      35.3      64.00
     20      150.51    9.30    4.335  0.20( 0.10) 0.51      35.6     200.00
     21      150.69    9.51    4.280  0.20( 0.10) 0.52      36.2      19.00
     22      150.90    9.86    4.194  0.20( 0.10) 0.52      37.1     213.00
     23      150.91    9.96    4.169  0.20( 0.10) 0.52      37.3      16.00
     24      150.88   10.03    4.152  0.20( 0.10) 0.52      37.5     168.00
```

25	150.79	10.14	4.127	0.20(0.10)	0.52	37.8	169.00
26	150.18	10.69	4.004	0.20(0.10)	0.52	39.0	179.00
27	149.45	11.19	3.900	0.20(0.10)	0.52	40.0	181.00
28	149.17	11.33	3.873	0.20(0.10)	0.52	40.2	160.00
29	149.09	11.36	3.866	0.20(0.10)	0.52	40.3	159.00
30	149.09	11.36	3.866	0.20(0.10)	0.52	40.3	17.00
31	148.82	11.45	3.849	0.20(0.10)	0.52	40.4	211.00
32	147.43	11.80	3.782	0.20(0.10)	0.52	40.8	187.00
33	146.15	12.11	3.727	0.20(0.10)	0.52	41.2	10.00
34	145.42	12.29	3.696	0.20(0.11)	0.53	41.3	184.00
35	144.68	12.43	3.671	0.20(0.11)	0.53	41.5	208.00
36	142.78	12.77	3.615	0.20(0.11)	0.53	41.6	147.00
37	142.56	12.82	3.608	0.20(0.11)	0.53	41.7	184.00
38	139.63	13.32	3.530	0.20(0.11)	0.53	41.8	152.00
39	124.90	16.29	3.144	0.20(0.11)	0.53	42.5	144.00
40	117.25	18.03	2.967	0.20(0.11)	0.53	42.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 226.00 = 3435.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	136.72	5.42	5.911	0.20(0.10)	0.51	22.6	215.00
2	144.44	6.15	5.494	0.20(0.10)	0.51	25.9	183.00
3	146.97	6.39	5.376	0.20(0.10)	0.51	27.0	195.00
4	149.69	6.68	5.239	0.20(0.10)	0.51	28.3	170.00
5	152.25	6.96	5.118	0.20(0.10)	0.51	29.6	175.00
6	152.56	7.00	5.103	0.20(0.10)	0.51	29.8	161.00
7	155.37	7.33	4.970	0.20(0.10)	0.51	31.3	174.00
8	156.11	7.42	4.934	0.20(0.10)	0.51	31.7	59.00
9	157.65	7.62	4.860	0.20(0.10)	0.51	32.7	150.00
10	157.98	7.67	4.844	0.20(0.10)	0.51	32.9	192.00
11	158.15	7.69	4.835	0.20(0.10)	0.51	33.0	173.00
12	160.91	8.14	4.681	0.20(0.10)	0.51	34.9	14.00
13	163.52	8.58	4.542	0.20(0.10)	0.51	36.8	223.00
14	163.55	8.58	4.541	0.20(0.10)	0.51	36.8	167.00
15	164.03	8.69	4.508	0.20(0.10)	0.52	37.3	199.00
16	164.44	8.79	4.478	0.20(0.10)	0.52	37.7	154.00
17	164.63	8.84	4.463	0.20(0.10)	0.52	37.9	191.10
18	165.60	9.15	4.376	0.20(0.10)	0.52	39.0	201.00
19	165.62	9.16	4.374	0.20(0.10)	0.52	39.0	190.00
20	165.74	9.22	4.357	0.20(0.10)	0.52	39.3	64.00
21	165.83	9.30	4.335	0.20(0.10)	0.52	39.5	200.00
22	165.90	9.39	4.311	0.20(0.10)	0.52	39.8	220.00
23	165.89	9.51	4.280	0.20(0.10)	0.52	40.1	19.00
24	165.79	9.86	4.194	0.20(0.10)	0.52	41.0	213.00
25	165.71	9.96	4.169	0.20(0.10)	0.52	41.3	16.00
26	165.62	10.03	4.152	0.20(0.10)	0.52	41.5	168.00
27	165.43	10.14	4.127	0.20(0.10)	0.52	41.7	169.00
28	164.38	10.69	4.004	0.20(0.10)	0.52	42.9	179.00
29	163.26	11.19	3.900	0.20(0.11)	0.53	43.9	181.00
30	162.89	11.33	3.873	0.20(0.11)	0.53	44.2	160.00
31	162.79	11.36	3.866	0.20(0.11)	0.53	44.2	159.00
32	162.79	11.36	3.866	0.20(0.11)	0.53	44.2	17.00
33	162.45	11.45	3.849	0.20(0.11)	0.53	44.4	211.00
34	160.82	11.80	3.782	0.20(0.11)	0.53	44.8	187.00
35	159.34	12.11	3.727	0.20(0.11)	0.53	45.1	10.00
36	158.50	12.29	3.696	0.20(0.11)	0.53	45.3	184.00
37	157.67	12.43	3.671	0.20(0.11)	0.53	45.4	208.00
38	155.56	12.77	3.615	0.20(0.11)	0.53	45.6	147.00
39	155.31	12.82	3.608	0.20(0.11)	0.53	45.6	184.00
40	152.10	13.32	3.530	0.20(0.11)	0.53	45.8	152.00
41	135.96	16.29	3.144	0.20(0.11)	0.53	46.5	144.00
42	127.66	18.03	2.967	0.20(0.11)	0.53	46.6	147.00

TOTAL AREA(ACRES) = 46.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 165.90 Tc(MIN.) = 9.393
EFFECTIVE AREA(ACRES) = 39.78 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 46.6
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 226.00 = 3435.00 FEET.

```
****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  60.97
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     165.90
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      136.72    5.42    5.907  0.20( 0.10) 0.51      22.6     215.00
      2      144.44    6.16    5.492  0.20( 0.10) 0.51      25.9     183.00
      3      146.97    6.40    5.373  0.20( 0.10) 0.51      27.0     195.00
      4      149.69    6.69    5.237  0.20( 0.10) 0.51      28.3     170.00
      5      152.25    6.97    5.116  0.20( 0.10) 0.51      29.6     175.00
      6      152.56    7.00    5.101  0.20( 0.10) 0.51      29.8     161.00
      7      155.37    7.33    4.968  0.20( 0.10) 0.51      31.3     174.00
      8      156.11    7.43    4.932  0.20( 0.10) 0.51      31.7      59.00
      9      157.65    7.63    4.858  0.20( 0.10) 0.51      32.7     150.00
     10      157.98    7.67    4.841  0.20( 0.10) 0.51      32.9     192.00
     11      158.15    7.70    4.833  0.20( 0.10) 0.51      33.0     173.00
     12      160.91    8.14    4.679  0.20( 0.10) 0.51      34.9      14.00
     13      163.52    8.58    4.540  0.20( 0.10) 0.51      36.8     223.00
     14      163.55    8.59    4.539  0.20( 0.10) 0.51      36.8     167.00
     15      164.03    8.69    4.507  0.20( 0.10) 0.52      37.3     199.00
     16      164.44    8.80    4.476  0.20( 0.10) 0.52      37.7     154.00
     17      164.63    8.85    4.461  0.20( 0.10) 0.52      37.9     191.10
     18      165.60    9.16    4.375  0.20( 0.10) 0.52      39.0     201.00
     19      165.62    9.16    4.373  0.20( 0.10) 0.52      39.0     190.00
     20      165.74    9.23    4.355  0.20( 0.10) 0.52      39.3      64.00
     21      165.83    9.31    4.333  0.20( 0.10) 0.52      39.5     200.00
     22      165.90    9.40    4.310  0.20( 0.10) 0.52      39.8     220.00
     23      165.89    9.52    4.279  0.20( 0.10) 0.52      40.1      19.00
     24      165.79    9.86    4.193  0.20( 0.10) 0.52      41.0     213.00
     25      165.71    9.96    4.168  0.20( 0.10) 0.52      41.3      16.00
     26      165.62   10.04    4.151  0.20( 0.10) 0.52      41.5     168.00
     27      165.43   10.14    4.125  0.20( 0.10) 0.52      41.7     169.00
     28      164.38   10.69    4.002  0.20( 0.10) 0.52      42.9     179.00
     29      163.26   11.20    3.898  0.20( 0.11) 0.53      43.9     181.00
     30      162.89   11.33    3.872  0.20( 0.11) 0.53      44.2     160.00
     31      162.79   11.37    3.865  0.20( 0.11) 0.53      44.2     159.00
     32      162.79   11.37    3.865  0.20( 0.11) 0.53      44.2      17.00
     33      162.45   11.46    3.848  0.20( 0.11) 0.53      44.4     211.00
     34      160.82   11.81    3.781  0.20( 0.11) 0.53      44.8     187.00
     35      159.34   12.12    3.726  0.20( 0.11) 0.53      45.1      10.00
     36      158.50   12.29    3.695  0.20( 0.11) 0.53      45.3     184.00
     37      157.67   12.44    3.670  0.20( 0.11) 0.53      45.4     208.00
     38      155.56   12.78    3.614  0.20( 0.11) 0.53      45.6     147.00
     39      155.31   12.82    3.607  0.20( 0.11) 0.53      45.6     184.00
     40      152.10   13.32    3.529  0.20( 0.11) 0.53      45.8     152.00
```

41	135.96	16.30	3.144	0.20(0.11)	0.53	46.5	144.00
42	127.66	18.04	2.966	0.20(0.11)	0.53	46.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 230.00 = 3455.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.77	5.06	6.144	0.20(0.11)	0.57	34.1	140.00
2	233.32	5.78	5.696	0.20(0.12)	0.58	39.0	104.00
3	241.31	6.24	5.450	0.20(0.12)	0.58	42.3	88.00
4	242.93	6.33	5.403	0.20(0.11)	0.57	43.0	63.00
5	245.41	6.48	5.335	0.20(0.11)	0.57	44.1	47.00
6	246.17	6.52	5.314	0.20(0.11)	0.57	44.5	45.00
7	255.55	7.09	5.067	0.20(0.11)	0.57	49.0	59.00
8	257.51	7.21	5.015	0.20(0.12)	0.58	50.0	95.00
9	260.01	7.38	4.950	0.20(0.12)	0.58	51.3	118.00
10	263.73	7.63	4.857	0.20(0.12)	0.58	53.3	138.00
11	270.49	8.09	4.697	0.20(0.12)	0.58	57.0	141.00
12	275.76	8.47	4.576	0.20(0.12)	0.58	59.9	31.00
13	278.27	8.65	4.519	0.20(0.12)	0.58	61.4	85.00
14	279.94	8.78	4.482	0.20(0.12)	0.58	62.4	38.00
15	280.09	8.79	4.478	0.20(0.12)	0.58	62.4	97.00
16	280.17	8.80	4.476	0.20(0.12)	0.58	62.5	136.00
17	280.96	8.89	4.450	0.20(0.12)	0.58	63.1	80.00
18	281.48	8.95	4.431	0.20(0.12)	0.58	63.6	6.00
19	284.38	9.32	4.330	0.20(0.12)	0.58	66.1	92.00
20	284.46	9.33	4.327	0.20(0.12)	0.58	66.1	35.00
21	284.99	9.42	4.305	0.20(0.12)	0.58	66.7	25.00
22	285.12	9.44	4.299	0.20(0.12)	0.58	66.8	24.00
23	285.99	9.59	4.261	0.20(0.12)	0.58	67.7	46.00
24	286.31	9.65	4.245	0.20(0.12)	0.58	68.1	129.00
25	287.68	9.95	4.172	0.20(0.12)	0.58	69.9	64.00
26	288.15	10.07	4.143	0.20(0.12)	0.58	70.6	32.00
27	288.21	10.09	4.139	0.20(0.12)	0.58	70.7	61.00
28	288.42	10.16	4.121	0.20(0.12)	0.58	71.1	134.00
29	288.59	10.24	4.104	0.20(0.12)	0.58	71.5	116.00
30	288.63	10.26	4.098	0.20(0.12)	0.58	71.6	78.00
31	288.45	10.83	3.974	0.20(0.12)	0.58	74.2	14.00
32	288.44	10.87	3.965	0.20(0.12)	0.58	74.4	76.00
33	288.39	10.94	3.950	0.20(0.12)	0.58	74.8	82.00
34	288.26	11.06	3.927	0.20(0.12)	0.58	75.2	67.00
35	288.04	11.21	3.895	0.20(0.12)	0.58	75.9	53.00
36	287.86	11.30	3.879	0.20(0.12)	0.58	76.2	43.00
37	287.62	11.38	3.863	0.20(0.12)	0.58	76.6	33.00
38	287.54	11.40	3.858	0.20(0.12)	0.58	76.6	56.00
39	287.13	11.50	3.839	0.20(0.12)	0.58	77.0	41.00
40	286.74	11.58	3.825	0.20(0.12)	0.58	77.2	114.00
41	286.32	11.65	3.810	0.20(0.12)	0.58	77.4	100.00
42	283.32	12.14	3.722	0.20(0.12)	0.58	78.7	13.00
43	283.12	12.17	3.717	0.20(0.12)	0.58	78.8	127.00
44	282.45	12.27	3.700	0.20(0.12)	0.58	79.0	123.00
45	281.74	12.37	3.683	0.20(0.12)	0.58	79.2	97.00
46	280.35	12.54	3.654	0.20(0.12)	0.58	79.6	19.00
47	279.63	12.63	3.638	0.20(0.12)	0.58	79.7	29.00
48	278.69	12.74	3.620	0.20(0.12)	0.58	79.9	33.00
49	278.65	12.74	3.620	0.20(0.12)	0.58	79.9	120.00
50	277.61	12.85	3.602	0.20(0.12)	0.58	80.1	73.00
51	277.49	12.86	3.600	0.20(0.12)	0.58	80.1	111.00
52	271.23	13.51	3.501	0.20(0.12)	0.58	80.8	16.00
53	268.30	13.82	3.455	0.20(0.12)	0.58	81.1	17.00
54	263.77	14.31	3.387	0.20(0.12)	0.58	81.6	22.00
55	263.03	14.39	3.376	0.20(0.12)	0.58	81.6	10.00
56	260.89	14.60	3.348	0.20(0.12)	0.58	81.7	7.00
57	250.90	15.61	3.222	0.20(0.12)	0.58	82.1	4.00
58	236.23	17.22	3.046	0.20(0.12)	0.58	82.3	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 230.00 = 4035.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	353.63	5.06	6.144	0.20(0.11)	0.55	55.2	140.00

2	363.79	5.42	5.907	0.20(0.11)	0.55	59.2	215.00
3	373.77	5.78	5.696	0.20(0.11)	0.55	63.2	104.00
4	384.34	6.16	5.492	0.20(0.11)	0.55	67.6	183.00
5	386.62	6.24	5.450	0.20(0.11)	0.55	68.6	88.00
6	389.24	6.33	5.403	0.20(0.11)	0.55	69.7	63.00
7	390.97	6.40	5.373	0.20(0.11)	0.55	70.5	195.00
8	393.13	6.48	5.335	0.20(0.11)	0.55	71.5	47.00
9	394.30	6.52	5.314	0.20(0.11)	0.55	72.0	45.00
10	398.66	6.69	5.237	0.20(0.11)	0.55	74.1	170.00
11	405.84	6.97	5.116	0.20(0.11)	0.55	77.7	175.00
12	406.74	7.00	5.101	0.20(0.11)	0.55	78.1	161.00
13	408.82	7.09	5.067	0.20(0.11)	0.55	79.2	59.00
14	411.85	7.21	5.015	0.20(0.11)	0.55	80.7	95.00
15	414.69	7.33	4.968	0.20(0.11)	0.55	82.2	174.00
16	415.75	7.38	4.950	0.20(0.11)	0.55	82.8	118.00
17	416.81	7.43	4.932	0.20(0.11)	0.55	83.4	59.00
18	421.36	7.63	4.858	0.20(0.11)	0.55	85.9	150.00
19	421.39	7.63	4.857	0.20(0.11)	0.55	85.9	138.00
20	422.33	7.67	4.841	0.20(0.11)	0.55	86.5	192.00
21	422.85	7.70	4.833	0.20(0.11)	0.55	86.8	173.00
22	431.08	8.09	4.697	0.20(0.11)	0.55	91.6	141.00
23	432.14	8.14	4.679	0.20(0.11)	0.55	92.3	14.00
24	438.60	8.47	4.576	0.20(0.11)	0.55	96.2	31.00
25	440.84	8.58	4.540	0.20(0.11)	0.55	97.6	223.00
26	440.92	8.59	4.539	0.20(0.11)	0.55	97.7	167.00
27	442.11	8.65	4.519	0.20(0.11)	0.55	98.5	85.00
28	442.85	8.69	4.507	0.20(0.11)	0.55	99.0	199.00
29	444.31	8.78	4.482	0.20(0.11)	0.55	99.9	38.00
30	444.50	8.79	4.478	0.20(0.11)	0.55	100.1	97.00
31	444.59	8.80	4.476	0.20(0.11)	0.55	100.2	154.00
32	444.62	8.80	4.476	0.20(0.11)	0.55	100.2	136.00
33	445.24	8.85	4.461	0.20(0.11)	0.55	100.7	191.10
34	445.72	8.89	4.450	0.20(0.11)	0.55	101.1	80.00
35	446.45	8.95	4.431	0.20(0.11)	0.56	101.8	6.00
36	448.68	9.16	4.375	0.20(0.11)	0.56	103.9	201.00
37	448.75	9.16	4.373	0.20(0.11)	0.56	104.0	190.00
38	449.38	9.23	4.355	0.20(0.11)	0.56	104.7	64.00
39	450.12	9.31	4.333	0.20(0.11)	0.56	105.5	200.00
40	450.23	9.32	4.330	0.20(0.11)	0.56	105.6	92.00
41	450.31	9.33	4.327	0.20(0.11)	0.56	105.7	35.00
42	450.78	9.40	4.310	0.20(0.11)	0.56	106.3	220.00
43	450.89	9.42	4.305	0.20(0.11)	0.56	106.5	25.00
44	451.01	9.44	4.299	0.20(0.11)	0.56	106.7	24.00
45	451.47	9.52	4.279	0.20(0.11)	0.56	107.4	19.00
46	451.86	9.59	4.261	0.20(0.11)	0.56	108.0	46.00
47	452.17	9.65	4.245	0.20(0.11)	0.56	108.6	129.00
48	453.08	9.86	4.193	0.20(0.11)	0.56	110.4	213.00
49	453.40	9.95	4.172	0.20(0.11)	0.56	111.2	64.00
50	453.45	9.96	4.168	0.20(0.11)	0.56	111.3	16.00
51	453.63	10.04	4.151	0.20(0.11)	0.56	111.9	168.00
52	453.71	10.07	4.143	0.20(0.11)	0.56	112.2	32.00
53	453.74	10.09	4.139	0.20(0.11)	0.56	112.3	61.00
54	453.80	10.14	4.125	0.20(0.11)	0.56	112.7	169.00
55	453.82	10.16	4.121	0.20(0.11)	0.56	112.9	134.00
56	453.84	10.24	4.104	0.20(0.11)	0.56	113.4	116.00
57	453.83	10.26	4.098	0.20(0.11)	0.56	113.6	78.00
58	452.87	10.69	4.002	0.20(0.11)	0.56	116.5	179.00
59	452.54	10.83	3.974	0.20(0.11)	0.56	117.4	14.00
60	452.43	10.87	3.965	0.20(0.11)	0.56	117.7	76.00
61	452.21	10.94	3.950	0.20(0.11)	0.56	118.2	82.00
62	451.83	11.06	3.927	0.20(0.11)	0.56	118.9	67.00
63	451.32	11.20	3.898	0.20(0.11)	0.56	119.8	181.00
64	451.26	11.21	3.895	0.20(0.11)	0.56	119.9	53.00
65	450.85	11.30	3.879	0.20(0.11)	0.56	120.3	43.00
66	450.64	11.33	3.872	0.20(0.11)	0.56	120.5	160.00
67	450.45	11.37	3.865	0.20(0.11)	0.56	120.7	159.00
68	450.44	11.37	3.865	0.20(0.11)	0.56	120.7	17.00
69	450.36	11.38	3.863	0.20(0.11)	0.56	120.8	33.00
70	450.20	11.40	3.858	0.20(0.11)	0.56	120.9	56.00
71	449.75	11.46	3.848	0.20(0.11)	0.56	121.2	211.00
72	449.38	11.50	3.839	0.20(0.11)	0.56	121.4	41.00

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    73      448.63   11.58    3.825  0.20( 0.11) 0.56     121.7     114.00
    74      447.87   11.65    3.810  0.20( 0.11) 0.56     122.0     100.00
    75      446.17   11.81    3.781  0.20( 0.11) 0.56     122.6     187.00
    76      442.78   12.12    3.726  0.20( 0.11) 0.56     123.8      10.00
    77      442.55   12.14    3.722  0.20( 0.11) 0.56     123.9      13.00
    78      442.21   12.17    3.717  0.20( 0.11) 0.56     124.0     127.00
    79      441.08   12.27    3.700  0.20( 0.11) 0.56     124.3     123.00
    80      440.75   12.29    3.695  0.20( 0.11) 0.56     124.4     184.00
    81      439.83   12.37    3.683  0.20( 0.11) 0.56     124.6      97.00
    82      438.81   12.44    3.670  0.20( 0.11) 0.56     124.8     208.00
    83      437.42   12.54    3.654  0.20( 0.11) 0.56     125.0      19.00
    84      436.11   12.63    3.638  0.20( 0.11) 0.56     125.3      29.00
    85      434.50   12.74    3.620  0.20( 0.11) 0.56     125.5      33.00
    86      434.43   12.74    3.620  0.20( 0.11) 0.56     125.5     120.00
    87      433.86   12.78    3.614  0.20( 0.11) 0.56     125.6     147.00
    88      433.20   12.82    3.607  0.20( 0.11) 0.56     125.7     184.00
    89      432.72   12.85    3.602  0.20( 0.11) 0.56     125.7      73.00
    90      432.53   12.86    3.600  0.20( 0.11) 0.56     125.7     111.00
    91      425.14   13.32    3.529  0.20( 0.11) 0.56     126.4     152.00
    92      422.31   13.51    3.501  0.20( 0.11) 0.56     126.6      16.00
    93      417.68   13.82    3.455  0.20( 0.11) 0.56     127.0      17.00
    94      410.49   14.31    3.387  0.20( 0.11) 0.56     127.6      22.00
    95      409.34   14.39    3.376  0.20( 0.11) 0.56     127.7      10.00
    96      406.04   14.60    3.348  0.20( 0.11) 0.56     127.8       7.00
    97      390.59   15.61    3.222  0.20( 0.11) 0.56     128.4       4.00
    98      380.59   16.30    3.144  0.20( 0.11) 0.56     128.7     144.00
    99      367.80   17.22    3.046  0.20( 0.11) 0.56     128.8       1.00
    **      357.46   18.04    2.966  0.20( 0.11) 0.56     128.9     147.00
  TOTAL AREA(ACRES) =       128.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      453.84  Tc(MIN.) =   10.236
  EFFECTIVE AREA(ACRES) =    113.42  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      128.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

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  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
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============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      128.9  TC(MIN.) =     10.24
  EFFECTIVE AREA(ACRES) =    113.42  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.557
  PEAK FLOW RATE(CFS)   =     453.84

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      353.63    5.06    6.144  0.20( 0.11) 0.55      55.2     140.00
      2      363.79    5.42    5.907  0.20( 0.11) 0.55      59.2     215.00
      3      373.77    5.78    5.696  0.20( 0.11) 0.55      63.2     104.00
      4      384.34    6.16    5.492  0.20( 0.11) 0.55      67.6     183.00
      5      386.62    6.24    5.450  0.20( 0.11) 0.55      68.6      88.00
      6      389.24    6.33    5.403  0.20( 0.11) 0.55      69.7      63.00
      7      390.97    6.40    5.373  0.20( 0.11) 0.55      70.5     195.00
      8      393.13    6.48    5.335  0.20( 0.11) 0.55      71.5      47.00
      9      394.30    6.52    5.314  0.20( 0.11) 0.55      72.0      45.00
     10      398.66    6.69    5.237  0.20( 0.11) 0.55      74.1     170.00
     11      405.84    6.97    5.116  0.20( 0.11) 0.55      77.7     175.00
     12      406.74    7.00    5.101  0.20( 0.11) 0.55      78.1     161.00
     13      408.82    7.09    5.067  0.20( 0.11) 0.55      79.2      59.00
     14      411.85    7.21    5.015  0.20( 0.11) 0.55      80.7      95.00
     15      414.69    7.33    4.968  0.20( 0.11) 0.55      82.2     174.00
     16      415.75    7.38    4.950  0.20( 0.11) 0.55      82.8     118.00
     17      416.81    7.43    4.932  0.20( 0.11) 0.55      83.4      59.00
     18      421.36    7.63    4.858  0.20( 0.11) 0.55      85.9     150.00
     19      421.39    7.63    4.857  0.20( 0.11) 0.55      85.9     138.00
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20	422.33	7.67	4.841	0.20(0.11)	0.55	86.5	192.00
21	422.85	7.70	4.833	0.20(0.11)	0.55	86.8	173.00
22	431.08	8.09	4.697	0.20(0.11)	0.55	91.6	141.00
23	432.14	8.14	4.679	0.20(0.11)	0.55	92.3	14.00
24	438.60	8.47	4.576	0.20(0.11)	0.55	96.2	31.00
25	440.84	8.58	4.540	0.20(0.11)	0.55	97.6	223.00
26	440.92	8.59	4.539	0.20(0.11)	0.55	97.7	167.00
27	442.11	8.65	4.519	0.20(0.11)	0.55	98.5	85.00
28	442.85	8.69	4.507	0.20(0.11)	0.55	99.0	199.00
29	444.31	8.78	4.482	0.20(0.11)	0.55	99.9	38.00
30	444.50	8.79	4.478	0.20(0.11)	0.55	100.1	97.00
31	444.59	8.80	4.476	0.20(0.11)	0.55	100.2	154.00
32	444.62	8.80	4.476	0.20(0.11)	0.55	100.2	136.00
33	445.24	8.85	4.461	0.20(0.11)	0.55	100.7	191.10
34	445.72	8.89	4.450	0.20(0.11)	0.55	101.1	80.00
35	446.45	8.95	4.431	0.20(0.11)	0.56	101.8	6.00
36	448.68	9.16	4.375	0.20(0.11)	0.56	103.9	201.00
37	448.75	9.16	4.373	0.20(0.11)	0.56	104.0	190.00
38	449.38	9.23	4.355	0.20(0.11)	0.56	104.7	64.00
39	450.12	9.31	4.333	0.20(0.11)	0.56	105.5	200.00
40	450.23	9.32	4.330	0.20(0.11)	0.56	105.6	92.00
41	450.31	9.33	4.327	0.20(0.11)	0.56	105.7	35.00
42	450.78	9.40	4.310	0.20(0.11)	0.56	106.3	220.00
43	450.89	9.42	4.305	0.20(0.11)	0.56	106.5	25.00
44	451.01	9.44	4.299	0.20(0.11)	0.56	106.7	24.00
45	451.47	9.52	4.279	0.20(0.11)	0.56	107.4	19.00
46	451.86	9.59	4.261	0.20(0.11)	0.56	108.0	46.00
47	452.17	9.65	4.245	0.20(0.11)	0.56	108.6	129.00
48	453.08	9.86	4.193	0.20(0.11)	0.56	110.4	213.00
49	453.40	9.95	4.172	0.20(0.11)	0.56	111.2	64.00
50	453.45	9.96	4.168	0.20(0.11)	0.56	111.3	16.00
51	453.63	10.04	4.151	0.20(0.11)	0.56	111.9	168.00
52	453.71	10.07	4.143	0.20(0.11)	0.56	112.2	32.00
53	453.74	10.09	4.139	0.20(0.11)	0.56	112.3	61.00
54	453.80	10.14	4.125	0.20(0.11)	0.56	112.7	169.00
55	453.82	10.16	4.121	0.20(0.11)	0.56	112.9	134.00
56	453.84	10.24	4.104	0.20(0.11)	0.56	113.4	116.00
57	453.83	10.26	4.098	0.20(0.11)	0.56	113.6	78.00
58	452.87	10.69	4.002	0.20(0.11)	0.56	116.5	179.00
59	452.54	10.83	3.974	0.20(0.11)	0.56	117.4	14.00
60	452.43	10.87	3.965	0.20(0.11)	0.56	117.7	76.00
61	452.21	10.94	3.950	0.20(0.11)	0.56	118.2	82.00
62	451.83	11.06	3.927	0.20(0.11)	0.56	118.9	67.00
63	451.32	11.20	3.898	0.20(0.11)	0.56	119.8	181.00
64	451.26	11.21	3.895	0.20(0.11)	0.56	119.9	53.00
65	450.85	11.30	3.879	0.20(0.11)	0.56	120.3	43.00
66	450.64	11.33	3.872	0.20(0.11)	0.56	120.5	160.00
67	450.45	11.37	3.865	0.20(0.11)	0.56	120.7	159.00
68	450.44	11.37	3.865	0.20(0.11)	0.56	120.7	17.00
69	450.36	11.38	3.863	0.20(0.11)	0.56	120.8	33.00
70	450.20	11.40	3.858	0.20(0.11)	0.56	120.9	56.00
71	449.75	11.46	3.848	0.20(0.11)	0.56	121.2	211.00
72	449.38	11.50	3.839	0.20(0.11)	0.56	121.4	41.00
73	448.63	11.58	3.825	0.20(0.11)	0.56	121.7	114.00
74	447.87	11.65	3.810	0.20(0.11)	0.56	122.0	100.00
75	446.17	11.81	3.781	0.20(0.11)	0.56	122.6	187.00
76	442.78	12.12	3.726	0.20(0.11)	0.56	123.8	10.00
77	442.55	12.14	3.722	0.20(0.11)	0.56	123.9	13.00
78	442.21	12.17	3.717	0.20(0.11)	0.56	124.0	127.00
79	441.08	12.27	3.700	0.20(0.11)	0.56	124.3	123.00
80	440.75	12.29	3.695	0.20(0.11)	0.56	124.4	184.00
81	439.83	12.37	3.683	0.20(0.11)	0.56	124.6	97.00
82	438.81	12.44	3.670	0.20(0.11)	0.56	124.8	208.00
83	437.42	12.54	3.654	0.20(0.11)	0.56	125.0	19.00
84	436.11	12.63	3.638	0.20(0.11)	0.56	125.3	29.00
85	434.50	12.74	3.620	0.20(0.11)	0.56	125.5	33.00
86	434.43	12.74	3.620	0.20(0.11)	0.56	125.5	120.00
87	433.86	12.78	3.614	0.20(0.11)	0.56	125.6	147.00
88	433.20	12.82	3.607	0.20(0.11)	0.56	125.7	184.00
89	432.72	12.85	3.602	0.20(0.11)	0.56	125.7	73.00
90	432.53	12.86	3.600	0.20(0.11)	0.56	125.7	111.00

91	425.14	13.32	3.529	0.20(0.11)	0.56	126.4	152.00
92	422.31	13.51	3.501	0.20(0.11)	0.56	126.6	16.00
93	417.68	13.82	3.455	0.20(0.11)	0.56	127.0	17.00
94	410.49	14.31	3.387	0.20(0.11)	0.56	127.6	22.00
95	409.34	14.39	3.376	0.20(0.11)	0.56	127.7	10.00
96	406.04	14.60	3.348	0.20(0.11)	0.56	127.8	7.00
97	390.59	15.61	3.222	0.20(0.11)	0.56	128.4	4.00
98	380.59	16.30	3.144	0.20(0.11)	0.56	128.7	144.00
99	367.80	17.22	3.046	0.20(0.11)	0.56	128.8	1.00
**	357.46	18.04	2.966	0.20(0.11)	0.56	128.9	147.00

END OF RATIONAL METHOD ANALYSIS

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A' (CONTINUE)                                 *
 ************************************************************************

  FILE NAME: EAST-2.DAT
  TIME/DATE OF STUDY: 21:01 10/31/2021
================================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
================================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.24   RAINFALL INTENSITY(INCH/HR) =  4.10
  EFFECTIVE AREA(ACRES) =   113.42
  TOTAL AREA(ACRES) =   128.90        PEAK FLOW RATE(CFS) =    453.80
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.56
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  69.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.81
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     453.80
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.448
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.93
  Tc(MIN.) =    8.90
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    3.53
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       5.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   4.60
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.84
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.84

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.349
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    91    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =   10.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.041
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.84   10.18    4.117  0.20( 0.18) 0.90       1.5     231.00
      2        3.44   10.51    4.041  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.18    4.117  0.20( 0.15) 0.76       2.5     231.00
      2        9.16   10.51    4.041  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.23    Tc(MIN.) =    10.18
  EFFECTIVE AREA(ACRES) =       2.46   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.23
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.46
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.23

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.55
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.55

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.45    4.056  0.20( 0.15) 0.76       2.5     231.00
      1        9.16   10.78    3.983  0.20( 0.15) 0.76       2.5     234.00
      2        2.55    6.80    5.187  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.80    5.187  0.20( 0.14) 0.72       2.2     237.00
      2       11.21   10.45    4.056  0.20( 0.15) 0.73       3.0     231.00
      3       11.11   10.78    3.983  0.20( 0.15) 0.73       3.0     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.21    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       3.02   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.21
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =       3.02
  TOTAL STREAM AREA(ACRES) =       3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.21

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.82    5.179  0.20( 0.14) 0.72       2.2     237.00
      1       11.21   10.47    4.052  0.20( 0.15) 0.73       3.0     231.00
      1       11.11   10.80    3.979  0.20( 0.15) 0.73       3.0     234.00
      2        2.71    5.00    6.187  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.00    6.187  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.82    5.179  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.47    4.052  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.80    3.979  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.98    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =       3.51   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.66
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.98
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.04    6.158  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.86    5.161  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.51    4.043  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.84    3.971  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      453.80   10.48    4.049  0.20( 0.11) 0.56     113.4     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      347.01    5.04    6.158  0.20( 0.11) 0.56      56.6     219.00
      2      393.61    6.86    5.161  0.20( 0.11) 0.56      76.9     237.00
      3      466.78   10.48    4.049  0.20( 0.11) 0.56     116.9     230.00
      4      466.08   10.51    4.043  0.20( 0.11) 0.56     116.9     231.00
      5      457.66   10.84    3.971  0.20( 0.11) 0.56     117.0     234.00
    TOTAL AREA(ACRES) =       132.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      466.78  Tc(MIN.) =   10.481
  EFFECTIVE AREA(ACRES) =    116.92  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      132.4
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  70.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.99
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     466.78
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =     116.92
  TOTAL STREAM AREA(ACRES) =     132.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     466.78

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.445
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.51      0.20      0.400    91    6.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.25
  RAINFALL INTENSITY(INCH/HR) =   5.45
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      347.01    5.07    6.139  0.20( 0.11) 0.56      56.6     219.00
      1      393.61    6.89    5.149  0.20( 0.11) 0.56      76.9     237.00
      1      466.78   10.51    4.043  0.20( 0.11) 0.56     116.9     230.00
      1      466.08   10.53    4.037  0.20( 0.11) 0.56     116.9     231.00
      1      457.66   10.87    3.965  0.20( 0.11) 0.56     117.0     234.00
      2        2.46    6.25    5.445  0.20( 0.08) 0.40       0.5     241.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      349.27    5.07    6.139  0.20( 0.11) 0.56      57.1     219.00
      2      379.68    6.25    5.445  0.20( 0.11) 0.56      70.3     241.00
      3      395.93    6.89    5.149  0.20( 0.11) 0.56      77.4     237.00
      4      468.60   10.51    4.043  0.20( 0.11) 0.56     117.4     230.00
      5      467.90   10.53    4.037  0.20( 0.11) 0.56     117.4     231.00
      6      459.44   10.87    3.965  0.20( 0.11) 0.56     117.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     468.60    Tc(MIN.) =    10.51
  EFFECTIVE AREA(ACRES) =     117.43   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      132.9
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.868
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.39      0.20      0.200    91    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   7.91   Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.25      0.20      0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =      10.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.35
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.19      0.20      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.81
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     15.51
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =      10.81
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A' - WITH 2 FLOW-BY DETENTION BASINS          *
 ************************************************************************

  FILE NAME: EAST-B.DAT
  TIME/DATE OF STUDY: 14:18 11/01/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.940
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20      0.600    91   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.65
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   12.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.633
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  15.84
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.16
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.97
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

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  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.95
  TOTAL STREAM AREA(ACRES) =       1.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.16

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    91    9.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.81
  TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      3.81

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.14
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =   11.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.857
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       6.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.66
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   3.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.16   12.97    3.583  0.20( 0.12) 0.60       1.9       1.00
      2        6.96   11.41    3.857  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.41    3.857  0.20( 0.12) 0.60       3.8       4.00
      2       12.62   12.97    3.583  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.81    Tc(MIN.) =    11.41
  EFFECTIVE AREA(ACRES) =       3.79   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.81
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.79
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.81

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    91    8.94
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.77
 TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.77

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
 STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   10.46
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.053
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.48
 EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.43
 FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.45    3.848  0.20( 0.12) 0.60       3.8       4.00
      1       12.62   13.02    3.576  0.20( 0.12) 0.60       4.0       1.00
      2        7.01   10.46    4.053  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.36   10.46    4.053  0.20( 0.11) 0.56       5.4       7.00
      2       19.46   11.45    3.848  0.20( 0.11) 0.57       5.8       4.00
      3       18.78   13.02    3.576  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.46    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =       5.76   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.46
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   3.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.76
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.46

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.356
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.64

**************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  3.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   4.10
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36   10.48    4.048  0.20( 0.11) 0.56       5.4       7.00
      1       19.46   11.47    3.844  0.20( 0.11) 0.57       5.8       4.00
      1       18.78   13.04    3.573  0.20( 0.11) 0.57       6.0       1.00
      2        5.17   10.27    4.096  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.36   10.27    4.096  0.20( 0.11) 0.56       6.8      10.00
      2       24.46   10.48    4.048  0.20( 0.11) 0.56       6.9       7.00
      3       24.30   11.47    3.844  0.20( 0.11) 0.56       7.2       4.00
      4       23.27   13.04    3.573  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.46    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.46
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.46

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20     0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.94
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.20      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.11
 EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.05

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.37
 TOTAL STREAM AREA(ACRES) =       0.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.36   10.53    4.039  0.20( 0.11) 0.56       6.8       10.00
     1       24.46   10.74    3.993  0.20( 0.11) 0.56       6.9        7.00
     1       24.30   11.73    3.796  0.20( 0.11) 0.56       7.2        4.00
     1       23.27   13.29    3.533  0.20( 0.11) 0.56       7.4        1.00
     2        2.05    5.00    6.187  0.20( 0.02) 0.10       0.4        6.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.96    5.00    6.187  0.20( 0.10) 0.51       3.6        6.00
     2       25.70   10.53    4.039  0.20( 0.11) 0.54       7.1       10.00
     3       25.78   10.74    3.993  0.20( 0.11) 0.54       7.2        7.00
     4       25.55   11.73    3.796  0.20( 0.11) 0.54       7.6        4.00
     5       24.44   13.29    3.533  0.20( 0.11) 0.54       7.8        1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.78    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.89
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.78
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.107
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20      0.100    91    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.39
 TOTAL STREAM AREA(ACRES) =       0.39
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.96    5.03    6.166  0.20( 0.10) 0.51       3.6       6.00
     1       25.70   10.55    4.033  0.20( 0.11) 0.54       7.1      10.00
     1       25.78   10.77    3.987  0.20( 0.11) 0.54       7.2       7.00
     1       25.55   11.76    3.791  0.20( 0.11) 0.54       7.6       4.00
     1       24.44   13.32    3.529  0.20( 0.11) 0.54       7.8       1.00
     2        1.79    6.99    5.107  0.20( 0.02) 0.10       0.4      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.51    5.03    6.166  0.20( 0.10) 0.48       3.9       6.00
     2       23.78    6.99    5.107  0.20( 0.10) 0.49       5.2      14.00
     3       27.11   10.55    4.033  0.20( 0.10) 0.51       7.5      10.00
     4       27.17   10.77    3.987  0.20( 0.10) 0.52       7.6       7.00
     5       26.88   11.76    3.791  0.20( 0.10) 0.52       8.0       4.00
     6       25.67   13.32    3.529  0.20( 0.10) 0.52       8.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      27.17    Tc(MIN.) =    10.77
 EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =        8.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.42
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.17
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.80
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.409
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.324
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    91    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.52
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.52

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.71    9.03    4.409  0.20( 0.10) 0.50       0.7      16.00
      2        3.52    9.34    4.324  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1         6.18    9.03    4.409  0.20( 0.11) 0.56       1.6      16.00
      2         6.18    9.34    4.324  0.20( 0.11) 0.56       1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.18    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.18
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.31
  RAINFALL INTENSITY(INCH/HR) =   4.33
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.18

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.861
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.22      0.20     0.100    91    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
```

```
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    8.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.612
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.17
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.35
  RAINFALL INTENSITY(INCH/HR) =   4.61
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.18    9.31    4.332  0.20( 0.11) 0.56       1.6      16.00
      1        6.18    9.62    4.251  0.20( 0.11) 0.56       1.6      17.00
      2        1.49    8.35    4.612  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.35    4.612  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.31    4.332  0.20( 0.09) 0.47       2.0      16.00
      3        7.55    9.62    4.251  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       7.58    Tc(MIN.) =     9.31
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.58
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.77    4.483  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.74    4.224  0.20( 0.09) 0.47       2.0      16.00
      3        7.55   10.05    4.148  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.07    6.139  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    7.03    5.091  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.59    4.025  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.80    3.979  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.79    3.784  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.36    3.523  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.40    5.07    6.139  0.20( 0.10) 0.48       4.9       6.00
      2       30.52    7.03    5.091  0.20( 0.10) 0.48       6.7      14.00
      3       32.81    8.77    4.483  0.20( 0.10) 0.49       8.1      19.00
      4       33.89    9.74    4.224  0.20( 0.10) 0.50       8.9      16.00
      5       34.15   10.05    4.148  0.20( 0.10) 0.50       9.2      17.00
      6       34.43   10.59    4.025  0.20( 0.10) 0.51       9.5      10.00
      7       34.41   10.80    3.979  0.20( 0.10) 0.51       9.6       7.00
      8       33.75   11.79    3.784  0.20( 0.10) 0.51       9.9       4.00
      9       32.06   13.36    3.523  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.43  Tc(MIN.) =   10.589
  EFFECTIVE AREA(ACRES) =      9.51  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.88
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.43
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.51
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.43

**************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.727
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    91    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.69

**************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =   10.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.22
 EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.75

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
 FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.40      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.54
 EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       4.29

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.47
 RAINFALL INTENSITY(INCH/HR) =   4.29
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.16
 EFFECTIVE STREAM AREA(ACRES) =       1.12
 TOTAL STREAM AREA(ACRES) =       1.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.29

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.40    6.23    5.455  0.20( 0.10) 0.48       4.9       6.00
     1       30.52    8.13    4.682  0.20( 0.10) 0.48       6.7      14.00
     1       32.81    9.87    4.191  0.20( 0.10) 0.49       8.1      19.00
     1       33.89   10.83    3.974  0.20( 0.10) 0.50       8.9      16.00
     1       34.15   11.14    3.910  0.20( 0.10) 0.50       9.2      17.00
```

```
     1       34.43   11.68    3.805  0.20( 0.10) 0.51       9.5       10.00
     1       34.41   11.89    3.766  0.20( 0.10) 0.51       9.6        7.00
     1       33.75   12.88    3.597  0.20( 0.10) 0.51       9.9        4.00
     1       32.06   14.46    3.368  0.20( 0.10) 0.51      10.2        1.00
     2        4.29    9.47    4.290  0.20( 0.03) 0.16       1.1       13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.99    6.23    5.455  0.20( 0.09) 0.44       5.6        6.00
      2       34.55    8.13    4.682  0.20( 0.09) 0.44       7.6       14.00
      3       36.58    9.47    4.290  0.20( 0.09) 0.45       8.9       13.00
      4       37.00    9.87    4.191  0.20( 0.09) 0.45       9.3       19.00
      5       37.86   10.83    3.974  0.20( 0.09) 0.46      10.0       16.00
      6       38.06   11.14    3.910  0.20( 0.09) 0.47      10.3       17.00
      7       38.23   11.68    3.805  0.20( 0.09) 0.47      10.6       10.00
      8       38.17   11.89    3.766  0.20( 0.09) 0.47      10.7        7.00
      9       37.34   12.88    3.597  0.20( 0.09) 0.47      11.1        4.00
     10       35.42   14.46    3.368  0.20( 0.10) 0.48      11.3        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.23    Tc(MIN.) =    11.68
  EFFECTIVE AREA(ACRES) =      10.63   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.81
  RAINFALL INTENSITY(INCH/HR) =   3.78
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.63
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.23

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.14      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.670
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.64      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.64
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    5.82
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.14
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.87
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
```

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 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.87

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.99    6.36    5.390  0.20( 0.09) 0.44       5.6       6.00
     1       34.55    8.26    4.640  0.20( 0.09) 0.44       7.6      14.00
     1       36.58    9.60    4.257  0.20( 0.09) 0.45       8.9      13.00
     1       37.00   10.00    4.160  0.20( 0.09) 0.45       9.3      19.00
     1       37.86   10.96    3.947  0.20( 0.09) 0.46      10.0      16.00
     1       38.06   11.27    3.884  0.20( 0.09) 0.47      10.3      17.00
     1       38.23   11.81    3.781  0.20( 0.09) 0.47      10.6      10.00
     1       38.17   12.02    3.743  0.20( 0.09) 0.47      10.7       7.00
     1       37.34   13.01    3.577  0.20( 0.09) 0.47      11.1       4.00
     1       35.42   14.59    3.350  0.20( 0.10) 0.48      11.3       1.00
     2        3.87    6.83    5.174  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.36    5.390  0.20( 0.09) 0.47       6.4       6.00
     2       35.74    6.83    5.174  0.20( 0.10) 0.48       6.9      25.00
     3       38.01    8.26    4.640  0.20( 0.09) 0.47       8.4      14.00
     4       39.75    9.60    4.257  0.20( 0.10) 0.48       9.7      13.00
     5       40.09   10.00    4.160  0.20( 0.10) 0.48      10.0      19.00
     6       40.79   10.96    3.947  0.20( 0.10) 0.48      10.8      16.00
     7       40.94   11.27    3.884  0.20( 0.10) 0.49      11.1      17.00
     8       41.03   11.81    3.781  0.20( 0.10) 0.49      11.4      10.00
     9       40.94   12.02    3.743  0.20( 0.10) 0.49      11.5       7.00
    10       39.99   13.01    3.577  0.20( 0.10) 0.49      11.8       4.00
    11       37.89   14.59    3.350  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      41.03    Tc(MIN.) =    11.81
 EFFECTIVE AREA(ACRES) =      11.41   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      41.03
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.88
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.88
 RAINFALL INTENSITY(INCH/HR) =   3.77
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.49
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  EFFECTIVE STREAM AREA(ACRES) =      11.41
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.03

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   10.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.123
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.26
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       7.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.44    5.354  0.20( 0.09) 0.47       6.4       6.00
     1       35.74    6.91    5.142  0.20( 0.10) 0.48       6.9      25.00
     1       38.01    8.34    4.616  0.20( 0.09) 0.47       8.4      14.00
     1       39.75    9.67    4.239  0.20( 0.10) 0.48       9.7      13.00
     1       40.09   10.07    4.143  0.20( 0.10) 0.48      10.0      19.00
     1       40.79   11.03    3.933  0.20( 0.10) 0.48      10.8      16.00
     1       40.94   11.34    3.870  0.20( 0.10) 0.49      11.1      17.00
     1       41.03   11.88    3.768  0.20( 0.10) 0.49      11.4      10.00
     1       40.94   12.09    3.730  0.20( 0.10) 0.49      11.5       7.00
     1       39.99   13.08    3.565  0.20( 0.10) 0.49      11.8       4.00
     1       37.89   14.66    3.341  0.20( 0.10) 0.50      12.1       1.00
     2        7.82   10.15    4.123  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.23    6.44    5.354  0.20( 0.10) 0.50       7.7       6.00
     2       42.42    6.91    5.142  0.20( 0.10) 0.50       8.4      25.00
     3       45.22    8.34    4.616  0.20( 0.10) 0.50      10.2      14.00
     4       47.41    9.67    4.239  0.20( 0.10) 0.50      11.8      13.00
     5       47.88   10.07    4.143  0.20( 0.10) 0.50      12.2      19.00
     6       47.97   10.15    4.123  0.20( 0.10) 0.50      12.3      29.00
     7       48.24   11.03    3.933  0.20( 0.10) 0.50      13.0      16.00
     8       48.26   11.34    3.870  0.20( 0.10) 0.51      13.2      17.00
     9       48.15   11.88    3.768  0.20( 0.10) 0.51      13.6      10.00
    10       47.99   12.09    3.730  0.20( 0.10) 0.51      13.7       7.00
    11       46.71   13.08    3.565  0.20( 0.10) 0.51      14.0       4.00
    12       44.18   14.66    3.341  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      48.26    Tc(MIN.) =    11.34
 EFFECTIVE AREA(ACRES) =      13.23   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.74
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      48.26
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.65
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      13.23
  TOTAL STREAM AREA(ACRES) =      14.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.26

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.001
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.24      0.20     0.100    91    7.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.25
  RAINFALL INTENSITY(INCH/HR) =   5.00
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.439
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.25      0.20     0.100    91    6.26
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   5.44
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.23    6.76    5.205  0.20( 0.10) 0.50       7.7       6.00
      1       42.42    7.23    5.009  0.20( 0.10) 0.50       8.4      25.00
      1       45.22    8.66    4.518  0.20( 0.10) 0.50      10.2      14.00
      1       47.41    9.99    4.162  0.20( 0.10) 0.50      11.8      13.00
      1       47.88   10.39    4.070  0.20( 0.10) 0.50      12.2      19.00
      1       47.97   10.47    4.051  0.20( 0.10) 0.50      12.3      29.00
      1       48.24   11.34    3.869  0.20( 0.10) 0.50      13.0      16.00
      1       48.26   11.65    3.810  0.20( 0.10) 0.51      13.2      17.00
      1       48.15   12.20    3.712  0.20( 0.10) 0.51      13.6      10.00
      1       47.99   12.41    3.675  0.20( 0.10) 0.51      13.7       7.00
      1       46.71   13.40    3.517  0.20( 0.10) 0.51      14.0       4.00
      1       44.18   14.98    3.300  0.20( 0.10) 0.51      14.2       1.00
      2        1.08    7.25    5.001  0.20( 0.02) 0.10       0.2      24.00
      3        1.22    6.26    5.439  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.26    5.439  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.76    5.205  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.23    5.009  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.25    5.001  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.66    4.518  0.20( 0.10) 0.48      10.7      14.00
      6       49.24    9.99    4.162  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.39    4.070  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.47    4.051  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.34    3.869  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.65    3.810  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.20    3.712  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.41    3.675  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.40    3.517  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   14.98    3.300  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      49.93    Tc(MIN.) =    11.34
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.93
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.578
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.20      0.20     0.600    91    8.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.81
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.81

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    9.16
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.372
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  6.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   4.37
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.236
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.73      0.20     0.600    91    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.36
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.36

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.32
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   0.39   Tc(MIN.) =    7.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.070
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  5.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.08
  RAINFALL INTENSITY(INCH/HR) =   5.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.16
  TOTAL STREAM AREA(ACRES) =       1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.38    9.16    4.372  0.20( 0.12) 0.60       2.2      33.00
      2        5.17    7.08    5.070  0.20( 0.12) 0.60       1.2      35.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.08    5.070  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.16    4.372  0.20( 0.12) 0.60       3.4      33.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.82    Tc(MIN.) =     9.16
  EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.82
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.22    5.012  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.31    4.334  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.34    5.401  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.84    5.172  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.30    4.980  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.33    4.971  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.73    4.496  0.20( 0.10) 0.48      10.7      14.00
      6       49.24   10.06    4.144  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.46    4.053  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.54    4.035  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.42    3.855  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.73    3.796  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.27    3.699  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.48    3.663  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.48    3.506  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   15.05    3.290  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.21    6.34    5.401  0.20( 0.10) 0.50      10.1      31.00
      2       55.86    6.84    5.172  0.20( 0.10) 0.51      10.9       6.00
      3       57.11    7.22    5.012  0.20( 0.10) 0.51      11.6      35.00
      4       57.32    7.30    4.980  0.20( 0.10) 0.51      11.7      25.00
      5       57.36    7.33    4.971  0.20( 0.10) 0.51      11.8      24.00
      6       59.99    8.73    4.496  0.20( 0.10) 0.51      13.9      14.00
      7       60.90    9.31    4.334  0.20( 0.10) 0.51      14.7      33.00
      8       61.48   10.06    4.144  0.20( 0.10) 0.51      15.6      13.00
      9       61.64   10.46    4.053  0.20( 0.10) 0.51      16.0      19.00
     10       61.66   10.54    4.035  0.20( 0.10) 0.51      16.1      29.00
     11       61.30   11.42    3.855  0.20( 0.10) 0.51      16.8      16.00
     12       61.12   11.73    3.796  0.20( 0.10) 0.51      17.1      17.00
     13       60.67   12.27    3.699  0.20( 0.10) 0.51      17.4      10.00
     14       60.39   12.48    3.663  0.20( 0.10) 0.51      17.5       7.00
     15       58.56   13.48    3.506  0.20( 0.10) 0.52      17.9       4.00
     16       55.27   15.05    3.290  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       61.66  Tc(MIN.) =   10.545
  EFFECTIVE AREA(ACRES) =     16.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.66
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.12
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.66

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.776
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    91    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.76

******************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

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 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    8.34
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
 STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    7.33
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.971
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.52      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.32
 EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.51
 FLOW VELOCITY(FEET/SEC.) =  4.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
 LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.33
 RAINFALL INTENSITY(INCH/HR) =   4.97
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.86
 TOTAL STREAM AREA(ACRES) =       0.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       54.21    7.01    5.099  0.20( 0.10) 0.50      10.1      31.00
     1       55.86    7.50    4.903  0.20( 0.10) 0.51      10.9       6.00
     1       57.11    7.89    4.765  0.20( 0.10) 0.51      11.6      35.00
     1       57.32    7.97    4.737  0.20( 0.10) 0.51      11.7      25.00
     1       57.36    7.99    4.729  0.20( 0.10) 0.51      11.8      24.00
     1       59.99    9.39    4.311  0.20( 0.10) 0.51      13.9      14.00
     1       60.90    9.95    4.171  0.20( 0.10) 0.51      14.7      33.00
     1       61.48   10.71    4.000  0.20( 0.10) 0.51      15.6      13.00
     1       61.64   11.10    3.918  0.20( 0.10) 0.51      16.0      19.00
     1       61.66   11.19    3.900  0.20( 0.10) 0.51      16.1      29.00
     1       61.30   12.06    3.736  0.20( 0.10) 0.51      16.8      16.00
     1       61.12   12.37    3.682  0.20( 0.10) 0.51      17.1      17.00
     1       60.67   12.94    3.589  0.20( 0.10) 0.51      17.4      10.00
     1       60.39   13.15    3.555  0.20( 0.10) 0.51      17.5       7.00
     1       58.56   14.14    3.410  0.20( 0.10) 0.52      17.9       4.00
     1       55.27   15.72    3.209  0.20( 0.10) 0.52      18.1       1.00
     2        3.83    7.33    4.971  0.20( 0.02) 0.10       0.9      38.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       57.97    7.01    5.099  0.20( 0.09) 0.47      10.9      31.00
```

```
      2       59.10    7.33    4.971  0.20( 0.09) 0.47      11.5       38.00
      3       59.64    7.50    4.903  0.20( 0.10) 0.48      11.8        6.00
      4       60.78    7.89    4.765  0.20( 0.10) 0.48      12.5       35.00
      5       60.97    7.97    4.737  0.20( 0.10) 0.48      12.6       25.00
      6       61.01    7.99    4.729  0.20( 0.10) 0.48      12.6       24.00
      7       63.31    9.39    4.311  0.20( 0.10) 0.48      14.7       14.00
      8       64.12    9.95    4.171  0.20( 0.10) 0.48      15.6       33.00
      9       64.56   10.71    4.000  0.20( 0.10) 0.49      16.5       13.00
     10       64.65   11.10    3.918  0.20( 0.10) 0.49      16.9       19.00
     11       64.66   11.19    3.900  0.20( 0.10) 0.49      17.0       29.00
     12       64.17   12.06    3.736  0.20( 0.10) 0.49      17.7       16.00
     13       63.95   12.37    3.682  0.20( 0.10) 0.49      17.9       17.00
     14       63.43   12.94    3.589  0.20( 0.10) 0.49      18.3       10.00
     15       63.12   13.15    3.555  0.20( 0.10) 0.49      18.4        7.00
     16       61.18   14.14    3.410  0.20( 0.10) 0.50      18.7        4.00
     17       57.73   15.72    3.209  0.20( 0.10) 0.50      18.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.98   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.66
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.649
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"          D        0.84      0.20     0.700    91    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.232
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    6.77
  EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       9.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  4.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.67
  TOTAL STREAM AREA(ACRES) =       2.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.87

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.02
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      5.02

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    9.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.284
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    3.65
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   4.28
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1        9.87    9.70    4.232  0.20( 0.13) 0.63       2.7      41.00
     2        8.37    9.50    4.284  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.16    9.50    4.284  0.20( 0.12) 0.60       4.8      43.00
      2       18.14    9.70    4.232  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.16    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       4.84   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.16
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.84
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.16

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.21      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      1.17
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.21
  TOTAL STREAM AREA(ACRES) =       0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.682
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    91    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.95
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.13
  RAINFALL INTENSITY(INCH/HR) =   4.68
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.45
  TOTAL STREAM AREA(ACRES) =       1.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.95

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.16    9.85    4.194  0.20( 0.12) 0.60       4.8      43.00
      1       18.14   10.06    4.146  0.20( 0.12) 0.60       4.9      41.00
      2        1.17    5.00    6.187  0.20( 0.02) 0.10       0.2      45.00
      3        5.95    8.13    4.682  0.20( 0.12) 0.60       1.5      46.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.75    5.00    6.187  0.20( 0.11) 0.57       3.6      45.00
      2       23.46    8.13    4.682  0.20( 0.12) 0.58       5.7      46.00
```

```
     3       24.26    9.85    4.194  0.20( 0.12) 0.58       6.5      43.00
     4       24.17   10.06    4.146  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.26    Tc(MIN.) =     9.85
  EFFECTIVE AREA(ACRES) =       6.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.26
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.92
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.75    5.07    6.139  0.20( 0.11) 0.57       3.6      45.00
      2       23.46    8.20    4.660  0.20( 0.12) 0.58       5.7      46.00
      3       24.26    9.92    4.178  0.20( 0.12) 0.58       6.5      43.00
      4       24.17   10.12    4.130  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       57.97    7.07    5.075  0.20( 0.09) 0.47      10.9      31.00
      2       59.10    7.38    4.949  0.20( 0.09) 0.47      11.5      38.00
      3       59.64    7.56    4.882  0.20( 0.10) 0.48      11.8       6.00
      4       60.78    7.94    4.745  0.20( 0.10) 0.48      12.5      35.00
      5       60.97    8.03    4.717  0.20( 0.10) 0.48      12.6      25.00
      6       61.01    8.05    4.710  0.20( 0.10) 0.48      12.6      24.00
      7       63.31    9.45    4.296  0.20( 0.10) 0.48      14.7      14.00
      8       64.12   10.00    4.158  0.20( 0.10) 0.48      15.6      33.00
      9       64.56   10.76    3.988  0.20( 0.10) 0.49      16.5      13.00
     10       64.65   11.16    3.907  0.20( 0.10) 0.49      16.9      19.00
     11       64.66   11.24    3.890  0.20( 0.10) 0.49      17.0      29.00
     12       64.17   12.11    3.726  0.20( 0.10) 0.49      17.7      16.00
     13       63.95   12.43    3.673  0.20( 0.10) 0.49      17.9      17.00
     14       63.43   12.99    3.580  0.20( 0.10) 0.49      18.3      10.00
     15       63.12   13.20    3.547  0.20( 0.10) 0.49      18.4       7.00
     16       61.18   14.20    3.403  0.20( 0.10) 0.50      18.7       4.00
     17       57.73   15.78    3.202  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       70.22    5.07    6.139  0.20( 0.10) 0.50      11.4      45.00
      2       80.08    7.07    5.075  0.20( 0.10) 0.51      15.8      31.00
      3       81.59    7.38    4.949  0.20( 0.10) 0.51      16.6      38.00
      4       82.34    7.56    4.882  0.20( 0.10) 0.51      17.0       6.00
      5       83.94    7.94    4.745  0.20( 0.10) 0.51      18.0      35.00
      6       84.23    8.03    4.717  0.20( 0.10) 0.51      18.1      25.00
```

```
      7       84.29    8.05    4.710  0.20( 0.10) 0.51      18.2       24.00
      8       84.72    8.20    4.660  0.20( 0.10) 0.51      18.5       46.00
      9       87.35    9.45    4.296  0.20( 0.10) 0.51      21.0       14.00
     10       88.26    9.92    4.178  0.20( 0.10) 0.51      22.0       43.00
     11       88.34   10.00    4.158  0.20( 0.10) 0.51      22.1       33.00
     12       88.36   10.12    4.130  0.20( 0.10) 0.51      22.3       41.00
     13       87.87   10.76    3.988  0.20( 0.10) 0.51      23.0       13.00
     14       87.48   11.16    3.907  0.20( 0.10) 0.51      23.5       19.00
     15       87.39   11.24    3.890  0.20( 0.10) 0.51      23.5       29.00
     16       85.91   12.11    3.726  0.20( 0.10) 0.52      24.3       16.00
     17       85.37   12.43    3.673  0.20( 0.10) 0.52      24.5       17.00
     18       84.29   12.99    3.580  0.20( 0.10) 0.52      24.8       10.00
     19       83.78   13.20    3.547  0.20( 0.10) 0.52      24.9        7.00
     20       80.97   14.20    3.403  0.20( 0.10) 0.52      25.3        4.00
     21       76.32   15.78    3.202  0.20( 0.10) 0.52      25.5        1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       88.36  Tc(MIN.) =   10.123
  EFFECTIVE AREA(ACRES) =     22.27  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.36
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.27
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      88.36

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.468
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    91    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.60   Tc(MIN.) =    8.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.476
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  4.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	70.22	5.18	6.063	0.20(0.10)	0.50	11.4	45.00
1	80.08	7.18	5.030	0.20(0.10)	0.51	15.8	31.00
1	81.59	7.49	4.908	0.20(0.10)	0.51	16.6	38.00
1	82.34	7.67	4.843	0.20(0.10)	0.51	17.0	6.00
1	83.94	8.05	4.709	0.20(0.10)	0.51	18.0	35.00
1	84.23	8.13	4.682	0.20(0.10)	0.51	18.1	25.00
1	84.29	8.16	4.675	0.20(0.10)	0.51	18.2	24.00
1	84.72	8.31	4.626	0.20(0.10)	0.51	18.5	46.00
1	87.35	9.56	4.269	0.20(0.10)	0.51	21.0	14.00
1	88.26	10.03	4.153	0.20(0.10)	0.51	22.0	43.00
1	88.34	10.11	4.133	0.20(0.10)	0.51	22.1	33.00
1	88.36	10.23	4.106	0.20(0.10)	0.51	22.3	41.00
1	87.87	10.87	3.966	0.20(0.10)	0.51	23.0	13.00
1	87.48	11.26	3.885	0.20(0.10)	0.51	23.5	19.00
1	87.39	11.35	3.869	0.20(0.10)	0.51	23.5	29.00
1	85.91	12.22	3.708	0.20(0.10)	0.52	24.3	16.00
1	85.37	12.53	3.655	0.20(0.10)	0.52	24.5	17.00
1	84.29	13.10	3.563	0.20(0.10)	0.52	24.8	10.00
1	83.78	13.31	3.531	0.20(0.10)	0.52	24.9	7.00
1	80.97	14.30	3.388	0.20(0.10)	0.52	25.3	4.00
1	76.32	15.89	3.190	0.20(0.10)	0.52	25.5	1.00
2	3.39	8.80	4.476	0.20(0.04)	0.20	0.9	32.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.18	6.063	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.18	5.030	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.49	4.908	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.67	4.843	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.05	4.709	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.13	4.682	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.16	4.675	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.31	4.626	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.80	4.476	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.56	4.269	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.03	4.153	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.11	4.133	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.23	4.106	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.87	3.966	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.26	3.885	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.35	3.869	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.22	3.708	0.20(0.10)	0.51	25.1	16.00
18	88.13	12.53	3.655	0.20(0.10)	0.51	25.3	17.00
19	86.99	13.10	3.563	0.20(0.10)	0.51	25.7	10.00
20	86.45	13.31	3.531	0.20(0.10)	0.51	25.8	7.00
21	83.53	14.30	3.388	0.20(0.10)	0.51	26.1	4.00
22	78.73	15.89	3.190	0.20(0.10)	0.51	26.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 91.47 Tc(MIN.) = 10.11
EFFECTIVE AREA(ACRES) = 22.95 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 26.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 50.00 = 2585.00 FEET.

****
FLOW PROCESS FROM NODE 50.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 457.00 DOWNSTREAM(FEET) = 454.50

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.49
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.47
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    4.08
```

```
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.31
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    5.60
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.592
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.70
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.70

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =    9.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.380
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.80
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   4.38
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.34
  TOTAL STREAM AREA(ACRES) =       1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.14
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.10   12.20    3.711  0.20( 0.10) 0.50       3.6      22.00
      2        5.14    9.14    4.380  0.20( 0.12) 0.60       1.3      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.88    9.14    4.380  0.20( 0.11) 0.53       4.0      53.00
      2       16.43   12.20    3.711  0.20( 0.11) 0.53       4.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.43    Tc(MIN.) =    12.20
  EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.56
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.43
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.23
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       4.93
  TOTAL STREAM AREA(ACRES) =       4.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.43

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.602
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91    8.38
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.47
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    9.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.322
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  5.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.88    9.16    4.373  0.20( 0.11) 0.53       4.0      53.00
      1       16.43   12.23    3.707  0.20( 0.11) 0.53       4.9      22.00
```

```
     2        7.19    9.35    4.322  0.20( 0.12) 0.60       1.9      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.00    9.16    4.373  0.20( 0.11) 0.55       5.9      53.00
      2       23.10    9.35    4.322  0.20( 0.11) 0.55       6.0      56.00
      3       22.57   12.23    3.707  0.20( 0.11) 0.55       6.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.10    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       5.98   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.10
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.40
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       5.98
  TOTAL STREAM AREA(ACRES) =       6.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.10

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.11      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.11
 TOTAL STREAM AREA(ACRES) =       0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.61

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       23.00    9.22    4.359  0.20( 0.11) 0.55       5.9      53.00
     1       23.10    9.40    4.308  0.20( 0.11) 0.55       6.0      56.00
     1       22.57   12.28    3.698  0.20( 0.11) 0.55       6.8      22.00
     2        0.61    5.00    6.187  0.20( 0.02) 0.10       0.1      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       18.47    5.00    6.187  0.20( 0.11) 0.54       3.3      59.00
     2       23.43    9.22    4.359  0.20( 0.11) 0.55       6.0      53.00
     3       23.52    9.40    4.308  0.20( 0.11) 0.55       6.1      56.00
     4       22.93   12.28    3.698  0.20( 0.11) 0.54       6.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.52    Tc(MIN.) =     9.40
 EFFECTIVE AREA(ACRES) =       6.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        6.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.57
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.52
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.84
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       6.09
```

```
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.52

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    8.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.558
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    3.43
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.27
  FLOW VELOCITY(FEET/SEC.) =  4.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.48
  TOTAL STREAM AREA(ACRES) =       1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.47    5.47    5.878  0.20( 0.11) 0.54       3.3      59.00
      1       23.43    9.65    4.245  0.20( 0.11) 0.55       6.0      53.00
      1       23.52    9.84    4.198  0.20( 0.11) 0.55       6.1      56.00
      1       22.93   12.72    3.624  0.20( 0.11) 0.54       6.9      22.00
      2        5.91    8.52    4.558  0.20( 0.12) 0.60       1.5      61.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.47    5.878  0.20( 0.11) 0.55       4.3      59.00
      2       28.01    8.52    4.558  0.20( 0.11) 0.56       6.8      61.00
      3       28.93    9.65    4.245  0.20( 0.11) 0.56       7.5      53.00
      4       28.96    9.84    4.198  0.20( 0.11) 0.56       7.6      56.00
      5       27.60   12.72    3.624  0.20( 0.11) 0.55       8.4      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.96    Tc(MIN.) =     9.84
  EFFECTIVE AREA(ACRES) =       7.57   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.96
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.57
```

```
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    91    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.89
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.89

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.597
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    3.06
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.40
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.48    5.869  0.20( 0.11) 0.55       4.3      59.00
      1       28.01    8.54    4.553  0.20( 0.11) 0.56       6.8      61.00
      1       28.93    9.67    4.241  0.20( 0.11) 0.56       7.5      53.00
      1       28.96    9.85    4.195  0.20( 0.11) 0.56       7.6      56.00
      1       27.60   12.73    3.622  0.20( 0.11) 0.55       8.4      22.00
      2        5.80    8.40    4.597  0.20( 0.12) 0.60       1.4      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.25    5.48    5.869  0.20( 0.11) 0.56       5.2      59.00
      2       33.59    8.40    4.597  0.20( 0.11) 0.56       8.1      64.00
      3       33.75    8.54    4.553  0.20( 0.11) 0.56       8.2      61.00
      4       34.27    9.67    4.241  0.20( 0.11) 0.56       8.9      53.00
      5       34.24    9.85    4.195  0.20( 0.11) 0.56       9.0      56.00
      6       32.14   12.73    3.622  0.20( 0.11) 0.56       9.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.27    Tc(MIN.) =     9.67
  EFFECTIVE AREA(ACRES) =       8.92   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        9.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.27
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.95
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.95
  RAINFALL INTENSITY(INCH/HR) =   4.17
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.92
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.27

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.608
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.30
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.30

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    9.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.209
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.32
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.79
 RAINFALL INTENSITY(INCH/HR) =   4.21
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.02
 TOTAL STREAM AREA(ACRES) =       1.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
 ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.15      0.20      0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.83
 TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.15
 TOTAL STREAM AREA(ACRES) =       0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.25    5.78    5.692  0.20( 0.11) 0.56       5.2      59.00
     1       33.59    8.68    4.510  0.20( 0.11) 0.56       8.1      64.00
     1       33.75    8.82    4.468  0.20( 0.11) 0.56       8.2      61.00
     1       34.27    9.95    4.171  0.20( 0.11) 0.56       8.9      53.00
     1       34.24   10.14    4.127  0.20( 0.11) 0.56       9.0      56.00
     1       32.14   13.03    3.574  0.20( 0.11) 0.56       9.9      22.00
     2        3.76    9.79    4.209  0.20( 0.11) 0.56       1.0      67.00
     3        0.83    5.00    6.187  0.20( 0.02) 0.10       0.2      63.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	30.27	5.00	6.187	0.20(0.11)	0.55	5.2	63.00
2	32.04	5.78	5.692	0.20(0.11)	0.55	5.9	59.00
3	37.78	8.68	4.510	0.20(0.11)	0.56	9.1	64.00
4	37.96	8.82	4.468	0.20(0.11)	0.56	9.3	61.00
5	38.53	9.79	4.209	0.20(0.11)	0.56	10.0	67.00
6	38.56	9.95	4.171	0.20(0.11)	0.56	10.1	53.00
7	38.48	10.14	4.127	0.20(0.11)	0.56	10.2	56.00
8	35.80	13.03	3.574	0.20(0.11)	0.55	11.0	22.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 38.56 Tc(MIN.) = 9.95
EFFECTIVE AREA(ACRES) = 10.09 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 11.0
LONGEST FLOWPATH FROM NODE 22.00 TO NODE 69.00 = 1725.00 FEET.

****
FLOW PROCESS FROM NODE 69.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 454.50
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.28
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.56
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 9.99
LONGEST FLOWPATH FROM NODE 22.00 TO NODE 70.00 = 1755.00 FEET.

****
FLOW PROCESS FROM NODE 70.00 TO NODE 70.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	30.27	5.05	6.154	0.20(0.11)	0.55	5.2	63.00
2	32.04	5.83	5.666	0.20(0.11)	0.55	5.9	59.00
3	37.78	8.73	4.497	0.20(0.11)	0.56	9.1	64.00
4	37.96	8.87	4.455	0.20(0.11)	0.56	9.3	61.00
5	38.53	9.84	4.198	0.20(0.11)	0.56	10.0	67.00
6	38.56	9.99	4.161	0.20(0.11)	0.56	10.1	53.00
7	38.48	10.18	4.117	0.20(0.11)	0.56	10.2	56.00
8	35.80	13.07	3.567	0.20(0.11)	0.55	11.0	22.00

LONGEST FLOWPATH FROM NODE 22.00 TO NODE 70.00 = 1755.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.23	6.027	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.23	5.009	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.54	4.889	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.72	4.824	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.10	4.692	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.19	4.665	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.21	4.658	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.36	4.609	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.85	4.461	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.61	4.256	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.08	4.141	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.16	4.121	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.28	4.094	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.92	3.955	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.31	3.875	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.40	3.859	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.27	3.699	0.20(0.10)	0.51	25.1	16.00

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    18       88.13   12.58    3.646  0.20( 0.10) 0.51      25.3      17.00
    19       86.99   13.15    3.555  0.20( 0.10) 0.51      25.7      10.00
    20       86.45   13.36    3.523  0.20( 0.10) 0.51      25.8       7.00
    21       83.53   14.36    3.381  0.20( 0.10) 0.51      26.1       4.00
    22       78.73   15.95    3.183  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.05    6.154  0.20( 0.10) 0.51      16.6      63.00
      2      103.63    5.23    6.027  0.20( 0.10) 0.51      17.3      45.00
      3      108.03    5.83    5.666  0.20( 0.10) 0.51      19.2      59.00
      4      118.01    7.23    5.009  0.20( 0.10) 0.51      24.0      31.00
      5      120.19    7.54    4.889  0.20( 0.10) 0.51      25.2      38.00
      6      121.33    7.72    4.824  0.20( 0.10) 0.51      25.8       6.00
      7      123.75    8.10    4.692  0.20( 0.10) 0.51      27.2      35.00
      8      124.21    8.19    4.665  0.20( 0.10) 0.51      27.5      25.00
      9      124.33    8.21    4.658  0.20( 0.10) 0.51      27.5      24.00
     10      125.08    8.36    4.609  0.20( 0.10) 0.51      28.1      46.00
     11      126.65    8.73    4.497  0.20( 0.10) 0.52      29.2      64.00
     12      127.08    8.85    4.461  0.20( 0.10) 0.52      29.6      32.00
     13      127.14    8.87    4.455  0.20( 0.10) 0.52      29.7      61.00
     14      128.98    9.61    4.256  0.20( 0.10) 0.52      31.7      14.00
     15      129.52    9.84    4.198  0.20( 0.10) 0.52      32.3      67.00
     16      129.82    9.99    4.161  0.20( 0.10) 0.52      32.7      53.00
     17      129.92   10.08    4.141  0.20( 0.10) 0.52      32.9      43.00
     18      129.96   10.16    4.121  0.20( 0.10) 0.52      33.1      33.00
     19      129.95   10.18    4.117  0.20( 0.10) 0.52      33.2      56.00
     20      129.85   10.28    4.094  0.20( 0.10) 0.52      33.3      41.00
     21      128.67   10.92    3.955  0.20( 0.10) 0.52      34.3      13.00
     22      127.85   11.31    3.875  0.20( 0.10) 0.52      34.8      19.00
     23      127.66   11.40    3.859  0.20( 0.10) 0.52      34.9      29.00
     24      125.26   12.27    3.699  0.20( 0.10) 0.52      35.9      16.00
     25      124.38   12.58    3.646  0.20( 0.10) 0.52      36.2      17.00
     26      122.94   13.07    3.567  0.20( 0.10) 0.52      36.7      22.00
     27      122.66   13.15    3.555  0.20( 0.10) 0.52      36.7      10.00
     28      121.79   13.36    3.523  0.20( 0.10) 0.52      36.8       7.00
     29      117.40   14.36    3.381  0.20( 0.10) 0.52      37.2       4.00
     30      110.55   15.95    3.183  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      129.96  Tc(MIN.) =   10.161
  EFFECTIVE AREA(ACRES) =     33.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.63
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.96
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

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 FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.24
 RAINFALL INTENSITY(INCH/HR) =   4.10
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.52
 EFFECTIVE STREAM AREA(ACRES) =      33.12
 TOTAL STREAM AREA(ACRES) =      37.39
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     129.96

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.38      0.20      0.100    91    5.27
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.05
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
 FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.27
 RAINFALL INTENSITY(INCH/HR) =   6.00
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.38
 TOTAL STREAM AREA(ACRES) =       0.38
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      102.10    5.13    6.098  0.20( 0.10) 0.51      16.6      63.00
     1      103.63    5.32    5.973  0.20( 0.10) 0.51      17.3      45.00
     1      108.03    5.91    5.623  0.20( 0.10) 0.51      19.2      59.00
     1      118.01    7.31    4.979  0.20( 0.10) 0.51      24.0      31.00
     1      120.19    7.62    4.860  0.20( 0.10) 0.51      25.2      38.00
     1      121.33    7.80    4.797  0.20( 0.10) 0.51      25.8       6.00
     1      123.75    8.18    4.667  0.20( 0.10) 0.51      27.2      35.00
     1      124.21    8.26    4.640  0.20( 0.10) 0.51      27.5      25.00
     1      124.33    8.28    4.633  0.20( 0.10) 0.51      27.5      24.00
     1      125.08    8.44    4.585  0.20( 0.10) 0.51      28.1      46.00
     1      126.65    8.80    4.474  0.20( 0.10) 0.52      29.2      64.00
     1      127.08    8.93    4.439  0.20( 0.10) 0.52      29.6      32.00
     1      127.14    8.95    4.433  0.20( 0.10) 0.52      29.7      61.00
     1      128.98    9.68    4.236  0.20( 0.10) 0.52      31.7      14.00
     1      129.52    9.92    4.179  0.20( 0.10) 0.52      32.3      67.00
```

1	129.82	10.07	4.142	0.20(0.10)	0.52	32.7	53.00
1	129.92	10.15	4.123	0.20(0.10)	0.52	32.9	43.00
1	129.96	10.24	4.104	0.20(0.10)	0.52	33.1	33.00
1	129.95	10.26	4.099	0.20(0.10)	0.52	33.2	56.00
1	129.85	10.36	4.076	0.20(0.10)	0.52	33.3	41.00
1	128.67	10.99	3.939	0.20(0.10)	0.52	34.3	13.00
1	127.85	11.39	3.860	0.20(0.10)	0.52	34.8	19.00
1	127.66	11.48	3.844	0.20(0.10)	0.52	34.9	29.00
1	125.26	12.35	3.685	0.20(0.10)	0.52	35.9	16.00
1	124.38	12.66	3.633	0.20(0.10)	0.52	36.2	17.00
1	122.94	13.15	3.555	0.20(0.10)	0.52	36.7	22.00
1	122.66	13.23	3.543	0.20(0.10)	0.52	36.7	10.00
1	121.79	13.44	3.511	0.20(0.10)	0.52	36.8	7.00
1	117.40	14.43	3.370	0.20(0.10)	0.52	37.2	4.00
1	110.55	16.02	3.174	0.20(0.10)	0.52	37.4	1.00
2	2.05	5.27	6.003	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.13	6.098	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.27	6.003	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.32	5.973	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.91	5.623	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.31	4.979	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.62	4.860	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.80	4.797	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.18	4.667	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.26	4.640	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.28	4.633	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.44	4.585	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.80	4.474	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.93	4.439	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.95	4.433	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.68	4.236	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.92	4.179	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.07	4.142	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.15	4.123	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.24	4.104	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.26	4.099	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.36	4.076	0.20(0.10)	0.51	33.7	41.00
22	130.01	10.99	3.939	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.39	3.860	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.48	3.844	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.35	3.685	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.66	3.633	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.15	3.555	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.23	3.543	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.44	3.511	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.43	3.370	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.02	3.174	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 131.35 Tc(MIN.) = 10.24
EFFECTIVE AREA(ACRES) = 33.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 448.00
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.3 INCHES

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.15
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.35
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.469
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.42
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.107
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.66
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
```

```
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.22
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    91    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.73

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   10.34
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.081
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    4.03
 EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
 FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
 LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   4.08
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.72   10.22    4.107  0.20( 0.12) 0.60       2.4      33.00
     2        6.49   10.34    4.081  0.20( 0.12) 0.60       1.8      73.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.18   10.22    4.107  0.20( 0.12) 0.60       4.2      33.00
     2       15.15   10.34    4.081  0.20( 0.12) 0.60       4.2      73.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.18    Tc(MIN.) =    10.22
 EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.30
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.18
 PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.91
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.96
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.18

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.740
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    91    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    9.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.403
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.956
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    91    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.14
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.14

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    8.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.582
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.09
  EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   4.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.26
  TOTAL STREAM AREA(ACRES) =       1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.18   10.91    3.958  0.20( 0.12) 0.60       4.2      33.00
      1       15.15   11.02    3.935  0.20( 0.12) 0.60       4.2      73.00
      2        5.09    9.05    4.403  0.20( 0.12) 0.60       1.3      76.00
      3        5.07    8.45    4.582  0.20( 0.11) 0.56       1.3      78.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.68    8.45    4.582  0.20( 0.12) 0.59       5.8      78.00
      2       24.02    9.05    4.403  0.20( 0.12) 0.59       6.1      76.00
      3       24.10   10.91    3.958  0.20( 0.12) 0.59       6.8      33.00
      4       24.02   11.02    3.935  0.20( 0.12) 0.59       6.8      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.10    Tc(MIN.) =    10.91
  EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.10
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.918
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        3.28      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =   11.03
  EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      34.32

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.68    8.64    4.522  0.20( 0.14) 0.70       9.0      78.00
      2       35.51    9.25    4.350  0.20( 0.14) 0.70       9.4      76.00
      3       34.32   11.10    3.918  0.20( 0.14) 0.69      10.1      33.00
      4       34.18   11.21    3.895  0.20( 0.14) 0.69      10.1      73.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      35.68  Tc(MIN.) =    8.64
  AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.05

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.68
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.05
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.68
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.706
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    91    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.59
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      3.59

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    9.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.217
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.57      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    2.15
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  5.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.36

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.288
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.60
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.60

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.86
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       8.23
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  6.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.69
  RAINFALL INTENSITY(INCH/HR) =   4.83
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.68    9.08    4.395  0.20( 0.14) 0.70       9.0      78.00
      1       35.51    9.69    4.236  0.20( 0.14) 0.70       9.4      76.00
      1       34.32   11.54    3.831  0.20( 0.14) 0.69      10.1      33.00
      1       34.18   11.66    3.810  0.20( 0.14) 0.69      10.1      73.00
      2        5.36    9.76    4.217  0.20( 0.08) 0.40       1.4      82.00
      3        8.23    7.69    4.835  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.42    7.69    4.835  0.20( 0.13) 0.65      10.7      80.00
      2       48.35    9.08    4.395  0.20( 0.13) 0.65      12.3      78.00
      3       48.04    9.69    4.236  0.20( 0.13) 0.65      12.7      76.00
      4       47.98    9.76    4.217  0.20( 0.13) 0.65      12.8      82.00
      5       45.66   11.54    3.831  0.20( 0.13) 0.65      13.5      33.00
      6       45.46   11.66    3.810  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.35    Tc(MIN.) =     9.08
  EFFECTIVE AREA(ACRES) =      12.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.44
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.35
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
```

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.42	7.77	4.806	0.20(0.13)	0.65	10.7	80.00
2	48.35	9.16	4.373	0.20(0.13)	0.65	12.3	78.00
3	48.04	9.77	4.216	0.20(0.13)	0.65	12.7	76.00
4	47.98	9.84	4.198	0.20(0.13)	0.65	12.8	82.00
5	45.66	11.62	3.816	0.20(0.13)	0.65	13.5	33.00
6	45.46	11.74	3.795	0.20(0.13)	0.65	13.5	73.00

LONGEST FLOWPATH FROM NODE 33.00 TO NODE 86.00 = 1770.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.17	6.069	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.31	5.976	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.36	5.947	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.95	5.600	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.35	4.963	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.66	4.846	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.84	4.782	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.22	4.653	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.30	4.627	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.33	4.620	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.48	4.573	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.84	4.462	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.97	4.427	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.99	4.422	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.72	4.227	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.96	4.170	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.11	4.133	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.19	4.114	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.28	4.095	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.30	4.090	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.40	4.068	0.20(0.10)	0.51	33.7	41.00
22	130.01	11.03	3.931	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.43	3.853	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.51	3.836	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.39	3.679	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.70	3.627	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.19	3.549	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.27	3.537	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.48	3.505	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.48	3.365	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.07	3.170	0.20(0.10)	0.52	37.8	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 86.00 = 2795.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	143.35	5.17	6.069	0.20(0.11)	0.54	24.2	63.00
2	144.99	5.31	5.976	0.20(0.11)	0.54	24.8	47.00
3	145.48	5.36	5.947	0.20(0.11)	0.54	25.0	45.00
4	151.53	5.95	5.600	0.20(0.11)	0.55	27.8	59.00
5	165.06	7.35	4.963	0.20(0.11)	0.55	34.6	31.00
6	167.99	7.66	4.846	0.20(0.11)	0.55	36.1	38.00
7	168.96	7.77	4.806	0.20(0.11)	0.55	36.6	80.00
8	169.47	7.84	4.782	0.20(0.11)	0.55	37.0	6.00
9	172.38	8.22	4.653	0.20(0.11)	0.55	38.8	35.00
10	172.95	8.30	4.627	0.20(0.11)	0.55	39.2	25.00
11	173.09	8.33	4.620	0.20(0.11)	0.55	39.3	24.00
12	174.04	8.48	4.573	0.20(0.11)	0.55	40.0	46.00
13	176.08	8.84	4.462	0.20(0.11)	0.55	41.6	64.00
14	176.67	8.97	4.427	0.20(0.11)	0.55	42.1	32.00
15	176.75	8.99	4.422	0.20(0.11)	0.55	42.2	61.00
16	177.42	9.16	4.373	0.20(0.11)	0.55	42.9	78.00
17	178.48	9.72	4.227	0.20(0.11)	0.55	44.8	14.00
18	178.56	9.77	4.216	0.20(0.11)	0.55	44.9	76.00

```
     19      178.66    9.84    4.198  0.20( 0.11) 0.55      45.2      82.00
     20      178.77    9.96    4.170  0.20( 0.11) 0.55      45.5      67.00
     21      178.85   10.11    4.133  0.20( 0.11) 0.55      46.0      53.00
     22      178.85   10.19    4.114  0.20( 0.11) 0.55      46.2      43.00
     23      178.76   10.28    4.095  0.20( 0.11) 0.55      46.5      33.00
     24      178.73   10.30    4.090  0.20( 0.11) 0.55      46.5      56.00
     25      178.49   10.40    4.068  0.20( 0.11) 0.55      46.7      41.00
     26      176.44   11.03    3.931  0.20( 0.11) 0.55      47.9      13.00
     27      175.07   11.43    3.853  0.20( 0.11) 0.55      48.6      19.00
     28      174.77   11.51    3.836  0.20( 0.11) 0.55      48.7      29.00
     29      174.33   11.62    3.816  0.20( 0.11) 0.55      48.9      33.00
     30      173.81   11.74    3.795  0.20( 0.11) 0.55      49.0      73.00
     31      170.53   12.39    3.679  0.20( 0.11) 0.55      49.8      16.00
     32      168.99   12.70    3.627  0.20( 0.11) 0.55      50.1      17.00
     33      166.55   13.19    3.549  0.20( 0.11) 0.55      50.5      22.00
     34      166.13   13.27    3.537  0.20( 0.11) 0.55      50.6      10.00
     35      164.85   13.48    3.505  0.20( 0.11) 0.55      50.7       7.00
     36      158.67   14.48    3.365  0.20( 0.11) 0.55      51.0       4.00
     37      149.34   16.07    3.170  0.20( 0.11) 0.55      51.3       1.00
   TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      178.85  Tc(MIN.) =   10.110
  EFFECTIVE AREA(ACRES) =     45.99  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.85
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.10   RAINFALL INTENSITY(INCH/HR) =  4.14
  EFFECTIVE AREA(ACRES) =    31.11
  TOTAL AREA(ACRES) =    34.70        PEAK FLOW RATE(CFS) =    121.00
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.55
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.93
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     121.00
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      31.11
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     121.00

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.43      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    5.43
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.43
  RAINFALL INTENSITY(INCH/HR) =   5.90
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.32

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      121.00   10.46    4.054  0.20( 0.11) 0.55      31.1       1.00
     2        2.32    5.43    5.899  0.20( 0.18) 0.90       0.4      88.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       94.61    5.43    5.899  0.20( 0.11) 0.56      16.6      88.00
     2      122.57   10.46    4.054  0.20( 0.11) 0.55      31.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     122.57    Tc(MIN.) =    10.46
 EFFECTIVE AREA(ACRES) =      31.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       35.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.12
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     122.57
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.59
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.406
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.29      0.20     0.100    91    6.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.41
 TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
 FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    7.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20     0.900    91    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.24      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.00
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   0.62
  Tc(MIN.) =    7.97
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    5.09
  EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       7.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   9.92
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.46
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    8.65
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.65
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.46

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        2.42    7.97    4.735  0.20( 0.02) 0.10       0.6      85.00
    2        7.46    8.65    4.520  0.20( 0.18) 0.90       1.8      92.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        9.64    7.97    4.735  0.20( 0.14) 0.70       2.2      85.00
    2        9.77    8.65    4.520  0.20( 0.14) 0.71       2.4      92.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.77    Tc(MIN.) =     8.65
 EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =        2.4
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.77
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.67
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        9.64    8.00    4.728  0.20( 0.14) 0.70       2.2      85.00
    2        9.77    8.67    4.513  0.20( 0.14) 0.71       2.4      92.00
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       94.61    5.57    5.815  0.20( 0.11) 0.56      16.6      88.00
    2      122.57   10.59    4.025  0.20( 0.11) 0.55      31.5       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      102.92    5.57    5.815  0.20( 0.11) 0.57      18.2      88.00
    2      117.77    8.00    4.728  0.20( 0.11) 0.57      26.1      85.00
    3      121.66    8.67    4.513  0.20( 0.11) 0.57      28.2      92.00
    4      131.26   10.59    4.025  0.20( 0.11) 0.57      33.9       1.00
   TOTAL AREA(ACRES) =        37.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      131.26  Tc(MIN.) =   10.588
 EFFECTIVE AREA(ACRES) =     33.93  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       37.5
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.46
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.26
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      33.93
  TOTAL STREAM AREA(ACRES) =      37.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     131.26

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.782
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.14      0.20     0.900    91    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.72
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      4.72

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.08      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.78
  AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =    8.14
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   20.58
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      25.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =  11.15
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.20
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   4.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.20

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.95      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   16.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   11.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.924
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.69      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    5.82
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       9.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  17.95
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.07
  RAINFALL INTENSITY(INCH/HR) =   3.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      102.92    5.65    5.768  0.20( 0.11) 0.57      18.2      88.00
      1      117.77    8.07    4.702  0.20( 0.11) 0.57      26.1      85.00
      1      121.66    8.75    4.491  0.20( 0.11) 0.57      28.2      92.00
      1      131.26   10.66    4.009  0.20( 0.11) 0.57      33.9       1.00
```

```
      2       25.20    8.20    4.659  0.20( 0.18) 0.90       6.2      97.00
      3        9.07   11.07    3.924  0.20( 0.11) 0.54       2.6     100.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      131.45    5.65    5.768  0.20( 0.13) 0.63      23.8      88.00
      2      150.76    8.07    4.702  0.20( 0.13) 0.63      34.1      85.00
      3      151.73    8.20    4.659  0.20( 0.13) 0.63      34.7      97.00
      4      154.14    8.75    4.491  0.20( 0.12) 0.62      36.5      92.00
      5      161.72   10.66    4.009  0.20( 0.12) 0.61      42.7       1.00
      6      158.53   11.07    3.924  0.20( 0.12) 0.61      42.8     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     161.72    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =      42.69   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       46.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.42
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     161.72
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =      42.69
  TOTAL STREAM AREA(ACRES) =      46.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     161.72

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.44      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.38
```

```
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.38
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   6.02
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      131.45    5.73    5.721  0.20( 0.13) 0.63      23.8      88.00
      1      150.76    8.15    4.676  0.20( 0.13) 0.63      34.1      85.00
      1      151.73    8.28    4.633  0.20( 0.13) 0.63      34.7      97.00
      1      154.14    8.83    4.467  0.20( 0.12) 0.62      36.5      92.00
      1      161.72   10.74    3.992  0.20( 0.12) 0.61      42.7       1.00
      1      158.53   11.15    3.908  0.20( 0.12) 0.61      42.8     100.00
      2        2.38    5.24    6.021  0.20( 0.18) 0.90       0.4     104.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      129.05    5.24    6.021  0.20( 0.13) 0.63      22.2     104.00
      2      133.70    5.73    5.721  0.20( 0.13) 0.63      24.2      88.00
      3      152.59    8.15    4.676  0.20( 0.13) 0.63      34.6      85.00
      4      153.55    8.28    4.633  0.20( 0.13) 0.63      35.1      97.00
      5      155.89    8.83    4.467  0.20( 0.13) 0.63      37.0      92.00
      6      163.28   10.74    3.992  0.20( 0.12) 0.62      43.1       1.00
      7      160.05   11.15    3.908  0.20( 0.12) 0.62      43.2     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     163.28    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      43.13   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       46.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   420.30
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.55
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     163.28
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   11.04
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.04
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      43.13
  TOTAL STREAM AREA(ACRES) =      46.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     163.28

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.748
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    6.98
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.112
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.35      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.60
  EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.67
  TOTAL STREAM AREA(ACRES) =       0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      129.05    5.56    5.821  0.20( 0.13) 0.63      22.2     104.00
      1      133.70    6.04    5.551  0.20( 0.13) 0.63      24.2      88.00
      1      152.59    8.46    4.579  0.20( 0.13) 0.63      34.6      85.00
      1      153.55    8.59    4.539  0.20( 0.13) 0.63      35.1      97.00
      1      155.89    9.13    4.382  0.20( 0.13) 0.63      37.0      92.00
      1      163.28   11.04    3.931  0.20( 0.12) 0.62      43.1       1.00
      1      160.05   11.45    3.850  0.20( 0.12) 0.62      43.2     100.00
      2        3.07    6.98    5.112  0.20( 0.02) 0.10       0.7      95.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      131.84    5.56    5.821  0.20( 0.12) 0.62      22.7     104.00
      2      136.59    6.04    5.551  0.20( 0.12) 0.62      24.8      88.00
      3      144.08    6.98    5.112  0.20( 0.12) 0.62      28.9      95.00
      4      155.34    8.46    4.579  0.20( 0.12) 0.62      35.2      85.00
      5      156.27    8.59    4.539  0.20( 0.12) 0.62      35.8      97.00
      6      158.52    9.13    4.382  0.20( 0.12) 0.62      37.6      92.00
      7      165.63   11.04    3.931  0.20( 0.12) 0.61      43.8       1.00
      8      162.35   11.45    3.850  0.20( 0.12) 0.61      43.9     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     165.63    Tc(MIN.) =    11.04
  EFFECTIVE AREA(ACRES) =      43.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       47.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  44.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     165.63
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.06
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.775
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.93      0.20     0.900    91    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.554
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.84      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.05
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.68
  Tc(MIN.) =    8.54
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       6.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =  11.75
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.342
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    91    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.005
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.55
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.97   10.19    4.116  0.20( 0.18) 0.90       1.8      97.00
      2        3.69   10.68    4.005  0.20( 0.10) 0.50       1.0     111.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.59   10.19    4.116  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.68    4.005  0.20( 0.15) 0.75       2.8     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.59    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.59
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.518
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.09

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    9.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.304
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       4.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.42
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.997
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.22
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.22

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.81
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  4.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   4.70
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.42    4.304  0.20( 0.11) 0.56       1.3     114.00
      2        6.21    8.08    4.701  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.08    4.701  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.42    4.304  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.71    Tc(MIN.) =     8.08
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.71
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.18    4.665  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.53    4.276  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.59   10.30    4.088  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.80    3.980  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.35    8.18    4.665  0.20( 0.13) 0.63       4.8     116.00
      2       20.72    9.53    4.276  0.20( 0.13) 0.64       5.3     114.00
      3       20.58   10.30    4.088  0.20( 0.13) 0.64       5.5      97.00
      4       20.19   10.80    3.980  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =          5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       20.72  Tc(MIN.) =    9.527
  EFFECTIVE AREA(ACRES) =      5.33  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.72
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.78
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.33
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.72

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    91    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =   10.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.952
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  2.60   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.93
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.55
  TOTAL STREAM AREA(ACRES) =       1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.44    4.584  0.20( 0.13) 0.63       4.8     116.00
      1       20.72    9.78    4.212  0.20( 0.13) 0.64       5.3     114.00
      1       20.58   10.56    4.032  0.20( 0.13) 0.64       5.5      97.00
      1       20.19   11.05    3.927  0.20( 0.13) 0.64       5.6     111.00
      2        5.37   10.93    3.952  0.20( 0.10) 0.50       1.5     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.18    8.44    4.584  0.20( 0.12) 0.61       6.0     116.00
      2       25.86    9.78    4.212  0.20( 0.12) 0.61       6.7     114.00
      3       25.88   10.56    4.032  0.20( 0.12) 0.61       7.0      97.00
      4       25.66   10.93    3.952  0.20( 0.12) 0.61       7.1     120.00
      5       25.53   11.05    3.927  0.20( 0.12) 0.61       7.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.88    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =       7.04   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.88
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.73
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.04
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.88

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.749
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.38      0.20     0.100    91    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.96
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.96

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   5.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.96

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.560
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.73      0.20     0.500    91    8.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.98
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       7.61

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.16
  TOTAL STREAM AREA(ACRES) =       2.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.18    8.61    4.531  0.20( 0.12) 0.61       6.0     116.00
      1       25.86    9.95    4.171  0.20( 0.12) 0.61       6.7     114.00
      1       25.88   10.73    3.995  0.20( 0.12) 0.61       7.0      97.00
      1       25.66   11.11    3.917  0.20( 0.12) 0.61       7.1     120.00
      1       25.53   11.23    3.893  0.20( 0.12) 0.61       7.1     111.00
      2        1.96    5.68    5.749  0.20( 0.02) 0.10       0.4     118.00
      3        7.61   10.64    4.013  0.20( 0.10) 0.50       2.2     123.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.03    5.68    5.749  0.20( 0.11) 0.55       5.5     118.00
      2       33.69    8.61    4.531  0.20( 0.11) 0.56       8.1     116.00
      3       34.67    9.95    4.171  0.20( 0.11) 0.56       9.1     114.00
      4       34.85   10.64    4.013  0.20( 0.11) 0.57       9.5     123.00
      5       34.81   10.73    3.995  0.20( 0.11) 0.57       9.6      97.00
      6       34.41   11.11    3.917  0.20( 0.11) 0.57       9.7     120.00
      7       34.22   11.23    3.893  0.20( 0.11) 0.57       9.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.85    Tc(MIN.) =    10.64
  EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.396
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.59      0.20     0.900    91    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      2.24

********************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.979
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    5.20
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
```

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------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.22

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.029
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.11
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    8.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.637
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.89      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    3.63
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  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       6.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.27
  RAINFALL INTENSITY(INCH/HR) =   4.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.59
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.22   10.80    3.979  0.20( 0.12) 0.61       2.1     127.00
      2        6.49    8.27    4.637  0.20( 0.10) 0.50       1.6     129.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.96    8.27    4.637  0.20( 0.11) 0.56       3.2     129.00
      2       12.77   10.80    3.979  0.20( 0.11) 0.56       3.7     127.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.96    Tc(MIN.) =     8.27
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.12
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.96
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.32
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.96    8.32    4.621  0.20( 0.11) 0.56       3.2     129.00
    2       12.77   10.85    3.968  0.20( 0.11) 0.56       3.7     127.00
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       29.03    6.01    5.567  0.20( 0.11) 0.55       5.5     118.00
    2       33.69    8.92    4.440  0.20( 0.11) 0.56       8.1     116.00
    3       34.67   10.26    4.098  0.20( 0.11) 0.56       9.1     114.00
    4       34.85   10.95    3.948  0.20( 0.11) 0.57       9.5     123.00
    5       34.81   11.04    3.930  0.20( 0.11) 0.57       9.6      97.00
    6       34.41   11.41    3.855  0.20( 0.11) 0.57       9.7     120.00
    7       34.22   11.53    3.832  0.20( 0.11) 0.57       9.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       40.36    6.01    5.567  0.20( 0.11) 0.55       7.8     118.00
    2       45.69    8.32    4.621  0.20( 0.11) 0.56      10.8     129.00
    3       46.61    8.92    4.440  0.20( 0.11) 0.56      11.4     116.00
    4       47.49   10.26    4.098  0.20( 0.11) 0.56      12.7     114.00
    5       47.59   10.85    3.968  0.20( 0.11) 0.57      13.2     127.00
    6       47.55   10.95    3.948  0.20( 0.11) 0.57      13.2     123.00
    7       47.45   11.04    3.930  0.20( 0.11) 0.57      13.2      97.00
    8       46.80   11.41    3.855  0.20( 0.11) 0.57      13.3     120.00
    9       46.54   11.53    3.832  0.20( 0.11) 0.57      13.4     111.00
  TOTAL AREA(ACRES) =        13.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       47.59  Tc(MIN.) =   10.855
 EFFECTIVE AREA(ACRES) =     13.15  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       13.4
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.59
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.99
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.99
 RAINFALL INTENSITY(INCH/HR) =   3.94
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      13.15
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.59

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.370
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   5.37
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.36    6.15    5.494  0.20( 0.11) 0.55       7.8     118.00
      1       45.69    8.46    4.579  0.20( 0.11) 0.56      10.8     129.00
      1       46.61    9.05    4.403  0.20( 0.11) 0.56      11.4     116.00
      1       47.49   10.39    4.068  0.20( 0.11) 0.56      12.7     114.00
      1       47.59   10.99    3.941  0.20( 0.11) 0.57      13.2     127.00
      1       47.55   11.09    3.921  0.20( 0.11) 0.57      13.2     123.00
      1       47.45   11.17    3.903  0.20( 0.11) 0.57      13.2      97.00
      1       46.80   11.55    3.830  0.20( 0.11) 0.57      13.3     120.00
      1       46.54   11.67    3.807  0.20( 0.11) 0.57      13.4     111.00
      2        1.49    6.40    5.370  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.83    6.15    5.494  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    6.40    5.370  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    8.46    4.579  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.05    4.403  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   10.39    4.068  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   10.99    3.941  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.09    3.921  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.17    3.903  0.20( 0.11) 0.56      13.6      97.00
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      9       47.87   11.55    3.830  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   11.67    3.807  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.69    Tc(MIN.) =    10.99
  EFFECTIVE AREA(ACRES) =      13.46   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.69
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   11.64
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.46      0.20     0.500    91    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.28   Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.17      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    4.37
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.62
  FLOW VELOCITY(FEET/SEC.) =  4.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   4.27
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.09

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.980
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.21
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
```

```
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =    8.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.666
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.09    9.56    4.268  0.20( 0.11) 0.57       1.6     134.00
      2        5.88    8.18    4.666  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.59    8.18    4.666  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.56    4.268  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.59    Tc(MIN.) =     8.18
```

```
  EFFECTIVE AREA(ACRES) =       2.83   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.59
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.59    8.25    4.643  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.63    4.251  0.20( 0.11) 0.54       3.1     134.00
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.83    6.83    5.175  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    7.08    5.069  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    9.11    4.388  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.70    4.231  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   11.04    3.929  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   11.64    3.813  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.73    3.795  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.82    3.779  0.20( 0.11) 0.56      13.6      97.00
      9       47.87   12.20    3.712  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   12.32    3.691  0.20( 0.11) 0.55      13.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.55    6.83    5.175  0.20( 0.11) 0.53      10.4     118.00
      2       53.32    7.08    5.069  0.20( 0.11) 0.53      10.8     138.00
      3       56.65    8.25    4.643  0.20( 0.11) 0.54      12.8     136.00
      4       58.47    9.11    4.388  0.20( 0.11) 0.54      14.0     129.00
      5       59.18    9.63    4.251  0.20( 0.11) 0.54      14.7     134.00
      6       59.23    9.70    4.231  0.20( 0.11) 0.54      14.8     116.00
      7       59.19   11.04    3.929  0.20( 0.11) 0.55      16.0     114.00
      8       58.94   11.64    3.813  0.20( 0.11) 0.55      16.5     127.00
      9       58.84   11.73    3.795  0.20( 0.11) 0.55      16.6     123.00
     10       58.69   11.82    3.779  0.20( 0.11) 0.55      16.6      97.00
     11       57.83   12.20    3.712  0.20( 0.11) 0.55      16.7     120.00
     12       57.51   12.32    3.691  0.20( 0.11) 0.55      16.7     111.00
    TOTAL AREA(ACRES) =        16.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       59.23  Tc(MIN.) =    9.704
  EFFECTIVE AREA(ACRES) =     14.78  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       16.7
```

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  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.23
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.55    7.16    5.035  0.20( 0.11) 0.53      10.4     118.00
      2       53.32    7.41    4.937  0.20( 0.11) 0.53      10.8     138.00
      3       56.65    8.58    4.540  0.20( 0.11) 0.54      12.8     136.00
      4       58.47    9.44    4.300  0.20( 0.11) 0.54      14.0     129.00
      5       59.18    9.95    4.171  0.20( 0.11) 0.54      14.7     134.00
      6       59.23   10.02    4.153  0.20( 0.11) 0.54      14.8     116.00
      7       59.19   11.36    3.865  0.20( 0.11) 0.55      16.0     114.00
      8       58.94   11.96    3.754  0.20( 0.11) 0.55      16.5     127.00
      9       58.84   12.05    3.737  0.20( 0.11) 0.55      16.6     123.00
     10       58.69   12.15    3.720  0.20( 0.11) 0.55      16.6      97.00
     11       57.83   12.53    3.655  0.20( 0.11) 0.55      16.7     120.00
     12       57.51   12.65    3.635  0.20( 0.11) 0.55      16.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      131.84    5.58    5.808  0.20( 0.12) 0.62      22.7     104.00
      2      136.59    6.06    5.540  0.20( 0.12) 0.62      24.8      88.00
      3      144.08    7.00    5.103  0.20( 0.12) 0.62      28.9      95.00
      4      155.34    8.48    4.572  0.20( 0.12) 0.62      35.2      85.00
      5      156.27    8.61    4.532  0.20( 0.12) 0.62      35.8      97.00
      6      158.52    9.15    4.376  0.20( 0.12) 0.62      37.6      92.00
      7      165.63   11.06    3.927  0.20( 0.12) 0.61      43.8       1.00
      8      162.35   11.47    3.846  0.20( 0.12) 0.61      43.9     100.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      179.22    5.58    5.808  0.20( 0.12) 0.60      30.9     104.00
      2      185.63    6.06    5.540  0.20( 0.12) 0.60      33.6      88.00
      3      196.12    7.00    5.103  0.20( 0.12) 0.60      39.1      95.00
      4      197.89    7.16    5.035  0.20( 0.12) 0.60      40.0     118.00
      5      200.56    7.41    4.937  0.20( 0.12) 0.60      41.5     138.00
      6      211.69    8.48    4.572  0.20( 0.12) 0.60      47.8      85.00
      7      212.74    8.58    4.540  0.20( 0.12) 0.60      48.4     136.00
      8      212.97    8.61    4.532  0.20( 0.12) 0.60      48.6      97.00
      9      216.38    9.15    4.376  0.20( 0.12) 0.60      51.2      92.00
```

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     10      218.05    9.44    4.300  0.20( 0.12) 0.60      52.6     129.00
     11      220.67    9.95    4.171  0.20( 0.12) 0.60      54.9     134.00
     12      221.01   10.02    4.153  0.20( 0.12) 0.59      55.2     116.00
     13      224.83   11.06    3.927  0.20( 0.12) 0.59      59.6       1.00
     14      222.36   11.36    3.865  0.20( 0.12) 0.59      59.9     114.00
     15      221.50   11.47    3.846  0.20( 0.12) 0.59      60.0     100.00
     16      217.31   11.96    3.754  0.20( 0.12) 0.59      60.4     127.00
     17      216.45   12.05    3.737  0.20( 0.12) 0.59      60.5     123.00
     18      215.57   12.15    3.720  0.20( 0.12) 0.59      60.5      97.00
     19      211.89   12.53    3.655  0.20( 0.12) 0.59      60.6     120.00
     20      210.69   12.65    3.635  0.20( 0.12) 0.59      60.6     111.00
    TOTAL AREA(ACRES) =        64.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      224.83  Tc(MIN.) =   11.057
  EFFECTIVE AREA(ACRES) =     59.56  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       64.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  51.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.80
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     224.83
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   11.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   3.89
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =      59.56
  TOTAL STREAM AREA(ACRES) =      64.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     224.83

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.12      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.67

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.455
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    91    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    8.03
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.19
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.98
  FLOW VELOCITY(FEET/SEC.) =  3.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       5.89

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.03
  RAINFALL INTENSITY(INCH/HR) =   4.72
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      179.22    5.76    5.708  0.20( 0.12) 0.60      30.9     104.00
      1      185.63    6.24    5.452  0.20( 0.12) 0.60      33.6      88.00
      1      196.12    7.17    5.035  0.20( 0.12) 0.60      39.1      95.00
      1      197.89    7.33    4.969  0.20( 0.12) 0.60      40.0     118.00
      1      200.56    7.58    4.875  0.20( 0.12) 0.60      41.5     138.00
      1      211.69    8.64    4.522  0.20( 0.12) 0.60      47.8      85.00
      1      212.74    8.75    4.490  0.20( 0.12) 0.60      48.4     136.00
      1      212.97    8.77    4.483  0.20( 0.12) 0.60      48.6      97.00
      1      216.38    9.32    4.331  0.20( 0.12) 0.60      51.2      92.00
      1      218.05    9.60    4.257  0.20( 0.12) 0.60      52.6     129.00
      1      220.67   10.11    4.133  0.20( 0.12) 0.60      54.9     134.00
      1      221.01   10.19    4.115  0.20( 0.12) 0.59      55.2     116.00
      1      224.83   11.22    3.894  0.20( 0.12) 0.59      59.6       1.00
      1      222.36   11.53    3.834  0.20( 0.12) 0.59      59.9     114.00
```

```
     1      221.50   11.63    3.815  0.20( 0.12) 0.59      60.0     100.00
     1      217.31   12.12    3.725  0.20( 0.12) 0.59      60.4     127.00
     1      216.45   12.22    3.708  0.20( 0.12) 0.59      60.5     123.00
     1      215.57   12.32    3.691  0.20( 0.12) 0.59      60.5      97.00
     1      211.89   12.69    3.628  0.20( 0.12) 0.59      60.6     120.00
     1      210.69   12.82    3.608  0.20( 0.12) 0.59      60.6     111.00
     2        0.67    5.00    6.187  0.20( 0.02) 0.10       0.1     140.00
     3        5.89    8.03    4.716  0.20( 0.04) 0.20       1.4     141.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      174.53    5.00    6.187  0.20( 0.12) 0.58      27.8     140.00
      2      184.95    5.76    5.708  0.20( 0.12) 0.58      32.0     104.00
      3      191.51    6.24    5.452  0.20( 0.12) 0.58      34.8      88.00
      4      202.28    7.17    5.035  0.20( 0.12) 0.58      40.4      95.00
      5      204.09    7.33    4.969  0.20( 0.12) 0.58      41.4     118.00
      6      206.83    7.58    4.875  0.20( 0.12) 0.58      43.0     138.00
      7      211.67    8.03    4.716  0.20( 0.12) 0.58      45.7     141.00
      8      217.82    8.64    4.522  0.20( 0.12) 0.59      49.3      85.00
      9      218.83    8.75    4.490  0.20( 0.12) 0.59      50.0     136.00
     10      219.05    8.77    4.483  0.20( 0.12) 0.59      50.1      97.00
     11      222.25    9.32    4.331  0.20( 0.12) 0.59      52.8      92.00
     12      223.83    9.60    4.257  0.20( 0.12) 0.59      54.1     129.00
     13      226.27   10.11    4.133  0.20( 0.12) 0.58      56.4     134.00
     14      226.59   10.19    4.115  0.20( 0.12) 0.58      56.8     116.00
     15      230.11   11.22    3.894  0.20( 0.12) 0.58      61.1       1.00
     16      227.55   11.53    3.834  0.20( 0.12) 0.58      61.4     114.00
     17      226.67   11.63    3.815  0.20( 0.12) 0.58      61.5     100.00
     18      222.35   12.12    3.725  0.20( 0.12) 0.58      61.9     127.00
     19      221.47   12.22    3.708  0.20( 0.12) 0.58      62.0     123.00
     20      220.56   12.32    3.691  0.20( 0.12) 0.58      62.0      97.00
     21      216.80   12.69    3.628  0.20( 0.12) 0.58      62.1     120.00
     22      215.57   12.82    3.608  0.20( 0.12) 0.58      62.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     230.11    Tc(MIN.) =    11.22
  EFFECTIVE AREA(ACRES) =      61.08   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       65.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  48.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.36
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     230.11
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.96      0.20     0.600    91   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      3.16

**************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   13.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.546
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.82      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    5.61
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       8.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.60
  FLOW VELOCITY(FEET/SEC.) =  3.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.26
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    91   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.87

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.574
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   13.03
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.82
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   4.27
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   14.73
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.73
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.443
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65   14.73    3.331  0.20( 0.18) 0.90       0.5     147.00
      2        2.41    8.91    4.443  0.20( 0.12) 0.60       0.6      10.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.76    8.91    4.443  0.20( 0.14) 0.70       0.9      10.00
      2        3.44   14.73    3.331  0.20( 0.15) 0.74       1.2     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.76    Tc(MIN.) =     8.91
  EFFECTIVE AREA(ACRES) =       0.95   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.13
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.76    9.13    4.382  0.20( 0.14) 0.70       0.9      10.00
      2        3.44   14.95    3.303  0.20( 0.15) 0.74       1.2     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.57   13.26    3.539  0.20( 0.12) 0.60       2.8     144.00
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
    TOTAL AREA(ACRES) =         3.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       12.11  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      3.88  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.08      0.20     0.500    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   2.10    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.74
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.34

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.266
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.59

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =   10.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.095
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.11      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.88
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.34    9.74    4.222  0.20( 0.10) 0.50       0.1     147.00
      2        2.88   10.28    4.095  0.20( 0.09) 0.44       0.8     152.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.16    9.74    4.222  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.28    4.095  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.22    Tc(MIN.) =    10.28
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.22
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.16    9.79    4.210  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.33    4.083  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.19    9.13    4.382  0.20( 0.12) 0.59       3.6      10.00
      2       14.44    9.79    4.210  0.20( 0.12) 0.59       3.9     147.00
      3       14.62   10.33    4.083  0.20( 0.12) 0.59       4.0     152.00
      4       14.88   13.26    3.539  0.20( 0.12) 0.60       4.8     144.00
      5       14.01   14.95    3.303  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       14.88  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      4.76  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.88
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.66
  RAINFALL INTENSITY(INCH/HR) =   3.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.76
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.88

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.175
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    91    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   6.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.19    9.53    4.275  0.20( 0.12) 0.59       3.6      10.00
      1       14.44   10.19    4.114  0.20( 0.12) 0.59       3.9     147.00
      1       14.62   10.73    3.996  0.20( 0.12) 0.59       4.0     152.00
      1       14.88   13.66    3.479  0.20( 0.12) 0.60       4.8     144.00
      1       14.01   15.36    3.253  0.20( 0.12) 0.61       4.8     147.00
      2        1.27    5.02    6.175  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.16    5.02    6.175  0.20( 0.11) 0.55       2.1     150.00
      2       15.07    9.53    4.275  0.20( 0.11) 0.57       3.9      10.00
      3       15.29   10.19    4.114  0.20( 0.11) 0.57       4.1     147.00
      4       15.44   10.73    3.996  0.20( 0.11) 0.57       4.3     152.00
      5       15.60   13.66    3.479  0.20( 0.12) 0.58       5.0     144.00
      6       14.67   15.36    3.253  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.60    Tc(MIN.) =    13.66
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.60
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.69
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.69
  RAINFALL INTENSITY(INCH/HR) =   3.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.99
  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.60
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.813
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.30      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.16    5.05    6.150  0.20( 0.11) 0.55       2.1     150.00
      1       15.07    9.57    4.266  0.20( 0.11) 0.57       3.9      10.00
      1       15.29   10.23    4.106  0.20( 0.11) 0.57       4.1     147.00
      1       15.44   10.76    3.988  0.20( 0.11) 0.57       4.3     152.00
      1       15.60   13.69    3.474  0.20( 0.12) 0.58       5.0     144.00
      1       14.67   15.39    3.249  0.20( 0.12) 0.59       5.1     147.00
      2        1.56    5.58    5.813  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.65    5.05    6.150  0.20( 0.10) 0.51       2.4     150.00
      2       14.05    5.58    5.813  0.20( 0.10) 0.51       2.6      14.00
      3       16.21    9.57    4.266  0.20( 0.11) 0.54       4.2      10.00
      4       16.38   10.23    4.106  0.20( 0.11) 0.55       4.4     147.00
      5       16.51   10.76    3.988  0.20( 0.11) 0.55       4.6     152.00
      6       16.52   13.69    3.474  0.20( 0.11) 0.56       5.3     144.00
      7       15.54   15.39    3.249  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    13.69
  EFFECTIVE AREA(ACRES) =       5.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   13.97
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.97
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       5.29
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.826
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    91    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.40
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    6.52
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.314
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.26      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    1.24
 EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.47

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.52
 RAINFALL INTENSITY(INCH/HR) =   5.31
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.15
 EFFECTIVE STREAM AREA(ACRES) =       0.52
 TOTAL STREAM AREA(ACRES) =       0.52
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.47

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.65    5.34    5.959  0.20( 0.10) 0.51       2.4     150.00
     1       14.05    5.86    5.649  0.20( 0.10) 0.51       2.6      14.00
     1       16.21    9.84    4.197  0.20( 0.11) 0.54       4.2      10.00
     1       16.38   10.50    4.044  0.20( 0.11) 0.55       4.4     147.00
     1       16.51   11.04    3.931  0.20( 0.11) 0.55       4.6     152.00
     1       16.52   13.97    3.434  0.20( 0.11) 0.56       5.3     144.00
     1       15.54   15.67    3.215  0.20( 0.11) 0.57       5.4     147.00
     2        2.47    6.52    5.314  0.20( 0.03) 0.15       0.5     154.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.92    5.34    5.959  0.20( 0.09) 0.46       2.8     150.00
     2       16.42    5.86    5.649  0.20( 0.09) 0.46       3.1      14.00
     3       16.88    6.52    5.314  0.20( 0.09) 0.46       3.4     154.00
     4       18.16    9.84    4.197  0.20( 0.10) 0.50       4.7      10.00
     5       18.26   10.50    4.044  0.20( 0.10) 0.50       4.9     147.00
     6       18.33   11.04    3.931  0.20( 0.10) 0.51       5.1     152.00
     7       18.12   13.97    3.434  0.20( 0.10) 0.52       5.8     144.00
     8       17.03   15.67    3.215  0.20( 0.11) 0.53       5.9     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      18.33    Tc(MIN.) =    11.04
  EFFECTIVE AREA(ACRES) =       5.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.33
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.415
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.24      0.20     0.600    91    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.79
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      4.79

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.425
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    91    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.63
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.63

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.63

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.01    4.415  0.20( 0.12) 0.60       1.2     159.00
      2        2.63    8.98    4.425  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.42    8.98    4.425  0.20( 0.12) 0.60       1.9     160.00
      2        7.42    9.01    4.415  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.42    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.19
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.42    9.16    4.374  0.20( 0.12) 0.60       1.9     160.00
      2        7.42    9.19    4.365  0.20( 0.12) 0.60       1.9     159.00
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.92    5.41    5.912  0.20( 0.09) 0.46       2.8     150.00
      2       16.42    5.93    5.609  0.20( 0.09) 0.46       3.1      14.00
      3       16.88    6.59    5.280  0.20( 0.09) 0.46       3.4     154.00
      4       18.16    9.92    4.179  0.20( 0.10) 0.50       4.7      10.00
      5       18.26   10.58    4.028  0.20( 0.10) 0.50       4.9     147.00
      6       18.33   11.11    3.916  0.20( 0.10) 0.51       5.1     152.00
      7       18.12   14.04    3.424  0.20( 0.10) 0.52       5.8     144.00
      8       17.03   15.74    3.207  0.20( 0.11) 0.53       5.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.90    5.41    5.912  0.20( 0.10) 0.50       4.0     150.00
      2       22.62    5.93    5.609  0.20( 0.10) 0.50       4.4      14.00
      3       23.37    6.59    5.280  0.20( 0.10) 0.50       4.8     154.00
      4       25.29    9.16    4.374  0.20( 0.10) 0.52       6.3     160.00
      5       25.30    9.19    4.365  0.20( 0.11) 0.53       6.3     159.00
      6       25.26    9.92    4.179  0.20( 0.11) 0.53       6.6      10.00
      7       25.09   10.58    4.028  0.20( 0.11) 0.53       6.8     147.00
      8       24.97   11.11    3.916  0.20( 0.11) 0.53       7.0     152.00
      9       23.89   14.04    3.424  0.20( 0.11) 0.54       7.7     144.00
     10       22.43   15.74    3.207  0.20( 0.11) 0.55       7.8     147.00
    TOTAL AREA(ACRES) =         7.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       25.30  Tc(MIN.) =    9.190
  EFFECTIVE AREA(ACRES) =      6.33  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.25
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.30
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.452
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.28      0.20     0.600    91    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      4.99

********************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.99

********************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.738
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      5.05
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      5.05

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.99    9.36    4.321  0.20( 0.12) 0.60       1.3      17.00
      2        5.05    7.97    4.738  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.72    7.97    4.738  0.20( 0.11) 0.55       2.3      16.00
      2        9.59    9.36    4.321  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.72    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.01
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        9.72    8.01    4.723  0.20( 0.11) 0.55       2.3      16.00
    2        9.59    9.40    4.309  0.20( 0.11) 0.55       2.5      17.00
 LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.90    5.63    5.781  0.20( 0.10) 0.50       4.0     150.00
    2       22.62    6.15    5.496  0.20( 0.10) 0.50       4.4      14.00
    3       23.37    6.81    5.185  0.20( 0.10) 0.50       4.8     154.00
    4       25.29    9.37    4.318  0.20( 0.10) 0.52       6.3     160.00
    5       25.30    9.40    4.309  0.20( 0.11) 0.53       6.3     159.00
    6       25.26   10.13    4.129  0.20( 0.11) 0.53       6.6      10.00
    7       25.09   10.79    3.983  0.20( 0.11) 0.53       6.8     147.00
    8       24.97   11.32    3.874  0.20( 0.11) 0.53       7.0     152.00
    9       23.89   14.25    3.395  0.20( 0.11) 0.54       7.7     144.00
   10       22.43   15.96    3.182  0.20( 0.11) 0.55       7.8     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       30.30    5.63    5.781  0.20( 0.10) 0.51       5.6     150.00
    2       31.33    6.15    5.496  0.20( 0.10) 0.51       6.1      14.00
    3       32.45    6.81    5.185  0.20( 0.10) 0.52       6.8     154.00
    4       33.99    8.01    4.723  0.20( 0.10) 0.52       7.8      16.00
    5       34.88    9.37    4.318  0.20( 0.11) 0.53       8.8     160.00
    6       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8     159.00
    7       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8      17.00
    8       34.43   10.13    4.129  0.20( 0.11) 0.54       9.1      10.00
    9       33.94   10.79    3.983  0.20( 0.11) 0.54       9.3     147.00
   10       33.56   11.32    3.874  0.20( 0.11) 0.54       9.5     152.00
   11       31.39   14.25    3.395  0.20( 0.11) 0.55      10.2     144.00
   12       29.44   15.96    3.182  0.20( 0.11) 0.55      10.3     147.00
  TOTAL AREA(ACRES) =        10.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       34.89  Tc(MIN.) =    9.400
 EFFECTIVE AREA(ACRES) =      8.82  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       10.3
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.66
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.89
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.45
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.45
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       8.82
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.89

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.521
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.29      0.20     0.100    91    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.863
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.44      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  3.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.17

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.157
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   6.16
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.30    5.68    5.750  0.20( 0.10) 0.51        5.6     150.00
      1       31.33    6.20    5.469  0.20( 0.10) 0.51        6.1      14.00
      1       32.45    6.86    5.162  0.20( 0.10) 0.52        6.8     154.00
      1       33.99    8.06    4.706  0.20( 0.10) 0.52        7.8      16.00
      1       34.88    9.42    4.305  0.20( 0.11) 0.53        8.8     160.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53        8.8     159.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53        8.8      17.00
      1       34.43   10.18    4.117  0.20( 0.11) 0.54        9.1      10.00
      1       33.94   10.84    3.972  0.20( 0.11) 0.54        9.3     147.00
      1       33.56   11.37    3.864  0.20( 0.11) 0.54        9.5     152.00
```

```
     1       31.39   14.31    3.388  0.20( 0.11) 0.55      10.2     144.00
     1       29.44   16.01    3.176  0.20( 0.11) 0.55      10.3     147.00
     2        3.17    7.61    4.863  0.20( 0.03) 0.16       0.7      19.00
     3        1.71    5.04    6.157  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.20    5.04    6.157  0.20( 0.09) 0.46       5.8     161.00
      2       34.70    5.68    5.750  0.20( 0.09) 0.46       6.4     150.00
      3       35.76    6.20    5.469  0.20( 0.09) 0.47       7.0      14.00
      4       36.93    6.86    5.162  0.20( 0.09) 0.47       7.7     154.00
      5       37.94    7.61    4.863  0.20( 0.09) 0.47       8.5      19.00
      6       38.37    8.06    4.706  0.20( 0.10) 0.48       8.9      16.00
      7       38.88    9.42    4.305  0.20( 0.10) 0.49       9.8     160.00
      8       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9     159.00
      9       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9      17.00
     10       38.26   10.18    4.117  0.20( 0.10) 0.50      10.1      10.00
     11       37.63   10.84    3.972  0.20( 0.10) 0.50      10.4     147.00
     12       37.15   11.37    3.864  0.20( 0.10) 0.50      10.5     152.00
     13       34.54   14.31    3.388  0.20( 0.10) 0.51      11.3     144.00
     14       32.39   16.01    3.176  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.89    Tc(MIN.) =     9.45
  EFFECTIVE AREA(ACRES) =       9.86   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.01
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.89
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.709
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.85      0.20     0.600    91    8.05
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.51
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      3.51

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.673
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.51    8.05    4.709  0.20( 0.12) 0.60       0.9     168.00
      2        4.06    8.16    4.673  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        7.54    8.05    4.709  0.20( 0.12) 0.60       1.8     168.00
    2        7.54    8.16    4.673  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.54    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.54    8.19    4.663  0.20( 0.12) 0.60       1.8     168.00
      2        7.54    8.30    4.628  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.20    5.11    6.113  0.20( 0.09) 0.46       5.8     161.00
      2       34.70    5.74    5.715  0.20( 0.09) 0.46       6.4     150.00
      3       35.76    6.26    5.439  0.20( 0.09) 0.47       7.0      14.00
      4       36.93    6.92    5.136  0.20( 0.09) 0.47       7.7     154.00
      5       37.94    7.67    4.842  0.20( 0.09) 0.47       8.5      19.00
      6       38.37    8.12    4.686  0.20( 0.10) 0.48       8.9      16.00
      7       38.88    9.48    4.289  0.20( 0.10) 0.49       9.8     160.00
      8       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9     159.00
      9       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9      17.00
     10       38.26   10.24    4.104  0.20( 0.10) 0.50      10.1      10.00
     11       37.63   10.90    3.960  0.20( 0.10) 0.50      10.4     147.00
     12       37.15   11.43    3.852  0.20( 0.10) 0.50      10.5     152.00
     13       34.54   14.37    3.380  0.20( 0.10) 0.51      11.3     144.00
     14       32.39   16.08    3.169  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.41    5.11    6.113  0.20( 0.10) 0.48       6.9     161.00
      2       41.21    5.74    5.715  0.20( 0.10) 0.49       7.7     150.00
      3       42.52    6.26    5.439  0.20( 0.10) 0.49       8.4      14.00
      4       43.96    6.92    5.136  0.20( 0.10) 0.49       9.3     154.00
      5       45.28    7.67    4.842  0.20( 0.10) 0.50      10.2      19.00
      6       45.89    8.12    4.686  0.20( 0.10) 0.50      10.7      16.00
      7       45.94    8.19    4.663  0.20( 0.10) 0.50      10.7     168.00
      8       45.98    8.30    4.628  0.20( 0.10) 0.50      10.8     169.00
      9       45.86    9.48    4.289  0.20( 0.10) 0.51      11.7     160.00
```

```
    10       45.85    9.51    4.281  0.20( 0.10) 0.51      11.7     159.00
    11       45.84    9.51    4.281  0.20( 0.10) 0.51      11.7      17.00
    12       44.92   10.24    4.104  0.20( 0.10) 0.51      12.0      10.00
    13       44.05   10.90    3.960  0.20( 0.10) 0.51      12.2     147.00
    14       43.39   11.43    3.852  0.20( 0.10) 0.51      12.4     152.00
    15       39.99   14.37    3.380  0.20( 0.10) 0.52      13.1     144.00
    16       37.49   16.08    3.169  0.20( 0.10) 0.52      13.2     147.00
   TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       45.98  Tc(MIN.) =    8.299
  EFFECTIVE AREA(ACRES) =     10.82  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.98
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.98
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.50
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.82
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.98

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.28      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
 SUBAREA RUNOFF(CFS) =      1.55
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.55

****************************************************************************
 FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.28
 TOTAL STREAM AREA(ACRES) =       0.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.55

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.41    5.32    5.973  0.20( 0.10) 0.48       6.9     161.00
     1       41.21    5.95    5.599  0.20( 0.10) 0.49       7.7     150.00
     1       42.52    6.47    5.337  0.20( 0.10) 0.49       8.4      14.00
     1       43.96    7.13    5.049  0.20( 0.10) 0.49       9.3     154.00
     1       45.28    7.87    4.770  0.20( 0.10) 0.50      10.2      19.00
     1       45.89    8.32    4.621  0.20( 0.10) 0.50      10.7      16.00
     1       45.94    8.39    4.599  0.20( 0.10) 0.50      10.7     168.00
     1       45.98    8.50    4.565  0.20( 0.10) 0.50      10.8     169.00
     1       45.86    9.68    4.238  0.20( 0.10) 0.51      11.7     160.00
     1       45.85    9.71    4.230  0.20( 0.10) 0.51      11.7     159.00
     1       45.84    9.71    4.230  0.20( 0.10) 0.51      11.7      17.00
     1       44.92   10.45    4.056  0.20( 0.10) 0.51      12.0      10.00
     1       44.05   11.11    3.917  0.20( 0.10) 0.51      12.2     147.00
     1       43.39   11.64    3.812  0.20( 0.10) 0.51      12.4     152.00
     1       39.99   14.58    3.351  0.20( 0.10) 0.52      13.1     144.00
     1       37.49   16.29    3.145  0.20( 0.10) 0.52      13.2     147.00
     2        1.55    5.00    6.187  0.20( 0.02) 0.10       0.3     170.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.96    5.00    6.187  0.20( 0.09) 0.47       6.8     170.00
     2       40.91    5.32    5.973  0.20( 0.09) 0.47       7.2     161.00
     3       42.62    5.95    5.599  0.20( 0.09) 0.47       8.0     150.00
     4       43.86    6.47    5.337  0.20( 0.10) 0.48       8.7      14.00
     5       45.23    7.13    5.049  0.20( 0.10) 0.48       9.5     154.00
     6       46.48    7.87    4.770  0.20( 0.10) 0.48      10.4      19.00
     7       47.05    8.32    4.621  0.20( 0.10) 0.49      10.9      16.00
     8       47.10    8.39    4.599  0.20( 0.10) 0.49      11.0     168.00
     9       47.12    8.50    4.565  0.20( 0.10) 0.49      11.1     169.00
    10       46.92    9.68    4.238  0.20( 0.10) 0.50      12.0     160.00
    11       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0     159.00
    12       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0      17.00
    13       45.94   10.45    4.056  0.20( 0.10) 0.50      12.3      10.00
    14       45.03   11.11    3.917  0.20( 0.10) 0.50      12.5     147.00
    15       44.35   11.64    3.812  0.20( 0.10) 0.50      12.7     152.00
    16       40.83   14.58    3.351  0.20( 0.10) 0.51      13.4     144.00
    17       38.27   16.29    3.145  0.20( 0.10) 0.51      13.4     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      47.12    Tc(MIN.) =     8.50
 EFFECTIVE AREA(ACRES) =      11.10   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       13.4
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.12
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.81      0.20     0.200    91    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   5.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.812
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.51      0.20      0.100    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.66

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.66

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.06    5.94    5.604  0.20( 0.04) 0.20       0.8     173.00
      2        2.66    5.58    5.812  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.61    5.58    5.812  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    5.94    5.604  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.62    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.62
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.61    5.72    5.728  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    6.09    5.528  0.20( 0.03) 0.16       1.3     173.00
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.96    5.06    6.142  0.20( 0.09) 0.47       6.8     170.00
      2       40.91    5.38    5.932  0.20( 0.09) 0.47       7.2     161.00
      3       42.62    6.02    5.564  0.20( 0.09) 0.47       8.0     150.00
      4       43.86    6.54    5.307  0.20( 0.10) 0.48       8.7      14.00
      5       45.23    7.19    5.024  0.20( 0.10) 0.48       9.5     154.00
      6       46.48    7.94    4.748  0.20( 0.10) 0.48      10.4      19.00
      7       47.05    8.38    4.601  0.20( 0.10) 0.49      10.9      16.00
      8       47.10    8.46    4.579  0.20( 0.10) 0.49      11.0     168.00
      9       47.12    8.56    4.546  0.20( 0.10) 0.49      11.1     169.00
     10       46.92    9.74    4.222  0.20( 0.10) 0.50      12.0     160.00
     11       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0     159.00
     12       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0      17.00
     13       45.94   10.51    4.042  0.20( 0.10) 0.50      12.3      10.00
     14       45.03   11.17    3.904  0.20( 0.10) 0.50      12.5     147.00
     15       44.35   11.71    3.800  0.20( 0.10) 0.50      12.7     152.00
     16       40.83   14.64    3.343  0.20( 0.10) 0.51      13.4     144.00
     17       38.27   16.35    3.138  0.20( 0.10) 0.51      13.4     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.24    5.06    6.142  0.20( 0.08) 0.42       7.9     170.00
      2       47.35    5.38    5.932  0.20( 0.08) 0.42       8.4     161.00
      3       48.42    5.72    5.728  0.20( 0.09) 0.43       8.9     174.00
      4       49.24    6.02    5.564  0.20( 0.09) 0.43       9.3     150.00
      5       49.40    6.09    5.528  0.20( 0.09) 0.43       9.4     173.00
      6       50.21    6.54    5.307  0.20( 0.09) 0.43      10.0      14.00
      7       51.24    7.19    5.024  0.20( 0.09) 0.44      10.9     154.00
      8       52.16    7.94    4.748  0.20( 0.09) 0.45      11.8      19.00
      9       52.55    8.38    4.601  0.20( 0.09) 0.45      12.3      16.00
     10       52.57    8.46    4.579  0.20( 0.09) 0.45      12.3     168.00
     11       52.56    8.56    4.546  0.20( 0.09) 0.46      12.4     169.00
     12       51.97    9.74    4.222  0.20( 0.09) 0.47      13.3     160.00
     13       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3     159.00
     14       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3      17.00
     15       50.77   10.51    4.042  0.20( 0.09) 0.47      13.6      10.00
     16       49.69   11.17    3.904  0.20( 0.09) 0.47      13.8     147.00
     17       48.89   11.71    3.800  0.20( 0.09) 0.47      14.0     152.00
     18       44.82   14.64    3.343  0.20( 0.10) 0.48      14.7     144.00
     19       42.01   16.35    3.138  0.20( 0.10) 0.48      14.8     147.00
    TOTAL AREA(ACRES) =        14.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       52.57  Tc(MIN.) =    8.455
  EFFECTIVE AREA(ACRES) =     12.33  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       14.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.28
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.57
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      12.33
  TOTAL STREAM AREA(ACRES) =      14.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      52.57

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20     0.100    91    5.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.21
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.70
  RAINFALL INTENSITY(INCH/HR) =   5.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.810
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =    7.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.966
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   4.97
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
```

EFFECTIVE STREAM AREA(ACRES) = 0.80
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.55

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.24	5.42	5.905	0.20(0.08)	0.42	7.9	170.00
1	47.35	5.74	5.716	0.20(0.08)	0.42	8.4	161.00
1	48.42	6.08	5.533	0.20(0.09)	0.43	8.9	174.00
1	49.24	6.37	5.383	0.20(0.09)	0.43	9.3	150.00
1	49.40	6.44	5.350	0.20(0.09)	0.43	9.4	173.00
1	50.21	6.89	5.148	0.20(0.09)	0.43	10.0	14.00
1	51.24	7.55	4.886	0.20(0.09)	0.44	10.9	154.00
1	52.16	8.28	4.634	0.20(0.09)	0.45	11.8	19.00
1	52.55	8.73	4.496	0.20(0.09)	0.45	12.3	16.00
1	52.57	8.80	4.476	0.20(0.09)	0.45	12.3	168.00
1	52.56	8.91	4.444	0.20(0.09)	0.46	12.4	169.00
1	51.97	10.09	4.139	0.20(0.09)	0.47	13.3	160.00
1	51.94	10.12	4.131	0.20(0.09)	0.47	13.3	159.00
1	51.94	10.12	4.131	0.20(0.09)	0.47	13.3	17.00
1	50.77	10.87	3.966	0.20(0.09)	0.47	13.6	10.00
1	49.69	11.53	3.834	0.20(0.09)	0.47	13.8	147.00
1	48.89	12.06	3.735	0.20(0.09)	0.47	14.0	152.00
1	44.82	15.00	3.297	0.20(0.10)	0.48	14.7	144.00
1	42.01	16.72	3.098	0.20(0.10)	0.48	14.8	147.00
2	2.21	5.70	5.737	0.20(0.02)	0.10	0.4	175.00
3	3.55	7.34	4.966	0.20(0.04)	0.20	0.8	167.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.52	5.42	5.905	0.20(0.08)	0.39	8.9	170.00
2	52.62	5.70	5.737	0.20(0.08)	0.39	9.4	175.00
3	52.75	5.74	5.716	0.20(0.08)	0.40	9.4	161.00
4	53.83	6.08	5.533	0.20(0.08)	0.40	10.0	174.00
5	54.65	6.37	5.383	0.20(0.08)	0.40	10.4	150.00
6	54.82	6.44	5.350	0.20(0.08)	0.40	10.6	173.00
7	55.65	6.89	5.148	0.20(0.08)	0.41	11.2	14.00
8	56.37	7.34	4.966	0.20(0.08)	0.41	11.8	167.00
9	56.61	7.55	4.886	0.20(0.08)	0.41	12.1	154.00
10	57.26	8.28	4.634	0.20(0.08)	0.42	13.0	19.00
11	57.49	8.73	4.496	0.20(0.09)	0.43	13.5	16.00
12	57.49	8.80	4.476	0.20(0.09)	0.43	13.6	168.00
13	57.44	8.91	4.444	0.20(0.09)	0.43	13.7	169.00
14	56.51	10.09	4.139	0.20(0.09)	0.44	14.5	160.00
15	56.48	10.12	4.131	0.20(0.09)	0.44	14.5	159.00
16	56.48	10.12	4.131	0.20(0.09)	0.44	14.5	17.00
17	55.13	10.87	3.966	0.20(0.09)	0.44	14.8	10.00
18	53.90	11.53	3.834	0.20(0.09)	0.45	15.0	147.00
19	52.99	12.06	3.735	0.20(0.09)	0.45	15.2	152.00
20	48.43	15.00	3.297	0.20(0.09)	0.46	15.9	144.00
21	45.41	16.72	3.098	0.20(0.09)	0.46	16.0	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 57.49 Tc(MIN.) = 8.73
EFFECTIVE AREA(ACRES) = 13.49 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 16.0
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 178.00 = 2300.00 FEET.

****
FLOW PROCESS FROM NODE 178.00 TO NODE 193.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 458.40 DOWNSTREAM(FEET) = 456.00

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.84
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.661
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    91    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.75
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    9.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.315
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.89
```

```
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.50
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.38
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       1.17
  TOTAL STREAM AREA(ACRES) =       1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.43

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.618
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.53
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.53

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.188
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.43    9.38    4.315  0.20( 0.11) 0.54       1.2     179.00
      2        7.83    9.88    4.188  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.10    9.38    4.315  0.20( 0.12) 0.58       3.2     179.00
      2       12.13    9.88    4.188  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.13    Tc(MIN.) =     9.88
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.13
```

```
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.10    9.52    4.279  0.20( 0.12) 0.58       3.2     179.00
     2       12.13   10.02    4.155  0.20( 0.12) 0.58       3.3     181.00
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       51.52    5.48    5.868  0.20( 0.08) 0.39       8.9     170.00
     2       52.62    5.76    5.703  0.20( 0.08) 0.39       9.4     175.00
     3       52.75    5.80    5.683  0.20( 0.08) 0.40       9.4     161.00
     4       53.83    6.14    5.502  0.20( 0.08) 0.40      10.0     174.00
     5       54.65    6.43    5.355  0.20( 0.08) 0.40      10.4     150.00
     6       54.82    6.50    5.322  0.20( 0.08) 0.40      10.6     173.00
     7       55.65    6.95    5.123  0.20( 0.08) 0.41      11.2      14.00
     8       56.37    7.40    4.943  0.20( 0.08) 0.41      11.8     167.00
     9       56.61    7.61    4.864  0.20( 0.08) 0.41      12.1     154.00
    10       57.26    8.34    4.615  0.20( 0.08) 0.42      13.0      19.00
    11       57.49    8.79    4.479  0.20( 0.09) 0.43      13.5      16.00
    12       57.49    8.86    4.458  0.20( 0.09) 0.43      13.6     168.00
    13       57.44    8.97    4.428  0.20( 0.09) 0.43      13.7     169.00
    14       56.51   10.14    4.125  0.20( 0.09) 0.44      14.5     160.00
    15       56.48   10.18    4.117  0.20( 0.09) 0.44      14.5     159.00
    16       56.48   10.18    4.117  0.20( 0.09) 0.44      14.5      17.00
    17       55.13   10.93    3.953  0.20( 0.09) 0.44      14.8      10.00
    18       53.90   11.59    3.823  0.20( 0.09) 0.45      15.0     147.00
    19       52.99   12.12    3.725  0.20( 0.09) 0.45      15.2     152.00
    20       48.43   15.06    3.289  0.20( 0.09) 0.46      15.9     144.00
    21       45.41   16.78    3.092  0.20( 0.09) 0.46      16.0     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
     2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
     3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
     4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
     5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
     6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
     7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
     8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
     9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
    10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
    11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
    12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
    13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
    14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
    15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
    16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
    17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
    18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
    19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
    20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
    21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
    22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
    23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
  TOTAL AREA(ACRES) =        19.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       69.25  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     16.67  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.210
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    91    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.82
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      4.82

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.937
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  16.07
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.42
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.42

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.336
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.35

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   10.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.129
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.13
  RAINFALL INTENSITY(INCH/HR) =   4.13
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.42   11.14    3.910  0.20( 0.12) 0.60       2.4     184.00
      2        4.88   10.13    4.129  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.98   10.13    4.129  0.20( 0.12) 0.58       3.6     187.00
      2       13.04   11.14    3.910  0.20( 0.12) 0.58       3.8     184.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.04    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.04
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   3.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.086
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.54      0.20     0.600    91    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.752
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.91
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.46

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.152
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.58
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.58
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.864
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.84
  EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       4.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  4.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.00
  TOTAL STREAM AREA(ACRES) =       1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.98   10.57    4.029  0.20( 0.12) 0.58       3.6     187.00
      1       13.04   11.58    3.824  0.20( 0.12) 0.58       3.8     184.00
      2        5.46    7.93    4.752  0.20( 0.12) 0.60       1.3     190.00
      3        4.27    7.61    4.864  0.20( 0.12) 0.60       1.0     191.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.98    7.61    4.864  0.20( 0.12) 0.59       4.8     191.10
      2       21.16    7.93    4.752  0.20( 0.12) 0.59       5.0     190.00
      3       21.11   10.57    4.029  0.20( 0.12) 0.59       5.9     187.00
      4       20.74   11.58    3.824  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.16    Tc(MIN.) =     7.93
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.98    7.66    4.846  0.20( 0.12) 0.59       4.8     191.10
      2       21.16    7.98    4.735  0.20( 0.12) 0.59       5.0     190.00
      3       21.11   10.62    4.018  0.20( 0.12) 0.59       5.9     187.00
      4       20.74   11.63    3.815  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
      2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
      3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
      4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
      5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
      6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
      7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
      8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
      9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
     10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
     11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
     12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
     13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
     14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
     15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
     16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
     17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
     18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
     19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
     20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
     21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
```

```
     22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
     23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       79.42    5.48    5.868  0.20( 0.09) 0.47      14.2     170.00
      2       81.11    5.76    5.703  0.20( 0.09) 0.47      14.9     175.00
      3       81.31    5.80    5.683  0.20( 0.09) 0.47      15.0     161.00
      4       83.07    6.14    5.502  0.20( 0.09) 0.47      15.9     174.00
      5       84.47    6.43    5.355  0.20( 0.09) 0.47      16.7     150.00
      6       84.77    6.50    5.322  0.20( 0.09) 0.47      16.8     173.00
      7       86.43    6.95    5.123  0.20( 0.09) 0.47      17.9      14.00
      8       87.96    7.40    4.943  0.20( 0.10) 0.48      19.0     167.00
      9       88.57    7.61    4.864  0.20( 0.10) 0.48      19.5     154.00
     10       88.70    7.66    4.846  0.20( 0.10) 0.48      19.6     191.10
     11       89.34    7.98    4.735  0.20( 0.10) 0.48      20.2     190.00
     12       89.87    8.34    4.615  0.20( 0.10) 0.48      20.9      19.00
     13       90.34    8.79    4.479  0.20( 0.10) 0.49      21.7      16.00
     14       90.38    8.86    4.458  0.20( 0.10) 0.49      21.8     168.00
     15       90.39    8.97    4.428  0.20( 0.10) 0.49      22.0     169.00
     16       90.23    9.52    4.279  0.20( 0.10) 0.49      22.8     179.00
     17       89.86   10.02    4.155  0.20( 0.10) 0.49      23.4     181.00
     18       89.67   10.14    4.125  0.20( 0.10) 0.50      23.5     160.00
     19       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6     159.00
     20       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6      17.00
     21       88.51   10.62    4.018  0.20( 0.10) 0.50      23.9     187.00
     22       87.64   10.93    3.953  0.20( 0.10) 0.50      24.1      10.00
     23       85.78   11.59    3.823  0.20( 0.10) 0.50      24.4     147.00
     24       85.67   11.63    3.815  0.20( 0.10) 0.50      24.5     184.00
     25       84.06   12.12    3.725  0.20( 0.10) 0.50      24.6     152.00
     26       75.75   15.06    3.289  0.20( 0.10) 0.50      25.3     144.00
     27       71.02   16.78    3.092  0.20( 0.10) 0.51      25.4     147.00
    TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       90.39  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     22.00  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.39
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    194.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =    9.00   RAINFALL INTENSITY(INCH/HR) =  4.42
```

```
  EFFECTIVE AREA(ACRES) =     4.87
  TOTAL AREA(ACRES) =     5.60        PEAK FLOW RATE(CFS) =     20.00
  AREA-AVERAGED Fm(INCH/HR) =   0.10  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.49
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =       4.87
  TOTAL STREAM AREA(ACRES) =       5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.00

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.54
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      6.54

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
```

```
 LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.28
 RAINFALL INTENSITY(INCH/HR) =   6.00
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       1.21
 TOTAL STREAM AREA(ACRES) =       1.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       20.00    9.03    4.411  0.20( 0.10) 0.49       4.9     147.00
     2        6.54    5.28    5.999  0.20( 0.18) 0.90       1.2     195.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.54    5.28    5.999  0.20( 0.12) 0.61       4.1     195.00
     2       24.76    9.03    4.411  0.20( 0.11) 0.57       6.1     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.76    Tc(MIN.) =     9.03
 EFFECTIVE AREA(ACRES) =       6.08   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
 FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      24.76
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.45
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.45
 RAINFALL INTENSITY(INCH/HR) =   4.30
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.57
 EFFECTIVE STREAM AREA(ACRES) =       6.08
 TOTAL STREAM AREA(ACRES) =       6.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.76
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    91    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   5.96
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.54    5.70    5.738  0.20( 0.12) 0.61       4.1     195.00
      1       24.76    9.45    4.297  0.20( 0.11) 0.57       6.1     147.00
      2        1.76    5.33    5.962  0.20( 0.02) 0.10       0.3     183.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.69    5.33    5.962  0.20( 0.11) 0.57       4.1     183.00
      2       24.24    5.70    5.738  0.20( 0.11) 0.57       4.4     195.00
      3       26.03    9.45    4.297  0.20( 0.11) 0.55       6.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.03    Tc(MIN.) =     9.45
  EFFECTIVE AREA(ACRES) =       6.41   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.03
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.760
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.12      0.20     0.500    91    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      4.70
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   4.76
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.70

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.556
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    91    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.19
```

```
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.19

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.70    7.90    4.760  0.20( 0.10) 0.50       1.1     199.00
      2        3.19    8.53    4.556  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.79    7.90    4.760  0.20( 0.11) 0.54       1.9     199.00
      2        7.69    8.53    4.556  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.79    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.79    7.98    4.732  0.20( 0.11) 0.54       1.9     199.00
      2        7.69    8.61    4.532  0.20( 0.11) 0.54       1.9     200.00
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.69    5.46    5.883  0.20( 0.11) 0.57       4.1     183.00
      2       24.24    5.83    5.667  0.20( 0.11) 0.57       4.4     195.00
      3       26.03    9.57    4.266  0.20( 0.11) 0.55       6.4     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.34    5.46    5.883  0.20( 0.11) 0.56       5.4     183.00
      2       31.08    5.83    5.667  0.20( 0.11) 0.57       5.7     195.00
      3       33.06    7.98    4.732  0.20( 0.11) 0.55       7.4     199.00
      4       33.25    8.61    4.532  0.20( 0.11) 0.55       7.8     200.00
      5       33.25    9.57    4.266  0.20( 0.11) 0.55       8.3     147.00
    TOTAL AREA(ACRES) =          9.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       33.25  Tc(MIN.) =    8.610
  EFFECTIVE AREA(ACRES) =      7.81  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.25
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.02
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       7.81
  TOTAL STREAM AREA(ACRES) =       9.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      33.25

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.652
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    91    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    7.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.991
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.42      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.28
  RAINFALL INTENSITY(INCH/HR) =   4.99
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.61

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.34    5.89    5.632  0.20( 0.11) 0.56       5.4     183.00
     1       31.08    6.24    5.448  0.20( 0.11) 0.57       5.7     195.00
     1       33.06    8.39    4.598  0.20( 0.11) 0.55       7.4     199.00
     1       33.25    9.02    4.412  0.20( 0.11) 0.55       7.8     200.00
     1       33.25    9.98    4.165  0.20( 0.11) 0.55       8.3     147.00
     2        3.61    7.28    4.991  0.20( 0.04) 0.20       0.8     192.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.65    5.89    5.632  0.20( 0.10) 0.52       6.1     183.00
     2       34.46    6.24    5.448  0.20( 0.11) 0.53       6.4     195.00
     3       35.64    7.28    4.991  0.20( 0.10) 0.52       7.4     192.00
     4       36.38    8.39    4.598  0.20( 0.10) 0.52       8.2     199.00
     5       36.44    9.02    4.412  0.20( 0.10) 0.52       8.6     200.00
     6       36.26    9.98    4.165  0.20( 0.10) 0.52       9.1     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      36.44    Tc(MIN.) =     9.02
 EFFECTIVE AREA(ACRES) =       8.62   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =        9.9
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.58
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      36.44
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.07
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
 ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.343
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    91    9.27
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.04
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.04

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   10.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.049
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.43
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      10.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.54
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.73
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.25

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.842
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20      0.100    91    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   5.84
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.25   10.48    4.049  0.20( 0.12) 0.60       2.9     184.00
      2        0.89    5.53    5.842  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.77    5.53    5.842  0.20( 0.11) 0.55       1.7      59.00
      2       10.87   10.48    4.049  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.87    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.87
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.87

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.81      0.20     0.600    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.77    5.89    5.634  0.20( 0.11) 0.55       1.7      59.00
      1       10.87   10.82    3.975  0.20( 0.11) 0.57       3.1     184.00
      2        3.43    7.72    4.825  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.83    5.89    5.634  0.20( 0.11) 0.56       2.3      59.00
      2       12.98    7.72    4.825  0.20( 0.11) 0.57       3.0      64.00
      3       13.68   10.82    3.975  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      13.68    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.68
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.86
  RAINFALL INTENSITY(INCH/HR) =   3.97
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.68

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.243
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"         D        0.48      0.20     0.600    91    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    6.46
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  13.14
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.83    5.92    5.615  0.20( 0.11) 0.56       2.3      59.00
      1       12.98    7.75    4.812  0.20( 0.11) 0.57       3.0      64.00
      1       13.68   10.86    3.968  0.20( 0.12) 0.58       3.9     184.00
      2        8.11   11.00    3.938  0.20( 0.12) 0.60       2.4     208.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    5.92    5.615  0.20( 0.12) 0.58       3.6      59.00
      2       20.00    7.75    4.812  0.20( 0.12) 0.58       4.7      64.00
      3       21.75   10.86    3.968  0.20( 0.12) 0.59       6.2     184.00
      4       21.68   11.00    3.938  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.75    Tc(MIN.) =    10.86
```

```
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.75
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   11.65
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.75

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.75
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =   10.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.04      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    7.08
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       9.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  5.96   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.63

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.627
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    9.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.354
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.23
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.51

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    6.77    5.200  0.20( 0.12) 0.58       3.6      59.00
      1       20.00    8.60    4.536  0.20( 0.12) 0.58       4.7      64.00
      1       21.75   11.65    3.810  0.20( 0.12) 0.59       6.2     184.00
      1       21.68   11.80    3.783  0.20( 0.12) 0.59       6.2     208.00
      2        9.63   10.82    3.976  0.20( 0.11) 0.57       2.8     211.00
      3        5.51    9.23    4.354  0.20( 0.10) 0.50       1.4     213.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    6.77    5.200  0.20( 0.11) 0.56       6.4      59.00
      2       34.11    8.60    4.536  0.20( 0.11) 0.57       8.2      64.00
      3       34.88    9.23    4.354  0.20( 0.11) 0.57       8.8     213.00
      4       35.92   10.82    3.976  0.20( 0.11) 0.57      10.0     211.00
      5       35.77   11.65    3.810  0.20( 0.11) 0.57      10.4     184.00
      6       35.60   11.80    3.783  0.20( 0.11) 0.57      10.5     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.92    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =      10.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.92
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.05
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      10.00
  TOTAL STREAM AREA(ACRES) =      10.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.92

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.18      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.18
 TOTAL STREAM AREA(ACRES) =       0.18
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.00

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.90    7.02    5.096  0.20( 0.11) 0.56       6.4      59.00
     1       34.11    8.83    4.467  0.20( 0.11) 0.57       8.2      64.00
     1       34.88    9.46    4.293  0.20( 0.11) 0.57       8.8     213.00
     1       35.92   11.05    3.929  0.20( 0.11) 0.57      10.0     211.00
     1       35.77   11.88    3.767  0.20( 0.11) 0.57      10.4     184.00
     1       35.60   12.03    3.741  0.20( 0.11) 0.57      10.5     208.00
     2        1.00    5.00    6.187  0.20( 0.02) 0.10       0.2     215.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.85    5.00    6.187  0.20( 0.11) 0.55       4.7     215.00
     2       31.72    7.02    5.096  0.20( 0.11) 0.55       6.6      59.00
     3       34.83    8.83    4.467  0.20( 0.11) 0.56       8.4      64.00
     4       35.58    9.46    4.293  0.20( 0.11) 0.56       9.0     213.00
     5       36.55   11.05    3.929  0.20( 0.11) 0.56      10.2     211.00
     6       36.37   11.88    3.767  0.20( 0.11) 0.56      10.6     184.00
     7       36.20   12.03    3.741  0.20( 0.11) 0.56      10.6     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      36.55    Tc(MIN.) =    11.05
 EFFECTIVE AREA(ACRES) =      10.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       10.6
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      36.55
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.10
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       27.85    5.06    6.147  0.20( 0.11) 0.55       4.7     215.00
    2       31.72    7.07    5.074  0.20( 0.11) 0.55       6.6      59.00
    3       34.83    8.88    4.452  0.20( 0.11) 0.56       8.4      64.00
    4       35.58    9.51    4.279  0.20( 0.11) 0.56       9.0     213.00
    5       36.55   11.10    3.918  0.20( 0.11) 0.56      10.2     211.00
    6       36.37   11.94    3.758  0.20( 0.11) 0.56      10.6     184.00
    7       36.20   12.08    3.732  0.20( 0.11) 0.56      10.6     208.00
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       33.65    5.94    5.604  0.20( 0.10) 0.52       6.1     183.00
    2       34.46    6.30    5.422  0.20( 0.11) 0.53       6.4     195.00
    3       35.64    7.33    4.971  0.20( 0.10) 0.52       7.4     192.00
    4       36.38    8.45    4.582  0.20( 0.10) 0.52       8.2     199.00
    5       36.44    9.07    4.398  0.20( 0.10) 0.52       8.6     200.00
    6       36.26   10.03    4.152  0.20( 0.10) 0.52       9.1     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       59.30    5.06    6.147  0.20( 0.11) 0.53       9.9     215.00
    2       63.20    5.94    5.604  0.20( 0.11) 0.54      11.6     183.00
    3       64.70    6.30    5.422  0.20( 0.11) 0.54      12.3     195.00
    4       67.07    7.07    5.074  0.20( 0.11) 0.54      13.7      59.00
    5       67.80    7.33    4.971  0.20( 0.11) 0.54      14.2     192.00
    6       70.47    8.45    4.582  0.20( 0.11) 0.54      16.2     199.00
    7       71.26    8.88    4.452  0.20( 0.11) 0.54      16.9      64.00
    8       71.50    9.07    4.398  0.20( 0.11) 0.54      17.2     200.00
    9       71.93    9.51    4.279  0.20( 0.11) 0.54      17.8     213.00
   10       72.15   10.03    4.152  0.20( 0.11) 0.54      18.5     147.00
   11       70.71   11.10    3.918  0.20( 0.11) 0.54      19.3     211.00
   12       69.10   11.94    3.758  0.20( 0.11) 0.54      19.7     184.00
   13       68.70   12.08    3.732  0.20( 0.11) 0.54      19.8     208.00
  TOTAL AREA(ACRES) =        20.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       72.15  Tc(MIN.) =   10.029
 EFFECTIVE AREA(ACRES) =     18.51  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       20.5
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.94
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      72.15
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.40
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.40
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      18.51
  TOTAL STREAM AREA(ACRES) =      20.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.15

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.839
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    91    7.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.86
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      3.86

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    9.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.383
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    5.33
  EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
```

```
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
 FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.13
 RAINFALL INTENSITY(INCH/HR) =   4.38
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.30
 TOTAL STREAM AREA(ACRES) =       2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       59.30    5.45    5.888  0.20( 0.11) 0.53       9.9     215.00
     1       63.20    6.33    5.403  0.20( 0.11) 0.54      11.6     183.00
     1       64.70    6.69    5.238  0.20( 0.11) 0.54      12.3     195.00
     1       67.07    7.46    4.920  0.20( 0.11) 0.54      13.7      59.00
     1       67.80    7.72    4.826  0.20( 0.11) 0.54      14.2     192.00
     1       70.47    8.82    4.469  0.20( 0.11) 0.54      16.2     199.00
     1       71.26    9.26    4.348  0.20( 0.11) 0.54      16.9      64.00
     1       71.50    9.45    4.297  0.20( 0.11) 0.54      17.2     200.00
     1       71.93    9.89    4.186  0.20( 0.11) 0.54      17.8     213.00
     1       72.15   10.40    4.066  0.20( 0.11) 0.54      18.5     147.00
     1       70.71   11.47    3.844  0.20( 0.11) 0.54      19.3     211.00
     1       69.10   12.33    3.690  0.20( 0.11) 0.54      19.7     184.00
     1       68.70   12.47    3.665  0.20( 0.11) 0.54      19.8     208.00
     2        8.82    9.13    4.383  0.20( 0.12) 0.60       2.3     201.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       66.44    5.45    5.888  0.20( 0.11) 0.54      11.3     215.00
     2       70.79    6.33    5.403  0.20( 0.11) 0.54      13.2     183.00
     3       72.46    6.69    5.238  0.20( 0.11) 0.54      14.0     195.00
     4       75.19    7.46    4.920  0.20( 0.11) 0.54      15.6      59.00
     5       76.04    7.72    4.826  0.20( 0.11) 0.54      16.1     192.00
     6       79.17    8.82    4.469  0.20( 0.11) 0.54      18.4     199.00
     7       79.85    9.13    4.383  0.20( 0.11) 0.54      19.0     201.00
     8       80.01    9.26    4.348  0.20( 0.11) 0.54      19.2      64.00
     9       80.15    9.45    4.297  0.20( 0.11) 0.54      19.5     200.00
    10       80.35    9.89    4.186  0.20( 0.11) 0.54      20.1     213.00
    11       80.32   10.40    4.066  0.20( 0.11) 0.54      20.8     147.00
    12       78.42   11.47    3.844  0.20( 0.11) 0.55      21.6     211.00
    13       76.49   12.33    3.690  0.20( 0.11) 0.55      22.0     184.00
    14       76.03   12.47    3.665  0.20( 0.11) 0.55      22.1     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      80.35    Tc(MIN.) =     9.89
 EFFECTIVE AREA(ACRES) =      20.14   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       22.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
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```
 FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.39
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      80.35
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.92
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91    8.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.12
 TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
 STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   12.56
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
 STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    9.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.418
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    5.03
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.55
  FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.01
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.01

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.884
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    91    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.640
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    5.80
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  14.08
  FLOW VELOCITY(FEET/SEC.) =  4.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.26
  RAINFALL INTENSITY(INCH/HR) =   4.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.01    9.08    4.396  0.20( 0.12) 0.60       2.1     220.00
      2        7.72    8.26    4.640  0.20( 0.10) 0.50       1.9     223.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       15.43    8.26    4.640  0.20( 0.11) 0.55       3.8     223.00
     2       15.31    9.08    4.396  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.43    Tc(MIN.) =     8.26
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.43
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    8.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.43    8.58    4.542  0.20( 0.11) 0.55       3.8     223.00
      2       15.31    9.39    4.311  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       66.44    5.48    5.869  0.20( 0.11) 0.54      11.3     215.00
      2       70.79    6.36    5.388  0.20( 0.11) 0.54      13.2     183.00
      3       72.46    6.72    5.225  0.20( 0.11) 0.54      14.0     195.00
      4       75.19    7.49    4.909  0.20( 0.11) 0.54      15.6      59.00
      5       76.04    7.74    4.815  0.20( 0.11) 0.54      16.1     192.00
      6       79.17    8.85    4.461  0.20( 0.11) 0.54      18.4     199.00
      7       79.85    9.16    4.375  0.20( 0.11) 0.54      19.0     201.00
      8       80.01    9.28    4.340  0.20( 0.11) 0.54      19.2      64.00
      9       80.15    9.48    4.290  0.20( 0.11) 0.54      19.5     200.00
     10       80.35    9.92    4.179  0.20( 0.11) 0.54      20.1     213.00
     11       80.32   10.43    4.060  0.20( 0.11) 0.54      20.8     147.00
     12       78.42   11.50    3.838  0.20( 0.11) 0.55      21.6     211.00
     13       76.49   12.35    3.685  0.20( 0.11) 0.55      22.0     184.00
     14       76.03   12.50    3.660  0.20( 0.11) 0.55      22.1     208.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.25    5.48    5.869  0.20( 0.11) 0.54      13.7     215.00
      2       84.42    6.36    5.388  0.20( 0.11) 0.54      16.0     183.00
      3       86.40    6.72    5.225  0.20( 0.11) 0.55      16.9     195.00
      4       89.77    7.49    4.909  0.20( 0.11) 0.54      18.9      59.00
      5       90.83    7.74    4.815  0.20( 0.11) 0.54      19.5     192.00
      6       93.82    8.58    4.542  0.20( 0.11) 0.54      21.6     223.00
      7       94.56    8.85    4.461  0.20( 0.11) 0.55      22.2     199.00
      8       95.19    9.16    4.375  0.20( 0.11) 0.55      22.9     201.00
      9       95.34    9.28    4.340  0.20( 0.11) 0.55      23.1      64.00
     10       95.40    9.39    4.311  0.20( 0.11) 0.55      23.3     220.00
     11       95.38    9.48    4.290  0.20( 0.11) 0.55      23.5     200.00
```

```
    12       95.18    9.92    4.179  0.20( 0.11) 0.55      24.1     213.00
    13       94.72   10.43    4.060  0.20( 0.11) 0.55      24.8     147.00
    14       92.01   11.50    3.838  0.20( 0.11) 0.55      25.6     211.00
    15       89.52   12.35    3.685  0.20( 0.11) 0.55      26.0     184.00
    16       88.97   12.50    3.660  0.20( 0.11) 0.55      26.0     208.00
   TOTAL AREA(ACRES) =        26.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       95.40  Tc(MIN.) =    9.393
  EFFECTIVE AREA(ACRES) =     23.33  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       26.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  52.67
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       79.25    5.49    5.865  0.20( 0.11) 0.54      13.7     215.00
      2       84.42    6.37    5.385  0.20( 0.11) 0.54      16.0     183.00
      3       86.40    6.72    5.222  0.20( 0.11) 0.55      16.9     195.00
      4       89.77    7.49    4.907  0.20( 0.11) 0.54      18.9      59.00
      5       90.83    7.75    4.813  0.20( 0.11) 0.54      19.5     192.00
      6       93.82    8.58    4.540  0.20( 0.11) 0.54      21.6     223.00
      7       94.56    8.86    4.459  0.20( 0.11) 0.55      22.2     199.00
      8       95.19    9.16    4.373  0.20( 0.11) 0.55      22.9     201.00
      9       95.34    9.29    4.338  0.20( 0.11) 0.55      23.1      64.00
     10       95.40    9.40    4.310  0.20( 0.11) 0.55      23.3     220.00
     11       95.38    9.48    4.288  0.20( 0.11) 0.55      23.5     200.00
     12       95.18    9.92    4.177  0.20( 0.11) 0.55      24.1     213.00
     13       94.72   10.44    4.058  0.20( 0.11) 0.55      24.8     147.00
     14       92.01   11.51    3.837  0.20( 0.11) 0.55      25.6     211.00
     15       89.52   12.36    3.684  0.20( 0.11) 0.55      26.0     184.00
     16       88.97   12.51    3.659  0.20( 0.11) 0.55      26.0     208.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      174.53    5.07    6.141  0.20( 0.12) 0.58      27.8     140.00
      2      184.95    5.82    5.672  0.20( 0.12) 0.58      32.0     104.00
      3      191.51    6.30    5.420  0.20( 0.12) 0.58      34.8      88.00
      4      202.28    7.23    5.010  0.20( 0.12) 0.58      40.4      95.00
      5      204.09    7.39    4.945  0.20( 0.12) 0.58      41.4     118.00
      6      206.83    7.64    4.852  0.20( 0.12) 0.58      43.0     138.00
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```
      7      211.67    8.09    4.695  0.20( 0.12) 0.58      45.7     141.00
      8      217.82    8.71    4.503  0.20( 0.12) 0.59      49.3      85.00
      9      218.83    8.81    4.472  0.20( 0.12) 0.59      50.0     136.00
     10      219.05    8.84    4.465  0.20( 0.12) 0.59      50.1      97.00
     11      222.25    9.38    4.315  0.20( 0.12) 0.59      52.8      92.00
     12      223.83    9.66    4.241  0.20( 0.12) 0.59      54.1     129.00
     13      226.27   10.17    4.118  0.20( 0.12) 0.58      56.4     134.00
     14      226.59   10.25    4.101  0.20( 0.12) 0.58      56.8     116.00
     15      230.11   11.28    3.882  0.20( 0.12) 0.58      61.1       1.00
     16      227.55   11.59    3.822  0.20( 0.12) 0.58      61.4     114.00
     17      226.67   11.69    3.803  0.20( 0.12) 0.58      61.5     100.00
     18      222.35   12.18    3.714  0.20( 0.12) 0.58      61.9     127.00
     19      221.47   12.28    3.697  0.20( 0.12) 0.58      62.0     123.00
     20      220.56   12.38    3.681  0.20( 0.12) 0.58      62.0      97.00
     21      216.80   12.76    3.618  0.20( 0.12) 0.58      62.1     120.00
     22      215.57   12.88    3.598  0.20( 0.12) 0.58      62.1     111.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      251.18    5.07    6.141  0.20( 0.11) 0.57      40.4     140.00
      2      259.62    5.49    5.865  0.20( 0.11) 0.57      43.8     215.00
      3      266.15    5.82    5.672  0.20( 0.11) 0.57      46.5     104.00
      4      275.52    6.30    5.420  0.20( 0.11) 0.57      50.6      88.00
      5      276.76    6.37    5.385  0.20( 0.11) 0.57      51.3     183.00
      6      282.80    6.72    5.222  0.20( 0.11) 0.57      54.3     195.00
      7      290.89    7.23    5.010  0.20( 0.11) 0.57      58.6      95.00
      8      293.43    7.39    4.945  0.20( 0.11) 0.57      60.0     118.00
      9      294.97    7.49    4.907  0.20( 0.11) 0.57      60.9      59.00
     10      297.21    7.64    4.852  0.20( 0.11) 0.57      62.2     138.00
     11      298.82    7.75    4.813  0.20( 0.11) 0.57      63.1     192.00
     12      303.73    8.09    4.695  0.20( 0.11) 0.57      66.1     141.00
     13      310.40    8.58    4.540  0.20( 0.11) 0.57      70.2     223.00
     14      311.97    8.71    4.503  0.20( 0.11) 0.57      71.2      85.00
     15      313.26    8.81    4.472  0.20( 0.11) 0.57      72.1     136.00
     16      313.55    8.84    4.465  0.20( 0.11) 0.57      72.3      97.00
     17      313.73    8.86    4.459  0.20( 0.11) 0.57      72.4     199.00
     18      316.16    9.16    4.373  0.20( 0.11) 0.57      74.6     201.00
     19      317.07    9.29    4.338  0.20( 0.11) 0.57      75.5      64.00
     20      317.64    9.38    4.315  0.20( 0.11) 0.57      76.1      92.00
     21      317.76    9.40    4.310  0.20( 0.11) 0.57      76.2     220.00
     22      318.20    9.48    4.288  0.20( 0.11) 0.57      76.7     200.00
     23      319.12    9.66    4.241  0.20( 0.11) 0.57      77.8     129.00
     24      320.25    9.92    4.177  0.20( 0.11) 0.57      79.4     213.00
     25      321.23   10.17    4.118  0.20( 0.11) 0.57      80.9     134.00
     26      321.48   10.25    4.101  0.20( 0.11) 0.57      81.3     116.00
     27      321.95   10.44    4.058  0.20( 0.11) 0.57      82.3     147.00
     28      322.70   11.28    3.882  0.20( 0.11) 0.57      86.5       1.00
     29      320.21   11.51    3.837  0.20( 0.11) 0.57      86.9     211.00
     30      319.33   11.59    3.822  0.20( 0.11) 0.57      87.1     114.00
     31      318.15   11.69    3.803  0.20( 0.11) 0.57      87.2     100.00
     32      312.39   12.18    3.714  0.20( 0.11) 0.57      87.9     127.00
     33      311.22   12.28    3.697  0.20( 0.11) 0.57      88.0     123.00
     34      310.25   12.36    3.684  0.20( 0.11) 0.57      88.0     184.00
     35      310.02   12.38    3.681  0.20( 0.11) 0.57      88.0      97.00
     36      308.25   12.51    3.659  0.20( 0.11) 0.57      88.1     208.00
     37      304.74   12.76    3.618  0.20( 0.11) 0.57      88.2     120.00
     38      303.02   12.88    3.598  0.20( 0.11) 0.57      88.2     111.00
    TOTAL AREA(ACRES) =        92.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      322.70  Tc(MIN.) =   11.280
  EFFECTIVE AREA(ACRES) =     86.48  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       92.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
```

>>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 92.5 TC(MIN.) = 11.28
EFFECTIVE AREA(ACRES) = 86.48 AREA-AVERAGED Fm(INCH/HR)= 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.572
PEAK FLOW RATE(CFS) = 322.70

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	251.18	5.07	6.141	0.20(0.11)	0.57	40.4	140.00
2	259.62	5.49	5.865	0.20(0.11)	0.57	43.8	215.00
3	266.15	5.82	5.672	0.20(0.11)	0.57	46.5	104.00
4	275.52	6.30	5.420	0.20(0.11)	0.57	50.6	88.00
5	276.76	6.37	5.385	0.20(0.11)	0.57	51.3	183.00
6	282.80	6.72	5.222	0.20(0.11)	0.57	54.3	195.00
7	290.89	7.23	5.010	0.20(0.11)	0.57	58.6	95.00
8	293.43	7.39	4.945	0.20(0.11)	0.57	60.0	118.00
9	294.97	7.49	4.907	0.20(0.11)	0.57	60.9	59.00
10	297.21	7.64	4.852	0.20(0.11)	0.57	62.2	138.00
11	298.82	7.75	4.813	0.20(0.11)	0.57	63.1	192.00
12	303.73	8.09	4.695	0.20(0.11)	0.57	66.1	141.00
13	310.40	8.58	4.540	0.20(0.11)	0.57	70.2	223.00
14	311.97	8.71	4.503	0.20(0.11)	0.57	71.2	85.00
15	313.26	8.81	4.472	0.20(0.11)	0.57	72.1	136.00
16	313.55	8.84	4.465	0.20(0.11)	0.57	72.3	97.00
17	313.73	8.86	4.459	0.20(0.11)	0.57	72.4	199.00
18	316.16	9.16	4.373	0.20(0.11)	0.57	74.6	201.00
19	317.07	9.29	4.338	0.20(0.11)	0.57	75.5	64.00
20	317.64	9.38	4.315	0.20(0.11)	0.57	76.1	92.00
21	317.76	9.40	4.310	0.20(0.11)	0.57	76.2	220.00
22	318.20	9.48	4.288	0.20(0.11)	0.57	76.7	200.00
23	319.12	9.66	4.241	0.20(0.11)	0.57	77.8	129.00
24	320.25	9.92	4.177	0.20(0.11)	0.57	79.4	213.00
25	321.23	10.17	4.118	0.20(0.11)	0.57	80.9	134.00
26	321.48	10.25	4.101	0.20(0.11)	0.57	81.3	116.00
27	321.95	10.44	4.058	0.20(0.11)	0.57	82.3	147.00
28	322.70	11.28	3.882	0.20(0.11)	0.57	86.5	1.00
29	320.21	11.51	3.837	0.20(0.11)	0.57	86.9	211.00
30	319.33	11.59	3.822	0.20(0.11)	0.57	87.1	114.00
31	318.15	11.69	3.803	0.20(0.11)	0.57	87.2	100.00
32	312.39	12.18	3.714	0.20(0.11)	0.57	87.9	127.00
33	311.22	12.28	3.697	0.20(0.11)	0.57	88.0	123.00
34	310.25	12.36	3.684	0.20(0.11)	0.57	88.0	184.00
35	310.02	12.38	3.681	0.20(0.11)	0.57	88.0	97.00
36	308.25	12.51	3.659	0.20(0.11)	0.57	88.1	208.00
37	304.74	12.76	3.618	0.20(0.11)	0.57	88.2	120.00
38	303.02	12.88	3.598	0.20(0.11)	0.57	88.2	111.00

END OF RATIONAL METHOD ANALYSIS

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
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           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A' (CONTINUE) - WITH 2 FLOW-BY DETENTION BASINS  *
 ************************************************************************

  FILE NAME: EAST-B2.DAT
  TIME/DATE OF STUDY: 14:25 11/01/2021
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   11.28   RAINFALL INTENSITY(INCH/HR) =  3.88
  EFFECTIVE AREA(ACRES) =    86.48
  TOTAL AREA(ACRES) =    92.50        PEAK FLOW RATE(CFS) =    322.70
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.57
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  78.0 INCH PIPE IS  59.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.87
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     322.70
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.54
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.448
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.93
  Tc(MIN.) =    8.90
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    3.53
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       5.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   4.60
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.84
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.84

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.349
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    91    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =   10.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.041
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.84   10.18    4.117  0.20( 0.18) 0.90       1.5     231.00
      2        3.44   10.51    4.041  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.18    4.117  0.20( 0.15) 0.76       2.5     231.00
      2        9.16   10.51    4.041  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.23    Tc(MIN.) =    10.18
  EFFECTIVE AREA(ACRES) =       2.46   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.23
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.46
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.23

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.55
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.55

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.45    4.056  0.20( 0.15) 0.76       2.5     231.00
      1        9.16   10.78    3.983  0.20( 0.15) 0.76       2.5     234.00
      2        2.55    6.80    5.187  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.80    5.187  0.20( 0.14) 0.72       2.2     237.00
      2       11.21   10.45    4.056  0.20( 0.15) 0.73       3.0     231.00
      3       11.11   10.78    3.983  0.20( 0.15) 0.73       3.0     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.21    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       3.02   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.21
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =       3.02
  TOTAL STREAM AREA(ACRES) =       3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.21

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.82    5.179  0.20( 0.14) 0.72       2.2     237.00
      1       11.21   10.47    4.052  0.20( 0.15) 0.73       3.0     231.00
      1       11.11   10.80    3.979  0.20( 0.15) 0.73       3.0     234.00
      2        2.71    5.00    6.187  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.00    6.187  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.82    5.179  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.47    4.052  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.80    3.979  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.98    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =       3.51   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.66
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.98
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.04    6.158  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.86    5.161  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.51    4.043  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.84    3.971  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      322.70   11.54    3.832  0.20( 0.11) 0.57      86.5     230.00
 LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      241.00    5.04    6.158  0.20( 0.11) 0.57      39.9     219.00
     2      273.09    6.86    5.161  0.20( 0.11) 0.57      54.1     237.00
     3      323.53   10.51    4.043  0.20( 0.12) 0.58      82.3     231.00
     4      327.41   10.84    3.971  0.20( 0.12) 0.58      84.8     234.00
     5      335.08   11.54    3.832  0.20( 0.12) 0.58      90.0     230.00
   TOTAL AREA(ACRES) =        96.0

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      335.08  Tc(MIN.) =   11.540
 EFFECTIVE AREA(ACRES) =     90.02  AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       96.0
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  78.0 INCH PIPE IS  60.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.06
 ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     335.08
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.57
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.57
 RAINFALL INTENSITY(INCH/HR) =   3.83
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =      90.02
 TOTAL STREAM AREA(ACRES) =      96.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     335.08

****************************************************************************
 FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
 ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.445
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        0.51      0.20     0.400    91    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA RUNOFF(CFS) =      2.46
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.25
 RAINFALL INTENSITY(INCH/HR) =   5.45
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      241.00    5.07    6.137  0.20( 0.11) 0.57      39.9     219.00
     1      273.09    6.89    5.148  0.20( 0.11) 0.57      54.1     237.00
     1      323.53   10.54    4.037  0.20( 0.12) 0.58      82.3     231.00
     1      327.41   10.87    3.965  0.20( 0.12) 0.58      84.8     234.00
     1      335.08   11.57    3.826  0.20( 0.12) 0.58      90.0     230.00
     2        2.46    6.25    5.445  0.20( 0.08) 0.40       0.5     241.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      243.26    5.07    6.137  0.20( 0.11) 0.57      40.3     219.00
     2      264.22    6.25    5.445  0.20( 0.11) 0.57      49.6     241.00
     3      275.41    6.89    5.148  0.20( 0.11) 0.57      54.6     237.00
     4      325.35   10.54    4.037  0.20( 0.11) 0.57      82.8     231.00
     5      329.19   10.87    3.965  0.20( 0.11) 0.57      85.3     234.00
     6      336.80   11.57    3.826  0.20( 0.11) 0.57      90.5     230.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     336.80    Tc(MIN.) =    11.57
 EFFECTIVE AREA(ACRES) =      90.53   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       96.6
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.868
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.39      0.20     0.200    91    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   7.91   Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.25      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =      10.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.35
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.19      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.81
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     15.51
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =      10.81
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

SOUTHEAST – AREA 'B'

100-YR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: S-EAST.DAT
  TIME/DATE OF STUDY: 19:29 11/08/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.83

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.267
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =    6.62
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =   12.82
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   8.18
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.38

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.401
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    91    9.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.957
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    4.19
  EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.16
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.96
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =       1.80
  TOTAL STREAM AREA(ACRES) =       1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.27
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.38    6.98    5.110  0.20( 0.16) 0.82       3.1       1.00
      2        6.27   10.91    3.957  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.59    6.98    5.110  0.20( 0.14) 0.71       4.3       1.00
      2       17.30   10.91    3.957  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.59    Tc(MIN.) =     6.98
  EFFECTIVE AREA(ACRES) =       4.28   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.367
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    91    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =   10.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.115
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.71
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.95
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.36
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.95

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.547
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    91    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      3.88
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.88

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   5.55
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.88

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.95   10.36    4.075  0.20( 0.07) 0.36       0.8       7.00
     2        3.88    6.05    5.547  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.23    6.05    5.547  0.20( 0.04) 0.20       1.3      10.00
     2        5.79   10.36    4.075  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.23    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.23
```

```
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   5.47
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.23

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.378
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20      0.100    91    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.23
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      7.23

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.23    6.20    5.470  0.20( 0.04) 0.20       1.3      10.00
      1        5.79   10.51    4.042  0.20( 0.05) 0.23       1.6       7.00
      2        7.23    6.39    5.378  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.38    6.20    5.470  0.20( 0.03) 0.14       2.7      10.00
```

```
      2       13.45    6.39    5.378  0.20( 0.03) 0.15       2.8       12.00
      3       11.22   10.51    4.042  0.20( 0.03) 0.17       3.1        7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.45    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.45
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   5.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.45

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.726
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    91    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      2.11

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.72
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.73
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.41
 TOTAL STREAM AREA(ACRES) =       0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.11

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.38    6.26    5.440  0.20( 0.03) 0.14       2.7      10.00
     1       13.45    6.45    5.349  0.20( 0.03) 0.15       2.8      12.00
     1       11.22   10.57    4.028  0.20( 0.03) 0.17       3.1       7.00
     2        2.11    5.72    5.726  0.20( 0.02) 0.10       0.4      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    5.72    5.726  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.26    5.440  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.45    5.349  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   10.57    4.028  0.20( 0.03) 0.16       3.5       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.41    Tc(MIN.) =     6.45
 EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        3.5
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.41
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    6.89
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    6.16    5.488  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.70    5.232  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.89    5.150  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   11.02    3.933  0.20( 0.03) 0.16       3.5       7.00
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.59    7.95    4.743  0.20( 0.14) 0.71       4.3       1.00
     2       17.30   11.90    3.765  0.20( 0.14) 0.68       4.9       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.16    5.488  0.20( 0.09) 0.45       6.2      14.00
      2       33.63    6.70    5.232  0.20( 0.09) 0.45       6.7      10.00
      3       33.88    6.89    5.150  0.20( 0.09) 0.45       6.9      12.00
      4       34.30    7.95    4.743  0.20( 0.09) 0.47       7.5       1.00
      5       30.51   11.02    3.933  0.20( 0.09) 0.46       8.3       7.00
      6       29.45   11.90    3.765  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.30  Tc(MIN.) =    7.951
  EFFECTIVE AREA(ACRES) =      7.54  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.30
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   4.59
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.30

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.545
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.28
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      2.28

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   5.54
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.62    5.266  0.20( 0.09) 0.45       6.2      14.00
      1       33.63    7.16    5.037  0.20( 0.09) 0.45       6.7      10.00
      1       33.88    7.35    4.963  0.20( 0.09) 0.45       6.9      12.00
      1       34.30    8.41    4.593  0.20( 0.09) 0.47       7.5       1.00
      1       30.51   11.49    3.841  0.20( 0.09) 0.46       8.3       7.00
      1       29.45   12.36    3.683  0.20( 0.09) 0.46       8.4       4.00
      2        2.28    6.05    5.545  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.05    5.545  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.62    5.266  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.16    5.037  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.35    4.963  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.41    4.593  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.49    3.841  0.20( 0.09) 0.45       8.7       7.00
      7       30.96   12.36    3.683  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.19    Tc(MIN.) =     8.41
  EFFECTIVE AREA(ACRES) =       8.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.19
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.443
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    6.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.52
  RAINFALL INTENSITY(INCH/HR) =   4.90
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.34
  TOTAL STREAM AREA(ACRES) =       0.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20      0.900    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65    7.52    4.896  0.20( 0.04) 0.20       0.3      18.00
      2        1.21    7.72    4.825  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    7.52    4.896  0.20( 0.10) 0.52       0.6      18.00
      2        2.84    7.72    4.825  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.85    Tc(MIN.) =     7.52
  EFFECTIVE AREA(ACRES) =       0.62   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.85
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    91    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    9.75
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =      11.36

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    6.20
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      17.56

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.38
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.35
  TOTAL STREAM AREA(ACRES) =       4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    8.91    4.443  0.20( 0.10) 0.52       0.6      18.00
      1        2.84    9.11    4.388  0.20( 0.10) 0.52       0.6      18.00
      2       17.56    8.38    4.604  0.20( 0.12) 0.59       4.4      21.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.38    4.604  0.20( 0.12) 0.58       4.9      21.00
      2       19.79    8.91    4.443  0.20( 0.12) 0.58       5.0      18.00
      3       19.56    9.11    4.388  0.20( 0.12) 0.58       5.0      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.35    Tc(MIN.) =     8.38
  EFFECTIVE AREA(ACRES) =       4.94   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.35
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.94
  TOTAL STREAM AREA(ACRES) =       4.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.35

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.190
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.72

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.092
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    91    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   5.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.40
```

```
  TOTAL STREAM AREA(ACRES) =       0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    9.24    4.352  0.20( 0.12) 0.58       4.9      21.00
      1       19.79    9.78    4.213  0.20( 0.12) 0.58       5.0      18.00
      1       19.56    9.98    4.165  0.20( 0.12) 0.58       5.0      18.00
      2        1.72    6.80    5.190  0.20( 0.02) 0.10       0.4      26.00
      3        1.83    7.02    5.092  0.20( 0.02) 0.10       0.4      27.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    6.80    5.190  0.20( 0.10) 0.49       4.4      26.00
      2       21.67    7.02    5.092  0.20( 0.10) 0.50       4.5      27.00
      3       23.35    9.24    4.352  0.20( 0.10) 0.51       5.7      21.00
      4       22.69    9.78    4.213  0.20( 0.10) 0.51       5.7      18.00
      5       22.43    9.98    4.165  0.20( 0.10) 0.51       5.8      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.35    Tc(MIN.) =     9.24
  EFFECTIVE AREA(ACRES) =       5.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.8
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.35
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    6.87    5.157  0.20( 0.10) 0.49       4.4      26.00
      2       21.67    7.10    5.061  0.20( 0.10) 0.50       4.5      27.00
      3       23.35    9.31    4.332  0.20( 0.10) 0.51       5.7      21.00
      4       22.69    9.85    4.194  0.20( 0.10) 0.51       5.7      18.00
      5       22.43   10.05    4.147  0.20( 0.10) 0.51       5.8      18.00
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.14    5.503  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.70    5.230  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.24    5.005  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.43    4.932  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.49    4.568  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.57    3.826  0.20( 0.09) 0.45       8.7       7.00
```

```
     7       30.96   12.44    3.669  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.14    5.503  0.20( 0.09) 0.45      10.0      16.00
      2       56.02    6.70    5.230  0.20( 0.09) 0.45      10.9      14.00
      3       56.52    6.87    5.157  0.20( 0.09) 0.46      11.2      26.00
      4       57.13    7.10    5.061  0.20( 0.09) 0.46      11.6      27.00
      5       57.48    7.24    5.005  0.20( 0.09) 0.46      11.8      10.00
      6       57.84    7.43    4.932  0.20( 0.09) 0.46      12.0      12.00
      7       58.91    8.49    4.568  0.20( 0.09) 0.47      13.3       1.00
      8       58.44    9.31    4.332  0.20( 0.10) 0.48      13.9      21.00
      9       57.06    9.85    4.194  0.20( 0.10) 0.48      14.1      18.00
     10       56.54   10.05    4.147  0.20( 0.10) 0.48      14.1      18.00
     11       52.73   11.57    3.826  0.20( 0.09) 0.47      14.5       7.00
     12       50.75   12.44    3.669  0.20( 0.09) 0.47      14.6       4.00
    TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.91  Tc(MIN.) =    8.490
  EFFECTIVE AREA(ACRES) =     13.27  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.25
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.02
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.27
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.91

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.14
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      3.14

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.14
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   6.01
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.67    5.245  0.20( 0.09) 0.45      10.0      16.00
      1       56.02    7.24    5.006  0.20( 0.09) 0.45      10.9      14.00
      1       56.52    7.40    4.941  0.20( 0.09) 0.46      11.2      26.00
      1       57.13    7.63    4.856  0.20( 0.09) 0.46      11.6      27.00
      1       57.48    7.77    4.806  0.20( 0.09) 0.46      11.8      10.00
      1       57.84    7.96    4.741  0.20( 0.09) 0.46      12.0      12.00
      1       58.91    9.02    4.413  0.20( 0.09) 0.47      13.3       1.00
      1       58.44    9.84    4.197  0.20( 0.10) 0.48      13.9      21.00
```

```
     1       57.06   10.39    4.070  0.20( 0.10) 0.48      14.1      18.00
     1       56.54   10.58    4.026  0.20( 0.10) 0.48      14.1      18.00
     1       52.73   12.12    3.725  0.20( 0.09) 0.47      14.5       7.00
     1       50.75   13.00    3.579  0.20( 0.09) 0.47      14.6       4.00
     2        3.14    5.26    6.010  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.18    5.26    6.010  0.20( 0.10) 0.48       8.5      31.00
      2       56.88    6.67    5.245  0.20( 0.10) 0.48      10.6      16.00
      3       58.61    7.24    5.006  0.20( 0.10) 0.48      11.5      14.00
      4       59.08    7.40    4.941  0.20( 0.10) 0.48      11.8      26.00
      5       59.65    7.63    4.856  0.20( 0.10) 0.48      12.2      27.00
      6       59.97    7.77    4.806  0.20( 0.10) 0.48      12.4      10.00
      7       60.29    7.96    4.741  0.20( 0.10) 0.48      12.6      12.00
      8       61.19    9.02    4.413  0.20( 0.10) 0.49      13.8       1.00
      9       60.60    9.84    4.197  0.20( 0.10) 0.49      14.5      21.00
     10       59.16   10.39    4.070  0.20( 0.10) 0.49      14.7      18.00
     11       58.61   10.58    4.026  0.20( 0.10) 0.49      14.7      18.00
     12       54.64   12.12    3.725  0.20( 0.10) 0.49      15.1       7.00
     13       52.58   13.00    3.579  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.19    Tc(MIN.) =     9.02
  EFFECTIVE AREA(ACRES) =      13.85   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.656
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        2.01      0.20     1.000    98   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.25
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      6.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.042
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.51      0.20     1.000    98
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   4.75
  Tc(MIN.) =   17.27
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    8.98
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      14.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.12
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   18.44
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.44
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.12

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.23      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        3.15      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =   13.83
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      14.87

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      16.69

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.08
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.12   18.44    2.929  0.20( 0.20) 1.00       5.5      37.00
      2       16.69    7.06    5.077  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.06    5.077  0.20( 0.18) 0.90       5.9      40.00
      2       23.50   18.44    2.929  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.35    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.89   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.35
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.56
  RAINFALL INTENSITY(INCH/HR) =   4.88
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.89
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.35

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.820
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.63      0.20     1.000    98    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.375
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        5.00      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.15
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =    9.15
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   18.79
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      21.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   6.17
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.62
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.56    4.881  0.20( 0.18) 0.90       5.9      40.00
      1       23.50   18.97    2.882  0.20( 0.19) 0.94       9.3      37.00
      2       21.16    9.36    4.321  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    7.56    4.881  0.20( 0.19) 0.95      10.4      40.00
      2       47.06    9.36    4.321  0.20( 0.19) 0.95      12.1      42.00
      3       37.27   18.97    2.882  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.06    Tc(MIN.) =     9.36
  EFFECTIVE AREA(ACRES) =      12.06   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
 FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.06
 PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   10.15
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.95
 EFFECTIVE STREAM AREA(ACRES) =      12.06
 TOTAL STREAM AREA(ACRES) =      14.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.06

****************************************************************************
 FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.957
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    91    7.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.68
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.56
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       7.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.28
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.67
  RAINFALL INTENSITY(INCH/HR) =   4.51
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.08

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.719
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    91    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   16.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.264
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.99      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    7.56
  EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =      10.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  19.68
  FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   4.26
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    8.36    4.608  0.20( 0.19) 0.95      10.4      40.00
      1       47.06   10.15    4.123  0.20( 0.19) 0.95      12.1      42.00
      1       37.27   19.81    2.811  0.20( 0.19) 0.96      14.9      37.00
      2        7.08    8.67    4.513  0.20( 0.04) 0.20       1.8      46.00
      3       10.38    9.58    4.264  0.20( 0.04) 0.20       2.7      48.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.36    4.608  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.67    4.513  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.58    4.264  0.20( 0.15) 0.74      16.0      48.00
```

```
     4       63.56   10.15    4.123  0.20( 0.15) 0.75      16.5      42.00
     5       48.47   19.81    2.811  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.73    Tc(MIN.) =     9.58
  EFFECTIVE AREA(ACRES) =      16.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.73
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.64      0.20     0.200    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =    8.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.426
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.76
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.68
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.97
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.29

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.013
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    91    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.95
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.874
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.87
  AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    7.58
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    6.53
  EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =      12.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   7.42
  LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.58
  RAINFALL INTENSITY(INCH/HR) =   4.87
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.83
  TOTAL STREAM AREA(ACRES) =       2.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.29    8.97    4.426  0.20( 0.04) 0.20       2.1      14.00
      2       12.31    7.58    4.874  0.20( 0.04) 0.20       2.8      52.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.03    7.58    4.874  0.20( 0.04) 0.20       4.6      52.00
      2       19.46    8.97    4.426  0.20( 0.04) 0.20       4.9      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.03    Tc(MIN.) =     7.58
  EFFECTIVE AREA(ACRES) =       4.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.03
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.03    8.39    4.600  0.20( 0.04) 0.20       4.6      52.00
      2       19.46    9.78    4.213  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.42    4.589  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.73    4.495  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.63    4.249  0.20( 0.15) 0.74      16.0      48.00
      4       63.56   10.21    4.109  0.20( 0.15) 0.75      16.5      42.00
      5       48.47   19.88    2.806  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.39    4.600  0.20( 0.12) 0.61      19.1      52.00
      2       82.58    8.42    4.589  0.20( 0.12) 0.61      19.1      40.00
      3       82.93    8.73    4.495  0.20( 0.12) 0.61      19.6      46.00
      4       83.25    9.63    4.249  0.20( 0.12) 0.61      20.9      48.00
      5       83.15    9.78    4.213  0.20( 0.12) 0.61      21.1      14.00
      6       82.54   10.21    4.109  0.20( 0.12) 0.62      21.5      42.00
      7       61.37   19.88    2.806  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.25  Tc(MIN.) =    9.635
  EFFECTIVE AREA(ACRES) =     20.92  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.25
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.00
 RAINFALL INTENSITY(INCH/HR) =   4.16
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.92
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.25

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.382
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        0.88      0.20     0.900    91    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      3.33
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      3.33

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.235
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.25      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.77
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   0.56
 Tc(MIN.) =    9.69
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.93
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       4.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   4.88
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.75    4.490  0.20( 0.12) 0.61      19.1      52.00
      1       82.58    8.78    4.480  0.20( 0.12) 0.61      19.1      40.00
      1       82.93    9.09    4.392  0.20( 0.12) 0.61      19.6      46.00
      1       83.25   10.00    4.160  0.20( 0.12) 0.61      20.9      48.00
      1       83.15   10.14    4.126  0.20( 0.12) 0.61      21.1      14.00
      1       82.54   10.57    4.028  0.20( 0.12) 0.62      21.5      42.00
      1       61.37   20.27    2.775  0.20( 0.13) 0.67      24.4      37.00
      2        4.14   10.51    4.043  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       86.33    8.75    4.490  0.20( 0.12) 0.62      20.0      52.00
      2       86.43    8.78    4.480  0.20( 0.12) 0.62      20.1      40.00
      3       86.84    9.09    4.392  0.20( 0.12) 0.62      20.6      46.00
      4       87.31   10.00    4.160  0.20( 0.12) 0.62      22.0      48.00
      5       87.24   10.14    4.126  0.20( 0.12) 0.62      22.2      14.00
      6       86.78   10.51    4.043  0.20( 0.13) 0.63      22.5      56.00
      7       86.66   10.57    4.028  0.20( 0.13) 0.63      22.6      42.00
      8       64.16   20.27    2.775  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.31    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =      22.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
```

```
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.31
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      22.00
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      87.31

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.51      0.20      0.100    91    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.717
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    9.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.230
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.71
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.82
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       86.33    9.13    4.381  0.20( 0.12) 0.62      20.0      52.00
     1       86.43    9.17    4.371  0.20( 0.12) 0.62      20.1      40.00
     1       86.84    9.48    4.289  0.20( 0.12) 0.62      20.6      46.00
     1       87.31   10.38    4.071  0.20( 0.12) 0.62      22.0      48.00
     1       87.24   10.52    4.039  0.20( 0.12) 0.62      22.2      14.00
     1       86.78   10.89    3.961  0.20( 0.13) 0.63      22.5      56.00
     1       86.66   10.96    3.947  0.20( 0.13) 0.63      22.6      42.00
     1       64.16   20.69    2.742  0.20( 0.13) 0.67      25.5      37.00
     2        2.46    6.38    5.382  0.20( 0.02) 0.10       0.5      60.00
     3        1.82    9.71    4.230  0.20( 0.02) 0.10       0.5      58.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       78.44    6.38    5.382  0.20( 0.12) 0.59      14.8      60.00
     2       90.11    9.13    4.381  0.20( 0.12) 0.59      21.0      52.00
     3       90.20    9.17    4.371  0.20( 0.12) 0.59      21.0      40.00
     4       90.60    9.48    4.289  0.20( 0.12) 0.59      21.6      46.00
     5       90.71    9.71    4.230  0.20( 0.12) 0.60      22.0      58.00
     6       90.92   10.38    4.071  0.20( 0.12) 0.60      23.0      48.00
     7       90.82   10.52    4.039  0.20( 0.12) 0.60      23.2      14.00
     8       90.29   10.89    3.961  0.20( 0.12) 0.61      23.5      56.00
     9       90.16   10.96    3.947  0.20( 0.12) 0.61      23.6      42.00
    10       66.58   20.69    2.742  0.20( 0.13) 0.65      26.5      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      90.92    Tc(MIN.) =    10.38
 EFFECTIVE AREA(ACRES) =      22.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       26.5
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.07
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.92
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.58
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  31.79
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.92
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.60
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.60
  RAINFALL INTENSITY(INCH/HR) =   4.02
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      22.99
  TOTAL STREAM AREA(ACRES) =      26.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.92

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.33
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      4.33

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   6.01
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       78.44    6.61    5.272  0.20( 0.12) 0.59      14.8      60.00
      1       90.11    9.36    4.321  0.20( 0.12) 0.59      21.0      52.00
      1       90.20    9.39    4.311  0.20( 0.12) 0.59      21.0      40.00
```

```
     1       90.60    9.70    4.232  0.20( 0.12) 0.59      21.6      46.00
     1       90.71    9.93    4.175  0.20( 0.12) 0.60      22.0      58.00
     1       90.92   10.60    4.022  0.20( 0.12) 0.60      23.0      48.00
     1       90.82   10.75    3.991  0.20( 0.12) 0.60      23.2      14.00
     1       90.29   11.11    3.915  0.20( 0.12) 0.61      23.5      56.00
     1       90.16   11.18    3.901  0.20( 0.12) 0.61      23.6      42.00
     1       66.58   20.93    2.724  0.20( 0.13) 0.65      26.5      37.00
     2        4.33    5.26    6.012  0.20( 0.18) 0.90       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       75.66    5.26    6.012  0.20( 0.12) 0.61      12.6      64.00
      2       82.22    6.61    5.272  0.20( 0.12) 0.60      15.6      60.00
      3       93.18    9.36    4.321  0.20( 0.12) 0.60      21.8      52.00
      4       93.27    9.39    4.311  0.20( 0.12) 0.60      21.8      40.00
      5       93.60    9.70    4.232  0.20( 0.12) 0.60      22.4      46.00
      6       93.68    9.93    4.175  0.20( 0.12) 0.61      22.8      58.00
      7       93.77   10.60    4.022  0.20( 0.12) 0.61      23.8      48.00
      8       93.64   10.75    3.991  0.20( 0.12) 0.61      24.0      14.00
      9       93.06   11.11    3.915  0.20( 0.12) 0.62      24.3      56.00
     10       92.92   11.18    3.901  0.20( 0.12) 0.62      24.4      42.00
     11       68.47   20.93    2.724  0.20( 0.13) 0.66      27.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.77    Tc(MIN.) =    10.60
  EFFECTIVE AREA(ACRES) =      23.79   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       27.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.319
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.55      0.20     0.100    91    6.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.003
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
```

```
  "BARREN"                    D        0.62      0.20     1.000    98    7.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.68
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.417
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.57
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   20.72
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1         PEAK FLOW RATE(CFS) =      23.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   9.34
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.00
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      23.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY WITH A FLOW-BY DETENTION BASIN                           *
* PROPOSED - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: S-EAST-B.DAT
  TIME/DATE OF STUDY: 19:18 11/08/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.83

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.267
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =    6.62
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =   12.82
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   8.18
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.38

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.401
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    91    9.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.957
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    4.19
  EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.16
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.96
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =       1.80
  TOTAL STREAM AREA(ACRES) =       1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.27
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.38    6.98    5.110  0.20( 0.16) 0.82       3.1       1.00
      2        6.27   10.91    3.957  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.59    6.98    5.110  0.20( 0.14) 0.71       4.3       1.00
      2       17.30   10.91    3.957  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.59    Tc(MIN.) =     6.98
  EFFECTIVE AREA(ACRES) =       4.28   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.367
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    91    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =   10.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.115
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.71
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.95
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.36
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.95

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.547
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    91    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      3.88
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.88

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   5.55
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.88

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.95   10.36    4.075  0.20( 0.07) 0.36       0.8       7.00
     2        3.88    6.05    5.547  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.23    6.05    5.547  0.20( 0.04) 0.20       1.3      10.00
     2        5.79   10.36    4.075  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.23    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.23
```

```
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   5.47
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.23

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.378
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20      0.100    91    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.23
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      7.23

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.23    6.20    5.470  0.20( 0.04) 0.20       1.3      10.00
      1        5.79   10.51    4.042  0.20( 0.05) 0.23       1.6       7.00
      2        7.23    6.39    5.378  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.38    6.20    5.470  0.20( 0.03) 0.14       2.7      10.00
```

```
      2       13.45    6.39    5.378  0.20( 0.03) 0.15       2.8       12.00
      3       11.22   10.51    4.042  0.20( 0.03) 0.17       3.1        7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.45    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.45
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   5.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.45

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.726
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    91    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      2.11

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.72
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.73
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.41
 TOTAL STREAM AREA(ACRES) =       0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.11

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.38    6.26    5.440  0.20( 0.03) 0.14       2.7      10.00
     1       13.45    6.45    5.349  0.20( 0.03) 0.15       2.8      12.00
     1       11.22   10.57    4.028  0.20( 0.03) 0.17       3.1       7.00
     2        2.11    5.72    5.726  0.20( 0.02) 0.10       0.4      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    5.72    5.726  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.26    5.440  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.45    5.349  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   10.57    4.028  0.20( 0.03) 0.16       3.5       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.41    Tc(MIN.) =     6.45
 EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        3.5
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.41
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    6.89
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    6.16    5.488  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.70    5.232  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.89    5.150  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   11.02    3.933  0.20( 0.03) 0.16       3.5       7.00
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.59    7.95    4.743  0.20( 0.14) 0.71       4.3       1.00
     2       17.30   11.90    3.765  0.20( 0.14) 0.68       4.9       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.16    5.488  0.20( 0.09) 0.45       6.2      14.00
      2       33.63    6.70    5.232  0.20( 0.09) 0.45       6.7      10.00
      3       33.88    6.89    5.150  0.20( 0.09) 0.45       6.9      12.00
      4       34.30    7.95    4.743  0.20( 0.09) 0.47       7.5       1.00
      5       30.51   11.02    3.933  0.20( 0.09) 0.46       8.3       7.00
      6       29.45   11.90    3.765  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.30  Tc(MIN.) =    7.951
  EFFECTIVE AREA(ACRES) =      7.54  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.30
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   4.59
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.30

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.545
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.28
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      2.28

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   5.54
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.62    5.266  0.20( 0.09) 0.45       6.2      14.00
      1       33.63    7.16    5.037  0.20( 0.09) 0.45       6.7      10.00
      1       33.88    7.35    4.963  0.20( 0.09) 0.45       6.9      12.00
      1       34.30    8.41    4.593  0.20( 0.09) 0.47       7.5       1.00
      1       30.51   11.49    3.841  0.20( 0.09) 0.46       8.3       7.00
      1       29.45   12.36    3.683  0.20( 0.09) 0.46       8.4       4.00
      2        2.28    6.05    5.545  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.05    5.545  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.62    5.266  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.16    5.037  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.35    4.963  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.41    4.593  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.49    3.841  0.20( 0.09) 0.45       8.7       7.00
      7       30.96   12.36    3.683  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.19    Tc(MIN.) =     8.41
  EFFECTIVE AREA(ACRES) =       8.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.19
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.443
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.65
 TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
 FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.65
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    7.52
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.52
 RAINFALL INTENSITY(INCH/HR) =   4.90
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20      0.900    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65    7.52    4.896  0.20( 0.04) 0.20       0.3      18.00
      2        1.21    7.72    4.825  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    7.52    4.896  0.20( 0.10) 0.52       0.6      18.00
      2        2.84    7.72    4.825  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.85    Tc(MIN.) =     7.52
  EFFECTIVE AREA(ACRES) =       0.62   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.85
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    91    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    9.75
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =      11.36

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    6.20
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      17.56

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.38
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.35
  TOTAL STREAM AREA(ACRES) =       4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    8.91    4.443  0.20( 0.10) 0.52       0.6      18.00
      1        2.84    9.11    4.388  0.20( 0.10) 0.52       0.6      18.00
      2       17.56    8.38    4.604  0.20( 0.12) 0.59       4.4      21.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.38    4.604  0.20( 0.12) 0.58       4.9      21.00
      2       19.79    8.91    4.443  0.20( 0.12) 0.58       5.0      18.00
      3       19.56    9.11    4.388  0.20( 0.12) 0.58       5.0      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.35    Tc(MIN.) =     8.38
  EFFECTIVE AREA(ACRES) =       4.94   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.35
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.94
  TOTAL STREAM AREA(ACRES) =       4.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.35

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.190
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.72

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.092
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    91    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   5.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.40
```

```
  TOTAL STREAM AREA(ACRES) =       0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    9.24    4.352  0.20( 0.12) 0.58       4.9      21.00
      1       19.79    9.78    4.213  0.20( 0.12) 0.58       5.0      18.00
      1       19.56    9.98    4.165  0.20( 0.12) 0.58       5.0      18.00
      2        1.72    6.80    5.190  0.20( 0.02) 0.10       0.4      26.00
      3        1.83    7.02    5.092  0.20( 0.02) 0.10       0.4      27.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    6.80    5.190  0.20( 0.10) 0.49       4.4      26.00
      2       21.67    7.02    5.092  0.20( 0.10) 0.50       4.5      27.00
      3       23.35    9.24    4.352  0.20( 0.10) 0.51       5.7      21.00
      4       22.69    9.78    4.213  0.20( 0.10) 0.51       5.7      18.00
      5       22.43    9.98    4.165  0.20( 0.10) 0.51       5.8      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.35    Tc(MIN.) =     9.24
  EFFECTIVE AREA(ACRES) =       5.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.8
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.35
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    6.87    5.157  0.20( 0.10) 0.49       4.4      26.00
      2       21.67    7.10    5.061  0.20( 0.10) 0.50       4.5      27.00
      3       23.35    9.31    4.332  0.20( 0.10) 0.51       5.7      21.00
      4       22.69    9.85    4.194  0.20( 0.10) 0.51       5.7      18.00
      5       22.43   10.05    4.147  0.20( 0.10) 0.51       5.8      18.00
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.14    5.503  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.70    5.230  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.24    5.005  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.43    4.932  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.49    4.568  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.57    3.826  0.20( 0.09) 0.45       8.7       7.00
```

```
     7       30.96   12.44    3.669  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.14    5.503  0.20( 0.09) 0.45      10.0      16.00
      2       56.02    6.70    5.230  0.20( 0.09) 0.45      10.9      14.00
      3       56.52    6.87    5.157  0.20( 0.09) 0.46      11.2      26.00
      4       57.13    7.10    5.061  0.20( 0.09) 0.46      11.6      27.00
      5       57.48    7.24    5.005  0.20( 0.09) 0.46      11.8      10.00
      6       57.84    7.43    4.932  0.20( 0.09) 0.46      12.0      12.00
      7       58.91    8.49    4.568  0.20( 0.09) 0.47      13.3       1.00
      8       58.44    9.31    4.332  0.20( 0.10) 0.48      13.9      21.00
      9       57.06    9.85    4.194  0.20( 0.10) 0.48      14.1      18.00
     10       56.54   10.05    4.147  0.20( 0.10) 0.48      14.1      18.00
     11       52.73   11.57    3.826  0.20( 0.09) 0.47      14.5       7.00
     12       50.75   12.44    3.669  0.20( 0.09) 0.47      14.6       4.00
    TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.91  Tc(MIN.) =    8.490
  EFFECTIVE AREA(ACRES) =     13.27  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.25
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.02
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.27
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.91

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.14
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      3.14

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.14
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   6.01
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.67    5.245  0.20( 0.09) 0.45      10.0      16.00
      1       56.02    7.24    5.006  0.20( 0.09) 0.45      10.9      14.00
      1       56.52    7.40    4.941  0.20( 0.09) 0.46      11.2      26.00
      1       57.13    7.63    4.856  0.20( 0.09) 0.46      11.6      27.00
      1       57.48    7.77    4.806  0.20( 0.09) 0.46      11.8      10.00
      1       57.84    7.96    4.741  0.20( 0.09) 0.46      12.0      12.00
      1       58.91    9.02    4.413  0.20( 0.09) 0.47      13.3       1.00
      1       58.44    9.84    4.197  0.20( 0.10) 0.48      13.9      21.00
```

```
     1       57.06   10.39    4.070  0.20( 0.10) 0.48      14.1      18.00
     1       56.54   10.58    4.026  0.20( 0.10) 0.48      14.1      18.00
     1       52.73   12.12    3.725  0.20( 0.09) 0.47      14.5       7.00
     1       50.75   13.00    3.579  0.20( 0.09) 0.47      14.6       4.00
     2        3.14    5.26    6.010  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.18    5.26    6.010  0.20( 0.10) 0.48       8.5      31.00
      2       56.88    6.67    5.245  0.20( 0.10) 0.48      10.6      16.00
      3       58.61    7.24    5.006  0.20( 0.10) 0.48      11.5      14.00
      4       59.08    7.40    4.941  0.20( 0.10) 0.48      11.8      26.00
      5       59.65    7.63    4.856  0.20( 0.10) 0.48      12.2      27.00
      6       59.97    7.77    4.806  0.20( 0.10) 0.48      12.4      10.00
      7       60.29    7.96    4.741  0.20( 0.10) 0.48      12.6      12.00
      8       61.19    9.02    4.413  0.20( 0.10) 0.49      13.8       1.00
      9       60.60    9.84    4.197  0.20( 0.10) 0.49      14.5      21.00
     10       59.16   10.39    4.070  0.20( 0.10) 0.49      14.7      18.00
     11       58.61   10.58    4.026  0.20( 0.10) 0.49      14.7      18.00
     12       54.64   12.12    3.725  0.20( 0.10) 0.49      15.1       7.00
     13       52.58   13.00    3.579  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.19    Tc(MIN.) =     9.02
  EFFECTIVE AREA(ACRES) =      13.85   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.656
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        2.01      0.20     1.000    98   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.25
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      6.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.042
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.51      0.20     1.000    98
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   4.75
  Tc(MIN.) =   17.27
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    8.98
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      14.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.12
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   18.44
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.44
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.12

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.15      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =   13.83
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      14.87

**************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      16.69

**************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.08
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.12   18.44    2.929  0.20( 0.20) 1.00       5.5      37.00
      2       16.69    7.06    5.077  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.06    5.077  0.20( 0.18) 0.90       5.9      40.00
      2       23.50   18.44    2.929  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.35    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.89   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.35
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.56
  RAINFALL INTENSITY(INCH/HR) =   4.88
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.89
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.35

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.820
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.63      0.20     1.000    98    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.375
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.00      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.15
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =    9.15
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   18.79
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      21.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   6.17
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.62
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.56    4.881  0.20( 0.18) 0.90       5.9      40.00
      1       23.50   18.97    2.882  0.20( 0.19) 0.94       9.3      37.00
      2       21.16    9.36    4.321  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    7.56    4.881  0.20( 0.19) 0.95      10.4      40.00
      2       47.06    9.36    4.321  0.20( 0.19) 0.95      12.1      42.00
      3       37.27   18.97    2.882  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.06    Tc(MIN.) =     9.36
  EFFECTIVE AREA(ACRES) =      12.06   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.06
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   10.15
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.15
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =      12.06
  TOTAL STREAM AREA(ACRES) =      14.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.06

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.957
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    91    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.56
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       7.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.28
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.67
  RAINFALL INTENSITY(INCH/HR) =   4.51
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.08

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.719
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    91    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   16.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.264
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.99      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    7.56
  EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =      10.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  19.68
  FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   4.26
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    8.36    4.608  0.20( 0.19) 0.95      10.4      40.00
      1       47.06   10.15    4.123  0.20( 0.19) 0.95      12.1      42.00
      1       37.27   19.81    2.811  0.20( 0.19) 0.96      14.9      37.00
      2        7.08    8.67    4.513  0.20( 0.04) 0.20       1.8      46.00
      3       10.38    9.58    4.264  0.20( 0.04) 0.20       2.7      48.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.36    4.608  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.67    4.513  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.58    4.264  0.20( 0.15) 0.74      16.0      48.00
```

```
     4       63.56   10.15    4.123  0.20( 0.15) 0.75      16.5      42.00
     5       48.47   19.81    2.811  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.73    Tc(MIN.) =     9.58
  EFFECTIVE AREA(ACRES) =      16.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.73
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.64      0.20     0.200    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =    8.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.426
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.76
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.68
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.97
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.29

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.013
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    91    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.95
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.874
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.87
 AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   0.36
 Tc(MIN.) =    7.58
 SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    6.53
 EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
 TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =      12.31

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   7.42
 LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.58
 RAINFALL INTENSITY(INCH/HR) =   4.87
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       2.83
 TOTAL STREAM AREA(ACRES) =       2.83
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.29    8.97    4.426  0.20( 0.04) 0.20       2.1      14.00
     2       12.31    7.58    4.874  0.20( 0.04) 0.20       2.8      52.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       20.03    7.58    4.874  0.20( 0.04) 0.20       4.6      52.00
     2       19.46    8.97    4.426  0.20( 0.04) 0.20       4.9      14.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.03    Tc(MIN.) =     7.58
 EFFECTIVE AREA(ACRES) =       4.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
 FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.03
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.03    8.39    4.600  0.20( 0.04) 0.20       4.6      52.00
      2       19.46    9.78    4.213  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.42    4.589  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.73    4.495  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.63    4.249  0.20( 0.15) 0.74      16.0      48.00
      4       63.56   10.21    4.109  0.20( 0.15) 0.75      16.5      42.00
      5       48.47   19.88    2.806  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.39    4.600  0.20( 0.12) 0.61      19.1      52.00
      2       82.58    8.42    4.589  0.20( 0.12) 0.61      19.1      40.00
      3       82.93    8.73    4.495  0.20( 0.12) 0.61      19.6      46.00
      4       83.25    9.63    4.249  0.20( 0.12) 0.61      20.9      48.00
      5       83.15    9.78    4.213  0.20( 0.12) 0.61      21.1      14.00
      6       82.54   10.21    4.109  0.20( 0.12) 0.62      21.5      42.00
      7       61.37   19.88    2.806  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.25  Tc(MIN.) =    9.635
  EFFECTIVE AREA(ACRES) =     20.92  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.25
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.00
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =      20.92
  TOTAL STREAM AREA(ACRES) =      24.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.25

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.88      0.20     0.900    91    9.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.33
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      3.33

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.25      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.77
  AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   0.56
  Tc(MIN.) =    9.69
  SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.93
  EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       4.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   4.88
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.75    4.490  0.20( 0.12) 0.61      19.1      52.00
      1       82.58    8.78    4.480  0.20( 0.12) 0.61      19.1      40.00
      1       82.93    9.09    4.392  0.20( 0.12) 0.61      19.6      46.00
      1       83.25   10.00    4.160  0.20( 0.12) 0.61      20.9      48.00
      1       83.15   10.14    4.126  0.20( 0.12) 0.61      21.1      14.00
      1       82.54   10.57    4.028  0.20( 0.12) 0.62      21.5      42.00
      1       61.37   20.27    2.775  0.20( 0.13) 0.67      24.4      37.00
      2        4.14   10.51    4.043  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       86.33    8.75    4.490  0.20( 0.12) 0.62      20.0      52.00
      2       86.43    8.78    4.480  0.20( 0.12) 0.62      20.1      40.00
      3       86.84    9.09    4.392  0.20( 0.12) 0.62      20.6      46.00
      4       87.31   10.00    4.160  0.20( 0.12) 0.62      22.0      48.00
      5       87.24   10.14    4.126  0.20( 0.12) 0.62      22.2      14.00
      6       86.78   10.51    4.043  0.20( 0.13) 0.63      22.5      56.00
      7       86.66   10.57    4.028  0.20( 0.13) 0.63      22.6      42.00
      8       64.16   20.27    2.775  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.31    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =      22.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
```

```
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.31
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      22.00
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      87.31

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.51      0.20      0.100    91    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.717
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    9.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.230
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.71
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.82
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       86.33    9.13    4.381  0.20( 0.12) 0.62      20.0      52.00
     1       86.43    9.17    4.371  0.20( 0.12) 0.62      20.1      40.00
     1       86.84    9.48    4.289  0.20( 0.12) 0.62      20.6      46.00
     1       87.31   10.38    4.071  0.20( 0.12) 0.62      22.0      48.00
     1       87.24   10.52    4.039  0.20( 0.12) 0.62      22.2      14.00
     1       86.78   10.89    3.961  0.20( 0.13) 0.63      22.5      56.00
     1       86.66   10.96    3.947  0.20( 0.13) 0.63      22.6      42.00
     1       64.16   20.69    2.742  0.20( 0.13) 0.67      25.5      37.00
     2        2.46    6.38    5.382  0.20( 0.02) 0.10       0.5      60.00
     3        1.82    9.71    4.230  0.20( 0.02) 0.10       0.5      58.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       78.44    6.38    5.382  0.20( 0.12) 0.59      14.8      60.00
     2       90.11    9.13    4.381  0.20( 0.12) 0.59      21.0      52.00
     3       90.20    9.17    4.371  0.20( 0.12) 0.59      21.0      40.00
     4       90.60    9.48    4.289  0.20( 0.12) 0.59      21.6      46.00
     5       90.71    9.71    4.230  0.20( 0.12) 0.60      22.0      58.00
     6       90.92   10.38    4.071  0.20( 0.12) 0.60      23.0      48.00
     7       90.82   10.52    4.039  0.20( 0.12) 0.60      23.2      14.00
     8       90.29   10.89    3.961  0.20( 0.12) 0.61      23.5      56.00
     9       90.16   10.96    3.947  0.20( 0.12) 0.61      23.6      42.00
    10       66.58   20.69    2.742  0.20( 0.13) 0.65      26.5      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      90.92    Tc(MIN.) =    10.38
 EFFECTIVE AREA(ACRES) =      22.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       26.5
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.07
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.92
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.58
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN.) =   10.37   RAINFALL INTENSITY(INCH/HR) =  4.07
 EFFECTIVE AREA(ACRES) =    13.89
 TOTAL AREA(ACRES) =    16.02        PEAK FLOW RATE(CFS) =     55.00
 AREA-AVERAGED Fm(INCH/HR) =   0.12  AREA-AVERAGED Fp(INCH/HR) =   0.20
 AREA-AVERAGED Ap =  0.60
 NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
       CONFLUENCE ANALYSES.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.53
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.00
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      13.89
  TOTAL STREAM AREA(ACRES) =      16.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.00

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.33
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      4.33

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
```

```
 RAINFALL INTENSITY(INCH/HR) =   6.01
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.80
 TOTAL STREAM AREA(ACRES) =       0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       55.00   10.39    4.068  0.20( 0.12) 0.60      13.9      37.00
     2        4.33    5.26    6.012  0.20( 0.18) 0.90       0.8      64.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       45.84    5.26    6.012  0.20( 0.13) 0.63       7.8      64.00
     2       57.88   10.39    4.068  0.20( 0.12) 0.62      14.7      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      57.88    Tc(MIN.) =    10.39
 EFFECTIVE AREA(ACRES) =      14.69   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       16.8
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.319
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.55      0.20      0.100    91    6.51
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.62
 TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.003
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                   D        0.62      0.20      1.000    98    7.24
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      2.68
```

```
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.417
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.57
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   20.72
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1          PEAK FLOW RATE(CFS) =      23.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   9.34
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.00
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      23.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 7

DETENTION BASIN CALCULATIONS

WEST

AREA “A”

100-YEAR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  WEST - AREA 'A' - NODE 33
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         35.80       18.00       75.(AMC II)     0.200       0.932

    TOTAL AREA (Acres) =     35.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.036

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.068
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 33, WEST AREA                                                    *
 ************************************************************************

  FILE NAME: WEST-33.DAT
  TIME/DATE OF STUDY: 18:41 11/07/2021


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      35.800 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.123 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.036
         LOW LOSS FRACTION = 0.068
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  67.751


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	8.138	35.233
2	50.316	182.615
3	87.801	162.292
4	97.582	42.348
5	99.235	7.158
6	99.694	1.987
7	99.924	0.993
8	100.000	0.331

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.9474
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 15.8394

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	5.7767	12.11	. Q . V . . .
14.083	5.8619	12.37	. Q . V . . .
14.167	5.9492	12.68	. Q . V . . .
14.250	6.0387	13.00	. Q . V . . .
14.333	6.1304	13.32	. Q . V . . .
14.417	6.2243	13.64	. Q . V . . .
14.500	6.3207	14.00	. Q . V . . .
14.583	6.4197	14.37	. Q . V . . .
14.667	6.5215	14.78	. Q . V . . .
14.750	6.6263	15.22	. Q . V . . .
14.833	6.7346	15.72	. Q . V . . .
14.917	6.8464	16.24	. Q . V . . .
15.000	6.9624	16.84	. Q . V . . .
15.083	7.0828	17.49	. Q . V . . .
15.167	7.2087	18.28	. Q . V . . .
15.250	7.3406	19.15	. Q . V . . .
15.333	7.4797	20.20	. Q . V . . .
15.417	7.6251	21.11	. Q . V. . .
15.500	7.7714	21.24	. Q . V. . .
15.583	7.9210	21.72	. Q . V . . .
15.667	8.0832	23.56	. Q . V . . .
15.750	8.2633	26.15	. Q . V . . .
15.833	8.4701	30.02	. Q . .V . . .
15.917	8.7151	35.57	. Q . . V . . .
16.000	9.0333	46.20	. Q. . V . . .
16.083	9.5390	73.43	. . Q . V . . .
16.167	10.4433	131.31	. . . Q . . .
16.250	11.2199	112.76	. . . Q V . . .
16.333	11.5920	54.04	. Q . . V. . .
16.417	11.8070	31.21	. Q . . V. . .
16.500	11.9783	24.86	. Q . . V . . .
16.583	12.1304	22.10	. Q . . V . . .
16.667	12.2659	19.68	. Q . . V . . .
16.750	12.3885	17.80	. Q . . .V . . .
16.833	12.5019	16.46	. Q . . .V . . .
16.917	12.6079	15.39	. Q . . .V . . .
17.000	12.7078	14.50	. Q . . . V . . .
17.083	12.8024	13.74	. Q . . . V . . .
17.167	12.8923	13.06	. Q . . . V . . .
17.250	12.9781	12.45	. Q . . . V . . .
17.333	13.0604	11.94	. Q . . . V . . .
17.417	13.1395	11.50	. Q . . . . V . . .
17.500	13.2159	11.09	. Q . . . . V . . .
17.583	13.2898	10.73	. Q . . . . V . . .
17.667	13.3615	10.40	. Q . . . . V . . .
17.750	13.4310	10.10	. Q . . . . V . . .
17.833	13.4986	9.82	.Q . . . . V . . .
17.917	13.5645	9.56	.Q . . . . V . . .
18.000	13.6287	9.32	.Q . . . . V . . .

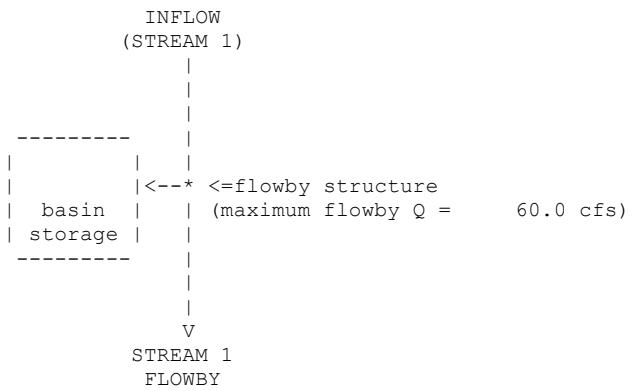
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	170.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

```
*****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-----------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
=============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
60.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.24	0.24	0.000
0.167	1.48	1.48	0.000
0.250	2.59	2.59	0.000
0.333	2.88	2.88	0.000
0.417	2.94	2.94	0.000
0.500	2.96	2.96	0.000
0.583	2.98	2.98	0.000
0.667	2.99	2.99	0.000
0.750	3.00	3.00	0.000
0.833	3.01	3.01	0.000
0.917	3.02	3.02	0.000
1.000	3.03	3.03	0.000
1.083	3.04	3.04	0.000
1.167	3.05	3.05	0.000
1.250	3.06	3.06	0.000
1.333	3.08	3.08	0.000
1.417	3.09	3.09	0.000
1.500	3.10	3.10	0.000
1.583	3.11	3.11	0.000
1.667	3.12	3.12	0.000
1.750	3.13	3.13	0.000

1.833	3.14	3.14	0.000
1.917	3.15	3.15	0.000
2.000	3.17	3.17	0.000
2.083	3.18	3.18	0.000
2.167	3.19	3.19	0.000
2.250	3.20	3.20	0.000
2.333	3.21	3.21	0.000
2.417	3.23	3.23	0.000
2.500	3.24	3.24	0.000
2.583	3.25	3.25	0.000
2.667	3.26	3.26	0.000
2.750	3.28	3.28	0.000
2.833	3.29	3.29	0.000
2.917	3.30	3.30	0.000
3.000	3.31	3.31	0.000
3.083	3.33	3.33	0.000
3.167	3.34	3.34	0.000
3.250	3.35	3.35	0.000
3.333	3.37	3.37	0.000
3.417	3.38	3.38	0.000
3.500	3.40	3.40	0.000
3.583	3.41	3.41	0.000
3.667	3.42	3.42	0.000
3.750	3.44	3.44	0.000
3.833	3.45	3.45	0.000
3.917	3.47	3.47	0.000
4.000	3.48	3.48	0.000
4.083	3.50	3.50	0.000
4.167	3.51	3.51	0.000
4.250	3.53	3.53	0.000
4.333	3.54	3.54	0.000
4.417	3.56	3.56	0.000
4.500	3.57	3.57	0.000
4.583	3.59	3.59	0.000
4.667	3.61	3.61	0.000
4.750	3.62	3.62	0.000
4.833	3.64	3.64	0.000
4.917	3.66	3.66	0.000
5.000	3.67	3.67	0.000
5.083	3.69	3.69	0.000
5.167	3.71	3.71	0.000
5.250	3.73	3.73	0.000
5.333	3.74	3.74	0.000
5.417	3.76	3.76	0.000
5.500	3.78	3.78	0.000
5.583	3.80	3.80	0.000
5.667	3.82	3.82	0.000
5.750	3.84	3.84	0.000
5.833	3.86	3.86	0.000
5.917	3.88	3.88	0.000
6.000	3.90	3.90	0.000
6.083	3.92	3.92	0.000
6.167	3.94	3.94	0.000
6.250	3.96	3.96	0.000
6.333	3.98	3.98	0.000
6.417	4.00	4.00	0.000
6.500	4.02	4.02	0.000
6.583	4.04	4.04	0.000
6.667	4.07	4.07	0.000
6.750	4.09	4.09	0.000
6.833	4.11	4.11	0.000
6.917	4.13	4.13	0.000
7.000	4.16	4.16	0.000
7.083	4.18	4.18	0.000
7.167	4.21	4.21	0.000
7.250	4.23	4.23	0.000
7.333	4.25	4.25	0.000
7.417	4.28	4.28	0.000
7.500	4.31	4.31	0.000
7.583	4.33	4.33	0.000
7.667	4.36	4.36	0.000

7.750	4.38	4.38	0.000
7.833	4.41	4.41	0.000
7.917	4.44	4.44	0.000
8.000	4.47	4.47	0.000
8.083	4.50	4.50	0.000
8.167	4.53	4.53	0.000
8.250	4.56	4.56	0.000
8.333	4.59	4.59	0.000
8.417	4.62	4.62	0.000
8.500	4.65	4.65	0.000
8.583	4.68	4.68	0.000
8.667	4.71	4.71	0.000
8.750	4.75	4.75	0.000
8.833	4.78	4.78	0.000
8.917	4.81	4.81	0.000
9.000	4.85	4.85	0.000
9.083	4.88	4.88	0.000
9.167	4.92	4.92	0.000
9.250	4.96	4.96	0.000
9.333	4.99	4.99	0.000
9.417	5.03	5.03	0.000
9.500	5.07	5.07	0.000
9.583	5.11	5.11	0.000
9.667	5.15	5.15	0.000
9.750	5.19	5.19	0.000
9.833	5.24	5.24	0.000
9.917	5.28	5.28	0.000
10.000	5.33	5.33	0.000
10.083	5.37	5.37	0.000
10.167	5.42	5.42	0.000
10.250	5.46	5.46	0.000
10.333	5.51	5.51	0.000
10.417	5.56	5.56	0.000
10.500	5.61	5.61	0.000
10.583	5.67	5.67	0.000
10.667	5.72	5.72	0.000
10.750	5.77	5.77	0.000
10.833	5.83	5.83	0.000
10.917	5.89	5.89	0.000
11.000	5.95	5.95	0.000
11.083	6.01	6.01	0.000
11.167	6.07	6.07	0.000
11.250	6.13	6.13	0.000
11.333	6.20	6.20	0.000
11.417	6.27	6.27	0.000
11.500	6.34	6.34	0.000
11.583	6.41	6.41	0.000
11.667	6.48	6.48	0.000
11.750	6.56	6.56	0.000
11.833	6.64	6.64	0.000
11.917	6.72	6.72	0.000
12.000	6.80	6.80	0.000
12.083	7.03	7.03	0.000
12.167	7.88	7.88	0.000
12.250	8.65	8.65	0.000
12.333	8.92	8.92	0.000
12.417	9.06	9.06	0.000
12.500	9.18	9.18	0.000
12.583	9.29	9.29	0.000
12.667	9.41	9.41	0.000
12.750	9.53	9.53	0.000
12.833	9.65	9.65	0.000
12.917	9.78	9.78	0.000
13.000	9.92	9.92	0.000
13.083	10.06	10.06	0.000
13.167	10.21	10.21	0.000
13.250	10.36	10.36	0.000
13.333	10.52	10.52	0.000
13.417	10.68	10.68	0.000
13.500	10.86	10.86	0.000
13.583	11.04	11.04	0.000

13.667	11.23	11.23	0.000
13.750	11.43	11.43	0.000
13.833	11.65	11.65	0.000
13.917	11.87	11.87	0.000
14.000	12.11	12.11	0.000
14.083	12.37	12.37	0.000
14.167	12.68	12.68	0.000
14.250	13.00	13.00	0.000
14.333	13.32	13.32	0.000
14.417	13.64	13.64	0.000
14.500	14.00	14.00	0.000
14.583	14.37	14.37	0.000
14.667	14.78	14.78	0.000
14.750	15.22	15.22	0.000
14.833	15.72	15.72	0.000
14.917	16.24	16.24	0.000
15.000	16.84	16.84	0.000
15.083	17.49	17.49	0.000
15.167	18.28	18.28	0.000
15.250	19.15	19.15	0.000
15.333	20.20	20.20	0.000
15.417	21.11	21.11	0.000
15.500	21.24	21.24	0.000
15.583	21.72	21.72	0.000
15.667	23.56	23.56	0.000
15.750	26.15	26.15	0.000
15.833	30.02	30.02	0.000
15.917	35.57	35.57	0.000
16.000	46.20	46.20	0.000
16.083	73.43	60.00	0.092
16.167	131.31	60.00	0.584
16.250	112.76	60.00	0.947
16.333	54.04	54.04	0.947
16.417	31.21	31.21	0.947
16.500	24.86	24.86	0.947
16.583	22.10	22.10	0.947
16.667	19.68	19.68	0.947
16.750	17.80	17.80	0.947
16.833	16.46	16.46	0.947
16.917	15.39	15.39	0.947
17.000	14.50	14.50	0.947
17.083	13.74	13.74	0.947
17.167	13.06	13.06	0.947
17.250	12.45	12.45	0.947
17.333	11.94	11.94	0.947
17.417	11.50	11.50	0.947
17.500	11.09	11.09	0.947
17.583	10.73	10.73	0.947
17.667	10.40	10.40	0.947
17.750	10.10	10.10	0.947
17.833	9.82	9.82	0.947
17.917	9.56	9.56	0.947
18.000	9.32	9.32	0.947
18.083	8.95	8.95	0.947
18.167	7.99	7.99	0.947
18.250	7.13	7.13	0.947
18.333	6.78	6.78	0.947
18.417	6.59	6.59	0.947
18.500	6.43	6.43	0.947
18.583	6.29	6.29	0.947
18.667	6.15	6.15	0.947
18.750	6.02	6.02	0.947
18.833	5.90	5.90	0.947
18.917	5.79	5.79	0.947
19.000	5.68	5.68	0.947
19.083	5.58	5.58	0.947
19.167	5.48	5.48	0.947
19.250	5.38	5.38	0.947
19.333	5.29	5.29	0.947
19.417	5.21	5.21	0.947
19.500	5.12	5.12	0.947

19.583	5.04	5.04	0.947
19.667	4.97	4.97	0.947
19.750	4.89	4.89	0.947
19.833	4.82	4.82	0.947
19.917	4.75	4.75	0.947
20.000	4.69	4.69	0.947
20.083	4.62	4.62	0.947
20.167	4.56	4.56	0.947
20.250	4.50	4.50	0.947
20.333	4.45	4.45	0.947
20.417	4.39	4.39	0.947
20.500	4.34	4.34	0.947
20.583	4.29	4.29	0.947
20.667	4.24	4.24	0.947
20.750	4.19	4.19	0.947
20.833	4.14	4.14	0.947
20.917	4.09	4.09	0.947
21.000	4.05	4.05	0.947
21.083	4.00	4.00	0.947
21.167	3.96	3.96	0.947
21.250	3.92	3.92	0.947
21.333	3.88	3.88	0.947
21.417	3.84	3.84	0.947
21.500	3.80	3.80	0.947
21.583	3.77	3.77	0.947
21.667	3.73	3.73	0.947
21.750	3.70	3.70	0.947
21.833	3.66	3.66	0.947
21.917	3.63	3.63	0.947
22.000	3.59	3.59	0.947
22.083	3.56	3.56	0.947
22.167	3.53	3.53	0.947
22.250	3.50	3.50	0.947
22.333	3.47	3.47	0.947
22.417	3.44	3.44	0.947
22.500	3.41	3.41	0.947
22.583	3.38	3.38	0.947
22.667	3.36	3.36	0.947
22.750	3.33	3.33	0.947
22.833	3.30	3.30	0.947
22.917	3.28	3.28	0.947
23.000	3.25	3.25	0.947
23.083	3.23	3.23	0.947
23.167	3.20	3.20	0.947
23.250	3.18	3.18	0.947
23.333	3.16	3.16	0.947
23.417	3.13	3.13	0.947
23.500	3.11	3.11	0.947
23.583	3.09	3.09	0.947
23.667	3.07	3.07	0.947
23.750	3.05	3.05	0.947
23.833	3.03	3.03	0.947
23.917	3.00	3.00	0.947
24.000	2.98	2.98	0.947

==========

END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

EAST – AREA ‘A’

100-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  NODE 86 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         51.30       55.00       75.(AMC II)     0.200       0.880

    TOTAL AREA (Acres) =     51.30

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.110

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.120
==========================================================================
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**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 86, EAST AREA                                                    *
 ************************************************************************

  FILE NAME: EAST-86.DAT
  TIME/DATE OF STUDY: 13:38 11/01/2021


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      51.300 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.128 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.110
         LOW LOSS FRACTION = 0.120
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  65.257


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.555	46.871
2	47.443	247.468
3	85.986	239.129
4	97.102	68.964
5	99.082	12.283
6	99.633	3.416
7	99.908	1.708
8	100.000	0.569

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.5651
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 21.4895

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	7.8093	16.37	. Q . V . . .
14.083	7.9245	16.71	. Q . V . . .
14.167	8.0425	17.14	. Q . V . . .
14.250	8.1635	17.58	. Q . V . . .
14.333	8.2876	18.01	. Q . V . . .
14.417	8.4146	18.44	. Q . V . . .
14.500	8.5449	18.92	. Q . V . . .
14.583	8.6787	19.43	. Q . V . . .
14.667	8.8164	19.99	. Q . V . . .
14.750	8.9581	20.58	. Q . V . . .
14.833	9.1044	21.24	. Q . V . . .
14.917	9.2555	21.95	. Q . V . . .
15.000	9.4122	22.75	. Q . V . . .
15.083	9.5749	23.62	. Q . V . . .
15.167	9.7446	24.63	. Q . V . . .
15.250	9.9218	25.73	. Q . V . . .
15.333	10.1080	27.04	. Q . V . . .
15.417	10.3023	28.21	. Q . V . . .
15.500	10.4980	28.42	. Q . V . . .
15.583	10.6975	28.96	. Q . V . . .
15.667	10.9122	31.17	. Q . V . . .
15.750	11.1492	34.41	. Q . V . . .
15.833	11.4199	39.31	. Q . .V . . .
15.917	11.7419	46.75	. Q. .V . . .
16.000	12.1646	61.37	. Q . V . . .
16.083	12.8449	98.79	. . Q. V . . .
16.167	14.0768	178.88	. . . V . Q .
16.250	15.1865	161.12	. . . V . Q . .
16.333	15.7239	78.02	. . Q . V. . .
16.417	16.0215	43.22	. Q . . V. . .
16.500	16.2538	33.72	. Q . . V . .
16.583	16.4598	29.91	. Q . . V . .
16.667	16.6436	26.69	. Q . . V . .
16.750	16.8102	24.18	. Q . . .V . .
16.833	16.9643	22.38	. Q . . .V . .
16.917	17.1084	20.92	. Q . . .V . .
17.000	17.2441	19.71	. Q . . . V . .
17.083	17.3727	18.67	. Q . . . V . .
17.167	17.4948	17.73	. Q . . . V . .
17.250	17.6112	16.90	. Q . . . V . .
17.333	17.7228	16.20	. Q . . . V . .
17.417	17.8302	15.59	. Q . . . V . .
17.500	17.9338	15.04	. Q . . . V . .
17.583	18.0340	14.55	. Q . . . V . .
17.667	18.1311	14.10	. Q . . . V . .
17.750	18.2254	13.69	. Q . . . V . .
17.833	18.3170	13.31	. Q . . . V . .
17.917	18.4063	12.96	. Q . . . V . .
18.000	18.4933	12.63	. Q . . . V . .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

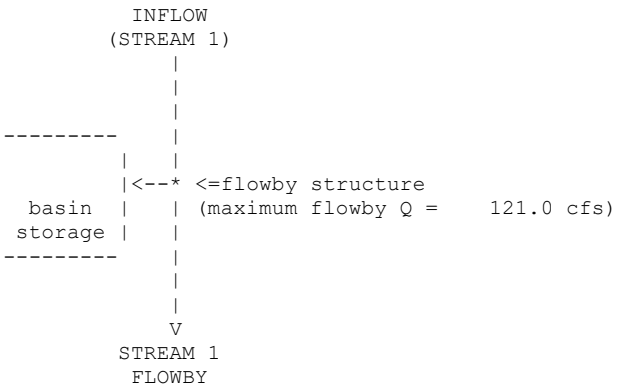
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	170.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 2

>>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
121.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.30	0.30	0.000
0.167	1.89	1.89	0.000
0.250	3.43	3.43	0.000
0.333	3.88	3.88	0.000
0.417	3.97	3.97	0.000
0.500	4.01	4.01	0.000
0.583	4.03	4.03	0.000
0.667	4.05	4.05	0.000
0.750	4.06	4.06	0.000
0.833	4.08	4.08	0.000
0.917	4.09	4.09	0.000
1.000	4.10	4.10	0.000
1.083	4.12	4.12	0.000
1.167	4.13	4.13	0.000
1.250	4.15	4.15	0.000
1.333	4.16	4.16	0.000
1.417	4.18	4.18	0.000
1.500	4.19	4.19	0.000
1.583	4.20	4.20	0.000
1.667	4.22	4.22	0.000
1.750	4.24	4.24	0.000

1.833	4.25	4.25	0.000
1.917	4.27	4.27	0.000
2.000	4.28	4.28	0.000
2.083	4.30	4.30	0.000
2.167	4.31	4.31	0.000
2.250	4.33	4.33	0.000
2.333	4.35	4.35	0.000
2.417	4.36	4.36	0.000
2.500	4.38	4.38	0.000
2.583	4.40	4.40	0.000
2.667	4.41	4.41	0.000
2.750	4.43	4.43	0.000
2.833	4.45	4.45	0.000
2.917	4.47	4.47	0.000
3.000	4.48	4.48	0.000
3.083	4.50	4.50	0.000
3.167	4.52	4.52	0.000
3.250	4.54	4.54	0.000
3.333	4.56	4.56	0.000
3.417	4.57	4.57	0.000
3.500	4.59	4.59	0.000
3.583	4.61	4.61	0.000
3.667	4.63	4.63	0.000
3.750	4.65	4.65	0.000
3.833	4.67	4.67	0.000
3.917	4.69	4.69	0.000
4.000	4.71	4.71	0.000
4.083	4.73	4.73	0.000
4.167	4.75	4.75	0.000
4.250	4.77	4.77	0.000
4.333	4.79	4.79	0.000
4.417	4.81	4.81	0.000
4.500	4.84	4.84	0.000
4.583	4.86	4.86	0.000
4.667	4.88	4.88	0.000
4.750	4.90	4.90	0.000
4.833	4.92	4.92	0.000
4.917	4.95	4.95	0.000
5.000	4.97	4.97	0.000
5.083	4.99	4.99	0.000
5.167	5.02	5.02	0.000
5.250	5.04	5.04	0.000
5.333	5.06	5.06	0.000
5.417	5.09	5.09	0.000
5.500	5.11	5.11	0.000
5.583	5.14	5.14	0.000
5.667	5.16	5.16	0.000
5.750	5.19	5.19	0.000
5.833	5.22	5.22	0.000
5.917	5.24	5.24	0.000
6.000	5.27	5.27	0.000
6.083	5.30	5.30	0.000
6.167	5.32	5.32	0.000
6.250	5.35	5.35	0.000
6.333	5.38	5.38	0.000
6.417	5.41	5.41	0.000
6.500	5.44	5.44	0.000
6.583	5.47	5.47	0.000
6.667	5.50	5.50	0.000
6.750	5.53	5.53	0.000
6.833	5.56	5.56	0.000
6.917	5.59	5.59	0.000
7.000	5.62	5.62	0.000
7.083	5.65	5.65	0.000
7.167	5.69	5.69	0.000
7.250	5.72	5.72	0.000
7.333	5.75	5.75	0.000
7.417	5.79	5.79	0.000
7.500	5.82	5.82	0.000
7.583	5.86	5.86	0.000
7.667	5.89	5.89	0.000

7.750	5.93	5.93	0.000
7.833	5.97	5.97	0.000
7.917	6.00	6.00	0.000
8.000	6.04	6.04	0.000
8.083	6.08	6.08	0.000
8.167	6.12	6.12	0.000
8.250	6.16	6.16	0.000
8.333	6.20	6.20	0.000
8.417	6.24	6.24	0.000
8.500	6.29	6.29	0.000
8.583	6.33	6.33	0.000
8.667	6.37	6.37	0.000
8.750	6.42	6.42	0.000
8.833	6.46	6.46	0.000
8.917	6.51	6.51	0.000
9.000	6.56	6.56	0.000
9.083	6.60	6.60	0.000
9.167	6.65	6.65	0.000
9.250	6.70	6.70	0.000
9.333	6.75	6.75	0.000
9.417	6.81	6.81	0.000
9.500	6.86	6.86	0.000
9.583	6.91	6.91	0.000
9.667	6.97	6.97	0.000
9.750	7.02	7.02	0.000
9.833	7.08	7.08	0.000
9.917	7.14	7.14	0.000
10.000	7.20	7.20	0.000
10.083	7.26	7.26	0.000
10.167	7.33	7.33	0.000
10.250	7.39	7.39	0.000
10.333	7.46	7.46	0.000
10.417	7.52	7.52	0.000
10.500	7.59	7.59	0.000
10.583	7.66	7.66	0.000
10.667	7.73	7.73	0.000
10.750	7.81	7.81	0.000
10.833	7.88	7.88	0.000
10.917	7.96	7.96	0.000
11.000	8.04	8.04	0.000
11.083	8.12	8.12	0.000
11.167	8.21	8.21	0.000
11.250	8.29	8.29	0.000
11.333	8.38	8.38	0.000
11.417	8.47	8.47	0.000
11.500	8.57	8.57	0.000
11.583	8.66	8.66	0.000
11.667	8.76	8.76	0.000
11.750	8.87	8.87	0.000
11.833	8.97	8.97	0.000
11.917	9.08	9.08	0.000
12.000	9.19	9.19	0.000
12.083	9.49	9.49	0.000
12.167	10.59	10.59	0.000
12.250	11.65	11.65	0.000
12.333	12.06	12.06	0.000
12.417	12.24	12.24	0.000
12.500	12.40	12.40	0.000
12.583	12.56	12.56	0.000
12.667	12.72	12.72	0.000
12.750	12.88	12.88	0.000
12.833	13.05	13.05	0.000
12.917	13.23	13.23	0.000
13.000	13.41	13.41	0.000
13.083	13.60	13.60	0.000
13.167	13.80	13.80	0.000
13.250	14.00	14.00	0.000
13.333	14.22	14.22	0.000
13.417	14.44	14.44	0.000
13.500	14.68	14.68	0.000
13.583	14.92	14.92	0.000

13.667	15.19	15.19	0.000
13.750	15.45	15.45	0.000
13.833	15.74	15.74	0.000
13.917	16.04	16.04	0.000
14.000	16.37	16.37	0.000
14.083	16.71	16.71	0.000
14.167	17.14	17.14	0.000
14.250	17.58	17.58	0.000
14.333	18.01	18.01	0.000
14.417	18.44	18.44	0.000
14.500	18.92	18.92	0.000
14.583	19.43	19.43	0.000
14.667	19.99	19.99	0.000
14.750	20.58	20.58	0.000
14.833	21.24	21.24	0.000
14.917	21.95	21.95	0.000
15.000	22.75	22.75	0.000
15.083	23.62	23.62	0.000
15.167	24.63	24.63	0.000
15.250	25.73	25.73	0.000
15.333	27.04	27.04	0.000
15.417	28.21	28.21	0.000
15.500	28.42	28.42	0.000
15.583	28.96	28.96	0.000
15.667	31.17	31.17	0.000
15.750	34.41	34.41	0.000
15.833	39.31	39.31	0.000
15.917	46.75	46.75	0.000
16.000	61.37	61.37	0.000
16.083	98.79	98.79	0.000
16.167	178.88	121.00	0.399
16.250	161.12	121.00	0.675
16.333	78.02	78.02	0.675
16.417	43.22	43.22	0.675
16.500	33.72	33.72	0.675
16.583	29.91	29.91	0.675
16.667	26.69	26.69	0.675
16.750	24.18	24.18	0.675
16.833	22.38	22.38	0.675
16.917	20.92	20.92	0.675
17.000	19.71	19.71	0.675
17.083	18.67	18.67	0.675
17.167	17.73	17.73	0.675
17.250	16.90	16.90	0.675
17.333	16.20	16.20	0.675
17.417	15.59	15.59	0.675
17.500	15.04	15.04	0.675
17.583	14.55	14.55	0.675
17.667	14.10	14.10	0.675
17.750	13.69	13.69	0.675
17.833	13.31	13.31	0.675
17.917	12.96	12.96	0.675
18.000	12.63	12.63	0.675
18.083	12.15	12.15	0.675
18.167	10.90	10.90	0.675
18.250	9.71	9.71	0.675
18.333	9.20	9.20	0.675
18.417	8.94	8.94	0.675
18.500	8.72	8.72	0.675
18.583	8.52	8.52	0.675
18.667	8.33	8.33	0.675
18.750	8.16	8.16	0.675
18.833	8.00	8.00	0.675
18.917	7.84	7.84	0.675
19.000	7.69	7.69	0.675
19.083	7.55	7.55	0.675
19.167	7.42	7.42	0.675
19.250	7.29	7.29	0.675
19.333	7.17	7.17	0.675
19.417	7.05	7.05	0.675
19.500	6.94	6.94	0.675

19.583	6.83	6.83	0.675
19.667	6.73	6.73	0.675
19.750	6.63	6.63	0.675
19.833	6.53	6.53	0.675
19.917	6.44	6.44	0.675
20.000	6.35	6.35	0.675
20.083	6.26	6.26	0.675
20.167	6.18	6.18	0.675
20.250	6.10	6.10	0.675
20.333	6.02	6.02	0.675
20.417	5.95	5.95	0.675
20.500	5.87	5.87	0.675
20.583	5.80	5.80	0.675
20.667	5.73	5.73	0.675
20.750	5.67	5.67	0.675
20.833	5.60	5.60	0.675
20.917	5.54	5.54	0.675
21.000	5.48	5.48	0.675
21.083	5.42	5.42	0.675
21.167	5.36	5.36	0.675
21.250	5.31	5.31	0.675
21.333	5.25	5.25	0.675
21.417	5.20	5.20	0.675
21.500	5.15	5.15	0.675
21.583	5.10	5.10	0.675
21.667	5.05	5.05	0.675
21.750	5.00	5.00	0.675
21.833	4.96	4.96	0.675
21.917	4.91	4.91	0.675
22.000	4.87	4.87	0.675
22.083	4.82	4.82	0.675
22.167	4.78	4.78	0.675
22.250	4.74	4.74	0.675
22.333	4.70	4.70	0.675
22.417	4.66	4.66	0.675
22.500	4.62	4.62	0.675
22.583	4.58	4.58	0.675
22.667	4.54	4.54	0.675
22.750	4.51	4.51	0.675
22.833	4.47	4.47	0.675
22.917	4.44	4.44	0.675
23.000	4.40	4.40	0.675
23.083	4.37	4.37	0.675
23.167	4.34	4.34	0.675
23.250	4.30	4.30	0.675
23.333	4.27	4.27	0.675
23.417	4.24	4.24	0.675
23.500	4.21	4.21	0.675
23.583	4.18	4.18	0.675
23.667	4.15	4.15	0.675
23.750	4.12	4.12	0.675
23.833	4.09	4.09	0.675
23.917	4.07	4.07	0.675
24.000	4.04	4.04	0.675

==========

END OF FLOODSCx ROUTING ANALYSIS

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  NODE 193 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         25.40       49.00       75.(AMC II)     0.200       0.888

    TOTAL AREA (Acres) =     25.40

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.098

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.112
==========================================================================
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******************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 193, EAST AREA                                                   *
 ************************************************************************

  FILE NAME: EAST-193.DAT
  TIME/DATE OF STUDY: 13:53 11/01/2021


******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      25.400 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.125 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.098
         LOW LOSS FRACTION = 0.112
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  66.560


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==============================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.856	24.132
2	48.951	126.237
3	86.967	116.778
4	97.367	31.947
5	99.167	5.528
6	99.667	1.535
7	99.917	0.768
8	100.000	0.256

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.1802
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 10.7305

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 25.0 50.0 75.0 100.0
14.000	3.9034	8.18	. Q . V . . .
14.083	3.9609	8.35	. Q . V . . .
14.167	4.0199	8.56	. Q . V . . .
14.250	4.0803	8.77	. Q . V . . .
14.333	4.1423	8.99	. Q . V . . .
14.417	4.2057	9.21	. Q . V . . .
14.500	4.2707	9.45	. Q . V . . .
14.583	4.3375	9.70	. Q . V . . .
14.667	4.4063	9.98	. Q . V . . .
14.750	4.4770	10.27	. Q . V . . .
14.833	4.5501	10.61	. Q . V . . .
14.917	4.6256	10.96	. Q . V . . .
15.000	4.7039	11.37	. Q . V . . .
15.083	4.7852	11.80	. Q . V . . .
15.167	4.8699	12.31	. Q . V . . .
15.250	4.9585	12.86	. Q . V . . .
15.333	5.0516	13.52	. Q . V . . .
15.417	5.1487	14.10	. Q . V. . . .
15.500	5.2465	14.20	. Q . V. . . .
15.583	5.3464	14.50	. Q . V. . . .
15.667	5.4540	15.63	. Q . V . . .
15.750	5.5730	17.27	. Q . V . . .
15.833	5.7093	19.80	. Q . .V . . .
15.917	5.8718	23.59	. Q. .V . . .
16.000	6.0852	30.99	. Q . V . . .
16.083	6.4291	49.94	. Q. V . . .
16.167	7.0516	90.38	. V . Q .
16.250	7.5977	79.31	. V .Q . .
16.333	7.8581	37.81	. Q . V. . .
16.417	8.0041	21.20	. Q . V. . .
16.500	8.1191	16.70	. Q . V . .
16.583	8.2214	14.85	. Q . V . .
16.667	8.3128	13.27	. Q . V . .
16.750	8.3957	12.03	. Q . .V . .
16.833	8.4724	11.14	. Q . .V . .
16.917	8.5441	10.42	. Q . .V . .
17.000	8.6117	9.81	. Q . . V . .
17.083	8.6758	9.30	. Q . . V . .
17.167	8.7366	8.83	. Q . . V . .
17.250	8.7946	8.43	. Q . . V . .
17.333	8.8503	8.08	. Q . . V . .
17.417	8.9039	7.78	. Q . . . V .
17.500	8.9556	7.51	. Q . . . V .
17.583	9.0056	7.26	. Q . . . V .
17.667	9.0541	7.04	. Q . . . V .
17.750	9.1011	6.83	. Q . . . V .
17.833	9.1468	6.64	. Q . . . V .
17.917	9.1914	6.47	. Q . . . V .
18.000	9.2348	6.31	. Q . . . V .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

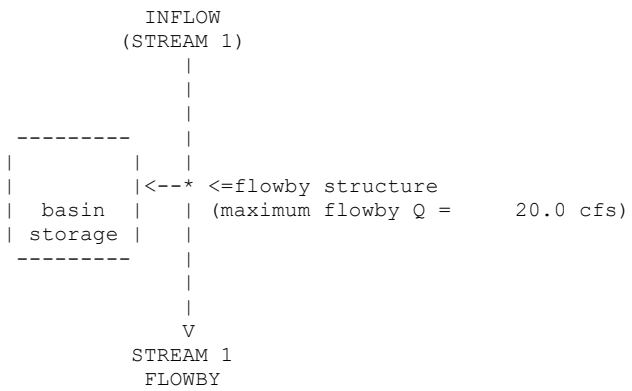
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	165.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 2

>>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
20.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.16	0.16	0.000
0.167	0.97	0.97	0.000
0.250	1.73	1.73	0.000
0.333	1.94	1.94	0.000
0.417	1.99	1.99	0.000
0.500	2.00	2.00	0.000
0.583	2.01	2.01	0.000
0.667	2.02	2.02	0.000
0.750	2.03	2.03	0.000
0.833	2.04	2.04	0.000
0.917	2.04	2.04	0.000
1.000	2.05	2.05	0.000
1.083	2.06	2.06	0.000
1.167	2.06	2.06	0.000
1.250	2.07	2.07	0.000
1.333	2.08	2.08	0.000
1.417	2.09	2.09	0.000
1.500	2.09	2.09	0.000
1.583	2.10	2.10	0.000
1.667	2.11	2.11	0.000
1.750	2.12	2.12	0.000

1.833	2.12	2.12	0.000
1.917	2.13	2.13	0.000
2.000	2.14	2.14	0.000
2.083	2.15	2.15	0.000
2.167	2.16	2.16	0.000
2.250	2.16	2.16	0.000
2.333	2.17	2.17	0.000
2.417	2.18	2.18	0.000
2.500	2.19	2.19	0.000
2.583	2.20	2.20	0.000
2.667	2.21	2.21	0.000
2.750	2.21	2.21	0.000
2.833	2.22	2.22	0.000
2.917	2.23	2.23	0.000
3.000	2.24	2.24	0.000
3.083	2.25	2.25	0.000
3.167	2.26	2.26	0.000
3.250	2.27	2.27	0.000
3.333	2.28	2.28	0.000
3.417	2.29	2.29	0.000
3.500	2.30	2.30	0.000
3.583	2.30	2.30	0.000
3.667	2.31	2.31	0.000
3.750	2.32	2.32	0.000
3.833	2.33	2.33	0.000
3.917	2.34	2.34	0.000
4.000	2.35	2.35	0.000
4.083	2.36	2.36	0.000
4.167	2.37	2.37	0.000
4.250	2.38	2.38	0.000
4.333	2.39	2.39	0.000
4.417	2.41	2.41	0.000
4.500	2.42	2.42	0.000
4.583	2.43	2.43	0.000
4.667	2.44	2.44	0.000
4.750	2.45	2.45	0.000
4.833	2.46	2.46	0.000
4.917	2.47	2.47	0.000
5.000	2.48	2.48	0.000
5.083	2.49	2.49	0.000
5.167	2.51	2.51	0.000
5.250	2.52	2.52	0.000
5.333	2.53	2.53	0.000
5.417	2.54	2.54	0.000
5.500	2.56	2.56	0.000
5.583	2.57	2.57	0.000
5.667	2.58	2.58	0.000
5.750	2.59	2.59	0.000
5.833	2.61	2.61	0.000
5.917	2.62	2.62	0.000
6.000	2.63	2.63	0.000
6.083	2.65	2.65	0.000
6.167	2.66	2.66	0.000
6.250	2.67	2.67	0.000
6.333	2.69	2.69	0.000
6.417	2.70	2.70	0.000
6.500	2.72	2.72	0.000
6.583	2.73	2.73	0.000
6.667	2.75	2.75	0.000
6.750	2.76	2.76	0.000
6.833	2.78	2.78	0.000
6.917	2.79	2.79	0.000
7.000	2.81	2.81	0.000
7.083	2.83	2.83	0.000
7.167	2.84	2.84	0.000
7.250	2.86	2.86	0.000
7.333	2.88	2.88	0.000
7.417	2.89	2.89	0.000
7.500	2.91	2.91	0.000
7.583	2.93	2.93	0.000
7.667	2.95	2.95	0.000

7.750	2.96	2.96	0.000
7.833	2.98	2.98	0.000
7.917	3.00	3.00	0.000
8.000	3.02	3.02	0.000
8.083	3.04	3.04	0.000
8.167	3.06	3.06	0.000
8.250	3.08	3.08	0.000
8.333	3.10	3.10	0.000
8.417	3.12	3.12	0.000
8.500	3.14	3.14	0.000
8.583	3.16	3.16	0.000
8.667	3.19	3.19	0.000
8.750	3.21	3.21	0.000
8.833	3.23	3.23	0.000
8.917	3.25	3.25	0.000
9.000	3.28	3.28	0.000
9.083	3.30	3.30	0.000
9.167	3.33	3.33	0.000
9.250	3.35	3.35	0.000
9.333	3.38	3.38	0.000
9.417	3.40	3.40	0.000
9.500	3.43	3.43	0.000
9.583	3.45	3.45	0.000
9.667	3.48	3.48	0.000
9.750	3.51	3.51	0.000
9.833	3.54	3.54	0.000
9.917	3.57	3.57	0.000
10.000	3.60	3.60	0.000
10.083	3.63	3.63	0.000
10.167	3.66	3.66	0.000
10.250	3.69	3.69	0.000
10.333	3.73	3.73	0.000
10.417	3.76	3.76	0.000
10.500	3.79	3.79	0.000
10.583	3.83	3.83	0.000
10.667	3.87	3.87	0.000
10.750	3.90	3.90	0.000
10.833	3.94	3.94	0.000
10.917	3.98	3.98	0.000
11.000	4.02	4.02	0.000
11.083	4.06	4.06	0.000
11.167	4.10	4.10	0.000
11.250	4.14	4.14	0.000
11.333	4.19	4.19	0.000
11.417	4.23	4.23	0.000
11.500	4.28	4.28	0.000
11.583	4.33	4.33	0.000
11.667	4.38	4.38	0.000
11.750	4.43	4.43	0.000
11.833	4.49	4.49	0.000
11.917	4.54	4.54	0.000
12.000	4.60	4.60	0.000
12.083	4.75	4.75	0.000
12.167	5.31	5.31	0.000
12.250	5.83	5.83	0.000
12.333	6.03	6.03	0.000
12.417	6.12	6.12	0.000
12.500	6.20	6.20	0.000
12.583	6.28	6.28	0.000
12.667	6.36	6.36	0.000
12.750	6.44	6.44	0.000
12.833	6.52	6.52	0.000
12.917	6.61	6.61	0.000
13.000	6.70	6.70	0.000
13.083	6.80	6.80	0.000
13.167	6.90	6.90	0.000
13.250	7.00	7.00	0.000
13.333	7.11	7.11	0.000
13.417	7.22	7.22	0.000
13.500	7.34	7.34	0.000
13.583	7.46	7.46	0.000

13.667	7.59	7.59	0.000
13.750	7.72	7.72	0.000
13.833	7.87	7.87	0.000
13.917	8.02	8.02	0.000
14.000	8.18	8.18	0.000
14.083	8.35	8.35	0.000
14.167	8.56	8.56	0.000
14.250	8.77	8.77	0.000
14.333	8.99	8.99	0.000
14.417	9.21	9.21	0.000
14.500	9.45	9.45	0.000
14.583	9.70	9.70	0.000
14.667	9.98	9.98	0.000
14.750	10.27	10.27	0.000
14.833	10.61	10.61	0.000
14.917	10.96	10.96	0.000
15.000	11.37	11.37	0.000
15.083	11.80	11.80	0.000
15.167	12.31	12.31	0.000
15.250	12.86	12.86	0.000
15.333	13.52	13.52	0.000
15.417	14.10	14.10	0.000
15.500	14.20	14.20	0.000
15.583	14.50	14.50	0.000
15.667	15.63	15.63	0.000
15.750	17.27	17.27	0.000
15.833	19.80	19.80	0.000
15.917	23.59	20.00	0.025
16.000	30.99	20.00	0.100
16.083	49.94	20.00	0.307
16.167	90.38	20.00	0.791
16.250	79.31	20.00	1.200
16.333	37.81	20.00	1.322
16.417	21.20	20.00	1.331
16.500	16.70	16.70	1.331
16.583	14.85	14.85	1.331
16.667	13.27	13.27	1.331
16.750	12.03	12.03	1.331
16.833	11.14	11.14	1.331
16.917	10.42	10.42	1.331
17.000	9.81	9.81	1.331
17.083	9.30	9.30	1.331
17.167	8.83	8.83	1.331
17.250	8.43	8.43	1.331
17.333	8.08	8.08	1.331
17.417	7.78	7.78	1.331
17.500	7.51	7.51	1.331
17.583	7.26	7.26	1.331
17.667	7.04	7.04	1.331
17.750	6.83	6.83	1.331
17.833	6.64	6.64	1.331
17.917	6.47	6.47	1.331
18.000	6.31	6.31	1.331
18.083	6.06	6.06	1.331
18.167	5.42	5.42	1.331
18.250	4.83	4.83	1.331
18.333	4.59	4.59	1.331
18.417	4.46	4.46	1.331
18.500	4.35	4.35	1.331
18.583	4.25	4.25	1.331
18.667	4.16	4.16	1.331
18.750	4.07	4.07	1.331
18.833	3.99	3.99	1.331
18.917	3.91	3.91	1.331
19.000	3.84	3.84	1.331
19.083	3.77	3.77	1.331
19.167	3.70	3.70	1.331
19.250	3.64	3.64	1.331
19.333	3.58	3.58	1.331
19.417	3.52	3.52	1.331
19.500	3.46	3.46	1.331

19.583	3.41	3.41	1.331
19.667	3.36	3.36	1.331
19.750	3.31	3.31	1.331
19.833	3.26	3.26	1.331
19.917	3.21	3.21	1.331
20.000	3.17	3.17	1.331
20.083	3.13	3.13	1.331
20.167	3.09	3.09	1.331
20.250	3.05	3.05	1.331
20.333	3.01	3.01	1.331
20.417	2.97	2.97	1.331
20.500	2.93	2.93	1.331
20.583	2.90	2.90	1.331
20.667	2.86	2.86	1.331
20.750	2.83	2.83	1.331
20.833	2.80	2.80	1.331
20.917	2.77	2.77	1.331
21.000	2.74	2.74	1.331
21.083	2.71	2.71	1.331
21.167	2.68	2.68	1.331
21.250	2.65	2.65	1.331
21.333	2.62	2.62	1.331
21.417	2.60	2.60	1.331
21.500	2.57	2.57	1.331
21.583	2.55	2.55	1.331
21.667	2.52	2.52	1.331
21.750	2.50	2.50	1.331
21.833	2.48	2.48	1.331
21.917	2.45	2.45	1.331
22.000	2.43	2.43	1.331
22.083	2.41	2.41	1.331
22.167	2.39	2.39	1.331
22.250	2.37	2.37	1.331
22.333	2.35	2.35	1.331
22.417	2.33	2.33	1.331
22.500	2.31	2.31	1.331
22.583	2.29	2.29	1.331
22.667	2.27	2.27	1.331
22.750	2.25	2.25	1.331
22.833	2.23	2.23	1.331
22.917	2.22	2.22	1.331
23.000	2.20	2.20	1.331
23.083	2.18	2.18	1.331
23.167	2.17	2.17	1.331
23.250	2.15	2.15	1.331
23.333	2.13	2.13	1.331
23.417	2.12	2.12	1.331
23.500	2.10	2.10	1.331
23.583	2.09	2.09	1.331
23.667	2.07	2.07	1.331
23.750	2.06	2.06	1.331
23.833	2.05	2.05	1.331
23.917	2.03	2.03	1.331
24.000	2.02	2.02	1.331

==========

END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

SOUTHEAST – AREA 'B'

100-YR STUDY

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  SOUTHEAST - AREA 'B' - NODE 63
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         26.50       60.00       75.(AMC II)     0.200       0.873

    TOTAL AREA (Acres) =     26.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.120

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.127
==========================================================================
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 63, SOUTHEAST AREA                                               *
 ************************************************************************

  FILE NAME: S-EAST63.DAT
  TIME/DATE OF STUDY: 14:08 11/04/2021


************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      26.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.130 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.120
         LOW LOSS FRACTION = 0.127
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  64.201


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.317	23.451
2	46.210	124.646
3	85.135	124.748
4	96.863	37.585
5	99.006	6.867
6	99.602	1.912
7	99.901	0.956
8	100.000	0.319

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.4061
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 11.0205

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 25.0 50.0 75.0 100.0
14.000	4.0003	8.38	. Q . V . . .
14.083	4.0592	8.56	. Q . V . . .
14.167	4.1196	8.77	. Q . V . . .
14.250	4.1815	8.99	. Q . V . . .
14.333	4.2449	9.21	. Q . V . . .
14.417	4.3099	9.43	. Q . V . . .
14.500	4.3765	9.68	. Q . V . . .
14.583	4.4450	9.93	. Q . V . . .
14.667	4.5153	10.22	. Q . V . . .
14.750	4.5878	10.52	. Q . V . . .
14.833	4.6626	10.86	. Q . V . . .
14.917	4.7399	11.22	. Q . V . . .
15.000	4.8200	11.63	. Q . V . . .
15.083	4.9032	12.08	. Q . V . . .
15.167	4.9900	12.59	. Q . V . . .
15.250	5.0806	13.16	. Q . V . . .
15.333	5.1758	13.83	. Q . V . . .
15.417	5.2752	14.43	. Q . V. . . .
15.500	5.3755	14.56	. Q . V. . . .
15.583	5.4777	14.84	. Q . V. . . .
15.667	5.5876	15.96	. Q . V . . .
15.750	5.7089	17.60	. Q . V . . .
15.833	5.8470	20.06	. Q . .V . . .
15.917	6.0111	23.83	. Q. .V . . .
16.000	6.2264	31.26	. . Q . V . . .
16.083	6.5726	50.26	. . Q V . . .
16.167	7.1995	91.03	. . . V . Q .
16.250	7.7762	83.74	. . . V . Q . .
16.333	8.0594	41.12	. . Q . V. . .
16.417	8.2148	22.55	. Q. . V. . .
16.500	8.3348	17.42	. Q . . V . .
16.583	8.4408	15.40	. Q . . V . .
16.667	8.5353	13.72	. Q . . V . .
16.750	8.6208	12.41	. Q . . .V . .
16.833	8.6998	11.48	. Q . . .V . .
16.917	8.7737	10.73	. Q . . .V . .
17.000	8.8433	10.10	. Q . . . V . .
17.083	8.9092	9.57	. Q . . . V . .
17.167	8.9718	9.09	. Q . . . V . .
17.250	9.0315	8.67	. Q . . . V . .
17.333	9.0887	8.31	. Q . . . V . .
17.417	9.1438	8.00	. Q . . . V . .
17.500	9.1970	7.72	. Q . . . V . .
17.583	9.2483	7.46	. Q . . . V . .
17.667	9.2981	7.23	. Q . . . V . .
17.750	9.3465	7.02	. Q . . . V . .
17.833	9.3935	6.82	. Q . . . V . .
17.917	9.4392	6.64	. Q . . . V . .
18.000	9.4839	6.48	. Q . . . V . .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

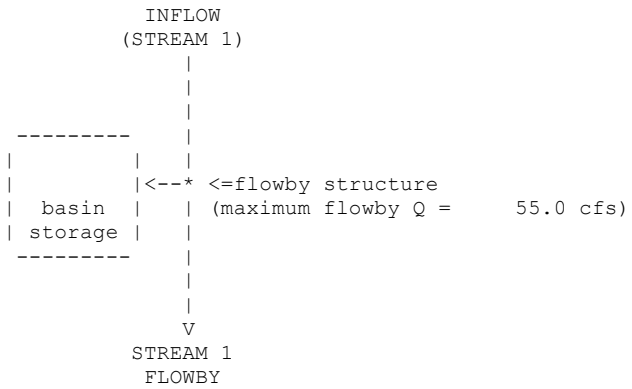
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	170.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 2

>>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
55.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.15	0.15	0.000
0.167	0.94	0.94	0.000
0.250	1.74	1.74	0.000
0.333	1.98	1.98	0.000
0.417	2.03	2.03	0.000
0.500	2.05	2.05	0.000
0.583	2.07	2.07	0.000
0.667	2.07	2.07	0.000
0.750	2.08	2.08	0.000
0.833	2.09	2.09	0.000
0.917	2.10	2.10	0.000
1.000	2.10	2.10	0.000
1.083	2.11	2.11	0.000
1.167	2.12	2.12	0.000
1.250	2.12	2.12	0.000
1.333	2.13	2.13	0.000
1.417	2.14	2.14	0.000
1.500	2.15	2.15	0.000
1.583	2.15	2.15	0.000
1.667	2.16	2.16	0.000
1.750	2.17	2.17	0.000

1.833	2.18	2.18	0.000
1.917	2.19	2.19	0.000
2.000	2.19	2.19	0.000
2.083	2.20	2.20	0.000
2.167	2.21	2.21	0.000
2.250	2.22	2.22	0.000
2.333	2.23	2.23	0.000
2.417	2.24	2.24	0.000
2.500	2.24	2.24	0.000
2.583	2.25	2.25	0.000
2.667	2.26	2.26	0.000
2.750	2.27	2.27	0.000
2.833	2.28	2.28	0.000
2.917	2.29	2.29	0.000
3.000	2.30	2.30	0.000
3.083	2.31	2.31	0.000
3.167	2.32	2.32	0.000
3.250	2.32	2.32	0.000
3.333	2.33	2.33	0.000
3.417	2.34	2.34	0.000
3.500	2.35	2.35	0.000
3.583	2.36	2.36	0.000
3.667	2.37	2.37	0.000
3.750	2.38	2.38	0.000
3.833	2.39	2.39	0.000
3.917	2.40	2.40	0.000
4.000	2.41	2.41	0.000
4.083	2.42	2.42	0.000
4.167	2.43	2.43	0.000
4.250	2.44	2.44	0.000
4.333	2.46	2.46	0.000
4.417	2.47	2.47	0.000
4.500	2.48	2.48	0.000
4.583	2.49	2.49	0.000
4.667	2.50	2.50	0.000
4.750	2.51	2.51	0.000
4.833	2.52	2.52	0.000
4.917	2.53	2.53	0.000
5.000	2.55	2.55	0.000
5.083	2.56	2.56	0.000
5.167	2.57	2.57	0.000
5.250	2.58	2.58	0.000
5.333	2.60	2.60	0.000
5.417	2.61	2.61	0.000
5.500	2.62	2.62	0.000
5.583	2.63	2.63	0.000
5.667	2.65	2.65	0.000
5.750	2.66	2.66	0.000
5.833	2.67	2.67	0.000
5.917	2.69	2.69	0.000
6.000	2.70	2.70	0.000
6.083	2.71	2.71	0.000
6.167	2.73	2.73	0.000
6.250	2.74	2.74	0.000
6.333	2.76	2.76	0.000
6.417	2.77	2.77	0.000
6.500	2.79	2.79	0.000
6.583	2.80	2.80	0.000
6.667	2.82	2.82	0.000
6.750	2.83	2.83	0.000
6.833	2.85	2.85	0.000
6.917	2.86	2.86	0.000
7.000	2.88	2.88	0.000
7.083	2.90	2.90	0.000
7.167	2.91	2.91	0.000
7.250	2.93	2.93	0.000
7.333	2.95	2.95	0.000
7.417	2.97	2.97	0.000
7.500	2.98	2.98	0.000
7.583	3.00	3.00	0.000
7.667	3.02	3.02	0.000

7.750	3.04	3.04	0.000
7.833	3.06	3.06	0.000
7.917	3.08	3.08	0.000
8.000	3.10	3.10	0.000
8.083	3.12	3.12	0.000
8.167	3.14	3.14	0.000
8.250	3.16	3.16	0.000
8.333	3.18	3.18	0.000
8.417	3.20	3.20	0.000
8.500	3.22	3.22	0.000
8.583	3.24	3.24	0.000
8.667	3.27	3.27	0.000
8.750	3.29	3.29	0.000
8.833	3.31	3.31	0.000
8.917	3.34	3.34	0.000
9.000	3.36	3.36	0.000
9.083	3.38	3.38	0.000
9.167	3.41	3.41	0.000
9.250	3.43	3.43	0.000
9.333	3.46	3.46	0.000
9.417	3.49	3.49	0.000
9.500	3.51	3.51	0.000
9.583	3.54	3.54	0.000
9.667	3.57	3.57	0.000
9.750	3.60	3.60	0.000
9.833	3.63	3.63	0.000
9.917	3.66	3.66	0.000
10.000	3.69	3.69	0.000
10.083	3.72	3.72	0.000
10.167	3.75	3.75	0.000
10.250	3.79	3.79	0.000
10.333	3.82	3.82	0.000
10.417	3.85	3.85	0.000
10.500	3.89	3.89	0.000
10.583	3.93	3.93	0.000
10.667	3.96	3.96	0.000
10.750	4.00	4.00	0.000
10.833	4.04	4.04	0.000
10.917	4.08	4.08	0.000
11.000	4.12	4.12	0.000
11.083	4.16	4.16	0.000
11.167	4.21	4.21	0.000
11.250	4.25	4.25	0.000
11.333	4.29	4.29	0.000
11.417	4.34	4.34	0.000
11.500	4.39	4.39	0.000
11.583	4.44	4.44	0.000
11.667	4.49	4.49	0.000
11.750	4.54	4.54	0.000
11.833	4.60	4.60	0.000
11.917	4.65	4.65	0.000
12.000	4.71	4.71	0.000
12.083	4.86	4.86	0.000
12.167	5.41	5.41	0.000
12.250	5.96	5.96	0.000
12.333	6.17	6.17	0.000
12.417	6.27	6.27	0.000
12.500	6.35	6.35	0.000
12.583	6.43	6.43	0.000
12.667	6.52	6.52	0.000
12.750	6.60	6.60	0.000
12.833	6.69	6.69	0.000
12.917	6.77	6.77	0.000
13.000	6.87	6.87	0.000
13.083	6.96	6.96	0.000
13.167	7.07	7.07	0.000
13.250	7.17	7.17	0.000
13.333	7.28	7.28	0.000
13.417	7.40	7.40	0.000
13.500	7.52	7.52	0.000
13.583	7.64	7.64	0.000

13.667	7.78	7.78	0.000
13.750	7.91	7.91	0.000
13.833	8.06	8.06	0.000
13.917	8.22	8.22	0.000
14.000	8.38	8.38	0.000
14.083	8.56	8.56	0.000
14.167	8.77	8.77	0.000
14.250	8.99	8.99	0.000
14.333	9.21	9.21	0.000
14.417	9.43	9.43	0.000
14.500	9.68	9.68	0.000
14.583	9.93	9.93	0.000
14.667	10.22	10.22	0.000
14.750	10.52	10.52	0.000
14.833	10.86	10.86	0.000
14.917	11.22	11.22	0.000
15.000	11.63	11.63	0.000
15.083	12.08	12.08	0.000
15.167	12.59	12.59	0.000
15.250	13.16	13.16	0.000
15.333	13.83	13.83	0.000
15.417	14.43	14.43	0.000
15.500	14.56	14.56	0.000
15.583	14.84	14.84	0.000
15.667	15.96	15.96	0.000
15.750	17.60	17.60	0.000
15.833	20.06	20.06	0.000
15.917	23.83	23.83	0.000
16.000	31.26	31.26	0.000
16.083	50.26	50.26	0.000
16.167	91.03	55.00	0.248
16.250	83.74	55.00	0.446
16.333	41.12	41.12	0.446
16.417	22.55	22.55	0.446
16.500	17.42	17.42	0.446
16.583	15.40	15.40	0.446
16.667	13.72	13.72	0.446
16.750	12.41	12.41	0.446
16.833	11.48	11.48	0.446
16.917	10.73	10.73	0.446
17.000	10.10	10.10	0.446
17.083	9.57	9.57	0.446
17.167	9.09	9.09	0.446
17.250	8.67	8.67	0.446
17.333	8.31	8.31	0.446
17.417	8.00	8.00	0.446
17.500	7.72	7.72	0.446
17.583	7.46	7.46	0.446
17.667	7.23	7.23	0.446
17.750	7.02	7.02	0.446
17.833	6.82	6.82	0.446
17.917	6.64	6.64	0.446
18.000	6.48	6.48	0.446
18.083	6.23	6.23	0.446
18.167	5.60	5.60	0.446
18.250	4.99	4.99	0.446
18.333	4.72	4.72	0.446
18.417	4.58	4.58	0.446
18.500	4.47	4.47	0.446
18.583	4.37	4.37	0.446
18.667	4.27	4.27	0.446
18.750	4.18	4.18	0.446
18.833	4.10	4.10	0.446
18.917	4.02	4.02	0.446
19.000	3.94	3.94	0.446
19.083	3.87	3.87	0.446
19.167	3.80	3.80	0.446
19.250	3.74	3.74	0.446
19.333	3.67	3.67	0.446
19.417	3.61	3.61	0.446
19.500	3.56	3.56	0.446

19.583	3.50	3.50	0.446
19.667	3.45	3.45	0.446
19.750	3.40	3.40	0.446
19.833	3.35	3.35	0.446
19.917	3.30	3.30	0.446
20.000	3.25	3.25	0.446
20.083	3.21	3.21	0.446
20.167	3.17	3.17	0.446
20.250	3.13	3.13	0.446
20.333	3.09	3.09	0.446
20.417	3.05	3.05	0.446
20.500	3.01	3.01	0.446
20.583	2.97	2.97	0.446
20.667	2.94	2.94	0.446
20.750	2.91	2.91	0.446
20.833	2.87	2.87	0.446
20.917	2.84	2.84	0.446
21.000	2.81	2.81	0.446
21.083	2.78	2.78	0.446
21.167	2.75	2.75	0.446
21.250	2.72	2.72	0.446
21.333	2.69	2.69	0.446
21.417	2.67	2.67	0.446
21.500	2.64	2.64	0.446
21.583	2.61	2.61	0.446
21.667	2.59	2.59	0.446
21.750	2.56	2.56	0.446
21.833	2.54	2.54	0.446
21.917	2.52	2.52	0.446
22.000	2.49	2.49	0.446
22.083	2.47	2.47	0.446
22.167	2.45	2.45	0.446
22.250	2.43	2.43	0.446
22.333	2.41	2.41	0.446
22.417	2.39	2.39	0.446
22.500	2.37	2.37	0.446
22.583	2.35	2.35	0.446
22.667	2.33	2.33	0.446
22.750	2.31	2.31	0.446
22.833	2.29	2.29	0.446
22.917	2.27	2.27	0.446
23.000	2.26	2.26	0.446
23.083	2.24	2.24	0.446
23.167	2.22	2.22	0.446
23.250	2.21	2.21	0.446
23.333	2.19	2.19	0.446
23.417	2.17	2.17	0.446
23.500	2.16	2.16	0.446
23.583	2.14	2.14	0.446
23.667	2.13	2.13	0.446
23.750	2.11	2.11	0.446
23.833	2.10	2.10	0.446
23.917	2.08	2.08	0.446
24.000	2.07	2.07	0.446

==========

END OF FLOODSCx ROUTING ANALYSIS

SECTION 8

2-YR STUDY

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

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******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ************************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 18:38 11/06/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.422
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    83   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      1.22

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.288
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        6.99      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.87
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   2.12
 Tc(MIN.) =   13.36
 SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =    6.84
 EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =       7.93

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   5.99
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS   4.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
 GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.93
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   13.63
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.212
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.16      0.20     1.000    83
 COMMERCIAL                  D        1.06      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
 AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   1.22
 Tc(MIN.) =   14.86
 SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   10.39
 EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
```

```
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      17.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   7.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       40.34      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.14
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =   16.86
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =   33.64
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =      49.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   9.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20      0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   5.18   Tc(MIN.) =   11.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.404
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =    7.05
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =       7.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.98
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.36
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.18
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.18
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.358
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =       9.83

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.83
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.87
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.316
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        8.58      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
  SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =    8.84
  EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      18.31

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.31
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.44
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.283
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        2.69      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    2.62
  EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      20.42

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.29      0.20     0.100    57    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.51

******************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    8.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.673
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.25      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.37
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       0.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.41
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.396
  SUBAREA LOSS RATE DATA(AMC  I ):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        2.57      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.13
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   3.15
  Tc(MIN.) =   11.61
  SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    2.77
  EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
  TOTAL AREA(ACRES) =        3.1          PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   3.53
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.130
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       12.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.16
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   5.17
  Tc(MIN.) =   16.78
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   10.80
  EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
  TOTAL AREA(ACRES) =       16.0          PEAK FLOW RATE(CFS) =      13.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   3.59
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     16.78
  EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
  PEAK FLOW RATE(CFS)   =      13.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         59.70       98.00       75.(AMC II)     0.200       0.035

    TOTAL AREA (Acres) =     59.70

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.196

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.965
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: WE-A.DAT
  TIME/DATE OF STUDY: 10:26 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      59.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.196
         LOW LOSS FRACTION = 0.965
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.997
          30-MINUTE FACTOR = 0.997
           1-HOUR FACTOR = 0.997
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.319



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
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1	2.588	18.682
2	17.032	104.287
3	43.494	191.058
4	72.197	207.231
5	88.229	115.752
6	95.282	50.925
7	98.044	19.938
8	98.842	5.761
9	99.436	4.294
10	99.775	2.441
11	99.944	1.221
12	100.000	0.407

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 8.2280
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.9685

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	12.5	25.0	37.5	50.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0003	0.03	Q	.	.	.	.
0.333	0.0006	0.05	Q	.	.	.	.
0.417	0.0010	0.06	Q	.	.	.	.
0.500	0.0015	0.06	Q	.	.	.	.
0.583	0.0019	0.07	Q	.	.	.	.
0.667	0.0024	0.07	Q	.	.	.	.
0.750	0.0029	0.07	Q	.	.	.	.
0.833	0.0034	0.07	Q	.	.	.	.
0.917	0.0038	0.07	Q	.	.	.	.
1.000	0.0043	0.07	Q	.	.	.	.
1.083	0.0048	0.07	Q	.	.	.	.
1.167	0.0053	0.07	Q	.	.	.	.
1.250	0.0057	0.07	Q	.	.	.	.
1.333	0.0062	0.07	Q	.	.	.	.
1.417	0.0067	0.07	Q	.	.	.	.
1.500	0.0072	0.07	Q	.	.	.	.
1.583	0.0077	0.07	Q	.	.	.	.
1.667	0.0082	0.07	Q	.	.	.	.
1.750	0.0087	0.07	Q	.	.	.	.
1.833	0.0092	0.07	Q	.	.	.	.
1.917	0.0097	0.07	Q	.	.	.	.
2.000	0.0102	0.07	Q	.	.	.	.
2.083	0.0107	0.07	Q	.	.	.	.
2.167	0.0112	0.07	Q	.	.	.	.
2.250	0.0117	0.07	Q	.	.	.	.
2.333	0.0122	0.07	Q	.	.	.	.
2.417	0.0127	0.07	Q	.	.	.	.
2.500	0.0132	0.07	Q	.	.	.	.
2.583	0.0137	0.07	Q	.	.	.	.
2.667	0.0142	0.07	Q	.	.	.	.
2.750	0.0147	0.07	Q	.	.	.	.
2.833	0.0152	0.07	Q	.	.	.	.
2.917	0.0158	0.08	Q	.	.	.	.
3.000	0.0163	0.08	Q	.	.	.	.
3.083	0.0168	0.08	Q	.	.	.	.
3.167	0.0173	0.08	Q	.	.	.	.
3.250	0.0178	0.08	Q	.	.	.	.
3.333	0.0184	0.08	Q	.	.	.	.
3.417	0.0189	0.08	Q	.	.	.	.
3.500	0.0194	0.08	Q	.	.	.	.
3.583	0.0200	0.08	Q	.	.	.	.
3.667	0.0205	0.08	Q	.	.	.	.
3.750	0.0211	0.08	Q	.	.	.	.
3.833	0.0216	0.08	Q	.	.	.	.
3.917	0.0221	0.08	Q	.	.	.	.
4.000	0.0227	0.08	Q	.	.	.	.
4.083	0.0232	0.08	Q	.	.	.	.
4.167	0.0238	0.08	Q	.	.	.	.
4.250	0.0243	0.08	Q	.	.	.	.
4.333	0.0249	0.08	Q	.	.	.	.
4.417	0.0255	0.08	Q	.	.	.	.
4.500	0.0260	0.08	Q	.	.	.	.
4.583	0.0266	0.08	Q	.	.	.	.
4.667	0.0271	0.08	Q	.	.	.	.
4.750	0.0277	0.08	Q	.	.	.	.
4.833	0.0283	0.08	Q	.	.	.	.
4.917	0.0289	0.08	Q	.	.	.	.
5.000	0.0294	0.08	Q	.	.	.	.

5.083	0.0300	0.08	Q	.	.	.	.
5.167	0.0306	0.08	Q	.	.	.	.
5.250	0.0312	0.08	Q	.	.	.	.
5.333	0.0318	0.09	Q	.	.	.	.
5.417	0.0324	0.09	Q	.	.	.	.
5.500	0.0330	0.09	Q	.	.	.	.
5.583	0.0335	0.09	Q	.	.	.	.
5.667	0.0341	0.09	Q	.	.	.	.
5.750	0.0347	0.09	Q	.	.	.	.
5.833	0.0354	0.09	Q	.	.	.	.
5.917	0.0360	0.09	Q	.	.	.	.
6.000	0.0366	0.09	Q	.	.	.	.
6.083	0.0372	0.09	Q	.	.	.	.
6.167	0.0378	0.09	Q	.	.	.	.
6.250	0.0384	0.09	Q	.	.	.	.
6.333	0.0390	0.09	Q	.	.	.	.
6.417	0.0397	0.09	Q	.	.	.	.
6.500	0.0403	0.09	Q	.	.	.	.
6.583	0.0409	0.09	Q	.	.	.	.
6.667	0.0416	0.09	Q	.	.	.	.
6.750	0.0422	0.09	Q	.	.	.	.
6.833	0.0429	0.09	Q	.	.	.	.
6.917	0.0435	0.09	Q	.	.	.	.
7.000	0.0442	0.09	Q	.	.	.	.
7.083	0.0448	0.10	Q	.	.	.	.
7.167	0.0455	0.10	Q	.	.	.	.
7.250	0.0461	0.10	Q	.	.	.	.
7.333	0.0468	0.10	Q	.	.	.	.
7.417	0.0475	0.10	Q	.	.	.	.
7.500	0.0481	0.10	Q	.	.	.	.
7.583	0.0488	0.10	Q	.	.	.	.
7.667	0.0495	0.10	QV	.	.	.	.
7.750	0.0502	0.10	QV	.	.	.	.
7.833	0.0509	0.10	QV	.	.	.	.
7.917	0.0516	0.10	QV	.	.	.	.
8.000	0.0523	0.10	QV	.	.	.	.
8.083	0.0530	0.10	QV	.	.	.	.
8.167	0.0537	0.10	QV	.	.	.	.
8.250	0.0544	0.10	QV	.	.	.	.
8.333	0.0551	0.10	QV	.	.	.	.
8.417	0.0558	0.10	QV	.	.	.	.
8.500	0.0566	0.11	QV	.	.	.	.
8.583	0.0573	0.11	QV	.	.	.	.
8.667	0.0580	0.11	QV	.	.	.	.
8.750	0.0588	0.11	QV	.	.	.	.
8.833	0.0595	0.11	QV	.	.	.	.
8.917	0.0603	0.11	QV	.	.	.	.
9.000	0.0610	0.11	QV	.	.	.	.
9.083	0.0618	0.11	QV	.	.	.	.
9.167	0.0626	0.11	QV	.	.	.	.
9.250	0.0633	0.11	QV	.	.	.	.
9.333	0.0641	0.11	QV	.	.	.	.
9.417	0.0649	0.11	QV	.	.	.	.
9.500	0.0657	0.11	QV	.	.	.	.
9.583	0.0665	0.12	QV	.	.	.	.
9.667	0.0673	0.12	QV	.	.	.	.
9.750	0.0681	0.12	QV	.	.	.	.
9.833	0.0689	0.12	QV	.	.	.	.
9.917	0.0697	0.12	QV	.	.	.	.
10.000	0.0706	0.12	QV	.	.	.	.
10.083	0.0714	0.12	QV	.	.	.	.
10.167	0.0723	0.12	QV	.	.	.	.
10.250	0.0731	0.12	QV	.	.	.	.
10.333	0.0740	0.12	QV	.	.	.	.
10.417	0.0748	0.13	QV	.	.	.	.
10.500	0.0757	0.13	QV	.	.	.	.
10.583	0.0766	0.13	QV	.	.	.	.
10.667	0.0775	0.13	QV	.	.	.	.
10.750	0.0784	0.13	QV	.	.	.	.
10.833	0.0793	0.13	QV	.	.	.	.
10.917	0.0802	0.13	QV	.	.	.	.

11.000	0.0811	0.13	QV	.	.	.	.
11.083	0.0821	0.14	QV	.	.	.	.
11.167	0.0830	0.14	QV	.	.	.	.
11.250	0.0840	0.14	QV	.	.	.	.
11.333	0.0849	0.14	QV	.	.	.	.
11.417	0.0859	0.14	QV	.	.	.	.
11.500	0.0869	0.14	QV	.	.	.	.
11.583	0.0879	0.14	QV	.	.	.	.
11.667	0.0889	0.15	QV	.	.	.	.
11.750	0.0899	0.15	QV	.	.	.	.
11.833	0.0909	0.15	QV	.	.	.	.
11.917	0.0920	0.15	QV	.	.	.	.
12.000	0.0930	0.15	QV	.	.	.	.
12.083	0.0941	0.16	QV	.	.	.	.
12.167	0.0952	0.16	QV	.	.	.	.
12.250	0.0964	0.17	QV	.	.	.	.
12.333	0.0977	0.19	QV	.	.	.	.
12.417	0.0990	0.19	Q V	.	.	.	.
12.500	0.1004	0.20	Q V	.	.	.	.
12.583	0.1018	0.20	Q V	.	.	.	.
12.667	0.1032	0.20	Q V	.	.	.	.
12.750	0.1046	0.21	Q V	.	.	.	.
12.833	0.1061	0.21	Q V	.	.	.	.
12.917	0.1076	0.21	Q V	.	.	.	.
13.000	0.1090	0.22	Q V	.	.	.	.
13.083	0.1106	0.22	Q V	.	.	.	.
13.167	0.1121	0.22	Q V	.	.	.	.
13.250	0.1136	0.23	Q V	.	.	.	.
13.333	0.1152	0.23	Q V	.	.	.	.
13.417	0.1168	0.23	Q V	.	.	.	.
13.500	0.1185	0.24	Q V	.	.	.	.
13.583	0.1201	0.24	Q V	.	.	.	.
13.667	0.1218	0.24	Q V	.	.	.	.
13.750	0.1235	0.25	Q V	.	.	.	.
13.833	0.1253	0.25	Q V	.	.	.	.
13.917	0.1270	0.26	Q V	.	.	.	.
14.000	0.1288	0.26	Q V	.	.	.	.
14.083	0.1307	0.27	Q V	.	.	.	.
14.167	0.1326	0.28	Q V	.	.	.	.
14.250	0.1346	0.29	Q V	.	.	.	.
14.333	0.1366	0.30	Q V	.	.	.	.
14.417	0.1387	0.30	Q V	.	.	.	.
14.500	0.1408	0.31	Q V	.	.	.	.
14.583	0.1431	0.32	Q V	.	.	.	.
14.667	0.1453	0.33	Q V	.	.	.	.
14.750	0.1477	0.34	Q V	.	.	.	.
14.833	0.1501	0.35	Q V	.	.	.	.
14.917	0.1525	0.36	Q V	.	.	.	.
15.000	0.1551	0.37	Q V	.	.	.	.
15.083	0.1578	0.39	Q V	.	.	.	.
15.167	0.1607	0.43	Q V	.	.	.	.
15.250	0.1646	0.56	Q V	.	.	.	.
15.333	0.1705	0.86	Q V	.	.	.	.
15.417	0.1793	1.28	.Q V	.	.	.	.
15.500	0.1906	1.64	.Q V	.	.	.	.
15.583	0.2035	1.88	.Q V	.	.	.	.
15.667	0.2191	2.27	.Q V	.	.	.	.
15.750	0.2410	3.17	. Q V	.	.	.	.
15.833	0.2737	4.75	. Q V	.	.	.	.
15.917	0.3227	7.11	. QV	.	.	.	.
16.000	0.3986	11.02	. Q	.	.	.	.
16.083	0.5313	19.27	. V Q	.	.	.	.
16.167	0.7820	36.41	. V	.	. Q.	.	.
16.250	1.1256	49.89	.	.	. V	.	Q.
16.333	1.4596	48.49	.	.	.	V.	Q .
16.417	1.6662	30.01	.	.	. Q	. V	.
16.500	1.7748	15.76	.	. Q	.	.	V .
16.583	1.8297	7.97	. Q	.	.	.	V .
16.667	1.8571	3.98	. Q	.	.	.	V .
16.750	1.8742	2.48	.Q	.	.	.	V .
16.833	1.8841	1.44	.Q	.	.	.	V .

16.917	1.8900	0.86	Q	.	.	.	V .
17.000	1.8937	0.54	Q	.	.	.	V .
17.083	1.8964	0.39	Q	.	.	.	V .
17.167	1.8988	0.34	Q	.	.	.	V .
17.250	1.9009	0.31	Q	.	.	.	V .
17.333	1.9029	0.29	Q	.	.	.	V .
17.417	1.9048	0.27	Q	.	.	.	V .
17.500	1.9066	0.26	Q	.	.	.	V .
17.583	1.9083	0.25	Q	.	.	.	V .
17.667	1.9100	0.24	Q	.	.	.	V .
17.750	1.9116	0.23	Q	.	.	.	V .
17.833	1.9131	0.23	Q	.	.	.	V .
17.917	1.9146	0.22	Q	.	.	.	V .
18.000	1.9161	0.21	Q	.	.	.	V .
18.083	1.9175	0.21	Q	.	.	.	V .
18.167	1.9189	0.20	Q	.	.	.	V .
18.250	1.9202	0.18	Q	.	.	.	V.
18.333	1.9213	0.17	Q	.	.	.	V.
18.417	1.9224	0.16	Q	.	.	.	V.
18.500	1.9235	0.15	Q	.	.	.	V.
18.583	1.9245	0.15	Q	.	.	.	V.
18.667	1.9255	0.15	Q	.	.	.	V.
18.750	1.9265	0.14	Q	.	.	.	V.
18.833	1.9274	0.14	Q	.	.	.	V.
18.917	1.9284	0.14	Q	.	.	.	V.
19.000	1.9293	0.13	Q	.	.	.	V.
19.083	1.9302	0.13	Q	.	.	.	V.
19.167	1.9311	0.13	Q	.	.	.	V.
19.250	1.9320	0.13	Q	.	.	.	V.
19.333	1.9328	0.12	Q	.	.	.	V.
19.417	1.9336	0.12	Q	.	.	.	V.
19.500	1.9345	0.12	Q	.	.	.	V.
19.583	1.9353	0.12	Q	.	.	.	V.
19.667	1.9361	0.12	Q	.	.	.	V.
19.750	1.9369	0.11	Q	.	.	.	V.
19.833	1.9376	0.11	Q	.	.	.	V.
19.917	1.9384	0.11	Q	.	.	.	V.
20.000	1.9392	0.11	Q	.	.	.	V.
20.083	1.9399	0.11	Q	.	.	.	V.
20.167	1.9406	0.11	Q	.	.	.	V.
20.250	1.9414	0.10	Q	.	.	.	V.
20.333	1.9421	0.10	Q	.	.	.	V.
20.417	1.9428	0.10	Q	.	.	.	V.
20.500	1.9435	0.10	Q	.	.	.	V.
20.583	1.9441	0.10	Q	.	.	.	V.
20.667	1.9448	0.10	Q	.	.	.	V.
20.750	1.9455	0.10	Q	.	.	.	V.
20.833	1.9462	0.10	Q	.	.	.	V.
20.917	1.9468	0.10	Q	.	.	.	V.
21.000	1.9475	0.09	Q	.	.	.	V.
21.083	1.9481	0.09	Q	.	.	.	V.
21.167	1.9487	0.09	Q	.	.	.	V.
21.250	1.9494	0.09	Q	.	.	.	V.
21.333	1.9500	0.09	Q	.	.	.	V.
21.417	1.9506	0.09	Q	.	.	.	V.
21.500	1.9512	0.09	Q	.	.	.	V.
21.583	1.9518	0.09	Q	.	.	.	V.
21.667	1.9524	0.09	Q	.	.	.	V.
21.750	1.9530	0.09	Q	.	.	.	V.
21.833	1.9536	0.08	Q	.	.	.	V.
21.917	1.9542	0.08	Q	.	.	.	V.
22.000	1.9547	0.08	Q	.	.	.	V.
22.083	1.9553	0.08	Q	.	.	.	V.
22.167	1.9559	0.08	Q	.	.	.	V.
22.250	1.9564	0.08	Q	.	.	.	V.
22.333	1.9570	0.08	Q	.	.	.	V.
22.417	1.9575	0.08	Q	.	.	.	V.
22.500	1.9581	0.08	Q	.	.	.	V.
22.583	1.9586	0.08	Q	.	.	.	V.
22.667	1.9591	0.08	Q	.	.	.	V.
22.750	1.9597	0.08	Q	.	.	.	V.

22.833	1.9602	0.08	Q	.	.	.	V.
22.917	1.9607	0.08	Q	.	.	.	V.
23.000	1.9612	0.08	Q	.	.	.	V.
23.083	1.9618	0.07	Q	.	.	.	V.
23.167	1.9623	0.07	Q	.	.	.	V.
23.250	1.9628	0.07	Q	.	.	.	V.
23.333	1.9633	0.07	Q	.	.	.	V.
23.417	1.9638	0.07	Q	.	.	.	V.
23.500	1.9643	0.07	Q	.	.	.	V.
23.583	1.9648	0.07	Q	.	.	.	V.
23.667	1.9653	0.07	Q	.	.	.	V.
23.750	1.9657	0.07	Q	.	.	.	V.
23.833	1.9662	0.07	Q	.	.	.	V.
23.917	1.9667	0.07	Q	.	.	.	V.
24.000	1.9672	0.07	Q	.	.	.	V.
24.083	1.9676	0.07	Q	.	.	.	V.
24.167	1.9680	0.06	Q	.	.	.	V.
24.250	1.9683	0.04	Q	.	.	.	V.
24.333	1.9684	0.02	Q	.	.	.	V.
24.417	1.9685	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1465.0
10%	45.0
20%	35.0
30%	30.0
40%	20.0
50%	20.0
60%	20.0
70%	15.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'B'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         20.70       95.00       75.(AMC II)     0.200       0.061

    TOTAL AREA (Acres) =     20.70

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.190

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.939
==========================================================================
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             F L O O D    R O U T I N G    A N A L Y S I S
             USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'B'                                                              *
 ************************************************************************

  FILE NAME: WE-B.DAT
  TIME/DATE OF STUDY: 10:49 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      20.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.185 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.190
         LOW LOSS FRACTION = 0.939
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  44.996



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	3.625	9.074
2	24.314	51.794
3	59.212	87.363
4	84.735	63.896
5	94.844	25.305
6	98.167	8.321
7	99.078	2.279
8	99.631	1.385
9	99.908	0.693
10	100.000	0.231

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.7732
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.7625

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0002	0.02	Q	.	.	.	.
0.333	0.0005	0.03	Q	.	.	.	.
0.417	0.0008	0.04	Q	.	.	.	.
0.500	0.0010	0.04	Q	.	.	.	.
0.583	0.0013	0.04	Q	.	.	.	.
0.667	0.0016	0.04	Q	.	.	.	.
0.750	0.0019	0.04	Q	.	.	.	.
0.833	0.0022	0.04	Q	.	.	.	.
0.917	0.0025	0.04	Q	.	.	.	.
1.000	0.0027	0.04	Q	.	.	.	.
1.083	0.0030	0.04	Q	.	.	.	.
1.167	0.0033	0.04	Q	.	.	.	.
1.250	0.0036	0.04	Q	.	.	.	.
1.333	0.0039	0.04	Q	.	.	.	.
1.417	0.0042	0.04	Q	.	.	.	.
1.500	0.0045	0.04	Q	.	.	.	.
1.583	0.0048	0.04	Q	.	.	.	.
1.667	0.0051	0.04	Q	.	.	.	.
1.750	0.0054	0.04	Q	.	.	.	.
1.833	0.0057	0.04	Q	.	.	.	.
1.917	0.0060	0.04	Q	.	.	.	.
2.000	0.0063	0.04	Q	.	.	.	.
2.083	0.0066	0.04	Q	.	.	.	.
2.167	0.0069	0.04	Q	.	.	.	.
2.250	0.0072	0.04	Q	.	.	.	.
2.333	0.0075	0.04	Q	.	.	.	.
2.417	0.0078	0.04	Q	.	.	.	.
2.500	0.0081	0.04	Q	.	.	.	.
2.583	0.0084	0.04	Q	.	.	.	.
2.667	0.0087	0.05	Q	.	.	.	.
2.750	0.0090	0.05	Q	.	.	.	.
2.833	0.0094	0.05	Q	.	.	.	.
2.917	0.0097	0.05	Q	.	.	.	.
3.000	0.0100	0.05	Q	.	.	.	.
3.083	0.0103	0.05	Q	.	.	.	.
3.167	0.0106	0.05	Q	.	.	.	.
3.250	0.0109	0.05	Q	.	.	.	.
3.333	0.0113	0.05	Q	.	.	.	.
3.417	0.0116	0.05	Q	.	.	.	.
3.500	0.0119	0.05	Q	.	.	.	.
3.583	0.0122	0.05	Q	.	.	.	.
3.667	0.0126	0.05	Q	.	.	.	.
3.750	0.0129	0.05	Q	.	.	.	.
3.833	0.0132	0.05	Q	.	.	.	.
3.917	0.0135	0.05	Q	.	.	.	.
4.000	0.0139	0.05	Q	.	.	.	.
4.083	0.0142	0.05	Q	.	.	.	.
4.167	0.0145	0.05	Q	.	.	.	.
4.250	0.0149	0.05	Q	.	.	.	.
4.333	0.0152	0.05	Q	.	.	.	.
4.417	0.0155	0.05	Q	.	.	.	.
4.500	0.0159	0.05	Q	.	.	.	.
4.583	0.0162	0.05	Q	.	.	.	.
4.667	0.0166	0.05	Q	.	.	.	.
4.750	0.0169	0.05	Q	.	.	.	.
4.833	0.0173	0.05	Q	.	.	.	.
4.917	0.0176	0.05	Q	.	.	.	.
5.000	0.0180	0.05	Q	.	.	.	.

5.083	0.0183	0.05	Q	.	.	.	.
5.167	0.0187	0.05	Q	.	.	.	.
5.250	0.0190	0.05	Q	.	.	.	.
5.333	0.0194	0.05	QV	.	.	.	.
5.417	0.0197	0.05	QV	.	.	.	.
5.500	0.0201	0.05	QV	.	.	.	.
5.583	0.0204	0.05	QV	.	.	.	.
5.667	0.0208	0.05	QV	.	.	.	.
5.750	0.0212	0.05	QV	.	.	.	.
5.833	0.0215	0.05	QV	.	.	.	.
5.917	0.0219	0.05	QV	.	.	.	.
6.000	0.0223	0.05	QV	.	.	.	.
6.083	0.0227	0.05	QV	.	.	.	.
6.167	0.0230	0.05	QV	.	.	.	.
6.250	0.0234	0.05	QV	.	.	.	.
6.333	0.0238	0.05	QV	.	.	.	.
6.417	0.0242	0.06	QV	.	.	.	.
6.500	0.0245	0.06	QV	.	.	.	.
6.583	0.0249	0.06	QV	.	.	.	.
6.667	0.0253	0.06	QV	.	.	.	.
6.750	0.0257	0.06	QV	.	.	.	.
6.833	0.0261	0.06	QV	.	.	.	.
6.917	0.0265	0.06	QV	.	.	.	.
7.000	0.0269	0.06	QV	.	.	.	.
7.083	0.0273	0.06	QV	.	.	.	.
7.167	0.0277	0.06	QV	.	.	.	.
7.250	0.0281	0.06	QV	.	.	.	.
7.333	0.0285	0.06	QV	.	.	.	.
7.417	0.0289	0.06	QV	.	.	.	.
7.500	0.0293	0.06	QV	.	.	.	.
7.583	0.0297	0.06	QV	.	.	.	.
7.667	0.0301	0.06	QV	.	.	.	.
7.750	0.0305	0.06	QV	.	.	.	.
7.833	0.0309	0.06	QV	.	.	.	.
7.917	0.0314	0.06	QV	.	.	.	.
8.000	0.0318	0.06	QV	.	.	.	.
8.083	0.0322	0.06	QV	.	.	.	.
8.167	0.0326	0.06	QV	.	.	.	.
8.250	0.0331	0.06	QV	.	.	.	.
8.333	0.0335	0.06	QV	.	.	.	.
8.417	0.0340	0.06	QV	.	.	.	.
8.500	0.0344	0.06	QV	.	.	.	.
8.583	0.0348	0.06	QV	.	.	.	.
8.667	0.0353	0.06	QV	.	.	.	.
8.750	0.0357	0.07	QV	.	.	.	.
8.833	0.0362	0.07	QV	.	.	.	.
8.917	0.0366	0.07	QV	.	.	.	.
9.000	0.0371	0.07	QV	.	.	.	.
9.083	0.0376	0.07	QV	.	.	.	.
9.167	0.0380	0.07	QV	.	.	.	.
9.250	0.0385	0.07	Q V	.	.	.	.
9.333	0.0390	0.07	Q V	.	.	.	.
9.417	0.0394	0.07	Q V	.	.	.	.
9.500	0.0399	0.07	Q V	.	.	.	.
9.583	0.0404	0.07	Q V	.	.	.	.
9.667	0.0409	0.07	Q V	.	.	.	.
9.750	0.0414	0.07	Q V	.	.	.	.
9.833	0.0419	0.07	Q V	.	.	.	.
9.917	0.0424	0.07	Q V	.	.	.	.
10.000	0.0429	0.07	Q V	.	.	.	.
10.083	0.0434	0.07	Q V	.	.	.	.
10.167	0.0439	0.07	Q V	.	.	.	.
10.250	0.0444	0.08	Q V	.	.	.	.
10.333	0.0449	0.08	Q V	.	.	.	.
10.417	0.0455	0.08	Q V	.	.	.	.
10.500	0.0460	0.08	Q V	.	.	.	.
10.583	0.0465	0.08	Q V	.	.	.	.
10.667	0.0471	0.08	Q V	.	.	.	.
10.750	0.0476	0.08	Q V	.	.	.	.
10.833	0.0482	0.08	Q V	.	.	.	.
10.917	0.0487	0.08	Q V	.	.	.	.

11.000	0.0493	0.08	Q V	.	.	.	.
11.083	0.0499	0.08	Q V	.	.	.	.
11.167	0.0504	0.08	Q V	.	.	.	.
11.250	0.0510	0.08	Q V	.	.	.	.
11.333	0.0516	0.08	Q V	.	.	.	.
11.417	0.0522	0.09	Q V	.	.	.	.
11.500	0.0528	0.09	Q V	.	.	.	.
11.583	0.0534	0.09	Q V	.	.	.	.
11.667	0.0540	0.09	Q V	.	.	.	.
11.750	0.0546	0.09	Q V	.	.	.	.
11.833	0.0553	0.09	Q V	.	.	.	.
11.917	0.0559	0.09	Q V	.	.	.	.
12.000	0.0565	0.09	Q V	.	.	.	.
12.083	0.0572	0.09	Q V	.	.	.	.
12.167	0.0579	0.10	Q V	.	.	.	.
12.250	0.0586	0.11	Q V	.	.	.	.
12.333	0.0594	0.12	Q V	.	.	.	.
12.417	0.0602	0.12	Q V	.	.	.	.
12.500	0.0611	0.12	Q V	.	.	.	.
12.583	0.0619	0.12	Q V	.	.	.	.
12.667	0.0628	0.12	Q V	.	.	.	.
12.750	0.0637	0.13	Q V	.	.	.	.
12.833	0.0645	0.13	Q V	.	.	.	.
12.917	0.0654	0.13	Q V	.	.	.	.
13.000	0.0663	0.13	Q V	.	.	.	.
13.083	0.0673	0.13	Q V	.	.	.	.
13.167	0.0682	0.14	Q V	.	.	.	.
13.250	0.0691	0.14	Q V	.	.	.	.
13.333	0.0701	0.14	Q V	.	.	.	.
13.417	0.0711	0.14	Q V	.	.	.	.
13.500	0.0721	0.14	Q V	.	.	.	.
13.583	0.0731	0.15	Q V	.	.	.	.
13.667	0.0741	0.15	Q V	.	.	.	.
13.750	0.0751	0.15	Q V	.	.	.	.
13.833	0.0762	0.15	Q V	.	.	.	.
13.917	0.0773	0.16	Q V	.	.	.	.
14.000	0.0784	0.16	Q V	.	.	.	.
14.083	0.0795	0.16	Q V	.	.	.	.
14.167	0.0807	0.17	Q V	.	.	.	.
14.250	0.0819	0.18	Q V	.	.	.	.
14.333	0.0831	0.18	Q V	.	.	.	.
14.417	0.0844	0.19	Q V	.	.	.	.
14.500	0.0857	0.19	Q V	.	.	.	.
14.583	0.0871	0.20	Q V	.	.	.	.
14.667	0.0885	0.20	Q V	.	.	.	.
14.750	0.0899	0.21	Q V	.	.	.	.
14.833	0.0914	0.21	Q V	.	.	.	.
14.917	0.0929	0.22	Q V	.	.	.	.
15.000	0.0944	0.23	Q V	.	.	.	.
15.083	0.0961	0.24	Q V	.	.	.	.
15.167	0.0979	0.26	Q V	.	.	.	.
15.250	0.1002	0.33	Q V	.	.	.	.
15.333	0.1034	0.47	Q V	.	.	.	.
15.417	0.1078	0.64	Q V	.	.	.	.
15.500	0.1129	0.75	Q V	.	.	.	.
15.583	0.1185	0.80	.Q V	.	.	.	.
15.667	0.1253	0.99	.Q V	.	.	.	.
15.750	0.1349	1.40	.Q V	.	.	.	.
15.833	0.1491	2.05	. Q V	.	.	.	.
15.917	0.1699	3.02	. Q V	.	.	.	.
16.000	0.2017	4.62	. Q V	.	.	.	.
16.083	0.2583	8.22	. Q V	.	.	.	.
16.167	0.3678	15.89	. .	V.Q	.	.	.
16.250	0.5086	20.44	. .	.	VQ	.	.
16.333	0.6128	15.14	. .	Q	.	V	.
16.417	0.6643	7.48	. Q.	.	.	V	.
16.500	0.6883	3.49	. Q .	.	.	V	.
16.583	0.7005	1.76	. Q .	.	.	V	.
16.667	0.7080	1.10	.Q .	.	.	V	.
16.750	0.7124	0.64	Q .	.	.	V	.
16.833	0.7150	0.38	Q .	.	.	V	.

16.917	0.7168	0.26	Q	.	.	.	V .
17.000	0.7183	0.22	Q	.	.	.	V .
17.083	0.7197	0.20	Q	.	.	.	V .
17.167	0.7211	0.19	Q	.	.	.	V .
17.250	0.7223	0.18	Q	.	.	.	V .
17.333	0.7234	0.17	Q	.	.	.	V .
17.417	0.7245	0.16	Q	.	.	.	V .
17.500	0.7256	0.15	Q	.	.	.	V .
17.583	0.7266	0.15	Q	.	.	.	V .
17.667	0.7276	0.14	Q	.	.	.	V .
17.750	0.7286	0.14	Q	.	.	.	V .
17.833	0.7295	0.13	Q	.	.	.	V .
17.917	0.7304	0.13	Q	.	.	.	V .
18.000	0.7313	0.13	Q	.	.	.	V .
18.083	0.7321	0.12	Q	.	.	.	V .
18.167	0.7329	0.12	Q	.	.	.	V .
18.250	0.7336	0.11	Q	.	.	.	V .
18.333	0.7343	0.10	Q	.	.	.	V .
18.417	0.7350	0.09	Q	.	.	.	V .
18.500	0.7356	0.09	Q	.	.	.	V .
18.583	0.7362	0.09	Q	.	.	.	V .
18.667	0.7368	0.09	Q	.	.	.	V .
18.750	0.7374	0.08	Q	.	.	.	V .
18.833	0.7380	0.08	Q	.	.	.	V .
18.917	0.7385	0.08	Q	.	.	.	V .
19.000	0.7391	0.08	Q	.	.	.	V .
19.083	0.7396	0.08	Q	.	.	.	V .
19.167	0.7401	0.08	Q	.	.	.	V .
19.250	0.7407	0.08	Q	.	.	.	V .
19.333	0.7412	0.07	Q	.	.	.	V .
19.417	0.7417	0.07	Q	.	.	.	V .
19.500	0.7422	0.07	Q	.	.	.	V .
19.583	0.7426	0.07	Q	.	.	.	V .
19.667	0.7431	0.07	Q	.	.	.	V .
19.750	0.7436	0.07	Q	.	.	.	V.
19.833	0.7441	0.07	Q	.	.	.	V.
19.917	0.7445	0.07	Q	.	.	.	V.
20.000	0.7450	0.07	Q	.	.	.	V.
20.083	0.7454	0.06	Q	.	.	.	V.
20.167	0.7459	0.06	Q	.	.	.	V.
20.250	0.7463	0.06	Q	.	.	.	V.
20.333	0.7467	0.06	Q	.	.	.	V.
20.417	0.7471	0.06	Q	.	.	.	V.
20.500	0.7476	0.06	Q	.	.	.	V.
20.583	0.7480	0.06	Q	.	.	.	V.
20.667	0.7484	0.06	Q	.	.	.	V.
20.750	0.7488	0.06	Q	.	.	.	V.
20.833	0.7492	0.06	Q	.	.	.	V.
20.917	0.7496	0.06	Q	.	.	.	V.
21.000	0.7500	0.06	Q	.	.	.	V.
21.083	0.7503	0.06	Q	.	.	.	V.
21.167	0.7507	0.06	Q	.	.	.	V.
21.250	0.7511	0.05	Q	.	.	.	V.
21.333	0.7515	0.05	Q	.	.	.	V.
21.417	0.7518	0.05	Q	.	.	.	V.
21.500	0.7522	0.05	Q	.	.	.	V.
21.583	0.7526	0.05	Q	.	.	.	V.
21.667	0.7529	0.05	Q	.	.	.	V.
21.750	0.7533	0.05	Q	.	.	.	V.
21.833	0.7536	0.05	Q	.	.	.	V.
21.917	0.7540	0.05	Q	.	.	.	V.
22.000	0.7543	0.05	Q	.	.	.	V.
22.083	0.7547	0.05	Q	.	.	.	V.
22.167	0.7550	0.05	Q	.	.	.	V.
22.250	0.7554	0.05	Q	.	.	.	V.
22.333	0.7557	0.05	Q	.	.	.	V.
22.417	0.7560	0.05	Q	.	.	.	V.
22.500	0.7563	0.05	Q	.	.	.	V.
22.583	0.7567	0.05	Q	.	.	.	V.
22.667	0.7570	0.05	Q	.	.	.	V.
22.750	0.7573	0.05	Q	.	.	.	V.

22.833	0.7576	0.05	Q	.	.	.	V.
22.917	0.7579	0.05	Q	.	.	.	V.
23.000	0.7583	0.05	Q	.	.	.	V.
23.083	0.7586	0.04	Q	.	.	.	V.
23.167	0.7589	0.04	Q	.	.	.	V.
23.250	0.7592	0.04	Q	.	.	.	V.
23.333	0.7595	0.04	Q	.	.	.	V.
23.417	0.7598	0.04	Q	.	.	.	V.
23.500	0.7601	0.04	Q	.	.	.	V.
23.583	0.7604	0.04	Q	.	.	.	V.
23.667	0.7607	0.04	Q	.	.	.	V.
23.750	0.7610	0.04	Q	.	.	.	V.
23.833	0.7613	0.04	Q	.	.	.	V.
23.917	0.7615	0.04	Q	.	.	.	V.
24.000	0.7618	0.04	Q	.	.	.	V.
24.083	0.7621	0.04	Q	.	.	.	V.
24.167	0.7623	0.03	Q	.	.	.	V.
24.250	0.7624	0.02	Q	.	.	.	V.
24.333	0.7625	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	45.0
20%	30.0
30%	25.0
40%	20.0
50%	15.0
60%	15.0
70%	15.0
80%	5.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                       Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'C'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         16.00       97.00       75.(AMC II)     0.200       0.044

    TOTAL AREA (Acres) =     16.00

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.194

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.956
==========================================================================
```

```
**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
             USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
          (c) Copyright 1989-2016 Advanced Engineering Software (aes)
              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'C'                                                              *
 ************************************************************************

  FILE NAME: WE-C.DAT
  TIME/DATE OF STUDY: 11:03 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      16.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.194
         LOW LOSS FRACTION = 0.956
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.369



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	2.593	5.018
2	17.076	28.024
3	43.597	51.319
4	72.304	55.549
5	88.291	30.934
6	95.315	13.592
7	98.055	5.303
8	98.849	1.535
9	99.440	1.144
10	99.776	0.650
11	99.944	0.325
12	100.000	0.108

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.1834
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.5496

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0001	0.01	Q	.	.	.	.
0.333	0.0002	0.02	Q	.	.	.	.
0.417	0.0004	0.02	Q	.	.	.	.
0.500	0.0005	0.02	Q	.	.	.	.
0.583	0.0007	0.02	Q	.	.	.	.
0.667	0.0008	0.02	Q	.	.	.	.
0.750	0.0010	0.02	Q	.	.	.	.
0.833	0.0011	0.02	Q	.	.	.	.
0.917	0.0013	0.02	Q	.	.	.	.
1.000	0.0015	0.02	Q	.	.	.	.
1.083	0.0016	0.02	Q	.	.	.	.
1.167	0.0018	0.02	Q	.	.	.	.
1.250	0.0019	0.02	Q	.	.	.	.
1.333	0.0021	0.02	Q	.	.	.	.
1.417	0.0023	0.02	Q	.	.	.	.
1.500	0.0024	0.02	Q	.	.	.	.
1.583	0.0026	0.02	Q	.	.	.	.
1.667	0.0028	0.02	Q	.	.	.	.
1.750	0.0029	0.02	Q	.	.	.	.
1.833	0.0031	0.02	Q	.	.	.	.
1.917	0.0033	0.02	Q	.	.	.	.
2.000	0.0034	0.02	Q	.	.	.	.
2.083	0.0036	0.02	Q	.	.	.	.
2.167	0.0038	0.02	Q	.	.	.	.
2.250	0.0039	0.02	Q	.	.	.	.
2.333	0.0041	0.02	Q	.	.	.	.
2.417	0.0043	0.02	Q	.	.	.	.
2.500	0.0044	0.02	Q	.	.	.	.
2.583	0.0046	0.02	Q	.	.	.	.
2.667	0.0048	0.03	Q	.	.	.	.
2.750	0.0050	0.03	Q	.	.	.	.
2.833	0.0051	0.03	Q	.	.	.	.
2.917	0.0053	0.03	Q	.	.	.	.
3.000	0.0055	0.03	Q	.	.	.	.
3.083	0.0057	0.03	Q	.	.	.	.
3.167	0.0058	0.03	Q	.	.	.	.
3.250	0.0060	0.03	Q	.	.	.	.
3.333	0.0062	0.03	Q	.	.	.	.
3.417	0.0064	0.03	Q	.	.	.	.
3.500	0.0066	0.03	Q	.	.	.	.
3.583	0.0067	0.03	Q	.	.	.	.
3.667	0.0069	0.03	Q	.	.	.	.
3.750	0.0071	0.03	Q	.	.	.	.
3.833	0.0073	0.03	Q	.	.	.	.
3.917	0.0075	0.03	Q	.	.	.	.
4.000	0.0076	0.03	Q	.	.	.	.
4.083	0.0078	0.03	Q	.	.	.	.
4.167	0.0080	0.03	Q	.	.	.	.
4.250	0.0082	0.03	Q	.	.	.	.
4.333	0.0084	0.03	Q	.	.	.	.
4.417	0.0086	0.03	Q	.	.	.	.
4.500	0.0088	0.03	Q	.	.	.	.
4.583	0.0090	0.03	Q	.	.	.	.
4.667	0.0091	0.03	Q	.	.	.	.
4.750	0.0093	0.03	Q	.	.	.	.
4.833	0.0095	0.03	Q	.	.	.	.
4.917	0.0097	0.03	Q	.	.	.	.
5.000	0.0099	0.03	Q	.	.	.	.

5.083	0.0101	0.03	Q	.	.	.	.
5.167	0.0103	0.03	Q	.	.	.	.
5.250	0.0105	0.03	Q	.	.	.	.
5.333	0.0107	0.03	Q	.	.	.	.
5.417	0.0109	0.03	Q	.	.	.	.
5.500	0.0111	0.03	Q	.	.	.	.
5.583	0.0113	0.03	Q	.	.	.	.
5.667	0.0115	0.03	Q	.	.	.	.
5.750	0.0117	0.03	Q	.	.	.	.
5.833	0.0119	0.03	Q	.	.	.	.
5.917	0.0121	0.03	Q	.	.	.	.
6.000	0.0123	0.03	Q	.	.	.	.
6.083	0.0125	0.03	Q	.	.	.	.
6.167	0.0127	0.03	Q	.	.	.	.
6.250	0.0129	0.03	Q	.	.	.	.
6.333	0.0132	0.03	Q	.	.	.	.
6.417	0.0134	0.03	Q	.	.	.	.
6.500	0.0136	0.03	Q	.	.	.	.
6.583	0.0138	0.03	QV	.	.	.	.
6.667	0.0140	0.03	QV	.	.	.	.
6.750	0.0142	0.03	QV	.	.	.	.
6.833	0.0144	0.03	QV	.	.	.	.
6.917	0.0147	0.03	QV	.	.	.	.
7.000	0.0149	0.03	QV	.	.	.	.
7.083	0.0151	0.03	QV	.	.	.	.
7.167	0.0153	0.03	QV	.	.	.	.
7.250	0.0155	0.03	QV	.	.	.	.
7.333	0.0158	0.03	QV	.	.	.	.
7.417	0.0160	0.03	QV	.	.	.	.
7.500	0.0162	0.03	QV	.	.	.	.
7.583	0.0164	0.03	QV	.	.	.	.
7.667	0.0167	0.03	QV	.	.	.	.
7.750	0.0169	0.03	QV	.	.	.	.
7.833	0.0171	0.03	QV	.	.	.	.
7.917	0.0174	0.03	QV	.	.	.	.
8.000	0.0176	0.03	QV	.	.	.	.
8.083	0.0178	0.03	QV	.	.	.	.
8.167	0.0181	0.03	QV	.	.	.	.
8.250	0.0183	0.03	QV	.	.	.	.
8.333	0.0186	0.04	QV	.	.	.	.
8.417	0.0188	0.04	QV	.	.	.	.
8.500	0.0191	0.04	QV	.	.	.	.
8.583	0.0193	0.04	QV	.	.	.	.
8.667	0.0196	0.04	QV	.	.	.	.
8.750	0.0198	0.04	QV	.	.	.	.
8.833	0.0201	0.04	QV	.	.	.	.
8.917	0.0203	0.04	QV	.	.	.	.
9.000	0.0206	0.04	QV	.	.	.	.
9.083	0.0208	0.04	QV	.	.	.	.
9.167	0.0211	0.04	QV	.	.	.	.
9.250	0.0213	0.04	QV	.	.	.	.
9.333	0.0216	0.04	QV	.	.	.	.
9.417	0.0219	0.04	QV	.	.	.	.
9.500	0.0221	0.04	QV	.	.	.	.
9.583	0.0224	0.04	QV	.	.	.	.
9.667	0.0227	0.04	QV	.	.	.	.
9.750	0.0229	0.04	QV	.	.	.	.
9.833	0.0232	0.04	QV	.	.	.	.
9.917	0.0235	0.04	QV	.	.	.	.
10.000	0.0238	0.04	QV	.	.	.	.
10.083	0.0241	0.04	QV	.	.	.	.
10.167	0.0243	0.04	QV	.	.	.	.
10.250	0.0246	0.04	QV	.	.	.	.
10.333	0.0249	0.04	QV	.	.	.	.
10.417	0.0252	0.04	QV	.	.	.	.
10.500	0.0255	0.04	QV	.	.	.	.
10.583	0.0258	0.04	QV	.	.	.	.
10.667	0.0261	0.04	QV	.	.	.	.
10.750	0.0264	0.04	QV	.	.	.	.
10.833	0.0267	0.04	QV	.	.	.	.
10.917	0.0270	0.04	QV	.	.	.	.

11.000	0.0273	0.05	QV	.	.	.	.
11.083	0.0276	0.05	Q V	.	.	.	.
11.167	0.0280	0.05	Q V	.	.	.	.
11.250	0.0283	0.05	Q V	.	.	.	.
11.333	0.0286	0.05	Q V	.	.	.	.
11.417	0.0289	0.05	Q V	.	.	.	.
11.500	0.0293	0.05	Q V	.	.	.	.
11.583	0.0296	0.05	Q V	.	.	.	.
11.667	0.0299	0.05	Q V	.	.	.	.
11.750	0.0303	0.05	Q V	.	.	.	.
11.833	0.0306	0.05	Q V	.	.	.	.
11.917	0.0310	0.05	Q V	.	.	.	.
12.000	0.0313	0.05	Q V	.	.	.	.
12.083	0.0317	0.05	Q V	.	.	.	.
12.167	0.0321	0.05	Q V	.	.	.	.
12.250	0.0325	0.06	Q V	.	.	.	.
12.333	0.0329	0.06	Q V	.	.	.	.
12.417	0.0334	0.07	Q V	.	.	.	.
12.500	0.0338	0.07	Q V	.	.	.	.
12.583	0.0343	0.07	Q V	.	.	.	.
12.667	0.0348	0.07	Q V	.	.	.	.
12.750	0.0353	0.07	Q V	.	.	.	.
12.833	0.0357	0.07	Q V	.	.	.	.
12.917	0.0362	0.07	Q V	.	.	.	.
13.000	0.0367	0.07	Q V	.	.	.	.
13.083	0.0372	0.07	Q V	.	.	.	.
13.167	0.0378	0.07	Q V	.	.	.	.
13.250	0.0383	0.08	Q V	.	.	.	.
13.333	0.0388	0.08	Q V	.	.	.	.
13.417	0.0394	0.08	Q V	.	.	.	.
13.500	0.0399	0.08	Q V	.	.	.	.
13.583	0.0405	0.08	Q V	.	.	.	.
13.667	0.0410	0.08	Q V	.	.	.	.
13.750	0.0416	0.08	Q V	.	.	.	.
13.833	0.0422	0.09	Q V	.	.	.	.
13.917	0.0428	0.09	Q V	.	.	.	.
14.000	0.0434	0.09	Q V	.	.	.	.
14.083	0.0440	0.09	Q V	.	.	.	.
14.167	0.0447	0.09	Q V	.	.	.	.
14.250	0.0453	0.10	Q V	.	.	.	.
14.333	0.0460	0.10	Q V	.	.	.	.
14.417	0.0467	0.10	Q V	.	.	.	.
14.500	0.0474	0.10	Q V	.	.	.	.
14.583	0.0482	0.11	Q V	.	.	.	.
14.667	0.0490	0.11	Q V	.	.	.	.
14.750	0.0497	0.11	Q V	.	.	.	.
14.833	0.0505	0.12	Q V	.	.	.	.
14.917	0.0514	0.12	Q V	.	.	.	.
15.000	0.0522	0.12	Q V	.	.	.	.
15.083	0.0531	0.13	Q V	.	.	.	.
15.167	0.0541	0.14	Q V	.	.	.	.
15.250	0.0553	0.18	Q V	.	.	.	.
15.333	0.0571	0.26	Q V	.	.	.	.
15.417	0.0597	0.37	Q V	.	.	.	.
15.500	0.0629	0.47	Q V	.	.	.	.
15.583	0.0666	0.54	.Q V	.	.	.	.
15.667	0.0710	0.64	.Q V	.	.	.	.
15.750	0.0771	0.89	.Q V	.	.	.	.
15.833	0.0862	1.31	. Q V	.	.	.	.
15.917	0.0996	1.95	. Q V	.	.	.	.
16.000	0.1203	3.00	. Q V	.	.	.	.
16.083	0.1562	5.22	. QV	.	.	.	.
16.167	0.2239	9.83	. .	V Q.	.	.	.
16.250	0.3166	13.45	. .	.	V Q	.	.
16.333	0.4065	13.06	. .	.	Q V.	.	.
16.417	0.4622	8.08	. .	Q	.	V	.
16.500	0.4915	4.26	. Q	.	.	V	.
16.583	0.5064	2.16	. Q	.	.	V	.
16.667	0.5139	1.10	. Q	.	.	V	.
16.750	0.5187	0.69	.Q	.	.	V	.
16.833	0.5215	0.41	Q	.	.	V	.

16.917	0.5233	0.26	Q	.	.	.	V .
17.000	0.5244	0.17	Q	.	.	.	V .
17.083	0.5253	0.13	Q	.	.	.	V .
17.167	0.5261	0.11	Q	.	.	.	V .
17.250	0.5268	0.10	Q	.	.	.	V .
17.333	0.5275	0.10	Q	.	.	.	V .
17.417	0.5281	0.09	Q	.	.	.	V .
17.500	0.5287	0.09	Q	.	.	.	V .
17.583	0.5293	0.08	Q	.	.	.	V .
17.667	0.5299	0.08	Q	.	.	.	V .
17.750	0.5304	0.08	Q	.	.	.	V .
17.833	0.5309	0.08	Q	.	.	.	V .
17.917	0.5314	0.07	Q	.	.	.	V .
18.000	0.5319	0.07	Q	.	.	.	V .
18.083	0.5324	0.07	Q	.	.	.	V .
18.167	0.5329	0.07	Q	.	.	.	V .
18.250	0.5333	0.06	Q	.	.	.	V .
18.333	0.5337	0.06	Q	.	.	.	V .
18.417	0.5341	0.05	Q	.	.	.	V .
18.500	0.5344	0.05	Q	.	.	.	V .
18.583	0.5348	0.05	Q	.	.	.	V .
18.667	0.5351	0.05	Q	.	.	.	V .
18.750	0.5354	0.05	Q	.	.	.	V .
18.833	0.5357	0.05	Q	.	.	.	V .
18.917	0.5361	0.05	Q	.	.	.	V.
19.000	0.5364	0.04	Q	.	.	.	V.
19.083	0.5367	0.04	Q	.	.	.	V.
19.167	0.5370	0.04	Q	.	.	.	V.
19.250	0.5373	0.04	Q	.	.	.	V.
19.333	0.5375	0.04	Q	.	.	.	V.
19.417	0.5378	0.04	Q	.	.	.	V.
19.500	0.5381	0.04	Q	.	.	.	V.
19.583	0.5384	0.04	Q	.	.	.	V.
19.667	0.5387	0.04	Q	.	.	.	V.
19.750	0.5389	0.04	Q	.	.	.	V.
19.833	0.5392	0.04	Q	.	.	.	V.
19.917	0.5394	0.04	Q	.	.	.	V.
20.000	0.5397	0.04	Q	.	.	.	V.
20.083	0.5399	0.04	Q	.	.	.	V.
20.167	0.5402	0.04	Q	.	.	.	V.
20.250	0.5404	0.04	Q	.	.	.	V.
20.333	0.5407	0.03	Q	.	.	.	V.
20.417	0.5409	0.03	Q	.	.	.	V.
20.500	0.5411	0.03	Q	.	.	.	V.
20.583	0.5414	0.03	Q	.	.	.	V.
20.667	0.5416	0.03	Q	.	.	.	V.
20.750	0.5418	0.03	Q	.	.	.	V.
20.833	0.5420	0.03	Q	.	.	.	V.
20.917	0.5423	0.03	Q	.	.	.	V.
21.000	0.5425	0.03	Q	.	.	.	V.
21.083	0.5427	0.03	Q	.	.	.	V.
21.167	0.5429	0.03	Q	.	.	.	V.
21.250	0.5431	0.03	Q	.	.	.	V.
21.333	0.5433	0.03	Q	.	.	.	V.
21.417	0.5435	0.03	Q	.	.	.	V.
21.500	0.5437	0.03	Q	.	.	.	V.
21.583	0.5440	0.03	Q	.	.	.	V.
21.667	0.5442	0.03	Q	.	.	.	V.
21.750	0.5444	0.03	Q	.	.	.	V.
21.833	0.5445	0.03	Q	.	.	.	V.
21.917	0.5447	0.03	Q	.	.	.	V.
22.000	0.5449	0.03	Q	.	.	.	V.
22.083	0.5451	0.03	Q	.	.	.	V.
22.167	0.5453	0.03	Q	.	.	.	V.
22.250	0.5455	0.03	Q	.	.	.	V.
22.333	0.5457	0.03	Q	.	.	.	V.
22.417	0.5459	0.03	Q	.	.	.	V.
22.500	0.5461	0.03	Q	.	.	.	V.
22.583	0.5462	0.03	Q	.	.	.	V.
22.667	0.5464	0.03	Q	.	.	.	V.
22.750	0.5466	0.03	Q	.	.	.	V.

22.833	0.5468	0.03	Q	.	.	.	V.
22.917	0.5470	0.03	Q	.	.	.	V.
23.000	0.5471	0.03	Q	.	.	.	V.
23.083	0.5473	0.03	Q	.	.	.	V.
23.167	0.5475	0.02	Q	.	.	.	V.
23.250	0.5476	0.02	Q	.	.	.	V.
23.333	0.5478	0.02	Q	.	.	.	V.
23.417	0.5480	0.02	Q	.	.	.	V.
23.500	0.5482	0.02	Q	.	.	.	V.
23.583	0.5483	0.02	Q	.	.	.	V.
23.667	0.5485	0.02	Q	.	.	.	V.
23.750	0.5486	0.02	Q	.	.	.	V.
23.833	0.5488	0.02	Q	.	.	.	V.
23.917	0.5490	0.02	Q	.	.	.	V.
24.000	0.5491	0.02	Q	.	.	.	V.
24.083	0.5493	0.02	Q	.	.	.	V.
24.167	0.5494	0.02	Q	.	.	.	V.
24.250	0.5495	0.01	Q	.	.	.	V.
24.333	0.5495	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	45.0
20%	35.0
30%	30.0
40%	20.0
50%	20.0
60%	20.0
70%	15.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

2-YR STUDY

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 2-YR STUDY                                                             *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: WEST-A.DAT
  TIME/DATE OF STUDY: 10:40 01/12/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.774
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    57    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.18

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.48
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.18
 PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.17
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.17
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.598
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =    6.10
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =       8.06

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.06
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   10.03
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.03
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.518
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =    6.07
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      13.72

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.72
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   1.44
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    57    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    8.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.659
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.26
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.39
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.659
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.24

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.60
  RAINFALL INTENSITY(INCH/HR) =   1.66
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.72   10.95    1.444  0.20( 0.04) 0.20      10.3       1.00
      2        1.24    8.60    1.659  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.66    8.60    1.659  0.20( 0.04) 0.19       8.9       5.00
      2       14.79   10.95    1.444  0.20( 0.04) 0.19      11.1       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.79    Tc(MIN.) =    10.95
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20     0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
```

```
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.32
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
 STREET FLOW TRAVEL TIME(MIN.) =   4.45   Tc(MIN.) =   10.77
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.458
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    2.12
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       3.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.70
 FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.77
 RAINFALL INTENSITY(INCH/HR) =   1.46
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.04

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.66    8.73    1.644  0.20( 0.04) 0.19       8.9       5.00
     1       14.79   11.08    1.434  0.20( 0.04) 0.19      11.1       1.00
     2        3.04   10.77    1.458  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.44    8.73    1.644  0.20( 0.03) 0.17      10.8       5.00
     2       17.68   10.77    1.458  0.20( 0.04) 0.18      13.2       8.00
     3       17.78   11.08    1.434  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.78    Tc(MIN.) =    11.08
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.78
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.27
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.27
 RAINFALL INTENSITY(INCH/HR) =   1.42
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.18
 EFFECTIVE STREAM AREA(ACRES) =      13.50
 TOTAL STREAM AREA(ACRES) =      13.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.78

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.65      0.20     0.100    57    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.07
 TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.07

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
 STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 50.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   4.35   Tc(MIN.) =   11.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.410
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.00
  FLOW VELOCITY(FEET/SEC.) =  2.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.64

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.44    8.93    1.623  0.20( 0.03) 0.17      10.8       5.00
      1       17.68   10.96    1.443  0.20( 0.04) 0.18      13.2       8.00
      1       17.78   11.27    1.420  0.20( 0.04) 0.18      13.5       1.00
      2        2.64   11.41    1.410  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.83    8.93    1.623  0.20( 0.03) 0.16      12.5       5.00
      2       20.28   10.96    1.443  0.20( 0.03) 0.17      15.2       8.00
      3       20.41   11.27    1.420  0.20( 0.03) 0.17      15.6       1.00
      4       20.29   11.41    1.410  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.41    Tc(MIN.) =    11.27
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
```

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------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.41
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.23
  RAINFALL INTENSITY(INCH/HR) =   1.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.41

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.161
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    57    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    7.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.50
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   1.85
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.83    9.91    1.529  0.20( 0.03) 0.16      12.5       5.00
      1       20.28   11.92    1.375  0.20( 0.03) 0.17      15.2       8.00
      1       20.41   12.23    1.355  0.20( 0.03) 0.17      15.6       1.00
      1       20.29   12.37    1.346  0.20( 0.03) 0.17      15.6      11.00
      2        1.86    7.10    1.851  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.26    7.10    1.851  0.20( 0.03) 0.16      10.1      14.00
      2       20.36    9.91    1.529  0.20( 0.03) 0.16      13.6       5.00
      3       21.65   11.92    1.375  0.20( 0.03) 0.16      16.4       8.00
      4       21.76   12.23    1.355  0.20( 0.03) 0.16      16.7       1.00
      5       21.64   12.37    1.346  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.76    Tc(MIN.) =    12.23
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.76
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.55
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.33      0.20      0.100    57    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    6.96
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.03

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   1.87
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.26    7.44    1.802  0.20( 0.03) 0.16      10.1      14.00
      1       20.36   10.25    1.500  0.20( 0.03) 0.16      13.6       5.00
      1       21.65   12.25    1.354  0.20( 0.03) 0.16      16.4       8.00
      1       21.76   12.55    1.334  0.20( 0.03) 0.16      16.7       1.00
      1       21.64   12.70    1.326  0.20( 0.03) 0.16      16.7      11.00
      2        1.03    6.96    1.873  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.79    6.96    1.873  0.20( 0.03) 0.15      10.0      17.00
      2       19.25    7.44    1.802  0.20( 0.03) 0.15      10.7      14.00
      3       21.18   10.25    1.500  0.20( 0.03) 0.16      14.2       5.00
      4       22.40   12.25    1.354  0.20( 0.03) 0.16      17.0       8.00
      5       22.50   12.55    1.334  0.20( 0.03) 0.16      17.3       1.00
      6       22.37   12.70    1.326  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.50    Tc(MIN.) =    12.55
  EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      22.50
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.65
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.50

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.815
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    57    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.51
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      2.51

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.51
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.687
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =    5.54
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =       7.87

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   1.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.87

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.79    7.06    1.858  0.20( 0.03) 0.15      10.0      17.00
      1       19.25    7.54    1.788  0.20( 0.03) 0.15      10.7      14.00
      1       21.18   10.34    1.492  0.20( 0.03) 0.16      14.2       5.00
      1       22.40   12.34    1.348  0.20( 0.03) 0.16      17.0       8.00
      1       22.50   12.65    1.329  0.20( 0.03) 0.16      17.3       1.00
      1       22.37   12.79    1.320  0.20( 0.03) 0.16      17.4      11.00
      2        7.87    8.34    1.687  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.13    7.06    1.858  0.20( 0.03) 0.17      14.5      17.00
      2       26.80    7.54    1.788  0.20( 0.03) 0.17      15.5      14.00
      3       27.68    8.34    1.687  0.20( 0.03) 0.17      17.0      19.00
      4       28.12   10.34    1.492  0.20( 0.03) 0.17      19.6       5.00
      5       28.65   12.34    1.348  0.20( 0.03) 0.17      22.3       8.00
      6       28.66   12.65    1.329  0.20( 0.03) 0.17      22.6       1.00
      7       28.48   12.79    1.320  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.66    Tc(MIN.) =    12.65
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.66
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.16
  RAINFALL INTENSITY(INCH/HR) =   1.25
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.66

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.914
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    57    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   1.91
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.48

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.972
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20      0.100    57    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.46
```

```
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   1.97
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.13    8.58    1.661  0.20( 0.03) 0.17      14.5      17.00
      1       26.80    9.06    1.610  0.20( 0.03) 0.17      15.5      14.00
      1       27.68    9.85    1.534  0.20( 0.03) 0.17      17.0      19.00
      1       28.12   11.85    1.379  0.20( 0.03) 0.17      19.6       5.00
      1       28.65   13.85    1.261  0.20( 0.03) 0.17      22.3       8.00
      1       28.66   14.16    1.246  0.20( 0.03) 0.17      22.6       1.00
      1       28.48   14.30    1.238  0.20( 0.03) 0.17      22.7      11.00
      2        0.48    6.70    1.914  0.20( 0.02) 0.10       0.3      22.00
      3        0.46    6.36    1.972  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.00    6.36    1.972  0.20( 0.03) 0.17      11.3      40.00
      2       24.51    6.70    1.914  0.20( 0.03) 0.17      11.9      22.00
      3       26.93    8.58    1.661  0.20( 0.03) 0.17      15.1      17.00
      4       27.58    9.06    1.610  0.20( 0.03) 0.17      16.0      14.00
      5       28.41    9.85    1.534  0.20( 0.03) 0.17      17.6      19.00
      6       28.78   11.85    1.379  0.20( 0.03) 0.17      20.1       5.00
      7       29.25   13.85    1.261  0.20( 0.03) 0.17      22.8       8.00
      8       29.25   14.16    1.246  0.20( 0.03) 0.17      23.2       1.00
      9       29.08   14.30    1.238  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.25    Tc(MIN.) =    14.16
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   14.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.31
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.25

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20      0.100    57    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    5.79
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20      0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.09

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
 FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.09
 PIPE TRAVEL TIME(MIN.) =   4.06    Tc(MIN.) =    9.85
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.85
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.534
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =    9.99
 EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      10.79

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.79
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.87
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.87
 RAINFALL INTENSITY(INCH/HR) =   1.53
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =       8.02
 TOTAL STREAM AREA(ACRES) =       8.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.00    6.52    1.944  0.20( 0.03) 0.17      11.3      40.00
```

```
     1       24.51    6.86    1.888  0.20( 0.03) 0.17      11.9      22.00
     1       26.93    8.73    1.643  0.20( 0.03) 0.17      15.1      17.00
     1       27.58    9.21    1.594  0.20( 0.03) 0.17      16.0      14.00
     1       28.41   10.01    1.520  0.20( 0.03) 0.17      17.6      19.00
     1       28.78   12.01    1.369  0.20( 0.03) 0.17      20.1       5.00
     1       29.25   14.01    1.253  0.20( 0.03) 0.17      22.8       8.00
     1       29.25   14.31    1.238  0.20( 0.03) 0.17      23.2       1.00
     1       29.08   14.46    1.230  0.20( 0.03) 0.17      23.2      11.00
     2       10.79    9.87    1.532  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.10    6.52    1.944  0.20( 0.03) 0.17      16.6      40.00
      2       33.80    6.86    1.888  0.20( 0.03) 0.17      17.5      22.00
      3       37.19    8.73    1.643  0.20( 0.03) 0.17      22.2      17.00
      4       38.07    9.21    1.594  0.20( 0.03) 0.17      23.5      14.00
      5       39.06    9.87    1.532  0.20( 0.03) 0.17      25.3      24.00
      6       39.12   10.01    1.520  0.20( 0.03) 0.17      25.6      19.00
      7       38.40   12.01    1.369  0.20( 0.03) 0.17      28.1       5.00
      8       38.03   14.01    1.253  0.20( 0.03) 0.17      30.9       8.00
      9       37.92   14.31    1.238  0.20( 0.03) 0.17      31.2       1.00
     10       37.69   14.46    1.230  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.12    Tc(MIN.) =    10.01
  EFFECTIVE AREA(ACRES) =      25.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.12
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   1.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      25.59
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.12

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    57    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.40
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      2.40

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.709
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    4.61
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =       6.82

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.94
  RAINFALL INTENSITY(INCH/HR) =   1.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.10    7.09    1.852  0.20( 0.03) 0.17      16.6      40.00
      1       33.80    7.43    1.803  0.20( 0.03) 0.17      17.5      22.00
      1       37.19    9.30    1.585  0.20( 0.03) 0.17      22.2      17.00
      1       38.07    9.76    1.542  0.20( 0.03) 0.17      23.5      14.00
      1       39.06   10.42    1.485  0.20( 0.03) 0.17      25.3      24.00
      1       39.12   10.56    1.474  0.20( 0.03) 0.17      25.6      19.00
      1       38.40   12.56    1.334  0.20( 0.03) 0.17      28.1       5.00
      1       38.03   14.56    1.226  0.20( 0.03) 0.17      30.9       8.00
      1       37.92   14.86    1.211  0.20( 0.03) 0.17      31.2       1.00
      1       37.69   15.01    1.204  0.20( 0.03) 0.17      31.2      11.00
      2        6.82    8.94    1.622  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.30    7.09    1.852  0.20( 0.04) 0.18      20.2      40.00
      2       40.12    7.43    1.803  0.20( 0.04) 0.18      21.2      22.00
      3       43.35    8.94    1.622  0.20( 0.04) 0.18      25.8      29.00
      4       43.86    9.30    1.585  0.20( 0.04) 0.18      26.7      17.00
      5       44.54    9.76    1.542  0.20( 0.04) 0.18      28.1      14.00
      6       45.29   10.42    1.485  0.20( 0.04) 0.18      29.9      24.00
      7       45.30   10.56    1.474  0.20( 0.04) 0.18      30.1      19.00
      8       43.98   12.56    1.334  0.20( 0.04) 0.18      32.7       5.00
      9       43.14   14.56    1.226  0.20( 0.04) 0.18      35.4       8.00
     10       42.97   14.86    1.211  0.20( 0.04) 0.18      35.7       1.00
     11       42.71   15.01    1.204  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.30    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      30.13   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.30
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.98
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.30
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.72
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.13
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.30

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.81      0.20     0.900    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.52
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.52
  RAINFALL INTENSITY(INCH/HR) =   2.14
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.30    7.26    1.828  0.20( 0.04) 0.18      20.2      40.00
      1       40.12    7.60    1.780  0.20( 0.04) 0.18      21.2      22.00
      1       43.35    9.10    1.605  0.20( 0.04) 0.18      25.8      29.00
      1       43.86    9.46    1.569  0.20( 0.04) 0.18      26.7      17.00
      1       44.54    9.93    1.527  0.20( 0.04) 0.18      28.1      14.00
      1       45.29   10.58    1.472  0.20( 0.04) 0.18      29.9      24.00
      1       45.30   10.72    1.461  0.20( 0.04) 0.18      30.1      19.00
      1       43.98   12.72    1.324  0.20( 0.04) 0.18      32.7       5.00
      1       43.14   14.72    1.218  0.20( 0.04) 0.18      35.4       8.00
      1       42.97   15.03    1.204  0.20( 0.04) 0.18      35.7       1.00
      1       42.71   15.18    1.197  0.20( 0.04) 0.18      35.8      11.00
      2        1.52    5.52    2.138  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.60    5.52    2.138  0.20( 0.04) 0.21      16.2      34.00
      2       40.58    7.26    1.828  0.20( 0.04) 0.21      21.0      40.00
      3       41.36    7.60    1.780  0.20( 0.04) 0.21      22.1      22.00
      4       44.46    9.10    1.605  0.20( 0.04) 0.20      26.6      29.00
      5       44.94    9.46    1.569  0.20( 0.04) 0.20      27.5      17.00
      6       45.59    9.93    1.527  0.20( 0.04) 0.20      28.9      14.00
      7       46.29   10.58    1.472  0.20( 0.04) 0.20      30.7      24.00
      8       46.29   10.72    1.461  0.20( 0.04) 0.20      30.9      19.00
      9       44.86   12.72    1.324  0.20( 0.04) 0.20      33.5       5.00
     10       43.95   14.72    1.218  0.20( 0.04) 0.19      36.2       8.00
     11       43.76   15.03    1.204  0.20( 0.04) 0.19      36.6       1.00
     12       43.50   15.18    1.197  0.20( 0.04) 0.19      36.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.29    Tc(MIN.) =    10.72
  EFFECTIVE AREA(ACRES) =      30.94   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       36.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.29
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.94
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      46.29

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    57    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.25
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.73
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.73
  RAINFALL INTENSITY(INCH/HR) =   1.76
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       36.60    5.57    2.128  0.20( 0.04) 0.21      16.2      34.00
      1       40.58    7.31    1.821  0.20( 0.04) 0.21      21.0      40.00
```

```
     1       41.36    7.64    1.774  0.20( 0.04) 0.21      22.1      22.00
     1       44.46    9.15    1.600  0.20( 0.04) 0.20      26.6      29.00
     1       44.94    9.51    1.565  0.20( 0.04) 0.20      27.5      17.00
     1       45.59    9.97    1.523  0.20( 0.04) 0.20      28.9      14.00
     1       46.29   10.63    1.469  0.20( 0.04) 0.20      30.7      24.00
     1       46.29   10.77    1.458  0.20( 0.04) 0.20      30.9      19.00
     1       44.86   12.77    1.322  0.20( 0.04) 0.20      33.5       5.00
     1       43.95   14.77    1.216  0.20( 0.04) 0.19      36.2       8.00
     1       43.76   15.07    1.201  0.20( 0.04) 0.19      36.6       1.00
     1       43.50   15.22    1.195  0.20( 0.04) 0.19      36.6      11.00
     2        3.25    7.73    1.762  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.44    5.57    2.128  0.20( 0.04) 0.21      17.7      34.00
      2       43.75    7.31    1.821  0.20( 0.04) 0.21      23.0      40.00
      3       44.59    7.64    1.774  0.20( 0.04) 0.20      24.1      22.00
      4       44.79    7.73    1.762  0.20( 0.04) 0.20      24.4      37.00
      5       47.40    9.15    1.600  0.20( 0.04) 0.20      28.7      29.00
      6       47.81    9.51    1.565  0.20( 0.04) 0.20      29.6      17.00
      7       48.38    9.97    1.523  0.20( 0.04) 0.20      30.9      14.00
      8       48.98   10.63    1.469  0.20( 0.04) 0.20      32.7      24.00
      9       48.96   10.77    1.458  0.20( 0.04) 0.20      33.0      19.00
     10       47.28   12.77    1.322  0.20( 0.04) 0.20      35.5       5.00
     11       46.16   14.77    1.216  0.20( 0.04) 0.19      38.3       8.00
     12       45.95   15.07    1.201  0.20( 0.04) 0.19      38.6       1.00
     13       45.67   15.22    1.195  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.98    Tc(MIN.) =    10.63
  EFFECTIVE AREA(ACRES) =      32.73   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.98
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.39
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.73
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.98

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.26      0.20     0.100    57    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.55      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    0.91
 EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.34

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.06
 RAINFALL INTENSITY(INCH/HR) =   1.86
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.44    6.38    1.968  0.20( 0.04) 0.21      17.7      34.00
     1       43.75    8.10    1.716  0.20( 0.04) 0.21      23.0      40.00
     1       44.59    8.44    1.676  0.20( 0.04) 0.20      24.1      22.00
     1       44.79    8.53    1.666  0.20( 0.04) 0.20      24.4      37.00
     1       47.40    9.92    1.528  0.20( 0.04) 0.20      28.7      29.00
     1       47.81   10.28    1.497  0.20( 0.04) 0.20      29.6      17.00
     1       48.38   10.74    1.459  0.20( 0.04) 0.20      30.9      14.00
     1       48.98   11.39    1.411  0.20( 0.04) 0.20      32.7      24.00
     1       48.96   11.54    1.401  0.20( 0.04) 0.20      33.0      19.00
     1       47.28   13.54    1.278  0.20( 0.04) 0.20      35.5       5.00
     1       46.16   15.54    1.181  0.20( 0.04) 0.19      38.3       8.00
     1       45.95   15.85    1.167  0.20( 0.04) 0.19      38.6       1.00
     1       45.67   16.02    1.160  0.20( 0.04) 0.19      38.6      11.00
```

```
     2        1.34    7.06    1.857  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.72    6.38    1.968  0.20( 0.04) 0.21      18.4      34.00
      2       42.47    7.06    1.857  0.20( 0.04) 0.21      20.6      40.00
      3       44.98    8.10    1.716  0.20( 0.04) 0.20      23.8      40.00
      4       45.80    8.44    1.676  0.20( 0.04) 0.20      24.9      22.00
      5       45.99    8.53    1.666  0.20( 0.04) 0.20      25.2      37.00
      6       48.50    9.92    1.528  0.20( 0.04) 0.20      29.5      29.00
      7       48.89   10.28    1.497  0.20( 0.04) 0.20      30.4      17.00
      8       49.43   10.74    1.459  0.20( 0.04) 0.20      31.8      14.00
      9       50.00   11.39    1.411  0.20( 0.04) 0.20      33.5      24.00
     10       49.97   11.54    1.401  0.20( 0.04) 0.20      33.8      19.00
     11       48.20   13.54    1.278  0.20( 0.04) 0.19      36.3       5.00
     12       47.01   15.54    1.181  0.20( 0.04) 0.19      39.1       8.00
     13       46.79   15.85    1.167  0.20( 0.04) 0.19      39.4       1.00
     14       46.51   16.02    1.160  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      50.00    Tc(MIN.) =    11.39
  EFFECTIVE AREA(ACRES) =      33.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.00
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.54
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.00

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.892
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.43      0.20     0.100    57    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.72
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      0.72

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   1.89
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.72

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       40.72    6.46    1.954  0.20( 0.04) 0.21      18.4      34.00
     1       42.47    7.14    1.845  0.20( 0.04) 0.21      20.6      40.00
     1       44.98    8.18    1.706  0.20( 0.04) 0.20      23.8      40.00
     1       45.80    8.52    1.667  0.20( 0.04) 0.20      24.9      22.00
     1       45.99    8.61    1.657  0.20( 0.04) 0.20      25.2      37.00
     1       48.50   10.00    1.521  0.20( 0.04) 0.20      29.5      29.00
     1       48.89   10.36    1.490  0.20( 0.04) 0.20      30.4      17.00
     1       49.43   10.82    1.453  0.20( 0.04) 0.20      31.8      14.00
     1       50.00   11.47    1.405  0.20( 0.04) 0.20      33.5      24.00
     1       49.97   11.61    1.396  0.20( 0.04) 0.20      33.8      19.00
     1       48.20   13.62    1.274  0.20( 0.04) 0.19      36.3       5.00
     1       47.01   15.62    1.177  0.20( 0.04) 0.19      39.1       8.00
     1       46.79   15.93    1.164  0.20( 0.04) 0.19      39.4       1.00
     1       46.51   16.10    1.157  0.20( 0.04) 0.19      39.5      11.00
     2        0.72    6.83    1.892  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.43    6.46    1.954  0.20( 0.04) 0.21      18.8      34.00
     2       42.41    6.83    1.892  0.20( 0.04) 0.21      20.0      42.00
     3       43.18    7.14    1.845  0.20( 0.04) 0.20      21.0      40.00
     4       45.64    8.18    1.706  0.20( 0.04) 0.20      24.2      40.00
     5       46.44    8.52    1.667  0.20( 0.04) 0.20      25.3      22.00
     6       46.62    8.61    1.657  0.20( 0.04) 0.20      25.6      37.00
     7       49.08   10.00    1.521  0.20( 0.04) 0.20      29.9      29.00
     8       49.45   10.36    1.490  0.20( 0.04) 0.20      30.8      17.00
     9       49.99   10.82    1.453  0.20( 0.04) 0.20      32.2      14.00
    10       50.53   11.47    1.405  0.20( 0.04) 0.19      34.0      24.00
    11       50.50   11.61    1.396  0.20( 0.04) 0.19      34.2      19.00
    12       48.68   13.62    1.274  0.20( 0.04) 0.19      36.8       5.00
    13       47.46   15.62    1.177  0.20( 0.04) 0.19      39.5       8.00
    14       47.23   15.93    1.164  0.20( 0.04) 0.19      39.9       1.00
    15       46.95   16.10    1.157  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.53    Tc(MIN.) =    11.47
```

```
  EFFECTIVE AREA(ACRES) =      33.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       39.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.53
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   11.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.90
  RAINFALL INTENSITY(INCH/HR) =   1.38
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.97
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.53

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20      0.100    57    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    8.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    0.64
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.49
  FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   1.70
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    57    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.91
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.91
  RAINFALL INTENSITY(INCH/HR) =   1.88
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.43    6.91    1.880  0.20( 0.04) 0.21      18.8      34.00
      1       42.41    7.28    1.824  0.20( 0.04) 0.21      20.0      42.00
      1       43.18    7.59    1.782  0.20( 0.04) 0.20      21.0      40.00
      1       45.64    8.62    1.656  0.20( 0.04) 0.20      24.2      40.00
      1       46.44    8.95    1.621  0.20( 0.04) 0.20      25.3      22.00
      1       46.62    9.04    1.611  0.20( 0.04) 0.20      25.6      37.00
      1       49.08   10.42    1.485  0.20( 0.04) 0.20      29.9      29.00
      1       49.45   10.79    1.456  0.20( 0.04) 0.20      30.8      17.00
      1       49.99   11.25    1.421  0.20( 0.04) 0.20      32.2      14.00
      1       50.53   11.90    1.376  0.20( 0.04) 0.19      34.0      24.00
      1       50.50   12.04    1.367  0.20( 0.04) 0.19      34.2      19.00
      1       48.68   14.05    1.251  0.20( 0.04) 0.19      36.8       5.00
      1       47.46   16.05    1.159  0.20( 0.04) 0.19      39.5       8.00
      1       47.23   16.36    1.146  0.20( 0.04) 0.19      39.9       1.00
      1       46.95   16.53    1.140  0.20( 0.04) 0.19      39.9      11.00
      2        1.20    8.20    1.704  0.20( 0.02) 0.10       0.8      44.00
      3        1.24    6.91    1.880  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.78    6.91    1.880  0.20( 0.04) 0.20      20.2      34.00
      2       43.78    6.91    1.880  0.20( 0.04) 0.20      20.2      40.00
      3       44.75    7.28    1.824  0.20( 0.04) 0.20      21.5      42.00
      4       45.51    7.59    1.782  0.20( 0.04) 0.20      22.5      40.00
      5       46.97    8.20    1.704  0.20( 0.04) 0.20      24.4      44.00
      6       47.89    8.62    1.656  0.20( 0.04) 0.19      25.7      40.00
      7       48.64    8.95    1.621  0.20( 0.04) 0.19      26.9      22.00
      8       48.82    9.04    1.611  0.20( 0.04) 0.19      27.1      37.00
      9       51.10   10.42    1.485  0.20( 0.04) 0.19      31.4      29.00
     10       51.43   10.79    1.456  0.20( 0.04) 0.19      32.3      17.00
     11       51.92   11.25    1.421  0.20( 0.04) 0.19      33.7      14.00
     12       52.40   11.90    1.376  0.20( 0.04) 0.19      35.5      24.00
     13       52.36   12.04    1.367  0.20( 0.04) 0.19      35.8      19.00
     14       50.38   14.05    1.251  0.20( 0.04) 0.19      38.3       5.00
     15       49.02   16.05    1.159  0.20( 0.04) 0.19      41.0       8.00
     16       48.78   16.36    1.146  0.20( 0.04) 0.19      41.4       1.00
```

```
    17       48.49   16.53    1.140  0.20( 0.04) 0.19      41.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.40    Tc(MIN.) =    11.90
  EFFECTIVE AREA(ACRES) =      35.49   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.40
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =   13.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.40
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   13.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    57    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.52
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      2.52

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.52
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.05
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.610
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   13.16
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      15.42

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.00
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.42
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   1.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.42

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    57    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
  STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    8.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.33
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.38
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.38
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
```

```
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       1.33

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.33
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.46
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.46
  RAINFALL INTENSITY(INCH/HR) =   1.67
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.42   10.30    1.495  0.20( 0.04) 0.20      10.9      48.00
      2        1.33    8.46    1.674  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.55    8.46    1.674  0.20( 0.04) 0.19       9.8      51.00
      2       16.61   10.30    1.495  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.61    Tc(MIN.) =    10.30
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.61
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.74
 RAINFALL INTENSITY(INCH/HR) =   1.46
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      11.79
 TOTAL STREAM AREA(ACRES) =      11.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.61

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.120
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.17      0.20      0.100    57    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   2.12
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.32

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.55    8.91    1.625  0.20( 0.04) 0.19       9.8      51.00
     1       16.61   10.74    1.459  0.20( 0.04) 0.19      11.8      48.00
     2        0.32    5.60    2.120  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.16    5.60    2.120  0.20( 0.04) 0.19       6.4      53.00
     2       15.80    8.91    1.625  0.20( 0.04) 0.19      10.0      51.00
     3       16.83   10.74    1.459  0.20( 0.04) 0.19      12.0      48.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.83    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.83
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   11.30
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.30
  RAINFALL INTENSITY(INCH/HR) =   1.42
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.83

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    57    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.72
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.645
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =    5.01
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       5.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.40
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.72
  RAINFALL INTENSITY(INCH/HR) =   1.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.16    6.20    2.000  0.20( 0.04) 0.19       6.4      53.00
      1       15.80    9.47    1.569  0.20( 0.04) 0.19      10.0      51.00
      1       16.83   11.30    1.418  0.20( 0.04) 0.19      12.0      48.00
      2        5.32    8.72    1.645  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.78    6.20    2.000  0.20( 0.04) 0.19       9.0      53.00
      2       20.51    8.72    1.645  0.20( 0.04) 0.19      12.9      56.00
      3       20.87    9.47    1.569  0.20( 0.04) 0.19      13.7      51.00
      4       21.39   11.30    1.418  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.39    Tc(MIN.) =    11.30
```

```
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.39
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.50
  RAINFALL INTENSITY(INCH/HR) =   1.40
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.39

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.386
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 D        1.10      0.20      0.850    57   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.20
  PIPE TRAVEL TIME(MIN.) =   2.99    Tc(MIN.) =   14.75
```

```
 LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.75
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                D        8.75      0.20     0.850    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =    8.24
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =       9.28

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.75
 RAINFALL INTENSITY(INCH/HR) =   1.22
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.28

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.78    6.40    1.964  0.20( 0.04) 0.19       9.0      53.00
     1       20.51    8.92    1.623  0.20( 0.04) 0.19      12.9      56.00
     1       20.87    9.67    1.550  0.20( 0.04) 0.19      13.7      51.00
     1       21.39   11.50    1.404  0.20( 0.04) 0.19      15.6      48.00
     2        9.28   14.75    1.217  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.68    6.40    1.964  0.20( 0.08) 0.40      13.3      53.00
     2       28.31    8.92    1.623  0.20( 0.08) 0.40      18.8      56.00
     3       28.89    9.67    1.550  0.20( 0.08) 0.40      20.2      51.00
     4       29.92   11.50    1.404  0.20( 0.08) 0.41      23.3      48.00
     5       27.74   14.75    1.217  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      29.92    Tc(MIN.) =    11.50
 EFFECTIVE AREA(ACRES) =      23.32   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.92
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   11.74
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.68    6.67    1.919  0.20( 0.08) 0.40      13.3      53.00
     2       28.31    9.17    1.598  0.20( 0.08) 0.40      18.8      56.00
     3       28.89    9.92    1.528  0.20( 0.08) 0.40      20.2      51.00
     4       29.92   11.74    1.387  0.20( 0.08) 0.41      23.3      48.00
     5       27.74   15.00    1.205  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.78    9.09    1.606  0.20( 0.04) 0.20      20.2      34.00
     2       43.78    9.09    1.606  0.20( 0.04) 0.20      20.2      40.00
     3       44.75    9.46    1.570  0.20( 0.04) 0.20      21.5      42.00
     4       45.51    9.76    1.542  0.20( 0.04) 0.20      22.5      40.00
     5       46.97   10.37    1.489  0.20( 0.04) 0.20      24.4      44.00
     6       47.89   10.73    1.460  0.20( 0.04) 0.19      25.7      40.00
     7       48.64   11.06    1.435  0.20( 0.04) 0.19      26.9      22.00
     8       48.82   11.15    1.428  0.20( 0.04) 0.19      27.1      37.00
     9       51.10   12.52    1.336  0.20( 0.04) 0.19      31.4      29.00
    10       51.43   12.88    1.315  0.20( 0.04) 0.19      32.3      17.00
    11       51.92   13.34    1.289  0.20( 0.04) 0.19      33.7      14.00
    12       52.40   13.99    1.254  0.20( 0.04) 0.19      35.5      24.00
    13       52.36   14.13    1.247  0.20( 0.04) 0.19      35.8      19.00
    14       50.38   16.15    1.155  0.20( 0.04) 0.19      38.3       5.00
    15       49.02   18.16    1.080  0.20( 0.04) 0.19      41.0       8.00
    16       48.78   18.47    1.069  0.20( 0.04) 0.19      41.4       1.00
    17       48.49   18.64    1.064  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       63.21    6.67    1.919  0.20( 0.06) 0.30      28.1      53.00
     2       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      34.00
     3       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      40.00
     4       72.31    9.17    1.598  0.20( 0.06) 0.29      39.3      56.00
     5       73.28    9.46    1.570  0.20( 0.06) 0.29      40.8      42.00
     6       74.28    9.76    1.542  0.20( 0.06) 0.29      42.3      40.00
     7       74.78    9.92    1.528  0.20( 0.06) 0.29      43.1      51.00
     8       76.11   10.37    1.489  0.20( 0.06) 0.29      45.4      44.00
     9       77.24   10.73    1.460  0.20( 0.06) 0.29      47.3      40.00
    10       78.18   11.06    1.435  0.20( 0.06) 0.29      49.0      22.00
    11       78.40   11.15    1.428  0.20( 0.06) 0.29      49.4      37.00
    12       79.72   11.74    1.387  0.20( 0.06) 0.29      52.3      48.00
    13       80.49   12.52    1.336  0.20( 0.06) 0.29      55.3      29.00
    14       80.59   12.88    1.315  0.20( 0.06) 0.29      56.4      17.00
    15       80.77   13.34    1.289  0.20( 0.06) 0.29      58.1      14.00
    16       80.82   13.99    1.254  0.20( 0.06) 0.29      60.3      24.00
    17       80.68   14.13    1.247  0.20( 0.06) 0.29      60.7      19.00
    18       79.25   15.00    1.205  0.20( 0.06) 0.29      62.3      59.00
    19       76.87   16.15    1.155  0.20( 0.06) 0.29      63.8       5.00
    20       73.65   18.16    1.080  0.20( 0.06) 0.29      66.5       8.00
    21       73.15   18.47    1.069  0.20( 0.06) 0.29      66.9       1.00
```

```
    22       72.71   18.64    1.064  0.20( 0.06) 0.29      66.9      11.00
   TOTAL AREA(ACRES) =        66.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       80.82  Tc(MIN.) =   13.991
  EFFECTIVE AREA(ACRES) =     60.31  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     13.99
  EFFECTIVE AREA(ACRES) =     60.31  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.291
  PEAK FLOW RATE(CFS)   =      80.82

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.21    6.67    1.919  0.20( 0.06) 0.30      28.1      53.00
      2       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      34.00
      3       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      40.00
      4       72.31    9.17    1.598  0.20( 0.06) 0.29      39.3      56.00
      5       73.28    9.46    1.570  0.20( 0.06) 0.29      40.8      42.00
      6       74.28    9.76    1.542  0.20( 0.06) 0.29      42.3      40.00
      7       74.78    9.92    1.528  0.20( 0.06) 0.29      43.1      51.00
      8       76.11   10.37    1.489  0.20( 0.06) 0.29      45.4      44.00
      9       77.24   10.73    1.460  0.20( 0.06) 0.29      47.3      40.00
     10       78.18   11.06    1.435  0.20( 0.06) 0.29      49.0      22.00
     11       78.40   11.15    1.428  0.20( 0.06) 0.29      49.4      37.00
     12       79.72   11.74    1.387  0.20( 0.06) 0.29      52.3      48.00
     13       80.49   12.52    1.336  0.20( 0.06) 0.29      55.3      29.00
     14       80.59   12.88    1.315  0.20( 0.06) 0.29      56.4      17.00
     15       80.77   13.34    1.289  0.20( 0.06) 0.29      58.1      14.00
     16       80.82   13.99    1.254  0.20( 0.06) 0.29      60.3      24.00
     17       80.68   14.13    1.247  0.20( 0.06) 0.29      60.7      19.00
     18       79.25   15.00    1.205  0.20( 0.06) 0.29      62.3      59.00
     19       76.87   16.15    1.155  0.20( 0.06) 0.29      63.8       5.00
     20       73.65   18.16    1.080  0.20( 0.06) 0.29      66.5       8.00
     21       73.15   18.47    1.069  0.20( 0.06) 0.29      66.9       1.00
     22       72.71   18.64    1.064  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

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**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         66.90       29.00       75.(AMC II)     0.200       0.637

    TOTAL AREA (Acres) =     66.90

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.058

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.363
==========================================================================
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**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: WP-A.DAT
  TIME/DATE OF STUDY: 10:35 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      66.900 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.134 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.058
         LOW LOSS FRACTION = 0.363
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.997
          30-MINUTE FACTOR = 0.997
           1-HOUR FACTOR = 0.997
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  62.143



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	6.866	55.549
2	43.778	298.650
3	83.351	320.167
4	96.304	104.799
5	98.837	20.497
6	99.517	5.501
7	99.807	2.345
8	99.952	1.172
9	100.000	0.391

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 3.3045
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 8.1185

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	22.5	45.0	67.5	90.0
0.083	0.0007	0.09	Q	.	.	.	.
0.167	0.0048	0.60	Q	.	.	.	.
0.250	0.0127	1.15	Q	.	.	.	.
0.333	0.0219	1.33	Q	.	.	.	.
0.417	0.0313	1.37	Q	.	.	.	.
0.500	0.0408	1.38	Q	.	.	.	.
0.583	0.0504	1.39	Q	.	.	.	.
0.667	0.0600	1.40	Q	.	.	.	.
0.750	0.0697	1.40	Q	.	.	.	.
0.833	0.0794	1.41	Q	.	.	.	.
0.917	0.0891	1.41	Q	.	.	.	.
1.000	0.0989	1.42	Q	.	.	.	.
1.083	0.1087	1.42	Q	.	.	.	.
1.167	0.1185	1.43	Q	.	.	.	.
1.250	0.1284	1.43	Q	.	.	.	.
1.333	0.1383	1.44	Q	.	.	.	.
1.417	0.1482	1.44	Q	.	.	.	.
1.500	0.1582	1.45	Q	.	.	.	.
1.583	0.1682	1.45	Q	.	.	.	.
1.667	0.1782	1.46	Q	.	.	.	.
1.750	0.1883	1.46	Q	.	.	.	.
1.833	0.1984	1.47	Q	.	.	.	.
1.917	0.2085	1.47	QV	.	.	.	.
2.000	0.2187	1.48	QV	.	.	.	.
2.083	0.2289	1.48	QV	.	.	.	.
2.167	0.2392	1.49	QV	.	.	.	.
2.250	0.2495	1.50	QV	.	.	.	.
2.333	0.2599	1.50	QV	.	.	.	.
2.417	0.2702	1.51	QV	.	.	.	.
2.500	0.2806	1.51	QV	.	.	.	.
2.583	0.2911	1.52	QV	.	.	.	.
2.667	0.3016	1.52	QV	.	.	.	.
2.750	0.3121	1.53	QV	.	.	.	.
2.833	0.3227	1.54	QV	.	.	.	.
2.917	0.3333	1.54	QV	.	.	.	.
3.000	0.3440	1.55	QV	.	.	.	.
3.083	0.3547	1.55	QV	.	.	.	.
3.167	0.3655	1.56	QV	.	.	.	.
3.250	0.3762	1.57	QV	.	.	.	.
3.333	0.3871	1.57	QV	.	.	.	.
3.417	0.3980	1.58	QV	.	.	.	.
3.500	0.4089	1.59	Q V	.	.	.	.
3.583	0.4198	1.59	Q V	.	.	.	.
3.667	0.4309	1.60	Q V	.	.	.	.
3.750	0.4419	1.61	Q V	.	.	.	.
3.833	0.4530	1.61	Q V	.	.	.	.
3.917	0.4642	1.62	Q V	.	.	.	.
4.000	0.4754	1.63	Q V	.	.	.	.
4.083	0.4866	1.63	Q V	.	.	.	.
4.167	0.4979	1.64	Q V	.	.	.	.
4.250	0.5093	1.65	Q V	.	.	.	.
4.333	0.5207	1.65	Q V	.	.	.	.
4.417	0.5321	1.66	Q V	.	.	.	.
4.500	0.5436	1.67	Q V	.	.	.	.
4.583	0.5552	1.68	Q V	.	.	.	.
4.667	0.5668	1.68	Q V	.	.	.	.
4.750	0.5784	1.69	Q V	.	.	.	.
4.833	0.5901	1.70	Q V	.	.	.	.
4.917	0.6019	1.71	Q V	.	.	.	.
5.000	0.6137	1.72	Q V	.	.	.	.

5.083	0.6256	1.72	Q	V	.	.	.	.
5.167	0.6375	1.73	Q	V	.	.	.	.
5.250	0.6495	1.74	Q	V	.	.	.	.
5.333	0.6615	1.75	Q	V	.	.	.	.
5.417	0.6736	1.76	Q	V	.	.	.	.
5.500	0.6858	1.77	Q	V	.	.	.	.
5.583	0.6980	1.77	Q	V	.	.	.	.
5.667	0.7103	1.78	Q	V	.	.	.	.
5.750	0.7226	1.79	Q	V	.	.	.	.
5.833	0.7350	1.80	Q	V	.	.	.	.
5.917	0.7475	1.81	Q	V	.	.	.	.
6.000	0.7600	1.82	Q	V	.	.	.	.
6.083	0.7726	1.83	Q	V	.	.	.	.
6.167	0.7853	1.84	Q	V	.	.	.	.
6.250	0.7980	1.85	Q	V	.	.	.	.
6.333	0.8108	1.86	Q	V	.	.	.	.
6.417	0.8236	1.87	Q	V	.	.	.	.
6.500	0.8365	1.88	Q	V	.	.	.	.
6.583	0.8495	1.89	Q	V	.	.	.	.
6.667	0.8626	1.90	Q	V	.	.	.	.
6.750	0.8757	1.91	Q	V	.	.	.	.
6.833	0.8890	1.92	Q	V	.	.	.	.
6.917	0.9022	1.93	Q	V	.	.	.	.
7.000	0.9156	1.94	Q	V	.	.	.	.
7.083	0.9290	1.95	Q	V	.	.	.	.
7.167	0.9426	1.96	Q	V	.	.	.	.
7.250	0.9562	1.97	Q	V	.	.	.	.
7.333	0.9698	1.99	Q	V	.	.	.	.
7.417	0.9836	2.00	Q	V	.	.	.	.
7.500	0.9974	2.01	Q	V	.	.	.	.
7.583	1.0113	2.02	Q	V	.	.	.	.
7.667	1.0253	2.03	Q	V	.	.	.	.
7.750	1.0394	2.05	Q	V	.	.	.	.
7.833	1.0536	2.06	Q	V	.	.	.	.
7.917	1.0679	2.07	Q	V	.	.	.	.
8.000	1.0822	2.08	Q	V	.	.	.	.
8.083	1.0967	2.10	Q	V	.	.	.	.
8.167	1.1112	2.11	Q	V	.	.	.	.
8.250	1.1259	2.13	Q	V	.	.	.	.
8.333	1.1406	2.14	Q	V	.	.	.	.
8.417	1.1554	2.15	Q	V	.	.	.	.
8.500	1.1704	2.17	Q	V	.	.	.	.
8.583	1.1854	2.18	Q	V	.	.	.	.
8.667	1.2005	2.20	Q	V	.	.	.	.
8.750	1.2158	2.21	Q	V	.	.	.	.
8.833	1.2311	2.23	Q	V	.	.	.	.
8.917	1.2466	2.24	Q	V	.	.	.	.
9.000	1.2622	2.26	.Q	V	.	.	.	.
9.083	1.2778	2.28	.Q	V	.	.	.	.
9.167	1.2936	2.29	.Q	V	.	.	.	.
9.250	1.3096	2.31	.Q	V	.	.	.	.
9.333	1.3256	2.33	.Q	V	.	.	.	.
9.417	1.3418	2.35	.Q	V	.	.	.	.
9.500	1.3580	2.37	.Q	V	.	.	.	.
9.583	1.3745	2.38	.Q	V	.	.	.	.
9.667	1.3910	2.40	.Q	V	.	.	.	.
9.750	1.4077	2.42	.Q	V	.	.	.	.
9.833	1.4245	2.44	.Q	V	.	.	.	.
9.917	1.4415	2.46	.Q	V	.	.	.	.
10.000	1.4586	2.48	.Q	V	.	.	.	.
10.083	1.4758	2.50	.Q	V	.	.	.	.
10.167	1.4932	2.53	.Q	V	.	.	.	.
10.250	1.5107	2.55	.Q	V	.	.	.	.
10.333	1.5284	2.57	.Q	V	.	.	.	.
10.417	1.5463	2.59	.Q	V	.	.	.	.
10.500	1.5643	2.62	.Q	V	.	.	.	.
10.583	1.5825	2.64	.Q	V	.	.	.	.
10.667	1.6008	2.67	.Q	V	.	.	.	.
10.750	1.6194	2.69	.Q	V	.	.	.	.
10.833	1.6381	2.72	.Q	V	.	.	.	.
10.917	1.6570	2.74	.Q	V	.	.	.	.

11.000	1.6760	2.77	.Q V . . . .
11.083	1.6953	2.80	.Q V . . . .
11.167	1.7148	2.83	.Q V . . . .
11.250	1.7345	2.86	.Q V . . . .
11.333	1.7544	2.89	.Q V . . . .
11.417	1.7745	2.92	.Q V . . . .
11.500	1.7948	2.95	.Q V . . . .
11.583	1.8153	2.98	.Q V . . . .
11.667	1.8361	3.02	.Q V. . . .
11.750	1.8571	3.05	.Q V. . . .
11.833	1.8784	3.09	.Q V. . . .
11.917	1.9000	3.13	.Q V. . . .
12.000	1.9218	3.17	.Q V. . . .
12.083	1.9442	3.25	.Q V. . . .
12.167	1.9687	3.56	.Q V. . . .
12.250	1.9954	3.88	.Q V. . . .
12.333	2.0231	4.02	.Q V. . . .
12.417	2.0512	4.08	.Q V . . .
12.500	2.0797	4.14	.Q V . . .
12.583	2.1085	4.19	.Q V . . .
12.667	2.1378	4.25	.Q V . . .
12.750	2.1674	4.30	.Q V . . .
12.833	2.1974	4.36	.Q V . . .
12.917	2.2279	4.42	.Q V . . .
13.000	2.2587	4.48	.Q .V . . .
13.083	2.2900	4.55	. Q .V . . .
13.167	2.3218	4.61	. Q .V . . .
13.250	2.3541	4.68	. Q .V . . .
13.333	2.3868	4.76	. Q .V . . .
13.417	2.4201	4.83	. Q .V . . .
13.500	2.4539	4.91	. Q . V . . .
13.583	2.4884	5.00	. Q . V . . .
13.667	2.5234	5.09	. Q . V . . .
13.750	2.5591	5.18	. Q . V . . .
13.833	2.5954	5.28	. Q . V . . .
13.917	2.6325	5.38	. Q . V . . .
14.000	2.6703	5.49	. Q . V . . .
14.083	2.7091	5.62	. Q . V . . .
14.167	2.7493	5.84	. Q . V . . .
14.250	2.7910	6.06	. Q . V . . .
14.333	2.8340	6.24	. Q . V . . .
14.417	2.8780	6.39	. Q . V . . .
14.500	2.9232	6.56	. Q . V . . .
14.583	2.9696	6.74	. Q . V . . .
14.667	3.0177	6.99	. Q . V . . .
14.750	3.0679	7.29	. Q . V . . .
14.833	3.1205	7.64	. Q . V . . .
14.917	3.1757	8.02	. Q . V . . .
15.000	3.2339	8.45	. Q . V . . .
15.083	3.2953	8.92	. Q . V . . .
15.167	3.3604	9.46	. Q . V . . .
15.250	3.4297	10.05	. Q . V . . .
15.333	3.5037	10.75	. Q . V . . .
15.417	3.5820	11.37	. Q . V . . .
15.500	3.6607	11.42	. Q . V . . .
15.583	3.7404	11.57	. Q . V . . .
15.667	3.8276	12.66	. Q . V . . .
15.750	3.9267	14.39	. Q . V. . . .
15.833	4.0441	17.05	. Q . V. . . .
15.917	4.1878	20.87	. Q. V . . .
16.000	4.3782	27.65	. . Q .V . . .
16.083	4.6852	44.58	. . Q. V . . .
16.167	5.2417	80.80	. . . V . Q .
16.250	5.7746	77.37	. . . V . Q .
16.333	6.0403	38.59	. . Q . V. . .
16.417	6.1779	19.97	. Q . . V . .
16.500	6.2778	14.52	. Q . . V . .
16.583	6.3635	12.43	. Q . . .V . .
16.667	6.4378	10.79	. Q . . .V . .
16.750	6.5027	9.42	. Q . . . V . .
16.833	6.5603	8.37	. Q . . . V . .

16.917	6.6124	7.57	.	Q	.	.	.	V	.	
17.000	6.6605	6.97	.	Q	.	.	.	V	.	
17.083	6.7054	6.53	.	Q	.	.	.	V	.	
17.167	6.7475	6.11	.	Q	.	.	.	V	.	
17.250	6.7871	5.74	.	Q	.	.	.	V	.	
17.333	6.8247	5.47	.	Q	.	.	.	V	.	
17.417	6.8609	5.25	.	Q	.	.	.	V	.	
17.500	6.8958	5.06	.	Q	.	.	.	V	.	
17.583	6.9295	4.89	.	Q	.	.	.	V	.	
17.667	6.9621	4.74	.	Q	.	.	.	V	.	
17.750	6.9937	4.59	.	Q	.	.	.	V	.	
17.833	7.0245	4.46	.	Q	.	.	.	V	.	
17.917	7.0544	4.34	.	Q	.	.	.	V	.	
18.000	7.0835	4.23	.	Q	.	.	.	V	.	
18.083	7.1116	4.08	.	Q	.	.	.	V	.	
18.167	7.1372	3.72	.	Q	.	.	.	V	.	
18.250	7.1603	3.35	.	Q	.	.	.	V	.	
18.333	7.1822	3.18	.	Q	.	.	.	V	.	
18.417	7.2035	3.09	.	Q	.	.	.	V	.	
18.500	7.2242	3.01	.	Q	.	.	.	V	.	
18.583	7.2445	2.94	.	Q	.	.	.	V	.	
18.667	7.2643	2.88	.	Q	.	.	.	V	.	
18.750	7.2837	2.82	.	Q	.	.	.	V	.	
18.833	7.3027	2.76	.	Q	.	.	.	V	.	
18.917	7.3214	2.71	.	Q	.	.	.	V	.	
19.000	7.3397	2.66	.	Q	.	.	.	V	.	
19.083	7.3576	2.61	.	Q	.	.	.	V	.	
19.167	7.3753	2.56	.	Q	.	.	.	V	.	
19.250	7.3926	2.52	.	Q	.	.	.	V	.	
19.333	7.4097	2.48	.	Q	.	.	.	V	.	
19.417	7.4265	2.44	.	Q	.	.	.	V	.	
19.500	7.4430	2.40	.	Q	.	.	.	V	.	
19.583	7.4592	2.36	.	Q	.	.	.	V	.	
19.667	7.4752	2.32	.	Q	.	.	.	V	.	
19.750	7.4910	2.29	.	Q	.	.	.	V	.	
19.833	7.5065	2.26	.	Q	.	.	.	V	.	
19.917	7.5218	2.22	.	Q	.	.	.	V	.	
20.000	7.5369	2.19	.	Q	.	.	.	V	.	
20.083	7.5518	2.16	.	Q	.	.	.	V	.	
20.167	7.5665	2.13	.	Q	.	.	.	V	.	
20.250	7.5810	2.11	.	Q	.	.	.	V	.	
20.333	7.5954	2.08	.	Q	.	.	.	V	.	
20.417	7.6095	2.05	.	Q	.	.	.	V	.	
20.500	7.6235	2.03	.	Q	.	.	.	V	.	
20.583	7.6373	2.01	.	Q	.	.	.	V	.	
20.667	7.6509	1.98	.	Q	.	.	.	V	.	
20.750	7.6644	1.96	.	Q	.	.	.	V	.	
20.833	7.6778	1.94	.	Q	.	.	.	V	.	
20.917	7.6910	1.91	.	Q	.	.	.	V	.	
21.000	7.7040	1.89	.	Q	.	.	.	V	.	
21.083	7.7169	1.87	.	Q	.	.	.	V	.	
21.167	7.7297	1.85	.	Q	.	.	.	V	.	
21.250	7.7423	1.83	.	Q	.	.	.	V	.	
21.333	7.7548	1.82	.	Q	.	.	.	V	.	
21.417	7.7672	1.80	.	Q	.	.	.	V	.	
21.500	7.7794	1.78	.	Q	.	.	.	V	.	
21.583	7.7916	1.76	.	Q	.	.	.	V	.	
21.667	7.8036	1.75	.	Q	.	.	.	V	.	
21.750	7.8155	1.73	.	Q	.	.	.	V	.	
21.833	7.8273	1.71	.	Q	.	.	.	V	.	
21.917	7.8390	1.70	.	Q	.	.	.	V	.	
22.000	7.8506	1.68	.	Q	.	.	.	V	.	
22.083	7.8621	1.67	.	Q	.	.	.	V	.	
22.167	7.8734	1.65	.	Q	.	.	.	V	.	
22.250	7.8847	1.64	.	Q	.	.	.	V	.	
22.333	7.8959	1.62	.	Q	.	.	.	V	.	
22.417	7.9070	1.61	.	Q	.	.	.	V	.	
22.500	7.9180	1.60	.	Q	.	.	.	V	.	
22.583	7.9289	1.58	.	Q	.	.	.	V	.	
22.667	7.9397	1.57	.	Q	.	.	.	V	.	
22.750	7.9505	1.56	.	Q	.	.	.	V	.	

22.833	7.9611	1.55	Q	.	.	.	V.
22.917	7.9717	1.53	Q	.	.	.	V.
23.000	7.9821	1.52	Q	.	.	.	V.
23.083	7.9926	1.51	Q	.	.	.	V.
23.167	8.0029	1.50	Q	.	.	.	V.
23.250	8.0131	1.49	Q	.	.	.	V.
23.333	8.0233	1.48	Q	.	.	.	V.
23.417	8.0334	1.47	Q	.	.	.	V.
23.500	8.0434	1.46	Q	.	.	.	V.
23.583	8.0534	1.45	Q	.	.	.	V.
23.667	8.0633	1.44	Q	.	.	.	V.
23.750	8.0731	1.43	Q	.	.	.	V.
23.833	8.0828	1.42	Q	.	.	.	V.
23.917	8.0925	1.41	Q	.	.	.	V.
24.000	8.1021	1.40	Q	.	.	.	V.
24.083	8.1111	1.29	Q	.	.	.	V.
24.167	8.1164	0.78	Q	.	.	.	V.
24.250	8.1180	0.23	Q	.	.	.	V.
24.333	8.1184	0.05	Q	.	.	.	V.
24.417	8.1185	0.02	Q	.	.	.	V.
24.500	8.1185	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1470.0
10%	115.0
20%	40.0
30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                              *
 ************************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 11:26 11/09/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    57    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      1.31

******************************************************************************
```

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.31
  PIPE TRAVEL TIME(MIN.) =   2.85    Tc(MIN.) =   12.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.343
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   11.21
  EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      12.33

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.33
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   13.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.60      0.20     0.100    57    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   4.42   Tc(MIN.) =   11.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.427
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    1.99
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.44
  FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.17
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.03      0.20     0.900    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.93
  TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      1.93

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.93
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   2.19
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.03
  TOTAL STREAM AREA(ACRES) =       1.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.93

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.75   11.17    1.427  0.20( 0.02) 0.10       2.2       4.00
      2        1.93    5.28    2.194  0.20( 0.18) 0.90       1.0       6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.94    5.28    2.194  0.20( 0.10) 0.50       2.1       6.00
      2        3.94   11.17    1.427  0.20( 0.07) 0.36       3.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.94    Tc(MIN.) =    11.17
  EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.40
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94    5.51    2.141  0.20( 0.10) 0.50       2.1       6.00
      2        3.94   11.40    1.410  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.33   13.16    1.299  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.73    5.51    2.141  0.20( 0.10) 0.50       6.7       6.00
      2       15.62   11.40    1.410  0.20( 0.09) 0.46      12.8       4.00
      3       15.94   13.16    1.299  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       15.94  Tc(MIN.) =   13.156
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.16
  RAINFALL INTENSITY(INCH/HR) =   1.30
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.94

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.996
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    57    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      0.96

********************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   4.92   Tc(MIN.) =   11.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.429
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    1.81
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       2.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   1.43
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.50

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.73    5.51    2.141  0.20( 0.10) 0.50       6.7       6.00
      1       15.62   11.40    1.410  0.20( 0.09) 0.46      12.8       4.00
      1       15.94   13.16    1.299  0.20( 0.09) 0.47      14.2       1.00
      2        2.50   11.14    1.429  0.20( 0.02) 0.10       2.0       9.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.59    5.51    2.141  0.20( 0.09) 0.45       7.6       6.00
      2       17.99   11.14    1.429  0.20( 0.08) 0.42      14.5       9.00
      3       18.08   11.40    1.410  0.20( 0.08) 0.42      14.7       4.00
      4       18.21   13.16    1.299  0.20( 0.08) 0.42      16.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.21    Tc(MIN.) =    13.16
  EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       16.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     13.16
  EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
  PEAK FLOW RATE(CFS)   =      18.21

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.59    5.51    2.141  0.20( 0.09) 0.45       7.6       6.00
      2       17.99   11.14    1.429  0.20( 0.08) 0.42      14.5       9.00
      3       18.08   11.40    1.410  0.20( 0.08) 0.42      14.7       4.00
      4       18.21   13.16    1.299  0.20( 0.08) 0.42      16.2       1.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'B'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         16.20       42.00       75.(AMC II)     0.200       0.523

    TOTAL AREA (Acres) =     16.20

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.084

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.477
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

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                                Irvine,Inc
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           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'B'                                                              *
 ************************************************************************

  FILE NAME: WP-B.DAT
  TIME/DATE OF STUDY: 10:55 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      16.200 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.176 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.084
         LOW LOSS FRACTION = 0.477
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  47.483



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	4.024	7.884
2	26.902	44.823
3	63.826	72.339
4	87.472	46.327
5	96.118	16.941
6	98.490	4.647
7	99.323	1.632
8	99.729	0.795
9	99.932	0.398
10	100.000	0.133

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.0737
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.6929

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0001	0.01	Q	.	.	.	.
0.167	0.0006	0.07	Q	.	.	.	.
0.250	0.0018	0.17	Q	.	.	.	.
0.333	0.0034	0.24	Q	.	.	.	.
0.417	0.0053	0.26	Q	.	.	.	.
0.500	0.0071	0.27	Q	.	.	.	.
0.583	0.0090	0.27	Q	.	.	.	.
0.667	0.0109	0.28	Q	.	.	.	.
0.750	0.0128	0.28	Q	.	.	.	.
0.833	0.0148	0.28	Q	.	.	.	.
0.917	0.0167	0.28	Q	.	.	.	.
1.000	0.0186	0.28	Q	.	.	.	.
1.083	0.0206	0.28	Q	.	.	.	.
1.167	0.0225	0.28	Q	.	.	.	.
1.250	0.0245	0.28	Q	.	.	.	.
1.333	0.0265	0.29	Q	.	.	.	.
1.417	0.0284	0.29	Q	.	.	.	.
1.500	0.0304	0.29	Q	.	.	.	.
1.583	0.0324	0.29	Q	.	.	.	.
1.667	0.0344	0.29	Q	.	.	.	.
1.750	0.0364	0.29	Q	.	.	.	.
1.833	0.0384	0.29	Q	.	.	.	.
1.917	0.0404	0.29	Q	.	.	.	.
2.000	0.0424	0.29	QV	.	.	.	.
2.083	0.0444	0.29	QV	.	.	.	.
2.167	0.0465	0.30	QV	.	.	.	.
2.250	0.0485	0.30	QV	.	.	.	.
2.333	0.0506	0.30	QV	.	.	.	.
2.417	0.0526	0.30	QV	.	.	.	.
2.500	0.0547	0.30	QV	.	.	.	.
2.583	0.0568	0.30	QV	.	.	.	.
2.667	0.0589	0.30	QV	.	.	.	.
2.750	0.0610	0.30	QV	.	.	.	.
2.833	0.0631	0.30	QV	.	.	.	.
2.917	0.0652	0.31	QV	.	.	.	.
3.000	0.0673	0.31	QV	.	.	.	.
3.083	0.0694	0.31	QV	.	.	.	.
3.167	0.0715	0.31	QV	.	.	.	.
3.250	0.0737	0.31	QV	.	.	.	.
3.333	0.0758	0.31	QV	.	.	.	.
3.417	0.0780	0.31	QV	.	.	.	.
3.500	0.0801	0.31	QV	.	.	.	.
3.583	0.0823	0.32	QV	.	.	.	.
3.667	0.0845	0.32	QV	.	.	.	.
3.750	0.0867	0.32	Q V	.	.	.	.
3.833	0.0889	0.32	Q V	.	.	.	.
3.917	0.0911	0.32	Q V	.	.	.	.
4.000	0.0933	0.32	Q V	.	.	.	.
4.083	0.0956	0.32	Q V	.	.	.	.
4.167	0.0978	0.33	Q V	.	.	.	.
4.250	0.1001	0.33	Q V	.	.	.	.
4.333	0.1023	0.33	Q V	.	.	.	.
4.417	0.1046	0.33	Q V	.	.	.	.
4.500	0.1069	0.33	Q V	.	.	.	.
4.583	0.1092	0.33	Q V	.	.	.	.
4.667	0.1115	0.33	Q V	.	.	.	.
4.750	0.1138	0.34	Q V	.	.	.	.
4.833	0.1161	0.34	Q V	.	.	.	.
4.917	0.1184	0.34	Q V	.	.	.	.
5.000	0.1208	0.34	Q V	.	.	.	.

5.083	0.1231	0.34	Q V	.	.	.	.
5.167	0.1255	0.34	Q V	.	.	.	.
5.250	0.1279	0.35	Q V	.	.	.	.
5.333	0.1303	0.35	Q V	.	.	.	.
5.417	0.1327	0.35	Q V	.	.	.	.
5.500	0.1351	0.35	Q V	.	.	.	.
5.583	0.1375	0.35	Q V	.	.	.	.
5.667	0.1399	0.35	Q V	.	.	.	.
5.750	0.1424	0.36	Q V	.	.	.	.
5.833	0.1448	0.36	Q V	.	.	.	.
5.917	0.1473	0.36	Q V	.	.	.	.
6.000	0.1498	0.36	Q V	.	.	.	.
6.083	0.1523	0.36	Q V	.	.	.	.
6.167	0.1548	0.36	Q V	.	.	.	.
6.250	0.1573	0.37	Q V	.	.	.	.
6.333	0.1599	0.37	Q V	.	.	.	.
6.417	0.1624	0.37	Q V	.	.	.	.
6.500	0.1650	0.37	Q V	.	.	.	.
6.583	0.1675	0.37	Q V	.	.	.	.
6.667	0.1701	0.38	Q V	.	.	.	.
6.750	0.1727	0.38	Q V	.	.	.	.
6.833	0.1754	0.38	Q V	.	.	.	.
6.917	0.1780	0.38	Q V	.	.	.	.
7.000	0.1806	0.38	Q V	.	.	.	.
7.083	0.1833	0.39	Q V	.	.	.	.
7.167	0.1860	0.39	Q V	.	.	.	.
7.250	0.1887	0.39	Q V	.	.	.	.
7.333	0.1914	0.39	Q V	.	.	.	.
7.417	0.1941	0.40	Q V	.	.	.	.
7.500	0.1969	0.40	Q V	.	.	.	.
7.583	0.1996	0.40	Q V	.	.	.	.
7.667	0.2024	0.40	Q V	.	.	.	.
7.750	0.2052	0.41	Q V	.	.	.	.
7.833	0.2080	0.41	Q V	.	.	.	.
7.917	0.2108	0.41	Q V	.	.	.	.
8.000	0.2137	0.41	Q V	.	.	.	.
8.083	0.2165	0.42	Q V	.	.	.	.
8.167	0.2194	0.42	Q V	.	.	.	.
8.250	0.2223	0.42	Q V	.	.	.	.
8.333	0.2252	0.42	Q V	.	.	.	.
8.417	0.2282	0.43	Q V	.	.	.	.
8.500	0.2311	0.43	Q V	.	.	.	.
8.583	0.2341	0.43	Q V	.	.	.	.
8.667	0.2371	0.44	Q V	.	.	.	.
8.750	0.2401	0.44	Q V	.	.	.	.
8.833	0.2432	0.44	Q V	.	.	.	.
8.917	0.2462	0.44	Q V	.	.	.	.
9.000	0.2493	0.45	Q V	.	.	.	.
9.083	0.2524	0.45	Q V	.	.	.	.
9.167	0.2555	0.45	Q V	.	.	.	.
9.250	0.2587	0.46	Q V	.	.	.	.
9.333	0.2619	0.46	Q V	.	.	.	.
9.417	0.2651	0.46	Q V	.	.	.	.
9.500	0.2683	0.47	Q V	.	.	.	.
9.583	0.2715	0.47	Q V	.	.	.	.
9.667	0.2748	0.48	Q V	.	.	.	.
9.750	0.2781	0.48	Q V	.	.	.	.
9.833	0.2815	0.48	Q V	.	.	.	.
9.917	0.2848	0.49	Q V	.	.	.	.
10.000	0.2882	0.49	Q V	.	.	.	.
10.083	0.2916	0.50	Q V	.	.	.	.
10.167	0.2951	0.50	Q V	.	.	.	.
10.250	0.2985	0.50	.Q V	.	.	.	.
10.333	0.3020	0.51	.Q V	.	.	.	.
10.417	0.3056	0.51	.Q V	.	.	.	.
10.500	0.3091	0.52	.Q V	.	.	.	.
10.583	0.3127	0.52	.Q V	.	.	.	.
10.667	0.3164	0.53	.Q V	.	.	.	.
10.750	0.3200	0.53	.Q V	.	.	.	.
10.833	0.3237	0.54	.Q V	.	.	.	.
10.917	0.3275	0.54	.Q V	.	.	.	.

11.000	0.3312	0.55	.Q V . . . .
11.083	0.3350	0.55	.Q V . . . .
11.167	0.3389	0.56	.Q V . . . .
11.250	0.3428	0.56	.Q V . . . .
11.333	0.3467	0.57	.Q V . . . .
11.417	0.3507	0.58	.Q V . . . .
11.500	0.3547	0.58	.Q V . . . .
11.583	0.3588	0.59	.Q V . . . .
11.667	0.3629	0.60	.Q V . . . .
11.750	0.3670	0.60	.Q V . . . .
11.833	0.3712	0.61	.Q V . . . .
11.917	0.3755	0.62	.Q V . . . .
12.000	0.3798	0.63	.Q V . . . .
12.083	0.3842	0.64	.Q V. . . .
12.167	0.3889	0.68	.Q V. . . .
12.250	0.3940	0.74	.Q V. . . .
12.333	0.3994	0.78	.Q V. . . .
12.417	0.4049	0.80	.Q V. . . .
12.500	0.4105	0.82	.Q V. . . .
12.583	0.4162	0.83	.Q V. . . .
12.667	0.4220	0.84	.Q V. . . .
12.750	0.4278	0.85	.Q V . . .
12.833	0.4337	0.86	.Q V . . .
12.917	0.4397	0.87	.Q V . . .
13.000	0.4458	0.88	.Q V . . .
13.083	0.4520	0.90	.Q V . . .
13.167	0.4583	0.91	.Q V . . .
13.250	0.4646	0.92	.Q V . . .
13.333	0.4711	0.94	.Q .V . . .
13.417	0.4777	0.95	.Q .V . . .
13.500	0.4843	0.97	.Q .V . . .
13.583	0.4911	0.98	.Q .V . . .
13.667	0.4980	1.00	. Q .V . . .
13.750	0.5050	1.02	. Q .V . . .
13.833	0.5122	1.04	. Q . V . . .
13.917	0.5195	1.06	. Q . V . . .
14.000	0.5269	1.08	. Q . V . . .
14.083	0.5345	1.10	. Q . V . . .
14.167	0.5424	1.14	. Q . V . . .
14.250	0.5505	1.18	. Q . V . . .
14.333	0.5589	1.22	. Q . V . . .
14.417	0.5675	1.25	. Q . V . . .
14.500	0.5763	1.28	. Q . V . . .
14.583	0.5854	1.32	. Q . V . . .
14.667	0.5947	1.35	. Q . V . . .
14.750	0.6043	1.39	. Q . V . . .
14.833	0.6142	1.44	. Q . V . . .
14.917	0.6245	1.49	. Q . V . . .
15.000	0.6353	1.57	. Q . V . . .
15.083	0.6468	1.67	. Q . V . . .
15.167	0.6591	1.79	. Q . V . . .
15.250	0.6724	1.93	. Q . V . . .
15.333	0.6868	2.09	. Q . V . . .
15.417	0.7023	2.24	. Q . V . . .
15.500	0.7182	2.32	. Q . V . . .
15.583	0.7345	2.36	. Q . V . . .
15.667	0.7519	2.53	. Q . V . . .
15.750	0.7717	2.87	. Q . V . . .
15.833	0.7951	3.40	. Q . V . . .
15.917	0.8239	4.19	. Q . V. . .
16.000	0.8618	5.50	. Q V . . .
16.083	0.9204	8.51	. . Q .V . .
16.167	1.0233	14.93	. . . V Q. .
16.250	1.1488	18.23	. . . V . Q .
16.333	1.2375	12.87	. . . Q V. .
16.417	1.2854	6.97	. . Q . V .
16.500	1.3134	4.06	. Q . . .V .
16.583	1.3341	3.00	. Q . . .V .
16.667	1.3511	2.47	. Q . . .V .
16.750	1.3653	2.07	. Q . . . V .
16.833	1.3775	1.76	. Q . . . V .

16.917	1.3882	1.55	.	Q	.	.	.	V	.
17.000	1.3980	1.43	.	Q	.	.	.	V	.
17.083	1.4072	1.34	.	Q	.	.	.	V	.
17.167	1.4159	1.26	.	Q	.	.	.	V	.
17.250	1.4240	1.18	.	Q	.	.	.	V	.
17.333	1.4317	1.12	.	Q	.	.	.	V	.
17.417	1.4390	1.07	.	Q	.	.	.	V	.
17.500	1.4461	1.03	.	Q	.	.	.	V	.
17.583	1.4529	0.99	.	Q	.	.	.	V	.
17.667	1.4595	0.96	.	Q	.	.	.	V	.
17.750	1.4659	0.93	.	Q	.	.	.	V	.
17.833	1.4721	0.90	.	Q	.	.	.	V	.
17.917	1.4782	0.88	.	Q	.	.	.	V	.
18.000	1.4840	0.85	.	Q	.	.	.	V	.
18.083	1.4897	0.83	.	Q	.	.	.	V	.
18.167	1.4950	0.77	.	Q	.	.	.	V	.
18.250	1.4999	0.70	.	Q	.	.	.	V	.
18.333	1.5044	0.65	.	Q	.	.	.	V	.
18.417	1.5087	0.63	.	Q	.	.	.	V	.
18.500	1.5129	0.61	.	Q	.	.	.	V	.
18.583	1.5170	0.59	.	Q	.	.	.	V	.
18.667	1.5210	0.58	.	Q	.	.	.	V	.
18.750	1.5249	0.57	.	Q	.	.	.	V	.
18.833	1.5287	0.56	.	Q	.	.	.	V	.
18.917	1.5324	0.54	.	Q	.	.	.	V	.
19.000	1.5361	0.53	.	Q	.	.	.	V	.
19.083	1.5397	0.52	.	Q	.	.	.	V	.
19.167	1.5433	0.51	.	Q	.	.	.	V	.
19.250	1.5467	0.51	.	Q	.	.	.	V	.
19.333	1.5502	0.50	Q	.	.	.	.	V	.
19.417	1.5535	0.49	Q	.	.	.	.	V	.
19.500	1.5568	0.48	Q	.	.	.	.	V	.
19.583	1.5601	0.47	Q	.	.	.	.	V	.
19.667	1.5633	0.47	Q	.	.	.	.	V	.
19.750	1.5665	0.46	Q	.	.	.	.	V	.
19.833	1.5696	0.45	Q	.	.	.	.	V	.
19.917	1.5726	0.45	Q	.	.	.	.	V	.
20.000	1.5757	0.44	Q	.	.	.	.	V	.
20.083	1.5786	0.43	Q	.	.	.	.	V	.
20.167	1.5816	0.43	Q	.	.	.	.	V	.
20.250	1.5845	0.42	Q	.	.	.	.	V	.
20.333	1.5874	0.42	Q	.	.	.	.	V	.
20.417	1.5902	0.41	Q	.	.	.	.	V	.
20.500	1.5930	0.41	Q	.	.	.	.	V	.
20.583	1.5958	0.40	Q	.	.	.	.	V	.
20.667	1.5985	0.40	Q	.	.	.	.	V	.
20.750	1.6012	0.39	Q	.	.	.	.	V	.
20.833	1.6038	0.39	Q	.	.	.	.	V	.
20.917	1.6065	0.38	Q	.	.	.	.	V	.
21.000	1.6091	0.38	Q	.	.	.	.	V	.
21.083	1.6117	0.37	Q	.	.	.	.	V	.
21.167	1.6142	0.37	Q	.	.	.	.	V	.
21.250	1.6168	0.37	Q	.	.	.	.	V	.
21.333	1.6193	0.36	Q	.	.	.	.	V	.
21.417	1.6217	0.36	Q	.	.	.	.	V	.
21.500	1.6242	0.36	Q	.	.	.	.	V	.
21.583	1.6266	0.35	Q	.	.	.	.	V	.
21.667	1.6290	0.35	Q	.	.	.	.	V	.
21.750	1.6314	0.35	Q	.	.	.	.	V	.
21.833	1.6337	0.34	Q	.	.	.	.	V	.
21.917	1.6361	0.34	Q	.	.	.	.	V	.
22.000	1.6384	0.34	Q	.	.	.	.	V	.
22.083	1.6407	0.33	Q	.	.	.	.	V	.
22.167	1.6430	0.33	Q	.	.	.	.	V	.
22.250	1.6452	0.33	Q	.	.	.	.	V	.
22.333	1.6474	0.32	Q	.	.	.	.	V	.
22.417	1.6497	0.32	Q	.	.	.	.	V	.
22.500	1.6519	0.32	Q	.	.	.	.	V	.
22.583	1.6540	0.32	Q	.	.	.	.	V	.
22.667	1.6562	0.31	Q	.	.	.	.	V	.
22.750	1.6583	0.31	Q	.	.	.	.	V	.

22.833	1.6605	0.31	Q	.	.	.	V.
22.917	1.6626	0.31	Q	.	.	.	V.
23.000	1.6647	0.30	Q	.	.	.	V.
23.083	1.6667	0.30	Q	.	.	.	V.
23.167	1.6688	0.30	Q	.	.	.	V.
23.250	1.6708	0.30	Q	.	.	.	V.
23.333	1.6729	0.29	Q	.	.	.	V.
23.417	1.6749	0.29	Q	.	.	.	V.
23.500	1.6769	0.29	Q	.	.	.	V.
23.583	1.6789	0.29	Q	.	.	.	V.
23.667	1.6809	0.29	Q	.	.	.	V.
23.750	1.6828	0.28	Q	.	.	.	V.
23.833	1.6848	0.28	Q	.	.	.	V.
23.917	1.6867	0.28	Q	.	.	.	V.
24.000	1.6886	0.28	Q	.	.	.	V.
24.083	1.6904	0.27	Q	.	.	.	V.
24.167	1.6918	0.20	Q	.	.	.	V.
24.250	1.6925	0.10	Q	.	.	.	V.
24.333	1.6928	0.03	Q	.	.	.	V.
24.417	1.6928	0.01	Q	.	.	.	V.
24.500	1.6929	0.00	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1470.0
10%	95.0
20%	40.0
30%	30.0
40%	20.0
50%	15.0
60%	15.0
70%	15.0
80%	10.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                              *
 ************************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 10:42 01/12/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.927
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20     0.200    57    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      2.11

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.11
 PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =    8.73
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.73
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        5.21      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =    7.52
 EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =       9.31

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.73
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.09      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =    5.90
 EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      15.21
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.73
 EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =      15.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'C'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         10.50       20.00       75.(AMC II)     0.200       0.715

    TOTAL AREA (Acres) =     10.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.040

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.285
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
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           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'C'                                                              *
 ************************************************************************

  FILE NAME: WP-C.DAT
  TIME/DATE OF STUDY: 11:13 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      10.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.108 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.040
         LOW LOSS FRACTION = 0.285
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 1.000
          30-MINUTE FACTOR = 1.000
           1-HOUR FACTOR = 1.000
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  77.375



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	10.503	13.337
2	60.658	63.689
3	92.954	41.011
4	98.668	7.257
5	99.521	1.082
6	99.808	0.365
7	99.952	0.183
8	100.000	0.061

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.3943
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.3987

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0002	0.03	Q	.	.	.	.
0.167	0.0012	0.15	Q	.	.	.	.
0.250	0.0027	0.23	Q	.	.	.	.
0.333	0.0044	0.24	Q	.	.	.	.
0.417	0.0061	0.24	Q	.	.	.	.
0.500	0.0078	0.24	Q	.	.	.	.
0.583	0.0094	0.25	Q	.	.	.	.
0.667	0.0111	0.25	Q	.	.	.	.
0.750	0.0128	0.25	Q	.	.	.	.
0.833	0.0146	0.25	Q	.	.	.	.
0.917	0.0163	0.25	Q	.	.	.	.
1.000	0.0180	0.25	Q	.	.	.	.
1.083	0.0197	0.25	Q	.	.	.	.
1.167	0.0215	0.25	Q	.	.	.	.
1.250	0.0232	0.25	Q	.	.	.	.
1.333	0.0249	0.25	Q	.	.	.	.
1.417	0.0267	0.25	Q	.	.	.	.
1.500	0.0285	0.26	Q	.	.	.	.
1.583	0.0302	0.26	Q	.	.	.	.
1.667	0.0320	0.26	Q	.	.	.	.
1.750	0.0338	0.26	Q	.	.	.	.
1.833	0.0355	0.26	QV	.	.	.	.
1.917	0.0373	0.26	QV	.	.	.	.
2.000	0.0391	0.26	QV	.	.	.	.
2.083	0.0409	0.26	QV	.	.	.	.
2.167	0.0427	0.26	QV	.	.	.	.
2.250	0.0446	0.26	QV	.	.	.	.
2.333	0.0464	0.26	QV	.	.	.	.
2.417	0.0482	0.27	QV	.	.	.	.
2.500	0.0501	0.27	QV	.	.	.	.
2.583	0.0519	0.27	QV	.	.	.	.
2.667	0.0538	0.27	QV	.	.	.	.
2.750	0.0556	0.27	QV	.	.	.	.
2.833	0.0575	0.27	QV	.	.	.	.
2.917	0.0594	0.27	QV	.	.	.	.
3.000	0.0612	0.27	QV	.	.	.	.
3.083	0.0631	0.27	QV	.	.	.	.
3.167	0.0650	0.28	QV	.	.	.	.
3.250	0.0669	0.28	QV	.	.	.	.
3.333	0.0688	0.28	QV	.	.	.	.
3.417	0.0708	0.28	Q V	.	.	.	.
3.500	0.0727	0.28	Q V	.	.	.	.
3.583	0.0746	0.28	Q V	.	.	.	.
3.667	0.0766	0.28	Q V	.	.	.	.
3.750	0.0785	0.28	Q V	.	.	.	.
3.833	0.0805	0.28	Q V	.	.	.	.
3.917	0.0824	0.29	Q V	.	.	.	.
4.000	0.0844	0.29	Q V	.	.	.	.
4.083	0.0864	0.29	Q V	.	.	.	.
4.167	0.0884	0.29	Q V	.	.	.	.
4.250	0.0904	0.29	Q V	.	.	.	.
4.333	0.0924	0.29	Q V	.	.	.	.
4.417	0.0944	0.29	Q V	.	.	.	.
4.500	0.0964	0.29	Q V	.	.	.	.
4.583	0.0985	0.30	Q V	.	.	.	.
4.667	0.1005	0.30	Q V	.	.	.	.
4.750	0.1026	0.30	Q V	.	.	.	.
4.833	0.1047	0.30	Q V	.	.	.	.
4.917	0.1067	0.30	Q V	.	.	.	.
5.000	0.1088	0.30	Q V	.	.	.	.

5.083	0.1109	0.30	Q	V	.	.	.	.
5.167	0.1130	0.31	Q	V	.	.	.	.
5.250	0.1151	0.31	Q	V	.	.	.	.
5.333	0.1173	0.31	Q	V	.	.	.	.
5.417	0.1194	0.31	Q	V	.	.	.	.
5.500	0.1215	0.31	Q	V	.	.	.	.
5.583	0.1237	0.31	Q	V	.	.	.	.
5.667	0.1259	0.31	Q	V	.	.	.	.
5.750	0.1280	0.32	Q	V	.	.	.	.
5.833	0.1302	0.32	Q	V	.	.	.	.
5.917	0.1324	0.32	Q	V	.	.	.	.
6.000	0.1346	0.32	Q	V	.	.	.	.
6.083	0.1369	0.32	Q	V	.	.	.	.
6.167	0.1391	0.32	Q	V	.	.	.	.
6.250	0.1413	0.33	Q	V	.	.	.	.
6.333	0.1436	0.33	Q	V	.	.	.	.
6.417	0.1459	0.33	Q	V	.	.	.	.
6.500	0.1481	0.33	Q	V	.	.	.	.
6.583	0.1504	0.33	Q	V	.	.	.	.
6.667	0.1527	0.33	Q	V	.	.	.	.
6.750	0.1551	0.34	Q	V	.	.	.	.
6.833	0.1574	0.34	Q	V	.	.	.	.
6.917	0.1597	0.34	Q	V	.	.	.	.
7.000	0.1621	0.34	Q	V	.	.	.	.
7.083	0.1645	0.34	Q	V	.	.	.	.
7.167	0.1668	0.35	Q	V	.	.	.	.
7.250	0.1692	0.35	Q	V	.	.	.	.
7.333	0.1717	0.35	Q	V	.	.	.	.
7.417	0.1741	0.35	Q	V	.	.	.	.
7.500	0.1765	0.35	Q	V	.	.	.	.
7.583	0.1790	0.36	Q	V	.	.	.	.
7.667	0.1815	0.36	Q	V	.	.	.	.
7.750	0.1839	0.36	Q	V	.	.	.	.
7.833	0.1865	0.36	Q	V	.	.	.	.
7.917	0.1890	0.37	Q	V	.	.	.	.
8.000	0.1915	0.37	Q	V	.	.	.	.
8.083	0.1941	0.37	Q	V	.	.	.	.
8.167	0.1966	0.37	Q	V	.	.	.	.
8.250	0.1992	0.38	Q	V	.	.	.	.
8.333	0.2018	0.38	Q	V	.	.	.	.
8.417	0.2044	0.38	Q	V	.	.	.	.
8.500	0.2071	0.38	Q	V	.	.	.	.
8.583	0.2097	0.39	Q	V	.	.	.	.
8.667	0.2124	0.39	Q	V	.	.	.	.
8.750	0.2151	0.39	Q	V	.	.	.	.
8.833	0.2178	0.39	Q	V	.	.	.	.
8.917	0.2205	0.40	Q	V	.	.	.	.
9.000	0.2233	0.40	Q	V	.	.	.	.
9.083	0.2260	0.40	Q	V	.	.	.	.
9.167	0.2288	0.41	Q	V	.	.	.	.
9.250	0.2316	0.41	Q	V	.	.	.	.
9.333	0.2345	0.41	Q	V	.	.	.	.
9.417	0.2373	0.41	Q	V	.	.	.	.
9.500	0.2402	0.42	Q	V	.	.	.	.
9.583	0.2431	0.42	Q	V	.	.	.	.
9.667	0.2460	0.42	Q	V	.	.	.	.
9.750	0.2490	0.43	Q	V	.	.	.	.
9.833	0.2520	0.43	Q	V	.	.	.	.
9.917	0.2549	0.43	Q	V	.	.	.	.
10.000	0.2580	0.44	Q	V	.	.	.	.
10.083	0.2610	0.44	Q	V	.	.	.	.
10.167	0.2641	0.45	Q	V	.	.	.	.
10.250	0.2672	0.45	Q	V	.	.	.	.
10.333	0.2703	0.45	Q	V	.	.	.	.
10.417	0.2735	0.46	Q	V	.	.	.	.
10.500	0.2767	0.46	Q	V	.	.	.	.
10.583	0.2799	0.47	Q	V	.	.	.	.
10.667	0.2831	0.47	Q	V	.	.	.	.
10.750	0.2864	0.48	Q	V	.	.	.	.
10.833	0.2897	0.48	Q	V	.	.	.	.
10.917	0.2930	0.48	Q	V	.	.	.	.

11.000	0.2964	0.49	Q V . . . .
11.083	0.2998	0.49	Q V . . . .
11.167	0.3033	0.50	Q V . . . .
11.250	0.3067	0.50	.Q V . . . .
11.333	0.3102	0.51	.Q V . . . .
11.417	0.3138	0.52	.Q V . . . .
11.500	0.3174	0.52	.Q V. . . . .
11.583	0.3210	0.53	.Q V. . . . .
11.667	0.3247	0.53	.Q V. . . . .
11.750	0.3284	0.54	.Q V. . . . .
11.833	0.3322	0.55	.Q V. . . . .
11.917	0.3360	0.55	.Q V. . . . .
12.000	0.3399	0.56	.Q V. . . . .
12.083	0.3438	0.58	.Q V. . . . .
12.167	0.3483	0.65	.Q V. . . . .
12.250	0.3531	0.70	.Q V . . . .
12.333	0.3580	0.71	.Q V . . . .
12.417	0.3630	0.72	.Q V . . . .
12.500	0.3681	0.73	.Q V . . . .
12.583	0.3732	0.74	.Q V . . . .
12.667	0.3783	0.75	.Q V . . . .
12.750	0.3836	0.76	.Q V . . . .
12.833	0.3889	0.77	.Q .V . . . .
12.917	0.3943	0.78	.Q .V . . . .
13.000	0.3997	0.79	.Q .V . . . .
13.083	0.4053	0.80	.Q .V . . . .
13.167	0.4109	0.82	.Q .V . . . .
13.250	0.4166	0.83	.Q .V . . . .
13.333	0.4224	0.84	.Q . V . . . .
13.417	0.4283	0.86	.Q . V . . . .
13.500	0.4343	0.87	.Q . V . . . .
13.583	0.4404	0.89	.Q . V . . . .
13.667	0.4466	0.90	.Q . V . . . .
13.750	0.4529	0.92	.Q . V . . . .
13.833	0.4594	0.94	.Q . V . . . .
13.917	0.4659	0.95	.Q . V . . . .
14.000	0.4726	0.97	.Q . V . . . .
14.083	0.4795	1.00	.Q . V . . . .
14.167	0.4867	1.04	. Q . V . . . .
14.250	0.4942	1.08	. Q . V . . . .
14.333	0.5019	1.12	. Q . V . . . .
14.417	0.5099	1.16	. Q . V . . . .
14.500	0.5182	1.20	. Q . V . . . .
14.583	0.5267	1.24	. Q . V . . . .
14.667	0.5356	1.29	. Q . V . . . .
14.750	0.5449	1.34	. Q . V . . . .
14.833	0.5545	1.40	. Q . V . . . .
14.917	0.5646	1.46	. Q . V . . . .
15.000	0.5752	1.54	. Q . V . . . .
15.083	0.5863	1.61	. Q . V . . . .
15.167	0.5980	1.70	. Q . V . . . .
15.250	0.6104	1.79	. Q . V . . . .
15.333	0.6235	1.91	. Q . V . . . .
15.417	0.6373	2.00	. Q . V . . . .
15.500	0.6509	1.98	. Q . V . . . .
15.583	0.6649	2.03	. Q . V. . . .
15.667	0.6805	2.26	. Q . V. . . .
15.750	0.6980	2.55	. Q . V. . . .
15.833	0.7189	3.04	. Q . V . . .
15.917	0.7444	3.69	. Q . .V . . .
16.000	0.7786	4.98	. Q. . . V . . .
16.083	0.8361	8.34	. . Q . V . . .
16.167	0.9405	15.17	. . . V Q . .
16.250	1.0140	10.66	. . .Q V . . .
16.333	1.0451	4.53	. Q. . . V. . .
16.417	1.0640	2.73	. Q . . V . .
16.500	1.0796	2.28	. Q . . V . .
16.583	1.0936	2.02	. Q . . .V . .
16.667	1.1059	1.78	. Q . . .V . .
16.750	1.1168	1.59	. Q . . .V . .
16.833	1.1268	1.45	. Q . . . V . .

| | | |

22.833	1.3716	0.27	Q	.	.	.	V.
22.917	1.3735	0.27	Q	.	.	.	V.
23.000	1.3753	0.27	Q	.	.	.	V.
23.083	1.3771	0.27	Q	.	.	.	V.
23.167	1.3789	0.26	Q	.	.	.	V.
23.250	1.3807	0.26	Q	.	.	.	V.
23.333	1.3825	0.26	Q	.	.	.	V.
23.417	1.3843	0.26	Q	.	.	.	V.
23.500	1.3861	0.26	Q	.	.	.	V.
23.583	1.3878	0.25	Q	.	.	.	V.
23.667	1.3896	0.25	Q	.	.	.	V.
23.750	1.3913	0.25	Q	.	.	.	V.
23.833	1.3930	0.25	Q	.	.	.	V.
23.917	1.3947	0.25	Q	.	.	.	V.
24.000	1.3964	0.25	Q	.	.	.	V.
24.083	1.3979	0.22	Q	.	.	.	V.
24.167	1.3986	0.10	Q	.	.	.	V.
24.250	1.3987	0.02	Q	.	.	.	V.
24.333	1.3987	0.00	Q	.	.	.	V.

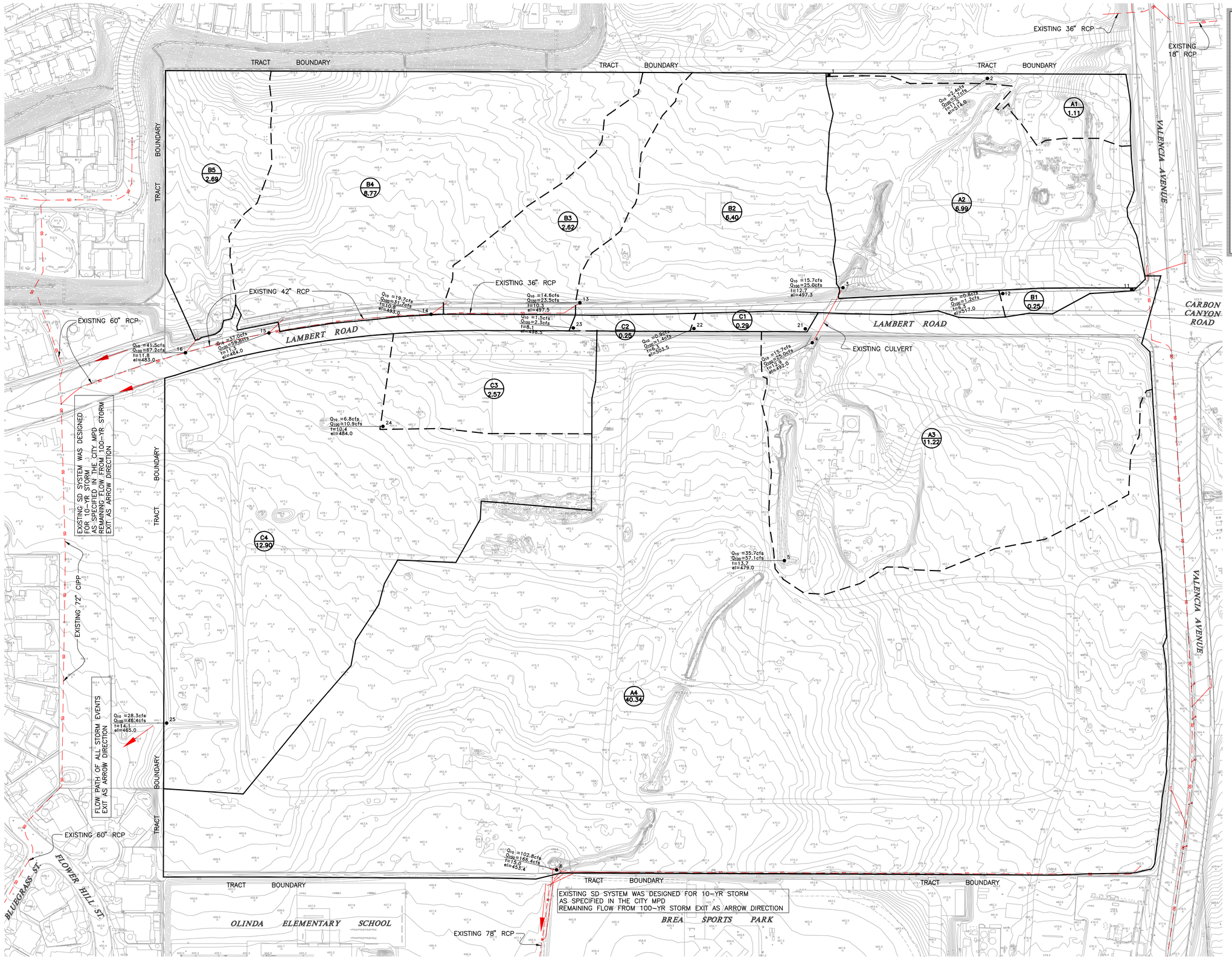
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	110.0
20%	35.0
30%	20.0
40%	15.0
50%	15.0
60%	10.0
70%	10.0
80%	5.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

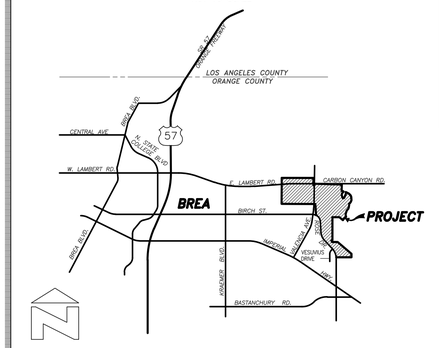
SECTION 9

HYDROLOGY MAPS



VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 25 — NODE NUMBER
- A1 / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{25} =8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- OVER FLOW PATH

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

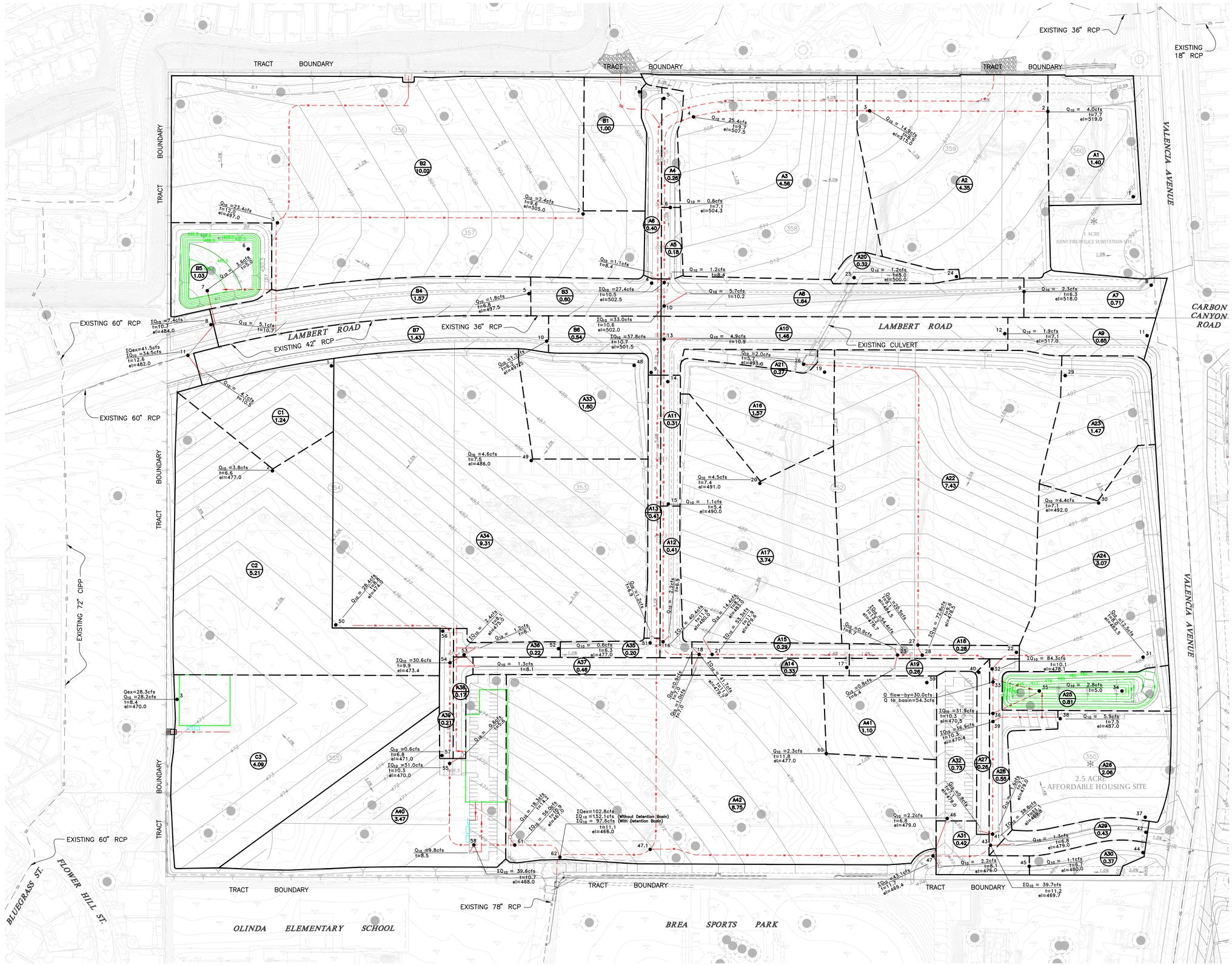
BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

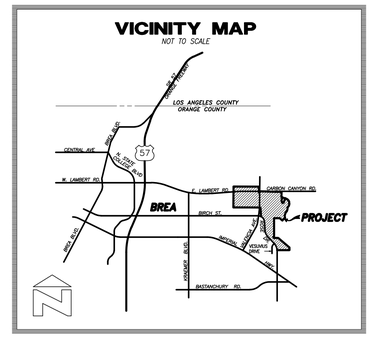
HYDROLOGY MAP
BREA 265 - WEST AREA
EXISTING CONDITION
10-yr & 100-yr STUDY

W.O. #4213-3X

K-1378

F:\0477\Engineering\SY_Hydrology\Brea265-Existing-West-10yr.dwg





LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- MWS
- WQ / DETENTION BASIN
- EXISTING STORM DRAIN

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

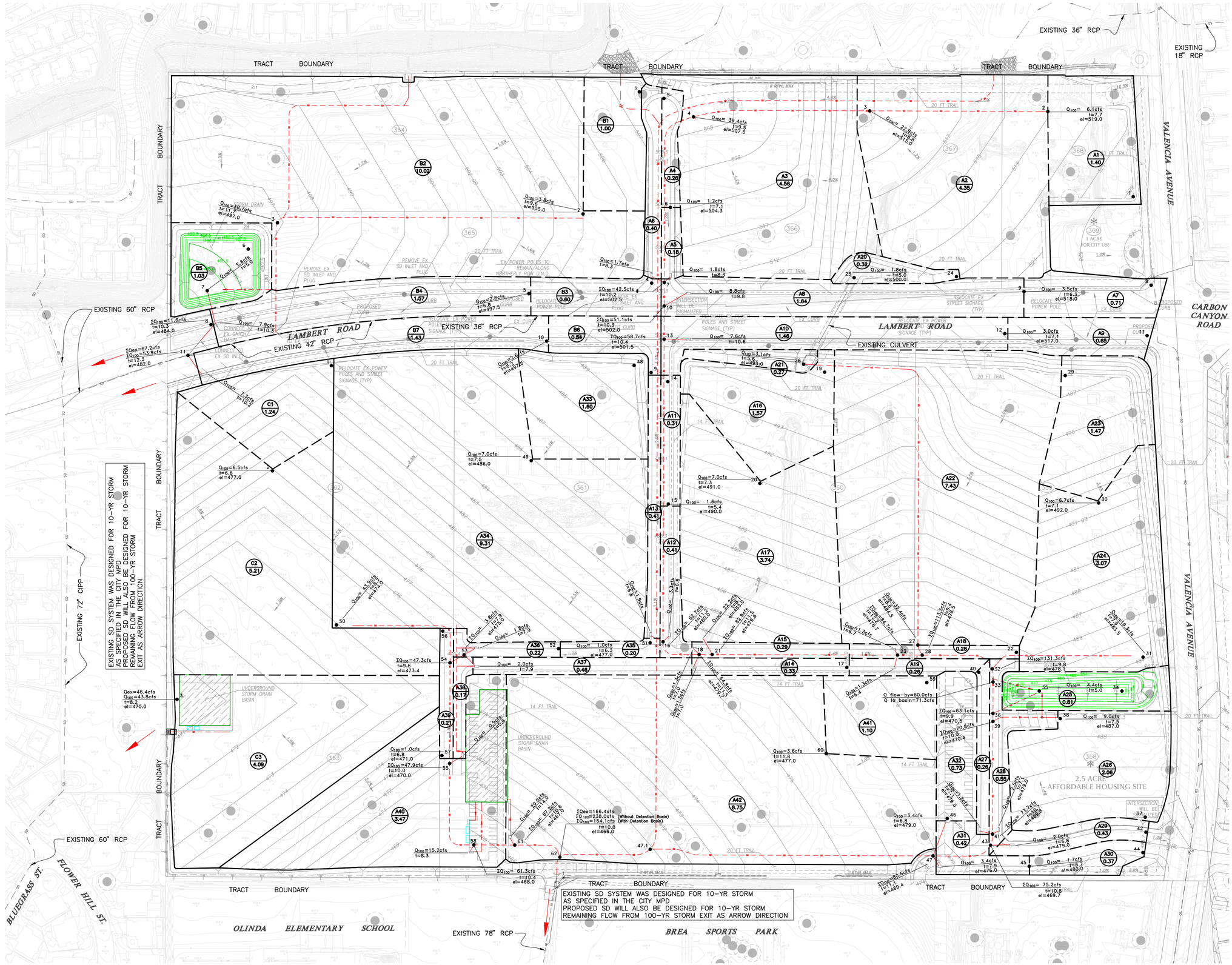
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

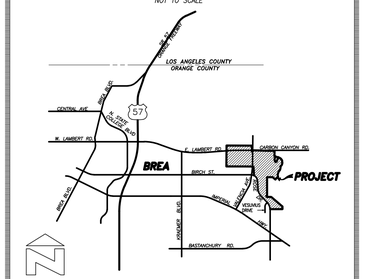
HYDROLOGY MAP
BREA 265 - WEST AREA
PROPOSED CONDITION
10-yr STUDY
WITH A DETENTION BASIN

WO: 4213-3



VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- MWS
- WQ / DETENTION BASIN
- EXISTING STORM DRAIN
- OVER FLOW PATH

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

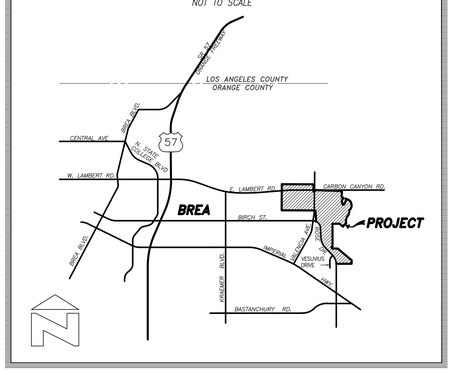
HYDROLOGY MAP
BREA 265 - WEST AREA
PROPOSED CONDITION
100-yr STUDY
WITH A DETENTION BASIN

WO: 4213-3



VICINITY MAP

NOT TO SCALE



LEGEND

———	MAJOR DRAINAGE BOUNDARY
– – – –	MINOR DRAINAGE BOUNDARY
25 ●	NODE NUMBER
A1 / 1.0	AREA DESIGNATION AREA ACREAGE (IN ACRES)
Q_{25} =8.0cfs t=15.0	PEAK FLOW RATE TIME OF CONCENTRATION
D	SOIL GROUP

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED FOR:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

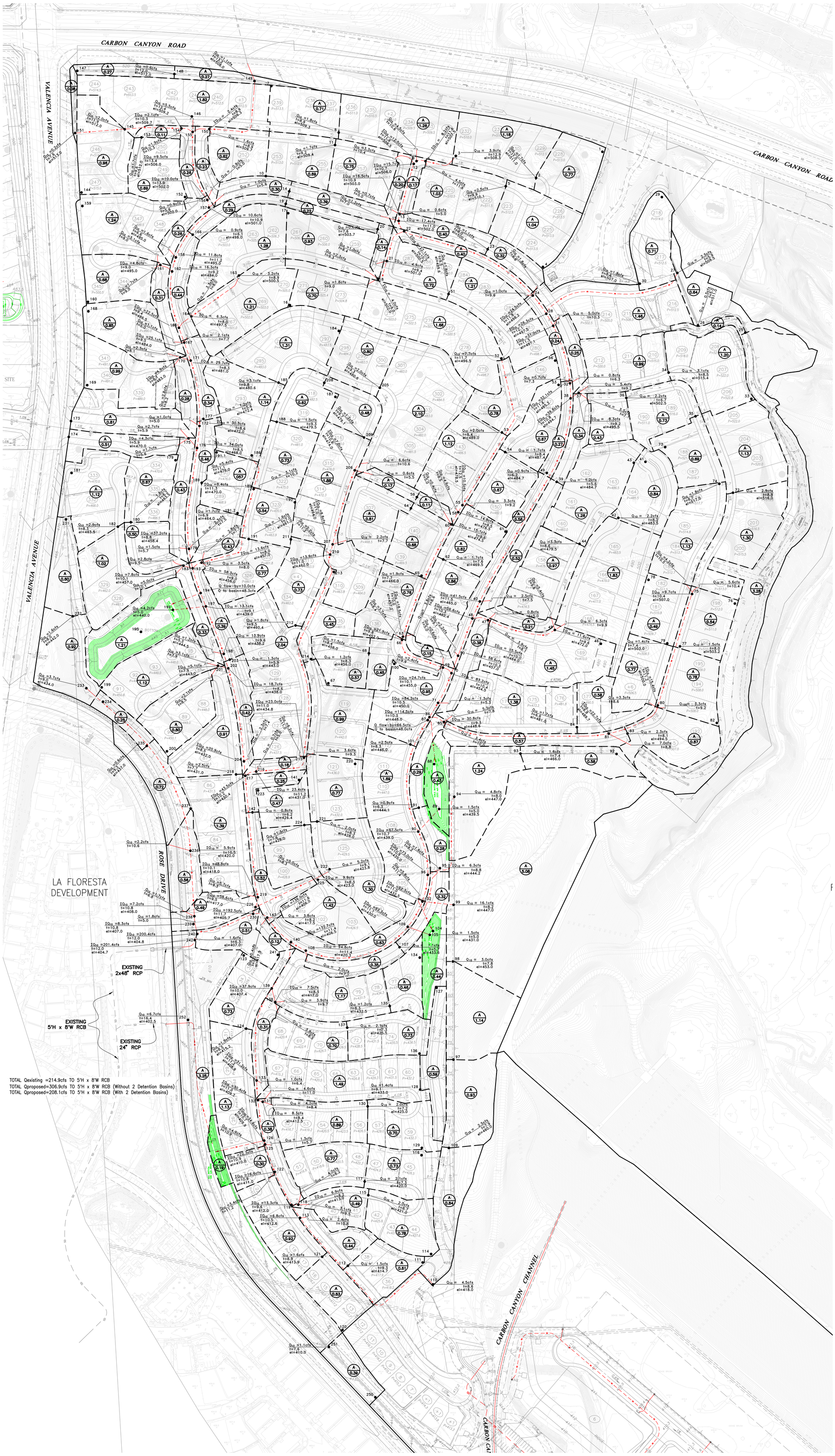
PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - EAST AREA
10-yr & 100-yr STUDY
EXISTING CONDITION

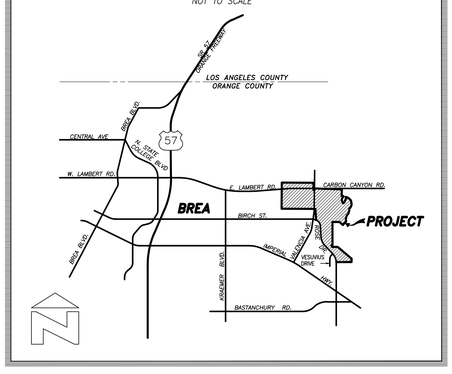
W.O. #4213-3X

F:\0477\Engineering\SY_Hydrology\Brea265-Existing-East-10yr.dwg



VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 25 — NODE NUMBER
- A1 / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

HUNSAKER & ASSOCIATES
I R V I N E , I N C .
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

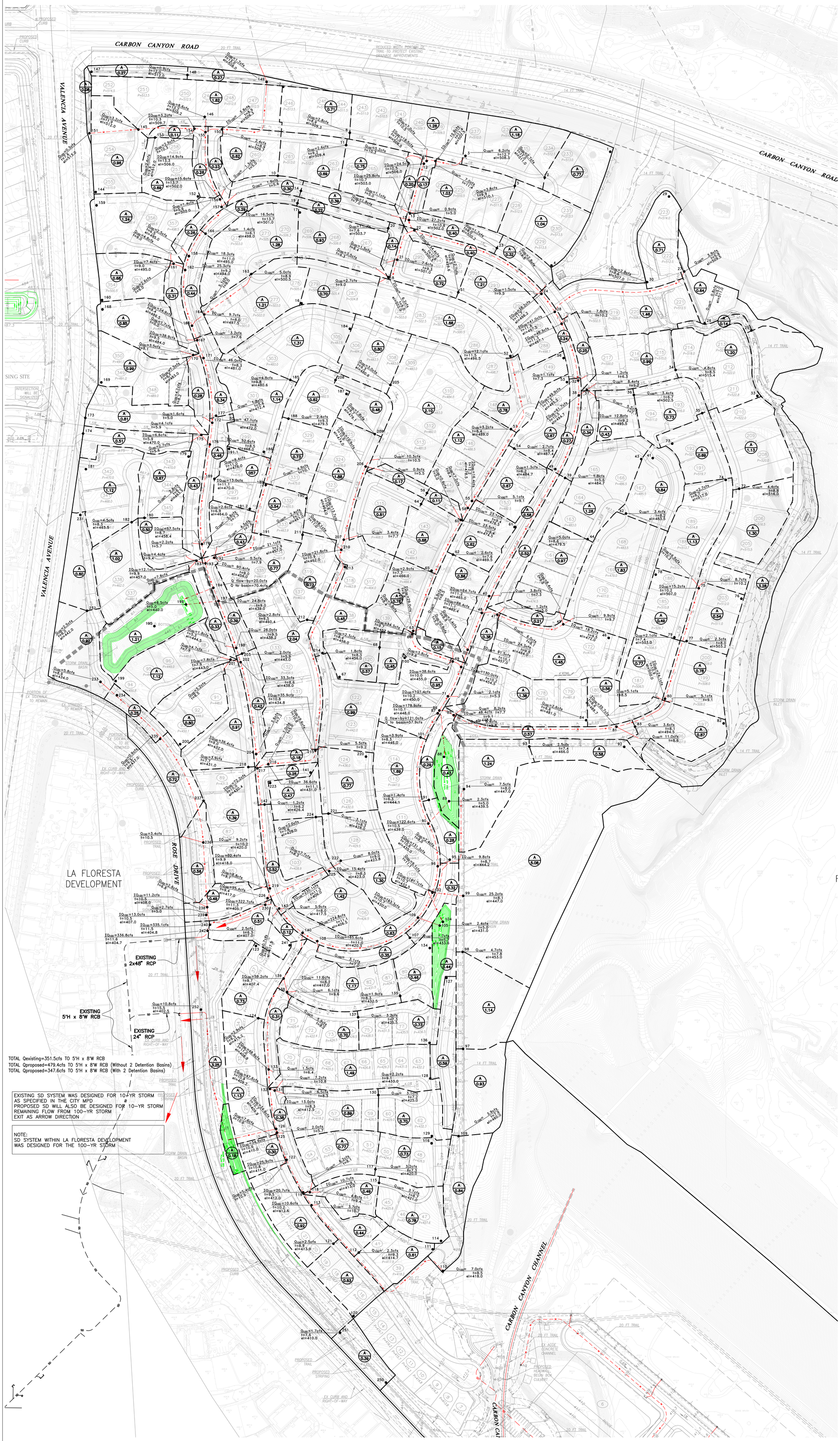
PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - EAST AREA
PROPOSED CONDITION
10-yr STUDY
WITH 2 DETENTION BASINS

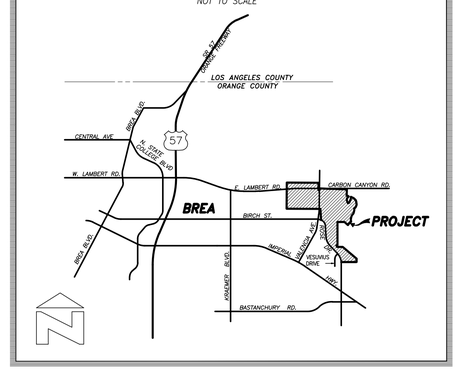
WO: 4213-3

F:\0477\Engineering\SY_Hydrology\Brea265-Proposed-East-With Detention Basins-10yr.dwg



VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 25 — NODE NUMBER
- A1 / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- OVER FLOW PATH

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:
HUNSAKER & ASSOCIATES
I R V I N E , I N C .
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

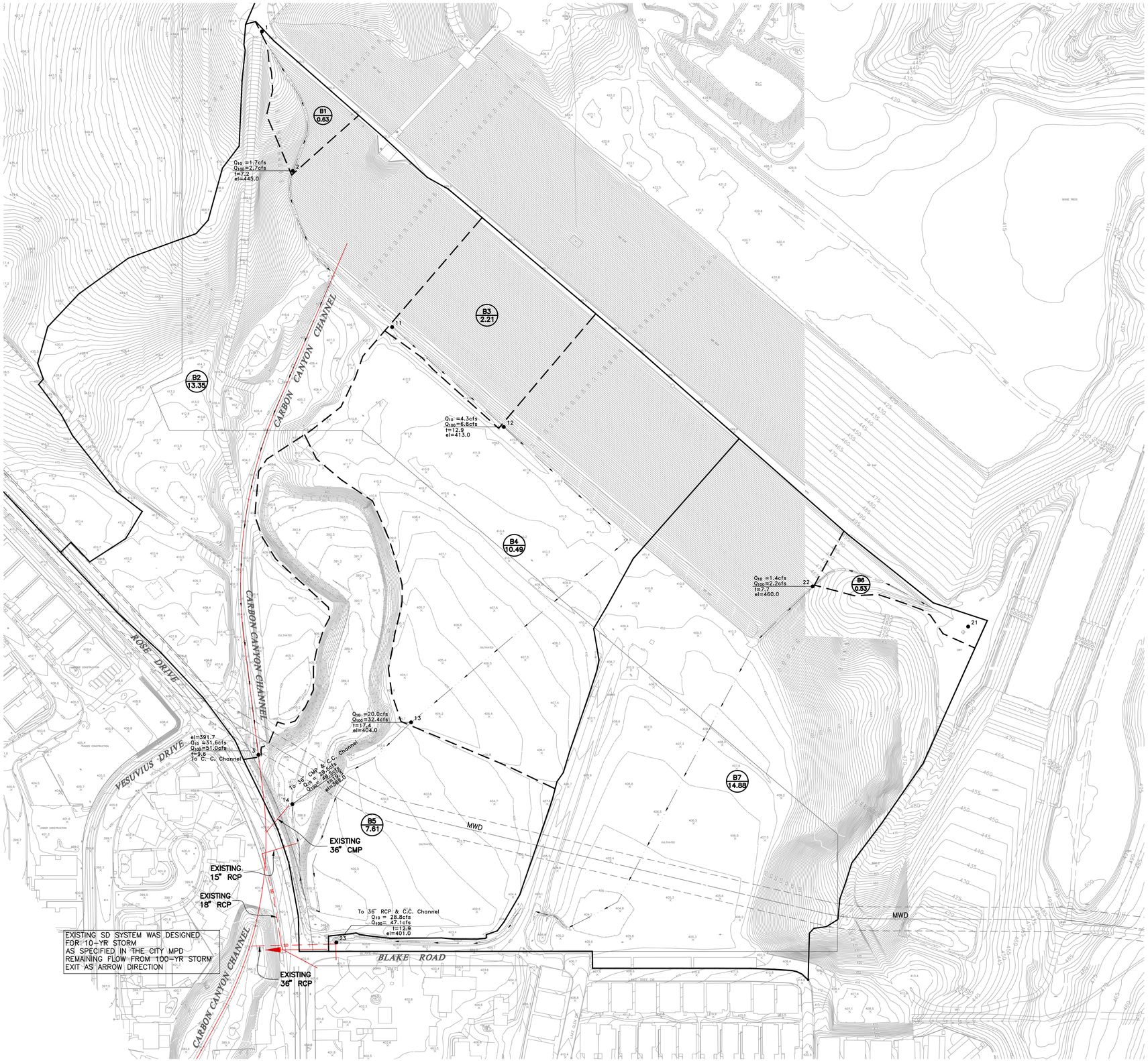
PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - EAST AREA
PROPOSED CONDITION
100-yr STUDY
WITH 2 DETENTION BASINS

WO: 4213-3

F:\0477\Engineering\SY_Hydrology\Brea265-Proposed-East-With Detention Basins.dwg



VICINITY MAP

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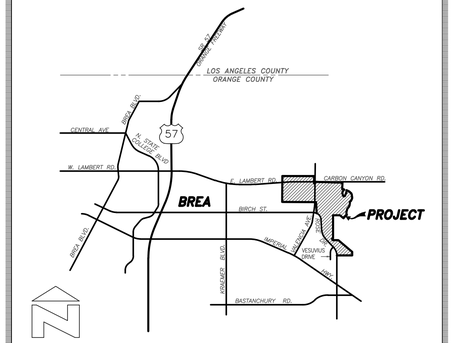

LEGEND

———	MAJOR DRAINAGE BOUNDARY
- - - -	MINOR DRAINAGE BOUNDARY
25 ●	NODE NUMBER
A1 / 1.0	AREA DESIGNATION AREA ACREAGE (IN ACRES)
Q_{100}=8.0cfs t=15.0	PEAK FLOW RATE TIME OF CONCENTRATION
D	SOIL GROUP
◄———	OVER FLOW PATH

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED FOR:

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NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - SOUTHEAST AREA
EXISTING CONDITION
10-yr & 100-yr STUDY

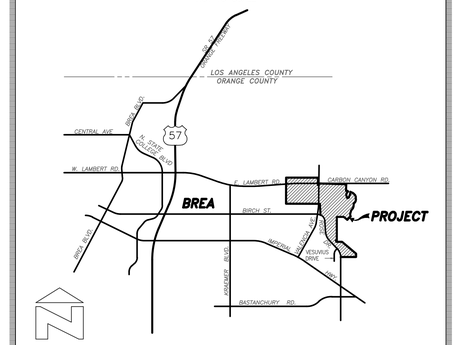
W.O. #4213-3X


CARBON CANYON CHANNEL
ROSE DRIVE
VESUVIUS DRIVE
BLAKE ROAD
LA FLORESTA DEVELOPMENT
MWD
EXISTING 36" CMP
EXISTING 15" RCP
EXISTING 18" RCP
EXISTING 36" RCP
B1 0.33
B2 2.74
B3 0.59
B4 1.16
B5 0.52
B6 0.29
B7 0.78
B8 1.50
B9 0.41
B10 0.46
B11 0.34
B12 0.29
B13 0.36
B14 2.45
B15 1.51
B16 0.37
B17 0.40
B17a 0.58
B18 2.01
B19 3.51
B20 0.23
B21 3.15
B22 0.40
B23 0.63
B24 5.00
B25 0.35
B26 1.36
B27 0.74
B28 1.99
B29 0.64
B30 1.46
B31 1.33
B32 1.50
B33 0.88
B34 0.25
B35 0.51
B36 0.32
B37 0.16
B38 0.80
B39 0.55
B40 0.62
B41 5.46
Q10 =1.5cfs t=9.1 el=414.0
Q10 =9.1cfs t=6.8 el=407.0
Q10 =4.0cfs t=11.1 el=411.8
ΣQ10 =12.5cfs t=7.2 el=406.3
Q10 =1.3cfs t=9.2 el=408.0
Q10 =1.9cfs t=10.3 el=405.9
Q10 =1.7cfs t=6.5 el=400.0
ΣQ10 =39.4cfs t=9.5 el=388.0
Q10 =4.0cfs t=12.5 el=413.0
Q10 =1.7cfs t=7.7 el=460.0
Q10 = 13.3cfs t=9.4 el=408.0
Q10 =2.1cfs t=9.1 el=409.0
ΣQ10 =38.0cfs t=8.9 el=403.4
ΣQ10 =55.1cfs t=9.8 el=402.8
ΣQ10 =55.7cfs t=9.8 el=401.9
ΣQ10 =29.8cfs t=10.9 el=394.3
Q10 =30.8cfs t=7.6 el=411.0
Q10 =58.0cfs t=9.8 el=405.0
Q10 =0.9cfs t=9.1 el=405.0
Q10 =2.8cfs t=9.0 el=395.0
Q10 =3.9cfs t=7.7 el=401.0
Q10 =7.0cfs t=9.0 el=390.0
Q10 =29.7cfs t=9.5 el=407.5
Q10 =2.6cfs t=9.0 el=407.1
Q10 = 2.7cfs t=9.0 el=407.0
Q10 =1.7cfs t=9.2 el=408.0
Q10 =1.1cfs t=9.2 el=410.0
Q10 =1.1cfs t=9.2 el=407.1
Q10 =4.1cfs t=9.4 el=407.1
Q10 =1.6cfs t=9.4 el=407.1
Q10 =1.4cfs t=9.4 el=407.1
Q10 =1.4cfs t=5.7 el=405.2
Q10 =15.1cfs t=7.7 el=404.2
Q10 =13.2cfs t=7.6 el=406.3
Q10 =8.9cfs t=7.7 el=410.0
Q10 =1.2cfs t=7.7 el=410.0
Q10 =8.7cfs t=7.7 el=408.0
Q10 = 6.7cfs t=9.8
Q10 = 2.7cfs t=9.8 el=407.0
Q10 = 2.1cfs t=9.1 el=409.0
Q10 = 0.9cfs t=9.8 el=405.0
Q10 = 1.7cfs t=9.8 el=405.0
Q10 = 1.4cfs t=9.8 el=405.0
Q10 = 1.6cfs t=9.8 el=405.0
Q10 = 1.1cfs t=9.8 el=405.0
Q10 = 1.1cfs t=9.8 el=405.0
Q10 = 1.1



VICINITY MAP

NOT TO SCALE



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IRVINE, INC.
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Three Hughes ▪ Irvine, CA 92618 ▪ PH.(949) 583-1010 ▪ FX: (949) 583-0759

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HYDROLOGY MAP
BREA 265 - SOUTHEAST AREA
PROPOSED CONDITION
100-yr STUDY
WITH A FLOW-BY DETENTION BASIN

WO: 4213-3

F:\0477\Engineering\SY_Hydrology\Brea265-Proposed-South-East-With Detention Basin.dwg

SECTION 10

REFERENCES

STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA
T.T. 16934 - REMEDIAL GRADING
CITY OF BREA

STORM DRAIN NOTES:

1. ALL CONCRETE IN REINFORCED CONCRETE STRUCTURES MUST BE 3250 PSI IN 28 DAYS, TYPE V PORTLAND CEMENT CONCRETE, CLASS A.

2. ALL PIPE LENGTHS SHALL BE HORIZONTAL PROJECTIONS UNLESS OTHERWISE SHOWN.

3. SHORING SHALL BE PROVIDED FOR TRENCH EXCAVATIONS IN NATIVE SOIL TO SATISFY STATE OF CALIFORNIA SAFETY REQUIREMENTS.

4. ALL PIPE CONSTRUCTION WITHIN THE FILL AREA MUST BE COORDINATED WITH THE GRADING WORK TO INSURE THAT WHEN THE FILL OPERATION HAS BEEN COMPLETED AT GRADE, THERE IS A MINIMUM OF ONE FOOT ABOVE THE TOP OF PIPE OR TO A MAXIMUM OF FIVE FEET ABOVE THE PROPOSED SUBGRADE OF THE PIPE, THE STORM DRAIN SHALL BE EXCAVATED AND THE PIPE INSTALLED.

5. ALL WORK SHALL CONFORM TO THE ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT'S (PF&RD) STANDARD SPECIFICATIONS. THESE SPECIFICATIONS, WHICH CAN BE PURCHASED FROM THE COUNTY, SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

6. THE CONTRACTOR MUST NOTIFY THE CITY OF BREA INSPECTOR AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION (714) 990-7689.

7. ALL FILLS SHALL BE COMPACTED TO 90% RELATIVE COMPACTION AS DETERMINED BY THE CALIFORNIA TEST METHOD NO. 216-F, 1963 "FIVE LAYER METHOD". ALL BACKFILL MATERIAL MUST BE FREE OF ORGANIC MATTER.

8. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE ALL SURVEYING REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT. AT THE REQUEST OF THE CITY OF BREA SUFFICIENT REFERENCE STAKING SHALL BE PROVIDED.

9. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH PIPE BEDDING DETAIL PER PF&RD STANDARD PLAN 1319.

10. PRIOR TO THE PLACEMENT OF STORM DRAIN IMPROVEMENTS, THE DEVELOPER'S SOIL ENGINEER SHALL CERTIFY IN WRITING TO THE CITY ENGINEER THAT THE STORM DRAIN'S SUBGRADE IS OF ADEQUATE STRENGTH TO SUPPORT THE STRUCTURES AND ANTICIPATED LOADS.

11. PRIOR TO BEGINNING CONSTRUCTION WORK, THE DEVELOPER'S CONTRACTOR SHALL OBTAIN A PERMIT FROM THE STATE DIVISION OF INDUSTRIAL SAFETY. A COPY OF THE PERMIT SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

12. WHEN APPLICABLE, THE DEVELOPER SHALL OBTAIN A PERMIT FROM THE STATE DEPARTMENT OF FISH AND GAME IN ACCORDANCE WITH SECTION 1602 OF THE CALIFORNIA FISH AND GAME CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

13. ALL CONTINUOUS STEEL SHALL BE LAPPED A MINIMUM OF 45 BAR DIAMETERS.

14. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 INCH MINIMUM.

15. A CITY OF BREA ENCROACHMENT PERMIT WILL BE REQUIRED TO PERFORM WORK WITHIN THE PUBLIC RIGHT-OF-WAY. ALL WORK SHALL CONFORM TO THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT.

16. THE LENGTH OF MANHOLE STRUCTURES MAY BE INCREASED TO MEET PIPE ENDS AS LONG AS THE REINFORCING STEEL IS CONTINUED AS REQUIRED. THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE MUST APPROVE ANY CHANGE IN SPUR LOCATION.

17. THE FLOOR OF THE MANHOLE STRUCTURES SHALL BE STEEL TROWELED TO THE SPRING LINE.

18. THE BODY OF THE MANHOLE STRUCTURES, INCLUDING SPUR, MUST BE POURED IN ONE CONTINUOUS OPERATION. A CONSTRUCTION JOINT AT THE SPRING LINE, WITH A LONGITUDINAL KEYWAY, WILL BE PERMITTED.

19. ALL REINFORCING BARS MUST BE SECURELY HELD IN PLACE IN THE FORMS. EACH MAT OF STEEL MUST BE TIE-WIRED TOGETHER TWO WAYS AT ALTERNATE INTERSECTIONS.

20. STORM DRAIN BACKFILL FOR ALL FACILITIES WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PLACED AND COMPACTED IN THE PRESENCE OF THE CITY OF BREA'S PUBLIC WORKS INSPECTOR AND MEET OR EXCEED MINIMUM PF&RD STANDARDS.

21. ALL PIPES SHALL BE BANDED AND GROUTED.

22. ALL AREA DRAIN PIPES SHALL BE:
   A. ACRYLONITRILE BUTADIENE STYRENE (ABS) SOLID WALL PIPE CONFORMING TO ASTM D2751, SDR35;
   B. POLYVINYL CHLORIDE PLASTIC (PVC) PIPE CONFORMING TO ASTM D3034, SDR35;
   C. ASBESTOS CEMENT PIPE CONFORMING TO ASTM C-663; OR
   D. AN APPROVED EQUAL.

23. R.C.P. SHALL COMPLY WITH ALL ASTM APPLICABLE STANDARDS.

24. CONSTRUCTION MATERIALS AND METHODS SHALL BE SUBJECT TO APPROVAL BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

25. CONSTRUCTION HOURS OF OPERATION SHALL BE BETWEEN 7:00AM AND 3:30PM, MONDAY THROUGH FRIDAY. CONSTRUCTION DURING HOURS OTHER THAN THOSE SPECIFIED SHALL REQUIRE A WRITTEN AUTHORIZATION FROM THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.

26. STATE LAW SB 3019 REQUIRES THE CONTRACTOR TO OBTAIN AN IDENTIFICATION NUMBER FROM UNDERGROUND SERVICE ALERT (USA) PRIOR TO THE ISSUANCE OF A CITY ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY USA TWO FULL WORKING DAYS (MINIMUM 48 HOURS) PRIOR TO ANY CONSTRUCTION ACTIVITIES, INCLUDING PAVEMENT OVERLAY, EXCAVATION AND ASPHALT CONCRETE OVERLAY, WHICH COULD AFFECT UNDERGROUND UTILITIES.

27. ANY CONTRACTORS OR SUBCONTRACTORS PERFORMING WORK ON THIS PROJECT SHALL FAMILARIZE THEMSELVES WITH THE SITE AND BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM THEIR OPERATIONS, WHETHER OR NOT SUCH FACILITIES ARE SHOWN ON THE PLANS.

28. PRIOR TO BEGINNING ANY CONSTRUCTION, WORK WHICH COULD DAMAGE OR CONFLICT WITH UNDERGROUND STRUCTURES OR UTILITIES, THE CONTRACTOR SHALL EXCAVATE INSPECTION HOLES TO DETERMINE THE LOCATION AND DEPTH OF SAID STRUCTURES AND FACILITIES.

29. PRIOR TO TAKING WATER FROM A FIRE HYDRANT, THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO OBTAIN A HYDRANT WATER METER FROM THE RESPONSIBLE WATER DISTRICT.

30. IF UTILITIES OR OTHER FACILITIES CONFLICT WITH THE PROPOSED IMPROVEMENTS, WORK SHALL STOP AND THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE SHALL BE NOTIFIED IMMEDIATELY.

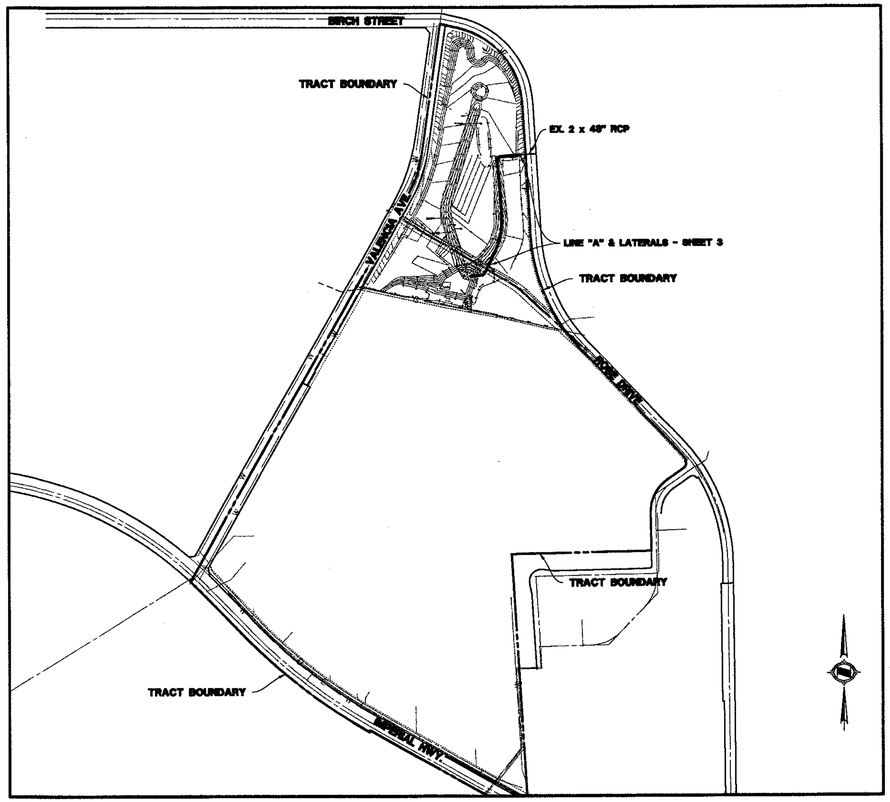
31. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED OR ALTERED EXISTING IMPROVEMENTS WITHIN THE PUBLIC RIGHT-OF-WAY AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

32. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL AT ALL TIMES.

33. SURVEY MONUMENTS SHALL BE PROTECTED AND PERPETUATED IN PLACE. DISTURBED OR COVERED MONUMENTS SHALL BE RESET BY A REGISTERED CIVIL ENGINEER WHO IS AUTHORIZED TO PRACTICE LAND SURVEYING, OR A LICENSED LAND SURVEYOR.

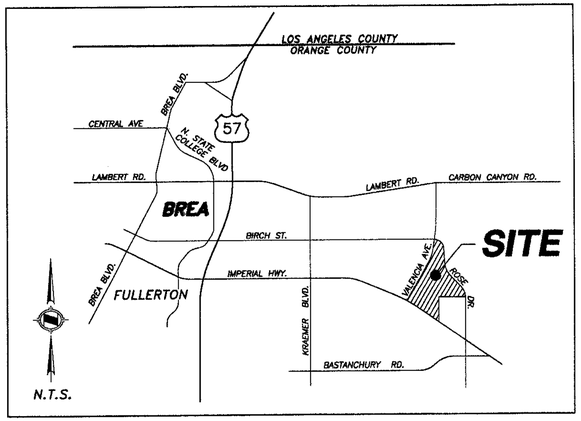
34. IRRIGATION LINES SHALL BE REMOVED, RELOCATED OR RECONSTRUCTED AS SHOWN OR AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE, IN THE FIELD.

35. NEW AND EXISTING MANHOLES AND WATER VALVES SHALL BE ADJUSTED TO FINISHED GRADE.



INDEX MAP
NO SCALE

VICINITY MAP



UTILITIES

CITY OF BREA -----	1 CIVIC CENTER CIRCLE, BREA CA 92821	(714) 990-7600
SEWER & WATER ---	CITY OF BREA	(714) 990-7600
STORM DRAIN ------	COUNTY OF ORANGE	(714) 834-4643
ELECTRIC ---------	SOUTHERN CALIFORNIA EDISON	(714) 870-3231
TELEPHONE -------	PACIFIC BELL TELEPHONE	(714) 666-5588
CABLE T.V. -------	ADELPHIA CABLE	(714) 338-2000
GAS -------------	SOUTHERN CALIFORNIA GAS COMPANY	(714) 422-4133

SHEET INDEX

1- TITLE SHEET, INDEX MAP, NOTES
2- ESTIMATE OF QUANTITIES, DETAILS
3- LINE "A", STA. 10+00.00 TO 18+22.06

STORM DRAIN NOTES: (CONTINUED)

36. PRIOR TO PAVING OF STREET, ALL UTILITIES SHALL BE INSTALLED, TESTED AND APPROVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE APPROPRIATE SERVING UTILITY COMPANY AND VERIFYING THAT THE UTILITY FACILITY IS IN PLACE BEFORE PAVING.

37. TRENCH BACKFILL SHALL BE PROVIDED IN ACCORDANCE WITH THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT OR IN ACCORDANCE WITH APWA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION, AND PER RECOMMENDATION OF THE SOILS ENGINEER.

38. THE CONTRACTOR SHALL NOT ORDER OR PLACE ANY CONCRETE OR ASPHALT CONCRETE PAVING UNTIL THE FORMS AND SUBGRADE OR AGGREGATE BASE HAS BEEN INSPECTED AND APPROVED IN THE FIELD BY THE CITY'S INSPECTOR.

39. THE CONTRACTOR SHALL REMOVE AND REPLACE, IN KIND, A MINIMUM OF ONE FOOT OF EXISTING ASPHALT CONCRETE AND AGGREGATE BASE ADJACENT TO NEWLY CONSTRUCTED CURB AND GUTTER.

40. THE FINAL OR SURFACE LAYER OF ASPHALT CONCRETE SHALL NOT BE PLACED UNTIL ALL ON-SITE IMPROVEMENTS, INCLUDING GRADING HAVE BEEN COMPLETED AND ALL UNACCEPTABLE WORK HAS BEEN CORRECTED, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

41. "AS-BUILT" RECORD DRAWINGS SHALL BE FURNISHED TO THE CITY UPON COMPLETION OF CONSTRUCTION.

42. APPROVAL OF THESE PLANS BY THE CITY OR IT'S AGENTS SHALL NOT RELIEVE THE CONTRACTOR OR THE APPLICANT FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE REVISIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.

UNDERGROUND SERVICE ALERT

CALL BEFORE YOU DIG

Call:Toll FREE
1-800-422-4133
TWO WORKING DAYS
BEFORE YOU DIG

"CAUTION": Remember that the USA Center notifies only those utilities belonging to the center. There could be other utilities present at the work site. The center will inform you of whom they will notify.

MAP DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
10/18/06 BY: RRW
DATE OF THIS PLOT
10/30/06

LEGEND & ABBREVIATIONS

FIRE HYDRANT	
STREET LIGHT	
FUTURE	
EXISTING	
S.D. LINE	
RIGHT-OF-WAY	
SEWER	S
WATER	W
STREET NAME SIGN	
BUTTERFLY VALVE	
TRACT BOUNDARY	
TRENCH LIMITS	

FS	FINISH SURFACE
TC	TOP OF CURB
FL	FLOW LINE
CL	CENTER LINE
BC	BEGIN CURVE
EC	END CURVE
BCR	BEGIN CURB RETURN
ECR	END CURB RETURN
BVC	BEGIN VERTICAL CURVE
EVC	END VERTICAL CURVE
CB	CATCH BASIN
LF	LINEAR FEET
LS	LUMP SUM
CY	CUBIC YARD
EA	EACH
MH	MANHOLE
JS	JUNCTION STRUCTURE
SF	SQUARE FEET

NOTICE TO CONTRACTOR:

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. NO CERTIFICATION IS MADE TO THE ACCURACY OR THOROUGHNESS OF THESE RECORDS. APPROVAL OF THIS PLAN BY THE CITY OF BREA DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF LOCATION OR THE EXISTENCE OF ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE OWNER BY ACCEPTING THESE PLANS OR PRECEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME THE LIABILITY AND THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED. THE CONTRACTOR IS REQUIRED TO TAKE ALL DUE PRECAUTIONARY MEANS TO PROTECT ALL UTILITY LINES AND STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITY OR STRUCTURES CONCERNED BEFORE STARTING WORK.

2. PURSUANT TO ASSEMBLY BILL 3019, NO EXCAVATION PERMIT IS VALID UNLESS UNDERGROUND SERVICE ALERT HAS BEEN CONTACTED AND HAS PROVIDED INQUIRY I.D. NUMBER.

3. CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. PRIOR TO THE CONSTRUCTION OF ANY CONCRETE STRUCTURE, THE CONTRACTOR SHALL VERIFY WITH THE SOILS ENGINEER THE TYPE OF CONCRETE RECOMMENDED.

5. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, ANY UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

6. CONTRACTOR AGREES THAT IN ACCORDANCE WITH THE GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL ASSUME THE SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING THE COURSE AND CONSTRUCTION OF THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSON AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, ENGINEER AND THE CITY OF BREA HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT. EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, ENGINEERING OR CITY OF BREA.

BENCHMARK: OCS BM: 2C - 88 - 70
150 FT. SOUTHWEST ALONG VALENCIA AVENUE FROM THE CROSSING OF THE SOUTHERN PACIFIC RAILWAY TO THE INTERSECTION OF DATE STREET; 81 FT. SOUTHEAST OF THE CENTERLINE OF VALENCIA AVENUE, 21 FT. NORTHEAST OF THE CENTERLINE OF DATE STREET, SET IN THE TOP OF THE SOUTHWEST CORNER OF A 5 FT. BY 5 FT. CONCRETE CATCH BASIN, LEVEL WITH THE SIDEWALK.
ELEVATION = 377.210 NGVD 29 / 1985 OCS ADJUSTMENT

BASIS OF BEARINGS:
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN OCS HORIZONTAL CONTROL STATION GPS NO. 517081 AND STATION GPS NO. 517841, BEING N24°02'56"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER/DEVELOPER:
CHEVRON LAND & DEVELOPMENT COMPANY
2929 Imperial Highway, Suite 200
Brea, California 92821
Phone:(714) 577-1372
Fax:(714) 577-1377

SOIL FIRM:
Alba-Keefe & Associates, Inc.
1403 N. BATAVIA STREET, SUITE 115
ORANGE, CA 92867
(714)755-1355 FAX (714)755-1366

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
PH: (949) 583-1010 • FX: (949) 583-0759

EDWARD A. MANDICH
R.C.E. 59089
11-8-06
DATE
EXP. DATE 06/30/07

REGISTERED PROFESSIONAL ENGINEER
EDWARD A. MANDICH
No. 59089
Exp. 06/30/07
CIVIL
STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER TONY OLMOS
56814 RCE
11/8/06 DATE

PLAN SCALE
1"=40'
(OR AS SHOWN)
PROFILE SCALE
1"=40' HORIZ.
1"=8' VERT.
(OR AS SHOWN)
DRAWN BY: T.T.
DESIGN BY: T.T.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT PLANS - LA FLORESTA
T.T. 16934 - REMEDIAL GRADING
TITLE SHEET, INDEX MAP, NOTES
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
1 OF 3

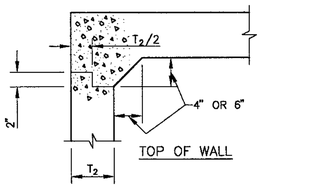
K-1389

L:\Unocal\HartleyCenter\IMP\STORM FOR REMEDIAL\SHT01.dwg

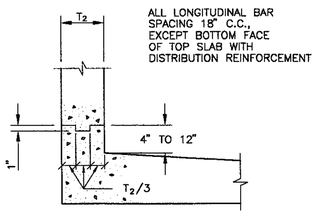
W.O. 0433-357 DIM DOC. NO. 70959
STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA TRACT 16934 CITY OF BREA

BOX SECTION		A	B	Upstream T.S. C-C
Design Cover		10'	18'	8'
Width	W	8'-0"	8'-0"	10'-0"
Height	H	5'-0"	5'-0"	4'-0"
Top Slab Thickness	T_1	10"	13.25"	10.50"
Side Wall Thickness	T_2	8"	9.5"	9"
Bottom Slab Thickness	T_3	10.5"	14"	11.25"
B Bars	Bar No. & Spacing	#9@20"	#9@15"	#9@20"
	Length	9'-1"	9'-4"	11'-3"
B_1 Bars	Bar No. & Spacing	#5@20"	#4@15"	#6@20"
	Length	5'-3"	5'-6"	6'-6"
C Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Horiz. Length	3'-8.5"	3'-10"	4'-4"
	Vert. Length	5'-3"	5'-7"	4'-4"
C_1 Bars	Bar No. & Spacing	#4@14"	#4@13"	#5@13"
	Horiz. Length	1'-5"	3'-10"	1'-10"
	Vert. Length	2'-11"	1'-10"	4'-4"
C_2 Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Horiz. Length	3'-9"	3'-10"	4'-4"
	Vert. Length	3'-0"	3'-4"	3'-1"
C_3 Bars	Bar No. & Spacing	#4@14"	#4@13"	#5@13"
	Horiz. Length	1'-4"	3'-10"	1'-10"
	Vert. Length	2'-7"	2'-7"	2'-8"
D Bars	Bar No. & Spacing	#4@18"	#4@18"	#4@18"
	Length	6'-6"	7'-0"	5'-7"
F Bars	Bar No. & Spacing	#8@14"	#8@11"	#9@16"
	Length	9'-1"	9'-4"	11'-3"
F_1 Bars	Bar No. & Spacing	#4@14"	#4@11"	#4@16"
	Length	5'-4"	5'-9"	5'-8"
G Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Length	4'-0"	4'-0"	5'-0"
H Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Length	4'-0"	4'-0"	5'-0"

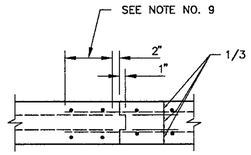
NUMBER OF LONGITUDINAL REINFORCEMENT #4 BARS			
Top Slab (Includes Distrb.)	15	15	17
Bottom Slab	15	15	17
Side Walls	12	12	8
TOTAL	42	42	42



TOP OF WALL



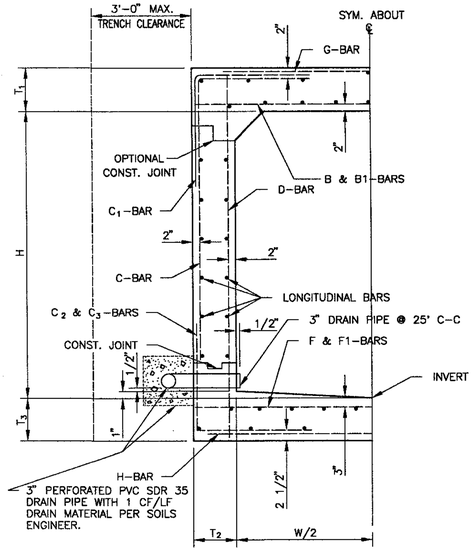
BASE OF WALL



TRANSVERSE JOINT

CONSTRUCTION JOINT DETAILS

NO SCALE



TYPICAL R.C. BOX SECTION

NO SCALE

DESIGN DATA:

LIVE LOAD:
HS20-44 UNLESS OTHERWISE NOTED

DEAD LOAD:
EARTH LOAD PER MARSTON'S FORMULA: W = 130 p.c.f.
Ku = Ku' = 0.150
Bd = OUTSIDE WIDTH OF BOX PLUS 3 FEET
SIDE EARTH 36 p.s.f. PER FOOT OF DEPTH
INTERNAL WATER PRESSURE : 62.4 p.s.f. PER FOOT OF DEPTH
WEIGHT OF CONCRETE : 150 p.s.f.

ALLOWABLE STRESSES:
f'_c = 3250 p.s.i. AT 28 DAYS
f_c = 1462 p.s.i.
f_s = 24,000 p.s.i.
n = 8
SHEAR AND BOND STRESSES PER CURRENT A.C.I. 318-05

R.C. BOX STRUCTURE

R.C. BOX STRUCTURAL NOTES

1. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR, UNLESS OTHERWISE SHOWN.
2. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.
3. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", 1971 EDITION, SECTION 7.1.
4. PLACING OF REINFORCEMENT SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", 1971 EDITION, SECTION 7.3.
5. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.
6. TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.
7. THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE ONE AND ONE HALF INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS.
8. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.
9. NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWING WITHOUT APPROVAL OF THE ENGINEER. NO MORE THAN TWO SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS. SPLICES SHALL BE STAGGERED.
10. REINFORCING BARS #8 OR SMALLER SHALL BE LAPPED AT LEAST 45 BAR DIAMETERS OF THE SMALLER BAR, #9 OR LARGER SHALL BE LAPPED 60 BAR DIAMETERS AT SPLICES.
11. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL TRANSVERSE CONSTRUCTION JOINTS.
12. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, TRANSVERSE CONSTRUCTION JOINTS (IN SLABS AND WALLS), SHALL BE PLACED AT THE END OF EACH POUR, BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET.
13. UNLESS OTHERWISE SHOWN ON THE DETAILS, IN CURVED SECTIONS TRANSVERSE BARS SHALL BE PLACED RADIALLY. THE SPACING OF STRAIGHT TRANSVERSE BARS IN THE TOP AND BOTTOM SLABS SHALL BE MEASURED AT THE CENTERLINE OF CONSTRUCTION. THE SPACING OF STRAIGHT BARS AND L-BARS IN WALLS SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
14. AT THE BEGINNING AND ENDING OF ALL POURS, A CURTAIN OF REINFORCEMENT COMPOSED OF B, C, C2, D, F, G AND H BARS SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINT.
15. D-BARS MAY BE SPLICED 45 BAR DIAMETERS AT THE LOWER LONGITUDINAL CONSTRUCTION JOINT, AT CONTRACTOR'S OPTION, AND PER NOTE 10 ABOVE.
16. IN ALL SECTIONS LAP C AND C2 BARS. THE VERTICAL LENGTH OF C AND C2 HAS BEEN CALCULATED FOR A FOUR INCH STARTER WALL. IF THE HEIGHT OF THE STARTER WALL IS VARIED, THE VERTICAL LENGTH OF THE C AND C2 BARS SHALL BE VARIED CORRESPONDINGLY SO AS TO MAINTAIN A 45 DIAMETER LAP BETWEEN THE TWO BARS. THE LAPS SHALL BE BASED ON THE SMALLER BAR.

NOTES

1. THE HORIZONTAL ANGLE OF DIVERGENCE OR CONVERGENCE, θ, SHALL NOT EXCEED 5° 45'.
2. THE REINFORCING STEEL BAR SIZE, SPACING AND COVER OVER THE STEEL OF STRAIGHT TRANSVERSE BARS IN TOP AND BOTTOM SLABS, OF L-BARS IN TOP AND BOTTOM CORNERS, OF STRAIGHT VERTICAL BARS IN SIDEWALLS AND/OR LONGITUDINAL DISTRIBUTION AND TIE BARS IN TOP OR BOTTOM SLABS OR SIDE WALLS SHALL BE THOSE OF WHICHEVER ADJOINING RCB SECTION PROVIDES THE GREATER STEEL AREA FOR EACH TYPE OF BAR AND GREATEST COVER. THE BAR LENGTHS SHALL VARY UNIFORMLY THROUGHOUT THE TRANSITION.
3. THE THICKNESS OF THE WALLS AND SLABS SHALL BE THOSE OF THE ADJOINING RCB SECTION AT EACH END OF THE TRANSITION AND SHALL VARY UNIFORMLY BETWEEN THE TWO ENDS.
4. f'_c = 28 MPa (4000 PSI) AT 28 DAYS AND THE CONCRETE SHALL BE THE SAME MIX AS THE ADJACENT RCB.
5. ALL STEEL EXCEPT LONGITUDINAL STEEL SHALL BE GRADE 400 (60) BILLET STEEL CONFORMING TO ASTM A 615 M (A 615) AND SHALL TERMINATE 40 mm (1 1/2") CLEAR OF CONCRETE SURFACE UNLESS OTHERWISE SHOWN.
6. THE TRANSITION STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STRUCTURAL NOTES APPLYING TO RCB STRUCTURES SHOWN ON THE PLANS.
7. DETAILS OF CONSTRUCTION JOINTS AND KEYWAYS SHALL BE AS SHOWN ON THE PLANS FOR SINGLE RCB STRUCTURES.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB

STANDARD PLAN METRIC 341-1 SHEET 2 OF 2

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. WESTERN STATES COMMITTEE REV. 1995

TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB

STANDARD PLAN METRIC 341-1 SHEET 1 OF 2

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

102 **MODIFIED A.P.W.A. STANDARD PLAN**

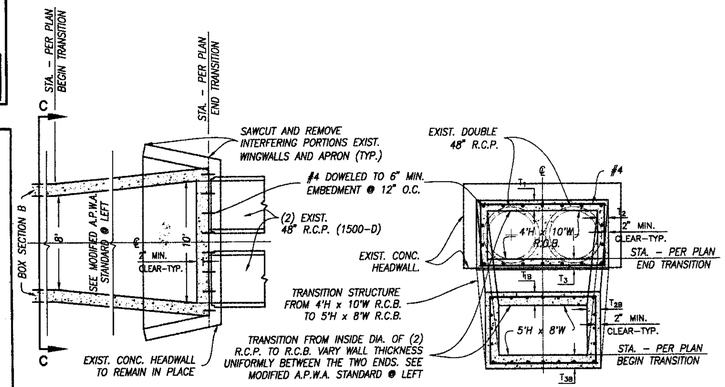
N.T.S.

ESTIMATE OF QUANTITIES

NO.	DESCRIPTION	QUANTITIES TOTAL	UNITS
79	INST. 90" C.S.P. 16 GA. 5"X1" CORRUGATIONS	89	L.F.
81	INST. 24" R.C.P. (SEE PROFILE FOR D-LOAD)	12	L.F.
93	CONST. J.S. TYPE V PER RDMD STD. PLAN 1314	3	EA.
99	CONST. BRICK & MORTAR PLUG	3	EA
100	INST. 5'H X 8'W REINFORCED CONCRETE BOX STRUCTURE PER DETAIL ON SHEET NO. 2	785	L.F.
101	CONST. TRANSITION STRUCTURE PER APWA 342-1	1	EA.
102	CONST. TRANSITION STRUCTURE PER APWA 341-1 MODIFIED - PER DETAILS ON SHEET NO. 2	1	EA.
103	CONST. REINFORCED CONCRETE BOX MANHOLE PER RDMD STD. PLAN 1506	2	EA.

QUANTITIES BASED ON PLANS DATED 08/07/06

QUANTITIES SHOWN ARE FOR BONDING PURPOSES ONLY. THE CONTRACTORS SHALL BE RESPONSIBLE FOR THEIR OWN ESTIMATE FOR BIDDING PURPOSES AND SHALL BID THE JOB COMPLETE. THE CONTRACTORS SHALL ALSO ADVISE THE OWNER AND ENGINEER OF ANY APPARENT DISCREPANCIES IN THE ESTIMATE.



SECT. C-C

$\emptyset$ = 5°42'38"
T_{1B} = 13.25" T_1 = 10.50"
T_{2B} = 9.50" T_2 = 9.00"
T_{3B} = 14.00" T_3 = 11.25"

CONCRETE REMOVAL NOTES:

1) *CONCRETE SHALL BE REMOVED USING HAND OPERATED EQUIPMENT TAKING CARE NOT TO DAMAGE THE REMAINING PORTION OF THE EXISTING STRUCTURE, THE CITY INSPECTOR SHALL BE THE SOLE JUDGE OF THE KIND OF EQUIPMENT USED IN THE CONCRETE REMOVAL OPERATION.*
2) *ANY SAWCUTS OR IRREGULARITIES IN THE SURFACES OF THE REMAINING WALL OR JOINT SHALL BE FILLED WITH AN EPOXY GROUT MIXTURE TO OBTAIN A SMOOTH PLANE SURFACE.*
3) *ALL EPOXY USED SHALL BE A COMMERCIAL QUALITY, TWO COMPONENT MIXTURE, SPECIALLY MANUFACTURED FOR THE INTENDED PURPOSES AND APPLIED PER MANUFACTURER'S DIRECTIONS.*

102 **MODIFIED TRANSITION STRUCTURE**

N.T.S.

MAP DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
11/07/06 BY: HTC
DATE OF THIS PLOT
11/07/06

BENCHMARK: *OCS BM: 2C - 88 - 70*
150 FT. SOUTHWEST ALONG VALENCIA AVENUE FROM THE CROSSING OF THE SOUTHERN PACIFIC RAILWAY TO THE INTERSECTION OF DATE STREET; 81 FT. SOUTHEAST OF THE CENTERLINE OF VALENCIA AVENUE, 21 FT. NORTHEAST OF THE CENTERLINE OF DATE STREET, SET IN THE TOP OF THE SOUTHWEST CORNER OF A 5 FT. BY 6 FT. CONCRETE CATCH BASIN, LEVEL WITH THE SIDEWALK.
ELEVATION = 377.210 NGVD 29 / 1995 OCS ADJUSTMENT

BASIS OF BEARINGS:
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN OCS HORIZONTAL CONTROL STATION OPS NO. 517B01 AND STATION OPS NO. 517B01, BEING N24° 07'56"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER/DEVELOPER:
CHEVRON LAND & DEVELOPMENT COMPANY
2929 Imperial Highway, Suite 200
Brea, California 92821
Phone:(714) 577-1372
Fax:(714) 577-1377

SOIL FIRM:
Albus-Keefe & Associates, Inc.
1403 N. BATAVIA STREET, SUITE 115
ORANGE, CA 92867
(714)755-1355 FAX (714)755-1366

H&A HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

EDWARD A. MANDICH R.C.E. 59089 — DATE — EXP. DATE 06/30/07

REGISTERED PROFESSIONAL ENGINEER EDWARD A. MANDICH No. 59089 Exp. 06/30/07 CIVIL STATE OF CALIFORNIA

REVISIONS			
DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER — RCE 56214 — DATE 11/7/06
TONY OLMOS

PLAN SCALE
1"=40' (OR AS SHOWN)
PROFILE SCALE
1"=40' HORIZ.
1"=8' VERT. (OR AS SHOWN)
DRAWN BY: T.T.
DESIGN BY: T.T.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT PLANS - LA FLORESTA
T.T. 16934 - REMEDIAL GRADING
ESTIMATE OF QUANTITIES, DETAILS
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.
SHEET NO. 2 OF 3

K-1390

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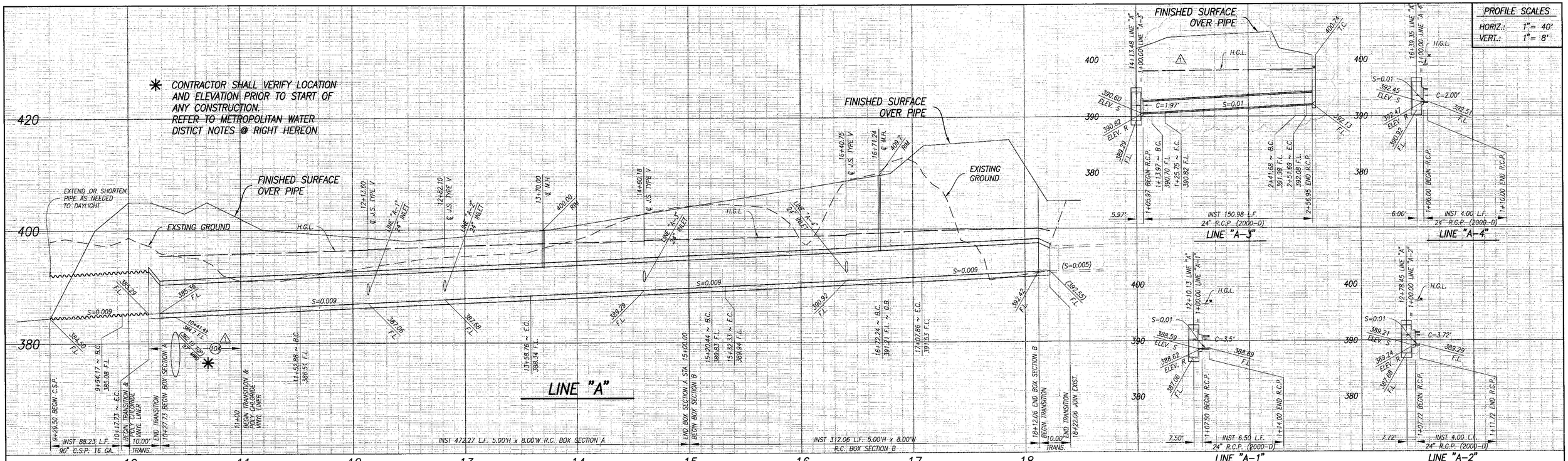
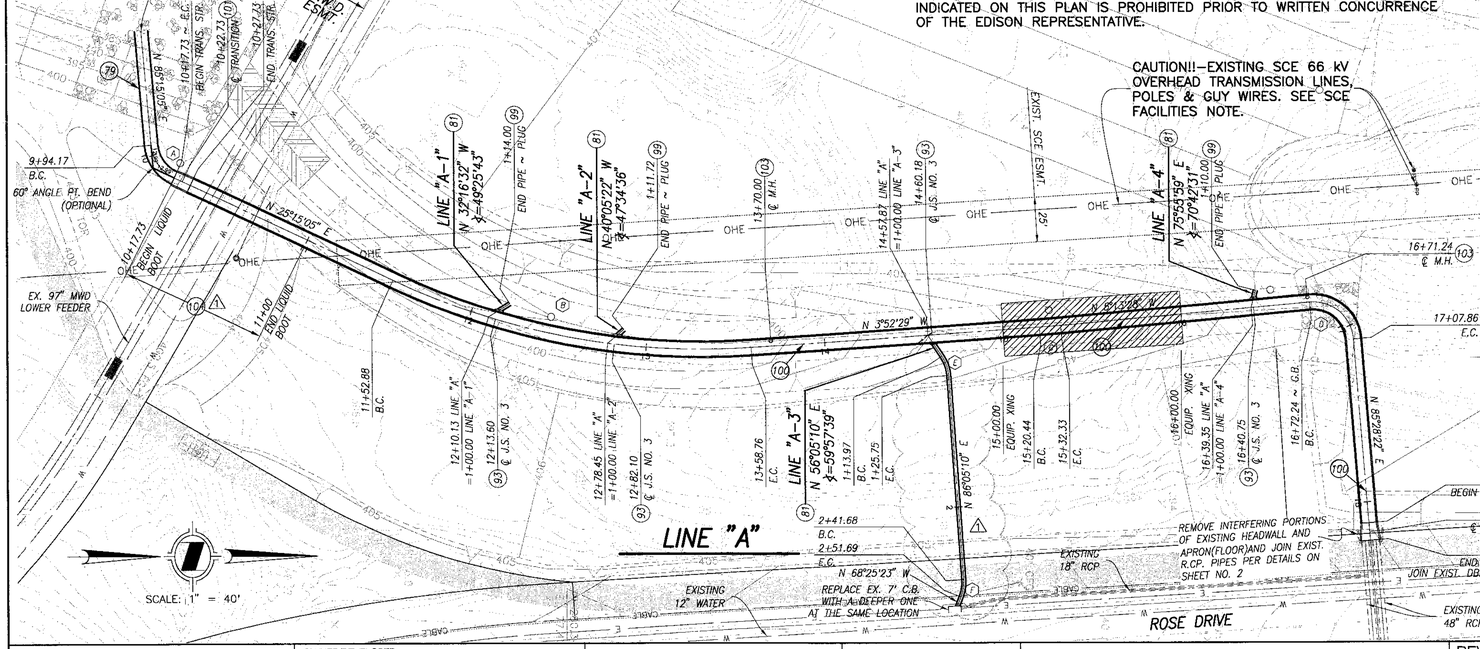
DOC. NO. 70959
RM
W.O. 0433-351 BIN
STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA TRACT 16934 CITY OF BREA





SOUTHERN CALIFORNIA EDISON FACILITIES NOTE:

ALL GRADING AND\OR STORM DRAIN CONSTRUCTION OPERATIONS WITHIN 25' FEET OF ANY EXISTING SOUTHERN CALIFORNIA EDISON OVERHEAD LINE INDICATED ON THIS PLAN IS PROHIBITED PRIOR TO WRITTEN CONCURRENCE OF THE EDISON REPRESENTATIVE.

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA NOTES:

A. A LIST OF ALL SPECIFICATIONS FOR ALL CONSTRUCTION EQUIPTMENT TO BE USED OVER M.W.D. PIPELINES MUST BE SUBMITTED TO M.W.D. FOR REVIEW AND APPROVAL AT LEAST TWO WEEKS PRIOR TO THEIR USE.

B. NOTIFY MR. RICK BICKER OR MR. TIM HATCH OF M.W.D. OPERATIONS MAINTENANCE BRANCH, TELEPHONE (714) 577-5084, AT LEAST TWO WORKING DAYS (MONDAY-THURSDAY) PRIOR TO STARTING ANY WORK IN THE VICINITY OF ANY M.W.D. FACILITIES.

CONSTRUCTION NOTES

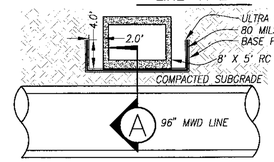
(79) INST. 90" CSP 16 GA. 5"X1" CORRUGATIONS
(81) INST. 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(93) CONST. J.S. TYPE V PER RDMD STD. PLAN 1314
(99) CONST. BRICK AND MORTAR PLUG
(100) INST. 5.00'H x 8.00'W R.C. BOX PER DETAIL ON SHEET NO. 2
(101) CONST. TRANSITION STRUCTURE PER APWA 342-1
(102) CONST. TRANSITION STRUCTURE PER APWA 341-1 (MODIFIED) JOIN RCB TO EXIST. DOUBLE PIPE PER DETAIL - SHEET NO. 2
(103) CONST. REINFORCED CONCRETE BOX MANHOLE PER RDMD STD. PLAN 1506
(A)(104) INSTALL "LIQUID BOOT" WATERPROOF MEMBRANE OR APPROVED EQUAL - TO THE SATISFACTION OF M.W.D.

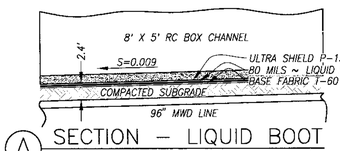
CURVE DATA

	BEARING/DELTA	RADIUS	LENGTH	TANGENT
(A)	60°00'00"	22.50'	23.56'	12.99'
(B)	29°07'34"	405.00'	205.88'	105.21'
(C)	01°20'59"	505.00'	11.90'	5.95'
(D)	90°41'51"	22.50'	35.61'	22.77'
(E)	30°00'00"	22.50'	11.78'	6.03'
(A)	25°29'27"	22.50'	10.01'	5.09'

NOTE TO CONTRACTOR:

EQUIPMENT CROSSING SHALL OCCUR ONLY AT THIS LOCATION WITH MIN. SOIL COVER OF 3'





(A) SECTION - LIQUID BOOT
NTS

(104) DETAIL - LIQUID BOOT
NTS

HYDRAULIC DATA

LINE	STA to STA	Q_{100}	DIA	So	n	Fr	Dn	Vn
"A"	9+29.50 10+17.73	401.9	90"	0.0090	0.024	---	FULL	---
			WIDTH					
"A"	10+27.73 12+13.60	401.9	8'	0.0090	0.014	1.45	3.35	15.02
"A"	12+13.60 12+82.10	393.8	8'	0.0090	0.014	1.45	3.30	14.94
"A"	12+82.10 14+60.18	391.7	8'	0.0090	0.014	1.45	3.28	14.92
"A"	14+60.18 16+40.75	383.3	8'	0.0090	0.014	1.45	3.23	14.83
"A"	16+40.75 18+12.06	365.1	8'	0.0090	0.014	1.46	3.12	14.63
			DIA					
"A-1"	---	12.5	24"	0.0100	0.013	---	1.06	7.38
"A-2"	---	3.3	24"	0.0100	0.013	---	0.52	5.14
"A-3"	---	8.7	24"	0.0100	0.013	---	0.86	6.73
"A-4"	---	26.6	24"	0.0100	0.013	---	FULL	---

BENCHMARK: OCS BM: 2C - 88 - 70
150 FT. SOUTHWEST ALONG VALENCIA AVENUE FROM THE CROSSING OF THE SOUTHERN PACIFIC RAILWAY TO THE INTERSECTION OF DATE STREET; 81 FT. SOUTHEAST OF THE CENTERLINE OF VALENCIA AVENUE, 21 FT. NORTHEAST OF THE CENTERLINE OF DATE STREET, SET IN THE TOP OF THE SOUTHWEST CORNER OF A 5 FT. BY 6 FT. CONCRETE CATCH BASIN, LEVEL WITH THE SIDEWALK.
ELEVATION = 377.210 NGVD 29 / 1995 OCS ADJUSTMENT

BASIS OF BEARINGS:
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN OCS HORIZONTAL CONTROL STATION CPS NO. 517861 AND STATION CPS NO. 517681, BEING N24°02'54"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER/DEVELOPER:
CHEVRON LAND & DEVELOPMENT COMPANY
145 S. State College Blvd., 4th Floor
Brea, California 92821
Phone:(714) 671-3534
Fax:(714) 671-3446

SOIL FIRM:
Albus-Keefe & Associates, Inc.
1403 N. BATAVIA STREET, SUITE 115
ORANGE, CA 92867
(714)755-1355 FAX (714)755-1366

H&A HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

EDWARD A. MANOICH
R.C.E. 59089
DATE
EXP. DATE 06/30/07

REGISTERED PROFESSIONAL ENGINEER EDWARD A. MANOICH No. 59089 Exp. 06/30/07 CIVIL STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
(1)	T.T.	REVISED LINE 'A-3', ADDED CB IN ROSE DR.	
(2)		LIQUID BOOT LINER - CONST. NOTE NO. 104	

REVIEWED BY:

CITY ENGINEER TONY OLMOS — RCE NO. EXP. 6/30/07 — DATE

PLAN SCALE 1"=40' (OR AS SHOWN)
PROFILE SCALE 1"=40' HORIZ. 1"=8' VERT. (OR AS SHOWN)
DRAWN BY: T.T.
DESIGN BY: T.T.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT PLANS - LA FLORESTA

T.T. 16934 - REMEDIAL GRADING

LINE "A" FROM STA. 10+00.00 TO 18+21.47 & LATERALS

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO. 3 OF 3

W.O. 0433-1ST
STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA TRACT 16934 CITY OF BREA
DOC. NO. 2007-0000000
BM: RP

K-1391

2/20/2007

14 May 1958
Previous edition is obsolete

Army C of E – Los Angeles

Project: Carbon Canyon Channel	HYDRAULIC DESIGN SUMMARY OF PERTINENT DATA	Sheet 1 of 2	Date 4 Nov 1963
Locality: Orange Co., Calif.	Referenced Drawings	By E.G.C.	Checked by

Station	Hydraulic elements	℄ slope	D_n	D_c	V	℄ Invert Elev.	Wall ht.-ft.	S.E. ft.	F.B. ft.	REMARKS
7+64 =	4.75 rect.									End of outlet conduit and
389+05.70	Transition		Varies	7.14	30.1	400.56	9.00		1.86	beginning of open channel
388+25.70				3.31	31.8		5.50		2.19	
387+69.20				5.48	29.9		5.59		2.11	
387+26				3.59	28.8		5.66		2.07	℄ Foot bridge
387+04.10				3.65	25.3		5.70		2.05	
386+86				3.70	27.9		5.73		2.03	Gaging station (right wall)
386+64.14				3.76	27.5		5.76		2.00	S.T.
386+19				3.88	26.6		5.83	.18	1.86	
386+14.14				3.89	26.5		5.84	.20	1.85	C.S. - R = 948.00'
385+70±		.010000	5.09	3.99	25.8		5.91	.20	1.82	30" gas line (over channel)
384+98				4.15	24.6		6.03	.20	1.78	
383+80				4.38	23.3		6.22	.20	1.74	Overflow apron (right wall)
382+95				4.55	22.4		6.36	.20	1.71	
381+60.35	10'			4.70	21.7		6.58	.20	1.78	S.C. - R = 948.00'
381+45.83				4.72	21.6		6.60	.14	1.61	℄ Rose Drive
381+10.35	Q = 1,000			4.76	21.5		6.60		1.84	T.S.
380+00±	n = .014			4.88	20.8		6.84		1.96	3" waste water line (over ch.)
379+65±	d_c = 6.75			4.92	20.6		6.89		1.97	96" M.W.D. water line (under ch.)
379+00		Varies	Varies	4.99	20.3	390.50	7.00		2.01	E.V.C. Grade Change
378+95.09		.560000	1.59	4.44	22.9	381.75	6.8±		2.4±	B.V.C.
378+90.88		Varies	Varies	3.91	26.3	387.14	6.6±		2.7±	E.V.C.
378+77.04				3.44	30.3	383.70	6.00		2.56	B.V.C. Grade Change
378+43.19				3.51	29.6		6.07		2.56	S.T.
377+93.19				3.62	28.7		6.18	.28	2.42	C.S. - R = 767.00'
377+90.20			4.48	3.63	28.6		6.18	.28	2.41	
376+64.40				3.86	26.7		6.45	.28	2.45	
375+00		.014000		4.11	24.9		6.79	.28	2.54	Pipe lines - 2" and 8" (over ch.)
373+00				4.11	24.7		6.77	.28	2.34	
375+00				4.63	24.3		6.77	.28	2.02	Equal energy
374+40±	10'			4.67	24.1		6.92	.28	2.11	1" pipe line (over channel)
373+95±	Q = 1100		4.82	4.59	24.0		7.02	.28	2.19	4' Foot bridge
373+60.13	n = .014			4.71	23.9		7.13	.28	2.28	S.C. - R = 767.00'
373+10.13	d_c = 7.2			4.74	23.7		7.30		2.56	T.S.
372+50				4.78	25.5	374.97	7.50		2.72	Grade Change
372+25	Transition	.008000	Varies	4.03	24.2		7.50		3.47	

K-1392

SPL Form 38
14 May 1958
Previous edition is obsolete

Army C of E - Los Angeles

Project: Carbon Canyon Channel	HYDRAULIC DESIGN SUMMARY OF PERTINENT DATA	Sheet 2 of 2	Date: 6 Nov. 1963
Locality: Orange Co., Calif.	Referenced Drawings	By: E.G.C.	Checked by

Station	Hydraulic elements	℄ slope	D_n	D_1	V	℄ Invert Elev.	Wall ht.-ft.	S.E. ft.	F.B. ft.	REMARKS
372+25				4.03	24.2		7.50		3.47	
371+62.56				4.18	23.4		7.50		3.32	S.T.
371+12.56	11.5			4.30	22.8		7.50	.18	3.11	C.S. - R= 948.00'
370+77	Q=1100			4.38	22.3		7.50	.18	3.03	
370+70	n=.014	.008000	5.14	4.39	22.2		7.50	.13	3.02	Overflow apron (right wall)
369+18.22	dc=6.55			4.65	21.0		7.50	.18	2.76	S.C. - R= 948.00'
368+68.22				4.73	20.6		7.50		2.77	T.S.
367+97				4.85	20.0		7.50		2.65	
365+00	Transition		Varies	5.10	19.0	368.99	7.00		1.90	Grade change
364+60	14.0 rect, n=.014			3.73	21.2		6.50		2.72	
364+00	Q=1100 dc=5.73		3.71	3.79	21.2		7.00		3.21	Equal energy Q=1100 c.f.s.
364+00	See		3.95	4.26	20.4		7.00		2.74	dc=6.08, 14.0' rect, Q=1200 c.f.s.
363+00	Remarks		4.19	4.66	20.2		8.00		3.34	dc=6.42, 14.0' rect, Q=1300 c.f.s.
361+00				5.41	20.0		8.62		3.21	
359+79	14.0' rect			4.58	20.2		9.00		4.42	Overflow apron (right wall)
359+61.18	Q=1500		4.62	4.46	20.2		9.05		4.59	S.T.
359+11.18	n=.014	.012000		4.12	20.3		9.21	.42	4.88	C.S. - R= 450.00'
359+00	dc=7.06			4.04	20.3		9.24	.42	4.99	
357+80	14.0 rect, n=.014		5.07	5.57	20.6		9.61	.42	3.83	Overflow apron (left wall)
357+00	Q=1700			6.60	20.8		9.86	.42	3.05	
356+09.47	dc=7.70		5.50	6.81	21.1		10.00	.42	2.98	℄ Imperial Hwy.
356+00	14.0' rect, n=.014			6.83	21.1		10.00	.42	2.96	Q=2000 c.f.s.
355+83.31	Q=1900			6.78	21.3		10.00	.42	3.01	S.C. - R= 450.00'
355+73.08	dc=8.28		5.71	6.75	21.4		10.00	.33	3.08	℄ P.E. R.R.
355+33.31	14			6.63	21.8		10.00		3.37	T.S.
354+75				6.46	22.4	356.69	10.00		3.54	Grade change
353+56	Q=2000			6.52	22.2		9.47		2.95	
353+30	n=.014			6.56	22.2		7.26		4.07	Overflow apron (left wall)
350+44	dc=8.60			6.58	22.0		9.00		2.42	
348+80		.002280		6.58	22.0		9.00		2.42	5" pipe line (over channel)
348+60			6.54	6.58	22.0		9.00		2.42	3" pipe line (over channel)
348+55				6.58	22.0		9.00		2.42	4" pipe line (over channel)
348+55				6.58	22.0		9.00		2.42	Overflow apron (left wall)
348+26.16				6.58	22.0		9.00		2.42	℄ Golden Ave.
347+80				6.58	22.0	350.93	9.00		2.42	Downstream end of project.

K-1393

CORPS OF ENGINEERS

Construct fence across channel

Fence To run continously

Equation Sta 71+64 (Outlet Works) Sta 389+05.70

End transition HI = 9.0'

Sta 388+25.70 HI=55' Begin transition

El 409.56

El 400.56

Transition

Top of wall

Existing 36"CMP

for fence details See Plan & Detail No.4 Sht.82

Approx. existing ground surface

Invert S = 0.01

Drop Structure

Sta 378+93 FVC 5ta 379+00 HI = 7.0'

Sta 378+95.08 BVC

Sta 378+50.28 EVC

Sta 378+72.04 BVC HI = 6.0'

Construct fence across channel

See detail hereon

Fence to run continously

℄ ROSE DRIVE Relocation 1 on 2 slope normal to ℄ road

Approx. existing ground surface

36" C.M.P. S = 0.014

Sta 376+38

Sta 377+76.94

North Line to Sta. 376+50

El 383.76

Existing M.W.D. 96" Water line

Existing 3" pipe

Place here after construction

18"CMP MWD Blowoff Sta 379+50

El 390.50

El 389.25

El 387.14

PROFILE

HORIZ SCALE 1-IN = 40 FT

40 0 40 80

VERT SCALE 1-IN = 10 FT.

10 0 10 20

Note: For continuation of access road profile see Sheet 92

80' V.C.

-10.00%

Approx existing ground surface

Channel excavation -0.838%

Finish grade

Fill Channel (19)

Excavation road (13)

50' V.C.

+6.66%

0.00%

Sta 5+77 End Access Rd. El 404.17

Sta 5+45 El 404.17

Sta 5+89.34 ℄ Rose Dr. Reloc.

Pi Sta 4+70 El 399.16

Pi Sta 0+40 El 402.76

PROFILE OF ACCESS ROAD

SCALE HORIZ 1IN=40 FT

40 0 40 80

SCALE VERT 1IN=10FT

10 0 10 20

℄ Channel

℄ Access Road

Approx. exist. ground surface

Channel Excavation (12)

2% Slope

Fill channel (19)

2" Plant mix surfacing (80)(81)(82)

6" Untreated rock base (79)

SECTION STA 382+50

SCALE HORIZ & VERT 1IN=10 FT

10 0 10 20

SOURCE OF INFORMATION

Field Books CA-N17-10, 119, ℄120 Corps of Engineers Topographic Surveys, 1941, 1949, 1950, 1956. Plane Table Sheets C2-9-12-13-℄23 Alignment Data Sheets, Bridge Drawings, State of California, Division of Highways, Carbon Canyon Creek Bridge No. 5-48 (Imperial Highway) Coordinates, Lambert Zone 6, California.

Equation: Y = -(0.01X + 0.04985X²)

Origin S = 0.01000

El 390.50

El 389.25 S = 0.500

El 387.14

Sta 378+95.08 EVC

Sta 378+84.34 PI VC

R = 30

T = 7.30

S = 0.01400

Sta 378+72.04 BVC

El 383.76

Sta 389+00 EVC

Sta 388+88 PI VC

El 383.88

PROFILE OF DROP STRUCTURE

SCALE HORIZ & VERT 1IN = 5 FT

5 0 5 10

CHANNEL DIMENSIONS			
STATION TO STATION		WIDTH	SLOPE
389+05.70	388+25.70	Excl. Trans.	0.0100
388+25.70	379+00	10.0'	0.0100
379+00	378+77.04	10.0'	Varies
378+77.04	375+00	10.0'	0.01400

Fill existing channel from Sta. 386+00 to toe of Dam. See Sheet 83

Fill existing channel to drain on a 0.5% grade to culvert. This fill to be paid for as miscellaneous fill.

Existing 3" waste water line supported by 1" cable. To remain in place, protect during construction. Supporting cable to be modified as required to keep pipe below road fill.

Pipe to be temporarily supported above work during construction. To be laid over the top of channel walls after construction

℄ Existing M.W.D. 96" water line

N 639,400

E 1,517,200

N 639,370.13

E 1,517,132.33

N 639,000

E 1,517,000

N 638,800

N 638,200

E 1,517,200

N 638,965.84

E 1,516,985.84

Existing wire fence revement to be removed

12' Berm

2% Slope

MATCH LINE TO STA 376+50

Sta 376+50

Sta 377+00

Sta 377+79

Sta 378+00

Sta 378+50

Sta 379+00

Sta 379+50

Sta 380+00

Sta 380+50

Sta 381+00

Sta 381+50

Sta 382+00

Sta 382+50

Sta 383+00

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Sta 385+00

Sta 385+50

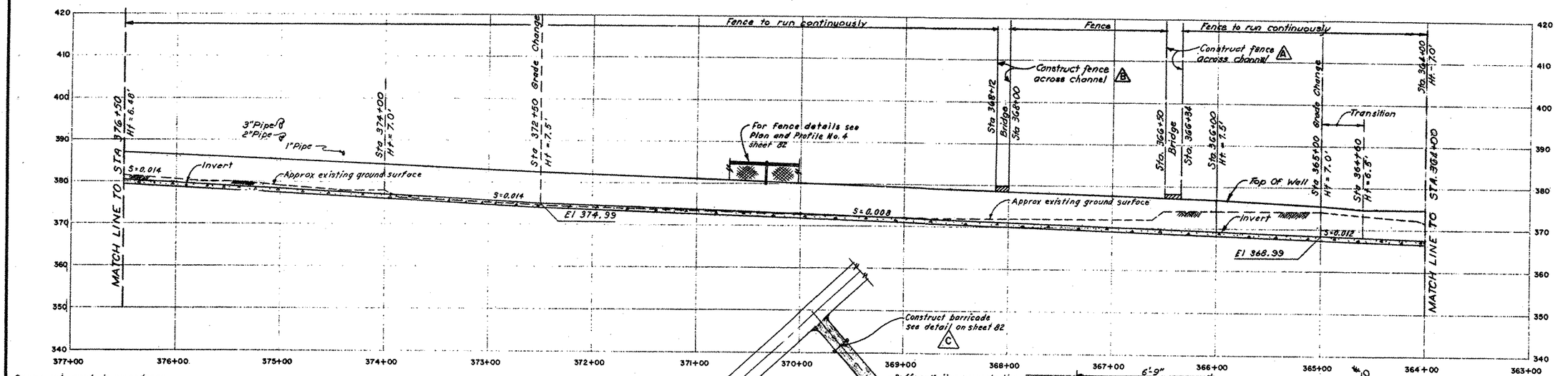
Sta 386+00

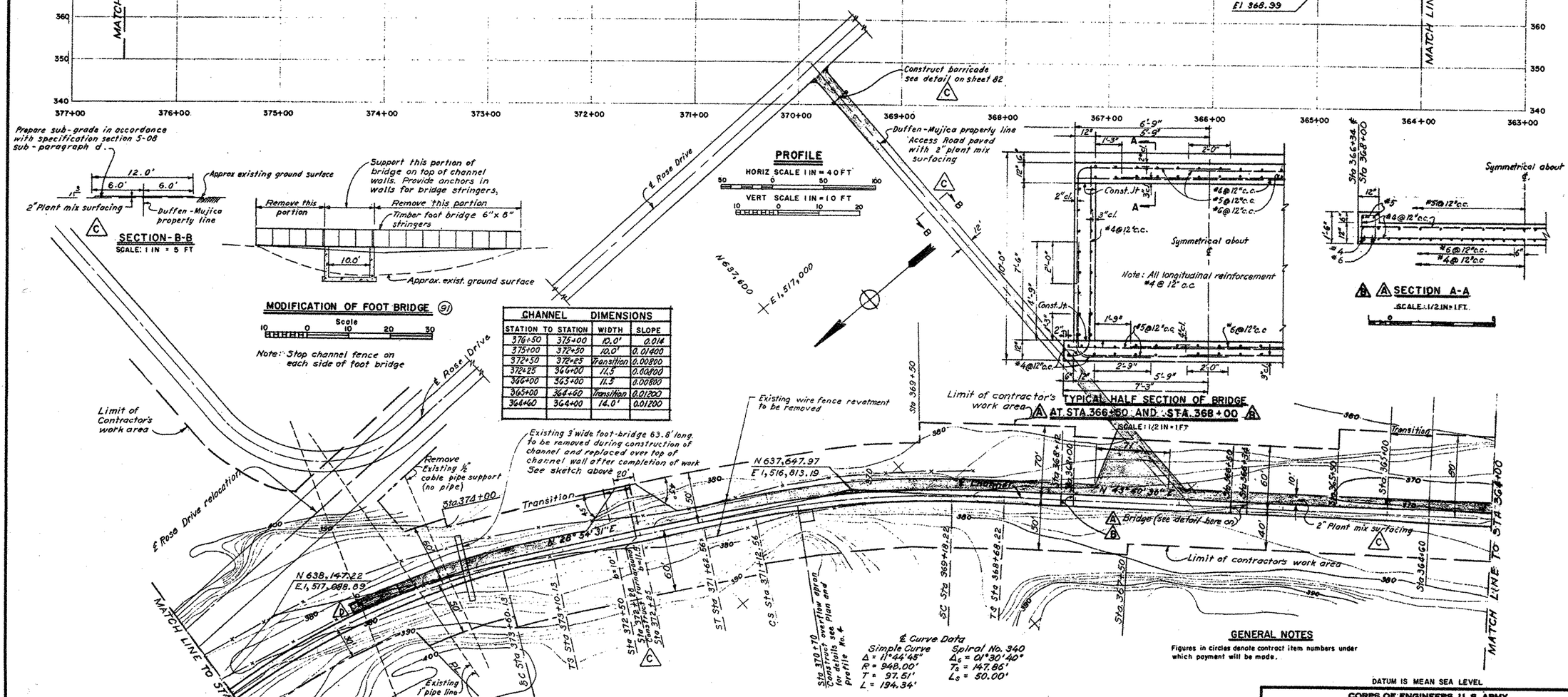
Sta 386+50

Sta 387+00

Sta 387+50

Sta





GENERAL NOTES

Figures in circles denote contract item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

REFERENCE DRAWINGS

For Channel Cross Sections see sheets 83 and 84.

RECORD DRAWING - AS CONSTRUCTED
CONT. No 59-126 REV. D DATE 12-7-61 BY P.C.B
CONT. No. n.i. DATE BY
CONT. No. REV. DATE BY

REV. NO.	DATE	REVISION	REV.	CHK.	APP.
A	4 Aug. 59	Added Bridge Section	C.W.L.	[illegible]	[illegible]
B	1 Oct. 59	Added Bridge Section	C.W.L.	[illegible]	[illegible]
C	6 Dec. 60	Added pavement for berm, turnaround and access road. Added barricade	C.W.L.	[illegible]	[illegible]
D	12-7-61	Extended 2" Plant mix surfacing "As Constructed"	P.C.B.		

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L.-R.K.M.
DRAWN BY: K.E.E.
CHECKED BY: C.W.L.-R.H.L.
SUBMITTED BY: [signature] CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO. 2
STA 376+50 TO STA 364+00

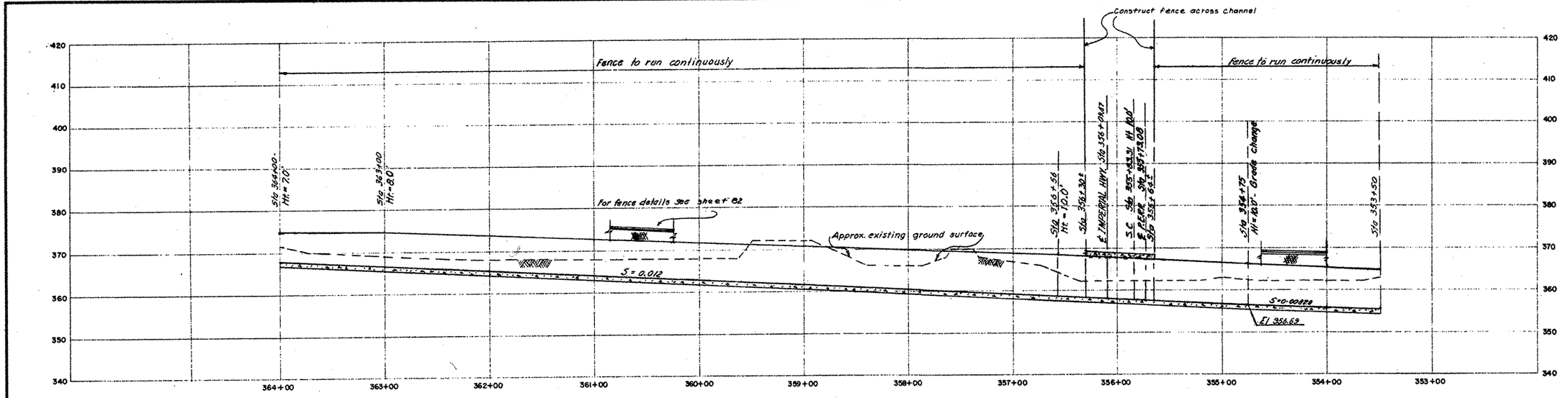
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION
APPROVED: [signature] COLONEL, C. E., DISTRICT ENGINEER

SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY OCS-CIV-59-25
SHEET 80 OF 102
FILE NO. (D. O. SERIES) 126/80 REV. "D"

H&A DOC # 64809

CORPS OF ENGINEERS

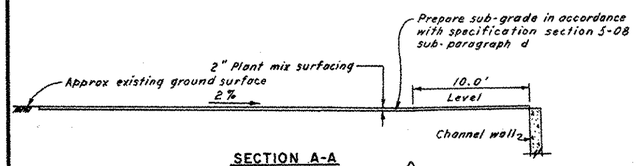
U.S. ARMY



PROFILE

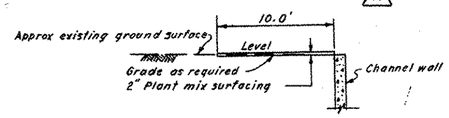
VERT. 1 IN = 10 FT

HORIZ. 1 IN = 40 FT



SECTION A-A

SCALE: 1 IN = 5 FT



SECTION B-B

SCALE: 1 IN = 5 FT

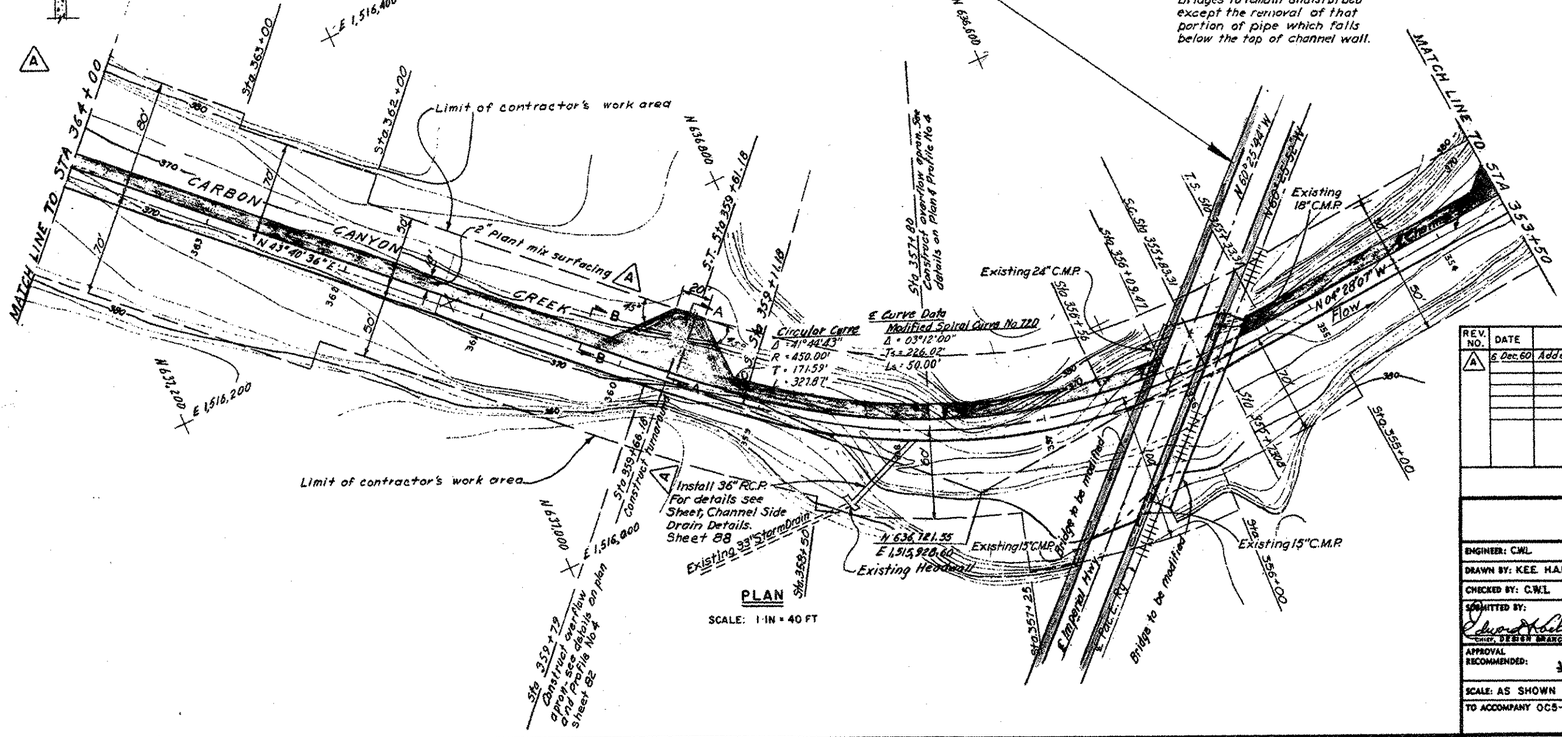
EASEMENT NO. DACW09-2-69-33
(or) DACW09-2-67-43

WIDEN IMPERIAL HWY. - BOTH SIDES -
STA. 356+09.47

REF. DWG. CA. DPT. OF HWYS.- 5584-1

Note:
Existing drain pipes around bridges to remain undisturbed except the removal of that portion of pipe which falls below the top of channel wall.

CHANNEL DIMENSIONS			
STATION TO STATION		WIDTH	SLOPE
366+00	365+00	11.5'	0.00800
365+00	364+60	TRANSITION	0.01200
364+60	364+00	14.0'	"
364+00	356+00	"	"
356+00	354+75	"	"
354+75	348+05	"	0.00828



PLAN

SCALE: 1 IN = 40 FT

AS-PERMIT-CONSTRUCTED

REFERENCE DRAWINGS

For channel cross sections see sheets 83 & 84
For bridge alteration details see sheet 86
For side drain details see sheet 88

REV. NO.	DATE	REVISION	REV.	CHK.	APP.
A	6 Dec 60	Added pavement for berm and turnaround	CWL	JRC	KEE

DATUM IS MEAN SEA LEVEL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L.
DRAWN BY: K.E.E. H.A.B.
CHECKED BY: C.W.L.
SUBMITTED BY: Chief, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA

CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO. 3
STA 364+00 TO STA 353+50

APPROVAL RECOMMENDED: Chief, ENGINEERING DIVISION

APPROVED: COLONEL, C. E., DISTRICT ENGINEER

SCALE: AS SHOWN

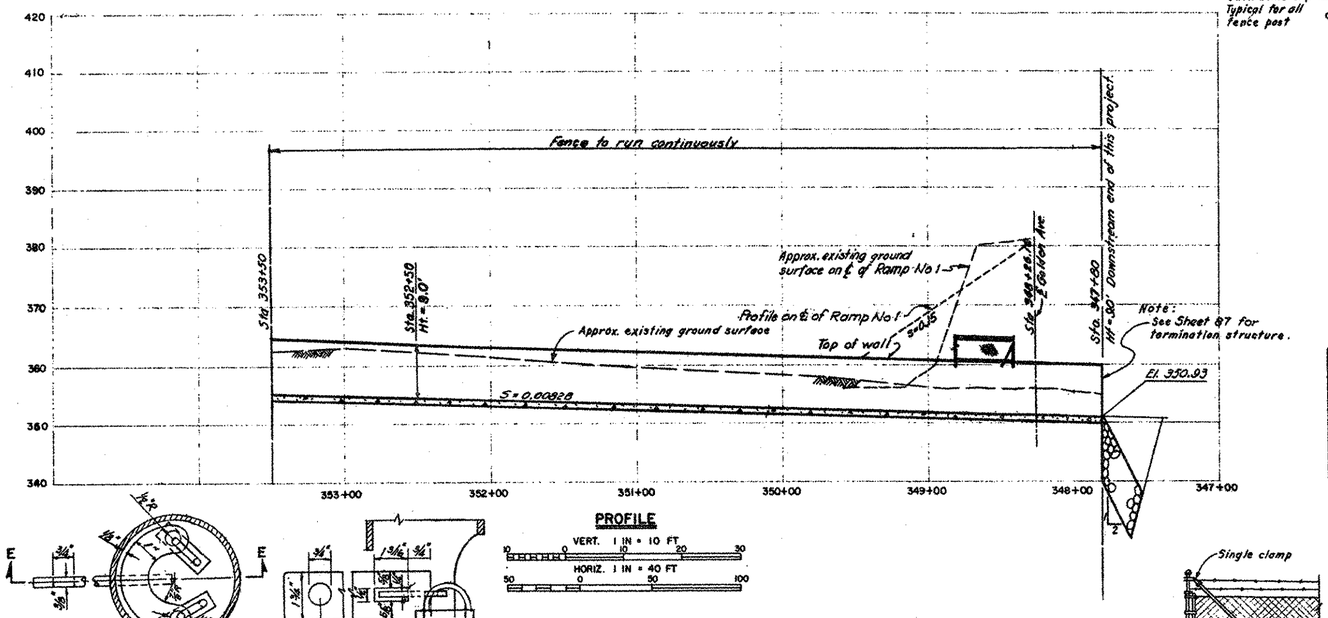
DATE: JANUARY 1958

TO ACCOMPANY OCE-CIV-59-25

SHEET 81 OF 102

FILE NO. (D. O. SERIES) 126/81 REV "A"

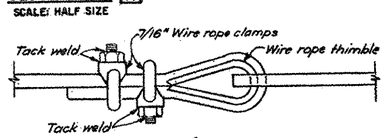
H&A DOC # 64809



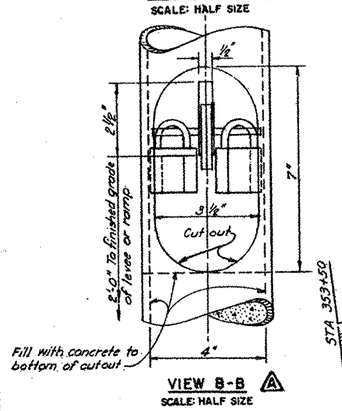
PROFILE
VERT. 1 IN = 10 FT
HORIZ. 1 IN = 40 FT

SECTION D-D
SCALE: HALF SIZE

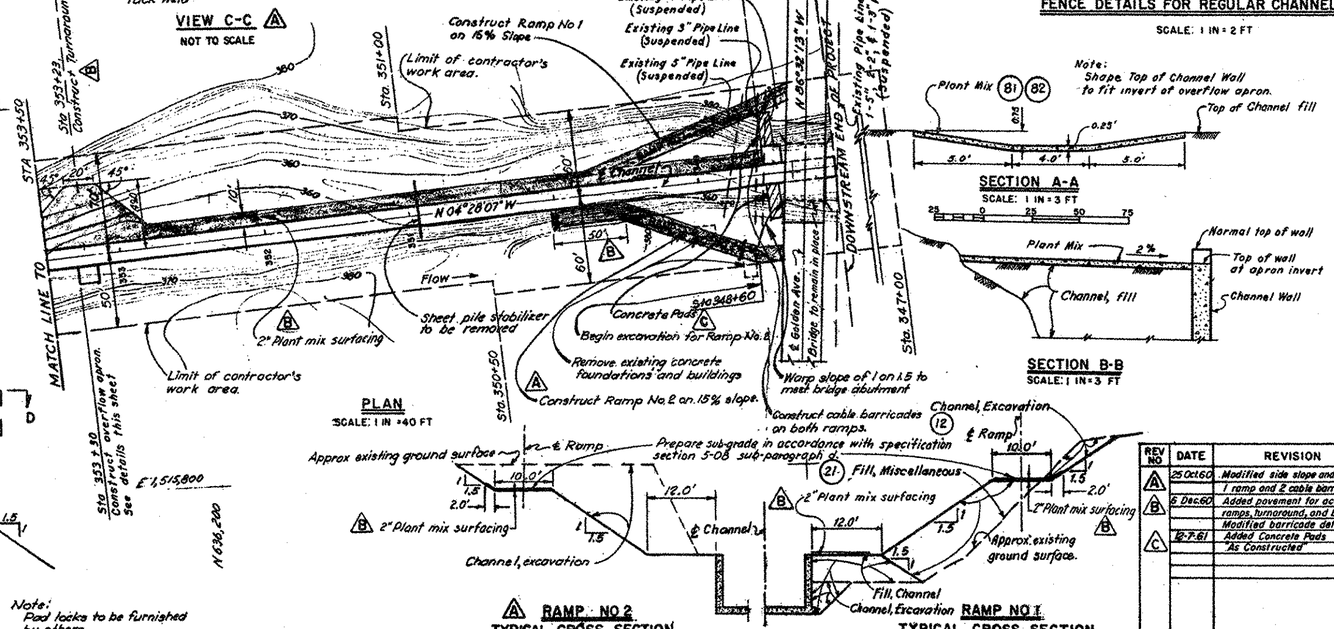
SECTION E-E
SCALE: HALF SIZE



VIEW C-C
NOT TO SCALE



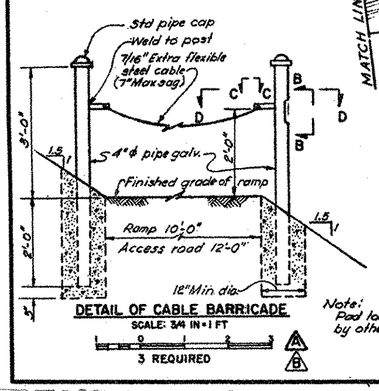
VIEW B-B
SCALE: HALF SIZE



PLAN
SCALE: 1 IN = 40 FT

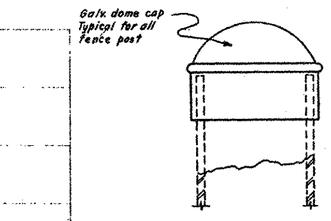
RAMP NO 2
TYPICAL CROSS SECTION
SCALE: 1 IN = 10 FT

RAMP NO 1
TYPICAL CROSS SECTION
SCALE: 1 IN = 10 FT



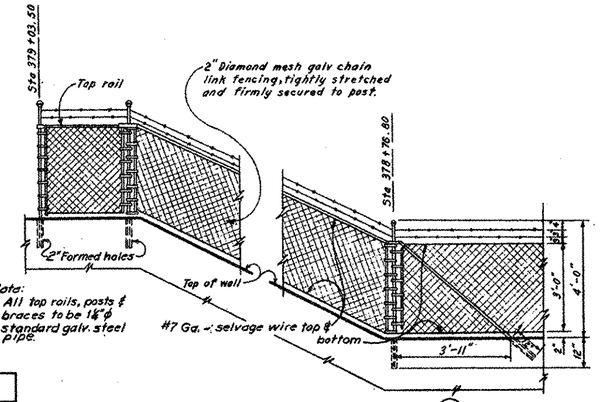
DETAIL OF CABLE BARRICADE
SCALE: 3/4 IN = 1 FT
3 REQUIRED

Note: Pad locks to be furnished by others.

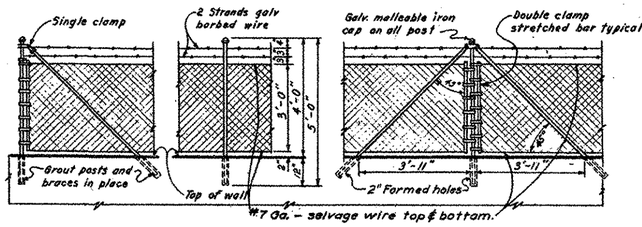


POST CAP
NOT TO SCALE

CHANNEL DIMENSIONS			
STATION TO	STATION	WIDTH	SLOPE
366+00	365+00	11.5	0.00800
365+00	364+60	TRANSITION	0.01200
364+60	364+00	14.0'	"
364+00	356+00	"	"
356+00	354+75	"	"
354+75	347+80	"	0.00828



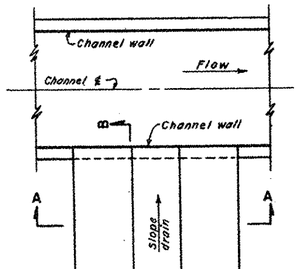
FENCE DETAILS FOR SPECIAL CHANNEL WALL (77)
SCALE: 1 IN = 2 FT



END POST | TYPICAL FENCE POST APPROX. 10 FT. C.C. | DOUBLE BRACE POST APPROX. 400 FT. INTERVALS

Note: All fence posts & braces to be 1½" ϕ standard galv. steel pipe.

FENCE DETAILS FOR REGULAR CHANNEL WALL (77)
SCALE: 1 IN = 2 FT



(81) (82) PLANT MIX OVERFLOW APRON
PLAN
SCALE: 1 IN = 5 FT

Note: Shape Top of Channel Wall to fit invert of overflow apron.

SECTION A-A
SCALE: 1 IN = 3 FT

SECTION B-B
SCALE: 1 IN = 3 FT

GENERAL NOTES

Figures in circles denote contract item numbers under which payment will be made.

REFERENCE DRAWINGS

For channel cross sections see Sheets 83 and 84.
For modification of Golden Ave. Bridge details see Sheet 85
For details of Termination Structure see Sheet 87

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 59-126 REV. C DATE 12-7-61 BY. P.C.B.
CONT. No. REV. DATE BY.
CONT. No. REV. DATE BY.

DATUM IS MEAN SEA LEVEL

REV NO	DATE	REVISION	REV.	CHK.	APP.
A	25 Oct 60	Modified side slope and added ramp and 2 cable barricades			
B	6 Dec 60	Added pavement for access ramps, turnaround, and berm. Modified barricade detail			
C	12-7-61	Added Concrete Pads "As Constructed"	P.C.B.		

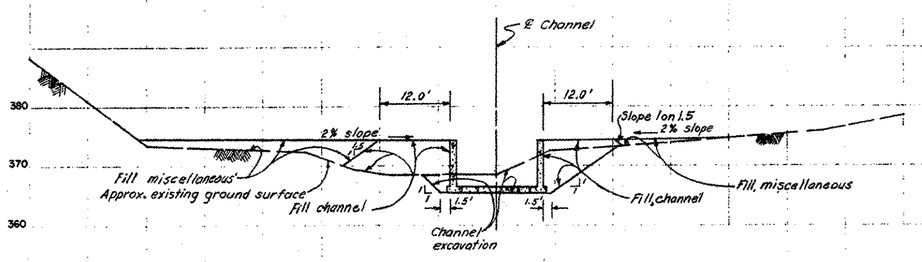
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L.
DRAWN BY: K.E.E. H.A.B. B.O.H.
CHECKED BY: C.W.L.
SUBMITTED BY: CHIEF, DE SIGN BRANCH

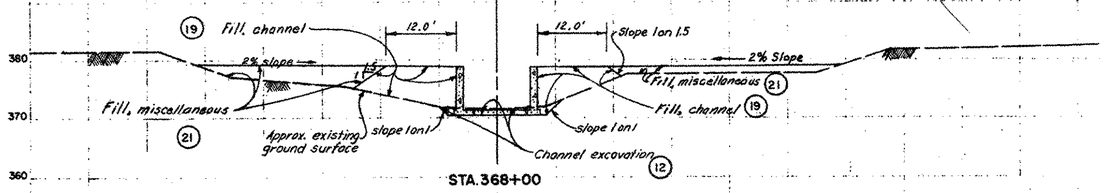
SANTA ANA RIVER BASIN (AND ORANGE COUNTY) CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO. 4
STA 353+50 TO STA 347+80

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C. E., DISTRICT ENGINEER
SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY OCS-CIV-59-25
SHEET 82 OF 102
FILE NO. (O. O. SERIES) 126/82 "REV C"

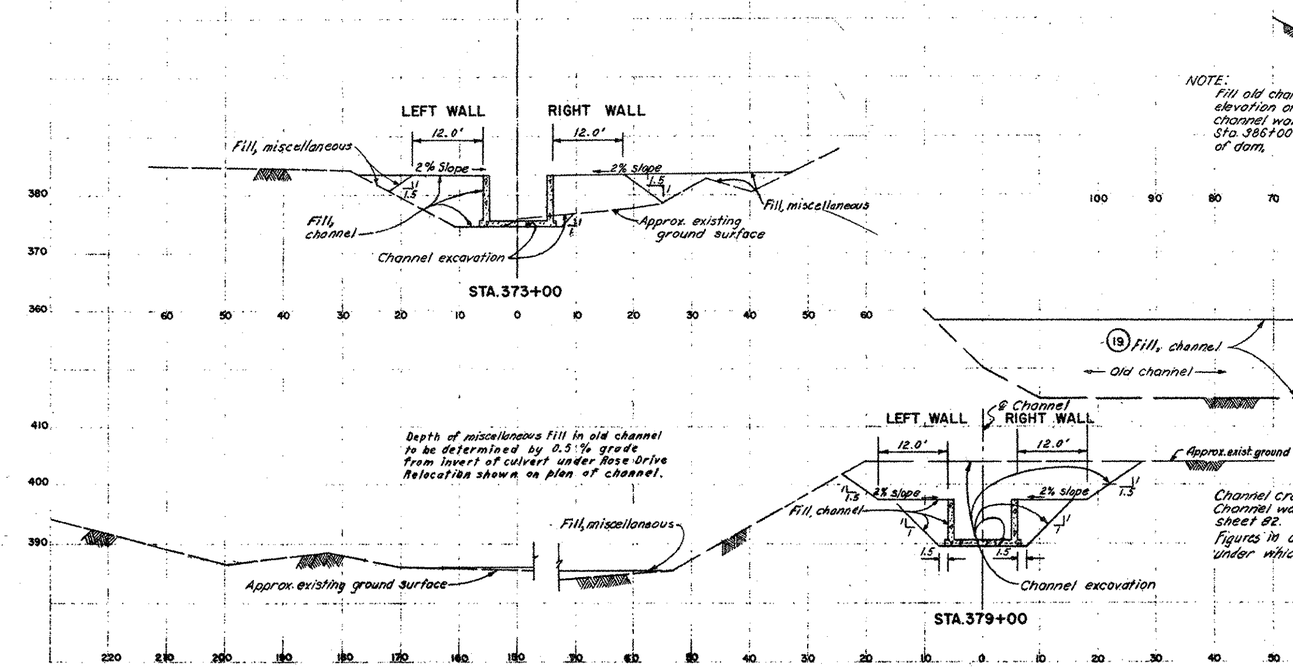
H&A DOC # 64809



STA. 363+00

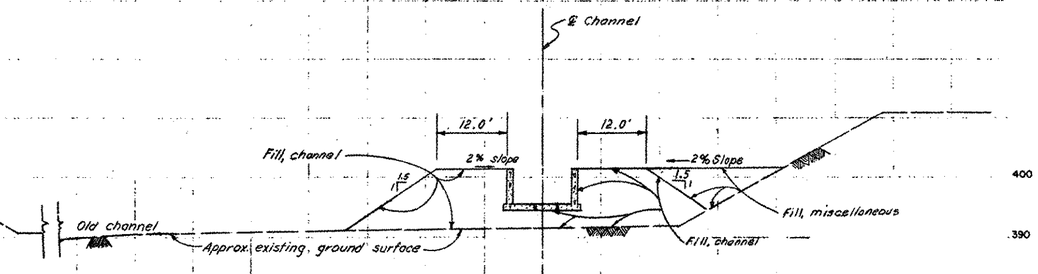


STA. 368+00

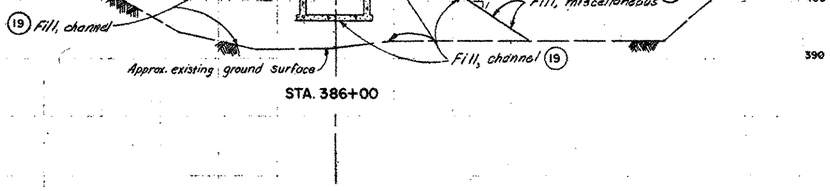


STA. 373+00

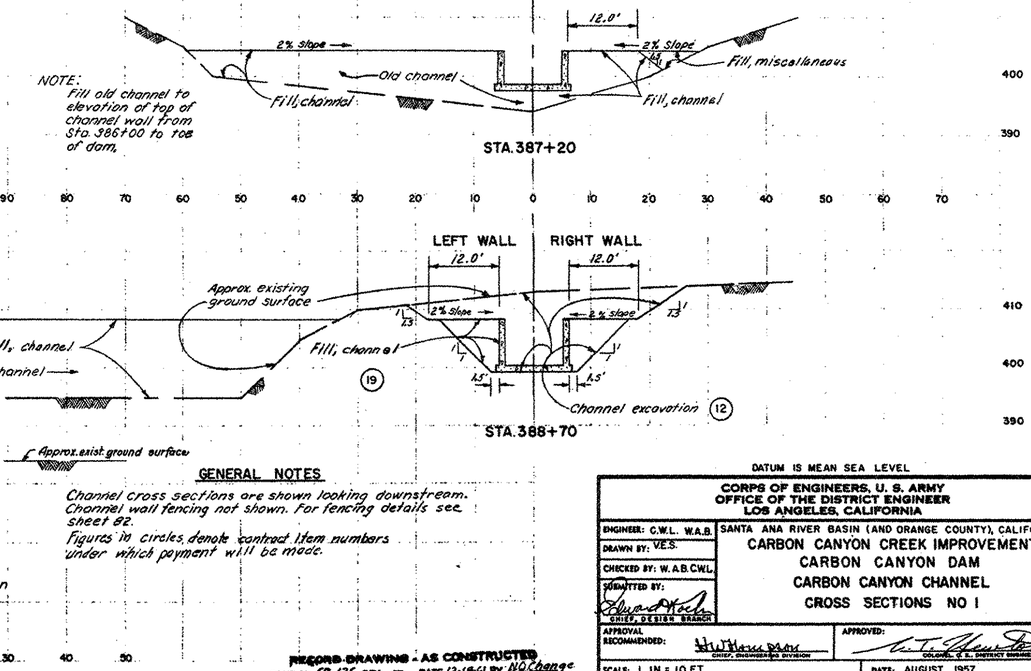
STA. 379+00



STA. 384+00



STA. 386+00



STA. 387+20

NOTE:
Fill old channel to elevation of top of channel wall from Sta. 386+00 to toe of dam.

STA. 388+70

GENERAL NOTES

Channel cross sections are shown looking downstream.
Channel wall fencing not shown. For fencing details see sheet 82.
Figures in circles denote contract Item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 59-126 REV. — DATE 12-18-61 BY NO Change
CONT. No. — REV. — DATE — BY —
CONT. No. — REV. — DATE — BY —

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

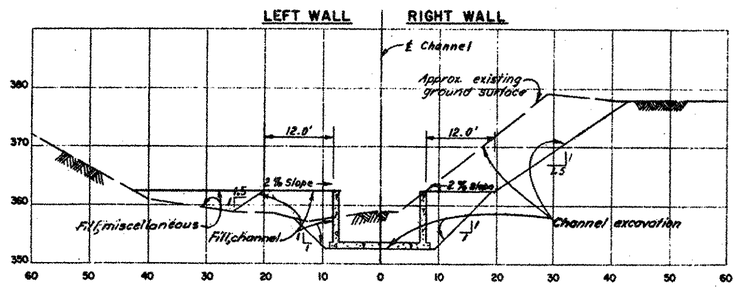
ENGINEER: C.W.L. W.A.B.
DRAWN BY: V.E.S.
CHECKED BY: W. A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
CROSS SECTIONS NO I

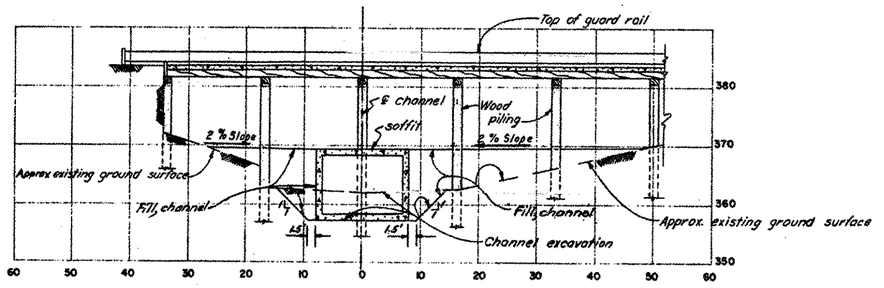
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C.E., DISTRICT ENGINEER

SCALE: 1 IN = 10 FT
DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25
SHEET 83 OF 102
FILE NO. (D. O. SERIES) 126/83

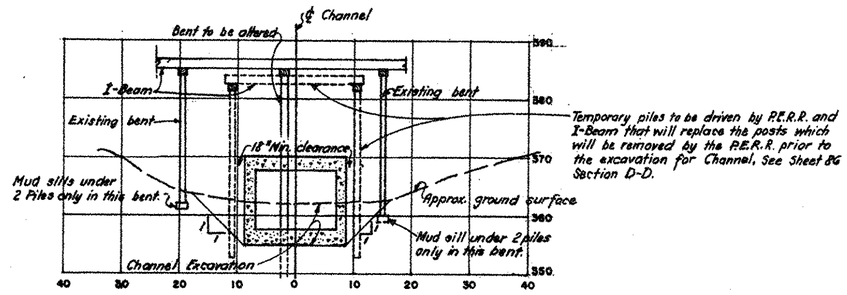
H&A DOC # 64809



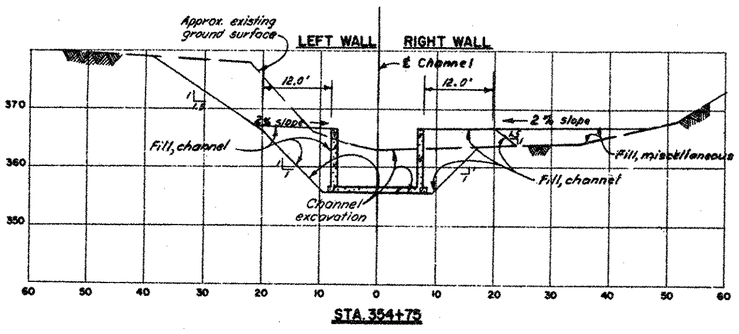
STA. 351+00



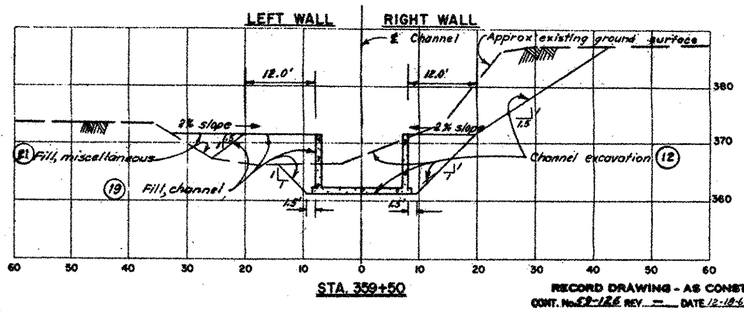
STA. 356+09.47



STA. 355+69
P.E.R.R. BENT ALTERATION



STA. 354+75



STA. 359+50

GENERAL NOTES

Channel Cross Sections are shown looking downstream.
Channel wall Fencing not shown. For fencing details see sheet 82
Figures in circles denote contract item numbers under which payment will be made.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 57-126 REV. — DATE 12-18-61 BY NO Change
CONT. No. REV. DATE BY
CONT. No. REV. DATE BY

DATUM IS MEAN SEA LEVEL

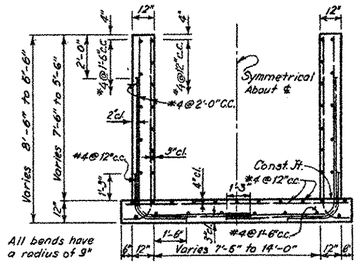
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L. W.A.B.
DRAWN BY: V.E.S.
CHECKED BY: W.A.B.-C.W.L.
SUBMITTED BY:

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
CROSS SECTIONS NO. 2

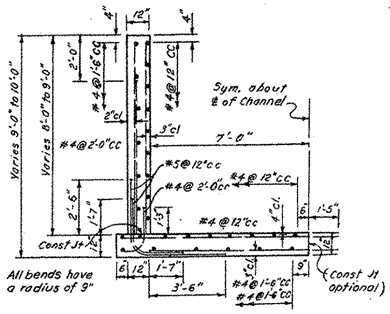
APPROVAL RECOMMENDED:
APPROVED:
SCALE: 1 IN = 10 FT
DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIVENG -04-353-59-25
SHEET 84 OF 102
FILE NO. (D. O. SERIES) 126/84

H&A # 64809



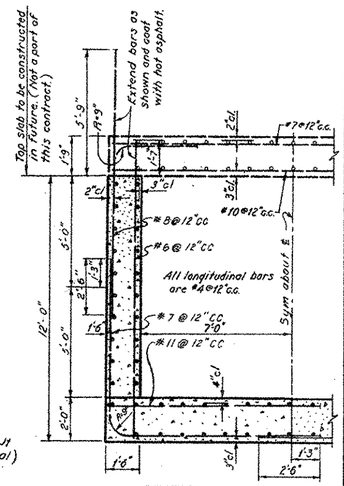
SECTION U_2

SCALE: 3/8 IN=1 FT



SECTION U_4

SCALE: 3/8 IN=1 FT

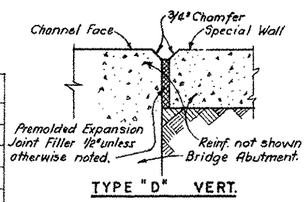


SECTION U_7

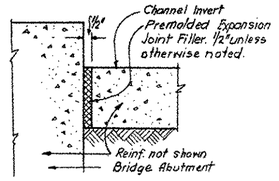
SCALE: 3/8 IN=1 FT

CARBON CANYON CHANNEL SECTIONS

FROM STATION	TO STATION	SECTION	HEIGHT OF WALL	WIDTH OF CHANNEL
389+05.70	388+65.70	U_1	VARIES 9'-0" TO 7'-3"	VARIES 8'-9" TO 7'-5"
388+65.70	388+25.70	U_2	VARIES 7'-3" TO 5'-6"	VARIES 7'-5" TO 10'-0"
388+25.70	382+49.00	U_2	VARIES 5'-6" TO 6'-5"	10'-0"
382+49.00	380+30.00	U_6 COVERED SEC.	6'-9"	10'-0"
380+30.00	379+00	U_2	VARIES 6'-9" TO 7'-0"	10'-0"
379+00	378+77.04	U_2	VARIES 7'-0" TO 6'-0"	10'-0"
378+77.04	374+00	U_2	VARIES 6'-0" TO 7'-0"	10'-0"
374+00	372+50	U_2	VARIES 7'-0" TO 7'-6"	10'-0"
372+50	372+25	U_2	7'-6"	VARIES 10'-0" TO 11'-6"
372+25	366+00	U_2	7'-6"	11'-6"
366+00	365+00	U_2	VARIES 7'-6" TO 7'-0"	11'-6"
365+00	364+60	U_2	VARIES 7'-0" TO 6'-6"	VARIES 11'-6" TO 14'-0"
364+60	364+00	U_2	VARIES 6'-6" TO 7'-0"	14'-0"
364+00	363+00	U_3	VARIES 7'-0" TO 8'-0"	14'-0"
363+00	359+78	U_4	VARIES 8'-0" TO 9'-0"	14'-0"
359+78	357+30	U_5	VARIES 9'-0" TO 10'-0"	14'-0"
357+30	356+30	U_7	10'-0"	14'-0"
356+30	355+64	COVERED SEC SEE SHEET 86	10'-0"	14'-0"
355+64	354+75	U_5	10'-0"	14'-0"
354+75	352+50	U_5	VARIES 10'-0" TO 9'-0"	14'-0"
352+50	347+82	U_4	9'-0"	14'-0"
347+82	347+80	SHEET PILING	9'-0"	14'-0"



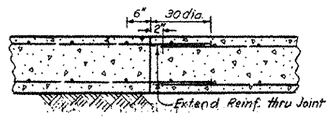
TYPE "D" VERT.



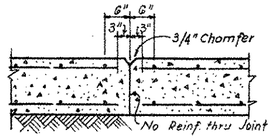
TYPE "D" HORIZ.

DETAILS OF EXPANSION JOINTS

NOT TO SCALE



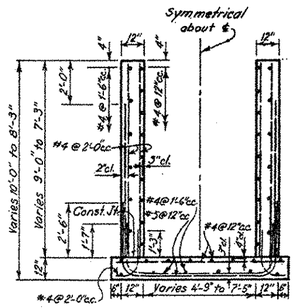
TYPE "J"



TYPE "B"

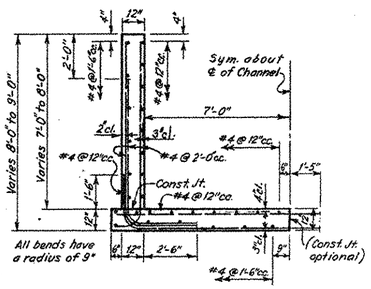
DETAILS OF CONSTRUCTION JOINTS

NOT TO SCALE



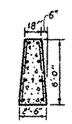
SECTION U_1

SCALE: 3/8 IN=1 FT



SECTION U_3

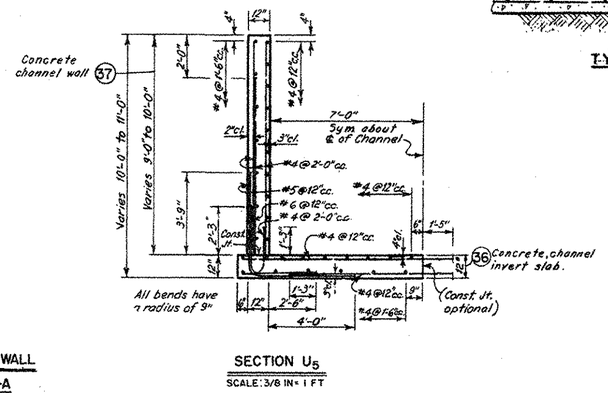
SCALE: 3/8 IN=1 FT



EXISTING TOE WALL

SECTION A-A

SCALE: 3/16 IN=1 FT



SECTION U_5

SCALE: 3/8 IN=1 FT

GENERAL NOTES

Steel reinforcement sizes are indicated by numbers, see hook detail.

All main steel reinforcement to be placed 3" clear from face of concrete, unless otherwise noted.

Dimensions from face of concrete to steel indicate clear cover unless otherwise noted.

Bar spacing are center to center of bars.

All exposed edges of concrete shall be chamfered 3/4" unless otherwise noted.

Splices in reinforcement shall be lapped 30 diameters of smaller bar, or as shown and approved.

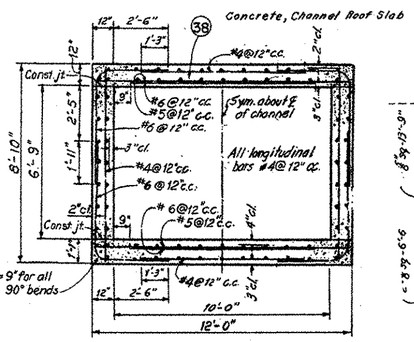
Splices in longitudinal reinforcement shall be staggered at 4 feet.

All steel reinforcement to be deformed bars conforming to Federal Spec. QQ-S-632 (See specifications)

Figures in circles denote contract item numbers under which payment will be made.

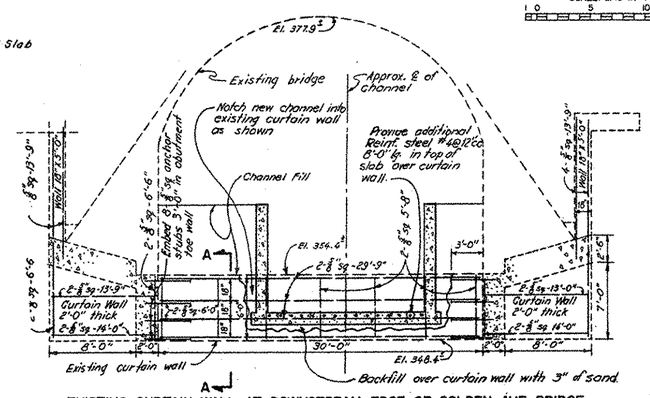
REFERENCE DRAWINGS

Plan and Profile No. 1 to No. 4 sheets 79 to 82



SECTION U_6

SCALE: 3/8 IN.=1 FT.

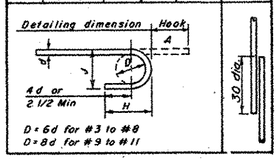


EXISTING CURTAIN WALL AT DOWNSTREAM EDGE OF GOLDEN AVE BRIDGE

ALTERATION OF GOLDEN AVENUE BRIDGE

SCALE: 3/16 IN=1 FT

DIMENSIONS FOR 180° HOOKS					SPLICES
BAR NO.	BAR SIZES d-INCHES	HOOK A	J	APPROX H	30 DIA
#3	0.375	5"	3"	4"	12"
#4	0.500	6"	4"	4 1/2"	1'-3"
#5	0.625	7"	5"	5"	1'-7"
#6	0.750	8"	6"	6"	1'-11"
#7	0.875	10"	7"	7"	2'-3"
#8	1.000	11"	8"	8"	2'-6"
#9	1.128	1'-3"	11 1/4"	10 1/8"	2'-10"
#10	1.270	1'-5	1'-01/2	11 1/4"	3'-2"
#11	1.410	1'-7"	1'-2"	1'-03/4"	3'-6"

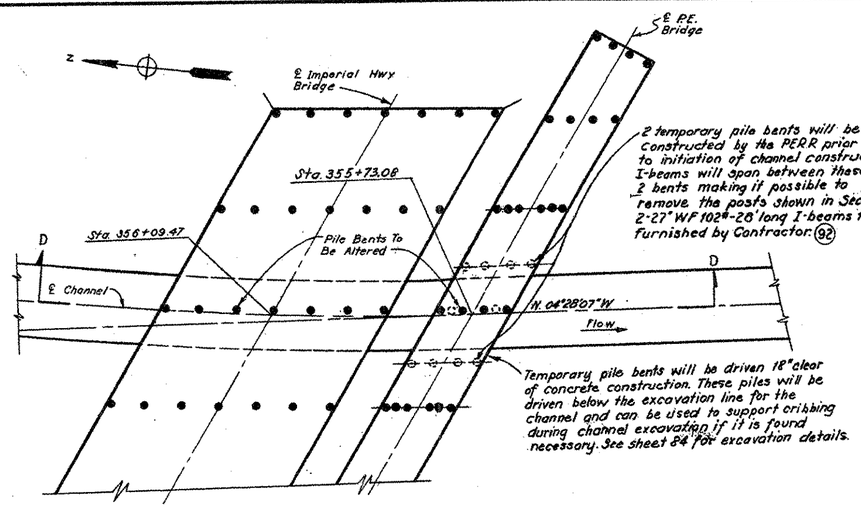


HOOK & SPLICE DETAIL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: N.A.W.	SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
DRAWN BY: J.E.L. H.A.B.	CARBON CANYON CREEK IMPROVEMENT
CHECKED BY: P.H.L. F.D.S.	CARBON CANYON DAM
SUBMITTED BY: CHIEF, DESIGN BRANCH	CARBON CANYON CHANNEL REINFORCEMENT AND STRUCTURAL DETAILS
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION	APPROVED: COLONEL, C.E., DISTRICT ENGINEER
SCALE: 3/8 IN = 1 FT.	DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIV ENG - 04-353-59-25	SHEET 86 OF 102 — FILE NO. (D. O. SERIES) 126/85

H-4-A DOC # 64809

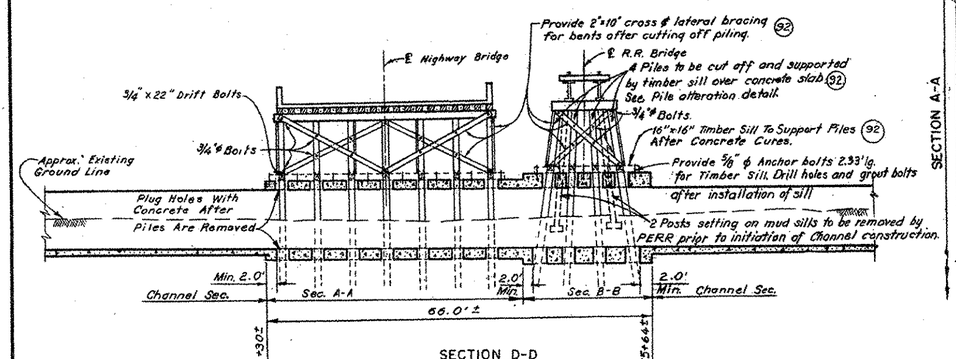


2 temporary pile bents will be constructed by the PERR prior to initiation of channel construction. I-beams will span between these 2 bents making it possible to remove the posts shown in Sect. D-D. 2-27" WF 102#-28' long I-beams to be furnished by Contractor. (92)

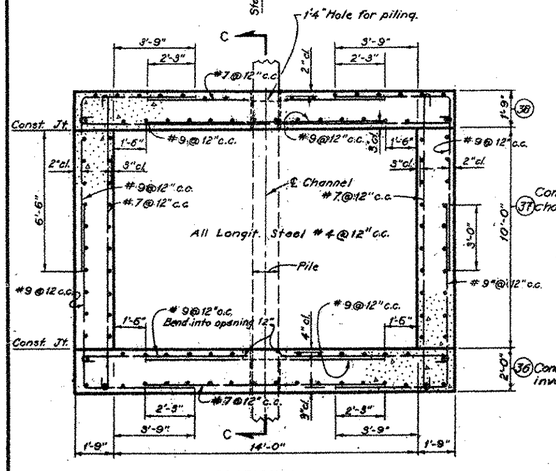
Temporary pile bents will be driven 18" clear of concrete construction. These piles will be driven below the excavation line for the channel and can be used to support cribbing during channel excavation if it is found necessary. See sheet 84 for excavation details.

IMPERIAL HWY. BRIDGE & P.E. RR. BRIDGE
PLAN OF PILE BENT TO BE REMOVED

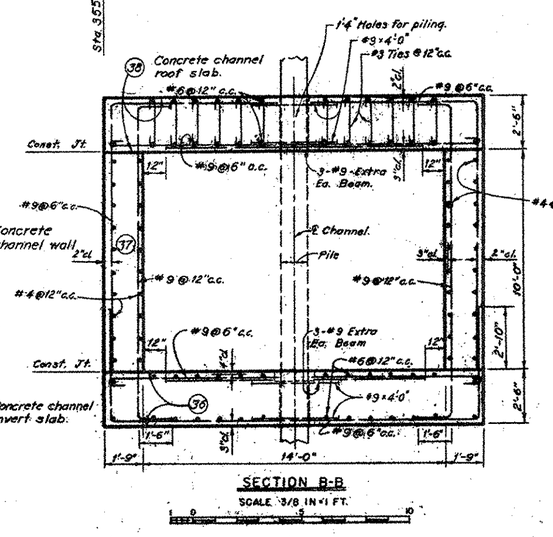
SCALE: 1 IN = 10 FT.



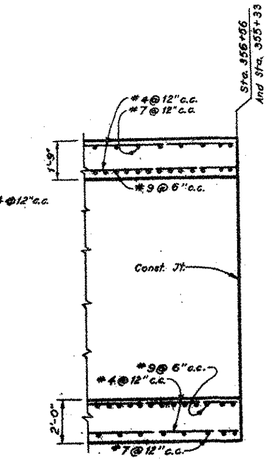
SECTION D-D
SCALE: 1 IN = 10 FT.



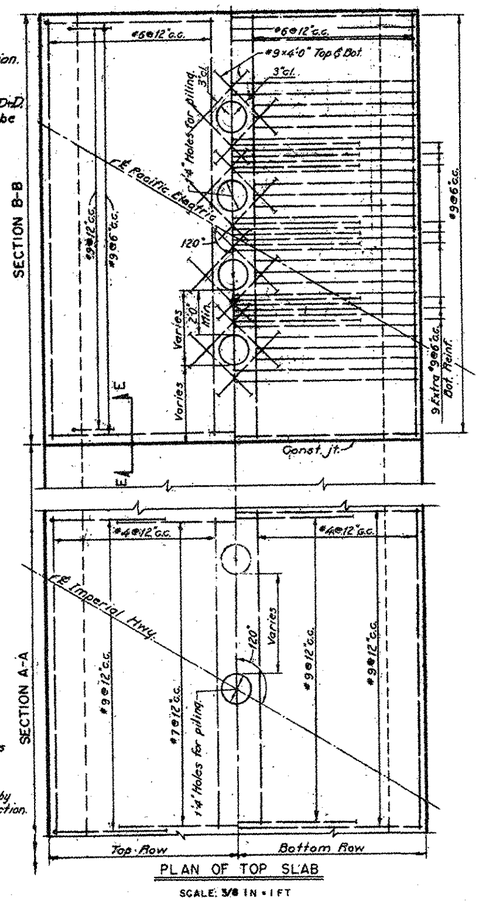
SECTION A-A
SCALE: 3/8 IN = 1 FT.



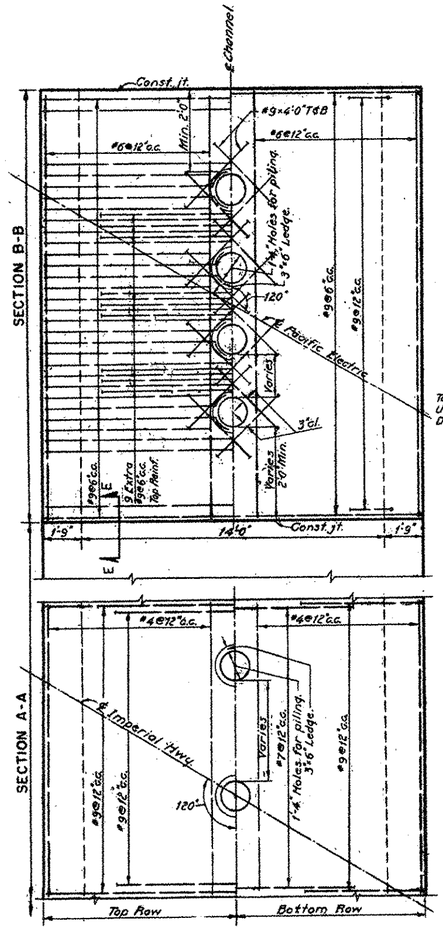
SECTION B-B
SCALE: 3/8 IN = 1 FT.



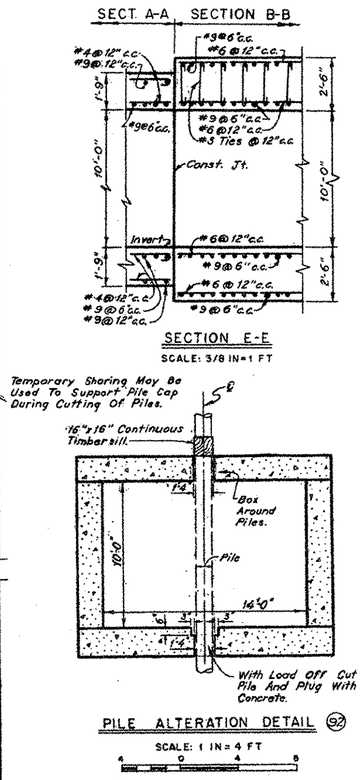
SECTION C-C
SCALE: 3/8 IN = 1 FT.



PLAN OF TOP SLAB
SCALE: 3/8 IN = 1 FT



PLAN OF BOTTOM SLAB
SCALE: 3/8 IN = 1 FT



SECTION E-E
SCALE: 3/8 IN = 1 FT

PILE ALTERATION DETAIL (92)
SCALE: 1 IN = 4 FT

GENERAL NOTES

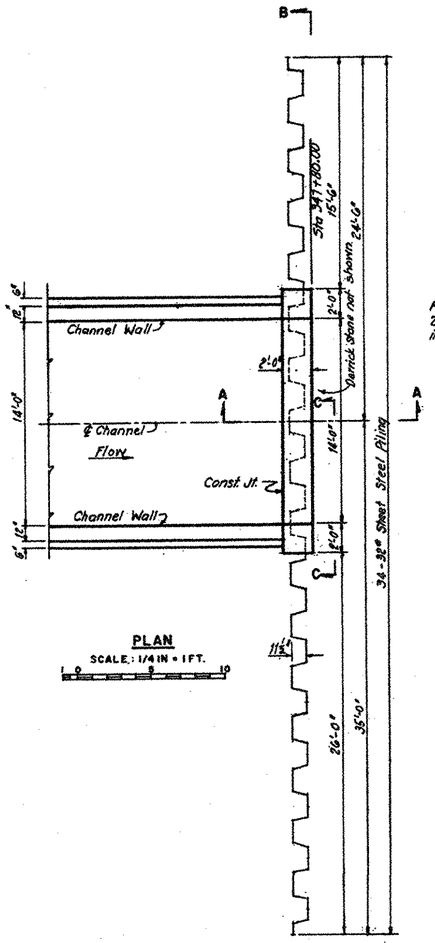
Figures in circles denote contract item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

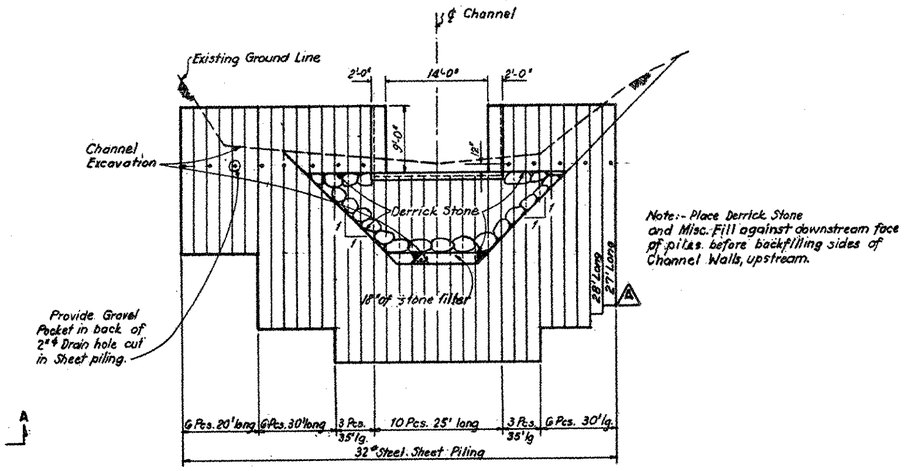
ENGINEER: F.D.S. C.W.L.	SANTA ANA RIVER BASIN (AND ORANGE COUNTY) CALIFORNIA
DRAWN BY: K.E.E. H.A.B.	CARBON CANYON CREEK IMPROVEMENT
CHECKED BY: F.D.S.	CARBON CANYON DAM
SUBMITTED BY: CHIEF, DESIGN BRANCH	CARBON CANYON CHANNEL
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION	IMPERIAL HIGHWAY AND PACIFIC ELECTRIC RY. BRIDGE ALTERATIONS
APPROVED: COLONEL, C. E., DISTRICT ENGINEER	
SCALE: AS SHOWN	DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25	SHEET 86 OF 102 — FILE NO. (D.O. SERIES) 126/86

H & A DOC. # 64809



PLAN

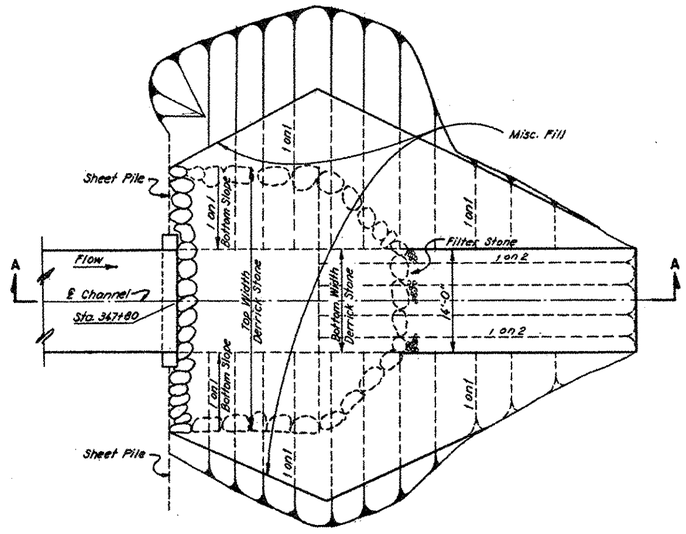
SCALE: 1/4 IN = 1 FT.



Note:- Place Derrick Stone and Misc. Fill against downstream face of piles before backfilling sides of Channel Walls, upstream.

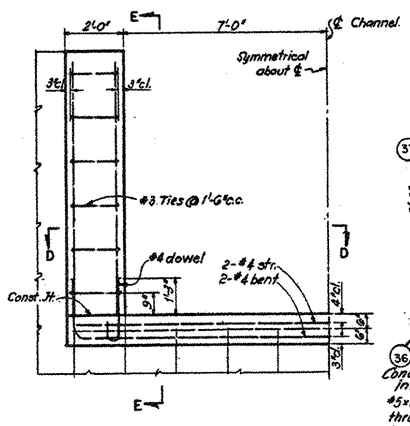
SECTION B-B

SCALE: 1/8 IN = 1 FT.



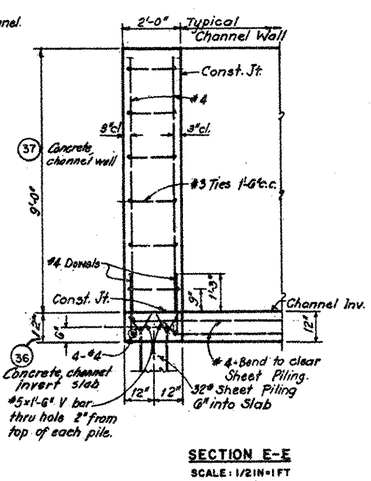
PLAN OF DERRICK STONE

SCALE 1/8 IN = 1 FT



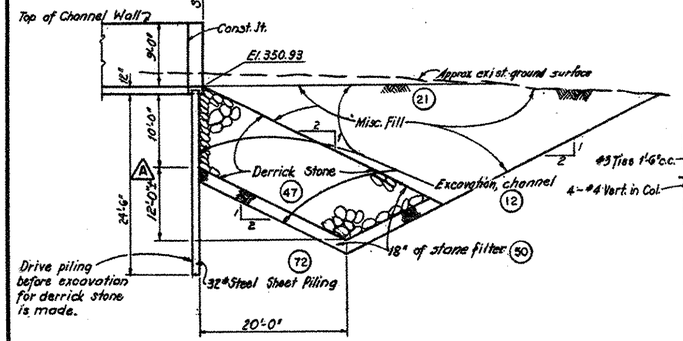
SECTION C-C

SCALE: 1/2 IN = 1 FT.



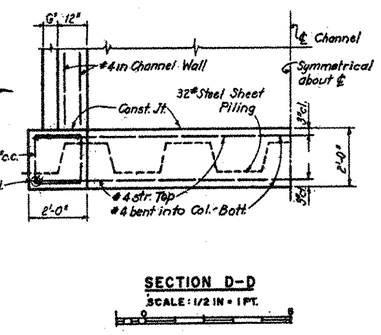
SECTION E-E

SCALE: 1/2 IN = 1 FT



SECTION A-A

SCALE: 1/8 IN = 1 FT.



SECTION D-D

SCALE: 1/2 IN = 1 FT.

GENERAL NOTES.

Figures in circles denote contract item numbers under which payment will be made.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 58-126 REV. A DATE 11-22-61 BY P.C.B.
CONT. No. REV. DATE BY
CONT. No. REV. DATE BY

DATUM IS MEAN SEA LEVEL

REV. NO.	DATE	REVISION	REV.	CHK.	APP.
A	11-22-61	Changed Dimensions And Shortened Piles As Constructed	PCB		

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: R.K.M. C.W.L.
DRAWN BY: H.L.
CHECKED BY: F.D.S.
SUBMITTED BY: CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
TERMINATION STRUCTURAL DETAILS

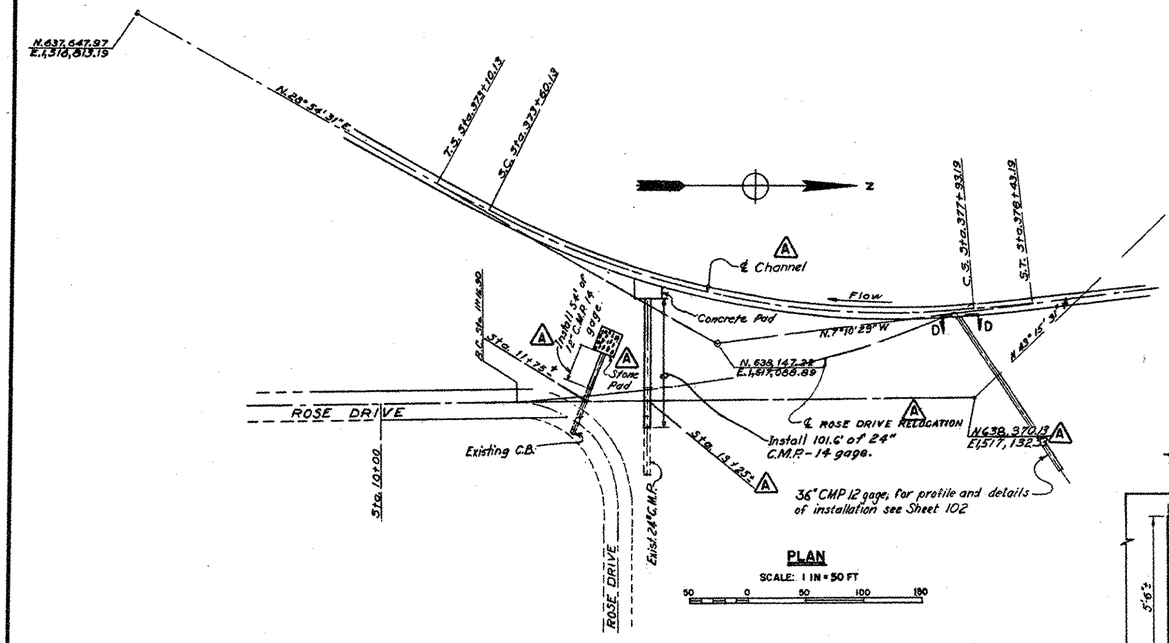
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C. E., DISTRICT ENGINEER

SCALE: AS SHOWN
DATE: MAY 1958

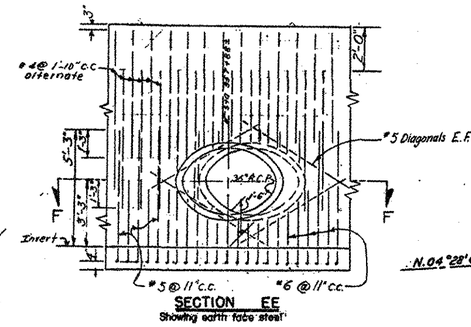
TO ACCOMPANY SPECIFICATIONS CIVENG -04-353-59-25
SHEET 87 OF 102
FILE NO. (D. O. SERIES) 126/87 REV. "A"

H&A DOC # 64809

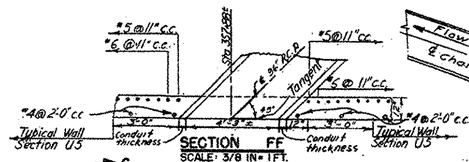
U.S. ARMY



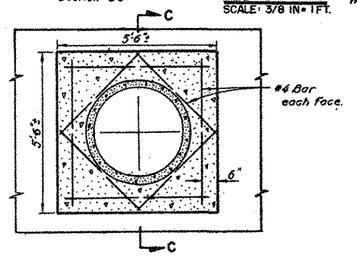
PLAN
SCALE: 1 IN = 50 FT
50 0 50 100 150



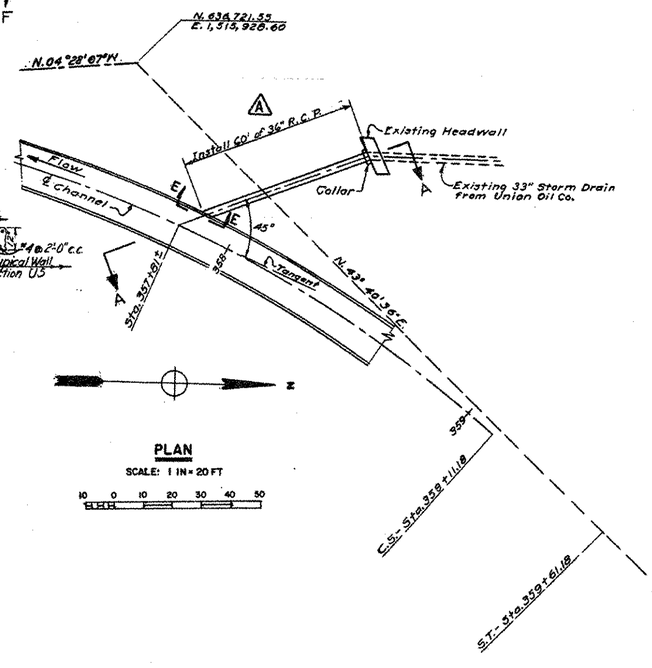
SECTION EE
Showing earth face steel



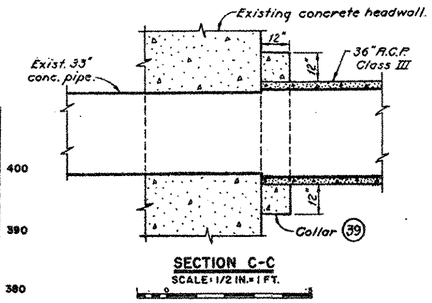
SECTION FF
SCALE: 3/8 IN = 1 FT.



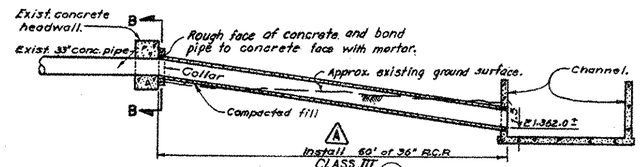
SECTION B-B
SCALE: 1/2 IN. = 1 FT.



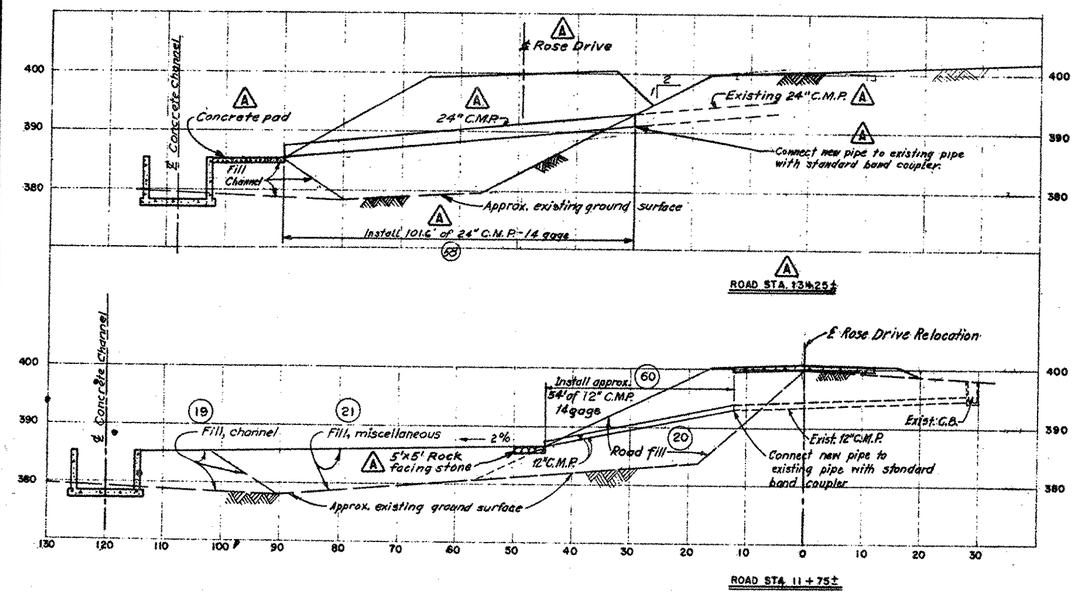
PLAN
SCALE: 1 IN = 20 FT
10 0 10 20 30 40 50



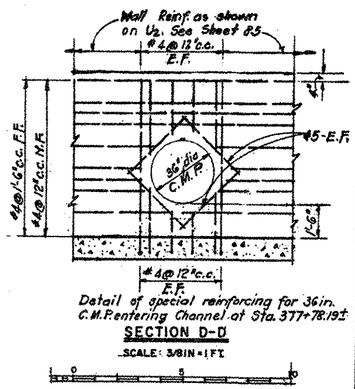
SECTION C-C
SCALE: 1/2 IN. = 1 FT.



SECTION A-A
SCALE: 1 IN = 10 FT
10 0 10 20 30



SECTIONS SHOWING EXTENSIONS OF EXISTING DRAINS
SCALE: 1 IN. = 10 FT



Detail of special reinforcing for 36 in. C.M.P. entering Channel at Sta. 377+78.19±

SECTION D-D
SCALE: 3/8 IN = 1 FT.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 57-126 REV. A DATE 11-23-61 BY P.C.B.
CONT. No. REV. DATE BY
CONT. No. REV. DATE BY

GENERAL NOTES

Figures in circles denote contract item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

REV. No.	DATE	REVISION	REV.	CHK.	APP.
A	11-23-61	Changed Road Relocation			
		Revised Dimensions & Stationing			
		Added Concrete & Stone			
		Work "As Constructed"	PCB		

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L. W.A.B.
DRAWN BY: H.A.B.
CHECKED BY: W.A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, CE, DISTRICT ENGINEER

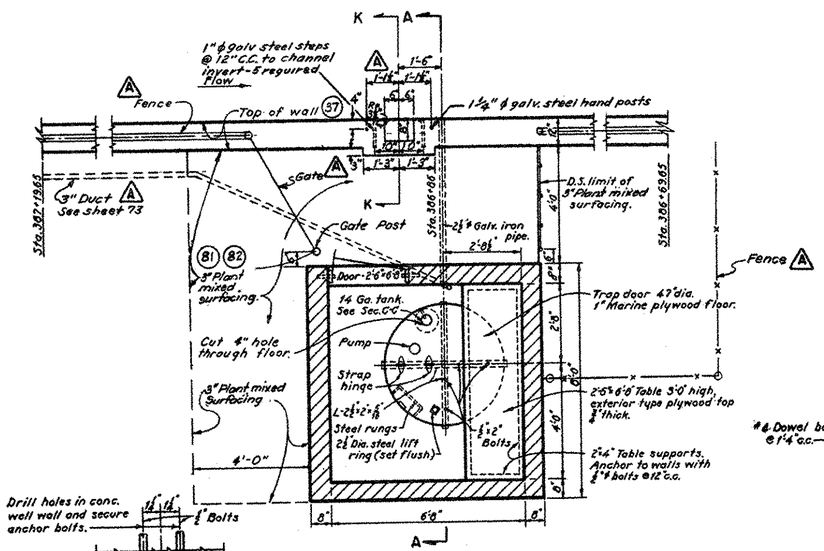
SANTA ANA RIVER BASIN (AND ORANGE COUNTY) CALIFORNIA

CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
CHANNEL SIDE DRAIN DETAILS

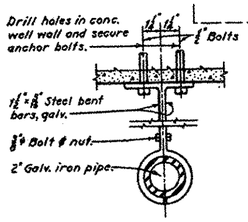
SCALE: AS SHOWN
DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIVENG-04-353-59-25
SHEET 86 OF 102
FILE NO. (D. O. SERIES) 126/88 REV. "A"

H & A DOC # 64809

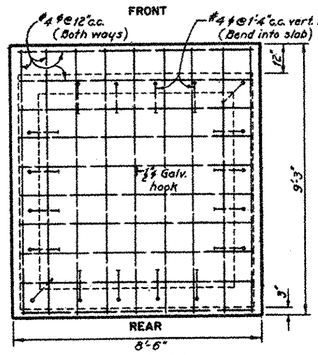
K-1402



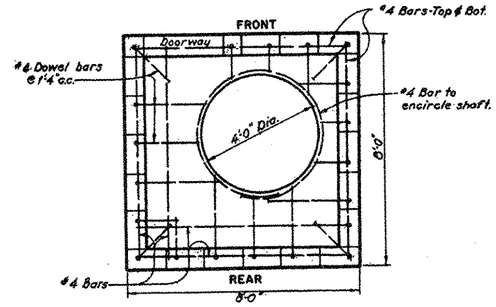
PLAN OF GAGING STATION
SCALE: 1/2 IN. = 1 FT.



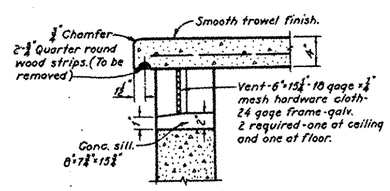
FLUSHING TANK SUPPORT
SCALE: 3 IN. = 1 FT.



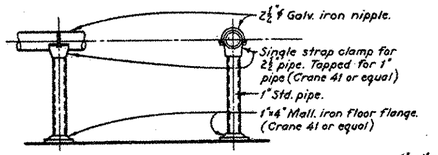
ROOF PLAN
SCALE: 1/2 IN. = 1 FT.



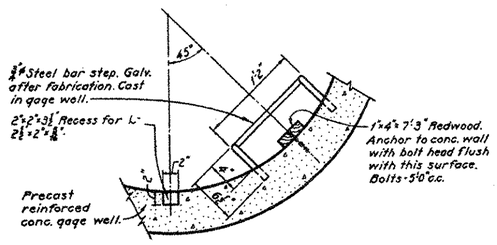
FLOOR PLAN
SCALE: 1/2 IN. = 1 FT.



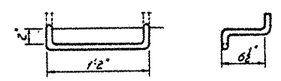
DETAIL "X"
SCALE: 1-1/2 IN. = 1 FT.



PIPE SUPPORT DETAIL
NOT TO SCALE

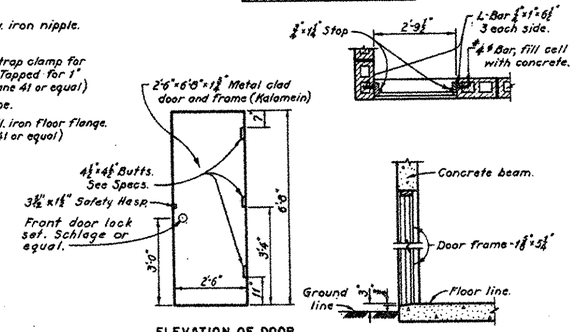


PLAN



ELEVATION END VIEW

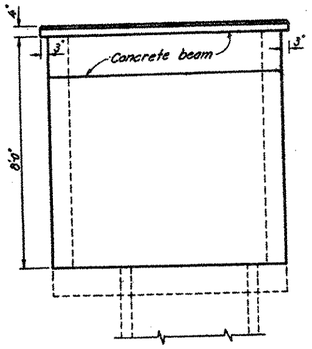
STEP DETAIL
SCALE: 1-1/2 IN. = 1 FT.



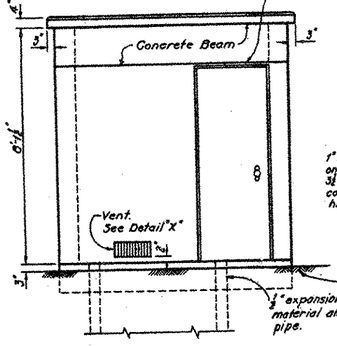
ELEVATION OF DOOR

SECTION THRU SILL

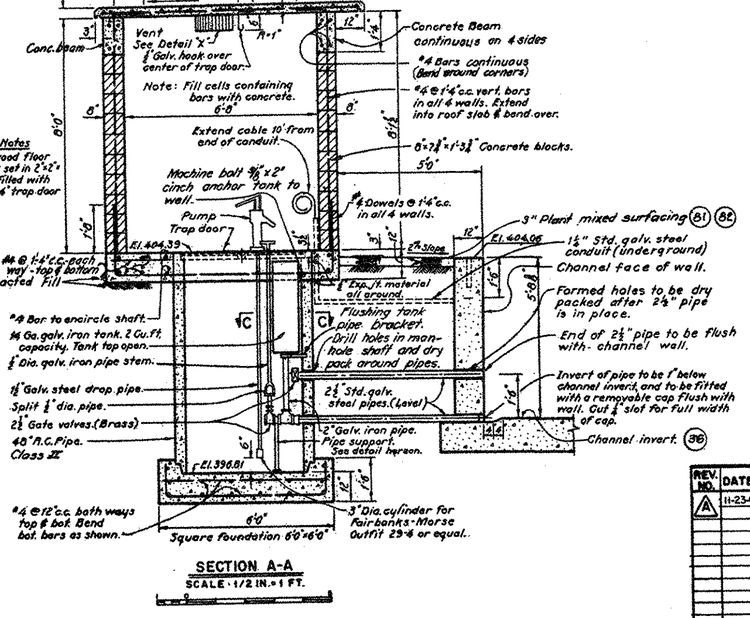
DOOR DETAILS
SCALE: 1/2 IN. = 1 FT.



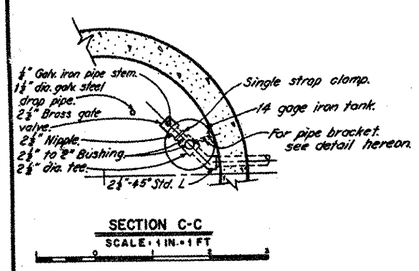
REAR ELEVATION
SCALE: 1/2 IN. = 1 FT.



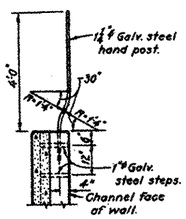
FRONT ELEVATION
SCALE: 1/2 IN. = 1 FT.



SECTION A-A
SCALE: 1/2 IN. = 1 FT.



SECTION C-C
SCALE: 1 IN. = 1 FT



SECTION K-K
SCALE: 1/2 IN. = 1 FT

GENERAL NOTES

For details of bridge across channel - See sheet 90
Payment for all work shown hereon, except Plant mixed surfacing, channel wall, channel invert, 1/4" Galv. conduit and Race shall be made under contract item number (78) Gaging Station.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 58-126 REV. A DATE 11-23-61 BY P.C.B.
CONT. No. ... REV. ... DATE ... BY ...
CONT. No. ... REV. ... DATE ... BY ...

DATUM IS MEAN SEA LEVEL

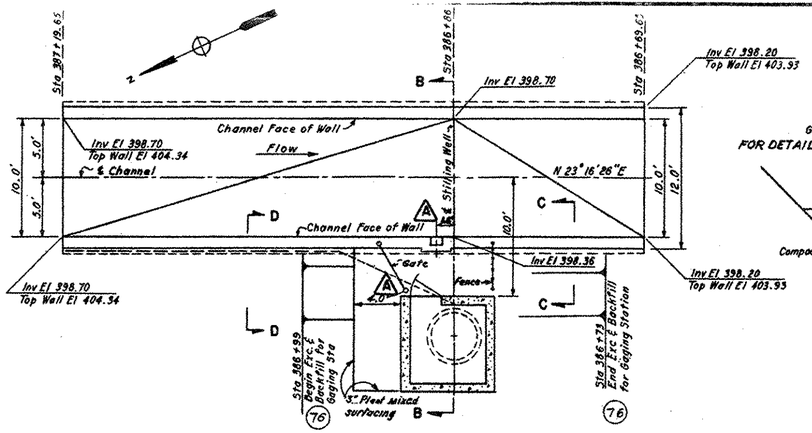
REV. NO.	DATE	REVISION	REV. CHK.	APP.
A	11-23-61	Added Fence & 3" Duct Moved		
		Gate & Gaging Station		
		Ladder "As Constructed"	PCB	

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

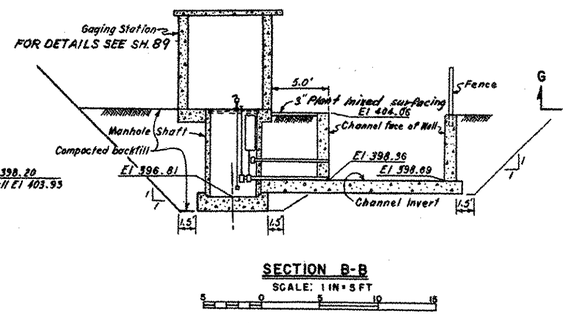
SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
GAGING STATION

ENGINEER: C.W.L. F.D.S.
DRAWN BY: R.H.S.
CHECKED BY: F.D.S. W.A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C.E., DISTRICT ENGINEER
SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25
SHEET 89 OF 102
FILE NO. (O. O. 588185) 126/89 REV. "A"

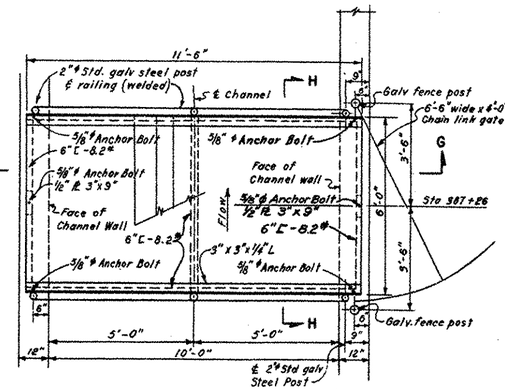
H-4 DOC # 648091



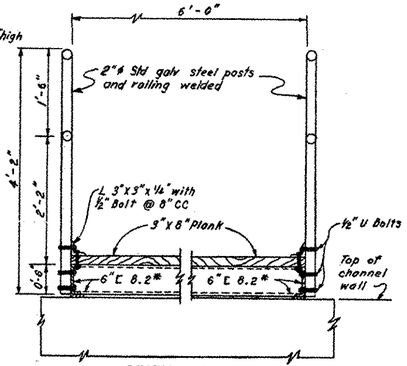
LOCATION PLAN
SCALE: 1 IN = 5 FT



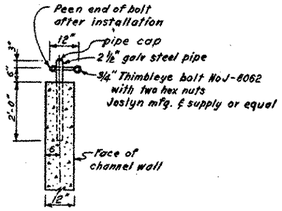
SECTION B-B
SCALE: 1 IN = 5 FT



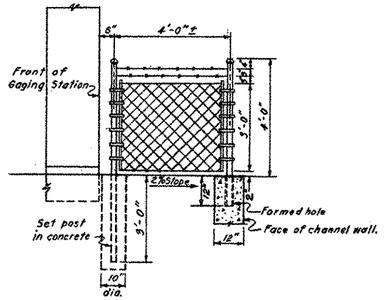
PLAN OF BRIDGE
SCALE: 1/2 IN = 1 FT



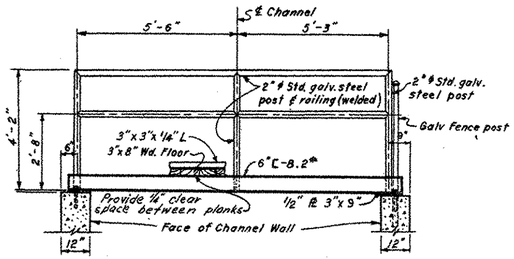
SECTION H-H
SCALE: 1 IN = 1 FT



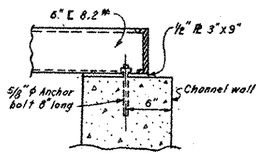
PIPE ANCHOR DETAIL
SCALE: 1/2 IN = 1 FT



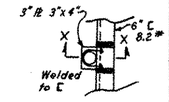
ELEVATION C-C
SCALE: 1/2 IN = 1 FT.



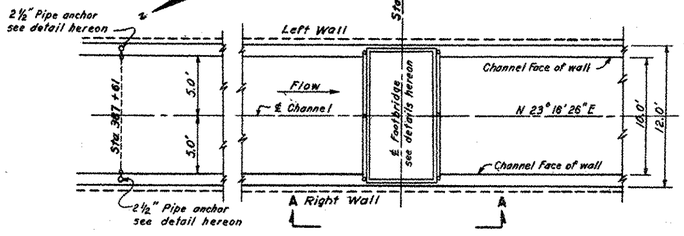
SECTION G-G
SCALE: 1/2 IN = 1 FT



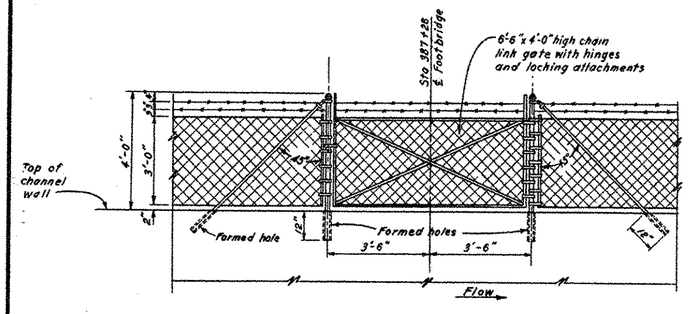
DETAIL OF ANCHOR AND BEARING PLATE
NOT TO SCALE



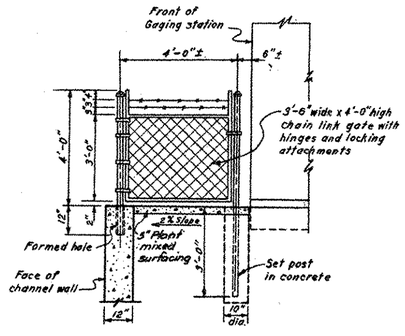
DETAIL OF CENTER POST ATTACHMENT
NOT TO SCALE



LOCATION PLAN
SCALE 1 IN = 5 FT

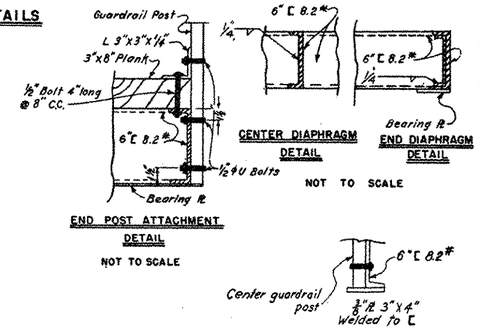


ELEVATION A-A
SCALE: 1/2 IN = 1 FT
RIGHT WALL



ELEVATION D-D
SCALE: 1/2 IN = 1 FT

FOOT BRIDGE DETAILS



CENTER DIAPHRAGM DETAIL
END DIAPHRAGM DETAIL
NOT TO SCALE

END POST ATTACHMENT DETAIL
NOT TO SCALE

SECTION X-X
NOT TO SCALE

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 59-126 REV. A DATE 11-23-61 BY P.C.B.
CONT. No. ____ REV. ____ DATE ____ BY ____
CONT. No. ____ REV. ____ DATE ____ BY ____

GENERAL NOTES

Payment for gaging station and bridge shown hereon shall be made under contract item number (76) Gaging Station.

Payment for fence shown hereon shall be made under contract item number (77) Fencing.

DATUM IS MEAN SEA LEVEL

REV NO	DATE	REVISION	REV.	CHK.	APP.
A	11-23-61	Moved Gate & Gaging Station Ladder "As Constructed"	PCB		

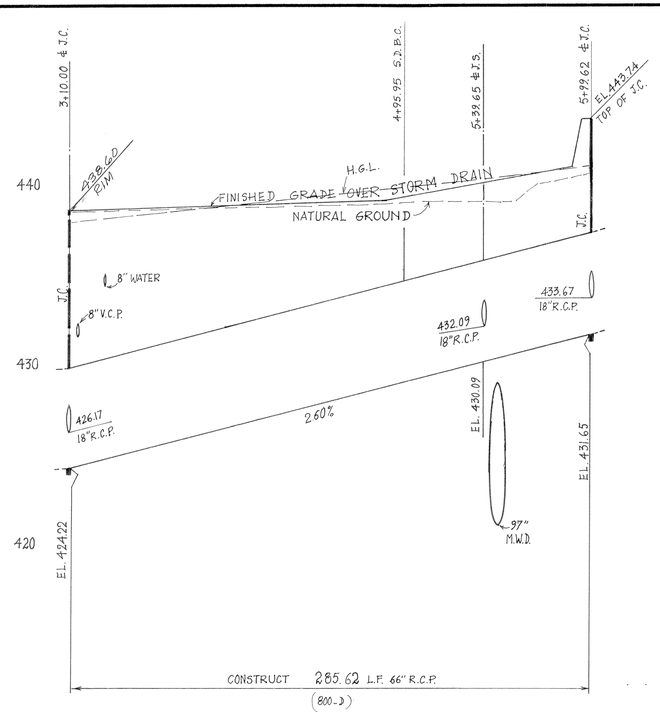
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

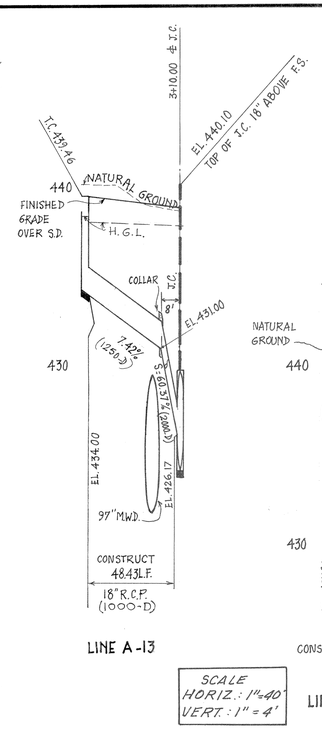
ENGINEER: C.W.L. F.D.S.
DRAWN BY: B.O.H.
CHECKED BY: F.D.S. W.A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C. E. DISTRICT ENGINEER

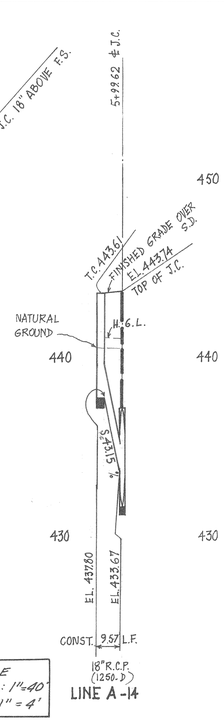
SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
GAGING STATION BRIDGE DETAILS

SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25
SHEET 90 OF 102
FILE NO. (D. O. SERIES) 126/90 REV. "A"

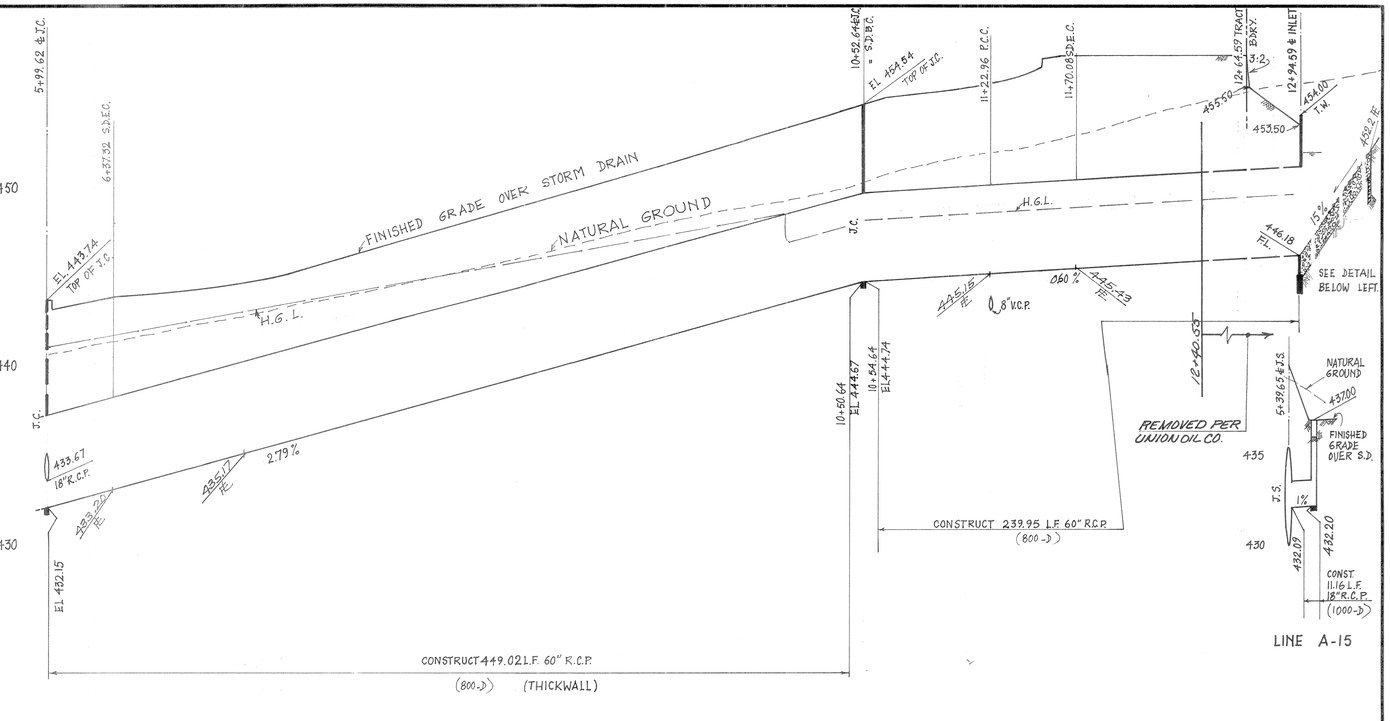
H&A DOC # 64809

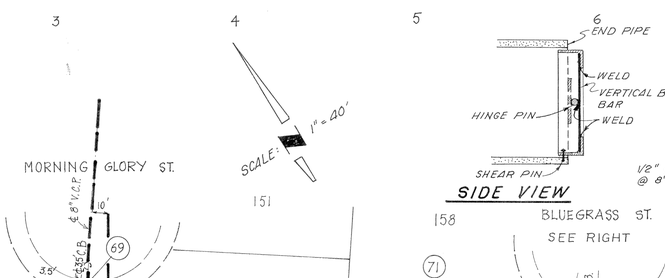




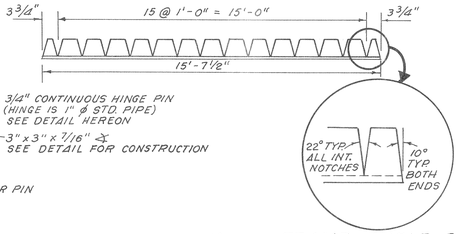


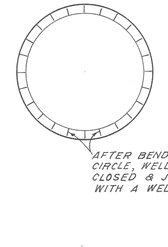
SCALE
HORIZ.: 1"=40'
VERT.: 1"=4'

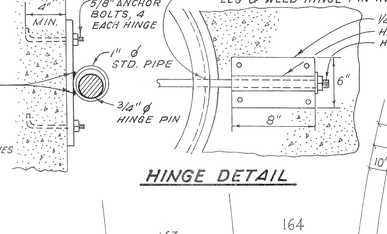


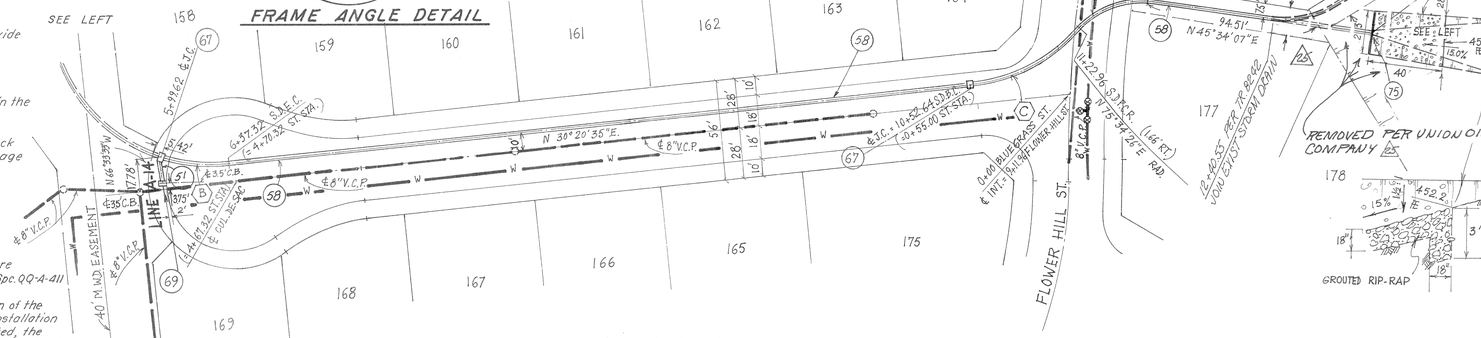


(75) INLET STRUCTURE DETAILS









BLUEGRASS ST.

(SEE SHEET #4)

NOTES:

1. The shear pin holes shall be drilled to provide a tight fit with shear pins in place.
2. Peen shear pin after installation.
3. Frome shall have oustanding leg facing in the direction of flow.
4. Thread ends of hinge pin so that nuts & lock washers are flush with hinge plate. Damage threads beyond nut face.
5. Galvanize after fabrication.
6. Cover movable contact surfaces with waterproof grease prior to installation
7. Shear pin material shall be comercially pure aluminum wire, alloy 1100, temper O Fed. Spec. QQ-A-411
8. The contractor shall check for free rotation of the barrier to the horizontal position before installation of the shear pin. If free rotation is obstructed, the engineer shall be notified for approval of modifications.

S.D. CURVE DATA	Δ	R	L	T
(A)	38° 10' 57"	90.00'	59.98'	31.15'
(B)	24° 00' 00"	90.00'	37.70'	19.13'
(C)	44° 46' 09"	90.00'	70.32'	37.07'
(D)	59° 59' 41"	45.00'	47.12'	25.98'
(E)	27° 49' 03"	90.00'	43.70'	22.29'

CONSTRUCTION NOTES

(50) CONSTRUCT 18" R.C.P. (1000-D)
(51) CONSTRUCT 18" R.C.P. (1250-D)
(58) CONSTRUCT 60" R.C.P. (800-D)
(61) CONSTRUCT 66" R.C.P. (800-D)
(67) CONSTRUCT JUNCTION CHAMBER PER BREA STD. 517.
(69) CONSTRUCT INLET TYPE 0S PER BREA STD. 505.
(72) CONSTRUCT STORM DRAIN PIPE COLLAR PER BREA STD. 514.
(75) CONSTRUCT INLET STRUCTURE (TEMPORARY)
(71) CONSTRUCT JUNCTION STRUCTURE TYPE VI CASE I PER DETAIL SHEET 18
(77) CONSTRUCT AREA DRAIN PER DETAIL SHEET # 19.
(78) CONSTRUCT GROUTED RIP-RAP (18" THICK)

SEE UNION OIL CO. TR. 8242 OFFSITE STORM DRAIN 0+00 TO 8+37.67

REVISIONS			
Nº	DESCRIPTION	APPROVED	DATE
1	INLET ALIGNMENT CORRECTED	Sam W. Peterson	1.31.78
2	REVISED INLET STRUCTURE DETAILS (75)	Sam W. Peterson 6/21/78	6.20.78
3	REVISED STM DRN ALIGN. PER UNION OIL CO. "AS-BUILT"		1-28-82

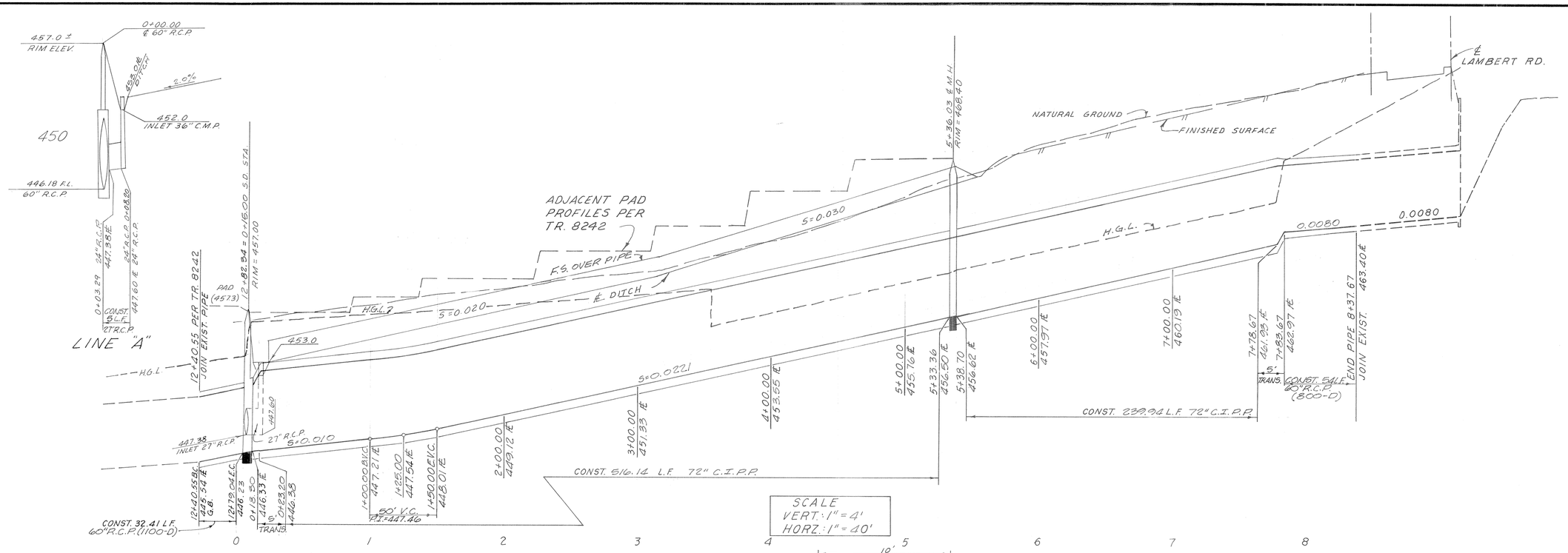
1756-21

ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

TRACT NO. 8242

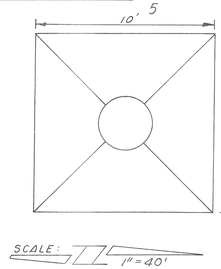
DRAWN BY: H.V.N.	APPROVED: Donald K. Keefe	SHEET 21 OF 27
CHECKED BY: L.R.W	CITY ENGINEER R.C.E. 9851	
DATE: 9/14/77	1-28-82	

J.H.H. JOB NO. 1785



CONSTRUCTION NOTES

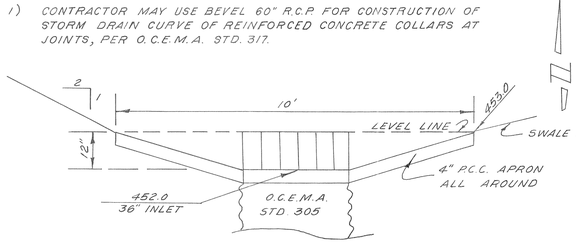
1	CONSTRUCT 72" C.I.P.P.	796 L.F.
2	CONSTRUCT REINFORCED CONCRETE COLLAR, PER BREA STD. 514	1 EA.
3	CONSTRUCT MANHOLE PER BREA STD. 519	1 EA.
4	CONSTRUCT INLET TYPE "I", WITH D_i = 36" C.M.P. PER O.C.E.M.A. STD. 305	1 EA.
5	CONSTRUCT 27" R.C.P. (1250 D)	8 L.F.
6	CONSTRUCT MANHOLE PER BREA STD. 517	1 EA.
7	CONSTRUCT 60" R.C.P. (1100-D)	32 L.F.
8	RELOCATE 60" R.C.P. (800-D)	54 L.F.



SCALE
VERT: 1" = 4'
HORZ: 1" = 40'

GENERAL NOTES

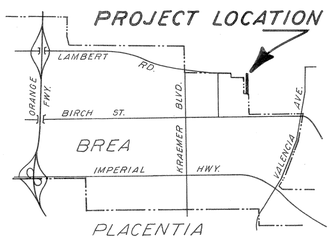
1) CONTRACTOR MAY USE BEVEL 60" R.C.P. FOR CONSTRUCTION OF STORM DRAIN CURVE OF REINFORCED CONCRETE COLLARS AT JOINTS, PER O.C.E.M.A. STD. 317.



DOWNDRAIN DETAIL

NO SCALE

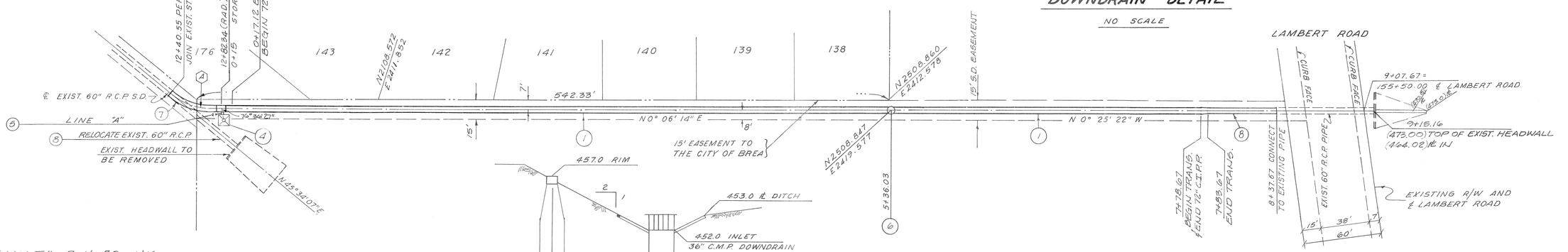
PROJECT LOCATION



LOCATION MAP

NO SCALE

TRACT 8242



CURVE DATA

	Δ	R	L	T
A	45° 27' 53"	45.00'	37.71'	18.85

"AS-BUILT" 7-11-80 WJG

REVISED PIPE SIZE AND TYPE	6/27/80 WJG	Susp 6/25/80

AS BUILT 9-12-80

1756-36

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL OBTAIN AND HAVE AVAILABLE ON JOB SITE, COPIES OF APPLICABLE STANDARDS SHOWN ON PLANS AND BE FAMILIAR WITH THEIR CONSTRUCTION.

Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this Project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this Project, excepting for liability arising from the sole negligence of the Owner or the Engineer.

CCEELS CALIFORNIA COUNCIL OF CIVIL ENGINEERS AND LAND SURVEYORS

BENCH MARK:

O.C.S. 2C-86-70 ELEV. = 382.74

ALUMINUM CAP IN THE NORTHWEST PART OF THE INTERSECTION OF KRAEMER BLVD. AND A FLOOD CONTROL CHANNEL; ABOUT 208 FT. NORTH ALONG THE EAST EDGE OF THE SOUTHERN PACIFIC R.R. CROSSING OF THE BLVD. (THE FIRST R.R. NORTH OF IMPERIAL HIGHWAY.) 36 FT. WEST OF THE CENTERLINE OF THE BLVD. SET IN THE TOP OF THE WEST END OF A CONCRETE RETAINING WALL WHERE IT JOINS A CONCRETE WINGWALL, ABOUT LEVEL WITH THE BLVD.

JENNINGS · HALDERMAN · HOOD
REGISTERED CIVIL ENGINEERS
540 NORTH GOLDEN CIRCLE DRIVE
SANTA ANA, CALIFORNIA (714) 835-3611

PREPARED UNDER THE SUPERVISION OF:

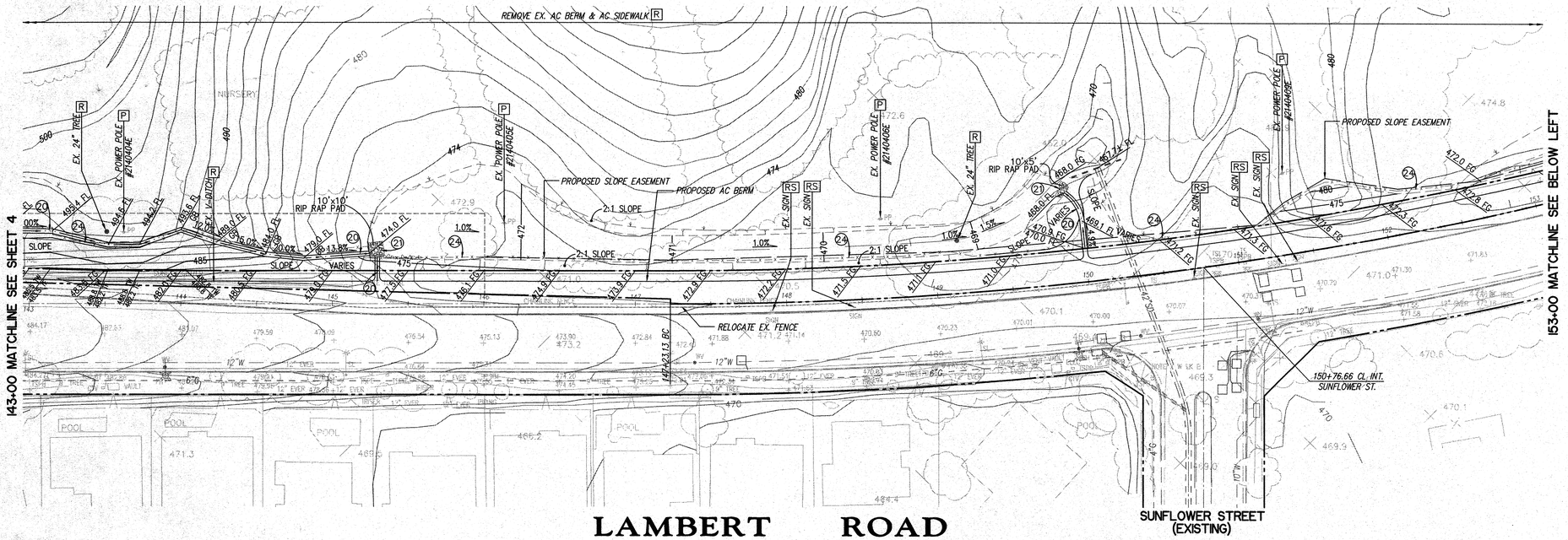
Lawrence R. Klein DATE: 4/18/80
RCE 19355

ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

UNION OIL COMPANY
TR. 8242 OFFSITE
STORM DRAIN 0+00.00 TO 8+37.67

Drawn by: R.R.A.	Approved: Melo K. Keith, City Engineer R.C.E. 9855	Sheet 1 OF 1
Checked by: S.P.		
Date: 2-14-80		

J.H.H. Job 2005



GRADING CONSTRUCTION NOTES

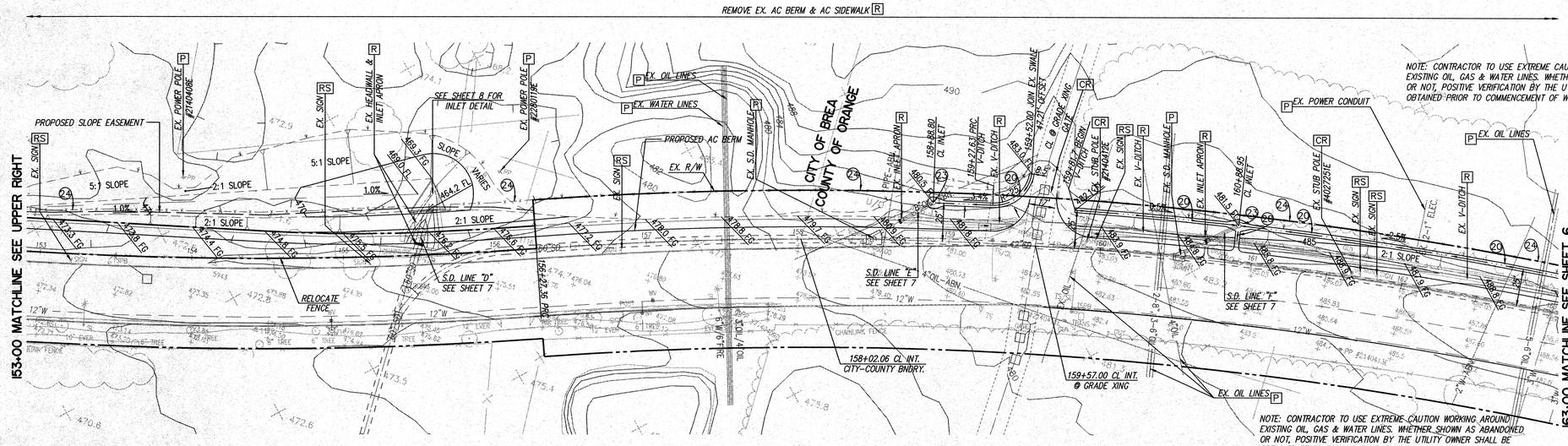
(20)—CONST. "V" DITCH PER DETAIL ON SHEET 8
(21)—CONST. RIP-RAP PER DETAIL ON SHEET 8

(23)—CONST. "V" DITCH DEPRESSION PER DETAIL ON SHEET 8
(24)—CONST. 6' HIGH CHAIN LINK FENCE

RELOCATION NOTES

(30)—RELOCATE EXISTING STREET LIGHT PER CITY STD. 820

NOTE: CONTRACTOR TO USE EXTREME CAUTION WORKING AROUND EXISTING OIL, GAS & WATER LINES. WHETHER SHOWN AS ABANDONED OR NOT, POSITIVE VERIFICATION BY THE UTILITY OWNER SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF WORK.



EXISTING FEATURES LEGEND

[P]—PROTECT IN PLACE
[R]—REMOVE EXISTING STRUCTURE
[CR]—COORDINATE RELOCATION WITH AFFECTED AGENCY
[RS]—REMOVE AND SALVAGE (TO CITY OR COUNTY YARD)

NOTE: ALL EXISTING STRUCTURES TO BE RELOCATED SHALL BE PLACED IN THE SAME RELATIVE LOCATION FROM THE EXISTING CURB TO THE PROPOSED CURB, UNLESS OTHERWISE SHOWN ON PLAN.

NOTE: TRAFFIC SIGNAL POLES, PULLBOXES CONTROLLERS & SENSORS TO BE RELOCATED PER TRAFFIC SIGNAL RELOCATION PLAN

NOTE: SEE STREET IMPROVEMENT SHEETS FOR SAWCUT LINES & PAVEMENT REMOVAL.

LANDSCAPE NOTE: ALL PROPOSED SLOPES SHALL BE HYDRO-SEEDED USING A DROUGHT-TOLERANT SEED MIX TO BE SPECIFIED BY THE LANDSCAPE ARCHITECT

NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

FB 5/31/01

BENCHMARK: *No. 2L 13 70 ELEV. 490.778*
FROM THE INTERSECTION OF VALENCIA AVE. WITH ROSE DR. AND BIRCH ST. GO 0.2 MI. N'LY. ALONG VALENCIA AVE. TO ITS JUNCTION WITH AN A/C RD. GOING E'LY., 42.6 FT. E'LY. FROM THE CENTER OF THE A/C RD., 14 FT. E'LY OF SPUR POLE #788040H, 26.7 FT. NW'LY. OF POWER POLE (NO NUMBER), 2.5 FT. W'LY. OF A WITNESS POST WITH PADDLE, SET IN THE TOP OF A 6" X 6" CONCRETE POST W'LY. 1.5 FT. ABOVE THE GROUND SURFACE.

OWNER/DEVELOPER:
BREA OLINDA VENTURES, L.L.C.
c/o PLC LAND COMPANY
19 CORPORATE PLAZA
NEWPORT BEACH, CA. 92660

SOIL FIRM:
LEIGHTON & ASSOCIATES, INC.
659 S. BREA CANYON ROAD, SUITE 4
WALNUT, CA 91789
(909)869-6382

PREPARED BY:
PARDEE, CORNWELL & ASSOCIATES, INC.
Planning / Engineering / Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3800 241-3432 FAX

FRED CORNWELL R.C.E. 45591 — DATE 5-16-01 — EXP. DATE 12/31/02

REGISTERED PROFESSIONAL ENGINEER — FRED CORNWELL — No. 45591 — Exp. 12/31/02 — CIVIL — STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

K-1408

REVIEWED BY:

PHIL A. WRAY — CITY ENGINEER — 38971 RCE — 5-31-01 DATE

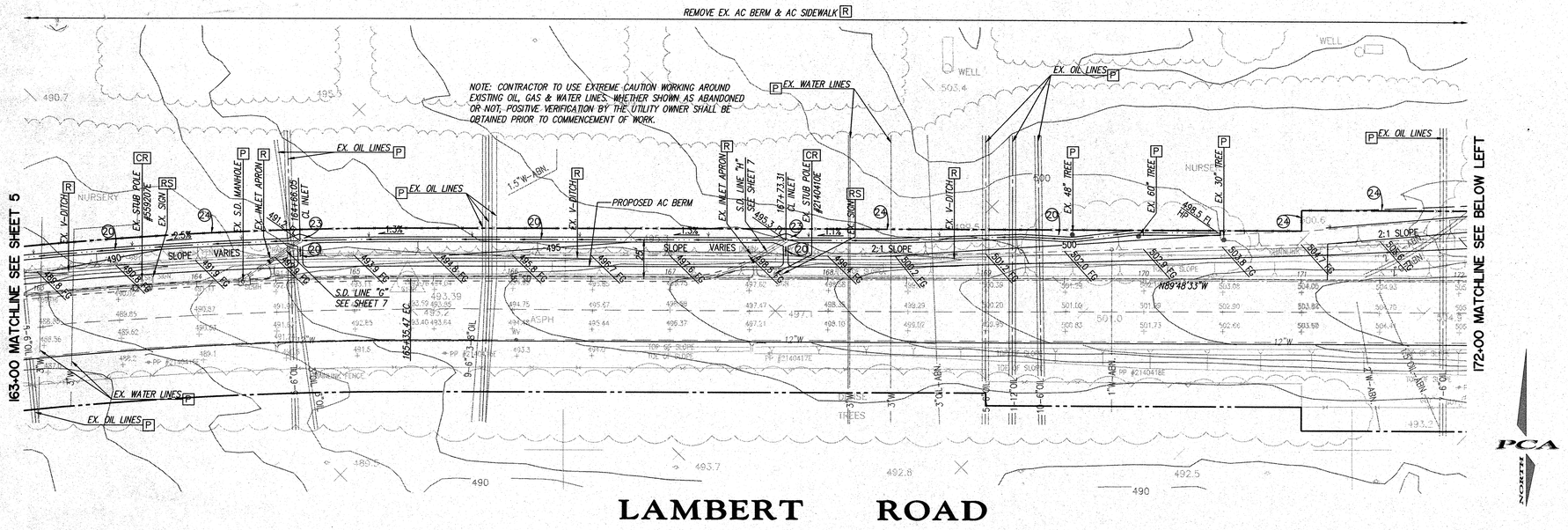
PLAN SCALE 1"=40'
PROFILE SCALE N/A
DRAWN BY: COM
DESIGN BY: RG
CHECKED BY: FKC

GRADING PLANS FOR:
LAMBERT ROAD
STA 143+00 – STA 163+00

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

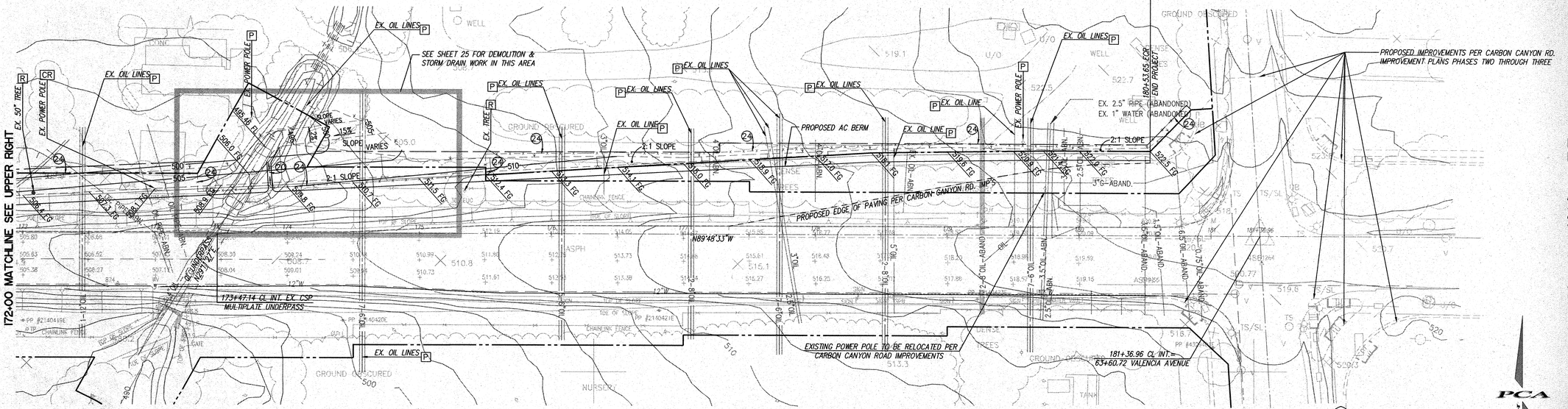
PROJECT NO.

SHEET NO.
5 OF 28



GRADING CONSTRUCTION NOTES

20—CONST. "V" DITCH PER DETAIL ON SHEET 8
21—CONST. RIP-RAP PER DETAIL ON SHEET 8
22—CONST. INLET APRON PER DETAIL ON SHEET 8
23—CONST. "V" DITCH DEPRESSION PER DETAIL ON SHEET 8
24—CONST. 6' HIGH CHAIN LINK FENCE



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NOTE: TRAFFIC SIGNAL POLES, PULLBOXES CONTROLLERS & SENSORS TO BE RELOCATED PER TRAFFIC SIGNAL RELOCATION PLAN

NOTE: SEE STREET IMPROVEMENT SHEETS FOR SAWCUT LINES & PAVEMENT REMOVAL.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

FKB 5/31/01

BENCHMARK: No. 2L 13 70 ELEV. 490.778

FROM THE INTERSECTION OF VALENCIA AVE. WITH ROSE DR. AND BIRCH ST. GO 0.2 MI. N'LY. ALONG VALENCIA AVE. TO ITS JUNCTION WITH AN A/C RD. GOING E'LY., 42.6 FT. E'LY. FROM THE CENTER OF THE A/C RD., 14 FT. E'LY. OF SPUR POLE #788040H, 26.7 FT. NW'LY. OF POWER POLE (NO NUMBER), 2.5 FT. W'LY. OF A WITNESS POST WITH PADDLE, SET IN THE TOP OF A 6" X 6" CONCRETE POST W'LY. 1.5 FT. ABOVE THE GROUND SURFACE.

OWNER/DEVELOPER:
BREA OLINDA VENTURES, L.L.C.
c/o PLC LAND COMPANY
19 CORPORATE PLAZA
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SOIL FIRM:
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151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

FRED CORNWELL R.C.E. 45591 — DATE 5/16/01 EXP. DATE 12/31/02

REGISTERED PROFESSIONAL ENGINEER FRED CORNWELL No. 45591 Exp. 12/31/02 CIVIL STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
PHIL A. WRAY — CITY ENGINEER — 38971 RCE — 5-31-01 DATE

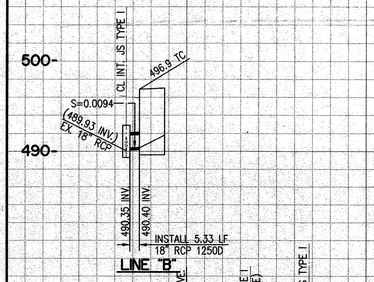
PLAN SCALE 1"=40'
PROFILE SCALE N/A
DRAWN BY: COM
DESIGN BY: RG
CHECKED BY: FKC

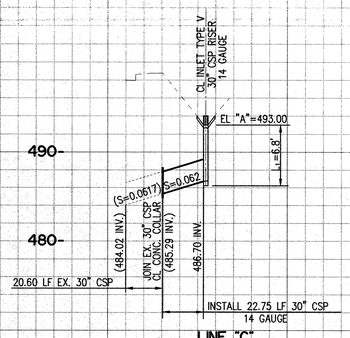
GRADING PLANS FOR:
LAMBERT ROAD
STA 163+00 – STA 180+53.65
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

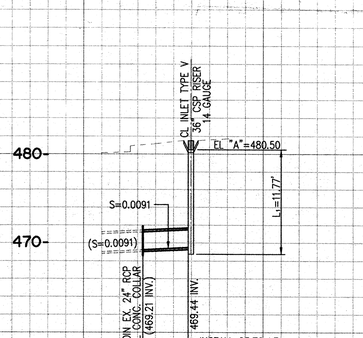
PROJECT NO.

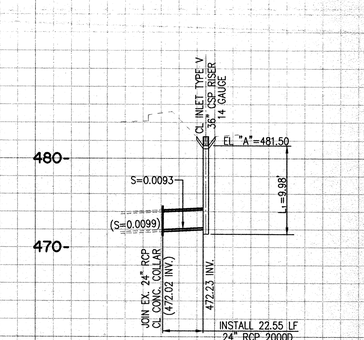
SHEET NO. 6 OF 28

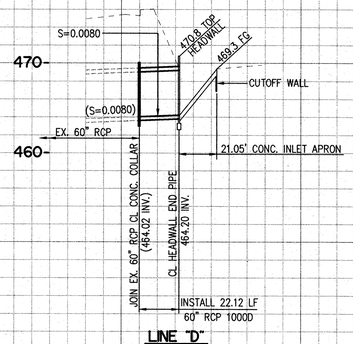
K-1429

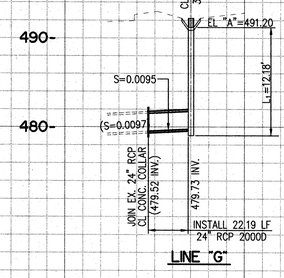


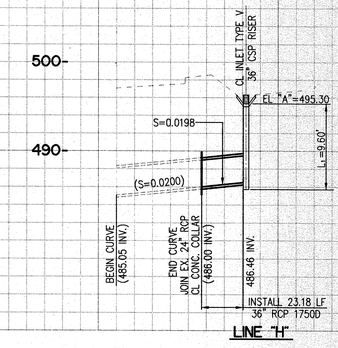




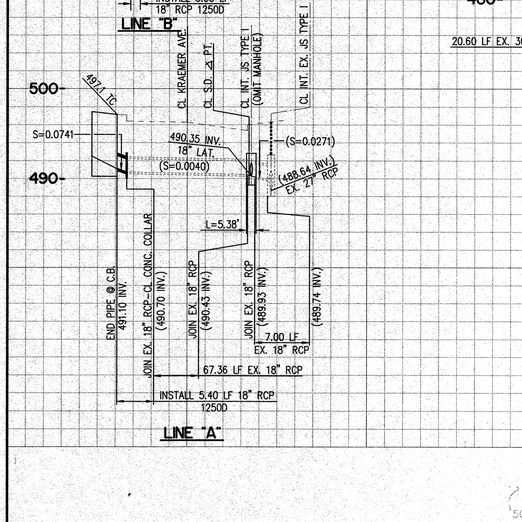


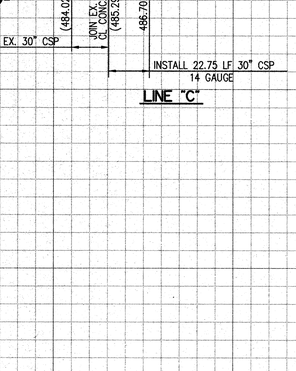






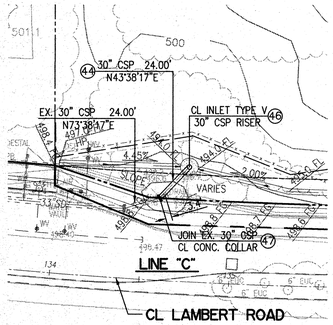
PROFILE SCALES
VERT. 1"= 8'
HORIZ. 1"= 40'



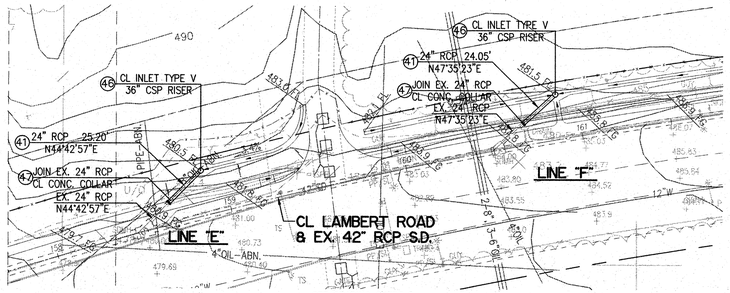


CONSTRUCTION NOTES

40 INSTALL 18" RCP (SEE PROFILE FOR D-LOAD)
41 INSTALL 24" RCP (SEE PROFILE FOR D-LOAD)
42 INSTALL 36" RCP (SEE PROFILE FOR D-LOAD)
43 INSTALL 60" RCP (SEE PROFILE FOR D-LOAD)
44 INSTALL 30" CSP (14 GAUGE)
45 CONST. INLET TYPE II PER O.C.P.F. & R.D. STD. 1302
46 CONST. INLET TYPE V PER O.C.P.F. & R.D. STD. 1305
47 CONST. CONCRETE COLLAR PER O.C.P.F. & R.D. STD. 1317
48 CONST. JUNCTION STRUCTURE TYPE I PER O.C.P.F. & R.D. STD. 1310
50 CONST. HEADWALL PER CALTRANS STD. D89
51 CONST. HEADWALL INLET APRON PER DETAIL ON SHEET 8

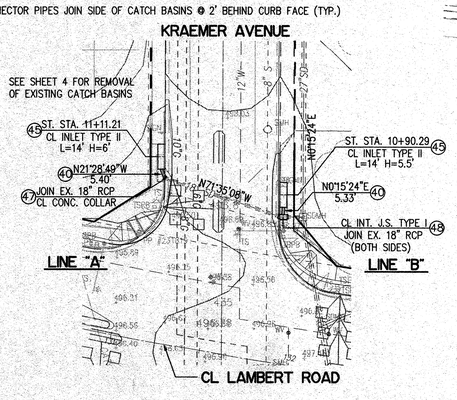


SEE GRADING SHEET 4

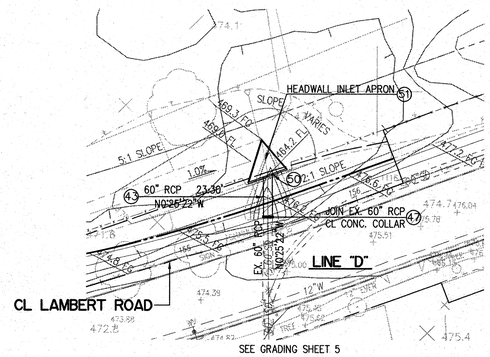


SEE GRADING SHEET 5

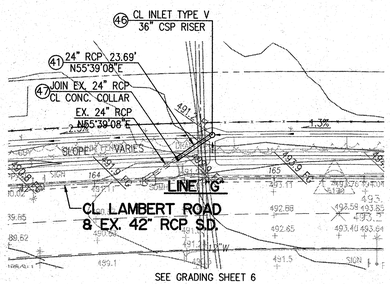
CONNECTOR PIPES JOIN SIDE OF CATCH BASINS @ 2' BEHIND CURB FACE (TYP.)



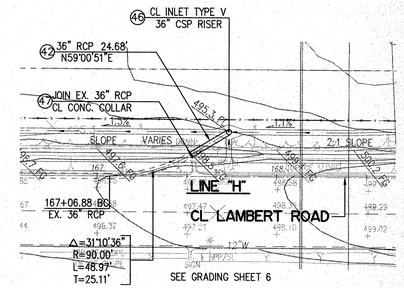
SEE GRADING SHEET 4



SEE GRADING SHEET 5



SEE GRADING SHEET 6



SEE GRADING SHEET 6

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

BENCHMARK: No. 2L 13 70 ELEV. 490.778 FROM THE INTERSECTION OF VALENCIA AVE. WITH ROSE DR. AND BIRCH ST. GO 0.2 MI. N'LY. ALONG VALENCIA AVE. TO ITS JUNCTION WITH AN A/C RD. GOING E'LY., 42.6 FT. E'LY. FROM THE CENTER OF THE A/C RD.; 14 FT. E'LY OF SPUR POLE #788040H, 26.7 FT. NW'LY. OF POWER POLE (NO NUMBER), 2.5 FT. W'LY. OF A WITNESS POST WITH PADDLE, SET IN THE TOP OF A 6" X 6" CONCRETE POST W'LY. 1.5 FT. ABOVE THE GROUND SURFACE.	OWNER/DEVELOPER: BREA OLINDA VENTURES, L.L.C. c/o PLC LAND COMPANY 19 CORPORATE PLAZA NEWPORT BEACH, CA. 92660 SOIL FIRM: LEIGHTON & ASSOCIATES, INC. 659 S. BREA CANYON ROAD, SUITE 4 WALNUT, CA 91789 (909)869-6382	PREPARED BY: PARDEE, CORNWELL & ASSOCIATES, INC. Planning, Engineering, Surveying 151 KALMUS DRIVE BLDG. M, SUITE 2 COSTA MESA, CALIF. 92626 (714) 241-3400 241-3432 FAX FRED CORNWELL R.C.E. 45591 — DATE 5/16/01 EXP. DATE 12/31/02	REGISTERED PROFESSIONAL ENGINEER FRED CORNWELL No. 45591 Exp. 12/31/02 CIVIL STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER PHIL A. WRAY — RCE 38971 — DATE 5-31-01

PLAN SCALE 1"=40'
PROFILE SCALE 1"=40' HORIZ. 1"=8' VERT.
DRAWN BY: COM
DESIGN BY: RG
CHECKED BY: FKC

STORM DRAIN IMPROVEMENT PLANS FOR:
LAMBERT ROAD
W/O KRAEMER AVENUE – VALENCIA AVENUE
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO. 7 OF 28

K-1410

CONTINUATION LINE SEE SHEET C-3.02

CONTINUATION LINE SEE SHEET C-3.06

CONTINUATION LINE SEE SHEET C-3.04

AS-BUILT DRAWINGS
Prepared by Park West Landscape, Inc.
Signature
Date 11/09

UTILITY CONSTRUCTION NOTES:

STORM DRAIN

(SD1) 78" RCP STORM DRAIN PIPE, D-LOAD=1400. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207-2. INSTALL PER "GREENBOOK" SECTION 306-1.2.

(SD2) STORM DRAIN MANHOLE. SEE APWA STD. PLAN 320-1.

(SD3) PVC SDR-35 STORM DRAIN PIPE. SEE DETAIL 10 ON SHEET C-5.01.

(SD4) 6" AKWADRAIN SOIL STRIP DRAIN. SEE DETAIL 7 ON SHEET C-5.02. DRAIN PIPE SHALL BE INSTALLED TO FOLLOW FINISH GRADES OF THE FIELD OR A MAXIMUM SLOPE OF 0.25% TOWARDS THE OUTLET PIPE. DRAIN PIPE LOCATION MAY BE ADJUSTED IN THE FIELD TO CLEAR ANY OBSTRUCTIONS.

(SD5) 6" PLANTER DRAIN. SEE DETAIL 11 ON SHEET C-5.02.

(SD6) CURB OPENING CATCH BASIN, SEE CITY OF BREA STD. DWG. 505. H=4.0'.

(SD7) JUNCTION COLLAR. PER APWA STD. PLAN 335-1.

(SD8) STORM DRAIN (DESILTING) INLET STRUCTURE, SEE DETAIL 2, ON SHEET C-5.02.

(SD9) TRENCH DRAIN, BALCO, INC. MODEL MLG-4A. SEE DETAIL 1, ON SHEET C-5.02.

(SD10) STORM DRAIN CLEANOUT. SEE DETAIL 8, ON SHEET C-5.01.

(SD11) CDS TECHNOLOGIES MODEL PMSU20-20. SEE DETAIL 3, ON SHEET C-5.04.

(SD12) 1500 GALLON CLARIFIER. JENSON PRECAST MODEL CL1500 WITH TRAFFIC RATED, FRAME AND COVER CAST IRON.

(SD13) 24" X 24" PRECAST CONCRETE CATCH BASIN WITH TRAFFIC RATED CAST IRON FRAME AND GRATE.

(SD14) FOOTING DRAIN SEE DETAIL 7, ON SHEET C-5.01.

(SD15) TRENCH DRAIN PER DETAIL 8, ON SHEET C-5.02.

(SD16) BEVELED (RADIUS) RCP SD, D-LOAD=1400. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207-2. INSTALL PER "GREEN BOOK SECTION 306-1.2.

(SD17) INSTALL KRISTAR FLOGARD PLUS CATCH BASIN INSERT FILTER.

(SD18) 18" X 18" NDS ATRIUM GRATE MODEL NO. 1881 WITH CATCH BASIN MODEL NO. 1882.

(SD19) 24" x 24" PRECAST CONCRETE CATCH BASIN WITH NON-TRAFFIC RATED CAST IRON FRAME AND GRATE.

(SD20) REMOVE RIP RAP.

(SD21) SUBGRADE DRAIN. SEE DEAIL 8, SHEET C-5.03.

(SD22) INSTALL DESILTING INLET PER DETAIL 2, SHEET C-5.04.

SANITARY SEWER

(SS1) VITRIFIED CLAY SANITARY SEWER PIPE. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207-8. INSTALL PER "GREENBOOK" SECTION 306-1.2.

(SS2) SANITARY SEWER MANHOLE. SEE APWA STD. PLAN 200-2.

(SS3) PVC SDR-35 SANITARY SEWER. SEE DETAIL 10 ON SHEET C-5.01.

(SS4) SANITARY SEWER CLEANOUT. SEE DETAIL 8 ON SHEET C-5.01.

(SS5) SANITARY SEWER LATERAL CONNECTION. SEE CITY OF BREA STD. DWG. 411.

(SS6) CAP FOR FUTURE CONNECTION.

(SS7) ADJUST EXISTING SEWER MANHOLE TO NEW GRADE.

(SS8) ENCASE SEWER LINE 10' ON BOTH SIDES OF 78"SD PIPE.

(SS9) INSTALL DRY WELL FOR FOUNTAIN DRAIN. SEE DETAIL 5, ON SHEET C-5.03.

(SS10) CONTRACTOR SHALL POT-HOLE AND VERIFY INVERT ELEVATION OF EXISTING 8"SS AT TIE-IN LOCATION PRIOR TO START OF ANY WORK ON NEW SANITARY SEWER LINE.

DOMESTIC WATER

(W1) WATERLINE. DUCTILE IRON CITY OF BREA STD. DWG. 301. SIZE AS SHOWN ON PLAN.

(W2) FIRE HYDRANT ASSEMBLY. SEE CITY OF BREA STD. DWG. 303.

(W3) THRUST BLOCKS AND RESTRAINT. SEE CITY OF BREA STD. DWG. 307.

(W4) 6" WATER METER SERVICE. SEE CITY OF BREA STD. DWG. 313.

(W5) BACKFLOW PREVENTION. SEE DETAIL 6 ON SHEET C-5.03.

(W6) 4" WATER METER SERVICE. SEE CITY OF BREA STD. DWG. 312.

(W7) WATER GATE VALVE. SEE CITY OF BREA STD. DWG 302 AND 309.

(W8) COPPER TUBING, TYPE K, PER ASTM 88. FITTINGS PER ASME B16.18, CAST-COPPER-ALLOY OR ASME B16.22, COPPER, SOLDER-JOINT PRESSURE TYPE.

(W9) ADJUST EXISTING WATER METER AND BACKFLOW PREVENTION ASSEMBLY TO NEW GRADE.

(W10) HOT TAP WITH TAPPING SLEAVE.

(W11) 2" WATER METER. SEE CITY OF BREA STD. DWG. 306.

UTILITY

(U1) GAS, SS AND OIL LINE BY OTHERS (NIC) TO BE INSTALLED WITH A MINIMUM OF 3' OF COVER. CONTRACTOR TO COORDINATE THE WORK WITH OWNER'S UTILITY CONTRACTOR.

(U2) SEE SITE ELECTRICAL RECONSTRUCTION PLAN SHEET E1.02.

NOTES:
1. SEE SHEET C-3.07 FOR STORM DRAIN MAINLINE PROFILE.
2. SEE SHEET C-3.08 FOR SEWER MAINLINE PROFILE.

METHANE NOTES:
1. OPEN SPACES AROUND UTILITIES THAT COME INTO BUILDING THROUGH CONCRETE SHALL BE SEALED WITH EXPANSIVE FOAM.
2. CONSTRUCT UTILITY DAM IMMEDIATELY OUTSIDE OF EACH BUILDING STRUCTURE'S FOUNDATION, IN EACH UTILITY TRENCH PER DETAIL 7 ON SHEET C-5.03.

N

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JUL 16 2007
PARK WEST LANDSCAPE, INC.

PLAN
SCALE: 1" = 20'

20' 10' 0' 20' 40'
GRAPHIC SCALE

K-1411

LPA
Architecture
Planning
Interior Design
Landscape Architecture
Graphics

5161 California Ave, Suite 100
Irvine, California 92612

P 949 |261-1001
F 949 |260-1190
E lpa@lpainc.com
W www.lpainc.com

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Exp. 3/31/08
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kpff Consulting Engineers
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BREA SPORTS PARK
RECORD DRAWINGS
3333 East Birch Street
Brea, CA
Developed for
City of Brea

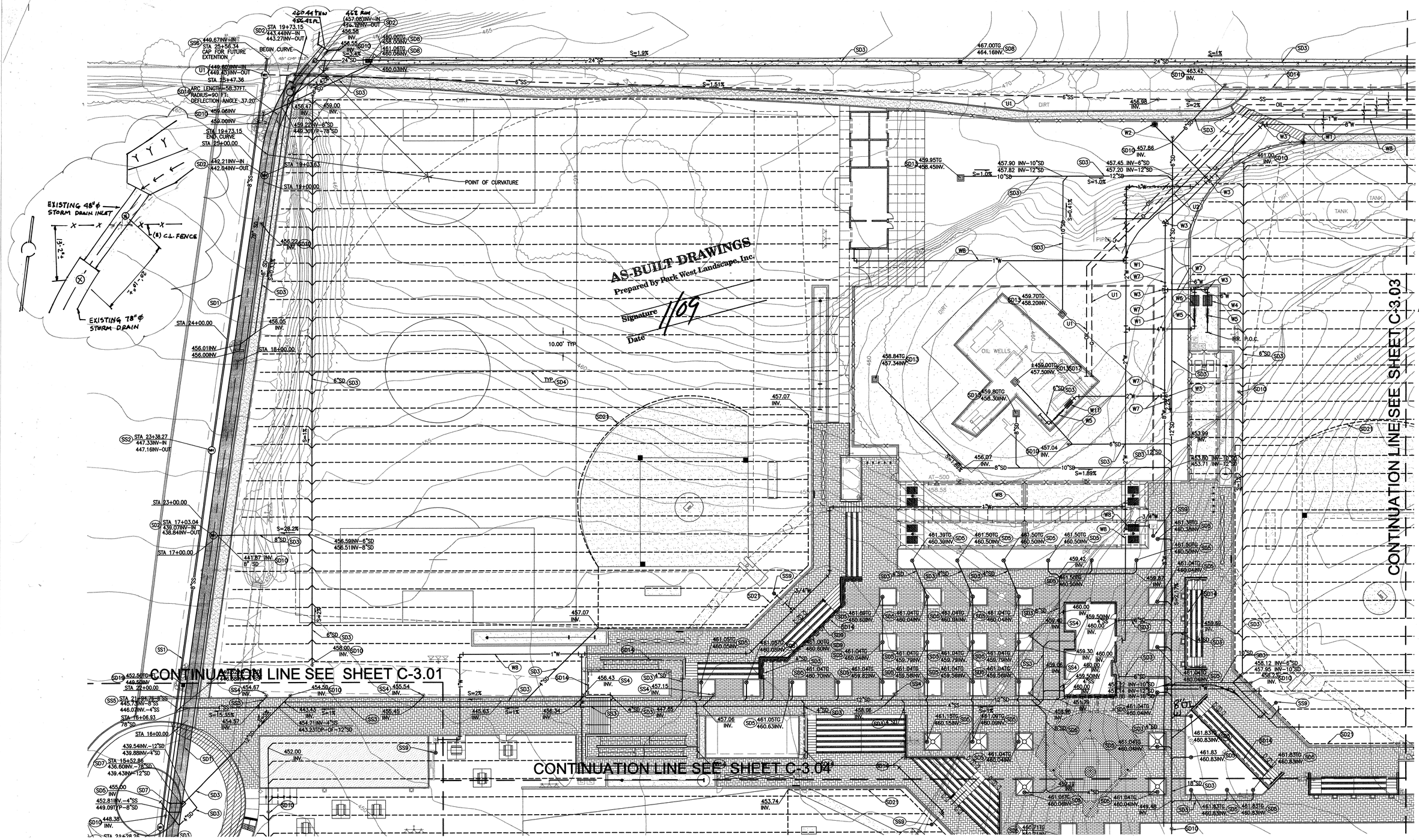
Revision	Description	Date
	100% DESIGN DEVELOPMENT	03-15-06
	50% CD SUBMITTAL	1 JUNE 06
	90% CD SUBMITTAL	06 SEPTEMBER 06
	100% CD SET / AGENCY RESUBMITTAL	17 NOV 06
	BID SET SUBMITTAL	19 MARCH 07

AS-Built Tish Eng

Job. No.	105416
Date	5 April 2007
Drawn by	AS
Checked by	AK

UTILITY PLAN

C-3.01



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JUL 16 2007
PARK WEST LANDSCAPE, INC.

PLAN
SCALE: 1" = 20'
20' 10' 0' 20' 40'
GRAPHIC SCALE

LPA
Architecture
Planning
Interior Design
Landscape Architecture
Graphics

5161 California Ave, Suite 100
Irvine, California 92612

P 949 |261-1001
F 949 |260-1190
E lpa@lpainc.com
W www.lpainc.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD HAYS DAVIS
No. C48082
Exp. 3/31/08
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STATE OF CALIFORNIA

kpff Consulting Engineers
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BREA SPORTS PARK
RECORD DRAWINGS
3333 East Birch Street
Brea, CA
Developed for
City of Brea

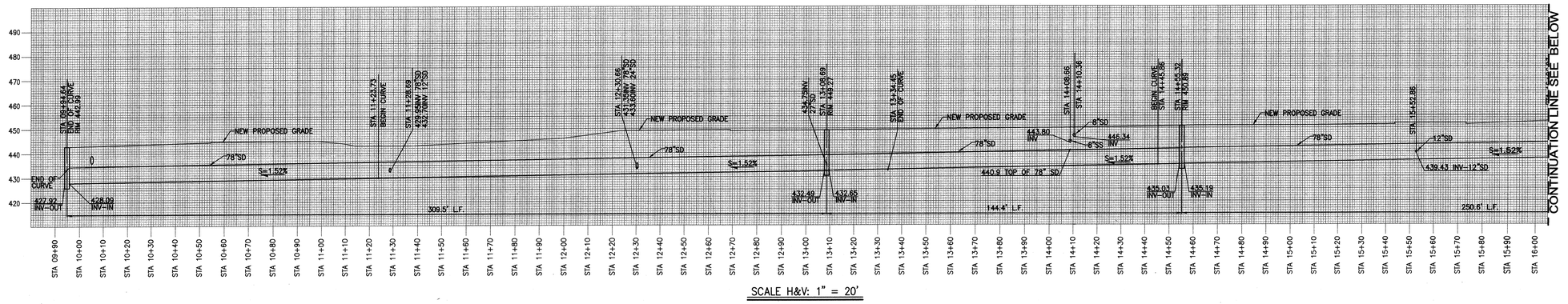
Revision	Description	Date

Revision	Description	Date
	100% DESIGN DEVELOPMENT	03-15-06
	50% CD SUBMITTAL	1 JUNE 06
	90% CD SUBMITTAL	08 SEPTEMBER 06
	100% CD SET / AGENCY RESUBMITTAL	17 NOV 06
	BID SET SUBMITTAL	19 MARCH 07

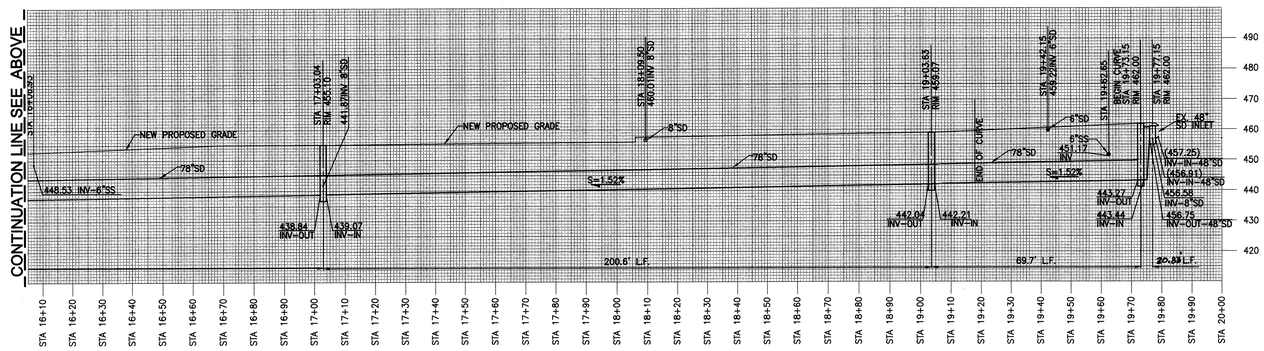
Job. No.	105416
Date	5 April 2007
Drawn by	AS
Checked by	AK

UTILITY PLAN

C-3.02



SCALE H&V: 1" = 20'



SCALE H&V: 1" = 20'

AS-BUILT DRAWINGS
Prepared by Park West Landscape, Inc.
Signature
Date

RECEIVED
JUL 16 2007
PARK WEST LANDSCAPE, INC.

K-1413

LPA
Architecture
Planning
Interior Design
Landscape Architecture
Graphics

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Irvine, California 92612

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(949) 252-1222 Fax (949) 252-8052

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BREA SPORTS PARK

RECORD DRAWINGS

3333 East Birch Street
Brea, CA

Developed for
City of Brea

Revision	Description	Date

Revision	Description	Date
	100% DESIGN DEVELOPMENT	03-1-06
	50% CD SUBMITTAL	1 JUNE 06
	90% CD SUBMITTAL	06 SEPTEMBER 06
	100% CD SET / AGENCY RESUBMITTAL	17 NOV 06
	BID SET SUBMITTAL	19 MARCH 07

Job. No.	105416
Date	5 April 2007
Drawn by	AS
Checked by	AK

STORM DRAIN PROFILE

C-3.07

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

IN THE

CITY OF BREA, CALIFORNIA

STORM DRAIN NOTES:

1. ALL CONCRETE IN REINFORCED CONCRETE STRUCTURES MUST BE 3250 PSI IN 28 DAYS, TYPE V PORTLAND CEMENT CONCRETE, CLASS A.

2. ALL PIPE LENGTHS SHALL BE HORIZONTAL PROJECTIONS UNLESS OTHERWISE SHOWN.

3. SHORING SHALL BE PROVIDED FOR TRENCH EXCAVATIONS IN NATIVE SOIL TO SATISFY STATE OF CALIFORNIA SAFETY REQUIREMENTS.

4. ALL PIPE CONSTRUCTION WITHIN THE FILL AREA MUST BE COORDINATED WITH THE GRADING WORK TO INSURE THAT WHEN THE FILL OPERATION HAS BEEN COMPLETED AT GRADE, THERE IS A MINIMUM OF ONE FOOT ABOVE THE TOP OF PIPE OR TO A MAXIMUM OF FIVE FEET ABOVE THE PROPOSED SUBGRADE OF THE PIPE, THE STORM DRAIN SHALL BE EXCAVATED AND THE PIPE INSTALLED.

5. ALL WORK SHALL CONFORM TO THE AMERICAN PUBLIC WORKS ASSOCIATION (APWA) STANDARD SPECIFICATIONS. THESE SPECIFICATIONS, WHICH CAN BE PURCHASED FROM THE BNI PUBLICATIONS, INC., SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

6. THE CONTRACTOR MUST NOTIFY THE CITY OF BREA INSPECTOR AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION (714) 990-7689.

7. ALL FILLS SHALL BE COMPACTED TO 90% RELATIVE COMPACTION AS DETERMINED BY THE CALIFORNIA TEST METHOD NO. 216-F, 1963 "FIVE LAYER METHOD". ALL BACKFILL MATERIAL MUST BE FREE OF ORGANIC MATTER.

8. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE ALL SURVEYING REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT. AT THE REQUEST OF THE CITY OF BREA SUFFICIENT REFERENCE STAKING SHALL BE PROVIDED.

9. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH PIPE BEDDING DETAIL PER OCPW STANDARD PLAN 1319.

10. PRIOR TO THE PLACEMENT OF STORM DRAIN IMPROVEMENTS, THE CITY'S SOIL ENGINEER SHALL CERTIFY IN WRITING TO THE CITY ENGINEER THAT THE STORM DRAIN'S SUBGRADE IS OF ADEQUATE STRENGTH TO SUPPORT THE STRUCTURES AND ANTICIPATED LOADS.

11. PRIOR TO BEGINNING CONSTRUCTION WORK, THE CITY'S CONTRACTOR SHALL OBTAIN A PERMIT FROM THE STATE DIVISION OF INDUSTRIAL SAFETY. A COPY OF THE PERMIT SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

12. WHEN APPLICABLE, THE DEVELOPER SHALL OBTAIN A PERMIT FROM THE STATE DEPARTMENT OF FISH AND GAME IN ACCORDANCE WITH SECTION 1602 OF THE CALIFORNIA FISH AND GAME CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

13. ALL CONTINUOUS STEEL SHALL BE LAPPED A MINIMUM OF 45 BAR DIAMETERS.

14. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 INCH MINIMUM.

15. A CITY OF BREA ENCROACHMENT PERMIT WILL BE REQUIRED TO PERFORM WORK WITHIN THE PUBLIC RIGHT-OF-WAY. ALL WORK SHALL CONFORM TO THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT.

16. THE LENGTH OF MANHOLE STRUCTURES MAY BE INCREASED TO MEET PIPE ENDS AS LONG AS THE REINFORCING STEEL IS CONTINUED AS REQUIRED. THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE MUST APPROVE ANY CHANGE IN SPUR LOCATION.

17. THE FLOOR OF THE MANHOLE STRUCTURES SHALL BE STEEL TROWELED TO THE SPRING LINE.

18. THE BODY OF THE MANHOLE STRUCTURES, INCLUDING SPUR, MUST BE POURED IN ONE CONTINUOUS OPERATION. A CONSTRUCTION JOINT AT THE SPRING LINE, WITH A LONGITUDINAL KEYWAY, WILL BE PERMITTED.

19. ALL REINFORCING BARS MUST BE SECURELY HELD IN PLACE IN THE FORMS. EACH MAT OF STEEL MUST BE TIE-WIRED TOGETHER TWO WAYS AT ALTERNATE INTERSECTIONS.

20. STORM DRAIN BACKFILL FOR ALL FACILITIES WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PLACED AND COMPACTED IN THE PRESENCE OF THE CITY OF BREA'S PUBLIC WORKS INSPECTOR AND MEET OR EXCEED MINIMUM RDMD STANDARDS.

21. ALL PIPES SHALL BE BANDED AND GROUTED.

22. ALL AREA DRAIN PIPES SHALL BE:
   A. ACRYLONITRILE BUTADIENE STYRENE (ABS) SOLID WALL PIPE CONFORMING TO ASTM D2751, SDR35;
   B. POLYVINYL CHLORIDE PLASTIC (PVC) PIPE CONFORMING TO ASTM D3034, SDR35;
   C. ASBESTOS CEMENT PIPE CONFORMING TO ASTM C-663; OR
   D. AN APPROVED EQUAL.

23. R.C.P. SHALL COMPLY WITH ALL ASTM APPLICABLE STANDARDS.

24. CONSTRUCTION MATERIALS AND METHODS SHALL BE SUBJECT TO APPROVAL BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

25. CONSTRUCTION HOURS OF OPERATION SHALL BE BETWEEN 7:00AM AND 5:00PM, MONDAY THROUGH FRIDAY. CONSTRUCTION DURING HOURS OTHER THAN THOSE SPECIFIED SHALL REQUIRE A WRITTEN AUTHORIZATION FROM THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.

26. STATE LAW SB 3019 REQUIRES THE CONTRACTOR TO OBTAIN AN IDENTIFICATION NUMBER FROM UNDERGROUND SERVICE ALERT (USA) PRIOR TO THE ISSUANCE OF A CITY ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY USA TWO FULL WORKING DAYS (MINIMUM 48 HOURS) PRIOR TO ANY CONSTRUCTION ACTIVITIES, INCLUDING PAVEMENT OVERLAY, EXCAVATION AND ASPHALT CONCRETE OVERLAY, WHICH COULD AFFECT UNDERGROUND UTILITIES.

27. ANY CONTRACTORS OR SUBCONTRACTORS PERFORMING WORK ON THIS PROJECT SHALL FAMILARIZE THEMSELVES WITH THE SITE AND BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM THEIR OPERATIONS, WHETHER OR NOT SUCH FACILITIES ARE SHOWN ON THE PLANS.

28. PRIOR TO BEGINNING ANY CONSTRUCTION, WORK WHICH COULD DAMAGE OR CONFLICT WITH UNDERGROUND STRUCTURES OR UTILITIES, THE CONTRACTOR SHALL EXCAVATE INSPECTION HOLES TO DETERMINE THE LOCATION AND DEPTH OF SAID STRUCTURES AND FACILITIES.

29. PRIOR TO TAKING WATER FROM A FIRE HYDRANT, THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO OBTAIN A HYDRANT WATER METER FROM THE RESPONSIBLE WATER DISTRICT.

30. IF UTILITIES OR OTHER FACILITIES CONFLICT WITH THE PROPOSED IMPROVEMENTS, WORK SHALL STOP AND THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE SHALL BE NOTIFIED IMMEDIATELY.

31. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED OR ALTERED EXISTING IMPROVEMENTS WITHIN THE PUBLIC RIGHT-OF-WAY AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

32. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL AT ALL TIMES.

33. SURVEY MONUMENTS SHALL BE PROTECTED AND PERPETUATED IN PLACE. DISTURBED OR COVERED MONUMENTS SHALL BE RESET BY A REGISTERED CIVIL ENGINEER WHO IS AUTHORIZED TO PRACTICE LAND SURVEYING, OR A LICENSED LAND SURVEYOR.

34. IRRIGATION LINES SHALL BE REMOVED, RELOCATED OR RECONSTRUCTED AS SHOWN OR AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE, IN THE FIELD.

35. NEW AND EXISTING MANHOLES AND WATER VALVES SHALL BE ADJUSTED TO GRADE.

STORM DRAIN NOTES: (CONTINUED)

36. PRIOR TO PAVING OF STREET, ALL UTILITIES SHALL BE INSTALLED, TESTED AND APPROVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE APPROPRIATE SERVING UTILITY COMPANY AND VERIFYING THAT THE UTILITY FACILITY IS IN PLACE BEFORE PAVING.

37. TRENCH BACKFILL SHALL BE PROVIDED IN ACCORDANCE WITH THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT OR IN ACCORDANCE WITH APWA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION, AND PER RECOMMENDATION OF THE SOILS ENGINEER.

38. THE CONTRACTOR SHALL NOT ORDER OR PLACE ANY CONCRETE OR ASPHALT CONCRETE PAVING UNTIL THE FORMS AND SUBGRADE OR AGGREGATE BASE HAS BEEN INSPECTED AND APPROVED IN THE FIELD BY THE CITY'S INSPECTOR.

39. THE CONTRACTOR SHALL REMOVE AND REPLACE, IN KIND, A MINIMUM OF ONE FOOT OF EXISTING ASPHALT CONCRETE AND AGGREGATE BASE ADJACENT TO NEWLY CONSTRUCTED CURB AND GUTTER.

40. THE FINAL OR SURFACE LAYER OF ASPHALT CONCRETE SHALL NOT BE PLACED UNTIL ALL ON-SITE IMPROVEMENTS, INCLUDING GRADING HAVE BEEN COMPLETED AND ALL UNACCEPTABLE WORK HAS BEEN CORRECTED, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

41. "AS-BUILT" RECORD DRAWINGS SHALL BE FURNISHED TO THE CITY UPON COMPLETION OF CONSTRUCTION.

42. APPROVAL OF THESE PLANS BY THE CITY OR IT'S AGENTS SHALL NOT RELIEVE THE CONTRACTOR OR THE APPLICANT FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE REVISIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.

UNDERGROUND SERVICE ALERT

CALL BEFORE YOU DIG

Call:Toll FREE
1-800-422-4133
TWO WORKING DAYS
BEFORE YOU DIG

"CAUTION": Remember that the USA Center notifies only those utilities belonging to the center. There could be other utilities present at the work site. The center will inform you of whom they will notify.

UTILITIES

CITY OF BREA ----	1 CIVIC CENTER CIRCLE, BREA CA 92821	(714) 990-7600
SEWER & WATER ---	CITY OF BREA (RON KRAUSE)	(714) 990-7697
STORM DRAIN -----	CITY OF BREA	(714) 990-7667
MAINTENANCE -----	CITY OF BREA (WILL WENZ)	(714) 990-7691
ELECTRIC --------	SOUTHERN CALIFORNIA EDISON (VICTOR PEDROZA)	(714) 870-3228
TELEPHONE -------	AT&T CALIFORNIA (CLIFF CONNORS)	(714) 666-5500
CABLE T.V. ------	TIME WARNER CABLE (DAVE CATE)	(714) 903-8380
GAS ----------	SOUTHERN CALIFORNIA GAS COMPANY (STEVE ALCALA)	(714) 634-3185

SHEET INDEX

1- TITLE SHEET, VICINITY MAP & NOTES
2- STORM DRAIN LINE "A" PLAN AND PROFILE
3- ENLARGED PLAN VIEW
4- STORM DRAIN DETAILS

NOTICE TO CONTRACTOR:

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. NO CERTIFICATION IS MADE TO THE ACCURACY OR THOROUGHNESS OF THESE RECORDS. APPROVAL OF THIS PLAN BY THE CITY OF BREA DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF LOCATION OR THE EXISTENCE OF ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE OWNER BY ACCEPTING THESE PLANS OR PRECEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME THE LIABILITY AND THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED. THE CONTRACTOR IS REQUIRED TO TAKE ALL DUE PRECAUTIONARY MEANS TO PROTECT ALL UTILITY LINES AND STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITY OR STRUCTURES CONCERNED BEFORE STARTING WORK.

2. PURSUANT TO ASSEMBLY BILL 3019, NO EXCAVATION PERMIT IS VALID UNLESS UNDERGROUND SERVICE ALERT HAS BEEN CONTACTED AND HAS PROVIDED INQUIRY I.D. NUMBER.

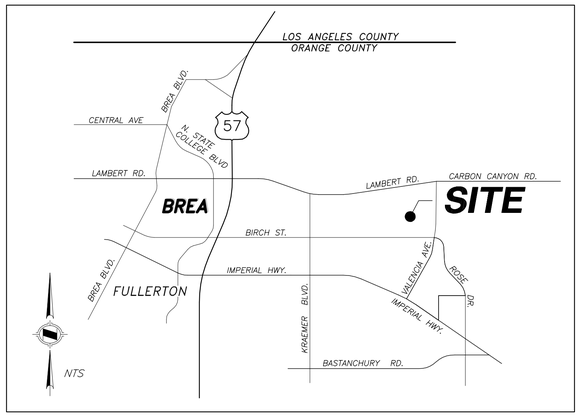
3. CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. PRIOR TO THE CONSTRUCTION OF ANY CONCRETE STRUCTURE, THE CONTRACTOR SHALL VERIFY WITH THE SOILS ENGINEER THE TYPE OF CONCRETE RECOMMENDED.

5. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, ANY UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

6. CONTRACTOR AGREES THAT IN ACCORDANCE WITH THE GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL ASSUME THE SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING THE COURSE AND CONSTRUCTION OF THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSON AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, ENGINEER AND THE CITY OF BREA HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT. EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, ENGINEERING OR CITY OF BREA.

VICINITY MAP



ESTIMATE OF QUANTITIES

NO.	DESCRIPTION	QUANTITIES TOTAL	UNITS
70	CONSTRUCT 78" C.M.P. (16 GAGE)	5	L.F.
78	CONSTRUCT 78" RCP (SEE PROFILE FOR D-LOAD)	12	L.F.
79	REMOVE INTERF. 48" RCP	5	L.F.
78	INSTALL 78" R.C.P. (SEE PROFILE FOR D-LOAD)	5	L.F.
80	REMOVE INTERF. 78" RCP	12	L.F.
100	CONSTRUCT CONCRETE COLLAR PER P.F. & R.D. STD. PLAN NO. 1317	1	EA.
101	REMOVE EX. M.H. & J.S.	1	EA.
103	CONSTRUCT J.S. TYPE III PER APWA STD. 322-1	1	EA.
104	CONSTRUCT HEADWALL INLET PER DETAILS ON SHEET 4	1	EA.
105	CONSTRUCT BLOCK WALL PER DETAILS ON SHEET 4	64	L.F.
106	CONSTRUCT 2' WIDTH WITH 1:1 SIDE SLOPE V-DITCH WITH CONC. BLOCK WALL	39	L.F.
	SEE SECTION H-H ON SHEET 4 FOR DETAILS		
107	EXISTING FENCE TO BE PROTECTED IN PLACE OR REMOVED & REPLACED	59	L.F.
108	EXISTING D.G. TRAIL AND CURB TO BE REMOVED/REPLACED IN-KIND	258	S.F.
109	EXISTING LAND SCAPE TO BE REMOVED/REPLACED IN-KIND	1,154	S.F.
110	EXISTING VALVE TO BE REMOVED/REPLACED IN-KIND	2	EA.
111	EXISTING 6" S.D. TO BE PROTECTED IN PLACE OR REMOVED & REPLACED IN KIND	70	L.F.
112	EXISTING LOW-FLOW OUTLET STRUCTURE TO BE PROTECTED IN PLACE	1	EA.
113	EXISTING 6" SEWER TO BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND	83	L.F.
114	EXISTING SEWER MANHOLE TO BE PROTECTED IN PLACE	1	EA.
115	EXISTING 8" SEWER TO BE PROTECTED IN PLACE	40	L.F.
116	EXISTING JUNCTION STRUCTURE/MANHOLE TO BE PROTECTED IN PLACE	1	EA.
117	EXISTING 48" C.M.P. TO BE PROTECTED IN PLACE	17	L.F.
118	EXISTING 24" S.D. TO BE PROTECTED IN PLACE	30	L.F.
119	EXISTING 8" S.D. TO BE REMOVED AND REPLACED IN KIND	54	L.F.
120	EXISTING 8" SEWER CAP TO BE PROTECTED IN PLACE	1	EA.
121	PROPOSED CONCRETE APRON, SEE SECTIONS D-D & E-E ON SHEET 4 FOR DETAILS	630	S.F.
122	EXISTING CONC. V-DITCH TO BE PROTECTED IN PLACE	6	L.F.
123	PROPOSED CUT OUT NOTCH TO EXIST. V-DITCH AND JOIN PROPOSED V-DITCH,	2.5	L.F.
	SEE SECTION G-G ON SHEET 3 FOR DETAILS	1	EA.
124	CONCRETE BLOCK WALL (SEE DETAIL NO. 105)	-	L.F.
125	CHAIN LINK FENCE REMOVAL LIMITS ONLY AND TO BE REPLACED IN-KIND	40	L.F.
126	CONSTRUCT WARPED WINGWALL PER DETAIL ON SHEET 3A	1	EA.
127	CONSTRUCT 6" THICK PCC #4 @ 24" BOTH WAYS OVER 4" CMB PER O.C.P.W. STD. PLAN 1805	1,206	S.F.

QUANTITIES SHOWN ARE FOR BONDING PURPOSES ONLY. THE CONTRACTORS SHALL BE RESPONSIBLE FOR THEIR OWN ESTIMATE FOR BIDDING PURPOSES AND SHALL BID THE JOB COMPLETE. THE CONTRACTORS SHALL ALSO ADVISE THE OWNER AND ENGINEER OF ANY APPARENT DISCREPANCIES IN THE ESTIMATE.

SHEET INDEX

1- TITLE SHEET, VICINITY MAP & NOTES
2- STORM DRAIN LINE "A" PLAN AND PROFILE
3 & 3A- ENLARGED PLAN VIEW
4- STORM DRAIN DETAILS

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92933
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

EDWARD A. MANDICH R.C.E. 59089 DATE

REGISTERED PROFESSIONAL ENGINEER DOUGLAS L. STALLSMITH NO. 38796 Exp. 3/31/11 CIVIL STATE OF CALIFORNIA

K-1414

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	1 CONST. WARPED WINGWALL TRANSITION PER DETAIL 126, CN 106 & 123 NOT USED, ADDED CN 126, SECTION G-G NOT USED, ADDED SHEET 3A, SECTIONS A-A & C-C, REMOVABLE C.L. POST ADDED CN 127, REVISED 6' TO 4' C.L. FENCE ON SHEET 3, ADDED BOLLARD DETAIL ON SHEET 3A, SECTION J	

APPROVED BY:

CITY ENGINEER RCE DATE
DELFINO CONSUNJI 57908 EXP. 06/30/12

CITY OF BREA
ECONOMIC DEVELOPMENT DEPARTMENT

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

TITLE SHEET

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
1 OF 4

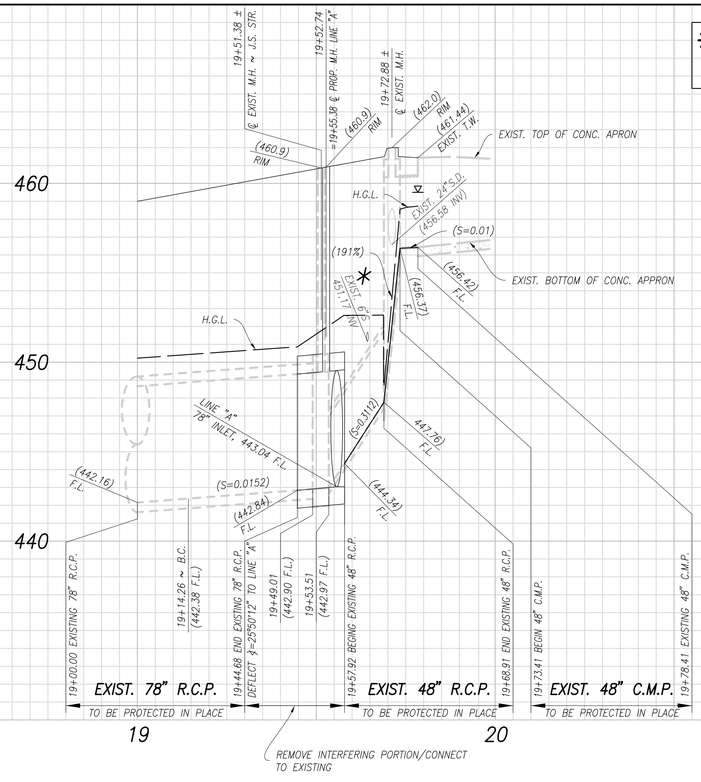
W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

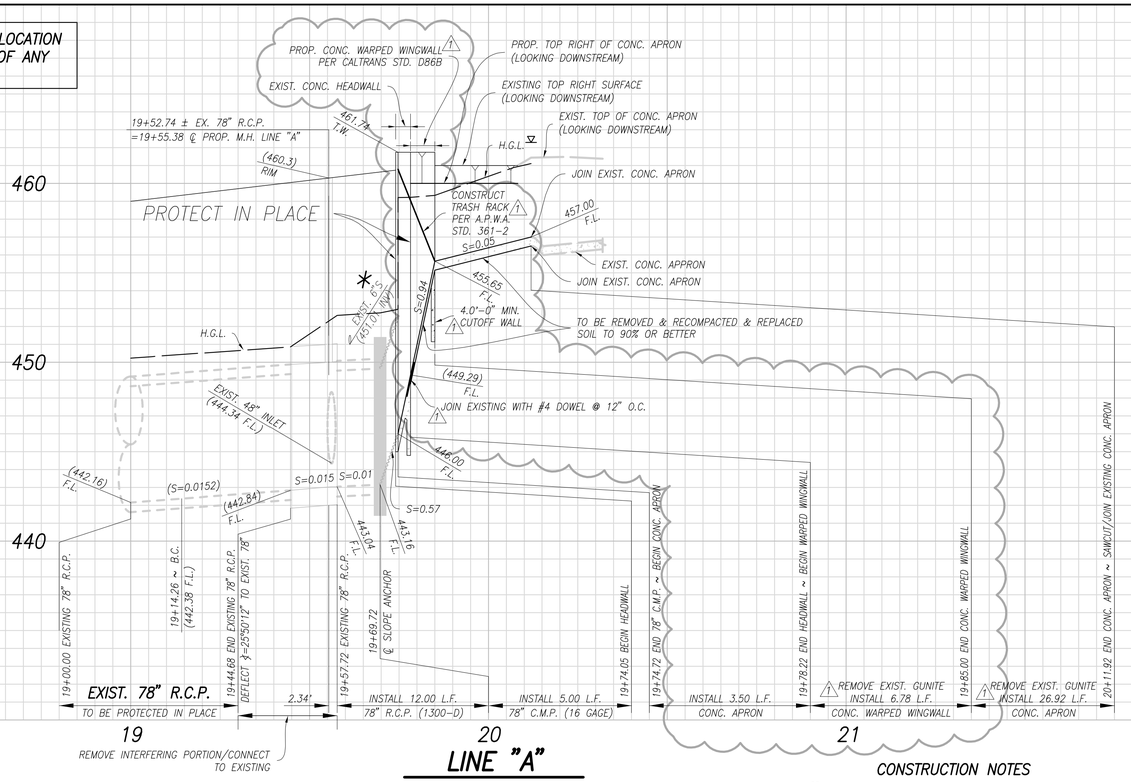
F:\0594\Engineering\SY_Storm Drain\SHT01.dwg

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

✱ CONTRACTOR TO VERIFY HORIZONTAL & VERTICAL LOCATION OF EXISTING UTILITY AND NOTIFY CIVIL ENGINEER OF ANY CONFLICT PRIOR TO STARTING CONSTRUCTION



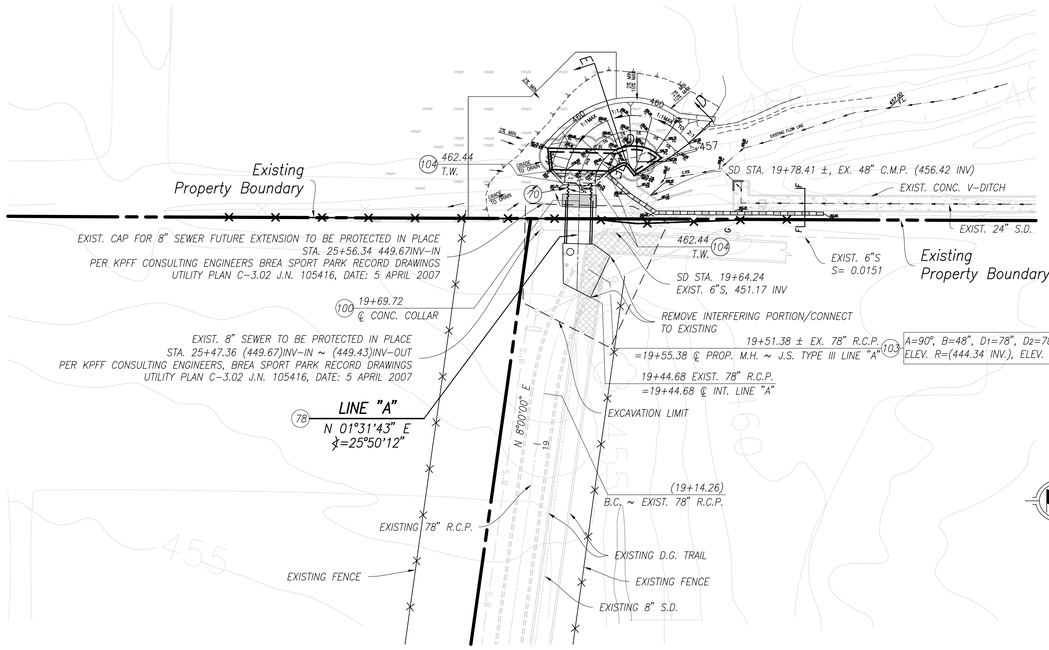


LINE "A"

PROFILE SCALES	
HORIZ.:	1"= 20'
VERT.:	1"= 4'

CONSTRUCTION NOTES

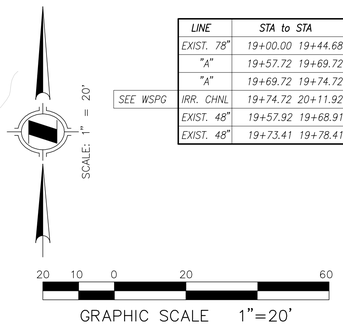
70 CONSTRUCT 78" C.M.P. (16 GAGE)
78 INSTALL 78" R.C.P. (SEE PROFILE FOR D-LOAD)
79 REMOVE INTERFERING PORTION OF 48" R.C.P. AND CONNECT TO EXISTING
80 REMOVE INTERFERING PORTION OF 78" R.C.P. AND CONNECT TO EXISTING
100 CONSTRUCT CONCRETE COLLAR PER A.P.W.A. STD. PLAN NO. 380-2
101 REMOVE EXISTING M.H. & JUNCTION STRUCTURE
103 CONSTRUCT J.S. TYPE III PER A.P.W.A. STD. PLAN NO. 322-1
104 CONSTRUCT HEADWALL INLET PER DETAILS ON SHEET 2
105 CONSTRUCT BLOCK WALL PER DETAILS ON SHEET 2
/1 106 ~~CONSTRUCT 2' WIDTH WITH 1:1 SIDE SLOPE V-DITCH WITH CONC. BLOCK WALL SEE SECTION H-H ON SHEET 4 FOR DETAILS~~
107 EXISTING FENCE TO BE PROTECTED IN PLACE OR REMOVED & REPLACED INTERFERING PORTION IN-KIND
108 EXISTING D.G. TRAIL AND CURB TO BE REMOVED/REPLACED IN-KIND
109 EXISTING LAND SCAPE TO BE REMOVED/REPLACED IN-KIND
110 EXISTING VALVE TO BE REMOVED/REPLACED IN-KIND
111 EXISTING 6" S.D. TO BE PROTECTED IN PLACE OR REMOVED & REPLACED IN KIND
112 EXISTING LOW-FLOW OUTLET STRUCTURE TO BE PROTECTED IN PLACE
113 EXISTING 6" SEWER TO BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND
114 EXISTING SEWER MANHOLE TO BE PROTECTED IN PLACE
115 EXISTING 8" SEWER TO BE PROTECTED IN PLACE
116 EXISTING JUNCTION STRUCTURE/MANHOLE TO BE PROTECTED IN PLACE
117 EXISTING 48" C.M.P. TO BE PROTECTED IN PLACE
118 EXISTING 24" S.D. TO BE PROTECTED IN PLACE
119 EXISTING 8" S.D. TO BE REMOVED AND REPLACED IN KIND
120 EXISTING 8" SEWER CAP TO BE PROTECTED IN PLACE
/1 121 PROPOSED CONCRETE APRON, SEE SECTIONS D-D & E-E ON SHEET 4 FOR DETAILS
122 EXISTING CONC. V-DITCH TO BE PROTECTED IN PLACE
/1 123 ~~PROPOSED CUT OUT NOTCH TO EXIST. V-DITCH AND JOIN PROPOSED V-DITCH, SEE SECTION G-G ON SHEET 3 FOR DETAILS~~
124 PROPOSED CONC. BLOCK WALLS, SEE SECTIONS F-F & H-H ON SHEET 4 FOR DETAILS
125 CHAIN LINK FENCE REMOVAL LIMITS ONLY AND TO BE REPLACED IN-KIND
/1 126 CONSTRUCT TRANSITION WARPED WINGWALL PER DETAIL ON SHEET 3A
127 CONSTRUCT 6" THICK PCC #4 @ 24" BOTH WAYS OVER 4" CMB PER O.C.P.W. STD. PLAN 1805



LINE "A"

FOR ENLARGED PLAN VIEW OF 1" = 5' SEE SHEET 3 OF 4 FOR MORE DETAILS

NOTE:
(460.67) = GRID TOPO ELEVATIONS PER CITY OF BREA



HYDRAULIC DATA

	LINE	STA to STA	Q_{SD}	DIA	So	n	Dc	Vc	Sc	Dn	Vn	Vf	Sf
	EXIST. 78"	19+00.00 19+44.68	622.0	78"	0.0152	0.013	6.17	19.12	0.0122	5.12	22.18	18.74	0.0141
	"A"	19+57.72 19+69.72	569.0	78"	0.0100	0.013	6.05	17.69	0.0102	FULL	---	17.15	0.0118
	"A"	19+69.72 19+74.72	569.0	78"	0.5680	0.024	6.05	17.69	0.0347	2.29	54.53	17.15	0.0401
SEE WSPG	IRR. CHNL	19+74.72 20+11.92	569.0	IRR.	5% ~ 94%	0.015	--	--	--	--	--	--	--
	EXIST. 48"	19+57.92 19+68.91	53.0	48"	0.3112	0.013	2.19	7.54	0.0040	0.70	36.14	4.22	0.0014
	EXIST. 48"	19+73.41 19+78.41	53.0	48"	0.0100	0.024	2.19	7.54	0.0138	2.42	6.66	4.22	0.0046

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92933
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	/1\ADDED CN 126 , CN 106 & 123 NOT USED, UPDATED LINE "A" PROFILE & ADDED NOTES	

K-1415

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

LINE "A" Sta. 19+57.72 TO Sta. 20+11.92

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO. 2 OF 4

CIP PROJECT NO. 7847

W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

F:\0594\Engineering\SY_Storm Drain\SHT02.dwg

NOTE:
(460x67) = GRID TOPO ELEVATIONS PER CITY OF BREA

TEMPORARY CONSTRUCTION LIMIT
110'

PROPOSED LICENSE AREA

GRADING LIMIT

TEMPORARY CONSTRUCTION LIMIT

2% MAX
3% MAX TO DAYLIGHT

15'

50'

20'

27'

TRASK RACK PER APWA STD 361-2

2% MIN

GRADE TO DRAIN

GRADING LIMIT

15'

2% MIN
10% MAX

PROPOSED LICENSE AREA

460

1:1 MAX

457

10 : 2

EXISTING FLOW LINE

CONSTRUCTION NOTES
(SEE SHEET 2 OF 4 FOR DESCRIPTIONS)

(107) EXISTING FENCE TO BE PROTECTED IN PLACE OR REMOVED & REPLACED INTERFERING PORTION IN-KIND

NOTE:
⚠1 PERMANENT 4' C.L. FENCE LOCATION AROUND STORM DRAIN IMPROVEMENTS SHALL BE DETERMINED BY CITY ENGINEER

CUT OUT FOR OVERFLOW

EXISTING V-DITCH

25'

0.8%

4" CONCRETE

PROP. EXCAVATION LIMIT

30'

40'

28'

11.2'

39'

27'

Existing Property Line

LINE "A"

EXISTING FENCE

STA. 0+00
STA. 0+08
STA. 0+22
STA. 0+44
STA. 0+51
STA. 0+69
END OF PROJECT

8.2' 13.8' 21.9' 7.0' 18.0'

VARIES
EXISTING CHAIN LINK POST
SEE BLOCK WALL DETAIL NO. 105
3" MIN. COVER
3" MIN.
6"
3" MIN.
3"
24"
6" 12" 6"
461.8 TOP EL.
461.3 F.L.
PROP. 2' WIDE CONC. DITCH
SAW CUT AND REMOVE INTERFERING PORTION OF EXISTING V-DITCH
EXIST. SURFACE
4" CONC. OR GUNITE SEE CONST. NOTES FOR PAVED DRAINAGE DEVICES SHEET 4
EXISTING 4' CONC. V-DITCH
4'

SECTION G-G ⚠1
PROP. 24' CUT OUT NOTCH AT EXIST. V-DITCH AT STA. 0+44
(LOOKING DOWNSTREAM)
NOT TO SCALE

SCALE: 1" = 5'

5 2.5 0 5 15
GRAPHIC SCALE 1"=5'

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92823
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

H&A HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	⚠1 ADDED CN 126, SECTION G-G NOT USED,	
		REVISED 6' TO 4' C.L. FENCE, ADDED TRASK RACK ON PLAN VIEW	
		ADDED SECTION J	

K-1416

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

ENLARGED PLAN VIEW OF 1" = 5'

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
3 OF 4

W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

F:\0594\Engineering\SY_Storm Drain\SHT03.dwg

NOTE:
(460x67) = GRID TOPO ELEVATIONS PER CITY OF BREA

8' REMOVABLE PANEL
SEE TYPICAL REMOVABLE C.L.
POST ON SHEET 4 FOR DETAIL

4" THICK CONCRETE W/#4 BARS LONGITUDINAL 24" O.C. BOTH WAYS
SEE CONSTRUCTION NOTES FOR PAVED DRAINAGE DEVICES ON SHEET 4 FOR MORE DETAIL.

TEMPORARY CONSTRUCTION LIMIT

CONCRETE REMOVAL LIMIT

BOLLARDS WITH CABLE RAILING (3 TOTAL)
IN BETWEEN PER DETAIL HEREON

PROPOSED
LICENSE AREA

GRADING
LIMIT

2% MIN
10% MAX
DAYLIGHT

13'

15'

12'

NOTE:
FOR ACTUAL CONCRETE APRON ELEVATIONS
SEE SHEET 3 SITE PLAN VIEW

CONCRETE REMOVAL LIMIT
CONSTRUCT
WARPED WINGWALL
PER DETAIL HEREON

PROPOSED
LICENSE AREA

CONCRETE REMOVAL LIMIT

1.5:1 ELEMENT
1:1 ELEMENT
1/2:1 ELEMENT
VERTICAL ELEMENT

21'

20'

50'

8' REMOVABLE PANEL
SEE TYPICAL REMOVABLE C.L.
POST ON SHEET 4 FOR DETAIL

CONCRETE REMOVAL LIMIT

4' HEADWALL FENCE PER A.P.W.A. STD. 600-3

EXIST. WINGWALL

EX. 4" CONCRETE

4" CONCRETE

Existing
Property Line

4' HEADWALL FENCE
PER A.P.W.A. STD. 600-3

PROP. EXCAVATION LIMIT

EXISTING 48" S.D.

5 2.5 0 5 15
GRAPHIC SCALE 1"=5'

#4 DOWEL @ 12" O.C.
TYPICAL CONNECTION
SEE DETAIL BELOW MIDDLE

Existing
Property Line

END EXIST. CONC. HEADWALL STRUCTURE
BEGIN WARPED WINGWALL STRUCTURE

DRILL & EPOXY
PER CALTRANS SPECIFICATION
SECTION 95-2.03

EXIST. CONC. HEADWALL STRUCTURE

#4 DOWEL @ 12" O.C.

WARPED WINGWALL

12" MIN. 12" MIN.

4"

18"

4"

RECOMPACT SOIL TO 90% OR BETTER

TYPICAL CONNECTION DETAIL BETWEEN EXIST. CONC. HEADWALL & WARPED WINGWALL

6"
6"
12"
12"
6"
6"
24"
6"
12"

PROVIDE CABBLE RAILING PER
CALTRANS STANDARD B11-47

6" DIAMETER STEEL PIPE
FILLED WITH CONCRETE
PAINTED YELLOW

4" THICK CONCRETE
CHANNEL BOTTOM

BOLLARD DETAIL
NOT TO SCALE

457.00
TOP EL.

6' ±

456.5 ±
EL.

#4 @ 24" BOTH WAYS TYPICAL

5%

9%

12" MIN. 12" MIN.

#4 DOWEL @ 12" O.C.

3"

RECOMPACT SOIL TO 90% OR BETTER

END 4" THICK CONCRETE
EXISTING CONCRETE APRON

SECTION C-C

TYPICAL CONNECTION BETWEEN 4" THICK CONCRETE & EXISTING CONCRETE APRON
NOT TO SCALE

CONSTRUCTION NOTES ⚠1
(126) CONSTRUCT WARPED WINGWALL PER DETAIL HEREON
(12) PROPOSED CONCRETE APRON, SEE SECTIONS D-D & E-E ON SHEET 4 FOR DETAILS

TRASK RACK PER
APWA STD 361-2

END WARPED WINGWALL STRUCTURE
BEGIN 4" THICK CONCRETE

6" THICK PCC #4 @ 24" BOTH WAYS
OVER 4" CMB PER O.C.P.W. STD. PLAN 1805

16"
12"
VARIES
12"
6"
4"

RECOMPACT SOIL
TO 90% OR BETTER

5%

#4 @ 24" BOTH WAYS TYPICAL

RECOMPACT SOIL TO 90%
OR BETTER

4" THICK CONCRETE W/#4 BARS LONGITUDINAL 24" O.C. BOTH WAYS.
SEE CONSTRUCTION NOTES FOR PAVED DRAINAGE DEVICES
ON SHEET 4 FOR MORE DETAIL.

#4 DOWEL @ 12" O.C.

EXISTING CONCRETE HEADWALL
TO BE PROTECTED IN-PLACE

9.4%

12" MIN.

4.0" CUTOFF WALL

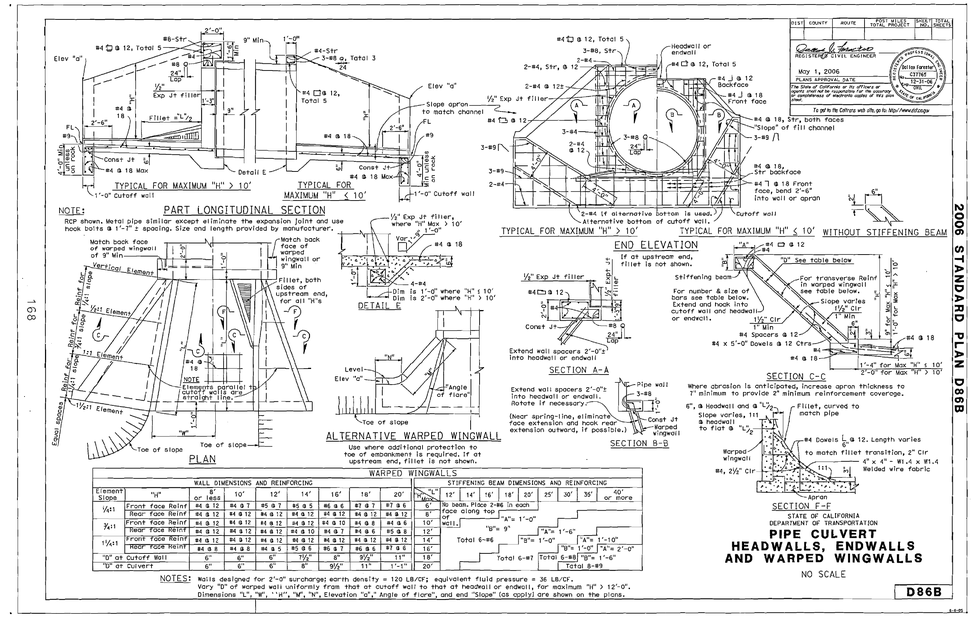
12"

WARPED WINGWALL
PER DETAIL 126

EXISTING 4.0'
CUTOFF WALL

SECTION A-A

PROFILE BETWEEN EXIST. CONC. HEADWALL WITH PROPOSED WARPED WINGWALL AND 4" THICK CONCRETE
NOT TO SCALE



WARPED WINGWALLS

Element Slope	"H"	WALL DIMENSIONS AND REINFORCING 0' or less	10'	12'	14'	16'	18'	20'	"H" Max.	STIFFENING BEAM DIMENSIONS AND REINFORCING 12'	14'	16'	18'	25'	30'	35'	40' or more
1½:1	Front face Reinf	#4 @ 12	#4 @ 12	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6	6'	No beam. Place 2-#6 in each face along top							
	Rear face Reinf	#4 @ 12	#4 @ 12	#6 @ 12	#6 @ 12	#7 @ 12	#8 @ 12	#8 @ 12	8'								
2:1	Front face Reinf	#4 @ 12	#5 @ 12	#6 @ 12	#6 @ 10	#6 @ 7	#6 @ 5	#6 @ 5	10'	"A" = 1'-0"							
	Rear face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 5	#5 @ 5	12'	"B" = 9"							
1½:1	Front face Reinf	#4 @ 12	#4 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	8'	Total 6-#6							
	Rear face Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 5	#5 @ 7	#6 @ 5	#7 @ 5	10'								
"G" at Cutoff Wall		6"	6"	6"	6"	7½"	8"	9½"	11"	12'	"A" = 1'-6"						
"G" at Culvert		6"	6"	6"	8"	9½"	11"	1'-1½"	1'-3"	14'	"B" = 1'-0"	"A" = 1'-10"					
										16'	"B" = 1'-0"	"A" = 2'-0"					
										18'	Total 6-#7	Total 6-#8	"B" = 1'-6"				
										20'		Total 8-#8					

NOTES: Walls designed for 2'-0" surcharges earth density = 120 LB/CF; equivalent fluid pressure = 36 LB/CF.
Vary "D" of warped walls uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'-0".
Dimensions "L", "W", "H", "W", "N", Elevation "G", Angle of Flare", and end "Slope" (as apply) are shown on the plans.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	POST MILES INCL. SHEETS	SHEET NO.	TOTAL SHEETS

May 1, 2006
PLANS APPROVAL DATE
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan.
To get to its Caltrans web site, go to: http://www.dot.ca.gov

WARPED WINGWALL DETAILS ⚠1

(126)
NOT TO SCALE

168

2006 STANDARD PLAN D86B

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92933
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

H&A HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618
FX: (949) 583-0759 ▪ PH: (949) 583-1010

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	⚠1 ADDED SHEET 3A, CN 121 & 126, WARPED WINGWALL DETAIL	
		126 & TYPICAL CONNECTION DETAIL BETWEEN EXIST. CONC.	
		HEADWALL & WARPED WINGWALL, ADDED SECTIONS A-A & C-C	
		ADDED 8' REMOVABLE PANEL CHAIN LINK FENCE, CN 127,	
		BOLLARD DETAIL, SECTION J	

K-1417

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

CALTRANS TRANSITION WINGWALL

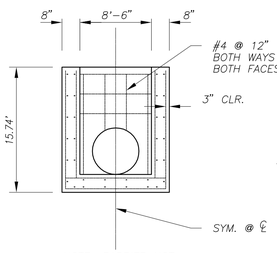
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
3A OF 4

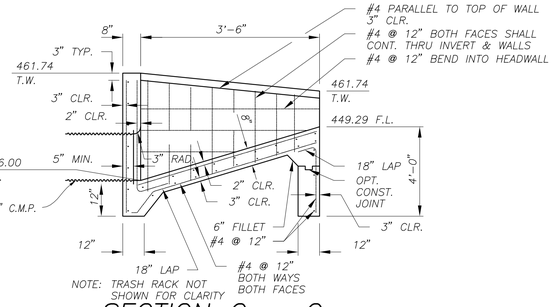
W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

F:\0594\Engineering\SY_Storm Drain\SHT03A.dwg



NOTE: BARRIER NOT SHOWN FOR CLARITY

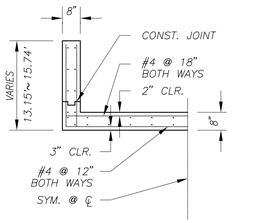
SECTION A – A



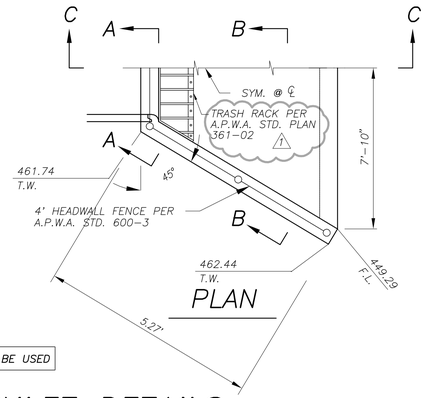
NOTE: TRASH RACK NOT SHOWN FOR CLARITY

SECTION C – C

(NOTE: HEADWALL FENCE NOT SHOWN)



SECTION B – B

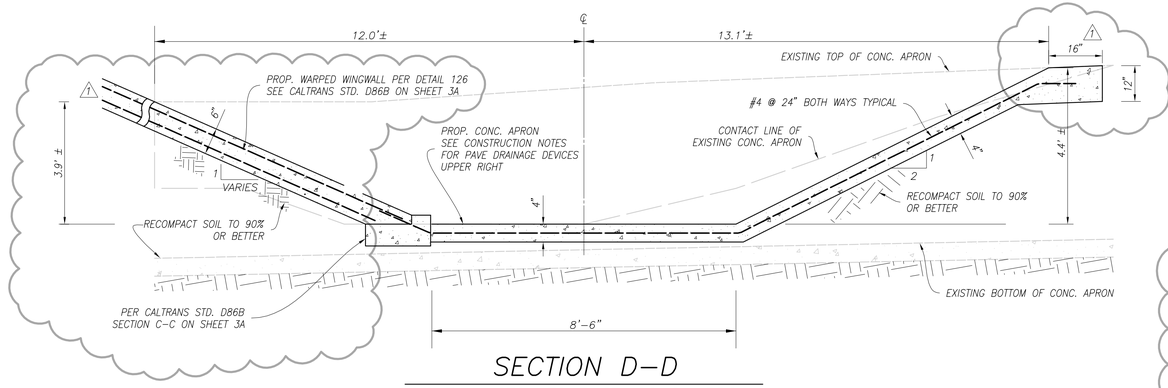


PLAN

NOTE: f'c = 4000 PSI OF CONCRETE SHALL BE USED

104 INLET DETAILS

N.T.S.



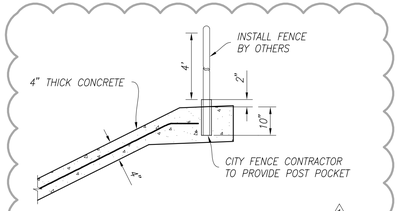
SECTION D–D

CUT A NOTCH TO EXIST. CONC. APRON & JOIN PROP. CONC. APRON (LOOKING DOWNSTREAM)

NOT TO SCALE

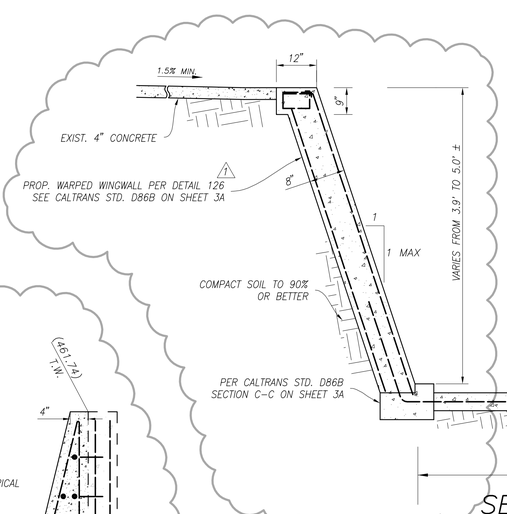
CONSTRUCTION NOTES FOR PAVED DRAINAGE DEVICES

1. APPROVED MATERIAL FOR CONSTRUCTION OF DEVICE IS EITHER 4" CONC. W/ NO. 4 BARS LONGITUDINAL 24" O.C. WITH NO. 4 TIE BARS 24" O.C. 1 1/2" ROCK B3250.
2. INSPECTION OF GRADED SWALE IS REQUIRED PRIOR TO INSTALLATION OF PAVING.
3. GROUND SHALL BE PRE-WET TO THE SATISFACTION OF THE BUILDING OFFICIAL OR ENGINEER PRIOR TO PLACEMENT OF CONCRETE.
4. PAVED DEVICE SHALL BE CURED WITH A MOISTURE LOSS RETARDANT.
5. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSION STRENGTH AT 28 DAYS OF 3250 P.S.I.



TYPICAL REMOVABLE CHAIN LINK POST

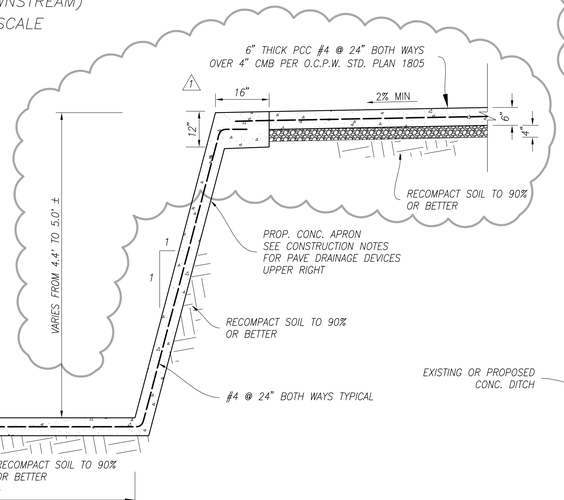
NOT TO SCALE

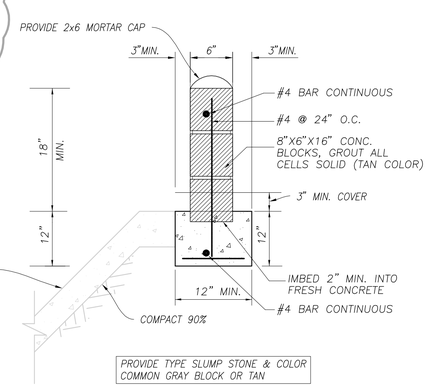


SECTION E–E

PROP. CONC. APRON WITH VARIED SIDE SLOPE (LOOKING DOWNSTREAM)

NOT TO SCALE



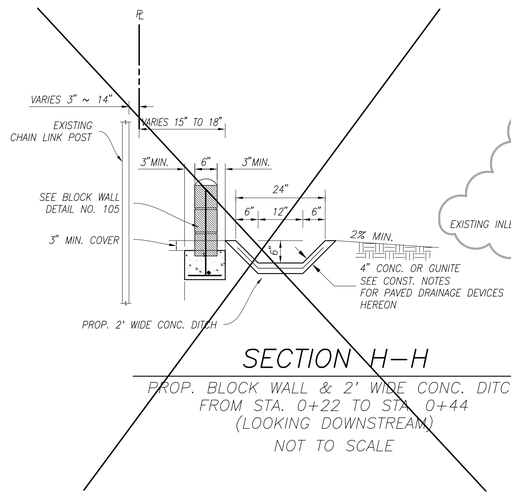


PROVIDE TYPE SLUMP STONE & COLOR COMMON GRAY BLOCK OR TAN

105 BLOCK WALL

(LOOKING UPSTREAM)

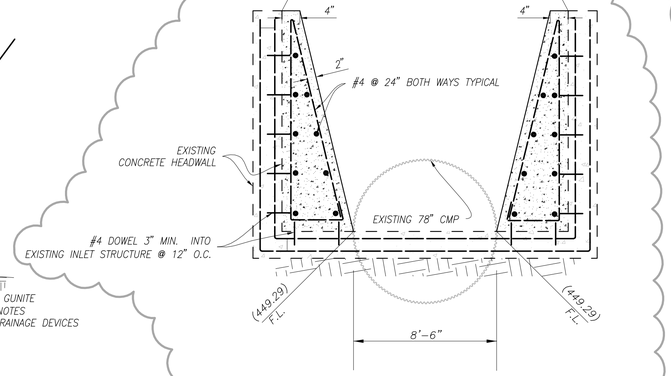
NOT TO SCALE



SECTION H–H

PROP. BLOCK WALL & 2' WIDE CONC. DITCH FROM STA. 0+22 TO STA. 0+44 (LOOKING DOWNSTREAM)

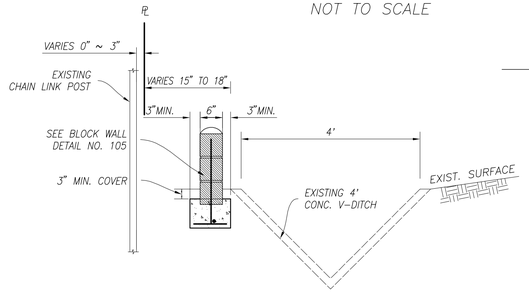
NOT TO SCALE



SECTION J–J ⚠1

PROP. CONC. APRON WITH VARIED SIDE SLOPE (LOOKING DOWNSTREAM)

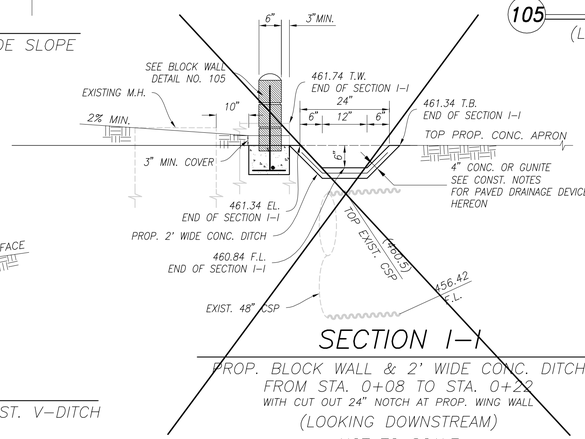
NOT TO SCALE



SECTION F–F

PROP. BLOCK WALL ALONG SOUTH SIDE OF EXIST. V-DITCH FROM STA. 0+44 TO STA. 0+69 (LOOKING DOWNSTREAM)

NOT TO SCALE



SECTION I–I

PROP. BLOCK WALL & 2' WIDE CONC. DITCH FROM STA. 0+08 TO STA. 0+22 WITH CUT OUT 24" NOTCH AT PROP. WING WALL (LOOKING DOWNSTREAM)

NOT TO SCALE

BENCHMARK:	OWNER/DEVELOPER: City of Brea, One Civic Center Circle, Brea, California 92933, Phone:(714) 671-4450, Fax:(714) 671-3691	H&A HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING • ENGINEERING • SURVEYING, Three Hughes • Irvine, CA 92618, FX: (949) 583-0759 • PH: (949) 583-1010	
BASIS OF BEARINGS:	SOIL FIRM:		

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	⚠1 UPDATED SECTIONS E, D & NOTE FOR DETAIL 104, ADDED	
		TYPICAL REMOVABLE C.L. POST, SECTIONS H & I NOT USED,	
		ADDED SECTION J	

K-1418

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

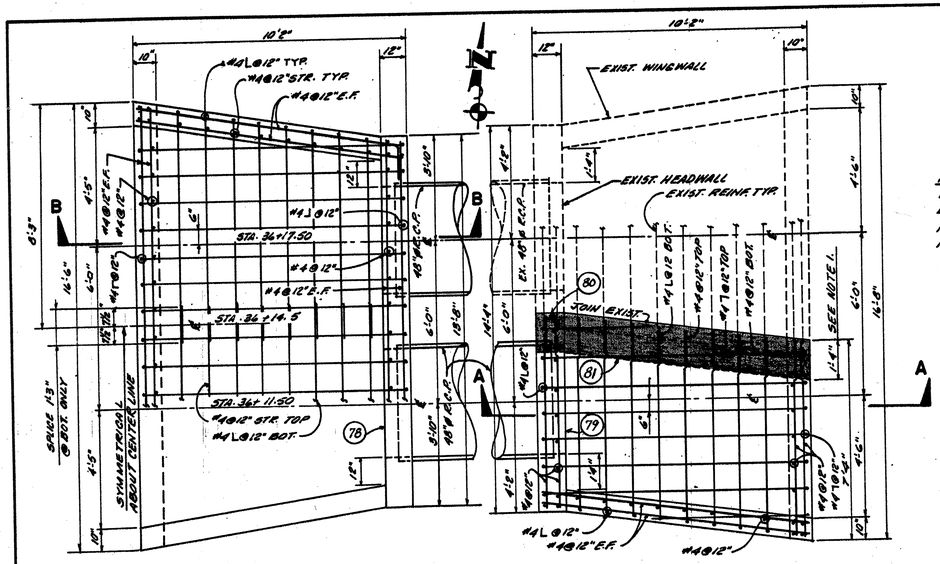
PROJECT NO.

SHEET NO. 4 OF 4

W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

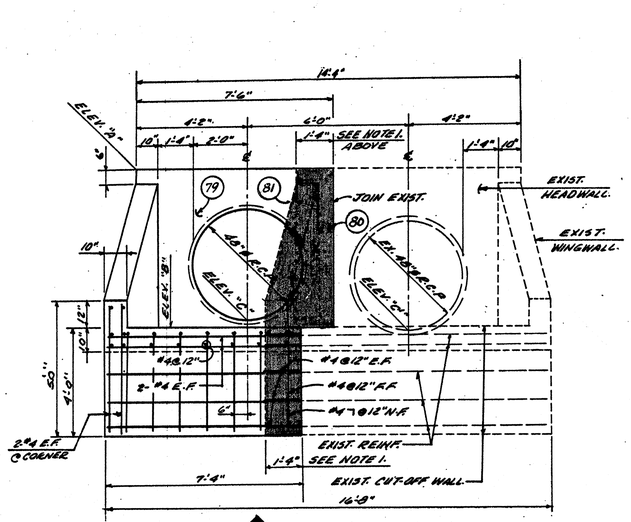
F:\0594\Engineering\SY_Storm Drain\SHT04.dwg

CIP PROJECT NO. 7847



PLAN-OUTLET STRUCTURE

SCALE: 3/8"=1'0"



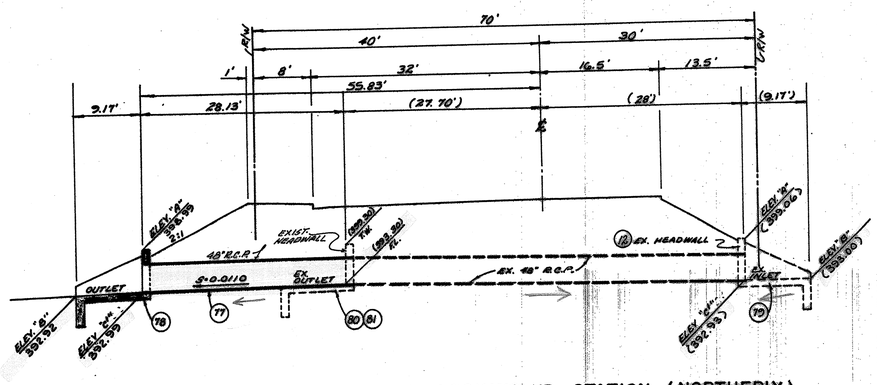
MODIFIED PLAN-INLET STRUCTURE

SCALE: 3/8"=1'0"

NOTE:
1.) REMOVE EXIST. CONC AND EXPOSE EXIST. REINF, SPLICE NEW REINF. TO EXIST. AS INDICATED ON PLAN.

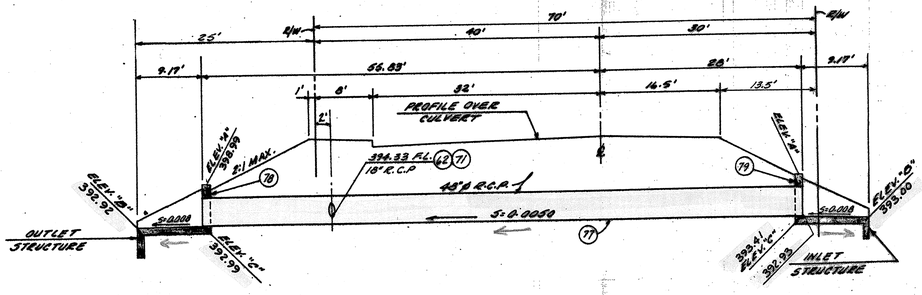
ELEVATION SCHEDULE				
LOCATION	ELEV. "A"	ELEV. "B"	ELEV. "C"	ELEV. "C'"
INLET STRUCT.	(399.04)*	(393.00)	393.41	(392.95)
OUTLET STRUCT.	396.99	392.92	392.99	392.99

LEGEND:
N.F. DENOTES NEAR FACE.
F.F. DENOTES FAR FACE.
E.F. DENOTES EACH FACE.



CULVERT SECTION - STA. 36+17.50 - LOOKING UP STATION (NORTHERLY)

SCALE: HORIZ. 1"=10'
VERT. 1"=5'



CULVERT SECTION - STA. 36+11.50 - LOOKING UP STATION (NORTHERLY)

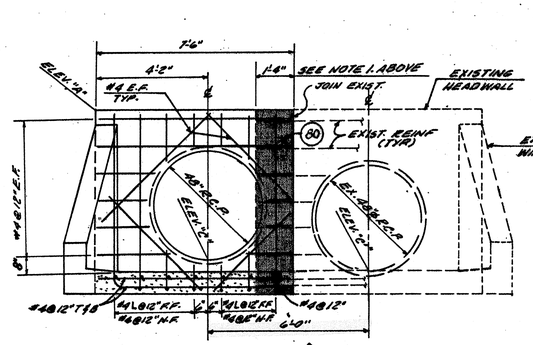
SCALE: HORIZ 1"=10'
VERT 1"=5'

SECTION "A-A" (INLET)

SCALE: 3/8"=1'0"

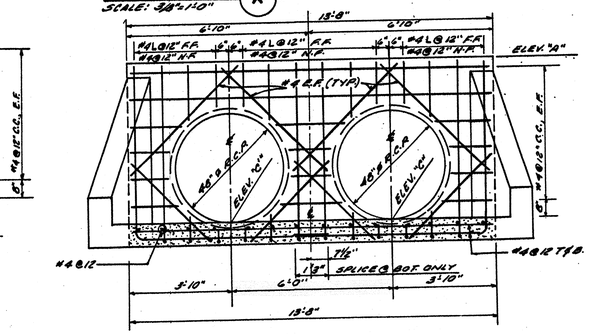
ELEVATION X

SCALE: 3/8"=1'0"



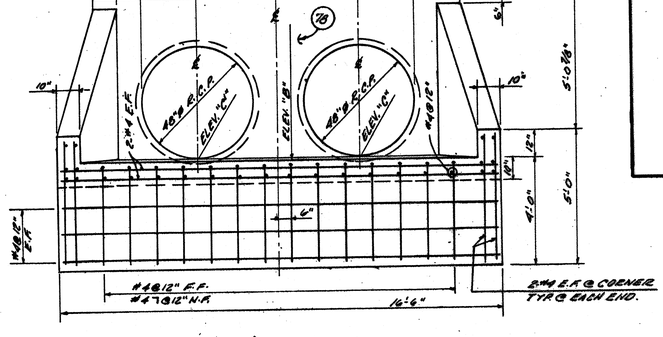
ELEVATION W

SCALE: 3/8"=1'0"



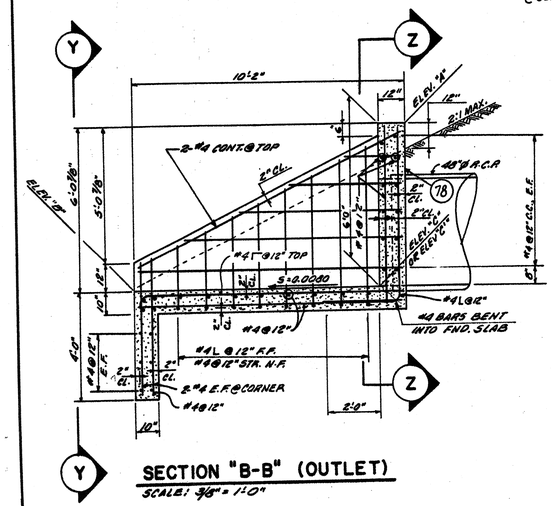
ELEVATION Z

SCALE: 3/8"=1'0"



ELEVATION Y

SCALE: 3/8"=1'0"



SECTION "B-B" (OUTLET)

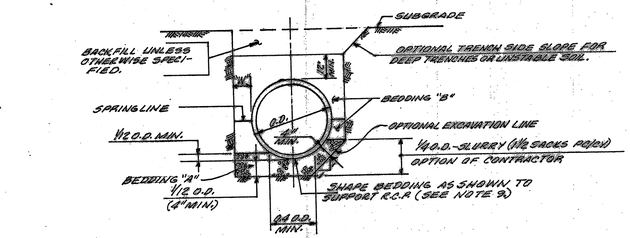
SCALE: 3/8"=1'0"

CULVERT-HEADWALL DETAILS (1/12)

SCALE: AS SHOWN

BEDDING & BACKFILL NOTES:

1.) BEDDING "A" SHALL BE COMPOSED OF SAND, NO.3 OR NO.4 CRUSHED ROCK OR GRAVEL OR OTHER GRANULAR MATERIAL HAVING A SAND EQUIVALENT OF NOT LESS THAN 30, AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER.
2.) BEDDING "B" SHALL BE COMPOSED OF SAND OR OTHER GRANULAR MATERIAL AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER.
3.) BEDDING "B" SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90 PERCENT UNLESS OTHERWISE SPECIFIED.
4.) BACKFILL SHALL BE PER SECTION 19 OF THE STANDARD SPECIFICATIONS.
5.) WHERE THE COVER IS 8 FEET OR LESS, "W" MUST BE GREATER THAN OR EQUAL TO 6 INCHES. WHERE THE COVER IS GREATER THAN 8 FEET, "W" MUST BE BETWEEN 6 AND 10 INCHES.
6.) "W" SHALL INCLUDE THE THICKNESS OF ANY SHORING.
7.) SHORING SHALL BE A MINIMUM OF 6" FROM THE PIPE AT SPRINGLINE.
8.) AN IMPROVED BEDDING METHOD SHALL BE SUBMITTED TO THE ENGINEER FOR ANY "W" OTHER THAN THAT PERMITTED IN NOTE 5.
9.) THE TRENCH BOTTOM SHALL BE SHAPED AS SHOWN, OR THE CONTRACTOR, AT HIS OPTION MAY CHOOSE NOT TO SCREED BEDDING "A" IN WHICH CASE, THE PIPE SHALL BE BACKFILLED TO A DEPTH OF 1/4 O.D. WITH TRENCH BACKFILL SLURRY AT HIS EXPENSE.



R.C.P. BEDDING AND BACKFILL DETAIL (2/12)

NO SCALE

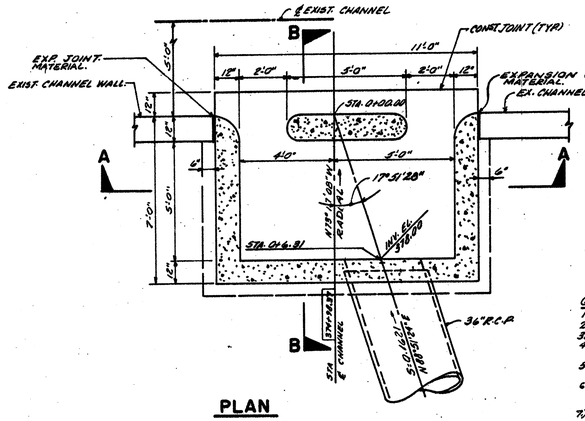
ROSE DRIVE A.H.F.P. NO. 1065
ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

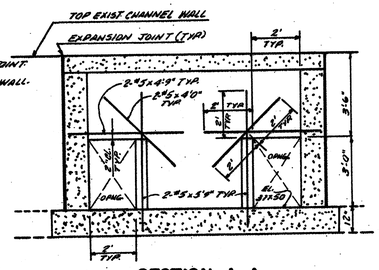
DRAINAGE DETAILS
DOUBLE 48" R.C.P. CULVERT AND HEADWALL STA. 36+14.5

DRAWN BY: B.R.G.		SHEET 12 OF 21
CHECKED BY:		
DATE: 8/17/82	SCALE: AS SHOWN	

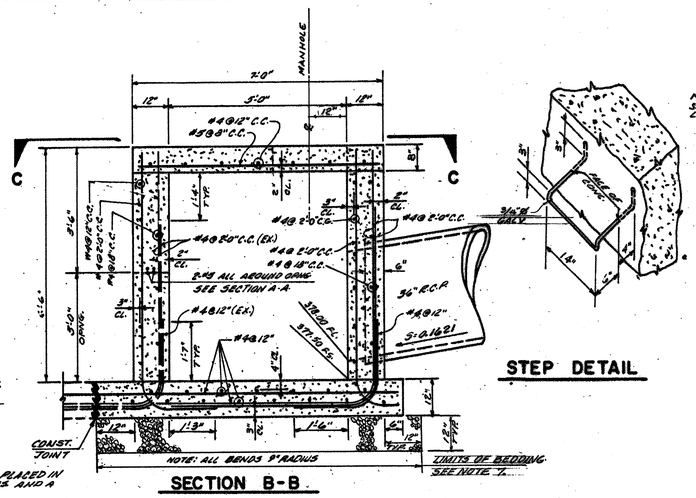
"AS BUILT" 4-7-83

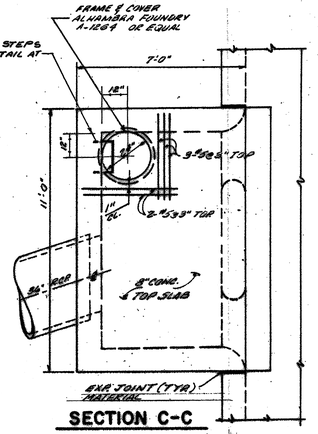
K-1419





GENERAL NOTES:
1) CONCRETE SHALL BE CLASS 560-C-4000.
2) REINF. STEEL SHALL BE GRADE 60 CONFORMING TO A.S.T.M. A-615.
3) EXPOSED EDGES OF CONCRETE SHALL BE BEVELED.
4) LONGITUDINAL STEEL, TRANSVERSE STEEL. BARS PER A.C.I. 318-77.
5) EXPANSION JOINTS SHALL BE 1" PREMOLDED BITUMINOUS, EXTENDING FULL DEPTH OF WALL.
6) METAL STEPS SHALL BE EQUALLY SPACED @ 15" INTERVALS FROM 15" ABOVE FLOOR TO WITHIN 12" OF THE TOP OF THE BOX. GALVANIZE AFTER FABRICATION.
7) MATERIAL USED FOR STRUCTURAL BACKFILL SHALL BE FURNISHED AND PLACED IN ACCORDANCE WITH SECTION 19-3.06 "STRUCTURE BACKFILL" OF STD. SPECS. AND A MIN. OF 12" THICK @ 18" EACH SIDE OF EXTERIOR WALL.

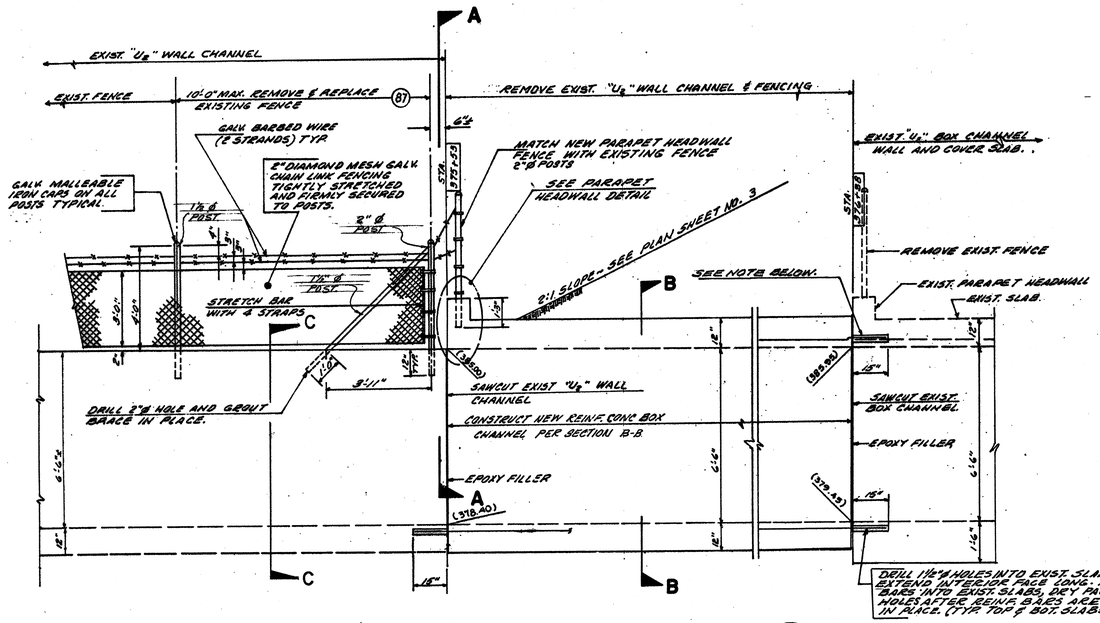




CHAMBER INLET STRUCTURE — DETAILS

NO SCALE

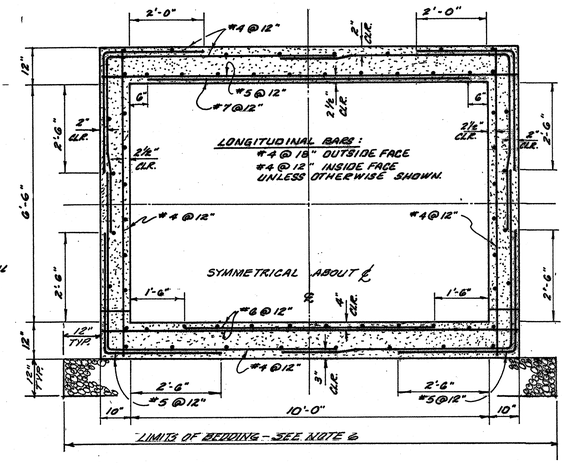
1/13



CARBON CANYON CHANNEL - REINF. CONC. BOX CHANNEL ADDITION

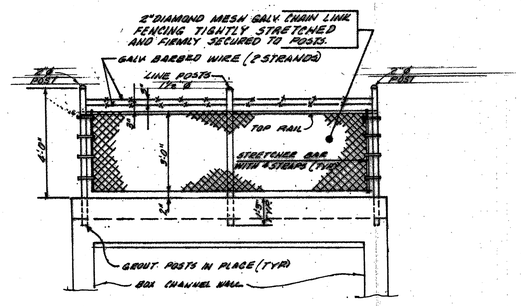
SCALE: 3/8" = 1'-0"

2/13



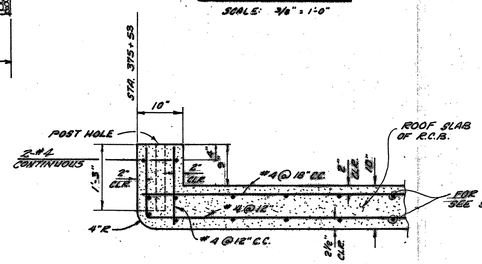
R.C.B. SECTION B-B
STA. 375+53 TO STA. 376+38

SCALE: ½" = 1'-0"



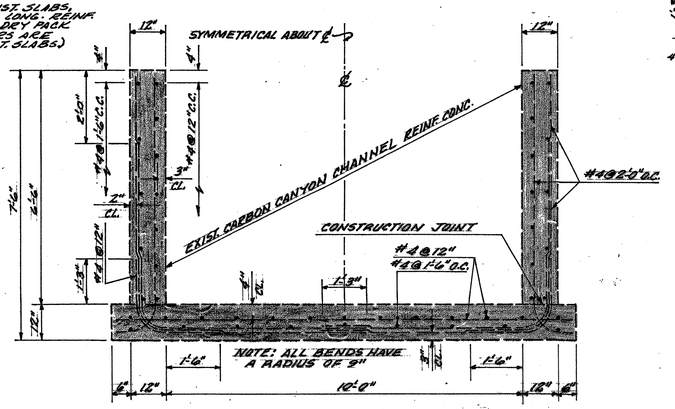
PARAPET HEADWALL FENCE (87)
SECTION A-A

SCALE: 3/4" = 1'-0"



PARAPET HEADWALL DETAIL

SCALE: 3/4" = 1'-0"



EXIST. "U2" WALL CHANNEL
SECTION C-C

SCALE: 1/2" = 1'-0"

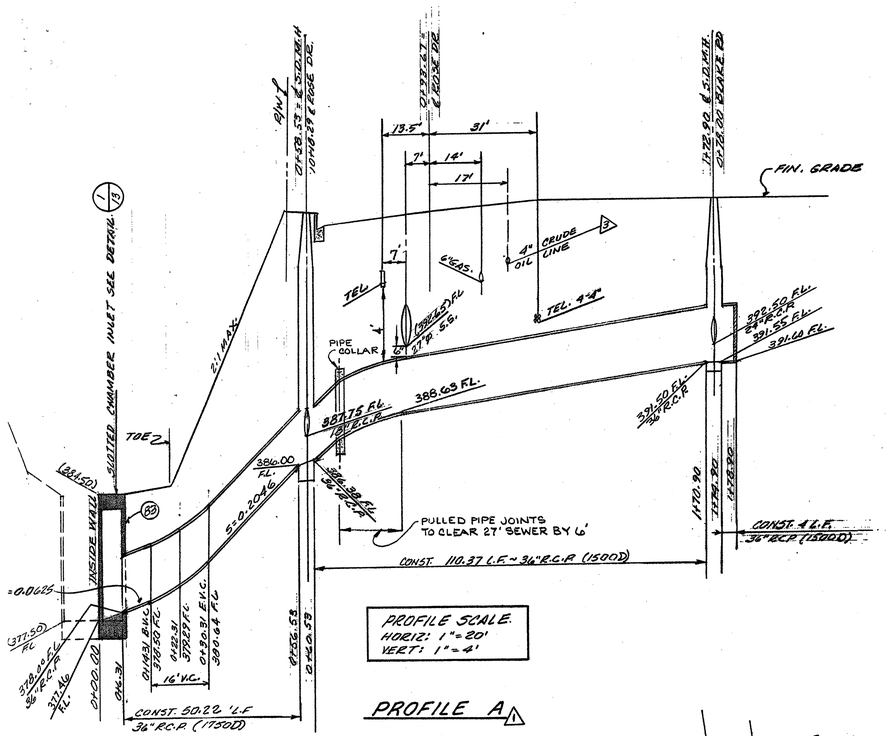
GENERAL NOTES:
1) CONCRETE SHALL BE CLASS 560-C-4000.
2) REINF. STEEL SHALL BE GRADE 60 CONFORMING TO A.S.T.M. A-615.
3) EXPOSED EDGES OF CONCRETE SHALL BE BEVELED.
4) LONGITUDINAL STEEL, TRANSVERSE STEEL BARS PER A.C.I. 318-77.
5) EXPANSION JOINTS SHALL BE EPOXY FILLER, EXTENDING FULL DEPTH OF WALL & SLABS.
6) MATERIAL USED FOR STRUCTURAL BACKFILL SHALL BE FURNISHED & PLACED IN ACCORDANCE WITH SECTION 19-3.06 "STRUCTURE BACKFILL" OF THE STANDARD SPECIFICATIONS AND A MIN. OF 12" THICK & 18" EACH SIDE OF EXTERIOR WALL.

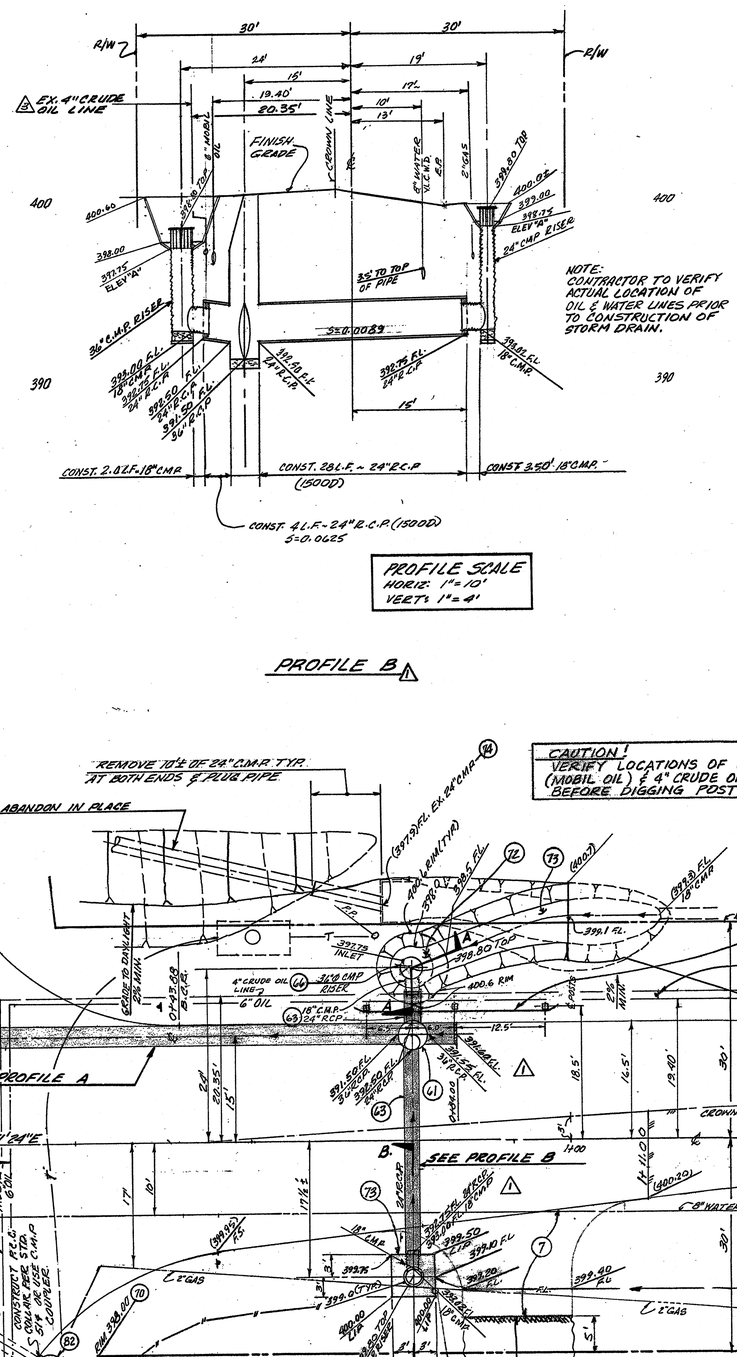
"AS BUILT" 4-7-83

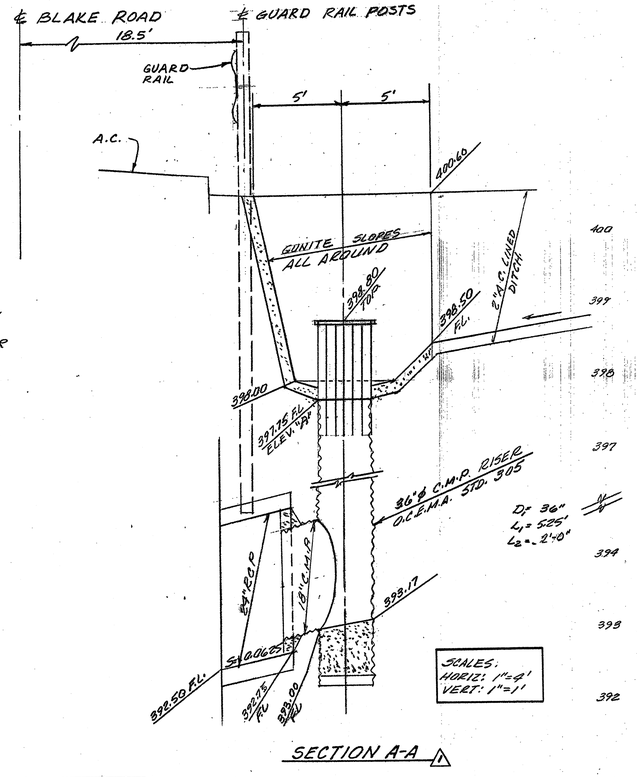
ROSE DRIVE A.H.F.P. NO. 1065	
ENGINEERING DEPARTMENT CITY OF BREA, CALIFORNIA	
DRAINAGE DETAILS CARBON CANYON CHANNEL 10'x 6'-6" R.C.B. AND INLET STRUCTURE	
DRAWN BY: B.R.G.	SHEET 13 OF 21
CHECKED BY: J.E.S.	
DATE: 8/17/82	SCALE: AS SHOWN

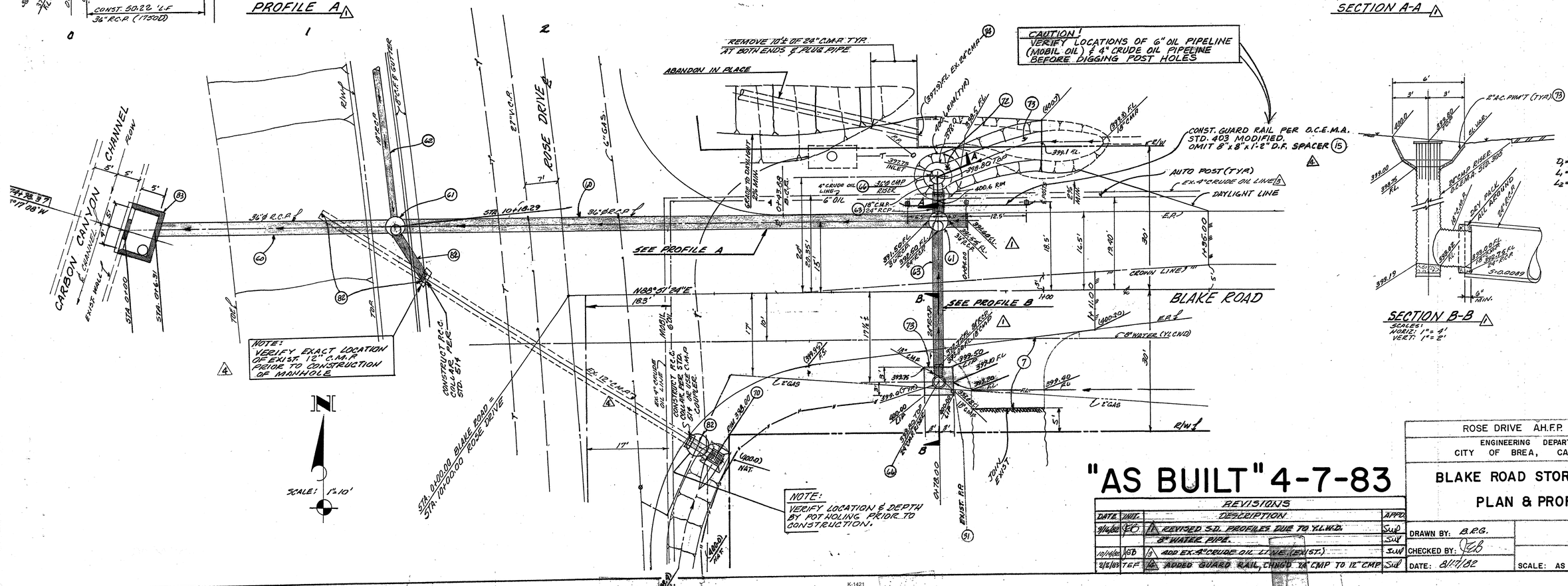
K-1420

REV 1.0 2005









REVISIONS			
DATE	INIT.	DESCRIPTION	APPD.
3/16/82	KB	1. REVISED S.D. PROFILES DUE TO Y.L.W.D. 8" WATER PIPE.	SWP SWP
10/14/82	KSB	3. ADD EX. 4" CRUDE OIL LINE (EXIST.)	SWP
2/8/83	TEF	4. ADDED GUARD RAIL, CHNGD 18" CMP TO 12" CMP	SWP

ROSE DRIVE AH.F.P. NO. 1065

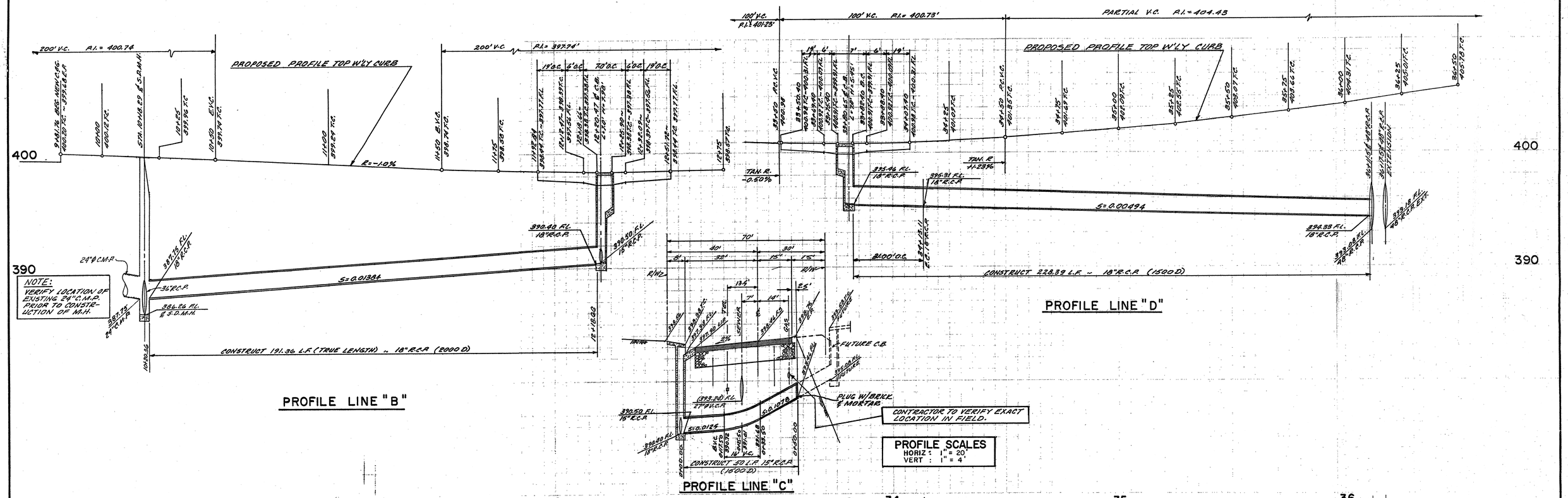
ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

BLAKE ROAD STORM DRAIN PLAN & PROFILE

DRAWN BY: B.R.G.
CHECKED BY: [illegible]
DATE: 8/17/82
SCALE: AS NOTED

SHEET 14 OF 21

K-1421



"AS BUILT" 4-7-83

REVISIONS			
DATE	INIT.	DESCRIPTION	APP'D
10/19/82		(3) ADDED 4" CRUDE OIL LINE (EXIST.)	

ROSE DRIVE A.H.F.P. NO. 1065

ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

ROSE DRIVE STORM DRAIN PLAN & PROFILE

DRAWN BY B.R.G.
CHECKED BY
DATE: 8/17/82
SCALE: AS NOTED

SHEET 15 OF 21

DOUBLE 48"RCP - CROSSING ROSE DRIVE

K-1422

MAY 10 2005

Appendix L Noise Data

Appendices

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LOCAL REGULATIONS AND STANDARDS

NOISE

Studies have identified noise as an environmental pollutant that can have substantial and permanent impacts on human health and general well-being. Not only is noise a health hazard, excessive noise can be a source of annoyance, tension, and discomfort that disrupts everyday activities. Brea aims to substantially reduce noise and its impacts within the urban environment, with a focus on protecting residential neighborhoods, schools, and similar sensitive uses.

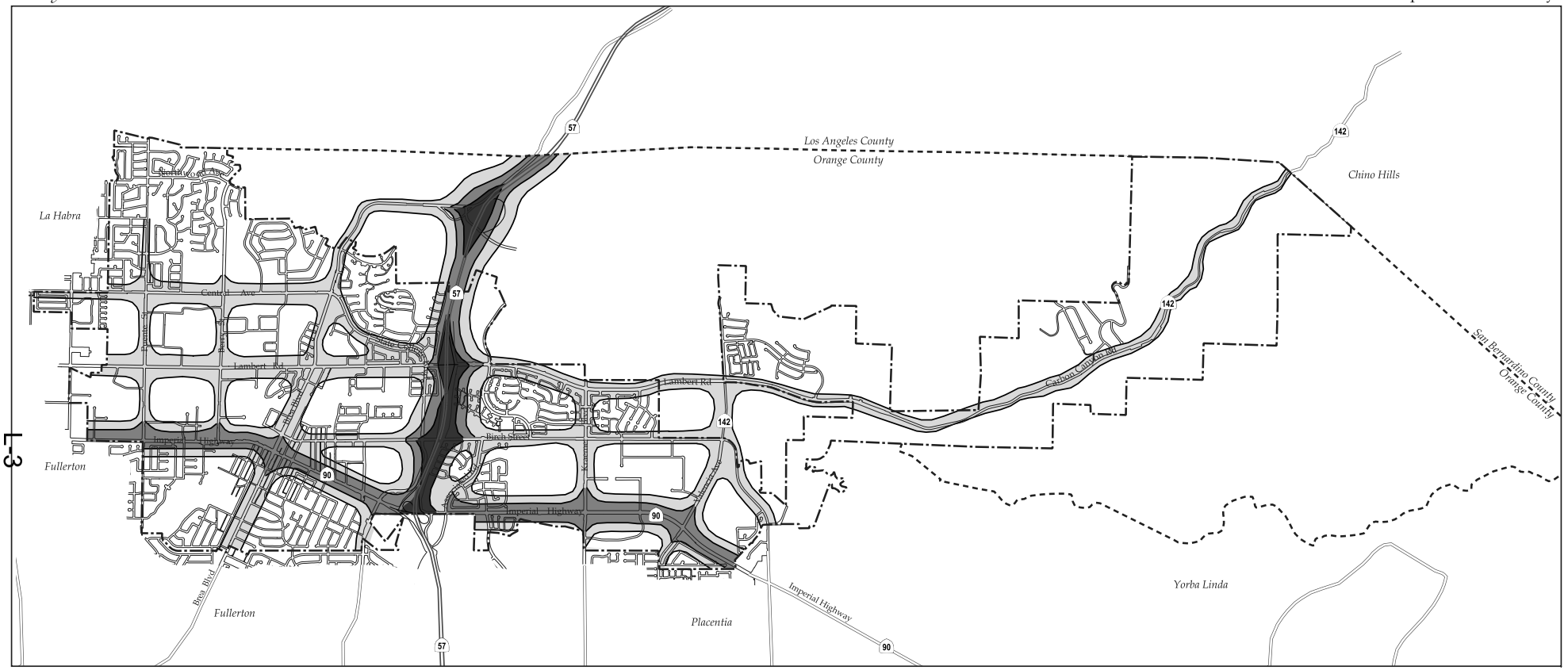
Context

In Brea, street and freeway traffic represent the primary noise sources. Industrial and commercial activity present concerns where adjacent to residential neighborhoods. In addition, mechanical equipment, playgrounds, leaf blowers, and construction equipment are examples of random noise sources that can contribute to neighborhood noise.

Figure PS-5 displays a composite picture of average noise levels in Brea in 2001. As Figure PS-5 illustrates, the loudest noise levels occur along State Highway 57, Imperial Highway, Brea Boulevard, and Valencia Avenue, where truck traffic associated with the Olinda Alpha landfill lumbers past homes and places of business. Lambert Road also experiences loud noise levels due to access to State Highway 57.

Noise and Land Use Compatibility Guidelines

Noise generally is defined as unwanted or intrusive sound. Because noise consists of pitch, loudness, and duration, describing noise with a single unit of measure presents a challenge. The A-weighted decibel scale, or dB(A), has been developed to describe the loudness of a sound or sound environment based on the sensitivity of the human ear. A sound level meter that measures A-weighted decibels has an electrical circuit that allows the meter to have the same sensitivity to sound at different frequencies as the average human ear. Table PS-3 indicates criteria the State has established to reduce adverse noise effects on human health.



Source: Weiland Associates, 2001.

Legend

- City Boundary
- Sphere of Influence

Community Noise Equivalent Level (CNEL) Contours

- Less than 60 CNEL
- 60 to 65 CNEL
- 65 to 70 CNEL
- Greater than 70 CNEL

N, W, E, S — City of Brea General Plan

0 3,000 6,000 9,000 12,000 Feet

0 0.5 1 1.5 2 Miles

BREA GENERAL PLAN

Figure PS-5
Noise Contours (2001)

Table PS-3
State Criteria for Minimizing Adverse Noise Effects on Humans

Objective	dB(A) Range
Prevent Hearing Loss	75-80
Prevent Physiological Effects (Other than hearing loss)	65-75
Prevent Speech Interference	50-60
Address People's Subjective Preference for Noise Control	45-50
Prevent Sleep Interruption	35-45

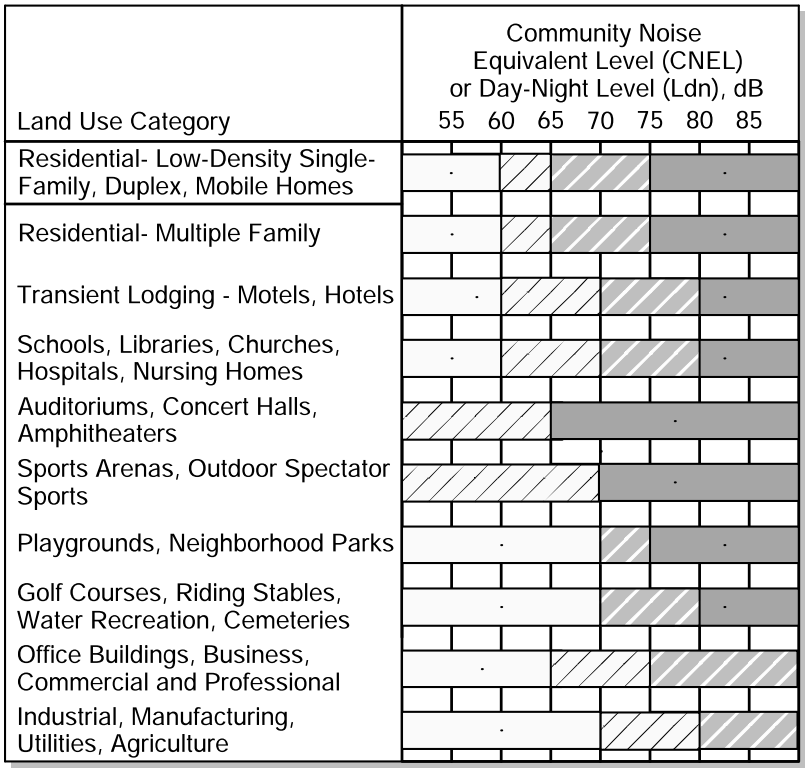
Source: California General Plan Guidelines, 2000.

The dB(A) descriptor only reports noise from a single source or combination of sources at a point in time. To allow a more comprehensive description of a noise environment, federal and State agencies have established noise and land use compatibility guidelines that use averaging approaches to noise measurement. Two measurement scales commonly used in California are the Community Noise Equivalent Level (CNEL) and the day-night level (Ldn). To account for increased human sensitivity at night, the CNEL level includes a 5-decibel penalty on noise during the 7:00 A.M. to 10:00 P.M. time period and a 10-decibel penalty on noise during the 10:00 P.M. to 7:00 A.M. time period. The Ldn level includes only the 10 decibel weighting for late-night noise. These values are nearly identical for all but unusual noise sources.

The City will use land use compatibility standards when planning and making development decisions in order to ensure that noise producers do not adversely affect sensitive receptors.

The City's primary goal with regard to community noise is to minimize the exposure of residents to unhealthful or excessive noise levels to the extent possible. To this end, the noise/land use compatibility guidelines in Figure PS-6, based on cumulative noise criteria for outdoor noise, are used to review development proposals and to identify and mitigation measures necessary to avoid or minimize impacts, including traffic noise impacts, a new use may have on established uses.

Figure PS-6
Noise/Land Use Compatibility



Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB
Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB
Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB
Very noisy urban areas near arterials, freeways or airports.

75+ dB
Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

Normally Acceptable
Specified land use is satisfactory, based on the assumption that any buildings are of normal conventional construction, without any special noise insulation requirements

Conditionally Acceptable
New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in design.

Clearly Unacceptable
New construction or development should generally not be undertaken.

The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) are measures of the 24-hour noise environment. They represent the constant A-weighted noise level that would be measured if all the sound energy received over the day were averaged. In order to account for the greater sensitivity of people to noise at night, the CNEL weighting includes a 5-decibel penalty on noise between 7:00 p.m. and 10:00 p.m. and a 10-decibel penalty on noise between 10:00 p.m. and 7:00 a.m. of the next day. The Ldn includes only the 10-decibel weighting for late-night noise events. For practical purposes, the two measures are equivalent for typical urban noise environments.

Noise Contours and Noise Impact Areas

The use of noise contours based on the major noise sources can describe the noise environment for the community. Noise contours outline areas of equal noise exposure. Future noise contours have been estimated using information about existing and projected land use development and transportation activity.

The projected noise contours and noise impact areas for Brea are displayed in Figure PS-7. These contours will serve as a guide for land use and development decisions. Contours of 60 dB(A) or greater define noise impact areas. An acoustical analysis must be prepared when noise sensitive land uses are proposed within noise impact areas. The analysis must show that the project is designed to attenuate noise to meet the City's noise standards in order to receive approval. If the project design does not meet the noise standards, mitigation can be recommended in the analysis. If the analysis demonstrates that the noise standards can be met by implementing the mitigation measures, the project can be approved conditioned upon implementation of the mitigation measures.

Transportation Related Noise

Transportation activity is the primary source of noise in Brea. The three major sources of transportation related noise are:

- Traffic on the Orange Freeway (SR-57)
- Commercial truck traffic associated with the Olinda Alpha landfill on Valencia Avenue and Imperial Highway
- Automobile traffic on Brea Boulevard, Brea Canyon Road, Central Avenue, and Lambert Road

Residential neighborhoods bordering the Orange Freeway are subject to loud noise levels. Properties directly adjacent to the freeway can experience decibels as high as 70 to 75 dB(A). Sound attenuation walls, landscaped buffers, and dirt mounds all help to reduce the sound intensity of the freeway. Figure PS-7 illustrates the projected noise contours along the freeway.

Commercial trucks associated with the Olinda Alpha landfill contribute to excessive noise levels via the Orange Freeway, Imperial Highway, and Valencia Avenue to connect with the landfill. Commercial trucks are not permitted to access Valencia Avenue via Lambert Road, minimizing some of the noise impacts to adjacent residential neighborhoods. Olinda Alpha is slated to close in the year 2013; however, the County of Orange is investigating extending the life of the landfill much further.

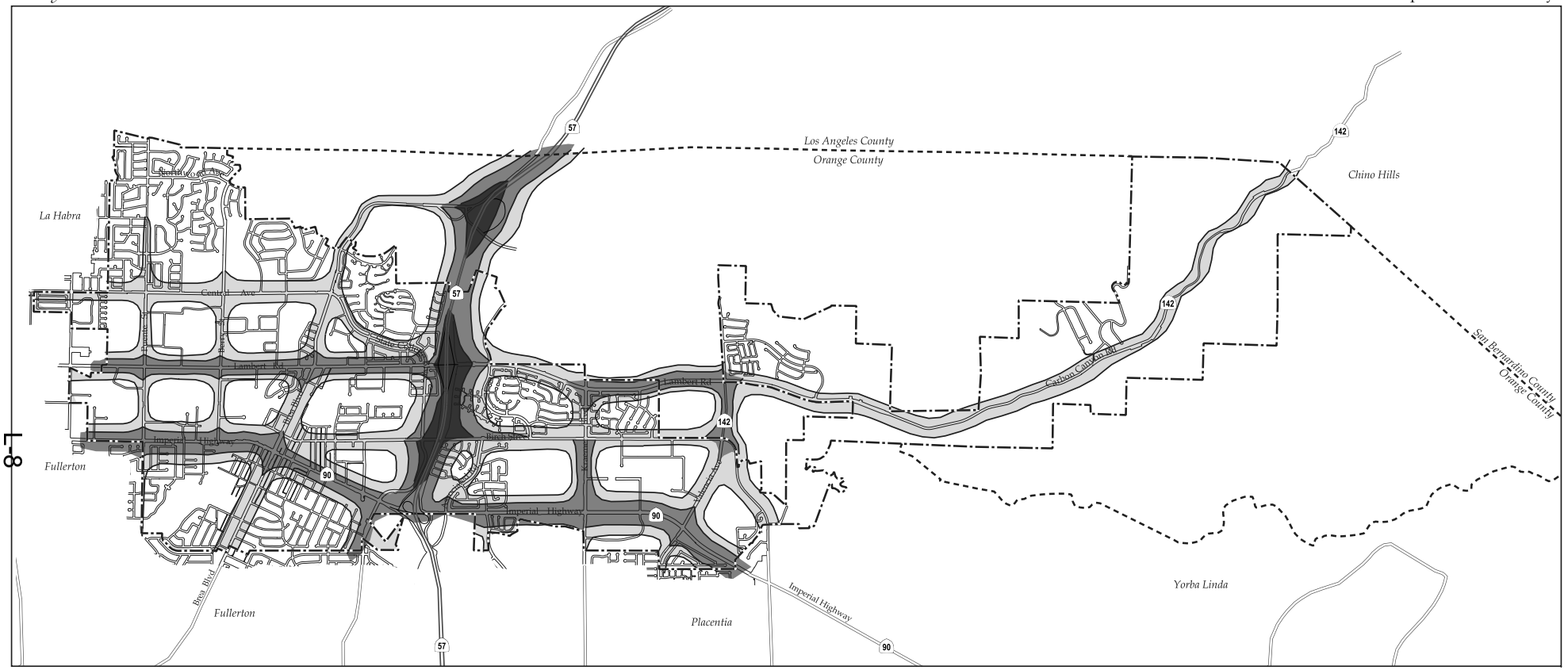
New residential development has been recently constructed at the northeast corner of Valencia Avenue and Carbon Canyon Road just south of the Olinda Alpha landfill entrance. Dense planting of deciduous and evergreen trees as well as a sound attenuation wall were set within the landscaped area to minimize the impacts to residential properties directly abutting Valencia Avenue.

Proposed residential land uses have also been designated for both sides of Valencia Avenue south of Lambert Road/Carbon Canyon Road. Residential, school, and park uses are proposed for the Hartley Research Center. Careful planning and mitigation within these areas will protect these sensitive uses from excessive noise levels.

Noise levels along Brea Boulevard, Brea Canyon Road, Central Avenue, and Lambert Road are above average and can impact sensitive uses adjacent to these streets.

Traffic noise depends primarily on the speed of traffic and the percentage of truck traffic. The primary source of noise from automobiles is high-frequency tire noise, which increases with speed. In addition, trucks and older automobiles produce engine and exhaust noise.

The most efficient and effective means of controlling noise from transportation systems is to reduce noise at the source. However, the City has little direct control over noise produced by transportation sources because State noise regulations preempt local regulations. Because the City cannot control noise at the source, City noise programs focus on reducing the impact of transportation noise at reception sites. During the planning stages of the development process, potential impacts from transportation noise will be identified and mitigation measures will be required as needed to meet City noise standards.



Source: Weiland Associates, 2001.

Legend

- City Boundary
- Sphere of Influence

Community Noise Equivalent Level (CNEL) Contours

- Less than 60 CNEL
- 60 to 65 CNEL
- 65 to 70 CNEL
- Greater than 70 CNEL

N, W, E, S — City of Brea General Plan

0 3,000 6,000 9,000 12,000 Feet

0 0.5 1 1.5 2 Miles

BREA GENERAL PLAN

Figure PS-6
Future Noise Contours



Sound attenuation walls and limits on speed help to shield residential neighborhoods from automobile noise on Imperial Highway.

Non-Transportation Related Noise

When reviewing a proposed industrial, commercial, or public project, noise generation and potential impacts to surrounding development are considered in accordance with CEQA. Specific attention should be given to non-residential proposals adjacent to residential neighborhoods. An acoustical analysis is required for projects that will generate noise potentially affecting sensitive receptors. Where significant impacts are identified, mitigation measures are required. Common mitigation measures that could be applied when reviewing projects include acoustically treated and quiet design: 1) furnaces, 2) fans, 3) motors, 4) compressors, and 5) valves and pumps. The City may also require limited delivery hours and hours of operation to minimize impacts on adjacent residential users or other sensitive receptors.

Goals and Policies

Certain areas of Brea are subject to high levels of noise. This in turn can reduce the quality of life within these neighborhoods. Consideration of noise sources in the planning process and identification of who that noise impacts is an effective method of minimizing the impacts of noise on residents. Areas already impacted by noise can explore different noise attenuation and rehabilitative improvements.

Goal PS-9	**Minimize the impact of point source noise and ambient noise levels throughout the community.**
Policy PS-9.1	Evaluate the need to require acoustical studies for development proposals that address both direct and indirect, particularly traffic, noise impacts, and require such studies, with appropriate mitigation included, as warranted.
Policy PS-9.2	Ensure that the noise standards set forth in the Municipal Code reflect standards most appropriate for Brea.
Policy PS-9.3	Ensure that acceptable noise levels are maintained near schools, hospitals, convalescent homes, and other noise sensitive areas in accordance with the City's Municipal Code and noise standards contained in the General Plan.
Policy PS-9.4	Employ creative methods of reducing noise pollution in the City.
Policy PS-9.5	Avoid placing high-noise activity centers near residential areas.
Goal PS-2	**Minimize the impacts of transportation-related noise.**
Policy PS-2.1	Reduce transportation noise by imposing traffic restrictions where necessary.
Policy PS-2.2	Work with the counties of Orange and Los Angeles to include noise mitigation measures in the design of new roadway projects.
Goal PS-3	**Minimize noise impacts from sources other than transportation.**
Policy PS-3.1	Require the inclusion of noise mitigation measures, techniques, and design features in the planning, design, and construction of future development and redevelopment projects.

Policy PS-3.2 Require that mixed-use structures be designed to prevent transfer of noise and vibration from commercial/retail to residential use.

Policy PS-3.3 Minimize stationary noise sources and noise emanating from construction activities and special events.

Policy PS-3.4 Require that new non-residential development plan delivery areas away from existing residential areas.

Policy PS-3.5 Continue active enforcement to limit commercial and industrial delivery hours adjoining residential areas.

Implementation Guide



See Section XXIII of the Implementation Guide for action programs.

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Brea City Code

CHAPTER 8.20: NOISE CONTROL

Section

8.20.010 Declaration of policy

8.20.020 Definitions

8.20.030 Noise level measurement criteria

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8.20.060 Interior noise standards

8.20.070 Special provisions

8.20.080 Motor vehicle racing

8.20.090 Schools, hospitals and churches

8.20.100 Air conditioning; refrigeration; pool filters and fans

8.20.110 Noise level measurement

8.20.120 Manner of enforcement

§ 8.20.010 DECLARATION OF POLICY.

A. In order to control unnecessary, excessive and annoying sounds emanating from areas of the city, it is hereby declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.

B. It is determined that certain sound levels are detrimental to the public health, welfare and safety, and contrary to the public interest.

('61 Code, § 7B.1) (Ord. 812, passed - -)

§ 8.20.020 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

AMBIENT NOISE LEVEL. The all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

CUMULATIVE PERIOD. An additive period of time composed of individual time segments which may be continuous or interrupted.

DECIBEL (dB). A unit which denotes the ratio between two (2) quantities which are proportional to power: the number of decibels corresponding to the ratio or two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio.

DWELLING UNIT. A single unit providing complete, independent living facilities for one (1) or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

EMERGENCY MACHINERY, VEHICLE, OR WORK. Any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

FIXED NOISE SOURCE. A stationary device which creates sounds while fixed or motionless, including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

GRADING. Any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

IMPACT NOISE. The noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

MOBILE NOISE SOURCE. Any noise source other than a fixed noise source.

NOISE LEVEL. The “A” weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) micronewtons per square meter. The unit of measurement shall be designated as dB(A).

PERSON. A person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.

RESIDENTIAL PROPERTY. A parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

SIMPLE TONE NOISE. A noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

SOUND LEVEL METER. An instrument meeting American National Standard Institute's Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

SOUND PRESSURE LEVEL OF A SOUND, IN DECIBELS. Twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

('61 Code, § 7B.2) (Ord. 812, passed - -)

§ 8.20.030 NOISE LEVEL MEASUREMENT CRITERIA.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in § 8.20.020.

('61 Code, § 7B.3) (Ord. 812, passed - -)

§ 8.20.040 DESIGNATED NOISE ZONE.

The entire territory of the city is hereby designated as “Noise Zone 1.”

('61 Code, § 7B.4) (Ord. 812, passed - -)

§ 8.20.050 EXTERIOR NOISE STANDARDS.

A. The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

NOISE STANDARDS

Noise Zone	*Noise Level*	*Time Period*
1	55 dB(A)	7:00 a.m. - 10:00 p.m.
1	50 dB(A)	10:00 p.m. - 7:00 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

B. It shall be unlawful for any person at any location within the city to create any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, to exceed:

1. The noise standard for a cumulative period of more than 30 minutes in any hour; or

2. The noise standard plus five (5) dB(A) for a cumulative period of more than 15 minutes in any hour; or

3. The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or

4. The noise standards plus fifteen (15) dB(A) for a cumulative period of more than one (1) minute in any hour; or

5. The noise standard plus twenty (20) dB(A) for any period of time.

C. In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

('61 Code, § 7B.5) (Ord. 812, passed - -)

§ 8.20.060 INTERIOR NOISE STANDARDS.

A. The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

INTERIOR NOISE STANDARDS

Noise Zone	*Noise Level*	*Time Period*
1	55 dB(A)	7:00 a.m. - 10:00 p.m.
1	45 dB(A)	10:00 p.m. - 7:00 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

B. It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, to exceed:

1. The interior noise standard for a cumulative period of more than five (5) minutes in any hour; or

2. The interior noise standard plus five (5) dB(A) for a cumulative period of more than one (1) minute in any hour; or

3. The interior noise standard plus ten (10) dB(A) for any period of time.

C. In the event the ambient noise level exceeds any of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

('61 Code, § 7B.6) (Ord. 812, passed - -)

§ 8.20.070 SPECIAL PROVISIONS.

The following activities shall be exempted from the provisions of this chapter:

A. Activities conducted on the grounds of any public nursery, elementary, intermediate or secondary school or college.

B. Outdoor gatherings, public dances and shows, provided said events are conducted pursuant to a permit as required by this code.

C. Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity.

D. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

F. All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions.

G. Mobile noise sources associated with agricultural operations; provided such operations do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

H. Mobile noise sources associated with agricultural pest control through pesticide application, provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the Agricultural Commissioner.

I. Noise sources, associated with the maintenance of real property, provided said activities take place between 7:00 a.m. and 7:00 p.m. on any day.

J. Any activity to the extent regulation thereof has been preempted by state or federal law.

('61 Code, § 7B.7) (Ord. 812, passed - -)

§ 8.20.080 MOTOR VEHICLE RACING.

It shall be unlawful to conduct motor vehicle racing, testing, timing or similar noise-producing activities at raceways, speedways, off-road vehicle courses, drag strips or other similar places, including, but not limited to, the operation of midget race cars, drag cars, motorcycles, off-road vehicles, and specialty automobiles, between the hours of 11:30 p.m. and 7:00 a.m.

('61 Code, § 7B.8) (Ord. 812, passed - -)

§ 8.20.090 SCHOOLS, HOSPITALS AND CHURCHES.

It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while same is in use to exceed the noise limits as specified in § 8.20.050 proscribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth of a mile of the institution indicating the presence of a school, church or hospital.

('61 Code, § 7B.9) (Ord. 812, passed - -)

§ 8.20.100 AIR CONDITIONING; REFRIGERATION; POOL FILTERS AND FANS.

During the five (5) year period following the effective date of this chapter, the noise standards enumerated in §§ 8.20.050 and 8.20.060 shall be increased eight (8) dB(A) where the alleged offensive noise source is an air conditioning, or refrigeration system, fan, or swimming pool filter, or associated equipment which was installed prior to the effective date of this chapter.

('61 Code, § 7B.10) (Ord. 812, passed - -)

§ 8.20.110 NOISE LEVEL MEASUREMENT.

The location selected for measuring exterior noise levels shall be at any point on the affected property. Interior noise measurements shall be made within the affected dwelling unit. The measurement shall be made at a point at least four (4) feet from the wall, ceiling or floor nearest the alleged offensive noise source and may be made with the windows of the affected unit open.

('61 Code, § 7B.11) (Ord. 812, passed - -)

§ 8.20.120 MANNER OF ENFORCEMENT.

A. The Police Department, the Code Enforcement Officer and their duly authorized representatives are directed to enforce the provisions of this chapter.

B. No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his or her duty.

('61 Code, § 7B.12) (Ord. 812, passed - -)

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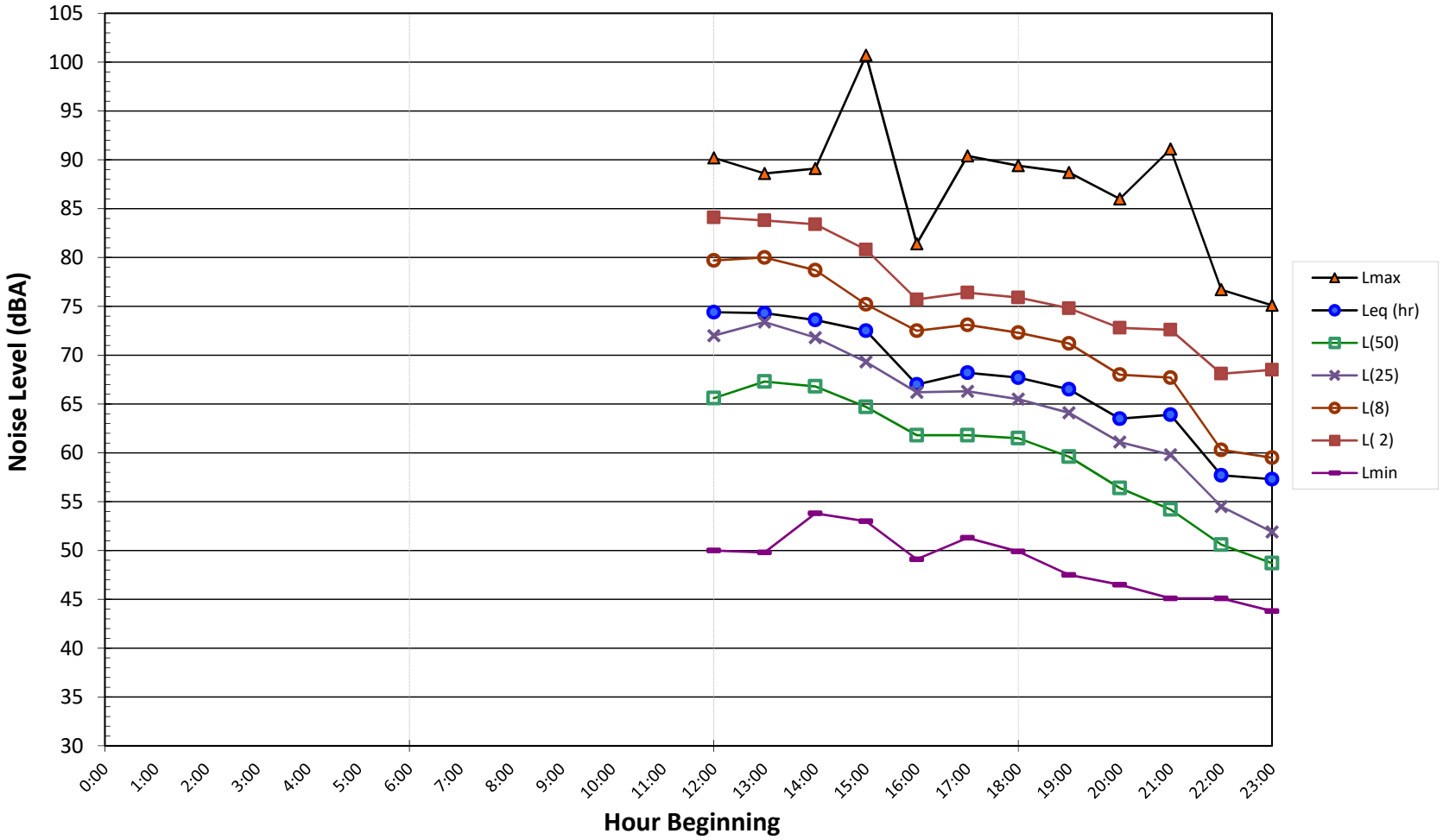
§ 20.20.040 VIBRATION.

Every use shall be so operated that the ground vibration inherently and recurrently generated does not cause a displacement of the earth greater than .003 of one (1) inch as measured at the property line of the subject use.

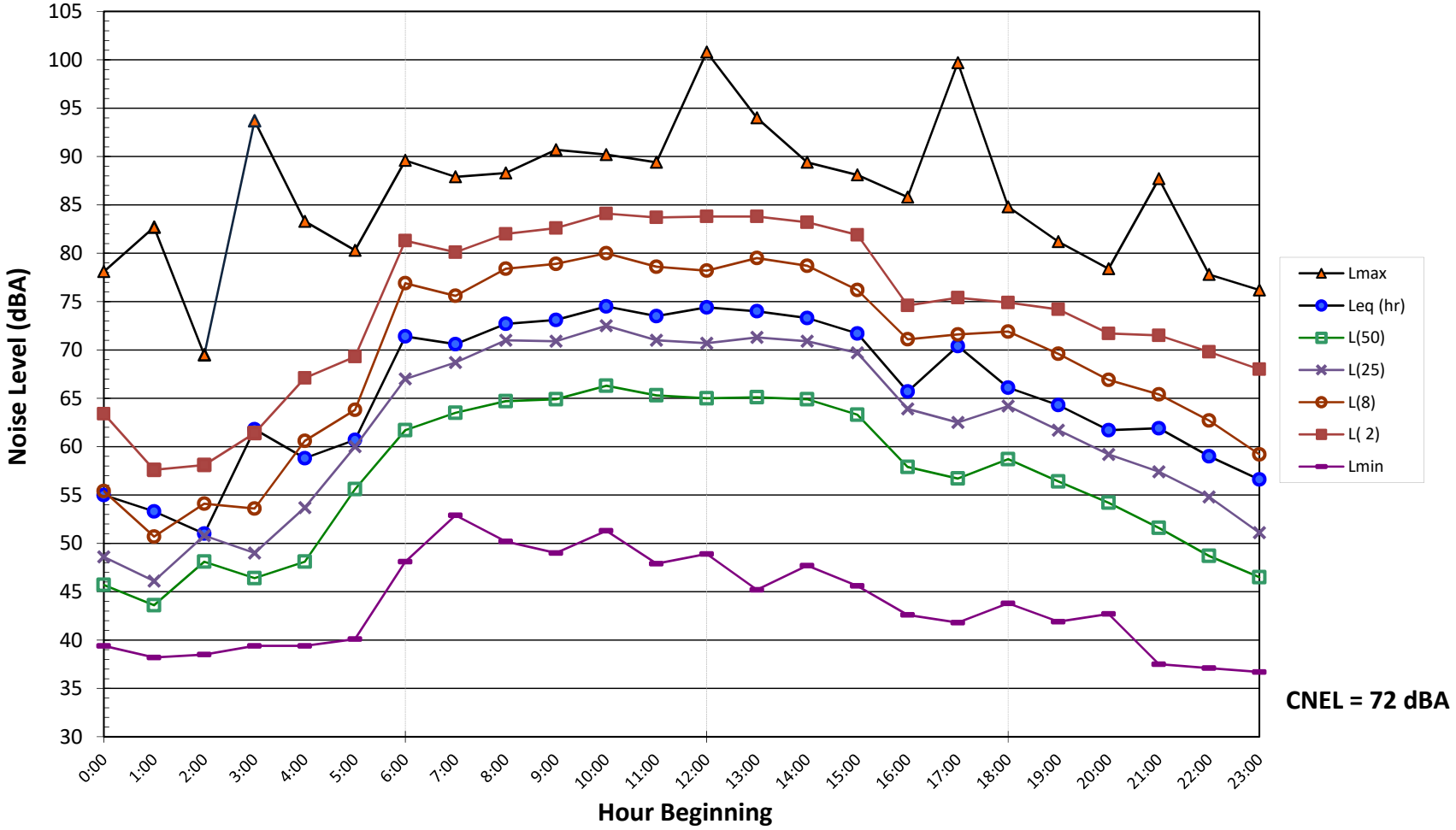
(Ord. 425, passed 10-14-68)

AMBIENT NOISE MONITORING RESULTS

Noise Levels at Location LT-1
Brea 265 Specific Plan - Brea, CA
Wednesday, March 13, 2019

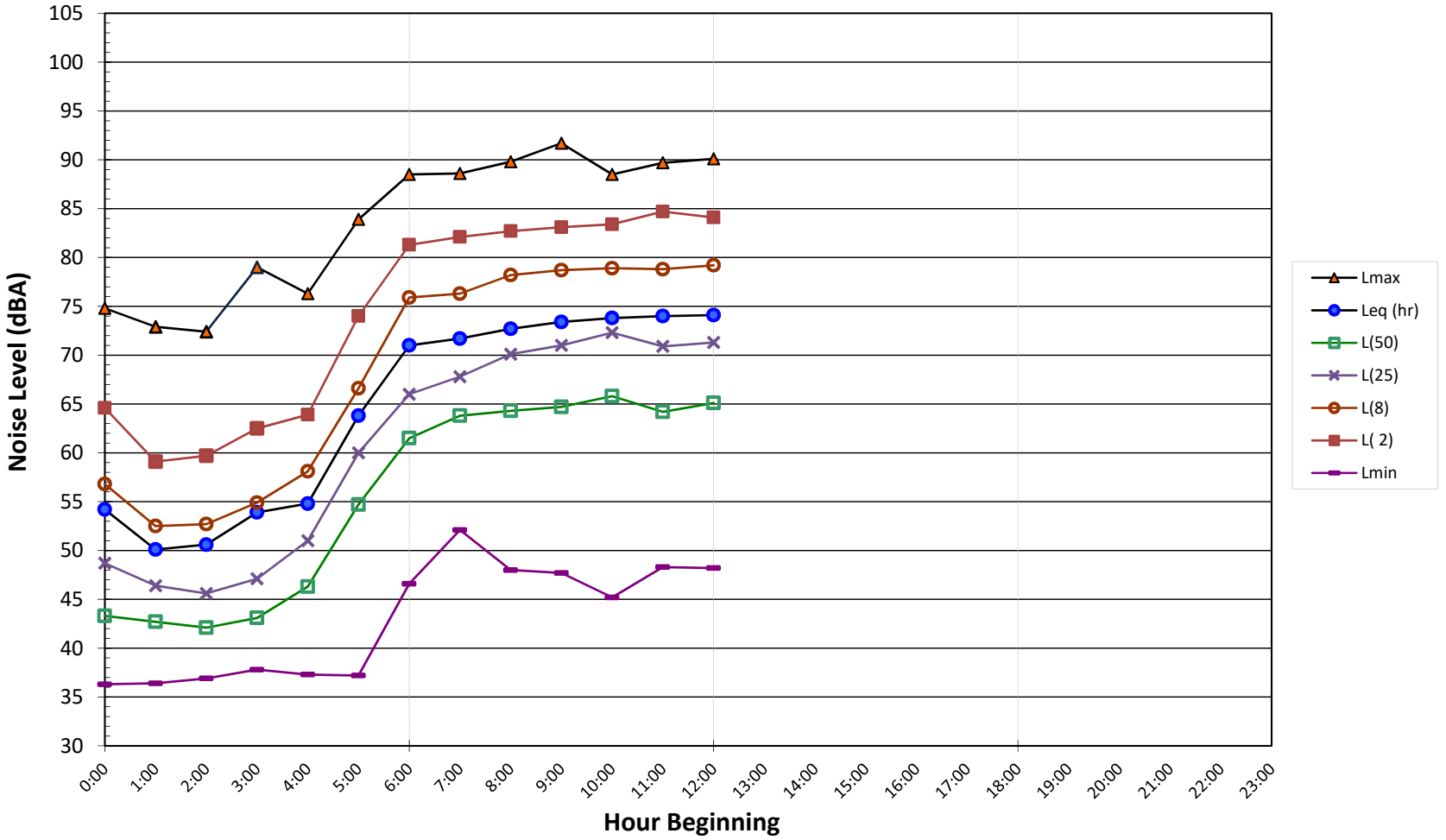


Noise Levels at Location LT-1
Brea 265 Specific Plan - Brea, CA
Thursday, March 14, 2019

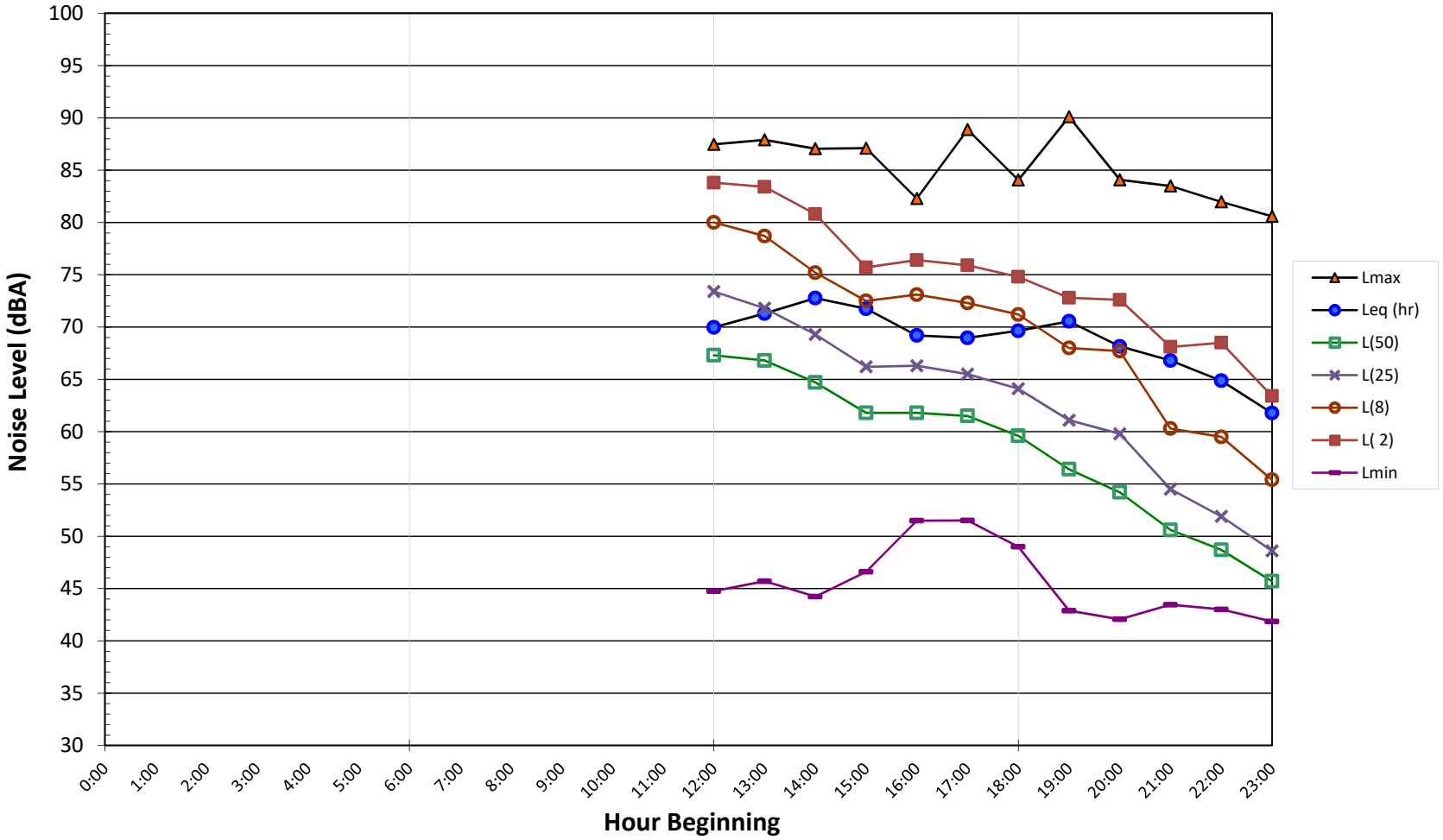


CNEL = 72 dBA

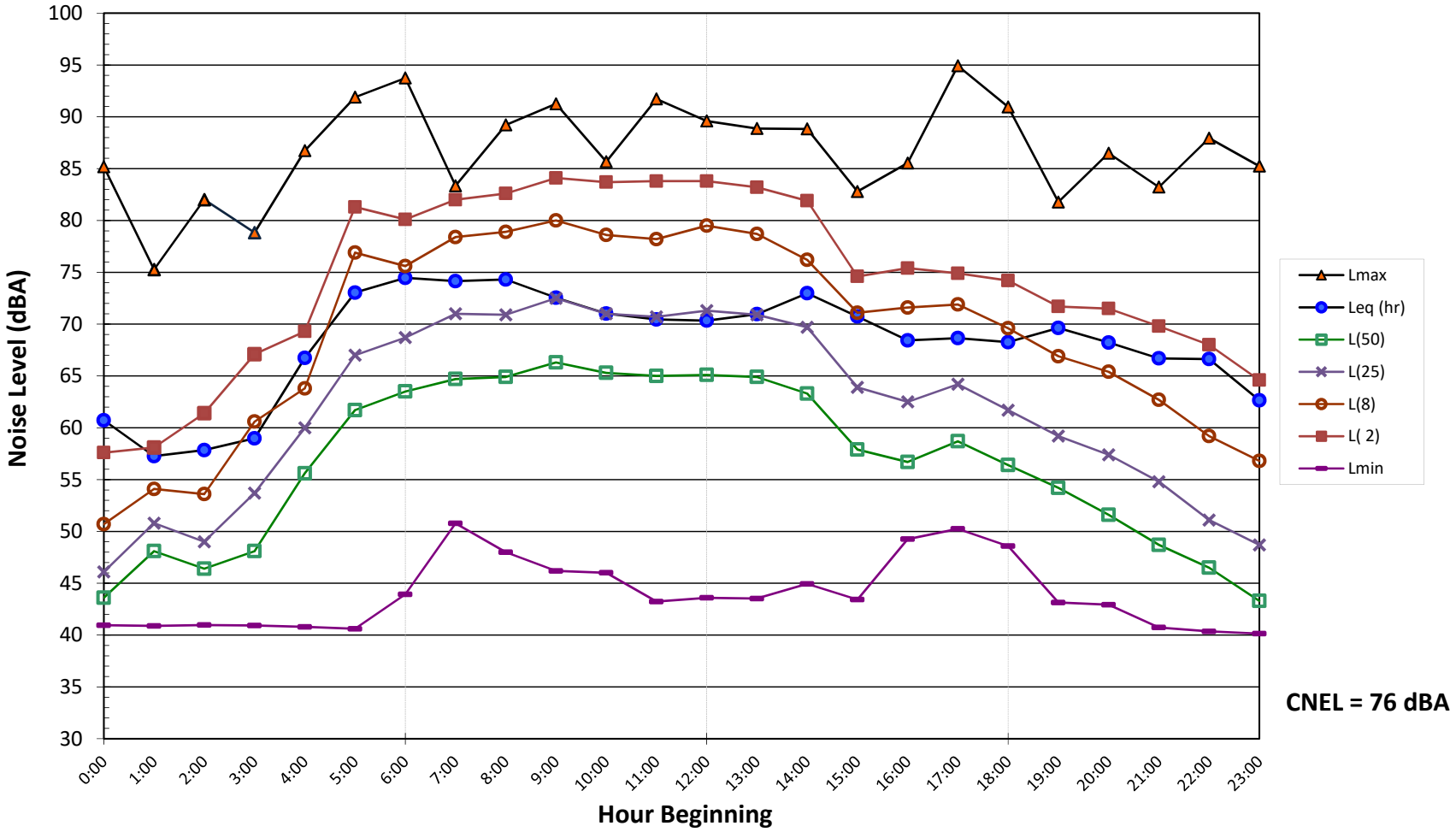
Noise Levels at Location LT-1
Brea 265 Specific Plan - Brea, CA
Friday, March 15, 2019



Noise Levels at Location LT-2
Brea 265 Specific Plan - Brea, CA
Wednesday, March 13, 2019

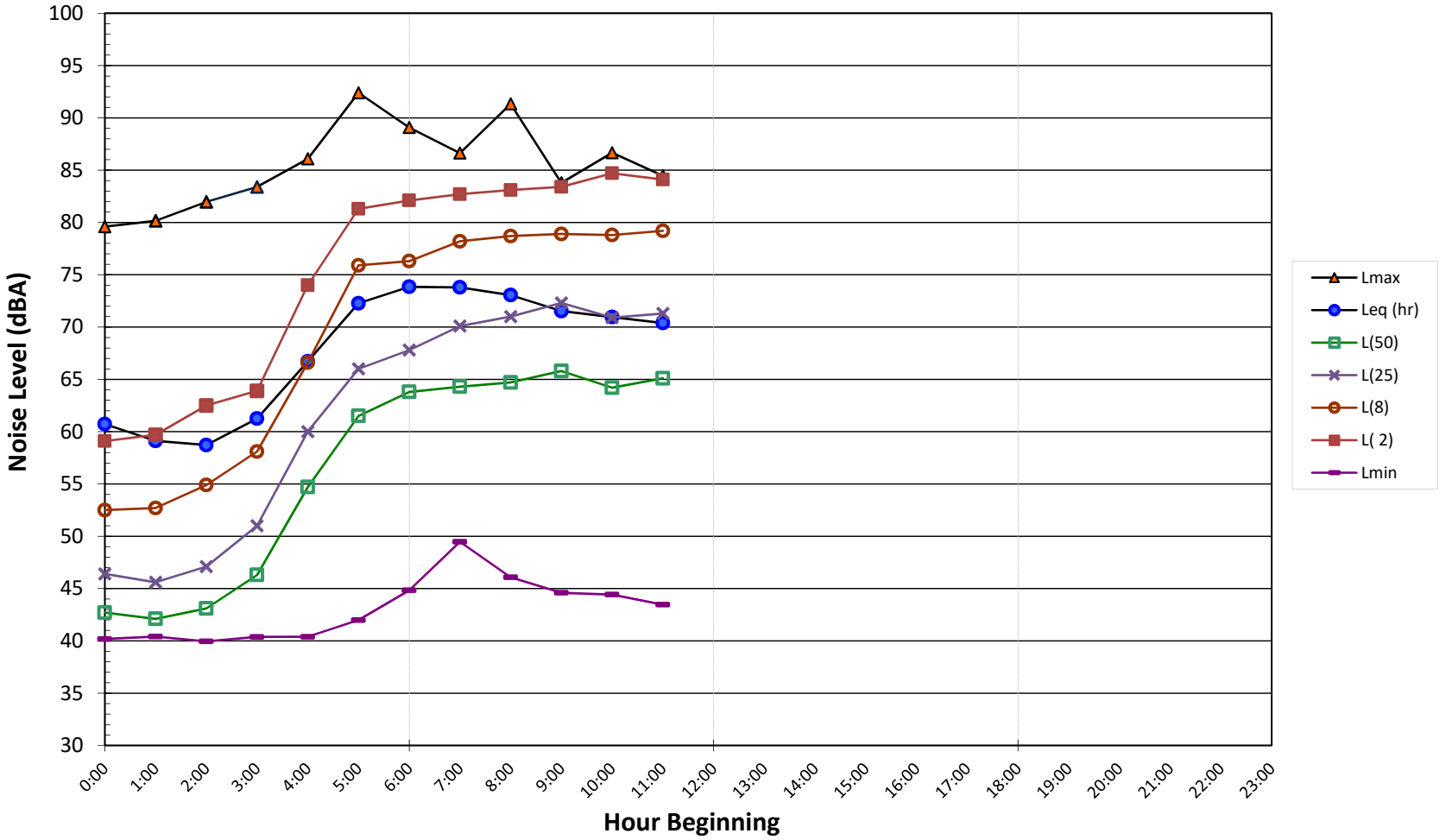


Noise Levels at Location LT-2
Brea 265 Specific Plan - Brea, CA
Thursday, March 14, 2019

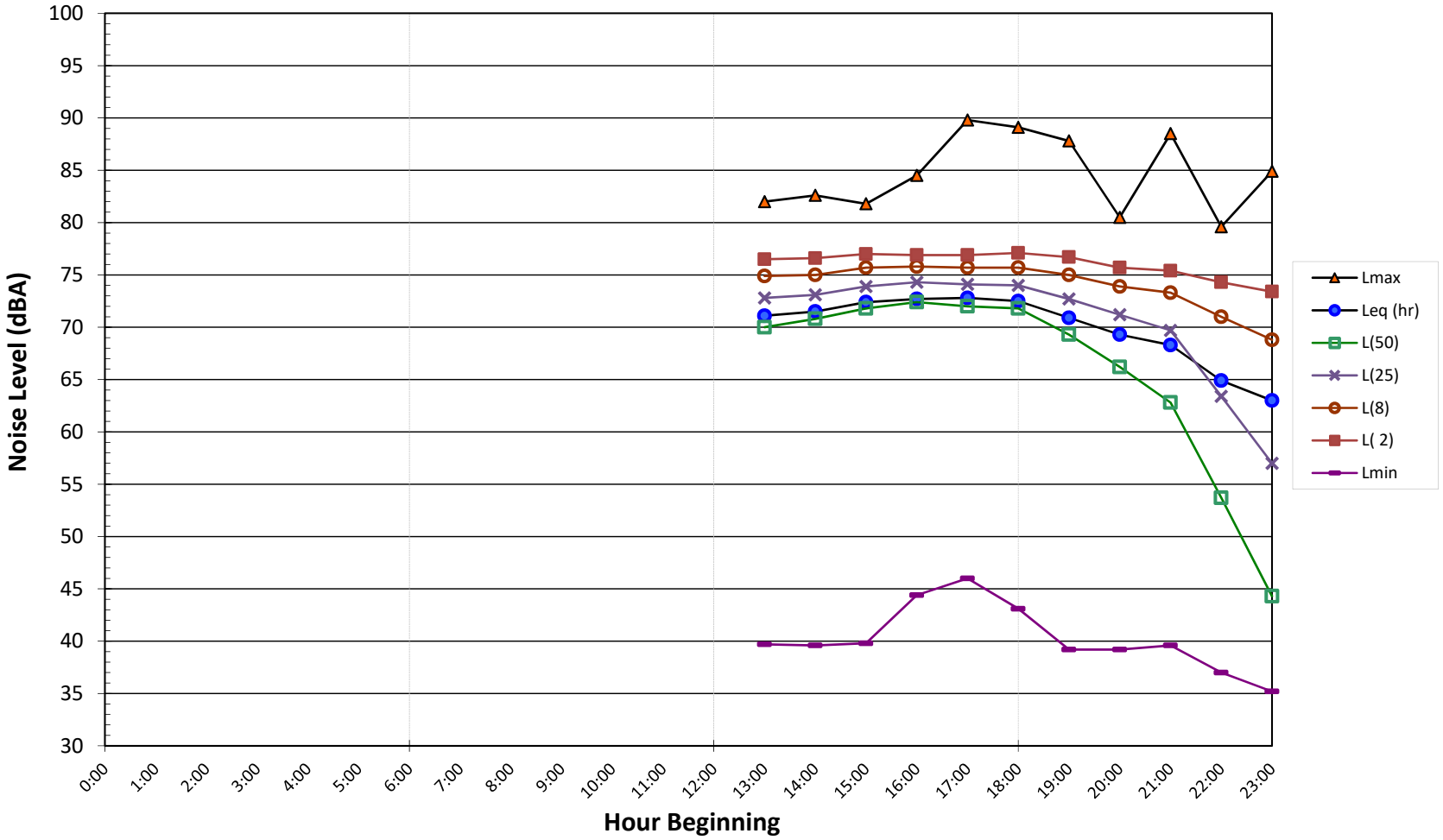


CNEL = 76 dBA

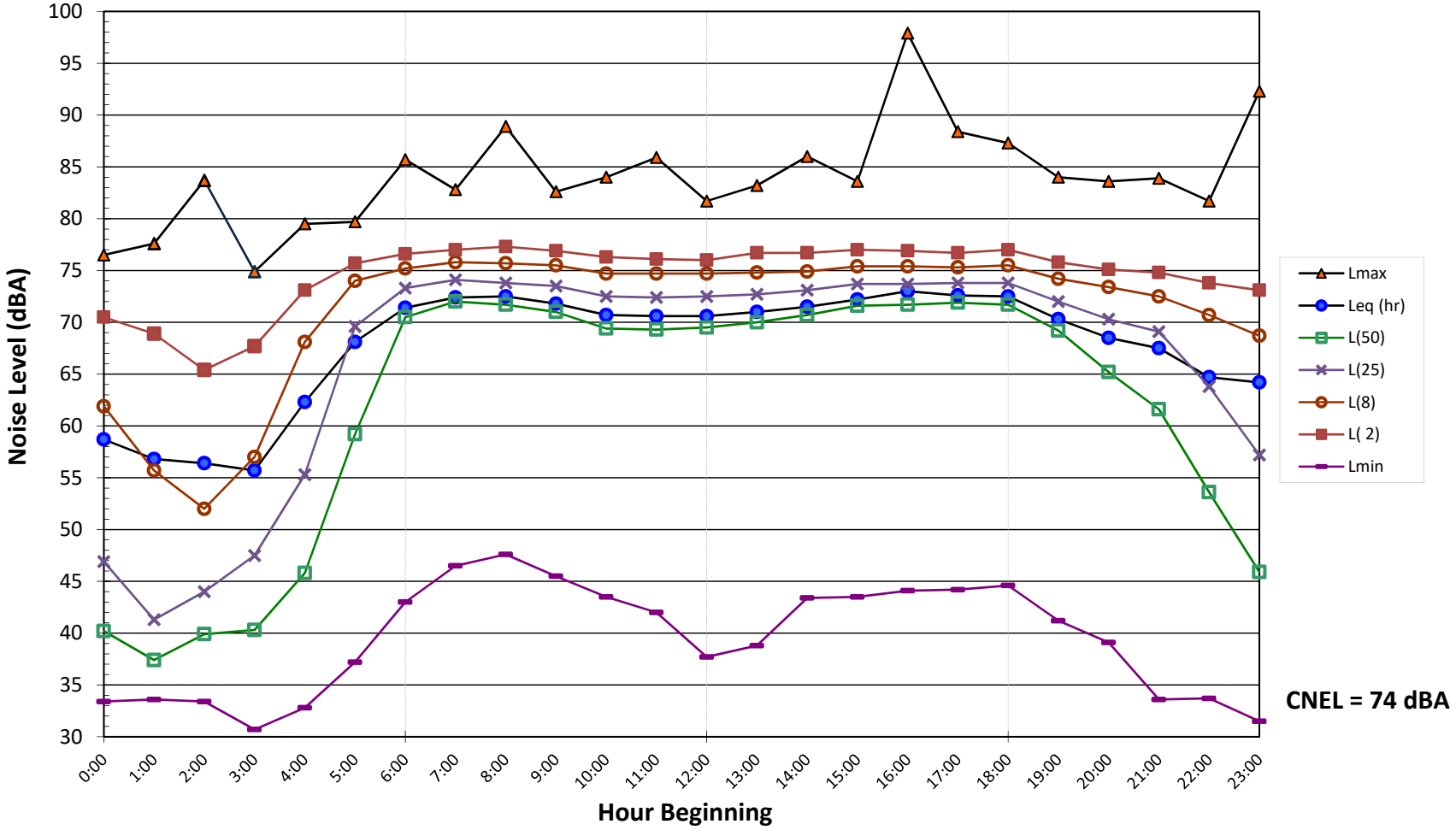
Noise Levels at Location LT-2
Brea 265 Specific Plan - Brea, CA
Friday, March 15, 2019



Noise Levels at Location LT-3
Brea 265 Specific Plan - Brea, CA
Wednesday, March 13, 2019

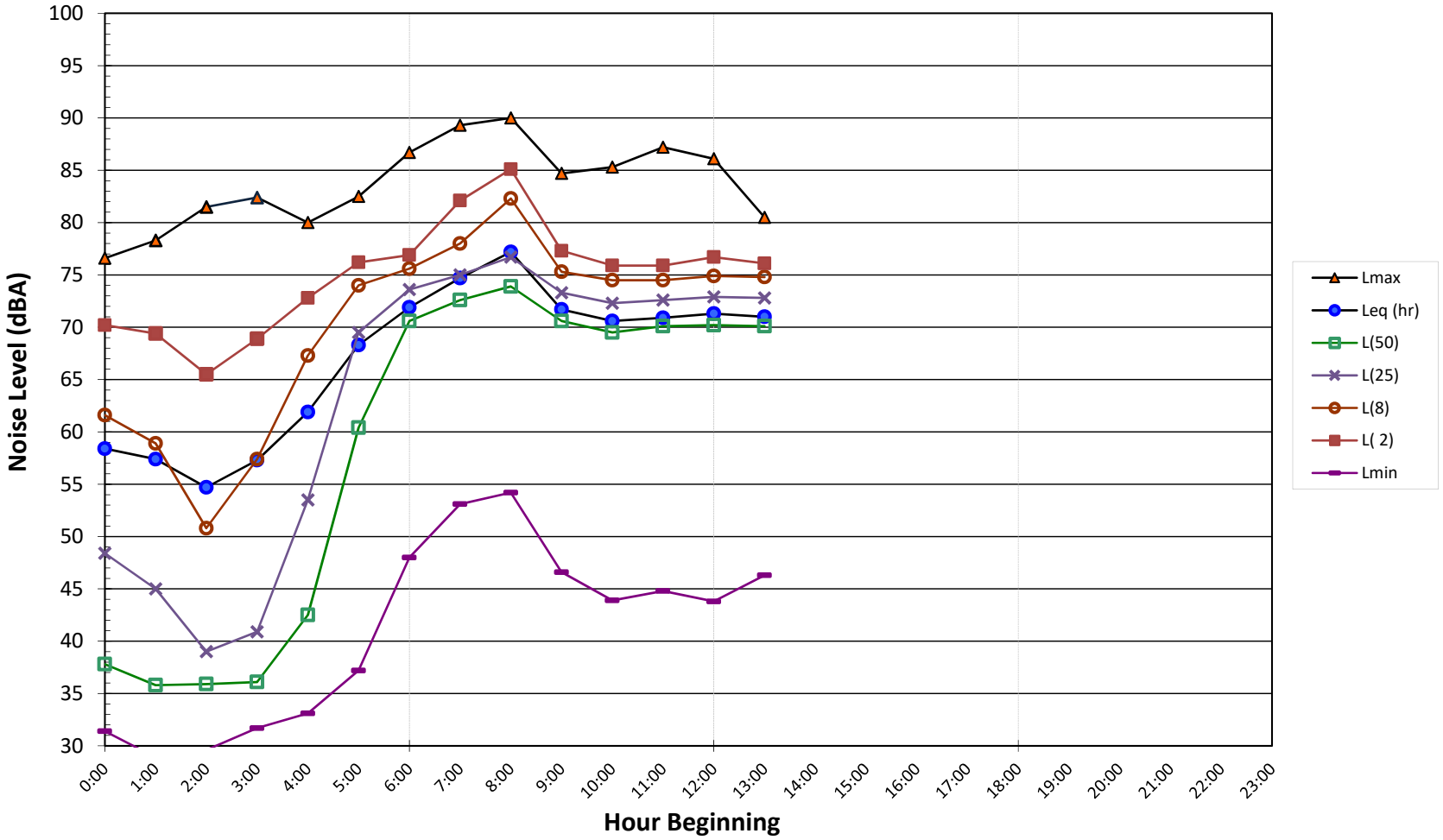


Noise Levels at Location LT-3
Brea 265 Specific Plan - Brea, CA
Thursday, March 14, 2019



CNEL = 74 dBA

Noise Levels at Location LT-3
Brea 265 Specific Plan - Brea, CA
Friday, March 15, 2019



TRAFFIC NOISE INCREASE CALCULATIONS

Traffic Noise Calculator: FHWA 77-108 **Project Title: Brea 265 Specific Plan (Existing)**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour																		
ID	$L_{eq-24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	72.3	76.0	76.4	219	692	2189	Lambert Road	east of State College Boulevard	58,979	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
2	71.0	74.7	75.0	160	506	1599	Lambert Road	west of Pointe Drive	43,978	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
3	72.0	75.7	76.1	204	645	2040	Lambert Road	east of Associated Road	33,527	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
4	72.0	75.7	76.0	201	636	2012	Lambert Road	west of Santa Fe Road/Kraemer Boulevard	33,075	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
5	69.6	73.3	73.7	117	370	1171	Lambert Road	east of Kraemer Boulevard	19,651	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
6	69.4	73.2	73.5	113	357	1129	Lambert Road	west of Valencia Avenue	19,245	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
7	68.6	72.3	72.7	93	294	929	Carbon Canyon Road	east of Santa Fe Road	20,106	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	67.7	71.4	71.8	76	239	757	Kraemer Boulevard	south of Lambert Road	16,570	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
9	69.5	73.2	73.6	114	362	1145	Valencia Avenue	south of Lambert Road	24,760	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
10	69.5	73.2	73.5	113	358	1131	Birch Street	east of State College Boulevard	24,470	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
11	69.4	73.1	73.5	111	351	1108	Birch Street	east of S Associated Road	23,978	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
12	69.7	73.4	73.8	120	381	1204	Birch Street	east of N Associated Road	20,525	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
13	68.8	72.5	72.9	97	306	968	Birch Street	east of Kraemer Boulevard	16,499	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
14	69.7	73.4	73.8	120	379	1198	Kraemer Boulevard	south of Birch Street	19,688	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
15	68.7	72.4	72.8	95	300	949	Valencia Avenue	south of Birch Street/Rose Drive	12,759	50	0.0%	90.7%	5.6%	3.7%	75.0%	10.0%	15.0%	4	Hard	50	0	44
16	66.3	70.0	70.4	55	173	546	Rose Drive	east of Valencia Avenue	20,375	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
17	67.4	71.1	71.5	71	223	707	Rose Drive	north of Imperial Highway	19,746	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
18	73.1	76.9	77.2	265	837	2646	Imperial Highway	east of State College Boulevard	71,271	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
19	74.0	77.7	78.1	323	1021	3228	Imperial Highway	east of SR-57 NB Ramps	53,058	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
20	73.8	77.5	77.9	310	981	3102	Imperial Highway	east of Associated Road	50,984	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
21	73.8	77.6	77.9	311	984	3112	Imperial Highway	east of Castlegate Lane/Placentia Avenue	51,154	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
22	73.6	77.3	77.7	295	934	2953	Imperial Highway	east of Kraemer Boulevard	42,990	50	0.0%	92.8%	4.5%	2.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
23	73.1	76.8	77.2	261	825	2609	Imperial Highway	east of Valencia Avenue	43,618	50	0.0%	95.1%	3.2%	1.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
24	68.5	72.2	72.6	91	288	910	Kraemer Boulevard	south of Imperial Highway	19,689	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
25	63.2	66.9	67.3	27	85	267	Valencia Avenue	south of Imperial Highway	9,847	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
26	65.3	69.0	69.4	43	137	433	Valencia Avenue	south of Golden Avenue	9,365	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
27	66.0	69.7	70.1	52	163	515	Valencia Avenue	south of Bastanchury Road	11,149	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
28	67.2	70.9	71.3	67	211	667	Rose Drive	south of Bastanchury Road	18,646	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44

Traffic Noise Calculator: FHWA 77-108 **Project Title: Brea 265 Specific Plan (Existing with Project)**

	Output						Inputs													Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour																	
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	72.4	76.1	76.5	222	702	2219	Lambert Road	east of State College Boulevard	59,783	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
2	71.2	74.9	75.3	169	534	1688	Lambert Road	west of Pointe Drive	46,409	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
3	72.3	76.0	76.4	219	692	2188	Lambert Road	east of Associated Road	35,958	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
4	72.3	76.0	76.4	216	683	2160	Lambert Road	west of Santa Fe Road/Kraemer Boulevard	35,506	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
5	70.3	74.0	74.4	138	436	1378	Lambert Road	east of Kraemer Boulevard	23,123	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
6	70.3	74.0	74.4	138	436	1378	Lambert Road	west of Valencia Avenue	23,496	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
7	68.7	72.4	72.8	95	300	950	Carbon Canyon Road	east of Santa Fe Road	20,553	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	68.1	71.8	72.1	82	259	819	Kraemer Boulevard	south of Lambert Road	17,932	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
9	70.0	73.7	74.1	129	409	1293	Valencia Avenue	south of Lambert Road	27,975	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
10	69.5	73.3	73.6	116	366	1156	Birch Street	east of State College Boulevard	25,006	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
11	69.5	73.2	73.6	115	363	1148	Birch Street	east of S Associated Road	24,826	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
12	69.9	73.6	74.0	125	396	1254	Birch Street	east of N Associated Road	21,373	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
13	69.0	72.7	73.1	102	324	1023	Birch Street	east of Kraemer Boulevard	17,443	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
14	69.9	73.6	74.0	125	396	1251	Kraemer Boulevard	south of Birch Street	20,558	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
15	69.1	72.8	73.2	104	328	1036	Valencia Avenue	south of Birch Street/Rose Drive	13,926	50	0.0%	90.7%	5.6%	3.7%	75.0%	10.0%	15.0%	4	Hard	50	0	44
16	66.9	70.6	71.0	63	198	626	Rose Drive	east of Valencia Avenue	23,347	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
17	67.9	71.7	72.0	80	253	800	Rose Drive	north of Imperial Highway	22,359	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
18	73.2	76.9	77.2	265	839	2652	Imperial Highway	east of State College Boulevard	71,449	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
19	74.0	77.8	78.1	326	1031	3259	Imperial Highway	east of SR-57 NB Ramps	53,574	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
20	73.9	77.6	78.0	314	992	3136	Imperial Highway	east of Associated Road	51,546	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
21	73.9	77.6	78.0	315	997	3154	Imperial Highway	east of Castlegate Lane/Placentia Avenue	51,836	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
22	73.7	77.4	77.8	302	954	3016	Imperial Highway	east of Kraemer Boulevard	43,906	50	0.0%	92.8%	4.5%	2.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
23	73.1	76.8	77.2	264	836	2643	Imperial Highway	east of Valencia Avenue	44,194	50	0.0%	95.1%	3.2%	1.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
24	68.7	72.4	72.8	94	299	944	Kraemer Boulevard	south of Imperial Highway	20,427	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
25	63.4	67.1	67.5	28	89	282	Valencia Avenue	south of Imperial Highway	10,404	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
26	65.5	69.2	69.6	46	145	459	Valencia Avenue	south of Golden Avenue	9,922	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
27	66.1	69.8	70.2	52	166	524	Valencia Avenue	south of Bastanchury Road	11,327	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
28	67.5	71.2	71.6	72	228	722	Rose Drive	south of Bastanchury Road	20,164	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44

Traffic Noise Calculator: FHWA 77-108 **Project Title: Brea 265 Specific Plan (Buildout w/o Project)**

	Output						Inputs													Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour																	
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	72.9	76.7	77.0	253	800	2529	Lambert Road	east of State College Boulevard	68,125	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
2	71.4	75.1	75.5	176	555	1755	Lambert Road	west of Pointe Drive	48,264	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
3	72.4	76.1	76.4	220	697	2205	Lambert Road	east of Associated Road	36,242	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
4	72.4	76.1	76.5	223	704	2225	Lambert Road	west of Santa Fe Road/Kraemer Boulevard	36,575	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
5	70.1	73.8	74.1	130	411	1299	Lambert Road	east of Kraemer Boulevard	21,793	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
6	69.9	73.6	74.0	125	395	1248	Lambert Road	west of Valencia Avenue	21,278	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
7	69.4	73.1	73.5	112	353	1117	Carbon Canyon Road	east of Santa Fe Road	24,159	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	68.3	72.0	72.4	87	275	870	Kraemer Boulevard	south of Lambert Road	19,043	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
9	69.6	73.3	73.7	117	369	1167	Valencia Avenue	south of Lambert Road	25,252	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
10	70.0	73.7	74.1	129	408	1289	Birch Street	east of State College Boulevard	27,884	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
11	69.8	73.5	73.8	121	384	1213	Birch Street	east of S Associated Road	26,245	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
12	70.3	74.0	74.4	136	431	1363	Birch Street	east of N Associated Road	23,240	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
13	69.1	72.8	73.2	104	329	1042	Birch Street	east of Kraemer Boulevard	17,760	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
14	70.2	73.9	74.3	134	423	1338	Kraemer Boulevard	south of Birch Street	22,001	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
15	69.3	73.0	73.4	109	344	1088	Valencia Avenue	south of Birch Street/Rose Drive	14,623	50	0.0%	90.7%	5.6%	3.7%	75.0%	10.0%	15.0%	4	Hard	50	0	44
16	66.7	70.4	70.8	60	188	596	Rose Drive	east of Valencia Avenue	22,219	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
17	68.0	71.7	72.1	81	255	808	Rose Drive	north of Imperial Highway	22,564	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
18	73.9	77.6	78.0	317	1004	3175	Imperial Highway	east of State College Boulevard	85,523	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
19	74.6	78.3	78.7	369	1167	3691	Imperial Highway	east of SR-57 NB Ramps	60,672	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
20	74.5	78.2	78.6	361	1142	3610	Imperial Highway	east of Associated Road	59,337	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
21	74.4	78.1	78.5	351	1109	3508	Imperial Highway	east of Castlegate Lane/Placentia Avenue	57,657	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
22	74.1	77.8	78.2	327	1033	3268	Imperial Highway	east of Kraemer Boulevard	47,570	50	0.0%	92.8%	4.5%	2.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
23	73.5	77.2	77.6	289	915	2894	Imperial Highway	east of Valencia Avenue	48,376	50	0.0%	95.1%	3.2%	1.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
24	69.0	72.7	73.1	103	324	1026	Kraemer Boulevard	south of Imperial Highway	22,184	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
25	63.9	67.6	68.0	31	99	312	Valencia Avenue	south of Imperial Highway	11,495	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
26	65.8	69.5	69.9	49	155	490	Valencia Avenue	south of Golden Avenue	10,608	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
27	66.6	70.3	70.7	59	186	587	Valencia Avenue	south of Bastanchury Road	12,693	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
28	67.5	71.2	71.6	72	229	723	Rose Drive	south of Bastanchury Road	20,197	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44

Traffic Noise Calculator: FHWA 77-108 **Project Title: Brea 265 Specific Plan (Buildout with Project)**

	Output						Inputs													Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour																	
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	73.0	76.7	77.1	256	809	2559	Lambert Road	east of State College Boulevard	68,929	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
2	71.6	75.3	75.7	184	583	1844	Lambert Road	west of Pointe Drive	50,695	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
3	72.6	76.3	76.7	235	744	2353	Lambert Road	east of Associated Road	38,673	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
4	72.7	76.4	76.8	237	750	2373	Lambert Road	west of Santa Fe Road/Kraemer Boulevard	39,006	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
5	70.7	74.4	74.8	151	476	1506	Lambert Road	east of Kraemer Boulevard	25,265	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	5	Hard	50	0	56
6	70.7	74.4	74.8	150	473	1497	Lambert Road	west of Valencia Avenue	25,529	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
7	69.5	73.2	73.6	114	360	1138	Carbon Canyon Road	east of Santa Fe Road	24,606	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	68.6	72.3	72.7	93	295	932	Kraemer Boulevard	south of Lambert Road	20,405	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
9	70.1	73.8	74.2	132	416	1316	Valencia Avenue	south of Lambert Road	28,467	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
10	70.1	73.8	74.2	131	415	1314	Birch Street	east of State College Boulevard	28,420	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
11	69.9	73.6	74.0	125	396	1252	Birch Street	east of S Associated Road	27,093	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
12	70.4	74.1	74.5	141	447	1413	Birch Street	east of N Associated Road	24,088	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
13	69.3	73.0	73.4	110	347	1097	Birch Street	east of Kraemer Boulevard	18,704	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
14	70.4	74.1	74.4	139	440	1391	Kraemer Boulevard	south of Birch Street	22,871	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
15	69.6	73.3	73.7	117	371	1174	Valencia Avenue	south of Birch Street/Rose Drive	15,790	50	0.0%	90.7%	5.6%	3.7%	75.0%	10.0%	15.0%	4	Hard	50	0	44
16	67.2	70.9	71.3	68	214	676	Rose Drive	east of Valencia Avenue	25,191	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	3	Hard	50	0	32
17	68.5	72.2	72.6	90	285	901	Rose Drive	north of Imperial Highway	25,177	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
18	73.9	77.7	78.0	318	1006	3182	Imperial Highway	east of State College Boulevard	85,701	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
19	74.6	78.3	78.7	372	1177	3722	Imperial Highway	east of SR-57 NB Ramps	61,188	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
20	74.5	78.2	78.6	364	1152	3644	Imperial Highway	east of Associated Road	59,899	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
21	74.4	78.1	78.5	355	1122	3549	Imperial Highway	east of Castlegate Lane/Placentia Avenue	58,339	50	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	6	Hard	50	0	68
22	74.1	77.9	78.2	333	1053	3330	Imperial Highway	east of Kraemer Boulevard	48,486	50	0.0%	92.8%	4.5%	2.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
23	73.6	77.3	77.7	293	926	2928	Imperial Highway	east of Valencia Avenue	48,952	50	0.0%	95.1%	3.2%	1.7%	75.0%	10.0%	15.0%	6	Hard	50	0	68
24	69.2	72.9	73.3	106	335	1060	Kraemer Boulevard	south of Imperial Highway	22,922	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
25	64.1	67.8	68.2	33	103	327	Valencia Avenue	south of Imperial Highway	12,052	35	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
26	66.0	69.8	70.1	52	163	516	Valencia Avenue	south of Golden Avenue	11,165	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
27	66.7	70.4	70.8	60	188	595	Valencia Avenue	south of Bastanchury Road	12,871	45	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
28	67.8	71.5	71.9	78	246	777	Rose Drive	south of Bastanchury Road	21,715	40	0.0%	95.4%	2.5%	2.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44

Appendix M Public Services Correspondence

Appendices

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Brea 265 Specific Plan
Fire Questionnaire

1. Is the Brea Fire Department the sole provider for fire protection and medical response service for the Project Area? Do other jurisdictions provide mutual aid? If so, who are they?

   Yes, Brea Fire Department is the sole provider for the project area. Mutual aid for the project area would be provided by the Orange County Fire Authority and Placentia Fire Department (After July 1, 2020).

2. What are the locations of first responding station(s) and what type of equipment and manpower/staffing does each station have?

   See Table 5.15-1 on page 5.15-2 of the Brea 265 Specific Plan DEIR for revised equipment and staffing for each station.

3. What is the department's standard or goal for desired response time for emergency and non-emergency calls? What is the average response time in the Project Area for emergency and non-emergency calls?

   The response times indicated in the DEIR on page 5.15-3 are current.

   Although the response times indicated are the standard and goal of the department, the proposed project area is not developed and currently, not allowing for any response time data for the proposed area.

4. Are there any existing deficiencies in the level of fire protection service currently provided to the area including and surrounding the Project Area?

   The location of Station #4 routinely experiences increased response times based on the time of day due to increased commuter traffic (restricted ingress/egress). Carbon Canyon Road is two lanes (one in each direction) and the increased amount of vehicles on the road causes delayed response times. With the additional development for this proposed project, we expect this routine issue to be compounded exponentially.

5. What impact will the Proposed Project, in combination with all the other projects planned in the area, have on the ability of the Fire Department to provide fire protection services in the City?

   The location of Fire Station #4 respective to the project area, restricted ingress and egress through the canyon (one lane in each direction) and the understaffing of the second due apparatus for structural firefighting, all provide a formula for inability to respond an effective firefighting force to the addition of 1100 residential structures in the area. First arriving personnel have to wait for second unit to arrive before interior firefighting operations can ensue, which will be restricted by the additional traffic and lack of appropriate staffing to meet this new demand in the area.

6. Please summarize any plans the Fire Department has for fire service facilities or expanded capacity (personnel, equipment), if any, that would serve the Project Area.

No current plans at this time.

7. Does the Fire Department anticipate that the Proposed Project will require a new or expanded fire station(s)? What type of new or expanded fire facilities (e.g., fire station, new equipment, vehicles, etc.) or personnel will be necessary?

   The recommendation is for the relocation and adequate up-staffing of Fire Station #4 to reduce the response time to the proposed area and better serve the newly developed community in all realms of public safety. In addition, identifying locations for Heli-Hydrant fire protection tanks as a means of immediate dipping sites for aerial firefighting aircraft tasked with responding to wild fires in the hills immediately to the north of the proposed site.

8. What are some of the conditions of approval that the Fire Department will require or recommended to reduce fire hazards and reduce potential impacts on fire service?

   Along with the required regulatory requirements, the Fire Department would require the relocation of Fire Station #4 and provide adequate level of staffing to meet community needs for fire protection and related emergency services. Also recommend an update to the emergency response plan to include the 1100 residences and citizens for an evacuation plan in an emergency.

9. How does the Fire Department get funded for new facilities and staffing? Development impact fees? General funding?

   Funding for new facilities and staffing is from the General Fund. Development Fire impact fees which are accrued via developments such as this can only be used for the purchase of new programs/equipment not previously employed by the department. Impact funds cannot be used for the replacement of preexisting equipment or relocation of stations, etc.

10. Please add any other comments you may wish to make regarding this project.

    In addition to the impacts mentioned above, the Fire Command staff identified the following additional impacts with the proposed project area:

    - Increase in traffic.
    - Increase in call volume.
    - Ingress & egress in and around the surrounding roads that would increase response times.
    - Current staffing not adequate to provide effective firefighting force for number of new structures
    - An increased exposure to Wildland Fires due to the project area designated as a Very High Fire Hazard Severity Zone.

Response Prepared By:

Chris Nigg / Peter Salgado	Fire Division Chief / Fire Protection Analyst
Name	**Title**
Brea Fire Department	2/12/2020
Agency	**Date**

Brea 265 Specific Plan
Police Questionnaire

1. Please indicate which police station would serve the Proposed Project and existing staffing at the responsible police station. For the entire city?

   The main Brea Police Department station located within the Brea Civic and Cultural Center would serve the project area. The station address is 1 Civic Center Circle, Brea. The existing staffing levels for the Brea Police Department are 61 full-time sworn police officers, 29 full-time non-sworn employees, and 19 part-time non-sworn employees. The facility and staff serves the entire City.

2. What is the Department's standard for desired response time for emergency and non-emergency calls? What is the current response time in the Specific Plan Area?

   The Department's desired emergency response time is three minutes, thirty seconds. Non-emergency response times are on average 6 minutes or greater depending on the call nature and call volume. This includes the project area.

2. Please indicate the type of service calls or service demands anticipated by the proposed residential uses.

   By measuring nearby similar project areas, it is estimated that 400-450 police incidents per year would be generated in this project area. This includes crimes, calls for service, and officer-initiated actions. Projected types of incidents would include burglary, theft, alarm activations, disturbances, suspicious persons and vehicles, traffic and parking complaints, and traffic enforcement.

3. What is the Department's standard for desired policeman per population (e.g., one policeman per 1,000 residents)? What is the current ratio?

   The Brea Police Department has no official standard ratio. The current ratio is approximately 1.4/1,000. The department is undergoing a staffing needs analysis provided by a consultant. The completed analysis will make recommendations for staffing adjustments, and the analysis will include data from the proposed project area as a factor. It is expected this analysis and final report will be completed by January 2020.

4. What impact will the Proposed Project, in combination with all the other projects planned in the area, have on the ability of the Department to provide police services in the area? What type of new facilities, equipment, or number of staffing will be necessary?

   The Project will definitely increase the service demand load on all Police Department operations. A development of this size can be expected to increase calls for service, total numbers of crimes, increased officer initiated activity (traffic enforcement, preventative patrol, etc), increase 9-1-

1 calls into our Communications Center, and increased need for community outreach. With no additional resources, existing resources will be taxed with those new services in addition to existing demands. While it is not anticipated that any new facilities will be necessary, additional staffing and associated equipment is likely to be necessary. The extent of additional needs is unknown at this time. This is not limited to field resources, but also includes support services. Again, the pending staffing needs analysis should provide guidelines.

5. What conditions and/or programs will the Department require or recommended to reduce safety hazards and reduce potential impacts on police service?

In the department's experience with similar, recent developments, there are some recommendations related to design and infrastructure of the project area. The department recommends there be no gated access points to any parts of the project. Gates are a hindrance to emergency response and deter preventative patrols. Individual mailboxes are recommended rather than gang mailboxes due to mail theft vulnerability. All common areas should be heavily lit, and we recommend all trail/park areas be plumbed for potential future surveillance camera locations. The maximum amount of off-street parking that is available and reasonable is recommended. The department would like to be consulted on street addressing and signage, particularly in high density areas of the project. Finally, the intersection of Lambert/Valencia, already heavily impacted with commuter traffic, may need to be re-engineered to allow greater flow and deter unsafe driving habits. This would require Cal Trans consultation since the intersection is part of State Highway 142.

7. Are there any ordinance or required standards for Crime Prevention Through Environmental Design (CPTED) to reduce potential criminal activities in the City?

The City of Brea has no ordinances or required standards directly related to CPTED.

8. How does the Department get funding for new facilities and staffing (e.g., development impact fees, general funding, special assessment fees, etc.). Please indicate development impact fee structure, if there is one.

Question is better answered by the City's Community Development Department, Planning Division and/or Administrative Services Department, Finance.

9. Please add any comments you may wish to make regarding this matter.

N/A

Response Prepared By:

John Burks	Chief of Police
Name	**Title**
Brea Police Department	June 13, 2019
Agency	**Date**

Appendix N Traffic Study

Appendices

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LINSCOTT LAW & GREENSPAN engineers

TRAFFIC CIRCULATION ANALYSIS

BREA 265 SPECIFIC PLAN

Brea, California
February 8, 2022

Prepared for:

PLACEWORKS
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LLG Ref. 2-18-4052-1



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APPENDIX

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TRAFFIC CIRCULATION ANALYSIS

BREA 265 SPECIFIC PLAN

Brea, California
February 8, 2022

1.0 INTRODUCTION

This Traffic Circulation Analysis report addresses the potential traffic and circulation needs associated with Brea 265 Specific Plan Project (hereinafter referred to as Project) in the City of Brea. The Project consists of the development of a mix of single family and multifamily residential units totaling 1,100 dwelling units along with a 13.0-acre sports park. The proposed Project is generally located east of the State Route (SR) 57 Freeway and north of SR-90 (Imperial Highway), towards the eastern portion of the City. The Project is expected to be developed in several phases with the Year 2035 utilized to assess the Project, at full occupancy, within a near-term cumulative traffic setting.

1.1 Scope of Work

This traffic circulation report documents the findings and recommendations of a traffic analysis conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the need for potential offsite improvements to offset Project's potential negative effect in the City's traffic circulation system. The traffic analysis evaluates the existing operating conditions at twenty-two (22) key study intersections within the project vicinity, estimates the trip generation potential of the proposed Project, and forecasts future near-term (Year 2035) and General Plan Buildout (Year 2045) operating conditions without and with the proposed Project. Where necessary, intersection improvements are identified.

This traffic report satisfies the traffic requirements of the City of Brea and is consistent with the current *Congestion Management Program (CMP) for Orange County.* The Scope of Work for this traffic study is included in ***Appendix A*** and was developed in conjunction with City of Brea Public Works Department staff.

The project site has been visited and an inventory of adjacent area roadways and intersections was performed. Existing weekday peak hour traffic count information has been collected at twenty-two (22) key study intersections for use in the preparation of intersection Level of Service (LOS) calculations. Information concerning cumulative projects (planned and/or approved) in the vicinity of the proposed Project has been researched at the Cities of Brea, Fullerton, Placentia, Yorba Linda, and Chino Hills. Based on our research, there are twenty-three (23) related projects in the City of Brea, two (2) related projects in Fullerton, and eight (8) related projects in the City of Chino Hills. The thirty-three (33) related projects were considered in the near-term cumulative traffic analysis for this project.

This traffic report analyzes existing and future weekday daily, AM peak hour and PM peak hour traffic conditions for a near-term (Year 2035) and long-term (Year 2045) traffic setting upon

completion of the proposed Project. Near-term (Year 2035) cumulative daily and peak hour traffic forecasts were projected by incorporating a one percent (1.0%) annual growth rate and the trip generation potential of thirty-three (33) related projects. General Plan Buildout (Year 2045) daily and peak hour traffic forecasts were projected based on traffic projections prepared by OCTA utilizing the OCTAM 5.0 Year 2045 Model.

1.2 Study Area

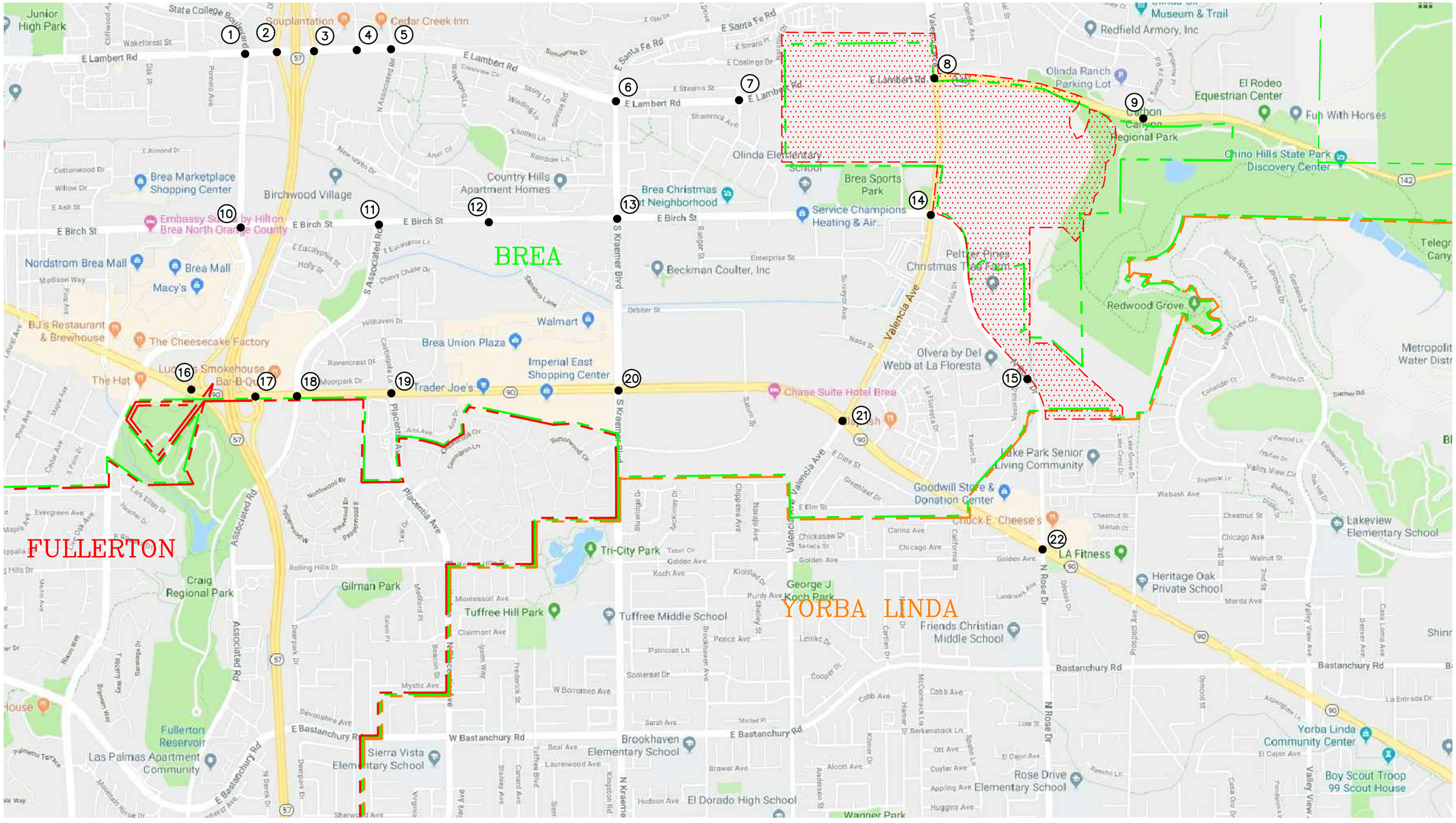
Twenty-two (22) study intersections have been identified for evaluation in collaboration with City of Brea staff. The twenty-two (22) intersections listed below provide regional and local access to the study area and define the extent of the boundaries for this traffic analysis, as well as identifies the applicable jurisdiction and/or City location.

Study Intersection	Applicable Jurisdiction (City Location)		
	Caltrans	City of Brea	City of Placentia
1. State College Boulevard at Lambert Road	--	Brea	--
2. SR-57 SB Ramps at Lambert Road	Caltrans (Brea)	--	--
3. SR-57 NB Ramps at Lambert Road	Caltrans (Brea)	--	--
4. Pointe Drive at Lambert Road	--	Brea	--
5. Wildcat Way/N Associated Road at Lambert Road	--	Brea	--
6. Santa Fe Road/Kraemer Boulevard at Lambert Road	--	Brea	--
7. Sunflower Street at Lambert Road	--	Brea	--
8. Valencia Avenue at Lambert Road/Carbon Canyon Road	Caltrans (Brea)	--	--
9. Santa Fe Road at Carbon Canyon Road	Caltrans (Brea)	--	--
10. State College Boulevard at Birch Street	--	Brea	--
11. S Associated Road at Birch Street	--	Brea	--
12. N Associated Road at Birch Street	--	Brea	--
13. Kraemer Boulevard at Birch Street	--	Brea	--
14. Valencia Avenue at Birch Street/Rose Drive	Caltrans (Brea)	--	--
15. Rose Drive at Vesuvius Drive		Brea	--
16. SR-57 SB Ramps at Imperial Highway	Caltrans (Brea)	--	--
17. SR-57 NB Ramps at Imperial Highway	Caltrans (Brea)	--	--
18. Associated Road at Imperial Highway	Caltrans (Brea)	--	--
19. Castlegate Lane/Placentia Avenue at Imperial Highway	Caltrans (Brea)	--	--
20. Kraemer Boulevard at Imperial Highway	Caltrans (Brea)	--	--
21. Valencia Avenue at Imperial Highway	Caltrans (Brea)	--	--
22. Rose Drive at Imperial Highway	--	--	Caltrans (Placentia)

Figure 1-1 presents a Vicinity Map, which illustrates the general location of the Project and depicts the study locations and surrounding street system. The Level of Service (LOS) investigations at these study locations were used to evaluate the potential traffic effect on the circulation system associated with area growth, cumulative projects and the proposed Project. When necessary, this report recommends intersection and/or roadway improvements that may be required to accommodate future traffic volumes and restore/maintain an acceptable Level of Service.

Included in this Traffic Circulation Analysis are:

- Existing traffic counts,
- Estimated project traffic generation/distribution/assignment,
- Estimated cumulative project traffic generation/distribution/assignment,
- Weekday AM and PM peak hour capacity analyses for existing conditions,
- Weekday AM and PM peak hour capacity analyses for future near-term (Year 2035) traffic conditions without and with the proposed Project,
- Weekday AM and PM peak hour capacity analyses for General Plan Buildout (Year 2045) traffic conditions without and with the proposed Project,
- Intersection Vehicle Queuing Evaluation,
- Site Access and Internal Circulation Evaluation,
- Area-Wide Traffic Improvements,
- Redbay Avenue at Birch Street Focused Assessment, and
- Voyager Avenue at Birch Street and N. Associated Road at Birch Street Focused Assessment.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 1

VICINITY MAP

BREA 265 SPECIFIC PLAN, BREA

2.0 PROJECT DESCRIPTION

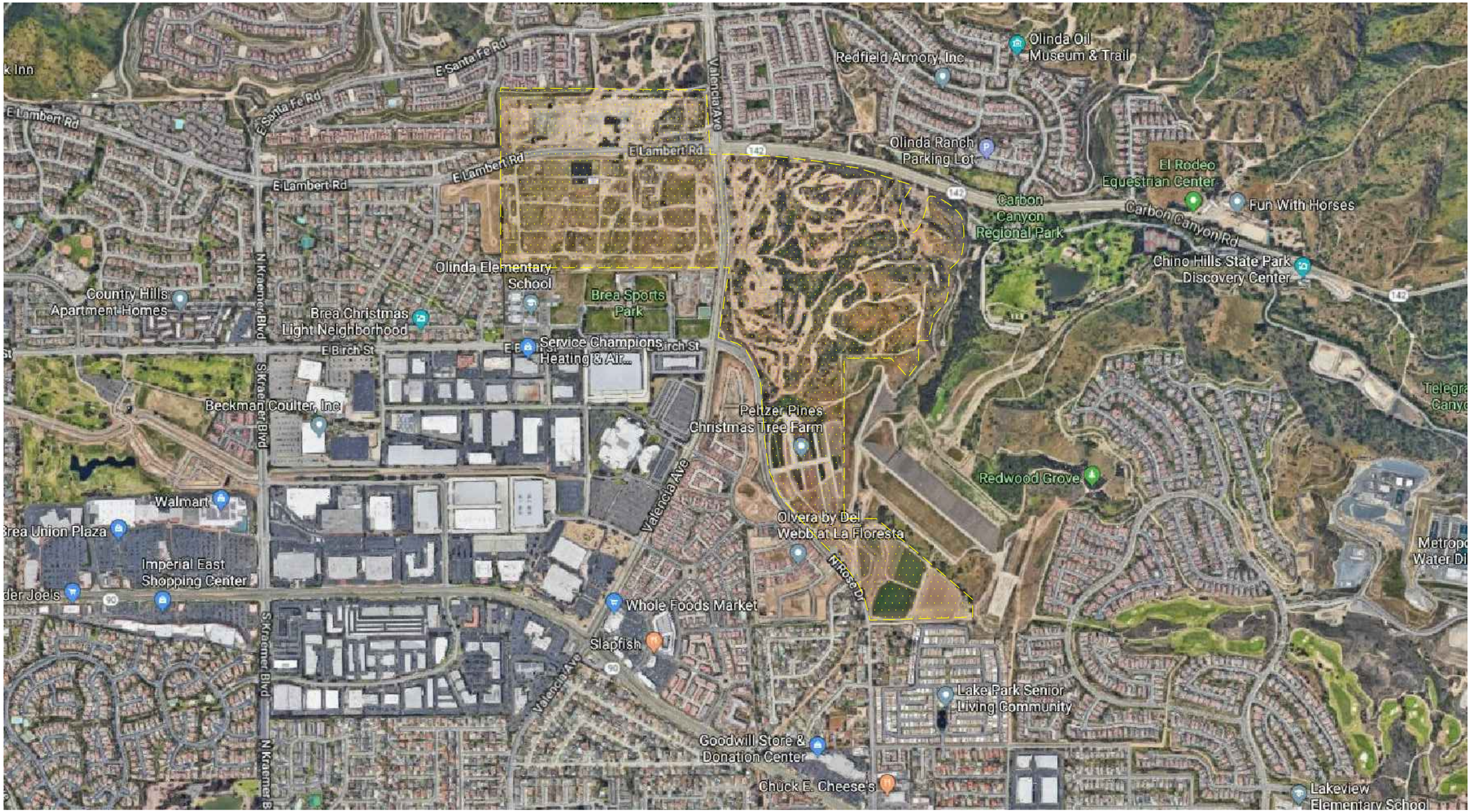
The Brea 265 Specific Plan is a master planned residential community consisting of 260.7 acres located in the City of Brea and unincorporated Orange County; although not a part of the Specific Plan, an additional 1.4 acres of open space located on the northeast corner of Valencia Avenue and Rose Drive has been included this resulting in a total overall acreage of 262.1 acres. The proposed Project is generally located east of the State Route (SR) 57 Freeway and north of SR-90 (Imperial Highway), towards the eastern portion of the City and is surrounded by existing residential neighborhood communities, the Brea Sports Park and Carbon Canyon Regional Park. The Specific Plan area is bisected by Valencia Avenue which runs in a north-south direction, and by Lambert Road which runs in an east-west direction. The Project site is located to the south of Lambert Road/Carbon Canyon Road, north of Rose Drive, east of Valencia Avenue and west of Carbon Canyon Regional Park. Of the 217.7 acres located within unincorporated Orange County, 123.2 acres is currently designated as "Hillside Residential" and 94.5 acres is designated as "Low Density Residential" land use in the City's General Plan. The 43-acre portion of the Project that is located within the City is designated as "Hillside Residential". ***Figure 2-1*** is an existing aerial photograph of the Project site.

2.1 General Plan Zoning

As noted above, the Project's General Plan zoning for the site is to be developed with 166.2 acres of "Hillside Residential" uses, which equates to 332 single family dwelling units (DU) at an assumed density of 2 DU per acre (166.2 acres x 2 DU/acre). For 94.5 acres of "Low Density Residential" use, the Project is zoned to allow development with a maximum density of up to 6 DU per acre. However, based on surrounding residential development, a density of 3 DU per acre has been utilized for the "Low Density Residential" uses, which translates to 283 single family dwelling units (94.5 acres x 3 DU/acre). Therefore, the Project site has a zoning development of up to 615 single family dwelling units.

2.2 Proposed Project

The proposed Project is a master planned residential community of low-density, medium-density, and high-density residential neighborhoods, parks, recreational amenities, and open space within thirteen (13) planning areas (PA) of the proposed specific plan. The Project will include a mix of approximately 1,100 residential dwelling units on 197.5 acres, up to 15.1 acres of parks/recreations uses, including up to 13 acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.1-acre Trail Staging Area, and 47.5 acres of open space/slopes. The proposed Project allows for a fire station and police substation on a 1.0 acre site on the northwest corner of Lambert and Valencia. Inclusion of 2.0 acres of Master Plan Right-of-way results in a total project acreage of 262.1 acres. Affordable housing units are also included as part of the total dwelling units proposed for the Project. The proposed Project would be developed and constructed in three (3) phases based on oil field abandonment, remediation, and construction of necessary infrastructure, as well as market conditions. The proposed land uses would be linked together by an extensive trail network that will connect to the Tracks at Brea and other regional systems, as well as to the adjacent neighborhoods and off-site parks, open space, and surrounding employment centers and retail venues.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

= PROJECT SITE

FIGURE 2-1

EXISTING SITE AERIAL

BREA 265 SPECIFIC PLAN, BREA

Per the Project's development tabulation, two (2) residential land use categories are proposed and consists of 450 "low density" DU, and 650 "medium density" DU, with 15.1 acres of parks/recreations uses, including up to 13 acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.1-acre Trail Staging Area. From review of the Project's details, the above-referenced land uses translate to the development of 450 single family detached DU, and 650 single family attached DU (i.e. townhomes, row homes, detached cluster homes, attached motor court homes, etc.). The proposed Sports Park component of the Project is essentially an expansion of the existing Brea Sports Park, that together will provide the Brea community and new residents of the Project with recreational opportunities.

For the purposes of this analysis, the Project site was split into three (3) zones. Zone 1 is the portion of the Project site located north of Lambert Road. Zone 2 is the portion located south of Lambert Road, west of Valencia Avenue (includes proposed Sports Park). Zone 3 is the portion located east of Valencia Avenue and east of Rose Drive. ***Table 2-1*** provides the Project development summary. ***Figure 2-2*** illustrates the Brea Specific Plan Land Use Plan for the Project. This figure generally illustrates the Parks and Open Space plan for the Project as well.

For our understanding, units may be transferred between land use designations and locations so long as the total number of units does not exceed 1,100 units and the number of units in the planning area does not exceed the maximum number of dwelling units per acre permitted for the planning area's land use designation.

The Project is expected to be completed in three (3) phases over the next several years or so by Year 2030 but is dependent on several factors, including the timing of Project approval. Project funding, market conditions and/or the current COVID-19 environment which could delay Project completion. Due the current COVID-19 pandemic, the Project, like most other proposed development, have experienced delays. As such, Year 2035 has been utilized to assess the Project's potential effect (full buildout/occupancy) on the City's circulation system within a near-term traffic setting.

2.3 Vehicular Site Access

As a part of the development of the Project, vehicular access to the Project from the public streets bordering the subject property will be provided via one (1) full access signalized driveway on Lambert Road, one (1) full access signalized driveway on Valencia Avenue, one (1) full access signalized driveway on Rose Drive, and one (1) full access signalized driveway at the existing intersection of Rose Drive at Vesuvius Drive. Vehicular circulation internal to the various proposed neighborhoods will be provided by a system of local residential streets. ***Figure 2-3*** illustrates the Project-sponsored proposed intersection lane configurations and traffic controls for the Project's vehicular access points noted above.

For the proposed Sports Park, primary vehicular access will be provided via the proposed signalized Project entries on Valencia Avenue and on Lambert Road, with additional vehicular access provided through the existing Brea Sports Park via the unsignalized easterly park driveway located on Birch Street. The "loop" road, which now serves as a "fire lane" and is used by authorized park service

Table 3-1 Proposed Land Use Summary

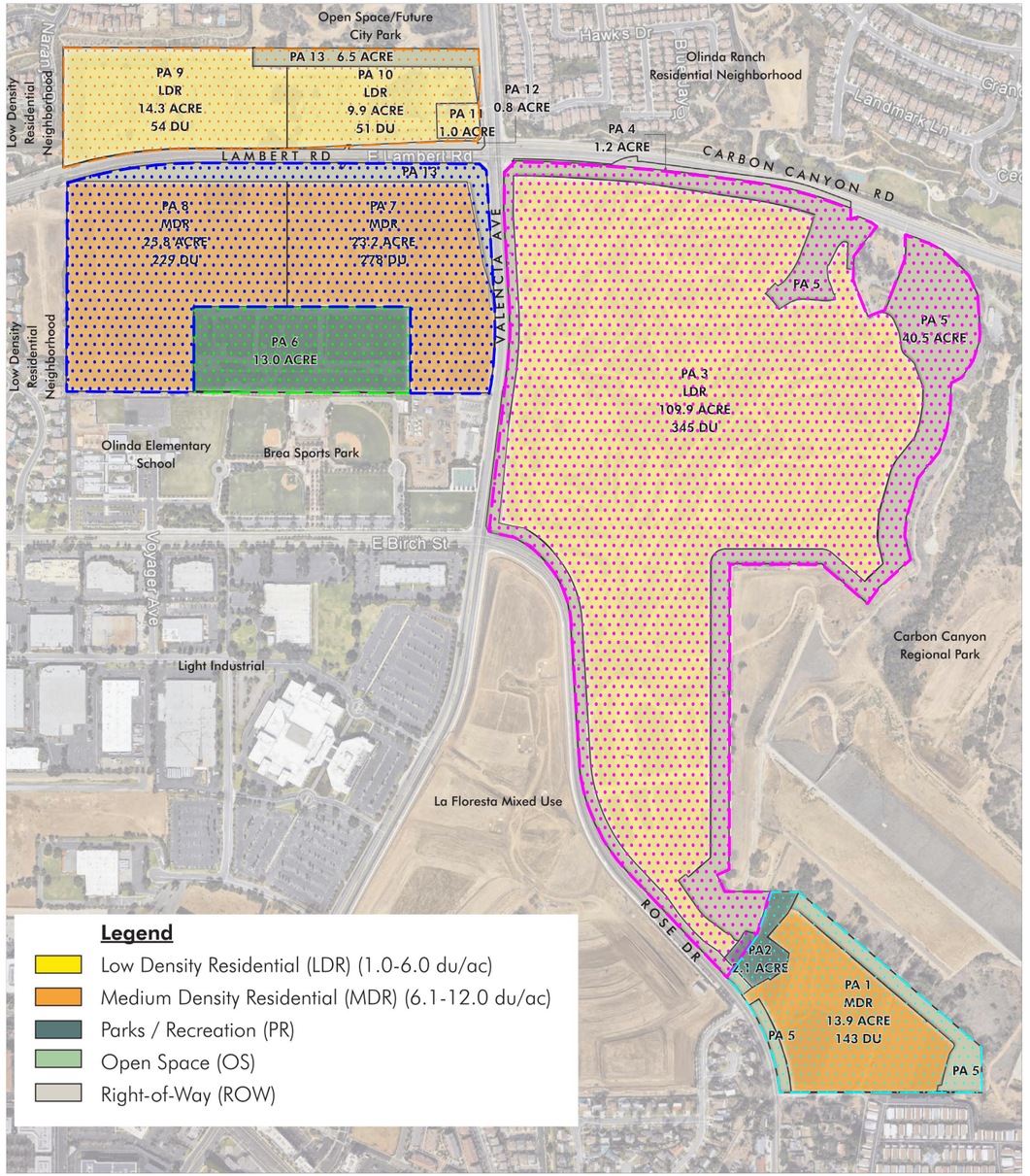
Land Use	Gross Area (Acres)	Density Range (DU/AC)	Dwelling Units
Residential[1]			
Low Density Residential (LDR)	134.6	1.0–6.0	450
Medium Density Residential (MDR)	62.9	6.1–12.0	650
Residential Subtotal	197.5		1,100
Nonresidential			
Park/Recreation (PR)	15.1	—	—
Open Space (OS)[2]	47.5	—	—
Master Plan Right-of-Way	2.0	—	—
Nonresidential Subtotal	64.6	—	—
Total	262.1 acres	4.2	1,100 units

[1] Units may be transferred between density designations and locations.
[2] Open Space category does not include private open space and recreation areas.

Table 3-2 Proposed Land Use Category Statistical Summary by Planning Area

Planning Area (PA)	Land Use Category	Gross Area (AC)	Density Range (DU/AC)[1]	Target Density (DU/AC)[2]	Dwelling Units (DU)[3]
1	MDR	13.9	6.1–12.0	10.3	143
2	PR	2.1	—	—	—
3	LDR	109.4	1.0–6.0	3.2	345
4	ROW	1.2	—	—	—
5	OS	40.5	—	—	—
6	PR	13.0	—	—	—
7	MDR	23.2	6.1–12.0	12.0	278
8	MDR	25.8	6.1–12.0	8.9	229
9	LDR	14.3	1.0–6.0	3.8	54
10	LDR	9.9	1.0–6.0	5.2	51
11[4]	LDR	1.0	1.0–6.0	—	—
12	ROW	0.8	—	—	—
13	OS	6.5	—	—	—
	Specific Plan Total	**262.1 acres**		**4.2**	**1,100**

[1] Density Range is the range between the minimum and maximum number of dwelling units per acre permitted for the planning area's land use designation, as defined by the Orange County General Plan.
[2] Target Density is the number of dwelling units per acre for the planning area as proposed by the Brea 265 Specific Plan and described in Table 3-2 of the Brea 265 Specific Plan). The proposed number of dwelling units in an implementing subdivision application may exceed the target density specified in any planning area without necessitating the preparation of a Specific Plan Amendment or Substantial Conformance provided that: 1) the proposed density transfer in the implementing subdivision application is within the density range for the planning area as described in Table 3-2 of the Brea 265 Specific Plan; and 2) the maximum number of 1,100 dwelling units for the entire Specific Plan is not exceeded.
[3] Transfer of dwelling units from one residential planning area to another within a residential land use category is permitted pursuant to the provisions in Section 6.3, Density Transfer, of the Brea 265 Specific Plan, provided that the maximum total of 1,100 dwelling units within the Brea 265 area is not exceeded.
[4] PA 11 provides for a reserved site for a public safety/civic uses within the time frame described in the Brea 265 Development Agreement. See Section 5.4.1 of the Brea 265 Specific Plan for permitted uses in the LDR residential category.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

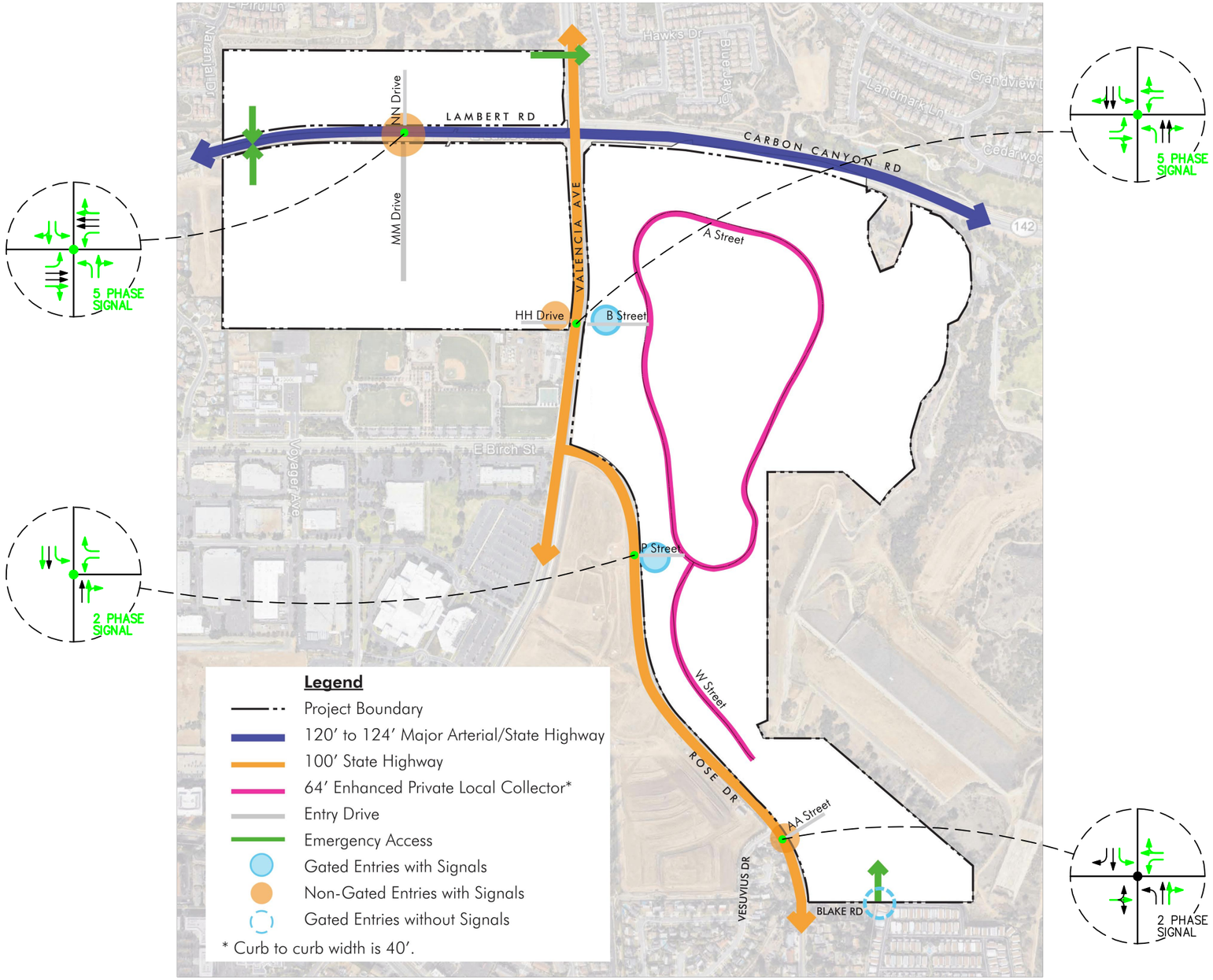
SOURCE: KTGY ARCHITECTURE+PLANNING

KEY
= ZONE 1
= ZONE 2A
= ZONE 2B
= ZONE 3A
= ZONE 3B

N-17

FIGURE 2–2

PROPOSED SITE PLAN
BREA 265 SPECIFIC PLAN, BREA



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: KTGY ARCHITECTURE+PLANNING

KEY

= APPROACH LANE ASSIGNMENT
= PROJECT SPECIFIC IMPROVEMENTS
= TRAFFIC SIGNAL, = STOP SIGN
= PROJECT SITE

FIGURE 2-3

CIRCULATION PLAN

BREA 265 SPECIFIC PLAN, BREA

vehicles, will be open to through traffic as well as provide for pedestrian and bicycle connectivity between the existing Brea Sports Park and this project component.

2.3.1 *Project Design Features*

In conjunction with access improvements noted above, inclusive of Project-sponsored traffic signals, proposed improvements to be completed as a part of the Project along Lambert Road, Carbon Canyon Road, Valencia Avenue and Rose Drive bordering the subject property include the following Project Design Features:

- Lambert Road, from Valencia Avenue west along Project frontage to just east of Sunflower Street - widen and construct Lambert Road along project frontage to Major Arterial Highway Standards per the City's requirements, providing three 12-foot travel lanes and an 8-foot bike lane in each direction, separated by a 14-foot median within 88-feet of paved width and a right-of way of 120-feet. Lambert Road currently includes two travel lanes in each direction, midblock along the Project frontage.

- Carbon Canyon Road (SR-142), from Valencia Avenue east along Project frontage - widen and construct the south side of Carbon Canyon Road along project frontage to ultimate half-section width per the City's Major Arterial Highway standard and provide three 12-foot travel lanes and an 8-foot bike lane in the eastbound direction, separated by a 14-foot median within 88-feet of paved width and a right-of way of 120-feet. Carbon Canyon Road currently includes three travel lanes, narrowing to two lanes in the easterly direction along the Project frontage.

- Valencia Avenue (SR-142), from Lambert Road/Carbon Canyon Road south to along project frontage - this state route is currently improved to the City's Primary Arterial standards, and now provides two travel lanes and an 8-foot bike lane in each direction, separated by a 14-foot median within 84-feet of paved width and a right-of way of 100-feet; no additional travel lanes are proposed with the Project.

- Rose Drive, from Valencia Avenue south along Project frontage to Vesuvius Drive - widen and construct the east side of Rose Drive along project frontage to Primary Arterial Standards per the City's requirements, providing two foot travel lanes and an 8-foot bike lane in the northbound, separated by a median within 42-feet of half-paved width and a 50-foot half right-of way. To achieve two southbound travels lane along the Project's entire frontage, modifications to the future median and/or lane widths may be needed. Subject to the City's review/approval, it is expected that the design of second southbound through lane will require motorist to merge left to continue through and be terminated as a right-turn lane at the intersection of Rose Drive and Vesuvius Drive to align with the existing southbound right-turn lane at this intersection. Rose Drive currently includes one travel lane in each direction and bike lanes, separated by a painted median.

Figure 2-3 illustrates the Project's Circulation Plan as presented in the Brea 265 Specific Plan.

2.4 Pedestrian and Bicycle Circulation

Pedestrian circulation will be provided via the existing sidewalk system. It should be noted that the existing public sidewalk currently terminates along Lambert Road at the western boundary of the Project site and at Carbon Canyon Road at the northeastern boundary of the Project site. The Project will construct sidewalks along the frontage with construction of the Project along Lambert Road, Carbon Canyon Road, and Rose Drive. The existing sidewalk system within the Project vicinity provides direct connectivity to the existing development located along major thoroughfares. Pedestrian access to the Project will be provided via the proposed Project driveways.

Existing pedestrian facilities within the project area are adequate. Sidewalks are generally provided throughout the City along with crosswalks at most major intersections. In close proximity to the site, Valencia Avenue, Lambert Road, and Imperial Highway provides pedestrians connectivity via the existing sidewalks linking the project site to the surrounding community. ***Figure 2-4*** illustrates the Non-Vehicular Circulation Plan that identifies the existing trails/sidewalks adjacent to the Project site and the proposed trails within the Project site as presented in the Brea 265 Specific Plan.

In addition to the trail and pedestrian connectivity proposed by the Project, a planned bikeway system will facilitate continuous bicycle access throughout the Project site, linking the site the current bicycle facilities in the immediate area. On-street bike plane will be provided on both sides of Lambert Road, Valencia Avenue, and Rose Drive, and on the south side of Carbon Canyon Road upon completion of proposed Project Design Features.

LEGEND

Public Multi-Purpose Trails:

20' Wide Dual Tread Multi-Purpose Trail
10' Asphalt + 10' D.G.

14' Wide Trail - AC Paving Center Striped
10' Asphalt + (x2) 2' Shoulder

On-street Bikeway

Existing Trail

N.A.P- Potential Future Trail Access

Pedestrian Under Crossing

Potential Future Access



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SOURCE: KTGY ARCHITECTURE+PLANNING

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 2-4

NON-VEHICULAR CIRCULATION PLAN

BREA 265 SPECIFIC PLAN, BREA

TABLE 2-1

PROJECT DEVELOPMENT SUMMARY

Land Use/Project Description	Project Development Totals No. of Dwelling Units (DU) / Acres
Proposed Project Zone 1 (north of Lambert, west of Valencia):	
▪ Single Family Detached Residential	105 DU
▪ Public Facility	1.0 acre
Zone 1 Subtotal	*105 DU*
Proposed Project Zone 2 (south of Lambert, west of Valencia:	
▪ Multifamily /Single Family Attached Residential	507 DU
▪ Sport Park	13.0 acres[1]
Zone 2 Subtotal	*507 DU*
Proposed Project Zone 3 (south of Carbon Canyon Road, east of Valencia and east of Rose:	
▪ Single Family Detached Residential	345 DU
▪ Multifamily/Single Family Attached Residential	143 DU
Zone 3 Subtotal	*488 DU*
Total Proposed Project	**1,100 Units 13.0 acre Sports Park**

[1] The Sports Park component of the Project assumed to developed with a combination of a baseball/softball field and multi-purpose field that can be used for football or soccer. Other on-site amenities include a fitness trail, an activities shelter, basketball and tennis courts, and a playground plus pickleball courts, For this analysis, it is assumed up to two (2) full-sized soccer fields will be provided. However, when taking into consideration that a full-sized soccer field can be subdivided into approximately 2-3 child-sized fields, this analysis will conservatively analyze a total of six (6) soccer fields.

3.0 EXISTING CONDITIONS

3.1 Existing Street System

The principal local network of streets serving the project site includes Lambert Road, Birch Street, Imperial Highway, Kraemer Boulevard, Valencia Avenue, and Rose Drive. The following discussion provides a brief synopsis of these key area streets. The descriptions are based on an inventory of existing roadway conditions.

Lambert Road is a six-lane, divided roadway west of Kraemer Boulevard and a four-lane, divided roadway east of Kraemer Boulevard, oriented in the east-west direction. Lambert Road borders the northeast side of the Project site. The posted speed limit on Lambert Road is 50 miles per hour (mph). On-street parking is not permitted along this roadway. Traffic signals control the study intersections of Lambert Road at State College Boulevard, SR-57 Ramps, Pointe Drive, Wildcat Way/N Associated Road, Santa Fe Road/Kraemer Boulevard, Sunflower Street, and Valencia Avenue. Project access will be provided via a signalized driveway along Lambert Road.

Birch Street is a four-lane, divided roadway oriented in the east-west direction. The posted speed limit on Birch Street is 50 miles per hour (mph). On-street parking is not permitted along this roadway. Traffic signals control the study intersections of Birch Street at State College Boulevard, S Associated Road, N Associated Road, Kraemer Boulevard, and Valencia Avenue.

Imperial Highway is a six-lane, divided roadway generally oriented in the east-west direction. The posted speed limit on Imperial Highway is 45 mph west of the SR-57 Freeway and 50 mph east of the SR-57 Freeway. On-street parking is not permitted along this roadway. A traffic signal controls the study intersections of Imperial Highway at SR-57 Ramps, Associated Road, Placentia Avenue, Kramer Boulevard, Valencia Avenue, and Rose Drive.

Kraemer Boulevard is a six-lane, divided roadway north of Imperial Highway and a four-lane, divided roadway south of Imperial Highway oriented in the north-south direction. The posted speed limit is 50 mph north of Imperial Highway and 45 mph south of Imperial Highway, with no on-street parking permitted. Traffic signals control the study intersections of Kraemer Boulevard at Lambert Road, Birch Street, and Imperial Highway.

Valencia Avenue is a four-lane, divided roadway that borders the Project site to the west, generally oriented in the north-south direction. The posted speed limit is 45 mph north of Imperial Highway and 40 mph south of Imperial Highway. Parking is not permitted on either side of the roadway. Traffic signals control the study intersections of Valencia Avenue at Lambert Road, Birch Street/Rose Drive, and Imperial Highway. Project access will be provided via a signalized driveway along Valencia Avenue.

Rose Drive is a two-lane, divided roadway that borders the southern portion of the Project site. The posted speed limit is 40 mph. On-street parking is not permitted on either side of the roadway. Traffic signals control the study intersections of Rose Drive at Valencia Avenue, Vesuvius Drive,

and Imperial Highway. Project access will be provided at a signalized driveway along Rose Drive and at the signalized intersection with Vesuvius Drive.

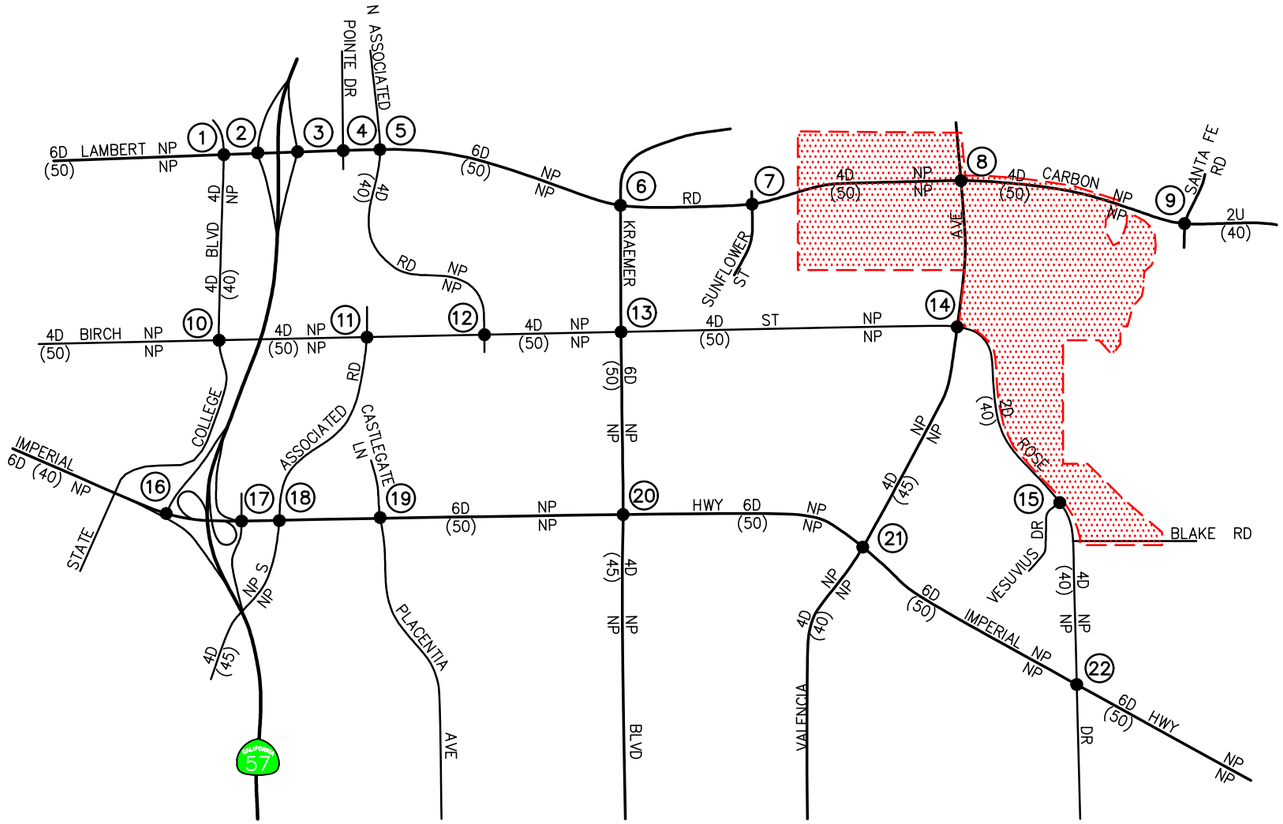
Figure 3-1 presents an inventory of the existing roadway conditions for the arterials and intersections evaluated in this report. This figure identifies the number of travel lanes for key arterials, as well as intersection configurations and controls for the key area study intersections.

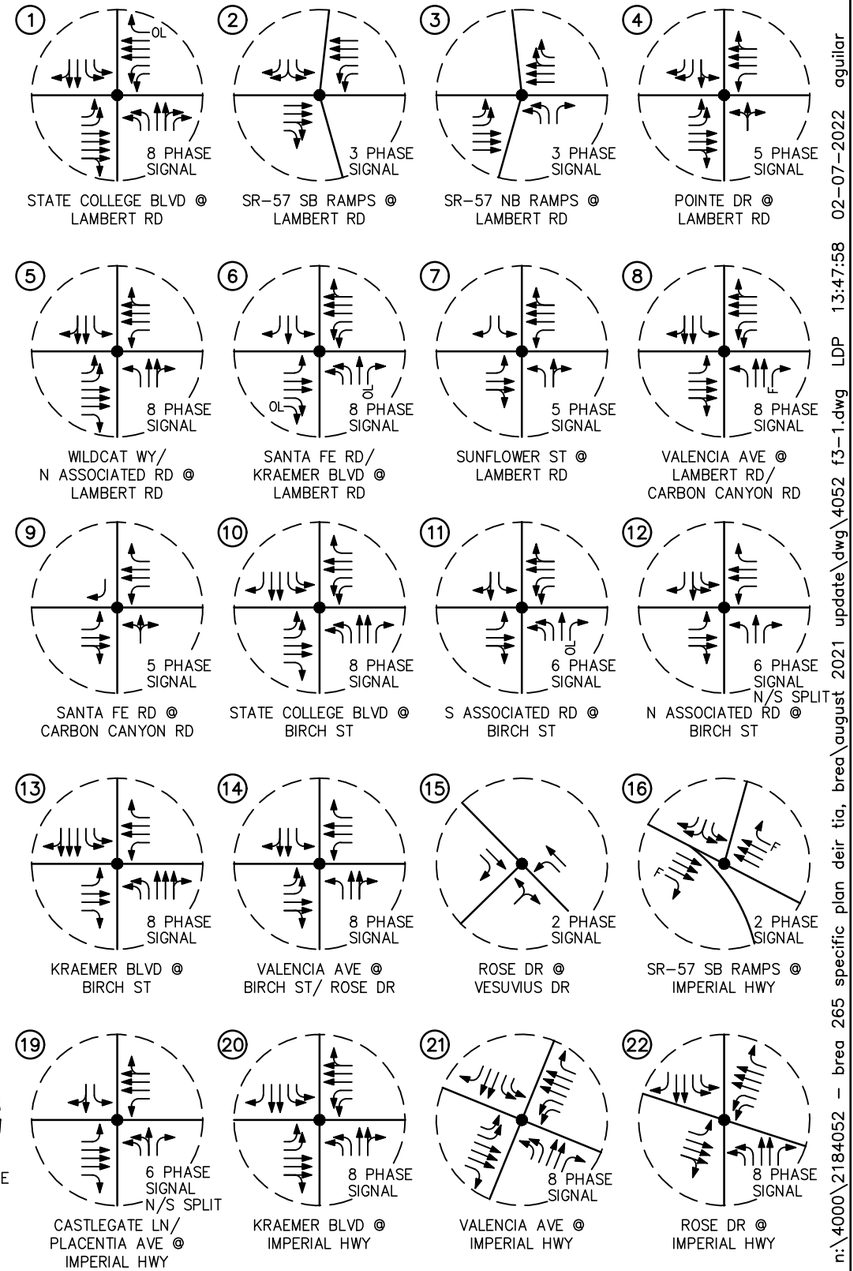
3.2 Existing Public Transit

Public transit bus service is provided in the project area by the Orange County Transportation Authority (OCTA). Five (5) OCTA bus routes operate within the vicinity of the Project site on State College Boulevard, Birch Street, Kraemer Boulevard, and Rose Drive, which consist of the following:

- OCTA Route 26 (Fullerton to Yorba Linda): Route 26 is a local bus route serving the Cities of Placentia, Fullerton, and Buena Park. The major routes of travel include Yorba Linda Avenue. Nearest to the project site are bus stops at the intersection of Rose Drive at Yorba Linda Boulevard. Route 26 operates on approximate 30-minute headways during weekdays and 45-minute headways during weekends.
- OCTA Route 57 (Brea to Newport Beach): Route 57 is a local bus route serving the Cities of Brea, Fullerton, Anaheim, Orange, Santa Ana, Costa Mesa, and Newport Beach. The major routes of travel include State College Boulevard. Nearest to the project site are bus stops at the intersection of State College Boulevard at Birch Street. Route 57 operates on approximate 15-minute headways during the weekdays and weekends.
- OCTA Route 71 (Yorba Linda to Newport Beach): Route 71 is a local bus route serving the Cities of Yorba Linda, Placentia, Anaheim, Orange, Tustin, Santa Ana, Irvine, Costa Mesa, and Newport Beach. The major routes of travel include Rose Drive and Red Hill Avenue. Nearest to the project site are bus stops at the intersection of Rose Drive at Yorba Linda Boulevard. Route 71 operates on approximate 45-minute headways during weekdays and 60-minute headways on weekends.
- OCTA Route 129 (La Habra to Anaheim): Route 129 is a community bus route serving the Cities of Anaheim, Placentia, Yorba Linda, Brea, and La Habra. The major routes of travel include La Habra Boulevard, Brea Boulevard, Birch Street, and Kraemer Boulevard. Nearest to the project site are bus stops at the intersection of Birch Street at Kraemer Boulevard. Route 129 operates on approximate 55-minute headways during weekdays and 60-minute headways on weekends.
- OCTA Route 153 (Brea to Anaheim): Route 153 is a community bus route serving the Cities of Brea, Placentia, Fullerton, Anaheim, and Orange. The major routes of travel include Placentia Avenue. Nearest to the project site are bus stops at the intersection of Birch Street at S Associated Road. Route 153 operates on approximate 60-minute headways during weekdays and weekends.

Figure 3-2 graphically illustrates the transit routes of OCTA within the vicinity of the Project site, as of October 10, 2021. ***Figure 3-3*** identifies the location of the existing bus stops in proximity to the Project site.





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

- ← = APPROACH LANE ASSIGNMENT
- ● = TRAFFIC SIGNAL, ▼ = STOP SIGN
- P = PARKING, NP = NO PARKING
- U = UNDIVIDED, D = DIVIDED
- 2 = NUMBER OF TRAVEL LANES
- (XX)= POSTED SPEED LIMIT (MPH)
- F = FREE-RIGHT
- OL = OVERLAP
- ▭ = PROJECT SITE

FIGURE 3-1

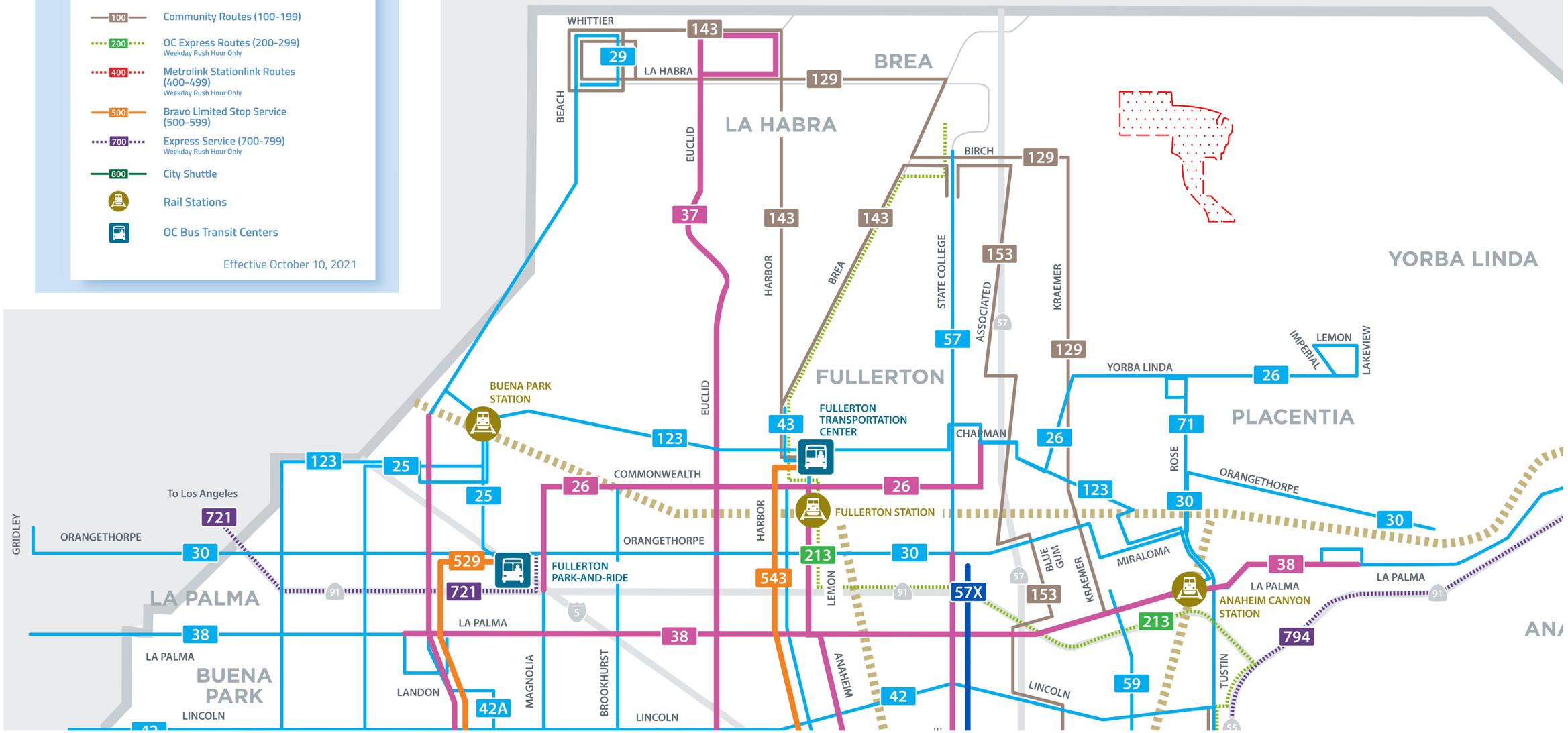
EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS

BREA 265 SPECIFIC PLAN, BREA

System Map

- 1 — Routes offering 15 minutes (or less) Weekday rush hour frequency
- 1 — Local Routes (1-99)
- 100 — Community Routes (100-199)
- 200 — OC Express Routes (200-299) Weekday Rush Hour Only
- 400 — Metrolink Stationlink Routes (400-499) Weekday Rush Hour Only
- 500 — Bravo Limited Stop Service (500-599)
- 700 — Express Service (700-799) Weekday Rush Hour Only
- 800 — City Shuttle
- Rail Stations
- OC Bus Transit Centers

Effective October 10, 2021



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SOURCE: OCTA

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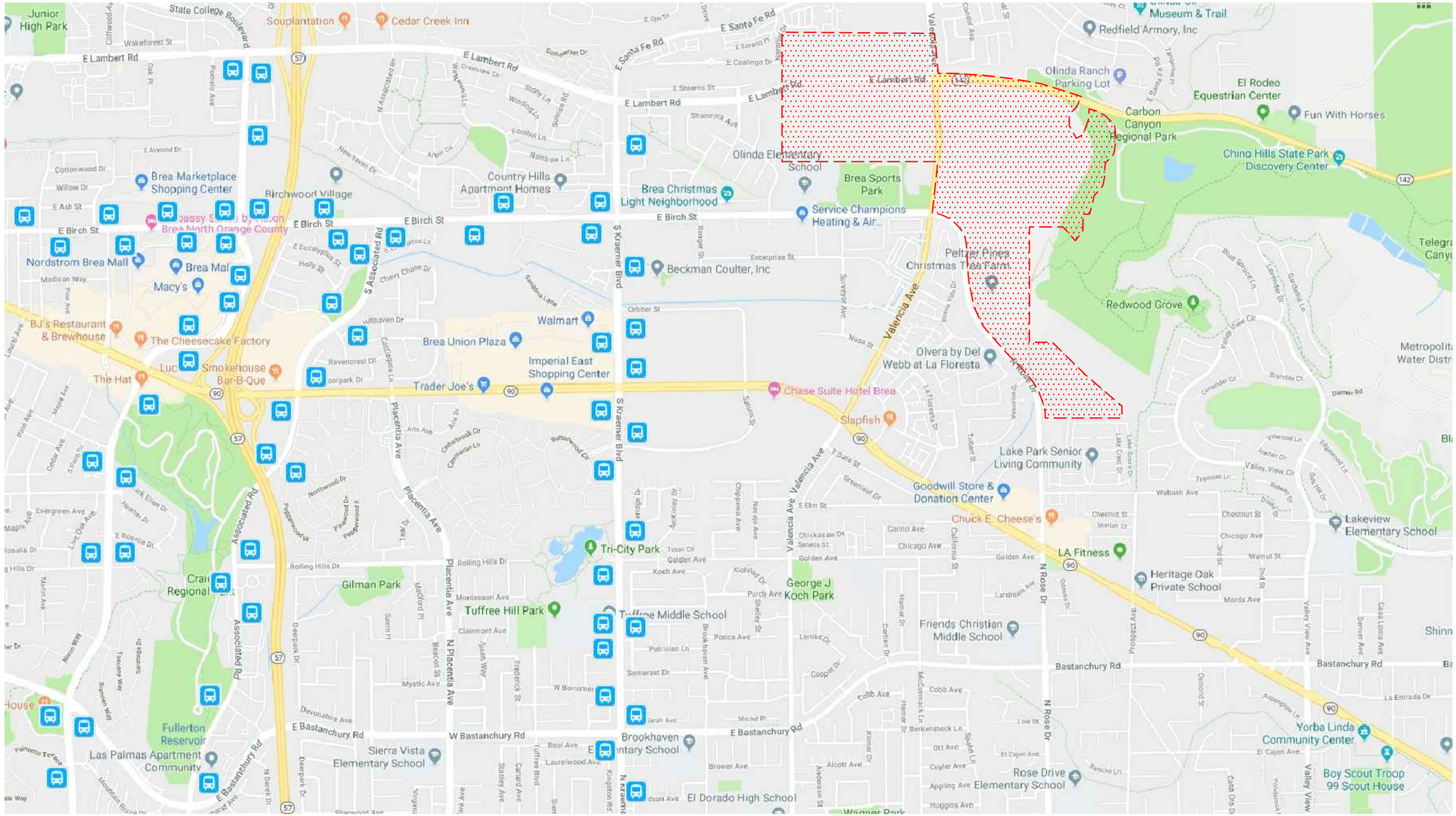
FIGURE 3-2

OCTA ROUTES

BREA 265 SPECIFIC PLAN, BREA


Junior High Park
State College Boulevard
Souplantation
Cedar Creek Inn
E Lambert Rd
Wakeforest St
E Santa Fe Rd
Somerset Dr
E Stearns St
Shamrock Ave
Museum & Trail
Redfield Armory, Inc
Olinda Ranch Parking Lot
El Rodeo Equestrian Center
Carbon Canyon Regional Park
Fun With Horses
Chino Hills State Park Discovery Center
Olinda Elementary School
Brea Sports Park
Service Champions Heating & Air...
Brea Marketplace Shopping Center
Birchwood Village
Country Hills Apartment Homes
Brea Christmas Light Neighborhood
E Birch St
Brea North Orange County
Nordstrom Brea Mall
Macy's
Madison Way
Beckman Coulter, Inc
Peltzer Pines Christmas Tree Farm
Redwood Grove
Telegraph Canyon
Metropolitan Water District
Walmart
Brea Union Plaza
Imperial East Shopping Center
Trader Joe's
BJ's Restaurant & Brewhouse
The Cheesecake Factory
The Hat
Smokehouse Bar-B-Que
Chase Suite Hotel Brea
Olvera by Del Webb at La Floresta
Slapfish
Lake Park Senior Living Community
Goodwill Store & Donation Center
Chuck E. Cheese's
LA Fitness
Heritage Oak Private School
Lakeview Elementary School
Tri-City Park
Gilman Park
George J Koch Park
Tuffree Hill Park
Tuffree Middle School
Friends Christian Middle School
Fullerton Reservoir
Las Palmas Apartment Community
Sierra Vista Elementary School
Brookhaven Elementary School
El Dorado High School
Rose Drive Elementary School
Yorba Linda Community Center
Boy Scout Troop 99 Scout House
Valencia Ave
S Kraemer Blvd
N Placentia Ave
Placentia Ave
S Associated Rd
Associated Rd
N Rose Dr
Bastanchury Rd
E Bastanchury Rd
W Bastanchury Rd
Chapman Ave
Orbiter St
Enterprise St
Range St
Saturn St
Nasa St
Chicago Ave
Golden Ave
Chestnut St
Walnut St
Rolling Hills Dr
Montessori Ave
Claremont Ave
Ponce Ave
Somerset Dr
Cobb Ave
Mystic Ave
Devonshire Ave
Brower Ave
Alcott Ave
Appling Ave
Huggins Ave
Valley View Ave
Denver Ave
Casa Loma Ave
Diemer Rd
Bramble Ct
Coriander Ct
Valley View Cir
Blue Spruce Ln
Lavender Dr
Gardenia Ln
Fremont Ln
Walnut Ave
Wabash Ave
Edgewood Ln
Yorkwood Ln
Aspengrove Ln
La Entrada Dr
El Cajon Ave
Marda Ave
Lake Park Dr
Lake Crest Dr
Lake Grove Dr
Trident Dr
Tarpon Dr
Tapadero Dr
Tahiti Dr
Tabor St
Talbert St
Sunset Ln
Sunset Rd
Stony Ln
Winding Ln
Foothill Ln
Rainbow Ln
Sunrise Rd
Meadow Ln
Waterview Ln
Creekview Cir
Oak Pl
Pomelo Ave
Cottonwood Dr
Willow Dr
E Ash St
E Almond Dr
Holly St
Eucalyptus St
Chevy Chase Dr
Sandpiper Lane
Ravencrest Dr
Castlegate Ln
Arts Ave
Aria Dr
Cedarbrook Cir
Cimmaron Ln
Buttonwood Dr
Northwood Dr
Pinewood Dr
Peppertree Dr
Peppertree Ln
Teton Cir
Koch Ave
Kiefer Dr
Purdy Ave
Shelley St
Hamner Dr
Carter Dr
Lemke Ct
Petrician Ln
Brookhaven Ave
Cooper Dr
Sarah Ave
Michel Pl
Beal Ave
Laurelwood Ave
Tuffree Blvd
Stanley Ave
Canard Ave
Kingston Rd
Derbyshire Dr
Derbyark Dr
Deerpark Dr
Mountain Ridge Dr
Palmetto Terrace
Maple Ave
Evergreen Ave
Live Oak Ave
Cedar Ave
Print Ave
Laurel Ave
Rosalia Dr
Hills Dr
Merlin Ave
Silicon Way
Tuscany Way
Bremen Way
Seascape Dr
Heather Dr
Mark Ellen Dr
S Plain Pl
Northwood Dr
Pinewood Dr
Peppertree Dr
Trena Dr
Madford Dr
Salem Pl
Beacon St
Aspen Way
Frederick St
Mystic Ave
W Borromeo
Sarah Ave
Somerset Dr
Petrician Ln
Ponce Ave
Claremont Ave
Montessori Ave
Rolling Hills Dr
Teton Cir
Golden Ave
Koch Ave
Kiefer Dr
Purdy Ave
Shelley St
Hamner Dr
Carter Dr
Lemke Ct

3.3 Existing Bikeway Plan

The City of Brea promotes bicycling as a means of mobility and a way in which to improve the quality of life within its community. The Bikeway Plan recognizes the needs of bicycle users and aims to create a complete and safe bicycle network throughout the City. The City of Brea Bike Plan (existing and proposed) is shown on ***Figure 3-4***. In close proximity to the site, an existing Class II bike lane is provided along Rose Drive. There is a proposed Class I bike path along Carbon Canyon Road and Valencia Avenue.

3.4 Existing Traffic Volumes

Due to the Covid-19 virus, the Governor of California has issued a state-wide "stay at home" order which has ultimately resulted in a decrease in traffic. Based on these current conditions, the ability to collect traffic counts to establish baseline conditions that would be reflective of traffic conditions without "stay at home" orders in effect are not possible. As such, to establish "baseline" traffic conditions, pre-Covid-19 (i.e. under normal circumstances without "stay at home" orders in effect), LLG has researched historic data and was able to obtain Year 2018/2019 AM peak hour and PM peak hour traffic counts at all twenty-two (22) study locations, as well as Year 2018 daily traffic counts at twenty-five (25) roadway segments. As such, to establish existing "baseline" traffic conditions, an annual growth factor of 1% per year was applied to the Year 2018/2019 conditions to establish Year 2021 pre-COVID-19 baseline traffic conditions.

Figures 3-5 and ***3-6*** illustrate the existing Year 2021 AM and PM peak hour traffic volumes at the twenty-two (22) study intersections evaluated in this report, respectively. *Figure 3-6* also presents the existing average daily traffic volumes for the twenty-five (25) roadway segments in the vicinity of the proposed Project.

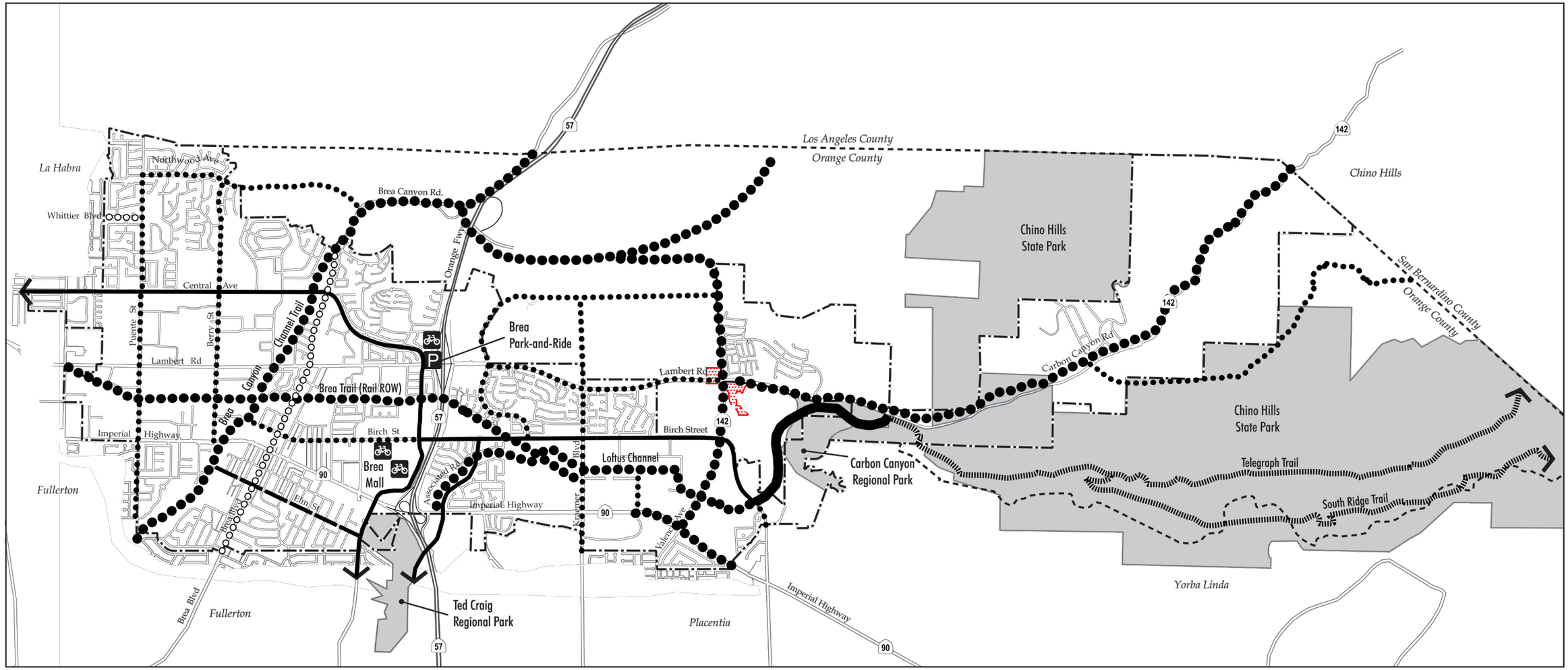
Appendix B contains the detailed peak hour and daily traffic count sheets for the study intersections and roadway segments.

3.5 Level of Service (LOS) Analysis Methodologies

Existing weekday AM and PM peak hour operating conditions for the study intersections were evaluated using the *Intersection Capacity Utilization* (ICU) methodology for signalized intersections as well as the methodology outlined in the *Highway Capacity Manual*. Per the City's direction, the Intersection Capacity Utilization (ICU) method will be used for the purpose of consistency with the City of Brea General Plan.

3.5.1 *Intersection Capacity Utilization (ICU) Method of Analysis*

Weekday AM and PM peak hour operating conditions for the signalized study intersections were evaluated using the Intersection Capacity Utilization (ICU) method. The ICU technique is intended for signalized intersection analysis and estimates the volume to capacity (V/C) relationship for an intersection based on the individual V/C ratios for key conflicting traffic movements. The ICU numerical value represents the percent signal (green) time, and thus capacity, required by existing



Legend

- City Boundary
- Sphere of Influence

Bike Ways

- Bike Path (Class I)
- Bike Lane (Class II)
- Bike Route (Class III)
- Off Road (Unpaved)

Bike Ways (Proposed)

- Bike Path (Class I)
- Bike Lane (Class II)
- Bike Route (Class III)

- Park and Ride
- Bike Parking Facility

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LINSCOTT LAW & GREENSPAN engineers

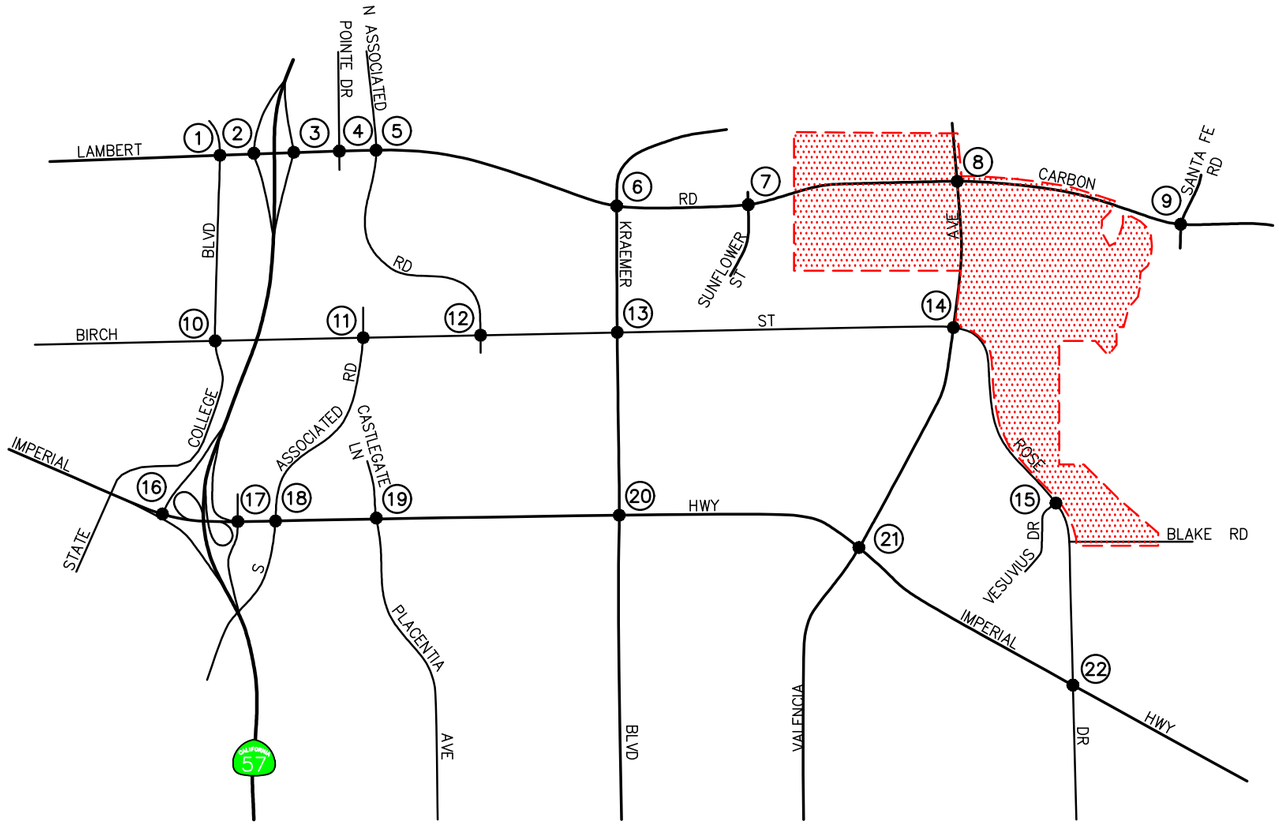
N NO SCALE

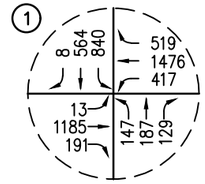
SOURCE: CITY OF BREA

FIGURE 3-4

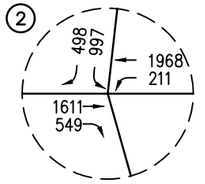
CITY OF BREA BIKE PLAN

BREA 265 SPECIFIC PLAN, BREA

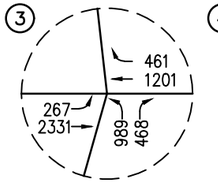




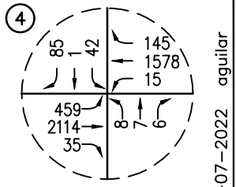
STATE COLLEGE BLVD @ LAMBERT RD



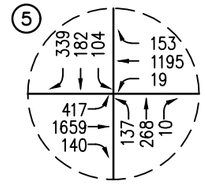
SR-57 SB RAMPS @ LAMBERT RD



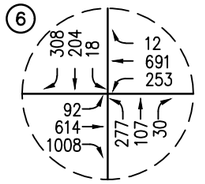
SR-57 NB RAMPS @ LAMBERT RD



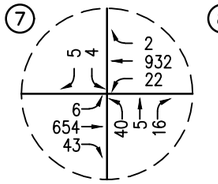
POINTE DR @ LAMBERT RD



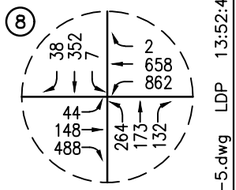
WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



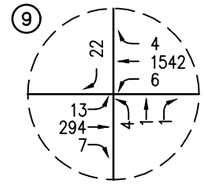
SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



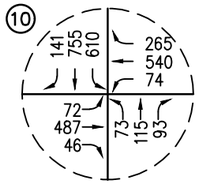
SUNFLOWER ST @ LAMBERT RD



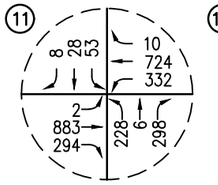
VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



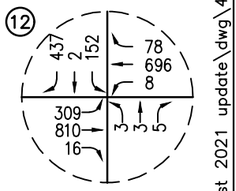
SANTA FE RD @ CARBON CANYON RD



STATE COLLEGE BLVD @ BIRCH ST



S ASSOCIATED RD @ BIRCH ST



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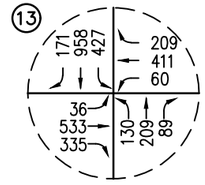
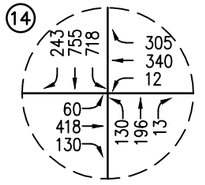
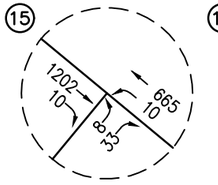


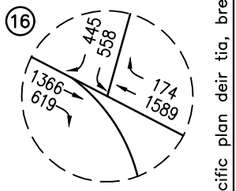
KRAEMER BLVD @ BIRCH ST



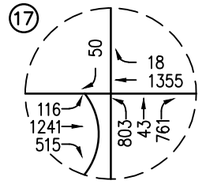
VALENCIA AVE @ BIRCH ST/ ROSE DR



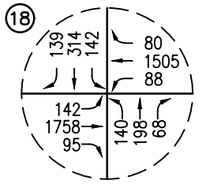
ROSE DR @ VESUVIUS DR



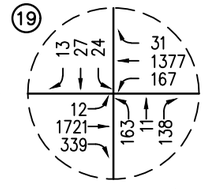
SR-57 SB RAMPS @ IMPERIAL HWY



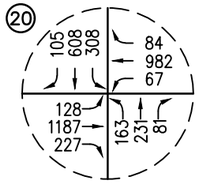
SR-57 NB RAMPS @ IMPERIAL HWY



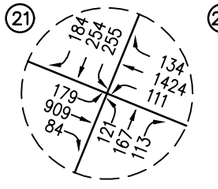
ASSOCIATED RD @ IMPERIAL HWY IMPERIAL HWY



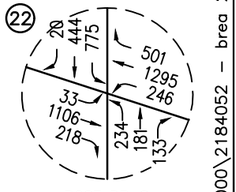
CASTLEGATE LN/ PLACENTIA AVE @



KRAEMER BLVD @ IMPERIAL HWY



VALENCIA AVE @ IMPERIAL HWY



ROSE DR @ IMPERIAL HWY

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

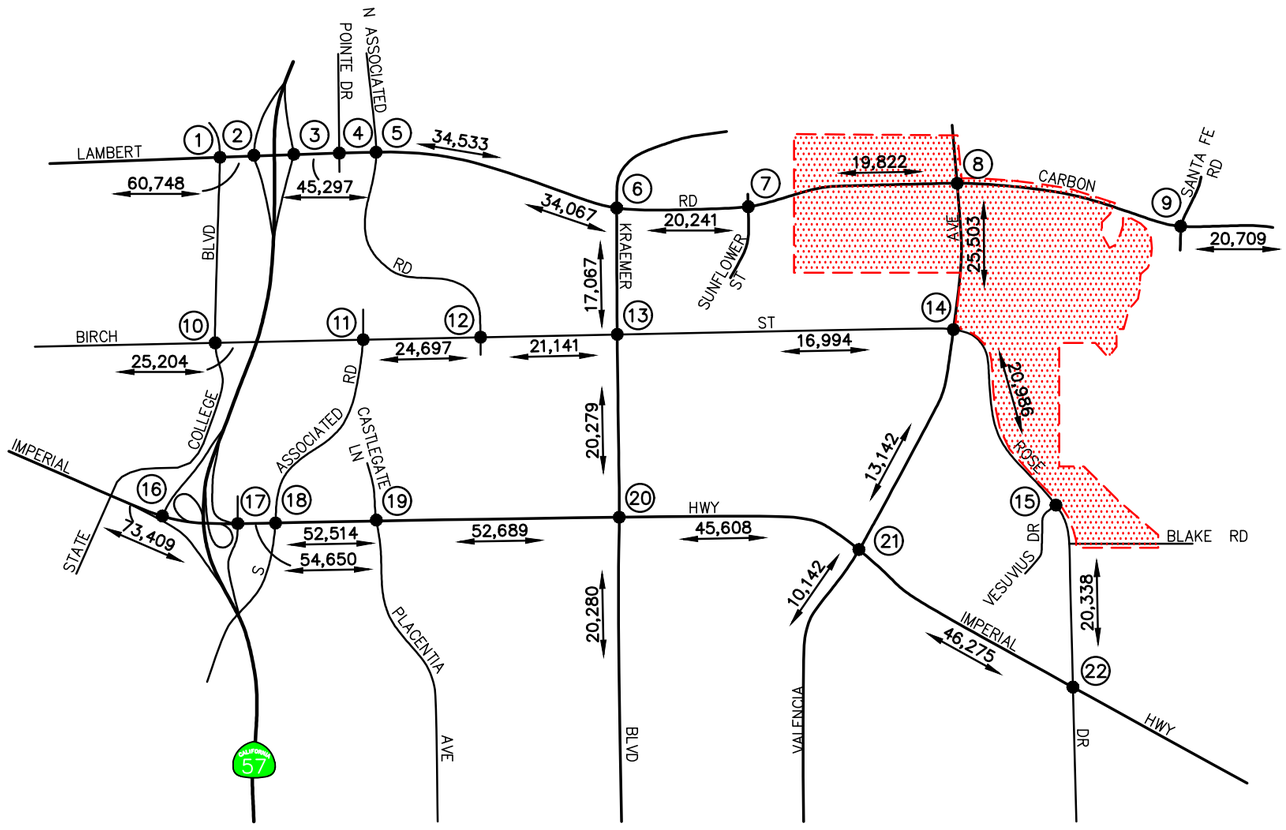
(#) = STUDY INTERSECTION

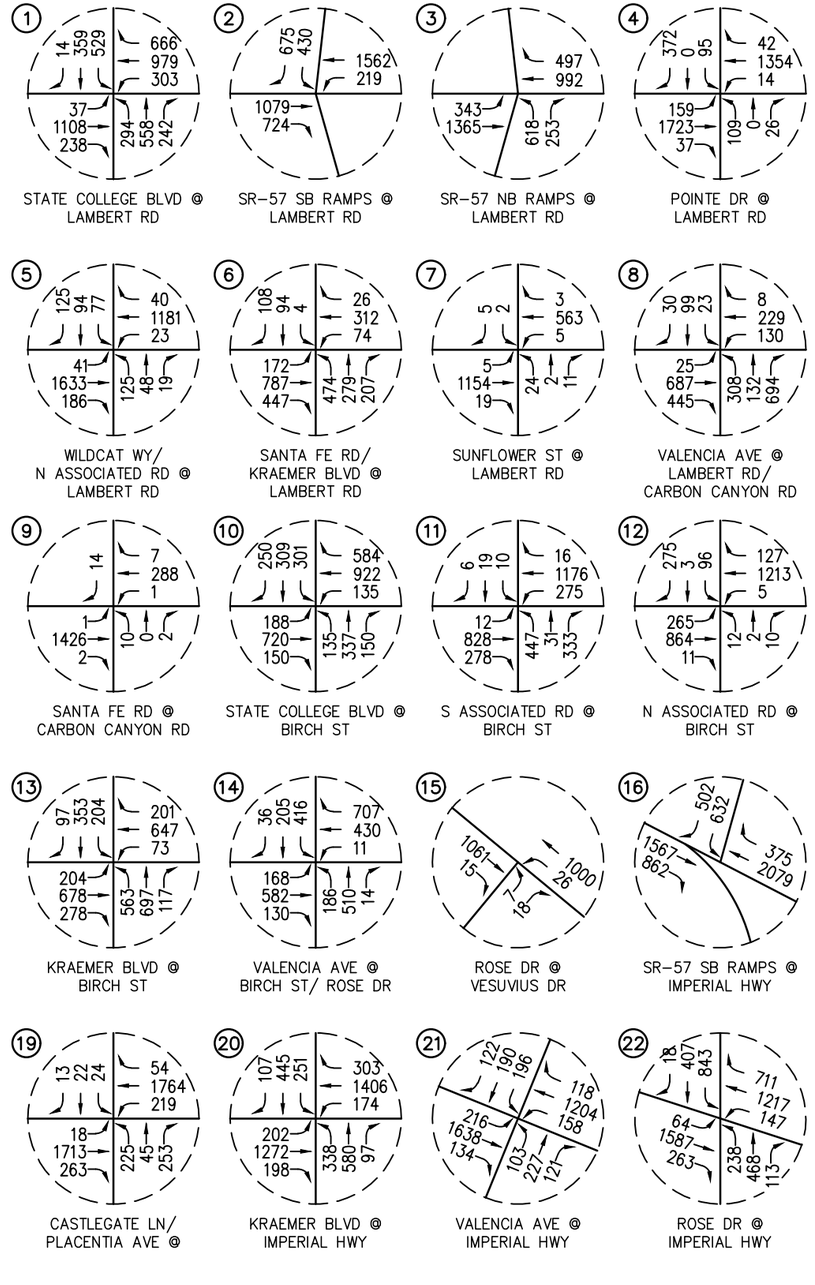
= PROJECT SITE

FIGURE 3-5

EXISTING AM PEAK HOUR TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

XX,XXX = DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 3-6

EXISTING PM PEAK HOUR AND DAILY TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA

and/or future traffic. It should be noted that the ICU methodology assumes uniform traffic distribution per intersection approach lane and optimal signal timing.

Per City of Brea requirements, the ICU calculations use a lane capacity of 1,700 vehicles per hour (vph) for through and all turn lanes. A clearance adjustment factor of 0.05 was added to each Level of Service calculation.

The ICU value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The ICU value is the sum of the critical volume to capacity ratios at an intersection; it is not intended to be indicative of the LOS of each of the individual turning movements. The six qualitative categories of Level of Service have been defined along with the corresponding ICU value range and are shown in ***Table 3-1***.

3.5.2 *Highway Capacity Manual (HCM) Method of Analysis (Signalized Intersections)*

Weekday AM and PM peak hour operating conditions for study intersections were evaluated using the methodology outlined in *Chapter 19 of the Highway Capacity Manual 6 (HCM 6)* for signalized intersections.

Based on the HCM operations method of analysis, level of service for signalized intersections and approaches is defined in terms of control delay, which is a measure of the increase in travel time due to traffic signal control, driver discomfort, and fuel consumption. Control delay includes the delay associated with vehicles slowing in advance of an intersection, the time spent stopped on an intersection approach, the time spent as vehicles move up in the queue, and the time needed for vehicles to accelerate to their desired speed. LOS criteria for traffic signals are stated in terms of the control delay in seconds per vehicle. The LOS thresholds established for the automobile mode at a signalized intersection are shown in ***Table 3-2***.

3.5.3 *Highway Capacity Manual (HCM) Method of Analysis (Unsignalized Intersections)*

The HCM unsignalized methodology for stop-controlled intersections was utilized for the analysis of the unsignalized intersections. LOS criteria for unsignalized intersections differ from LOS criteria for signalized intersections as signalized intersections are designed for heavier traffic and therefore a greater delay. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable, which can reduce users' delay tolerance.

Two-way stop-controlled intersections are comprised of a major street, which is uncontrolled, and a minor street, which is controlled by stop signs. Level of service for a two-way stop-controlled intersection is determined by the computed or measured control delay. The control delay by movement, by approach, and for the intersection as a whole is estimated by the computed capacity for each movement. LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns. The worst side street approach delay is reported. LOS is not defined for the intersection as a whole or for major-street approaches, as it is assumed that major-street through vehicles experience zero delay. The HCM control delay value range for two-way stop-controlled intersections is shown in ***Table 3-3***.

3.6 Level of Service Criteria

According to City of Brea and City of Placentia criteria, LOS D is the minimum acceptable condition that should be maintained during the morning and evening peak commute hours at intersections.

LOS E is the minimum acceptable condition that should be maintained during the weekday morning and evening peak commute hours for Orange County CMP designated intersections. Based on the above, LOS E would be the LOS standard at the following study intersections:

LOS "E" Requirements – Study Intersections

16. SR-57 SB Ramps at Imperial Highway (Caltrans)
17. SR-57 NB Ramps at Imperial Highway (Caltrans)

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (ICU METHODOLOGY)

Level of Service (LOS)	Intersection Capacity Utilization Value (V/C)	Level of Service Description
A	≤ 0.600	EXCELLENT. No vehicle waits longer than one red light, and no approach phase is fully used.
B	0.601 – 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.000	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Potentially very long delays with continuously increasing queue lengths.

TABLE 3-2

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM METHODOLOGY)[2]

Control Delay (sec/veh)	Level of Service (LOS)	Level of Service Description
≤ 10	A	This level of service occurs when the v/c ratio is low and either progression is exceptionally favorable or the cycle length is very short.
> 10-20	B	This level generally occurs when the v/c ratio is low and either progression is highly favorable or the cycle length is short.
> 20-35	C	Average traffic delays. These higher delays may result when progression is favorable or the cycle length is moderate. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
> 35-55	D	Long traffic delays. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop and individual cycle failures are noticeable.
> 55-80	E	Very long traffic delays. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high *v/c* ratios. Individual cycle failures are frequent.
> 80	F	Severe congestion. This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

[2] Source: *Highway Capacity Manual*, Chapter 18: Signalized Intersections.

TABLE 3-3

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM)[3]

Level of Service (LOS)	Highway Capacity Manual Delay Value (sec/veh)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

[3] Source: *Highway Capacity Manual 6th Edition*, Chapter 20 (Two-Way Stop Control).

3.7 Existing Level of Service Results

3.7.1 *Existing Conditions Intersection Capacity Analysis (ICU Methodology)*

Table 3-4 summarizes the existing peak hour service level calculations for the twenty-two (22) study intersections based on existing traffic volumes and current street geometrics based on the ICU Method of Analysis.

Review of *Table 3-4* indicates one (1) of the twenty-two (22) study intersections currently operates at an unacceptable LOS during the PM peak hour. The remaining study intersections currently operate at an acceptable LOS D or better during the AM and PM peak hours. The locations identified below currently operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
14. Valencia Ave at Birch St/Rose Dr	--	--	0.914	E

Appendix C presents the ICU LOS calculation worksheets for the twenty-two (22) key study intersections for the AM peak hour and PM peak hour.

3.7.2 *Existing Conditions Intersection Capacity Analysis (HCM Methodology)*

Table 3-5 summarizes the existing peak hour service level calculations for the twenty-two (22) study intersections based on existing traffic volumes and current street geometrics based on the HCM Method of Analysis.

Review of *Table 3-5* indicates that four (4) of the twenty-two (22) study intersections currently operates at an unacceptable LOS during the AM and/or PM peak hours. The remaining study intersections currently operate at an acceptable LOS D or better during the AM and PM peak hours. The locations identified below currently operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
5. Wildcat Way/N. Associated Rd at Lambert Rd	57.3	E	--	--
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	136.6	F	--	--
14. Valencia Ave at Birch St/Rose Dr	105.1	F	57.7	E
22. Rose Dr at Imperial Hwy	205.0	F	204.8	F

Appendix D presents the HCM LOS calculation worksheets for the twenty-two (22) key study intersections for the AM peak hour and PM peak hour.

TABLE 3-4
EXISTING PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Key Intersection	Jurisdiction	Minimum Acceptable LOS	Control Type	Time Period	ICU	LOS
1. State College Boulevard at Lambert Road	Brea	D	8∅ Traffic Signal	AM	0.684	B
				PM	0.657	B
2. SR-57 SB Ramps at Lambert Road	Brea/ Caltrans	D	3∅ Traffic Signal	AM	0.729	C
				PM	0.596	A
3. SR-57 NB Ramps at Lambert Road	Brea/ Caltrans	D	3∅ Traffic Signal	AM	0.798	C
				PM	0.552	A
4. Pointe Drive at Lambert Road	Brea	D	5∅ Traffic Signal	AM	0.560	A
				PM	0.539	A
5. Wildcat Way/N Associated Road at Lambert Road	Brea	D	8∅ Traffic Signal	AM	0.671	B
				PM	0.522	A
6. Santa Fe Road/Kraemer Boulevard at Lambert Road	Brea	D	8∅ Traffic Signal	AM	0.602	B
				PM	0.506	A
7. Sunflower Street at Lambert Road	Brea	D	5∅ Traffic Signal	AM	0.291	A
				PM	0.412	A
8. Valencia Avenue at Lambert Road/Carbon Canyon Road	Brea/ Caltrans	D	8∅ Traffic Signal	AM	0.861	D
				PM	0.569	A
9. Santa Fe Road at Carbon Canyon Road	Brea/ Caltrans	D	5∅ Traffic Signal	AM	0.515	A
				PM	0.478	A
10. State College Boulevard at Birch Street	Brea	D	8∅ Traffic Signal	AM	0.474	A
				PM	0.636	B
11. S Associated Road at Birch Street	Brea	D	6∅ Traffic Signal	AM	0.603	B
				PM	0.602	B
12. N Associated Road at Birch Street	Brea	D	6∅ Traffic Signal	AM	0.529	A
				PM	0.626	B
13. Kraemer Boulevard at Birch Street	Brea	D	8∅ Traffic Signal	AM	0.542	A
				PM	0.614	B
14. Valencia Avenue at Birch Street/Rose Drive	Brea/ Caltrans	D	8∅ Traffic Signal	AM	0.731	C
				PM	**0.914**	**E**

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 3-4 (CONTINUED)
EXISTING PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Key Intersection	Jurisdiction	Minimum Acceptable LOS	Control Type	Time Period	ICU	LOS
15. Rose Drive at Vesuvius Drive/Driveway D	Brea	D	2∅ Traffic Signal	AM	0.787	C
				PM	0.704	C
16. SR-57 SB Ramps at Imperial Highway	Brea/ Caltrans	E	2∅ Traffic Signal	AM	0.558	A
				PM	0.680	B
17. SR-57 NB Ramps at Imperial Highway	Brea/ Caltrans	E	4∅ Traffic Signal	AM	0.571	A
				PM	0.761	C
18. Associated Road at Imperial Highway	Brea/ Caltrans	D	8∅ Traffic Signal	AM	0.691	B
				PM	0.763	C
19. Castlegate Lane/Placentia Avenue at Imperial Highway	Brea/ Caltrans	D	6∅ Traffic Signal	AM	0.590	A
				PM	0.684	B
20. Kraemer Boulevard at Imperial Highway	Brea/ Caltrans	D	8∅ Traffic Signal	AM	0.574	A
				PM	0.717	C
21. Valencia Avenue at Imperial Highway	Brea/ Caltrans	D	8∅ Traffic Signal	AM	0.526	A
				PM	0.546	A
22. Rose Drive at Imperial Highway	Placentia/ Caltrans	D	8∅ Traffic Signal	AM	0.688	B
				PM	0.891	D

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 3-5
EXISTING PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Key Intersection	Jurisdiction	Minimum Acceptable LOS	Control Type	Time Period	Delay (s/v)	LOS
1. State College Boulevard at Lambert Road	Brea	D	8∅ Traffic Signal	AM	33.3	C
				PM	34.7	C
2. SR-57 SB Ramps at Lambert Road	Brea/ Caltrans	D	3∅ Traffic Signal	AM	26.3	C
				PM	19.1	B
3. SR-57 NB Ramps at Lambert Road	Brea/ Caltrans	D	3∅ Traffic Signal	AM	25.4	C
				PM	23.4	C
4. Pointe Drive at Lambert Road	Brea	D	5∅ Traffic Signal	AM	13.0	B
				PM	14.8	B
5. Wildcat Way/N Associated Road at Lambert Road	Brea	D	8∅ Traffic Signal	AM	**57.3**	**E**
				PM	18.3	B
6. Santa Fe Road/Kraemer Boulevard at Lambert Road	Brea	D	8∅ Traffic Signal	AM	28.8	C
				PM	29.5	C
7. Sunflower Street at Lambert Road	Brea	D	5∅ Traffic Signal	AM	9.3	A
				PM	6.7	A
8. Valencia Avenue at Lambert Road/Carbon Canyon Road	Brea/ Caltrans	D	8∅ Traffic Signal	AM	**136.6**	**F**
				PM	31.8	C
9. Santa Fe Road at Carbon Canyon Road	Brea/ Caltrans	D	5∅ Traffic Signal	AM	4.7	A
				PM	4.0	A
10. State College Boulevard at Birch Street	Brea	D	8∅ Traffic Signal	AM	40.3	D
				PM	30.2	C
11. S Associated Road at Birch Street	Brea	D	6∅ Traffic Signal	AM	25.6	C
				PM	25.1	C
12. N Associated Road at Birch Street	Brea	D	6∅ Traffic Signal	AM	25.4	C
				PM	23.0	C
13. Kraemer Boulevard at Birch Street	Brea	D	8∅ Traffic Signal	AM	36.1	D
				PM	41.9	D
14. Valencia Avenue at Birch Street/Rose Drive	Brea/ Caltrans	D	8∅ Traffic Signal	AM	**105.1**	**F**
				PM	**57.7**	**E**

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

TABLE 3-5 (CONTINUED)
EXISTING PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Key Intersection	Jurisdiction	Minimum Acceptable LOS	Control Type	Time Period	Delay (s/v)	LOS
15. Rose Drive at Vesuvius Drive/Driveway D	Brea	D	2∅ Traffic Signal	AM	6.8	A
				PM	4.1	A
16. SR-57 SB Ramps at Imperial Highway	Brea/ Caltrans	E	2∅ Traffic Signal	AM	14.9	B
				PM	15.3	B
17. SR-57 NB Ramps at Imperial Highway	Brea/ Caltrans	E	4∅ Traffic Signal	AM	26.7	C
				PM	29.9	C
18. Associated Road at Imperial Highway	Brea/ Caltrans	D	8∅ Traffic Signal	AM	26.7	C
				PM	39.5	D
19. Castlegate Lane/Placentia Avenue at Imperial Highway	Brea/ Caltrans	D	6∅ Traffic Signal	AM	17.7	B
				PM	23.4	C
20. Kraemer Boulevard at Imperial Highway	Brea/ Caltrans	D	8∅ Traffic Signal	AM	27.3	C
				PM	32.1	C
21. Valencia Avenue at Imperial Highway	Brea/ Caltrans	D	8∅ Traffic Signal	AM	27.2	C
				PM	25.4	C
22. Rose Drive at Imperial Highway	Placentia/ Caltrans	D	8∅ Traffic Signal	AM	**205.0**	**F**
				PM	**204.8**	**F**

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

4.0 TRAFFIC FORECASTING METHODOLOGY

In order to estimate the traffic characteristics of the proposed Project, a multi-step process has been utilized. The first step is traffic generation, which estimates the total arriving and departing traffic on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations or rates to the project development tabulation.

The second step of the forecasting process is traffic distribution, which identifies the origins and destinations of inbound and outbound project traffic. These origins and destinations are typically based on demographics and existing/expected future travel patterns in the study area.

The third step is traffic assignment, which involves the allocation of project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds. Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway links and intersection turning movements throughout the study area.

With the forecasting process complete and project traffic assignments developed, the proposed project is isolated by comparing operational (LOS) conditions at selected study intersections using expected future traffic volumes with and without forecast project traffic. The need for site-specific and/or cumulative local area traffic improvements can then be evaluated.

5.0 PROJECT TRAFFIC CHARACTERISTICS

5.1 Project Traffic Generation

The trip generation potential of the proposed Project will be estimated using trip rates contained in the 11th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE), [Washington, D.C., 2021]. ***Table 5-1*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project and also presents the project's forecast peak hour and daily traffic volumes.

Based on the Project description, the upper portion of *Table 5-1* identifies land use categories and trip rates which were considered in forecasting the trip generation of the Project. The land uses include ITE Land Use 210: Single Family Detached Housing, 215: Single Family Attached Housing, ITE Land Use 220: Multifamily Housing (Low-Rise), and ITE Land Use 488: Soccer Complex. The trip generation potential of both the Project's medium density ("multifamily" and "single family attached") components will be forecast based on ITE Land Use 215: Single Family Attached trip rates. Given the description of the Project's proposed Sports Park component, the trip generation potential will be forecast based on ITE Land Use 488: Soccer Complex[4] trip rates.

A review of the lower portion of this table indicates that the proposed Project is forecast to generate approximately 9,351 daily trips, with 634 trips (182 inbound, 452 outbound) produced in the AM peak hour and 893 trips (542 inbound, 351 outbound) produced in the PM peak hour on a "typical" weekday.

5.2 Project Traffic Distribution and Assignment

Tables 5-2 and 5-3 present the overall directional north/south/east/west distribution pattern for the residential and sports park components, respectively. ***Figures 5-1 through 5-5*** present the detailed Project Trip Distribution for Zone 1, Zone 2A, Zone 2B, Zone 3A and Zone 3B for review by the City. Project traffic volumes, both entering and exiting the site, have been distributed and assigned to the adjacent street system based on Project Select Zone model runs and were further refined based on the following considerations:

- location of site access points in relation to the surrounding street system,
- the site's proximity to major traffic carriers and regional access routes,
- physical characteristics of the circulation system such as lane channelization and presence of traffic signals that affect travel patterns,
- presence of traffic congestion in the surrounding vicinity,
- ingress/egress availability at the project site, and
- prior discussions with City Staff.

[4] Per Trip Generation, a soccer complex is an outdoor facility that is used for non-professional soccer games. It may consist of multiple fields. The size of each field within the land use may vary to accommodate games for different age groups. On-site amenities may include stadium seating, a fitness trail, an activities shelter, aquatic center, picnic grounds, basketball and tennis courts, and a playground, similar to the proposed Project's Sports Park component. For this analysis, it is assumed up to two (2) full-sized soccer fields will be provided. However, when taking into consideration that a full-sized soccer field can be subdivided into approximately 2-3 child-sized fields, this analysis will conservatively analyze a total of six (6) soccer fields.

The anticipated weekday AM and PM peak hour project traffic volumes associated with the proposed Project are presented in ***Figures 5-6*** and ***5-7***, respectively. *Figure 5-7* also presents the weekday daily Project traffic volumes. The traffic volume assignments presented in *Figures 5-6* and *5-7* reflect the traffic distribution characteristics shown in *Figures 5-1* through *5-5* and the traffic generation forecast presented in *Table 5-1*.

TABLE 5-1
PROJECT TRAFFIC GENERATION RATES AND FORECAST[5]

Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Rates:							
▪ 210: Single Family Detached Housing (TE/DU)	9.43	26%	74%	0.70	63%	37%	0.94
▪ 215: Single Family Attached Housing (TE/DU)	7.20	31%	69%	0.48	57%	43%	0.57
▪ 220: Multifamily Housing (Low-Rise[6]) (TE/DU)	6.74	24%	76%	0.40	63%	37%	0.51
▪ 488: Soccer Complex (TE/Field) [7]	71.33	61%	39%	0.99	66%	34%	16.43
Proposed Project Zone 1:							
▪ Single Family Homes (105 DU)	990	19	55	74	62	37	99
Proposed Project Zone 2:							
▪ Multifamily/Single Family Attached (507 DU)	3,650	75	168	243	165	124	289
▪ Sports Park (6 soccer fields)	428	4	2	6	65	34	99
Zone 2 Subtotal	*4,078*	*79*	*170*	*249*	*230*	*158*	*388*
Proposed Project Zone 3:							
▪ Single Family Homes (345 DU)	3,253	63	179	242	204	120	324
▪ Multifamily/Single Family Attached (143 DU)	1,030	21	48	69	46	36	82
Zone 3 Subtotal	*4,283*	*84*	*227*	*311*	*250*	*156*	*406*
Total Proposed Project	**9,351**	**182**	**452**	**634**	**542**	**351**	**893**

Notes:
TE/DU = Trip End per Dwelling Unit

5 Source: *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2021).

6 Low-Rise Multifamily Housing consists of buildings that are less than 3 levels.

7 A soccer complex is an outdoor facility that is used for non-professional soccer games. It may consist of multiple fields. The size of each field within the land use may vary to accommodate games for different age groups. On-site amenities may include stadium seating, a fitness trail, an activities shelter, aquatic center, picnic grounds, basketball and tennis courts, and a playground.

TABLE 5-2

PROJECT DIRECTIONAL DISTRIBUTION PATTERN – RESIDENTIAL COMPONENT[8]

Distribution Percentage	Orientation/Direction
15%	To/from the north
43%	To/from the south
14%	To/from the east
14%	To/from the west
14%	To/from a local destination
100%	**Total**

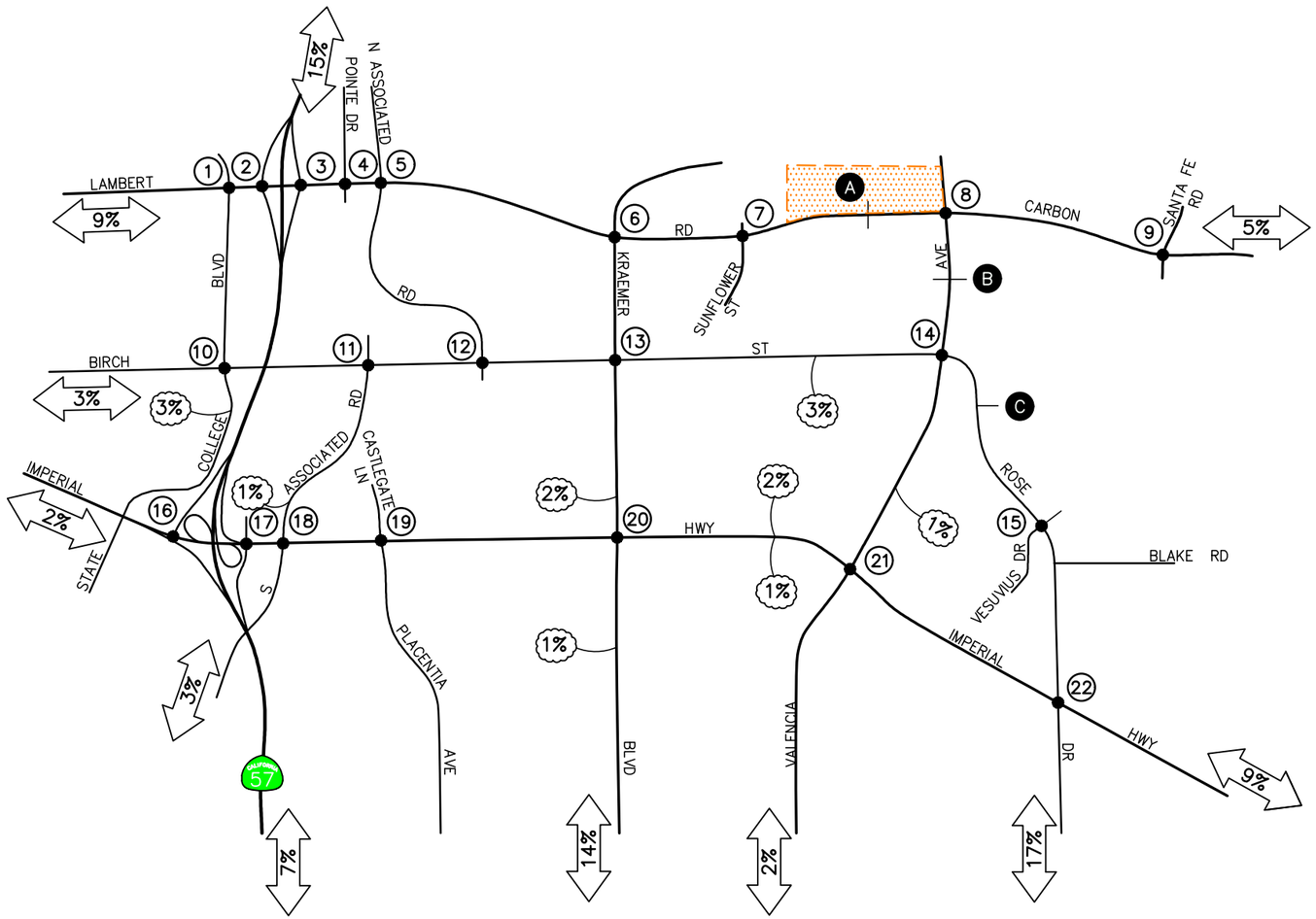
[8] Residential component of the project includes Zones 1,2A, 3A and 3B.

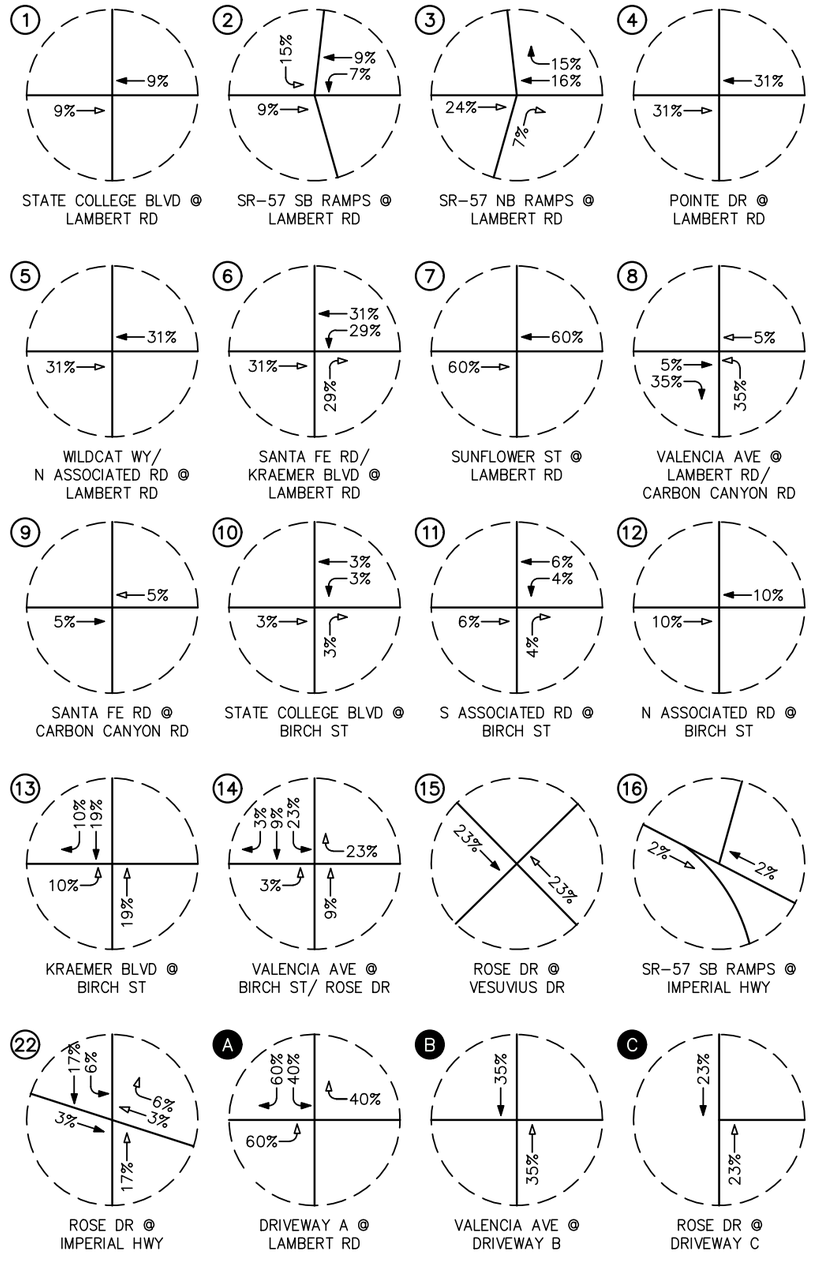
TABLE 5-3

PROJECT DIRECTIONAL DISTRIBUTION PATTERN – SPORTS PARK COMPONENT[9]

Distribution Percentage	Orientation/Direction
7%	To/from the north
51%	To/from the south
17%	To/from the east
19%	To/from the west
6%	To/from a local destination
100%	**Total**

[9] Residential component of the project includes Zone 2B.





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

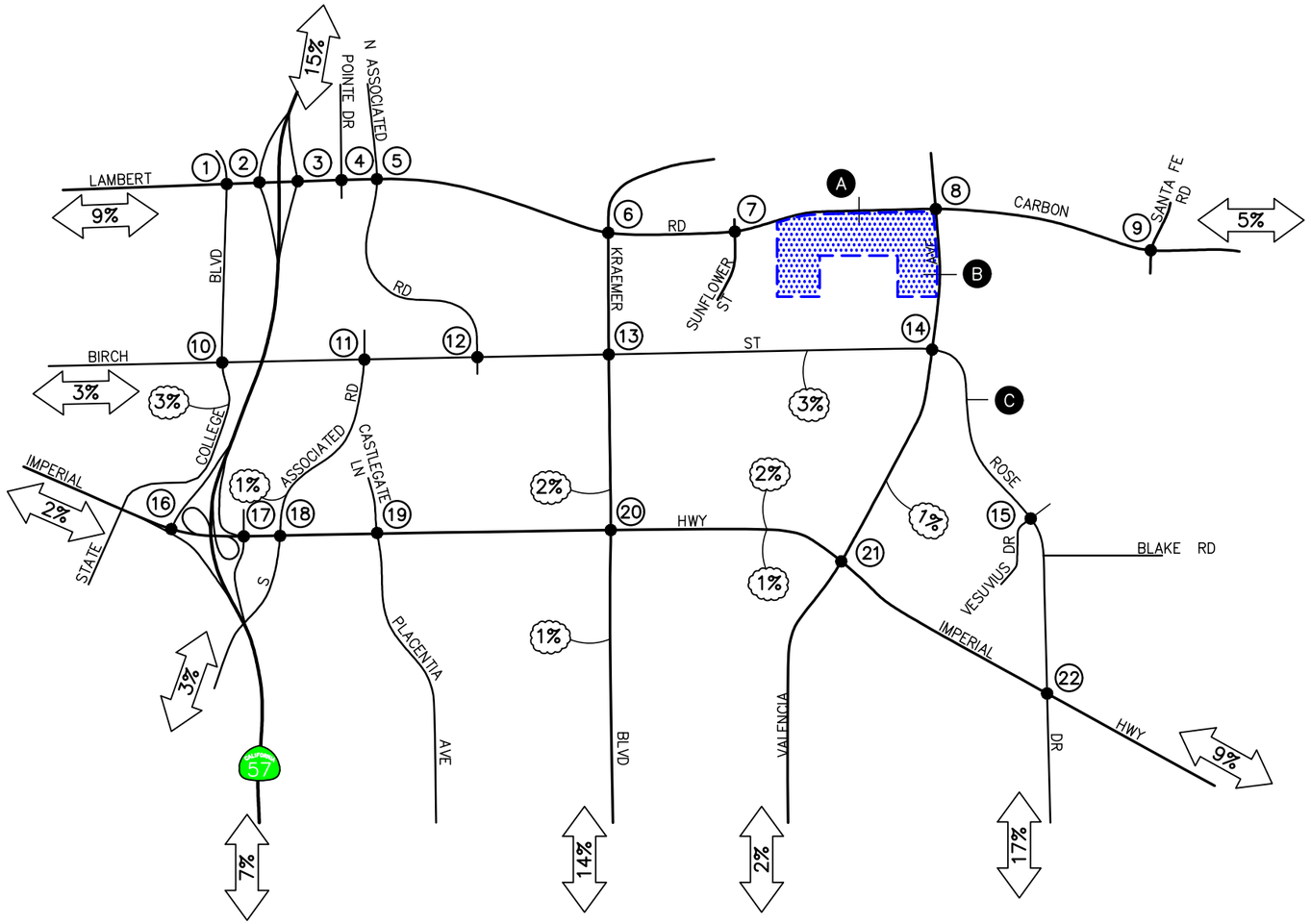
KEY

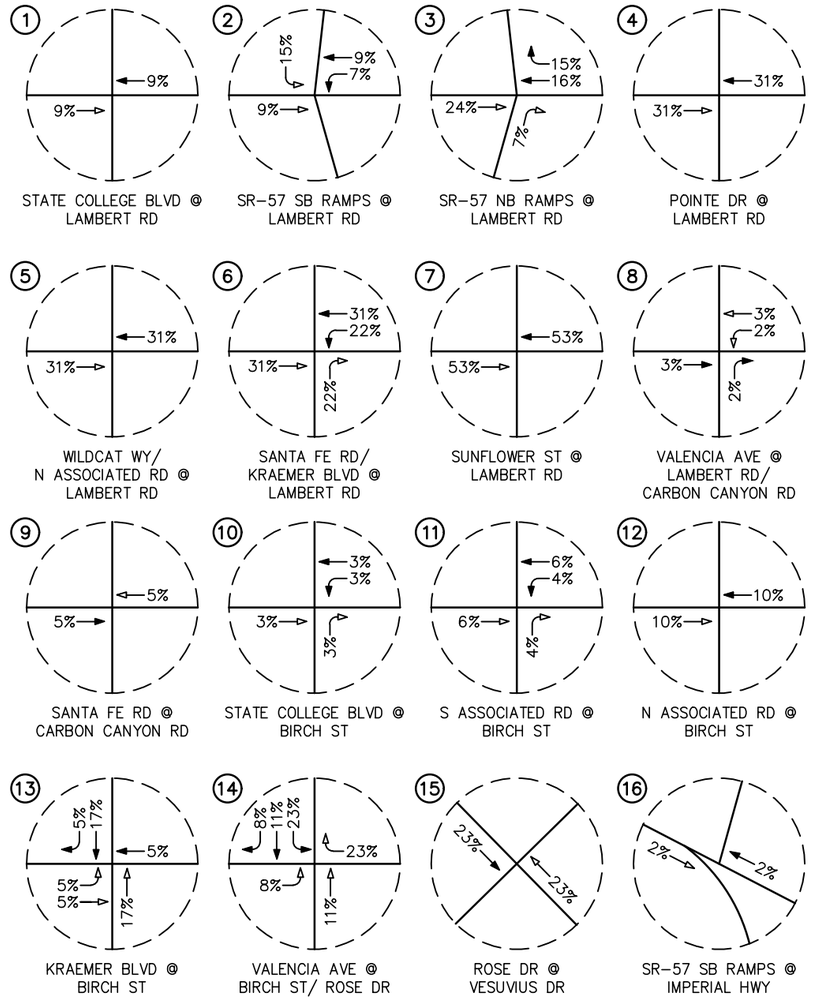
(#) = STUDY INTERSECTION
= INBOUND PERCENTAGE
= OUTBOUND PERCENTAGE
ZONE 1

FIGURE 5-1

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 1

BREA 265 SPECIFIC PLAN, BREA





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N NO SCALE

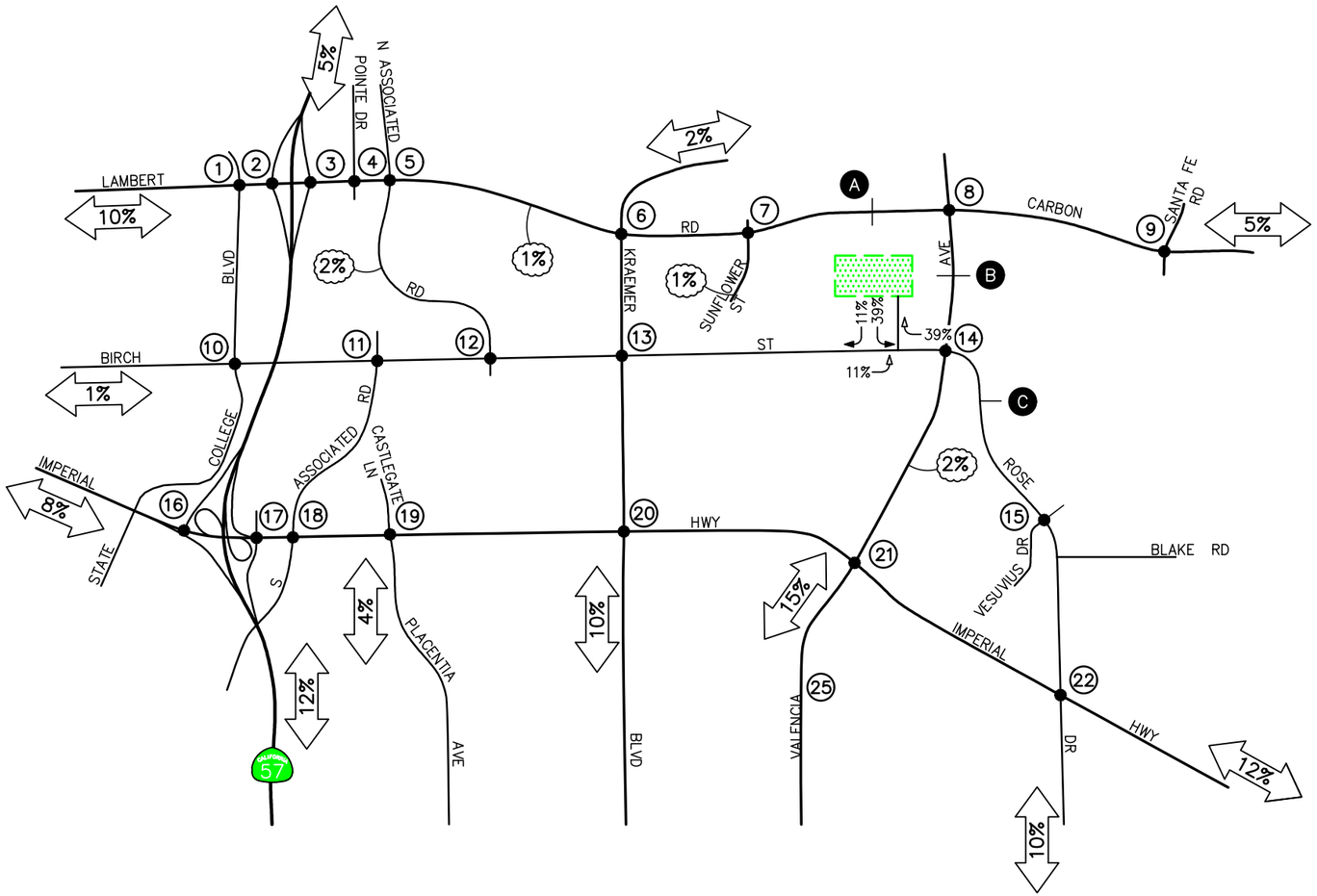
KEY

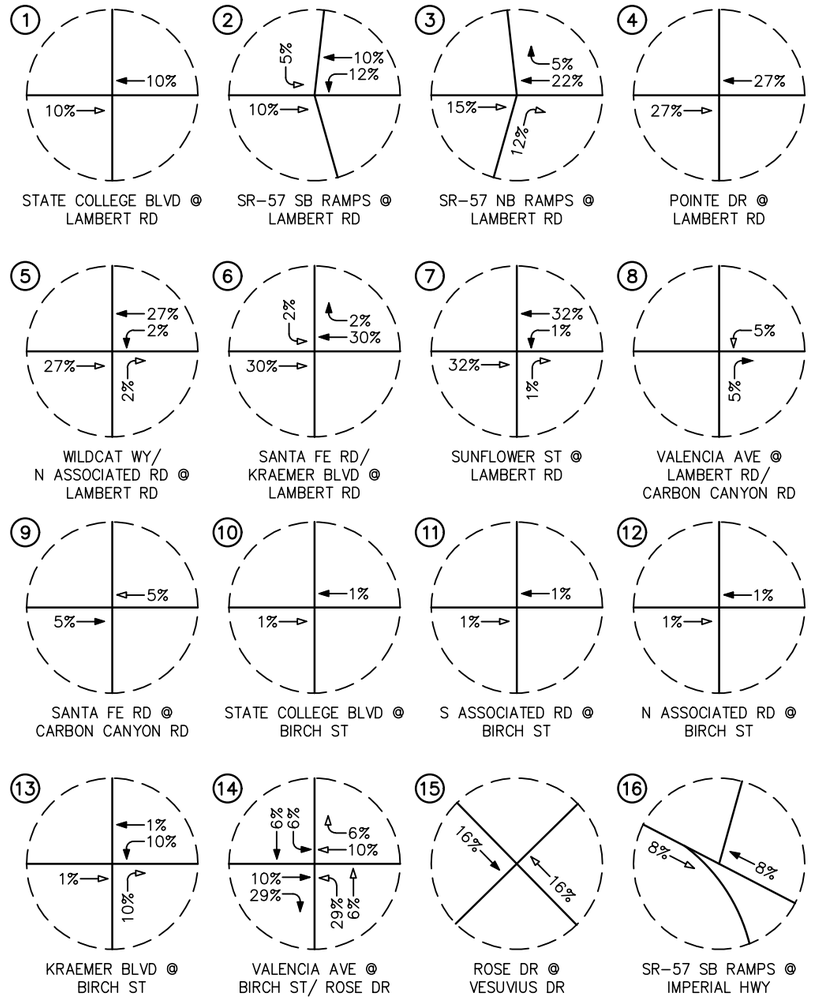
(#) = STUDY INTERSECTION
= INBOUND PERCENTAGE
= OUTBOUND PERCENTAGE
= ZONE 2A

FIGURE 5-2

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 2A

BREA 265 SPECIFIC PLAN, BREA





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N NO SCALE

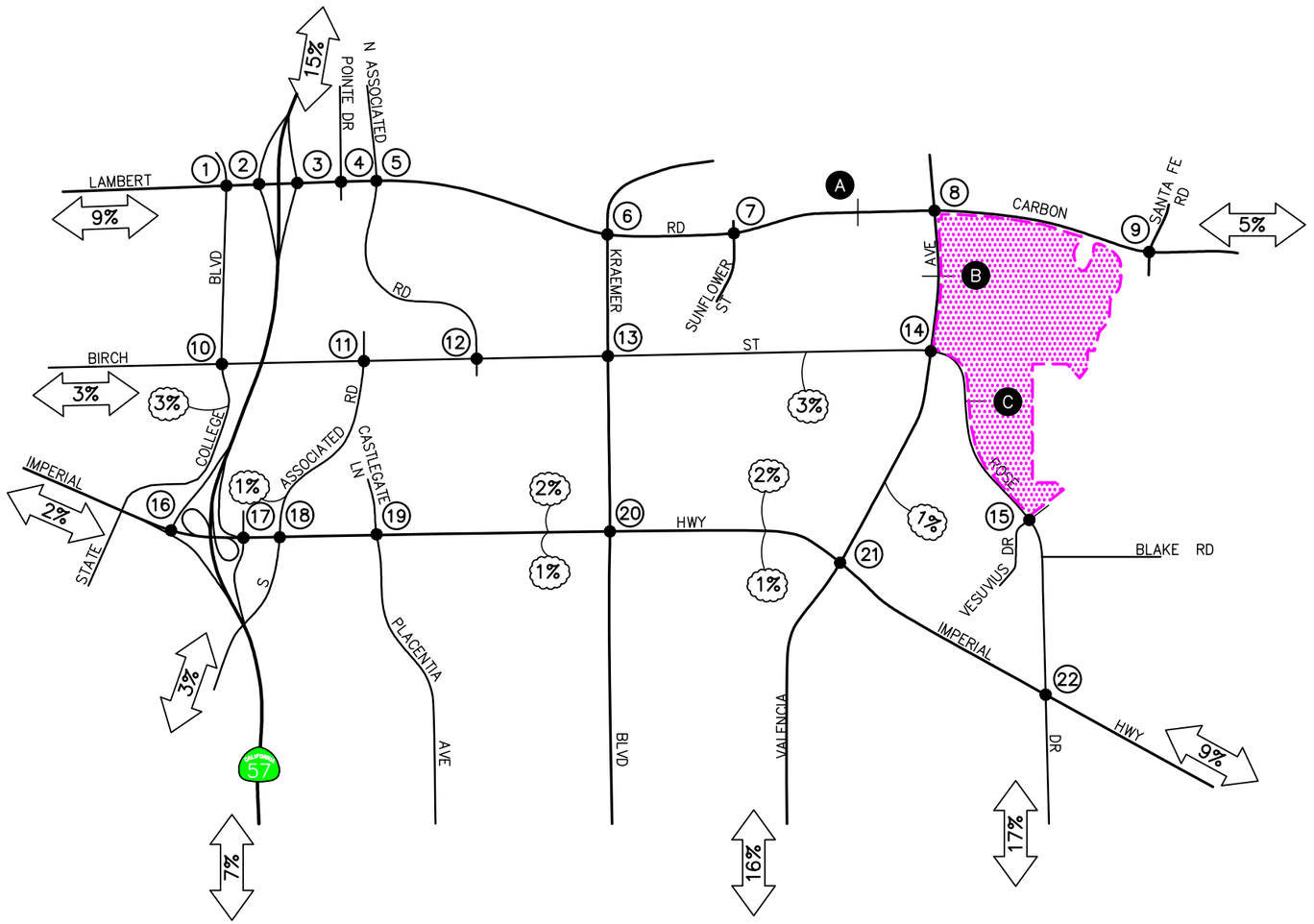
KEY

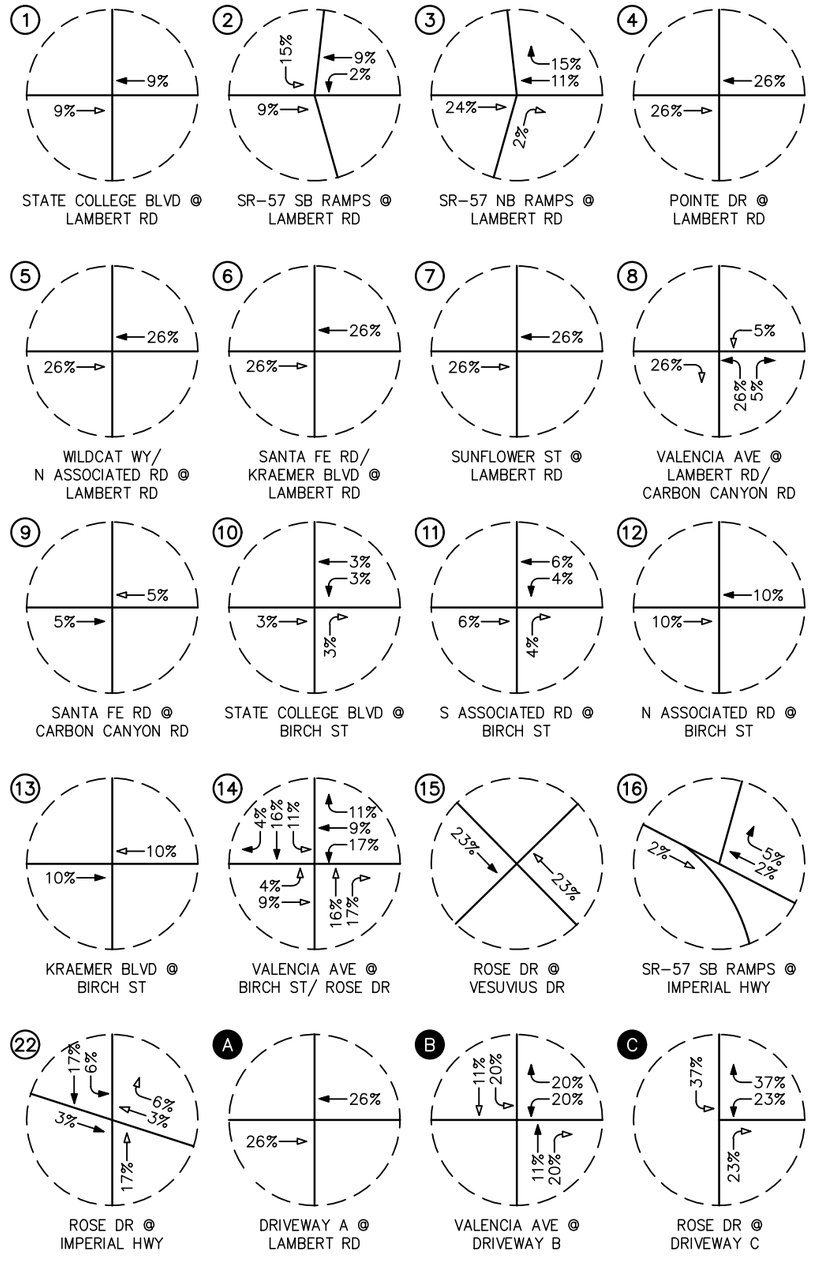
(#) = STUDY INTERSECTION
⟵ = INBOUND PERCENTAGE
⟵ = OUTBOUND PERCENTAGE
▭ = ZONE 2B

FIGURE 5-3

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 2B

BREA 265 SPECIFIC PLAN, BREA





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N NO SCALE

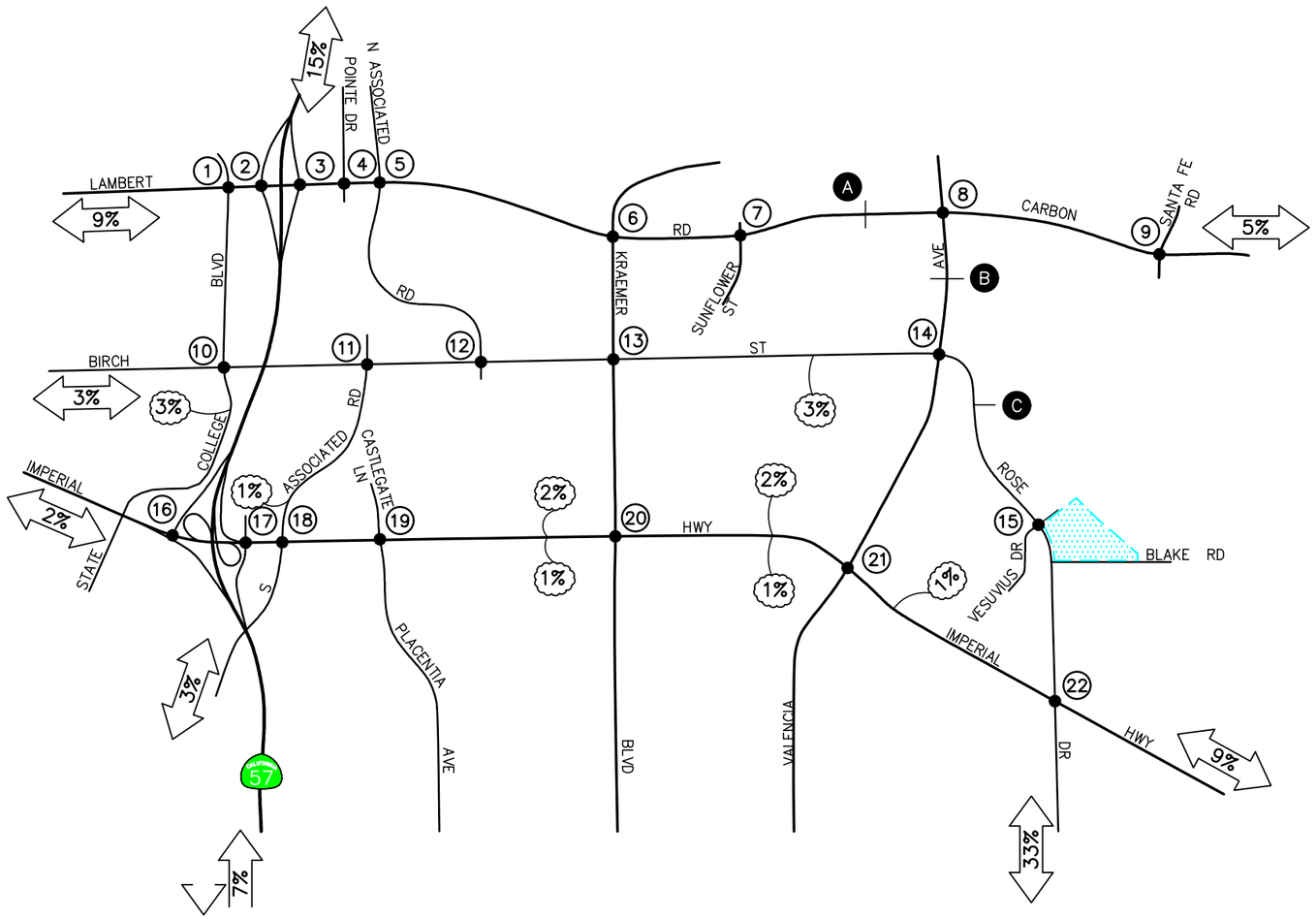
KEY

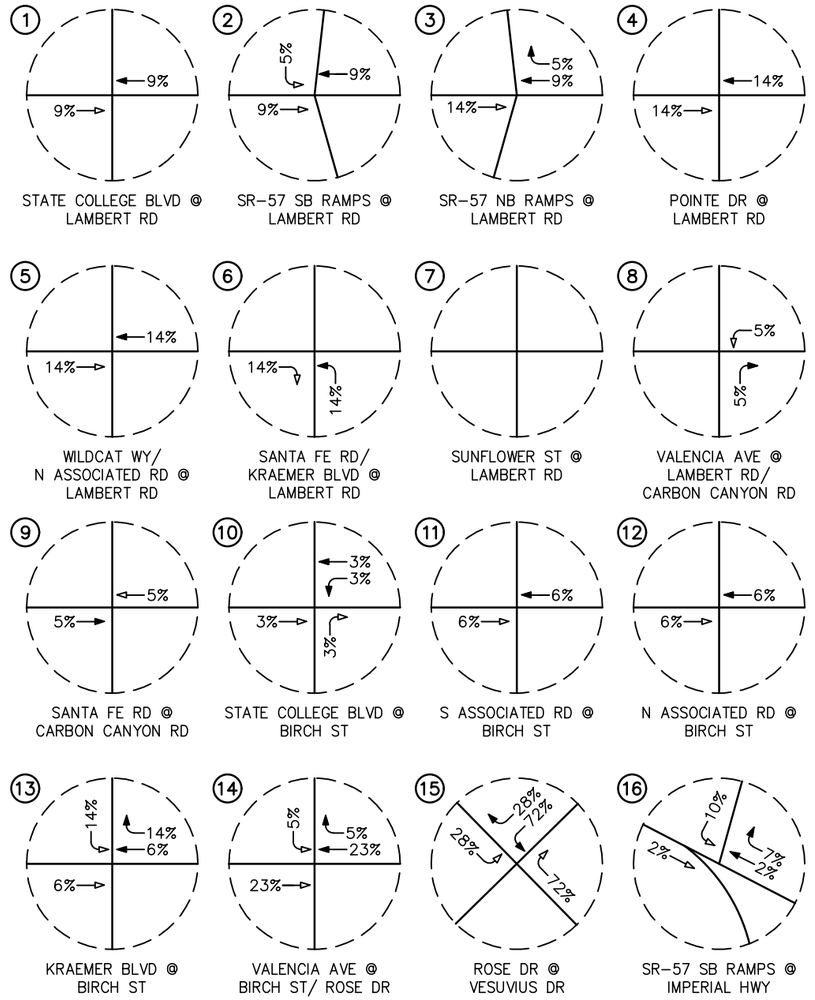
(#) = STUDY INTERSECTION
⟵ = INBOUND PERCENTAGE
⟵ = OUTBOUND PERCENTAGE
= ZONE 3A

FIGURE 5-4

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 3A

BREA 265 SPECIFIC PLAN, BREA





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N NO SCALE

KEY

(#) = STUDY INTERSECTION
◁—— = INBOUND PERCENTAGE
——▶ = OUTBOUND PERCENTAGE
▒▒ = ZONE 3B

FIGURE 5-5

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 3B

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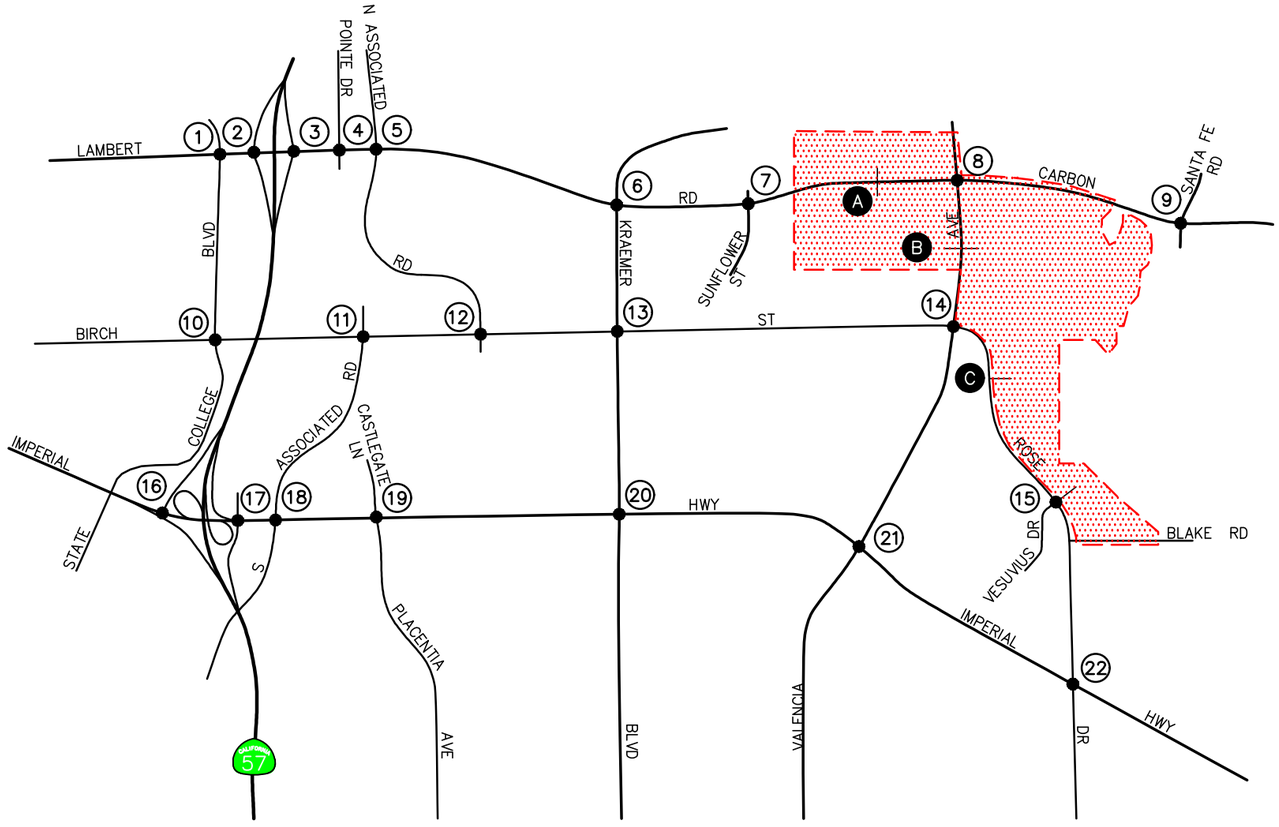
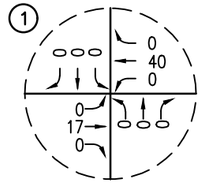
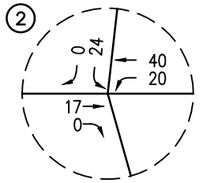
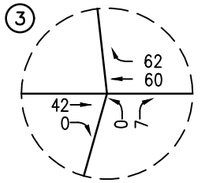




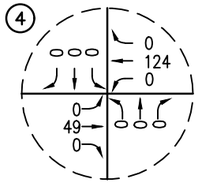
STATE COLLEGE BLVD @ LAMBERT RD



SR-57 SB RAMPS @ LAMBERT RD



SR-57 NB RAMPS @ LAMBERT RD



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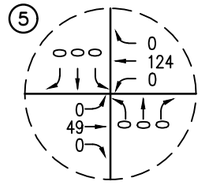

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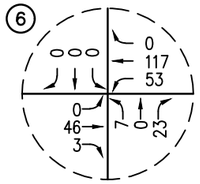

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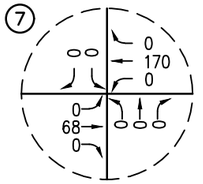

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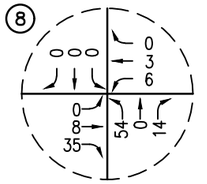
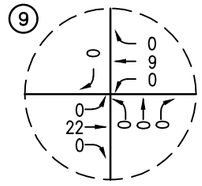


VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



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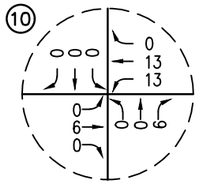

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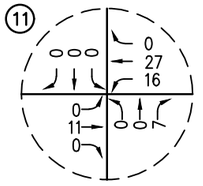

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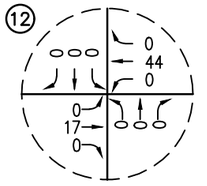

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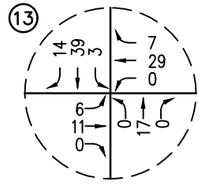

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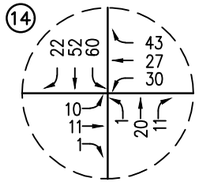

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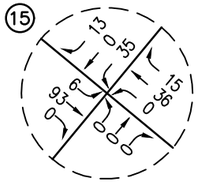
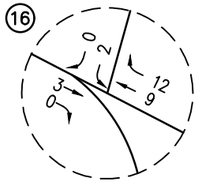


ROSE DR @ VESUVIUS DR



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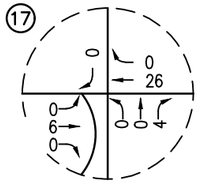

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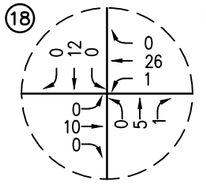

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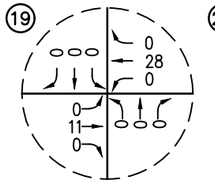

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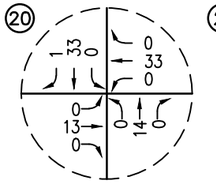

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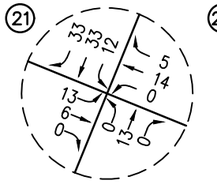
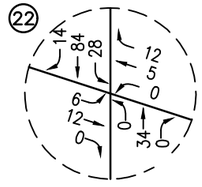
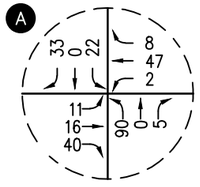


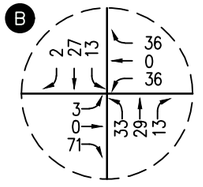
VALENCIA AVE @ IMPERIAL HWY



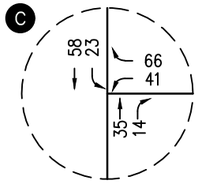
ROSE DR @ IMPERIAL HWY



DRIVEWAY A @ LAMBERT RD



VALENCIA AVE @ DRIVEWAY B



ROSE DR @ DRIVEWAY C

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

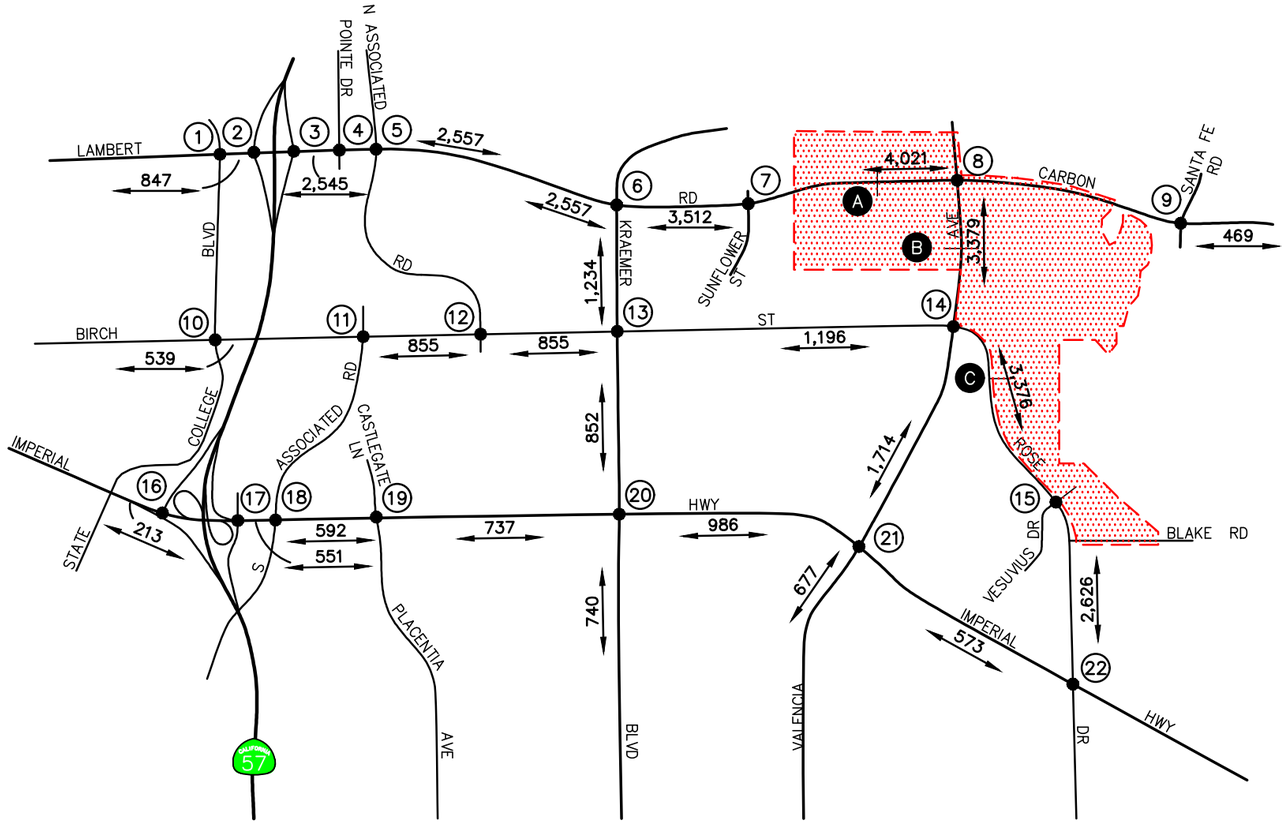
(#) = STUDY INTERSECTION

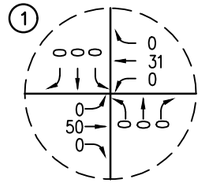
= PROJECT SITE

FIGURE 5-6

AM PEAK HOUR PROJECT TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA





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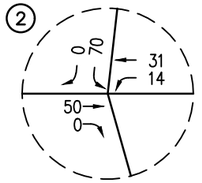

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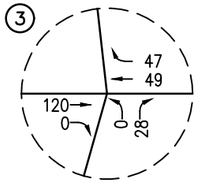

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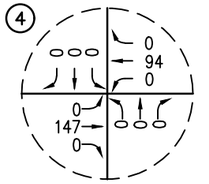
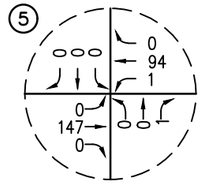
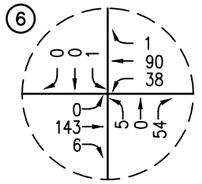


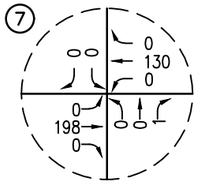
4 POINTE DR @ LAMBERT RD



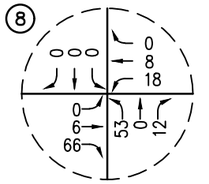
5 WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



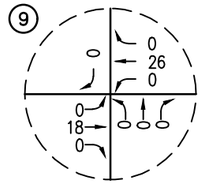
6 SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



7 SUNFLOWER ST @ LAMBERT RD



8 VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



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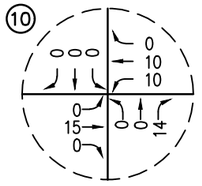

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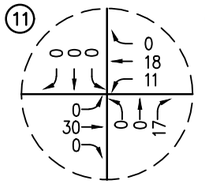

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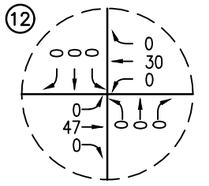

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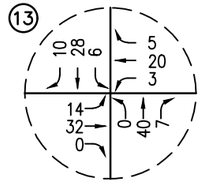
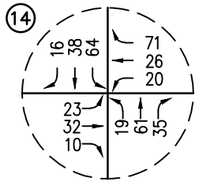
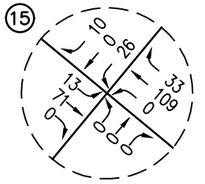


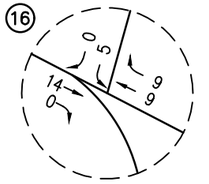
13 KRAEMER BLVD @ BIRCH ST



14 VALENCIA AVE @ BIRCH ST/ ROSE DR



15 ROSE DR @ VESUVIUS DR



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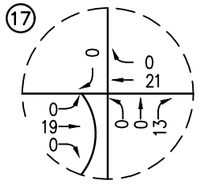

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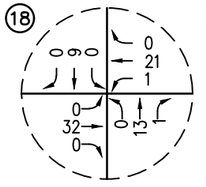

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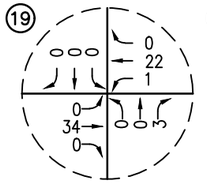

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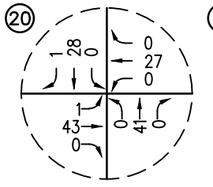
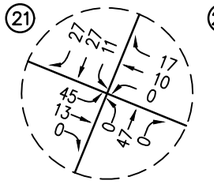


20 KRAEMER BLVD @ IMPERIAL HWY



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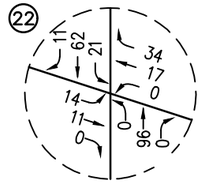
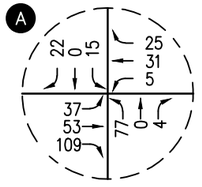
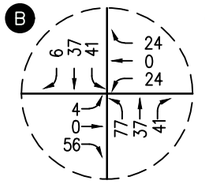


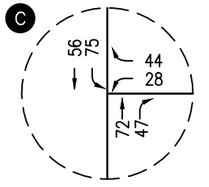
22 ROSE DR @ IMPERIAL HWY



A DRIVEWAY A @ LAMBERT RD



B VALENCIA AVE @ DRIVEWAY B



C ROSE DR @ DRIVEWAY C

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

XX,XXX = DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 5-7

PM PEAK HOUR AND DAILY PROJECT TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA

6.0 FUTURE TRAFFIC CONDITIONS

6.1 Ambient Traffic Growth

Horizon year, background traffic growth estimates have been calculated using an ambient traffic growth factor. The ambient traffic growth factor is intended to include unknown and future related projects in the study area, as well as account for regular growth in traffic volumes due to the development of projects outside the study area. The future growth in traffic volumes has been calculated at one percent (1.0%) per year. Applied to the Year 2021 existing traffic volumes, this factor results in an 14.0% growth in existing volumes to the near-term horizon year 2035.

6.2 Related Projects Traffic Characteristics

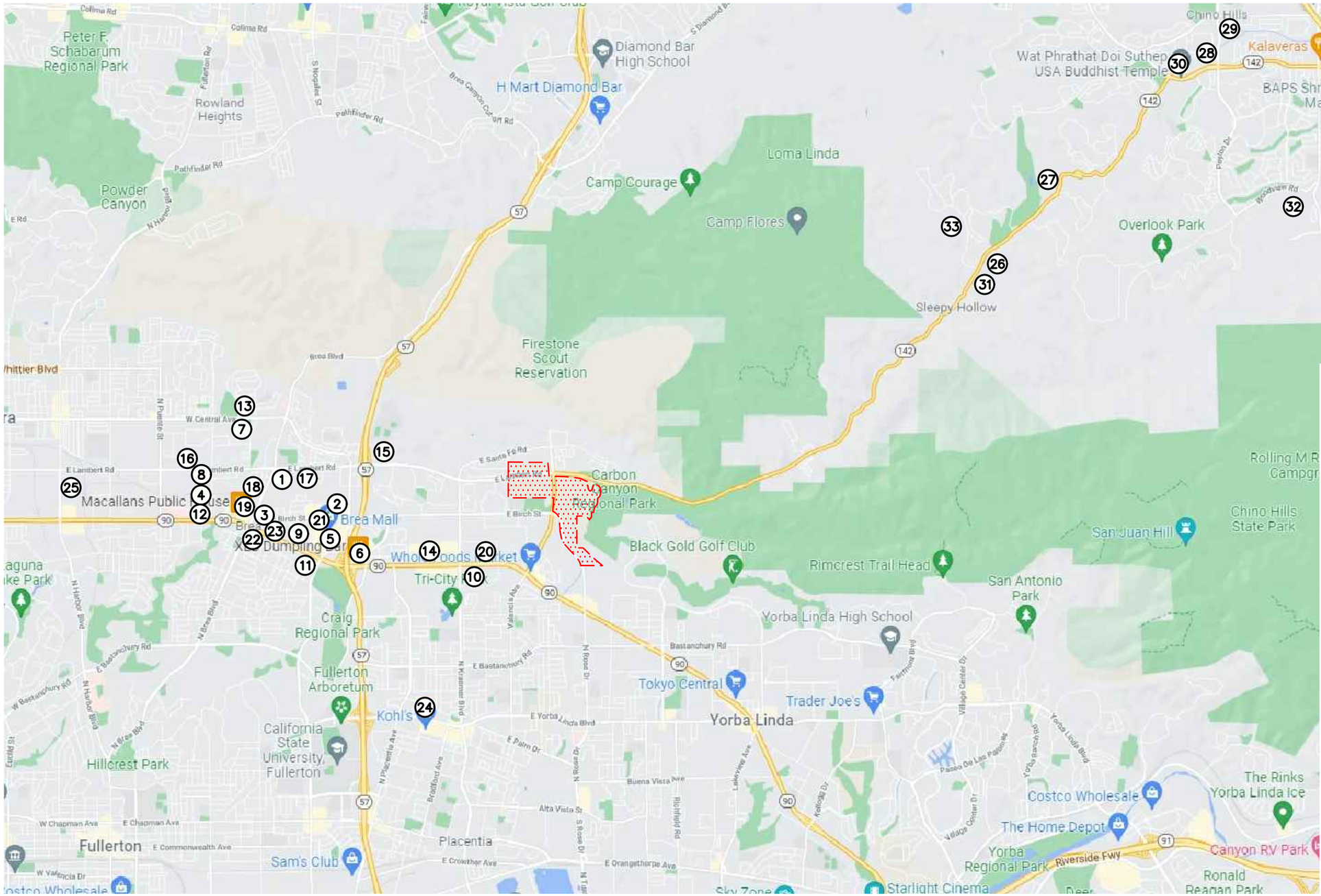
In order to make a realistic estimate of future on-street conditions prior to implementation of the proposed Project, the status of other known development projects (related projects) within the area of the proposed project has been researched at the City of Brea, City of Fullerton, City of Placentia, City of Yorba Linda, and City of Chino Hills. With this information, the proposed Project can be evaluated within the context of the cumulative setting.

Based on our research during the scoping process, there are twenty-three (23) related projects in the City of Brea, two (2) related projects in Fullerton, and eight (8) related projects in the City of Chino Hills that are being processed for approval. These thirty-three (33) related projects have been included as part of the cumulative background setting.

Table 6-1 provides a brief description for each of the thirty-three (33) related projects. ***Figure 6-1*** graphically illustrates the location of the thirty-three (33) related projects. These related projects are expected to generate vehicular traffic, which may affect the operating conditions of the study intersections.

Table 6-2 summarizes the trip generation potential for all thirty-three (33) related projects on a daily and peak hour basis for a typical weekday. As shown, the related projects are expected to generate 38,572 daily trips, with 3,006 trips (1,547 inbound, 1,459 outbound) anticipated during the AM peak hour and 3,517 trips (1,792 inbound, 1,725 outbound) produced during the PM peak hour.

The AM and PM peak hour traffic volumes associated with the thirty-three (33) related projects in the Year 2035 are presented in ***Figures 6-2*** and ***6-3***, respectively. *Figure 6-3* also presents the daily related project traffic volumes.



KEY

1. CVS
2. BREA PLACE
3. DOWNTOWN HOTEL
4. MERCURY APARTMENTS
5. BREA MALL MIXED-USE PROJECT
6. BREA PLAZA
7. CENTRAL PARK VILLAGE
8. NEW INDUSTRIAL BUILDING
9. ALVERO ASSISTED LIVING
10. EXTRA SPACE SELF STORAGE
11. BREA IMPERIAL CENTER
12. TRANSWESTERN
13. THE PHOENIX CLUB
14. ALDI GROCERY STORE
15. STARBUCKS WITH DRIVE-THRU
16. LAMBERT ROAD CONDOS
17. BREA METRO OFFICE CONDOS
18. FATHER'S HOUSE
19. CHA CHA'S EXPANSION
20. WESTERN REALCO
21. CAMP TRANSFORMATION
22. BREA EXPRESS WASH
23. RAISING CANE'S
24. 3105 YORBA LINDA BOULEVARD
25. BECKMAN BUSINESS CENTER
26. WOODBRIDGE PACIFIC GROUP (CANYON HILLS/HILLCREST)
27. STONEFIELD DEVELOPMENT
28. MORNINGFIELD ESTATES AND LOVING SAVIOR OF THE HILLS LUTHERAN CHURCH AN SCHOOL MASTER PLAN ADDENDUM
29. COPTIC ORTHODOX CHURCH
30. BUDDHIST TEMPLE OF CHINO HILLS
31. HIDDEN OAKS
32. GREENING LOS SERRANOS GOLF COURSE PROJECT
33. PARADISE RANCH

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

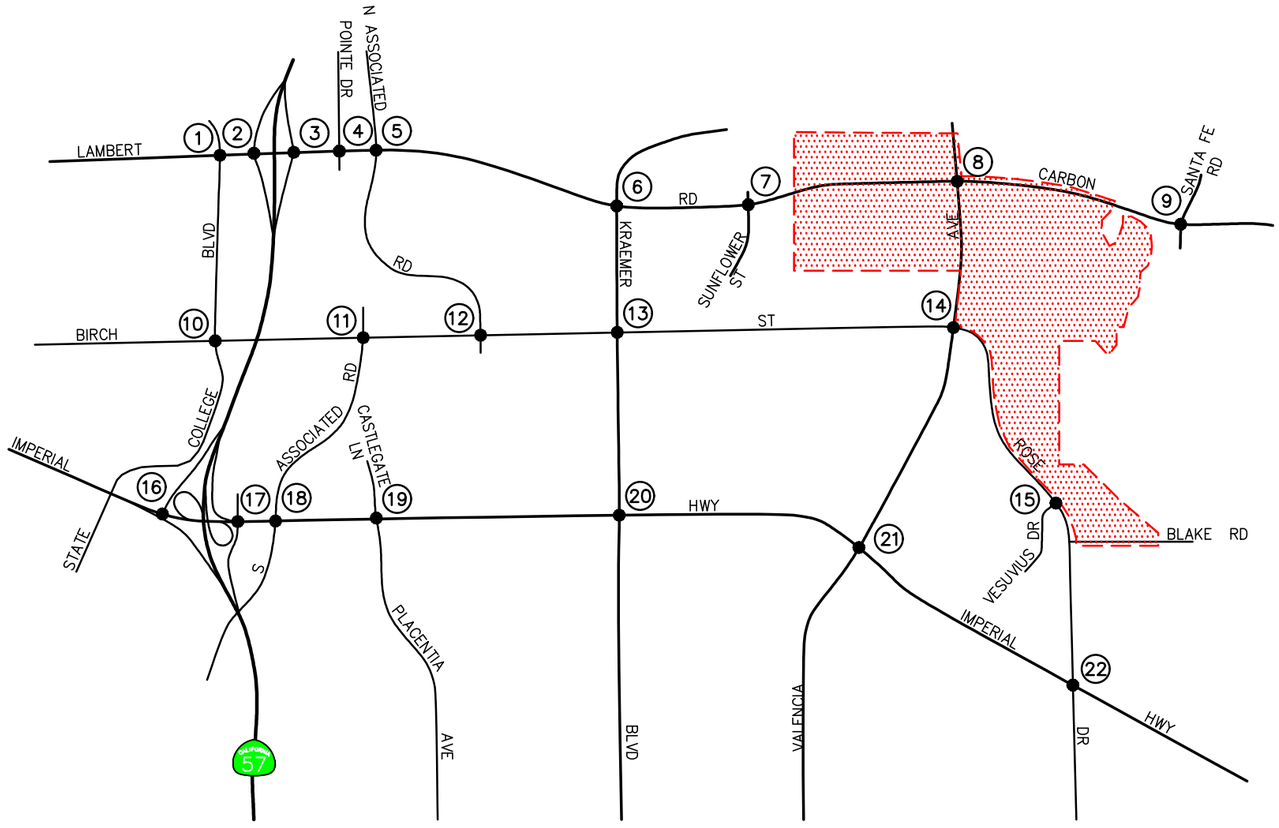
(#) = CUMULATIVE PROJECT LOCATION

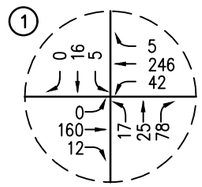
= PROJECT SITE

FIGURE 6-1

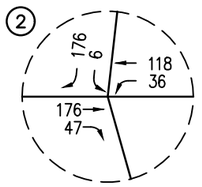
LOCATION OF CUMULATIVE PROJECTS

BREA 265 SPECIFIC PLAN, BREA

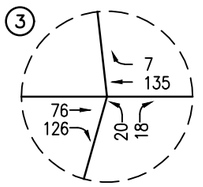




1 STATE COLLEGE BLVD @ LAMBERT RD



2 SR-57 SB RAMPS @ LAMBERT RD



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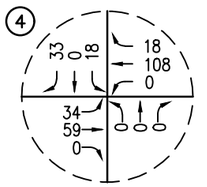
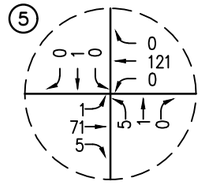
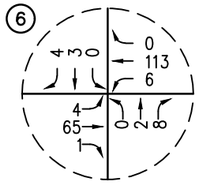


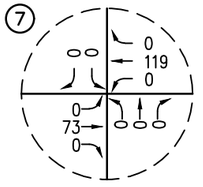
4 POINTE DR @ LAMBERT RD



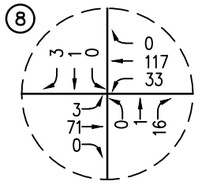
5 WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



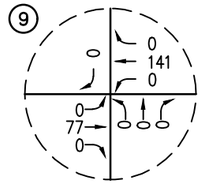
6 SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



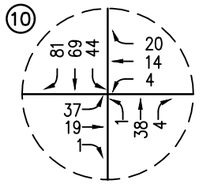
7 SUNFLOWER ST @ LAMBERT RD



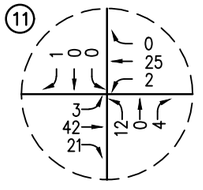
8 VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



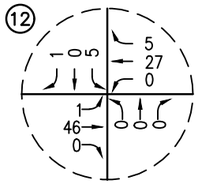
9 SANTA FE RD @ CARBON CANYON RD



10 STATE COLLEGE BLVD @ BIRCH ST



11 S ASSOCIATED RD @ BIRCH ST



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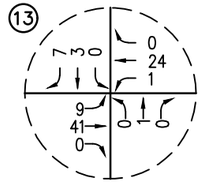
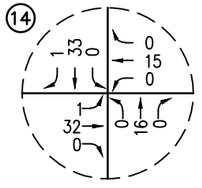
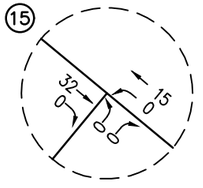


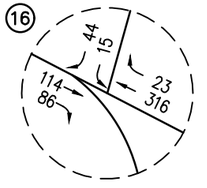
13 KRAEMER BLVD @ BIRCH ST



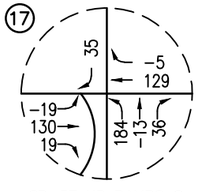
14 VALENCIA AVE @ BIRCH ST/ ROSE DR



15 ROSE DR @ VESUVIUS DR



16 SR-57 SB RAMPS @ IMPERIAL HWY



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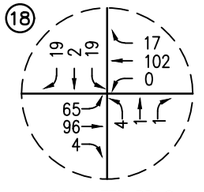

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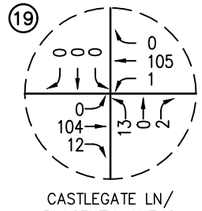

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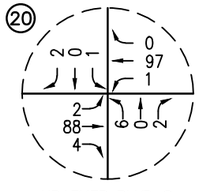

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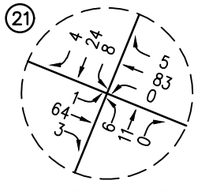

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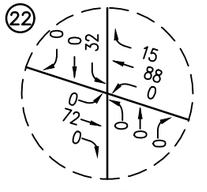

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LINSCOTT LAW & GREENSPAN engineers

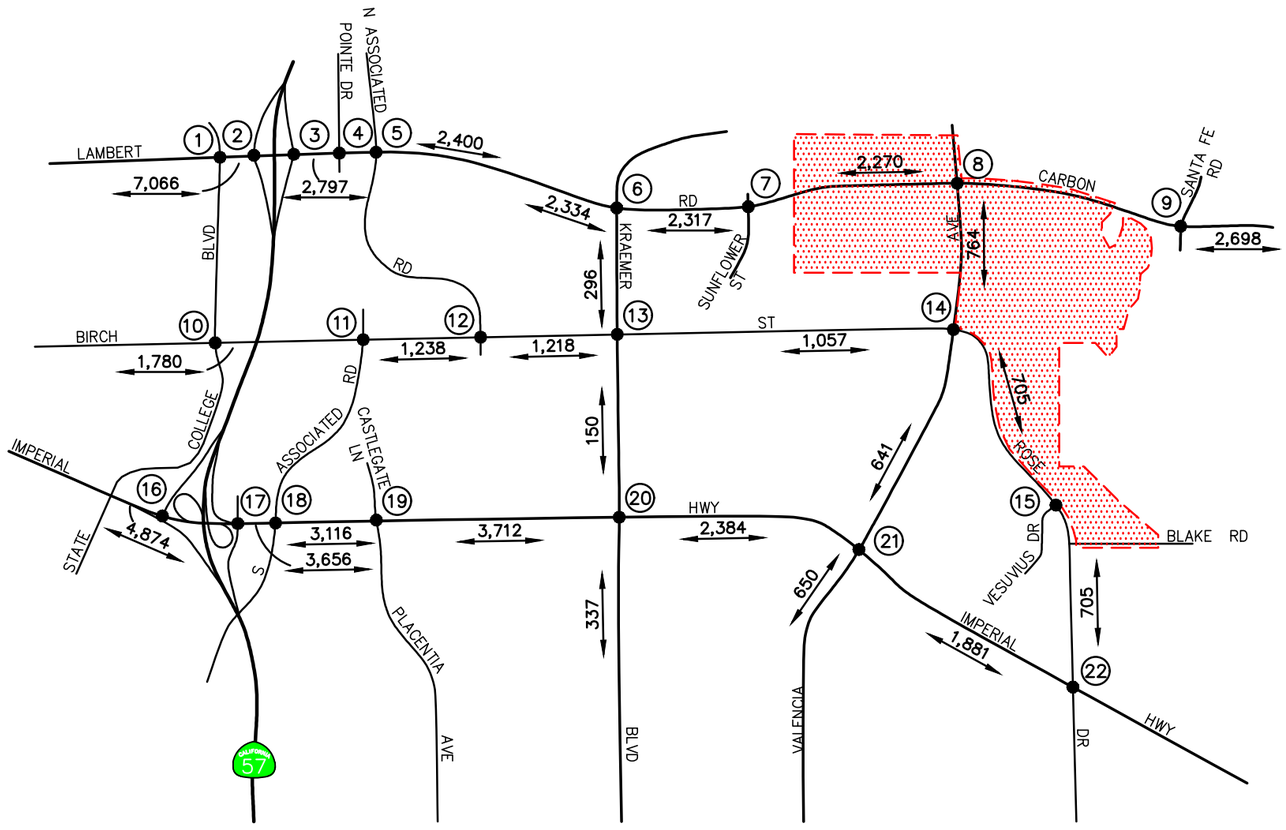
N NO SCALE

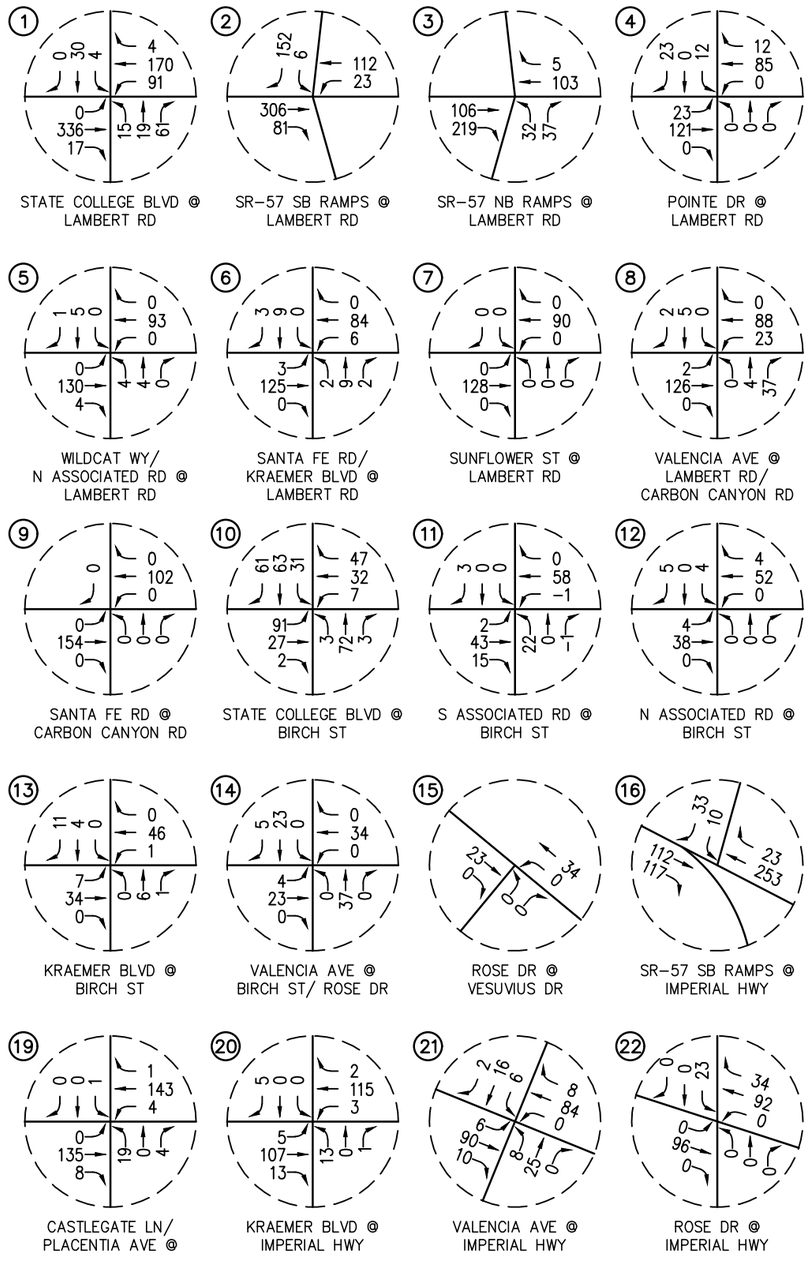
KEY
(#) = STUDY INTERSECTION
= PROJECT SITE

FIGURE 6-2

AM PEAK HOUR CUMULATIVE PROJECTS TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

XX,XXX = DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 6-3

PM PEAK HOUR AND DAILY CUMULATIVE PROJECTS TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA

TABLE 6-1
LOCATION AND DESCRIPTION OF CUMULATIVE PROJECTS[10]

No.	Description	Location/Address	Size
City of Brea			
1.	CVS	390 N. Brea Boulevard	13,000 SF Pharmacy with Drive-Through, 1,700 SF Coffee Shop with Drive-through
2.	Brea Place	State College Boulevard at Birch Street	653 DU Apartments, 5,000 SF Office, 150 Room Hotel[11]
3.	Downtown Hotel	220 S. Brea Boulevard	116 Room Hotel, 4,000 SF High Turnover Sit Down Restaurant
4.	Mercury Apartments	Southeast corner of Berry Street at Mercury Lane	120 DU Apartments
5.	Brea Mall Mixed-Use Project	1065 Brea Mall	Demolish existing 161,990 SF Sears department store and construct 119,415 SF additional retail space, a 128,000 SF health club, and 383 DU medium density residential units
6.	Brea Plaza	409-477 S. Associated Road and 1555, 1609, 1623, 1643 E. Imperial Highway	Demolition of an existing 18,450 SF movie theater and the construction of a mixed-use development with 21,355 SF of office space and 229[12] apartment units
7.	Central Park Village	340-420 W. Central Avenue	62 DU townhomes and 20 DU apartments[13]
8.	New Industrial Building	201 N. Berry Street	109,125 SF warehouse
9.	Alvero Assisted Living	251 S. Randolph Avenue	80 rooms with 82 beds residential care facility
10.	Extra Space Self Storage	2700 E. Imperial Highway	126,546 self-storage facility
11.	Brea Imperial Center	391 S. State College Boulevard	5,000 SF restaurant, 2,300 SF bagel/coffee shop, 1,600 SF café, 3,867 SF In-N-Out, 28,145 SF retail, and 4,400 SF bank to replace existing land uses which include 4,050 SF food uses, 24,481 SF retail, 4,400 SF bank, 2,325 SF medical office, 10,074 SF health studio spa.
12.	Transwestern	285 S. Berry Street and 711 W. Imperial Highway	126,797 SF warehouse
13.	The Phoenix Club	375 W. Central Avenue	8,350 SF restaurant with banquet hall
14.	Aldi Grocery Store	2395 E. Imperial Highway	21,106 SF grocery store
15.	Starbucks with Drive-Thru	2 Pointe Drive	2,400 SF coffee shop with drive-thru
16.	Lambert Road Condos	700-800 W. Lambert Road	24 DU condominiums

10 Source: City of Brea, Fullerton, and Chino Hills Planning Departments.

11 The traffic impact analysis conservatively evaluated 790 units as originally planned, which would result in higher traffic volumes in the cumulative scenarios.

12 Fifteen (15) of the proposed apartments are considered co-living units, which include five (5) 3-bedroom units and ten (10) four-bedroom units, therefore, to provide a conservative assessment, the co-living unit bedrooms have been counted as individual units for a total apartment count of 229 units.

13 The project has already built and occupied 206 DU apartments and 83 DU townhomes.

TABLE 6-1(CONTINUED)
LOCATION AND DESCRIPTION OF CUMULATIVE PROJECTS[14]

No.	Description	Location/Address	Size
City of Brea (Continued)			
17.	Brea Metro Office Condos	330 E. Lambert Road	33 DU condominiums
18.	Father's House	245 W. Birch Street	299 seat religious assembly
19.	Cha Cha's Expansion	110 W. Birch Street	Existing restaurant expansion of 2,710 SF
20.	Western Realco	2929 E. Imperial Highway	131,500 SF industrial building
21.	CAMP Transformation	910 E. Birch Street, Suite 250	4,100 SF Fitness Center
22.	Brea Express Wash	300 S. Brea Boulevard	4,254 SF express car wash
23.	Raising Cane's	255 E. Imperial Highway	Demolish existing 9,588 SF office building and construction of a 4,047 SF fast food restaurant with drive-through
City of Fullerton			
24.	3105 Yorba Linda Boulevard	3105 Yorba Linda Boulevard	4,840 SF drive-through car wash
25.	Beckman Business Center	4300 North Harbor Boulevard	522,250 SF Warehousing, 166,185 SF General Light Industrial, 105,880 SF Manufacturing, 42,000 SF Office, and 142,350 SF fulfillment center
City of Chino Hills			
26.	Woodbridge Pacific Group (Canyon Hills/Hillcrest)	Northwest of Carbon Canyon Road and west of Canyon Hills Road	38 DU Single Family Detached
27.	Stonefield Development	Northwest of Carbon Canyon Road and east of Fairway Drive	28 DU single-family
28.	Morningfield Estates and Loving Savior of the Hills Lutheran Church and School Master Plan Addendum	South of Morningfield Drive, west of Peyton Drive, north of Chino Hills Parkway, adjacent to San Bernardino County Flood Channel	7-Lot Subdivision with semi-custom single-family homes, plus 3 classrooms/71 student addition to the Lutheran School
29.	Coptic Orthodox Church	East side of Peyton Drive, north of the Chino Creek Drainage Channel and south of the Chino Valley Community Church property	14,695 SF multi-purpose room, 8,645 SF Sanctuary and 555 SF Bookstore
30.	Buddhist Temple of Chino Hills	Northeast of Chino Hills Parkway and Rustic Drive	23,400 SF Buddhist temple expansion
31.	Hidden Oaks	East of Carbon Canyon Road at Canyon Hills Road	53 DU Single Family
32.	Greening Los Serranos Golf Course Project	15656 Yorba Avenue	124 DU single family, 532 DU multifamily
33.	Paradise Ranch	East of Canyon Hills Road and south of Esquilime Drive	51 DU single-family

[14] Source: City of Brea, Fullerton, and Chino Hills Planning Departments.

TABLE 6-2
CUMULATIVE PROJECTS TRAFFIC GENERATION FORECAST[15]

Cumulative Project Description	Weekday Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
1. CVS	1,948	59	58	117	59	58	117
2. Brea Place	6,364	122	271	393	300	199	499
3. Downtown Hotel	1,201	45	34	79	44	37	81
4. Mercury Apartments[16]	653	11	32	43	32	21	53
5. Brea Mall Mixed-Use Project[17]	4,487	176	172	348	303	158	461
6. Brea Plaza[18]	-1,680	39	61	100	-33	-27	-60
7. Central Park Village	553	8	25	33	26	16	42
8. New Industrial Building	247	22	5	27	9	22	31
9. Alvero Assisted Living	213	9	6	15	8	12	20
10. Extra Space Self Storage	183	6	5	11	9	10	19
11. Brea Imperial Center[19]	1,315	58	60	118	56	37	93
12. Transwestern	288	24	7	31	10	26	36
13. The Phoenix Club	805	40	32	72	26	17	43
14. Aldi Grocery Store	1,783	31	23	54	72	72	144
15. Starbucks with Drive-Thru	961	52	51	103	35	35	70
16. Lambert Road Condos	162	2	8	10	8	4	12
17. Brea Metro Office Condos	222	3	10	13	11	6	17
18. Father's House	269	13	8	21	14	16	30
19. Cha Cha's Expansion	262	13	10	23	9	5	14
20. Western Realco	299	25	8	33	10	27	37
21. CAMP Transformation	140	3	2	5	8	6	14
22. Brea Express Wash	600	16	16	32	30	30	60
23. Raising Cane's[20]	1,727	0	0	0	61	48	109
24. 3105 Yorba Linda Boulevard	690	18	18	36	35	34	69
25. Beckman Business Center[21]	7,564	583	172	755	253	599	852

15 Source: *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2021), unless otherwise noted.

16 Source: *Mercury Apartments TIA*, prepared by LLG Engineers, dated July 2019.

17 Source: *Brea Mall Mixed-Use Project Scope of Work*, prepared by LLG Engineers, dated December 2021.

18 Source: *Brea Plaza Expansion Revised TCA*, prepared by LLG Engineers, dated July 2021.

19 Source: *Brea Imperial Center TIA*, prepared by Wildan Engineering, dated July 2018.

20 Source: *Focused Transportation Assessment for Raising Cane's Projct,* prepared by Kimley Horn, dated December 2020.

21 Source: *Beckman Business Center Proposed Building 6 Tenant/Land Use Modification TIA Report Addendum,* prepared by LLG Engineers, dated September 2019. Although this development is completely constructed, it was only partially occupied during the time the existing traffic counts were collected. Hence to provide a conservative assessment, all buildings are assumed to be vacant.

TABLE 6-2 (CONTINUED)

CUMULATIVE PROJECTS TRAFFIC GENERATION FORECAST[22]

Cumulative Project Description	Weekday Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
26. Woodbridge Pacific Group (Canyon Hills/Hillcrest)	358	7	20	27	23	13	36
27. Stonefield Development	264	5	15	20	16	10	26
28. Morningfield Estates and Loving Savior of the Hills Lutheran Church and School Master Plan Addendum[23]	264	36	33	69	24	26	50
29. Coptic Orthodox Church	494	20	11	31	19	23	42
30. Buddhist Temple of Chino Hills[24]	200	7	5	12	6	6	12
31. Hidden Oaks	500	10	27	37	32	18	50
32. Greening Los Serranos Golf Course Project	4,755	74	226	300	245	143	388
33. Paradise Ranch[25]	481	10	28	38	32	18	50
Cumulative Projects Total Trip Generation Potential	**38,572**	**1,547**	**1,459**	**3,006**	**1,792**	**1,725**	**3,517**

[22] Source: *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2021), unless otherwise noted.

[23] Source: *Morningfield Estates and Loving Savior of the Hills Lutheran Church and School Master Plan Addendum Traffic Impact Analysis,* prepared by LLG Engineers, dated April 12, 2017.

[24] Source: *Buddhist Temple Traffic Impact Analysis,* prepared by LLG Engineers, dated January 23, 2017.

[25] Source: *Paradise Ranch Traffic Study,* prepared by LLG Engineers, dated August 2021.

6.3 Year 2045 Traffic Conditions

As coordinated with City staff, the Year 2045 General Plan Buildout traffic volume forecasts for this traffic study were developed via the utilization of the OCTAM 5.0 Year 2045 traffic model. Specifically, daily, AM peak period and PM peak period link traffic volumes were provided for the existing base year (i.e. Year 2016) and for the Year 2045. The AM peak period corresponds to a three-hour morning commute period while the PM peak period corresponds to a four-hour afternoon commute period. Using the peak period model runs and the approved peak hour factors (i.e. AM = 0.3566 and PM = 0.2662), the one-hour peak hour link traffic volumes were determined. These future year 2045 link traffic volumes were post-processed based on the relationship of the base year validation model run output to the base year ground traffic counts resulting in anticipated Year 2045 without project daily traffic volumes for the roadway segments and AM peak hour/PM peak hour turning movements for the study intersections.

It should be noted that the OCTAM model has entitlements included assumed for Brea 265. However, to provide a conservative assessment Year 2045 traffic conditions exclude these entitlements resulting in the proposed Project being compared to a vacant site as it now currently exists.

Copies of the model post-processing worksheets are contained in ***Appendix E***.

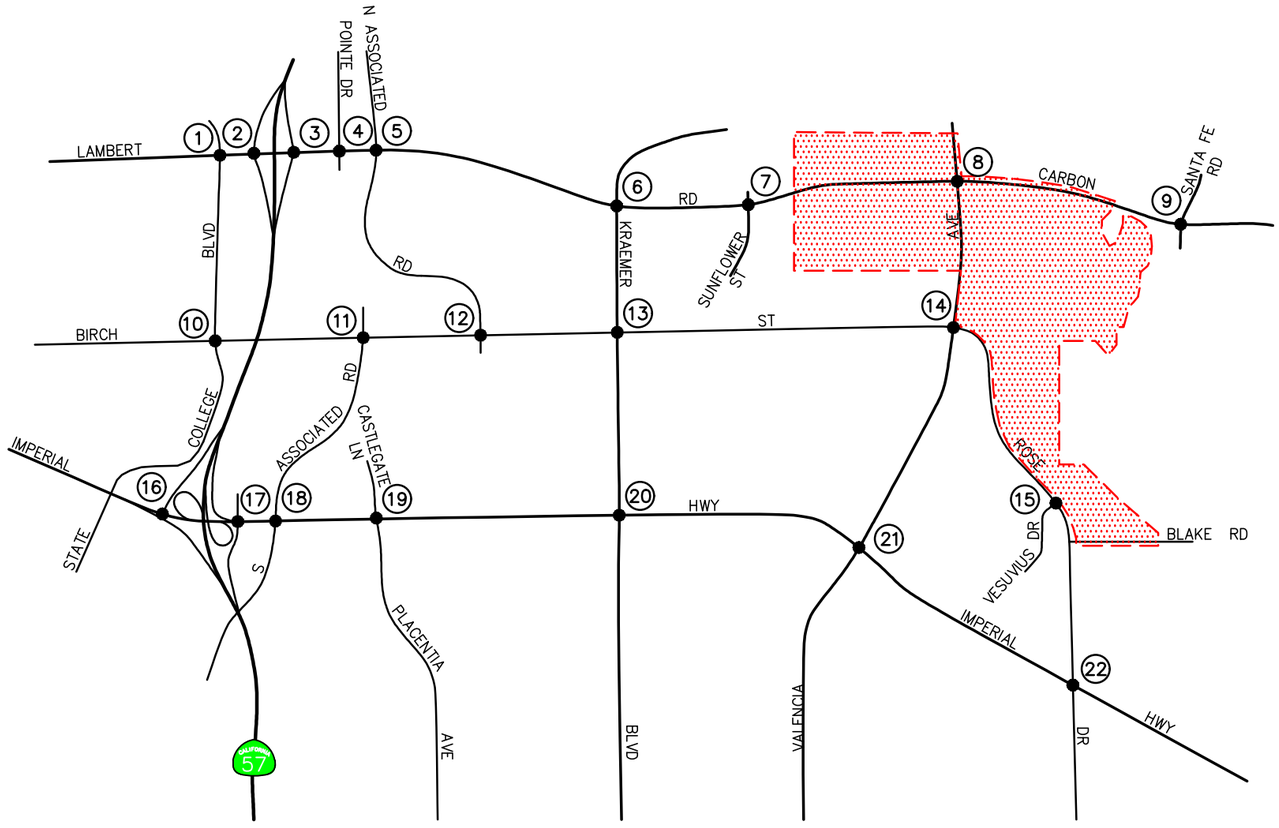
6.4 Year 2035 and Year 2045 Traffic Volumes

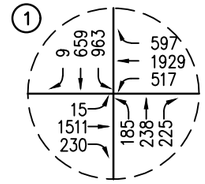
6.4.1 *Year 2035 Traffic Volumes*

Figures 6-4 and ***6-5*** present the AM and PM peak hour cumulative traffic volumes (existing traffic + ambient growth + related projects) at the twenty-two (22) key study intersections for the Year 2035, respectively. *Figure 6-5* also presents the Year 2035 daily cumulative traffic volumes. ***Figures 6-6*** and ***6-7*** illustrate the Year 2035 forecast AM and PM peak hour traffic volumes, with the inclusion of the trips generated by the proposed Project, respectively. *Figure 6-7* also presents the Year 2035 daily cumulative plus project traffic volumes.

6.4.2 *Year 2045 Traffic Volumes*

Figures 6-8 and ***6-9*** present the Year 2045 AM and PM peak hour buildout traffic volumes at the twenty-two (22) key study intersections, respectively. *Figure 6-9* also presents the Year 2045 daily buildout traffic volumes. ***Figures 6-10*** and ***6-11*** illustrate the Year 2045 forecast AM and PM peak hour traffic volumes, with the inclusion of the trips generated by the proposed Project, respectively. *Figure 6-11* also presents the Year 2045 daily buildout plus project traffic volumes.





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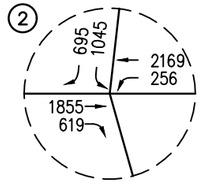

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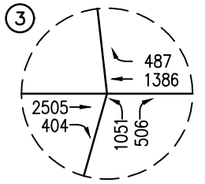

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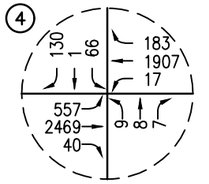

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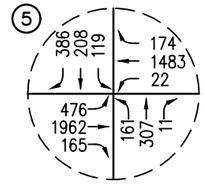

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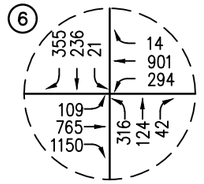

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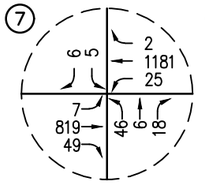
KRAEMER BLVD @
LAMBERT RD



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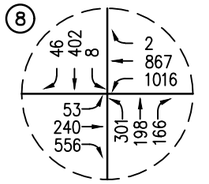

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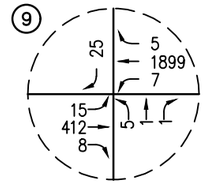

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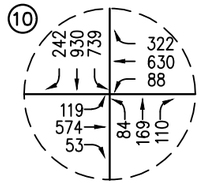

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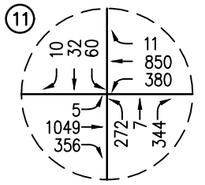

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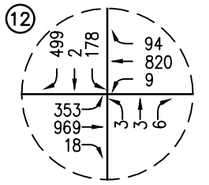

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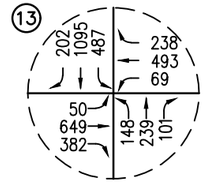

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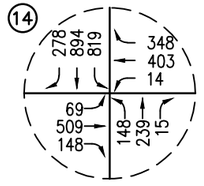

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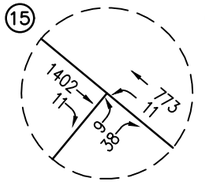
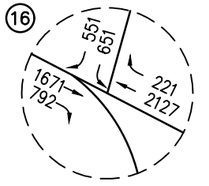


ROSE DR @
VESUVIUS DR



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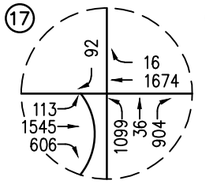

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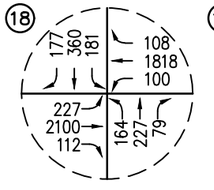

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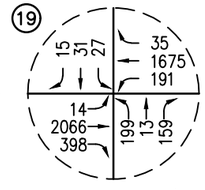

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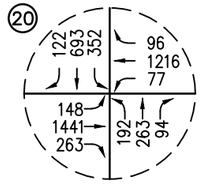

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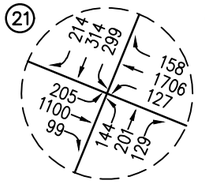
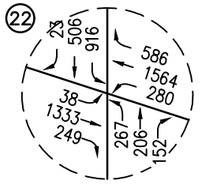
IMPERIAL HWY



VALENCIA AVE @
IMPERIAL HWY



ROSE DR @
IMPERIAL HWY

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

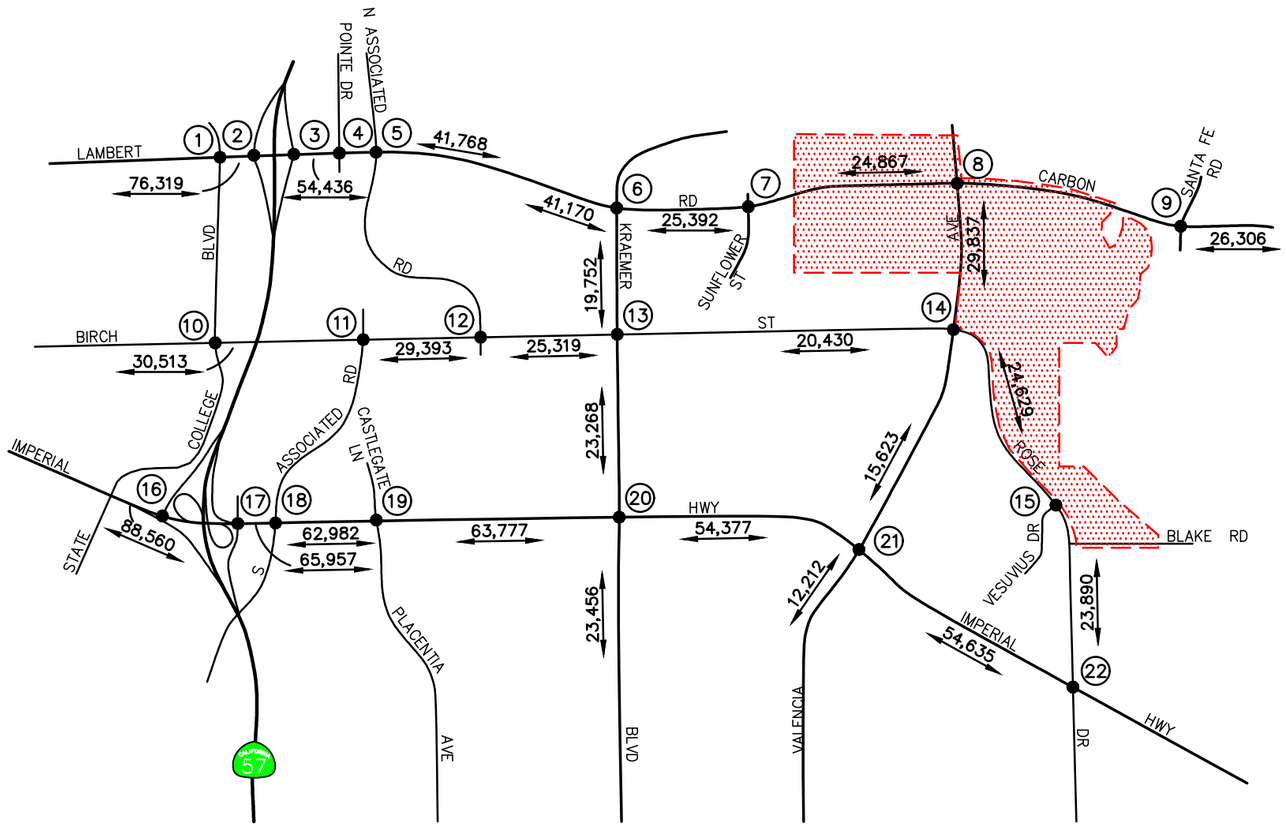
(#) = STUDY INTERSECTION

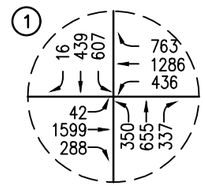
= PROJECT SITE

FIGURE 6-4

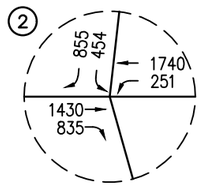
YEAR 2035 AM PEAK HOUR CUMULATIVE TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA

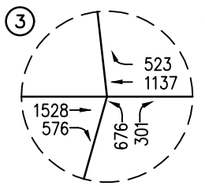




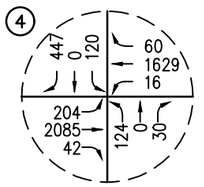
STATE COLLEGE BLVD @ LAMBERT RD



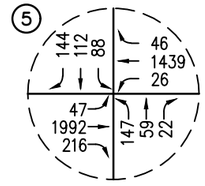
SR-57 SB RAMPS @ LAMBERT RD



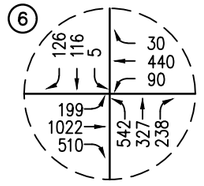
SR-57 NB RAMPS @ LAMBERT RD



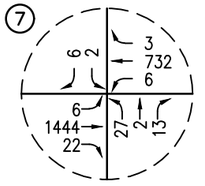
POINTE DR @ LAMBERT RD



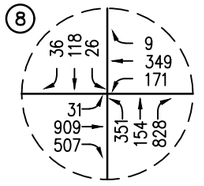
WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



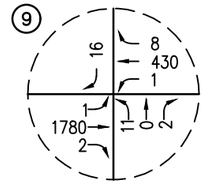
SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



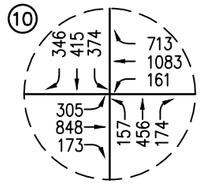
SUNFLOWER ST @ LAMBERT RD



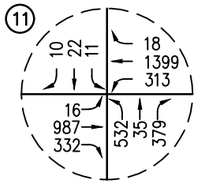
VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



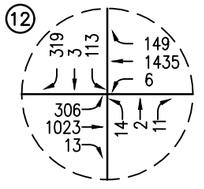
SANTA FE RD @ CARBON CANYON RD



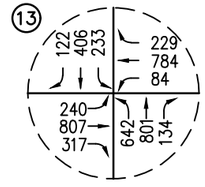
STATE COLLEGE BLVD @ BIRCH ST



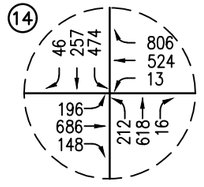
S ASSOCIATED RD @ BIRCH ST



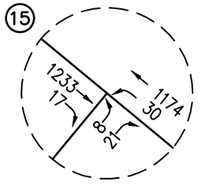
N ASSOCIATED RD @ BIRCH ST



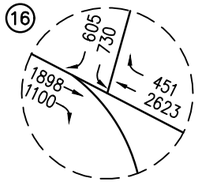
KRAEMER BLVD @ BIRCH ST



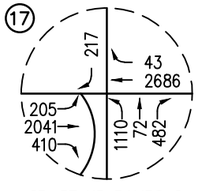
VALENCIA AVE @ BIRCH ST/ ROSE DR



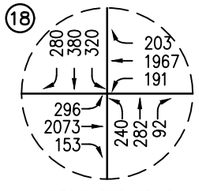
ROSE DR @ VESUVIUS DR



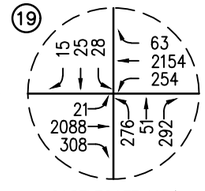
SR-57 SB RAMPS @ IMPERIAL HWY



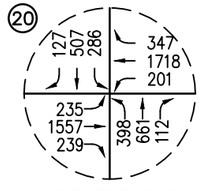
SR-57 NB RAMPS @ IMPERIAL HWY



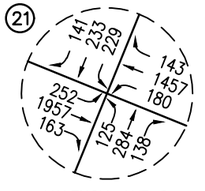
ASSOCIATED RD @ IMPERIAL HWY
IMPERIAL HWY



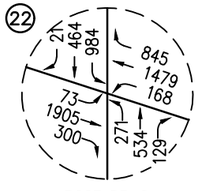
CASTLEGATE LN/ PLACENTIA AVE @



KRAEMER BLVD @ IMPERIAL HWY



VALENCIA AVE @ IMPERIAL HWY



ROSE DR @ IMPERIAL HWY

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

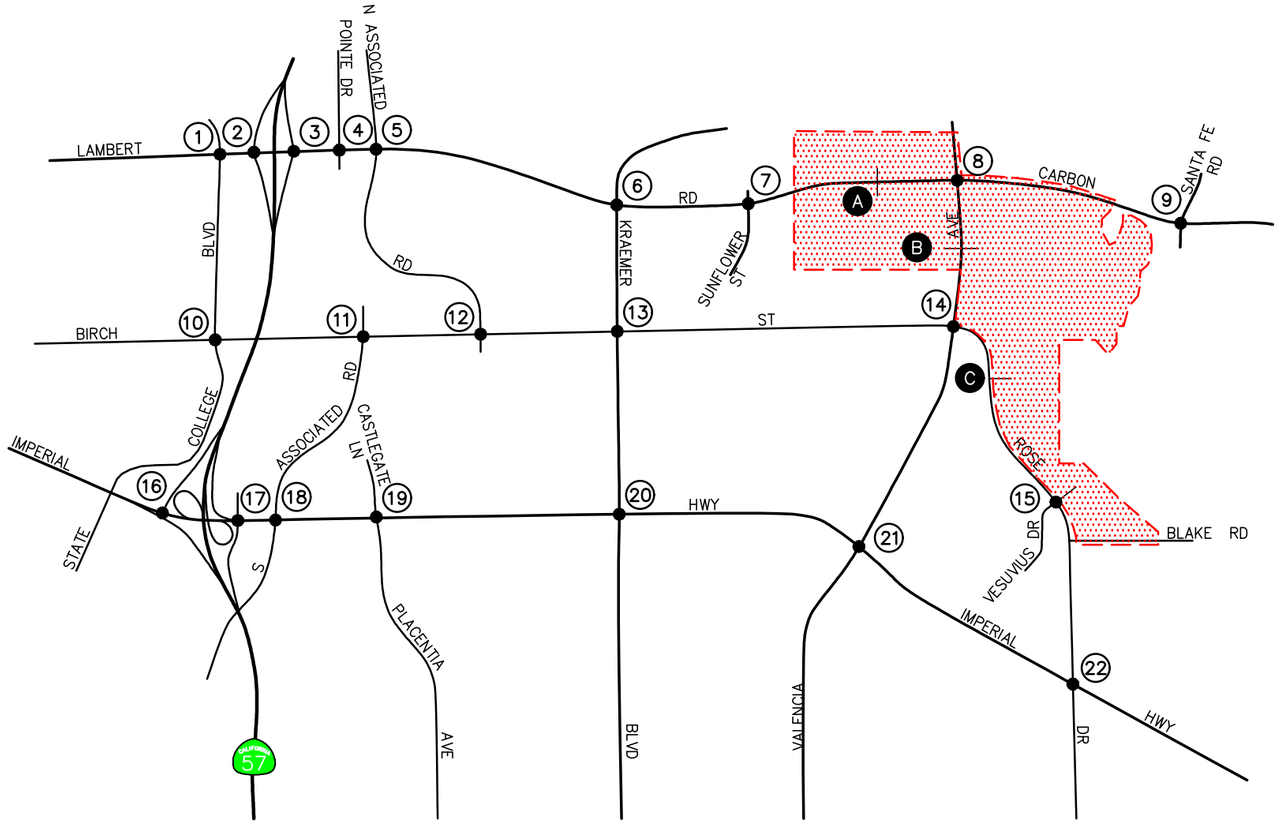
XX,XXX = DAILY TRAFFIC VOLUMES

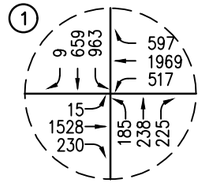
= PROJECT SITE

FIGURE 6–5

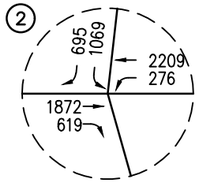
YEAR 2035 PM PEAK HOUR AND DAILY CUMULATIVE TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA

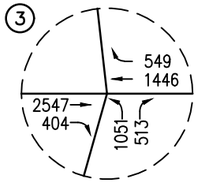




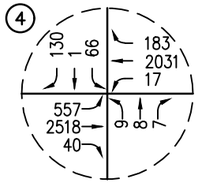
STATE COLLEGE BLVD @ LAMBERT RD



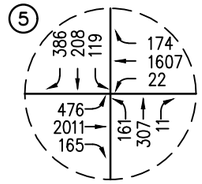
SR-57 SB RAMPS @ LAMBERT RD



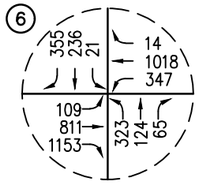
SR-57 NB RAMPS @ LAMBERT RD



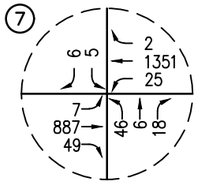
POINTE DR @ LAMBERT RD



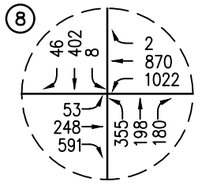
WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



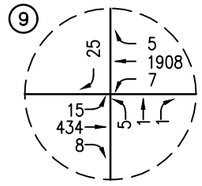
SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



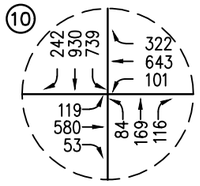
SUNFLOWER ST @ LAMBERT RD



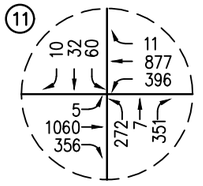
VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



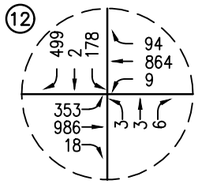
SANTA FE RD @ CARBON CANYON RD



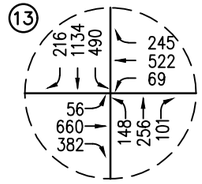
STATE COLLEGE BLVD @ BIRCH ST



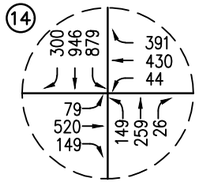
S ASSOCIATED RD @ BIRCH ST



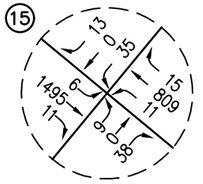
N ASSOCIATED RD @ BIRCH ST



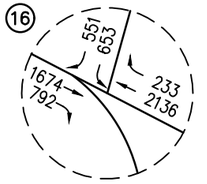
KRAEMER BLVD @ BIRCH ST



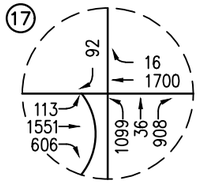
VALENCIA AVE @ BIRCH ST/ ROSE DR



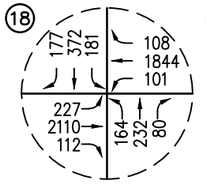
ROSE DR @ VESUVIUS DR



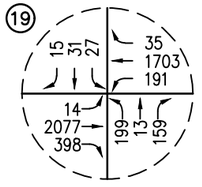
SR-57 SB RAMPS @ IMPERIAL HWY



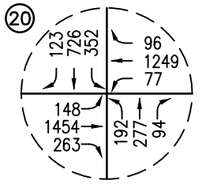
SR-57 NB RAMPS @ IMPERIAL HWY



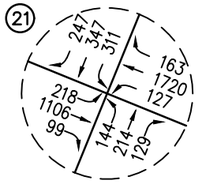
ASSOCIATED RD @ IMPERIAL HWY



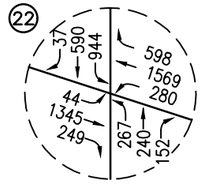
CASTLEGATE LN/ PLACENTIA AVE @



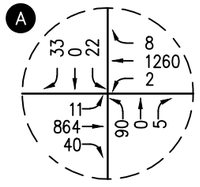
KRAEMER BLVD @ IMPERIAL HWY



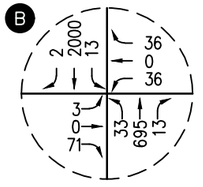
VALENCIA AVE @ IMPERIAL HWY



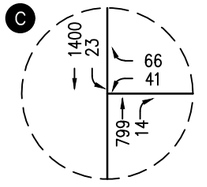
ROSE DR @ IMPERIAL HWY



DRIVEWAY A @ LAMBERT RD



VALENCIA AVE @ DRIVEWAY B



ROSE DR @ DRIVEWAY C

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

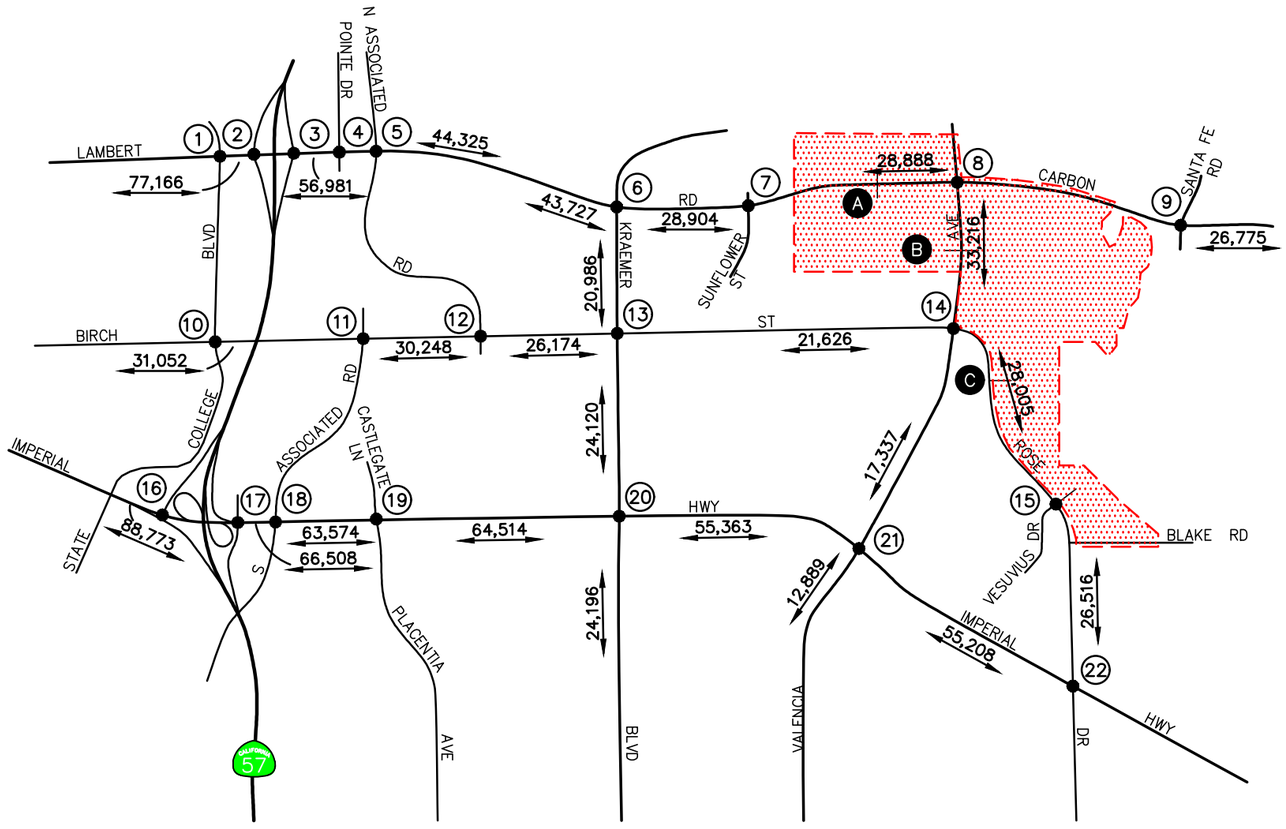
(#) = STUDY INTERSECTION

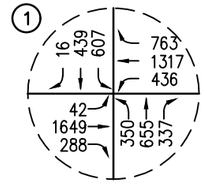
= PROJECT SITE

FIGURE 6-6

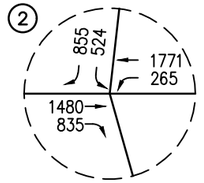
YEAR 2035 AM PEAK HOUR CUMULATIVE TRAFFIC VOLUMES WITH PROJECT

BREA 265 SPECIFIC PLAN, BREA

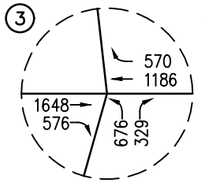




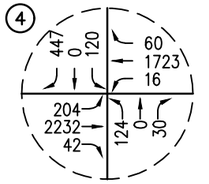
STATE COLLEGE BLVD @ LAMBERT RD



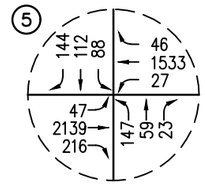
SR-57 SB RAMPS @ LAMBERT RD



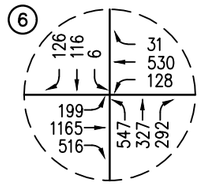
SR-57 NB RAMPS @ LAMBERT RD



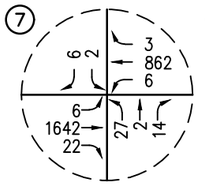
POINTE DR @ LAMBERT RD



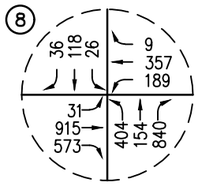
WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



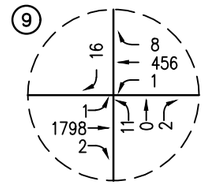
SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



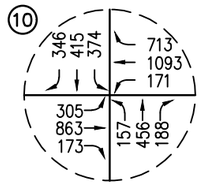
SUNFLOWER ST @ LAMBERT RD



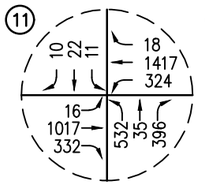
VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



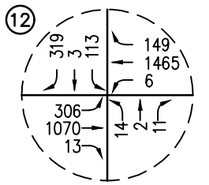
SANTA FE RD @ CARBON CANYON RD



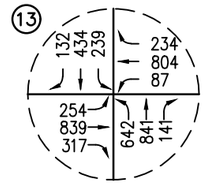
STATE COLLEGE BLVD @ BIRCH ST



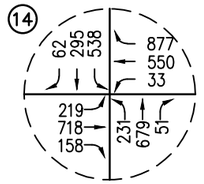
S ASSOCIATED RD @ BIRCH ST



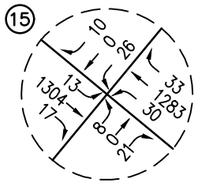
N ASSOCIATED RD @ BIRCH ST



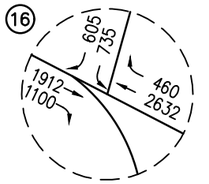
KRAEMER BLVD @ BIRCH ST



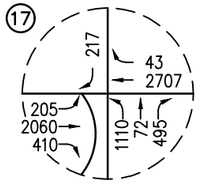
VALENCIA AVE @ BIRCH ST/ ROSE DR



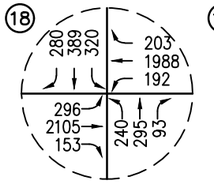
ROSE DR @ VESUVIUS DR



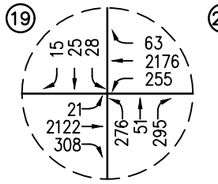
SR-57 SB RAMPS @ IMPERIAL HWY



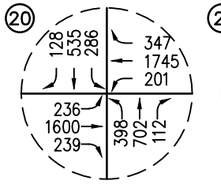
SR-57 NB RAMPS @ IMPERIAL HWY



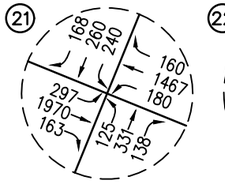
ASSOCIATED RD @ IMPERIAL HWY



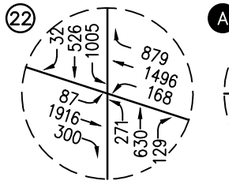
CASTLEGATE LN/ PLACENTIA AVE @



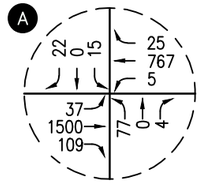
KRAEMER BLVD @ IMPERIAL HWY



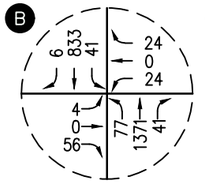
VALENCIA AVE @ IMPERIAL HWY



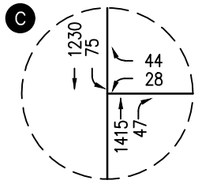
ROSE DR @ IMPERIAL HWY



DRIVEWAY A @ LAMBERT RD



VALENCIA AVE @ DRIVEWAY B



ROSE DR @ DRIVEWAY C

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

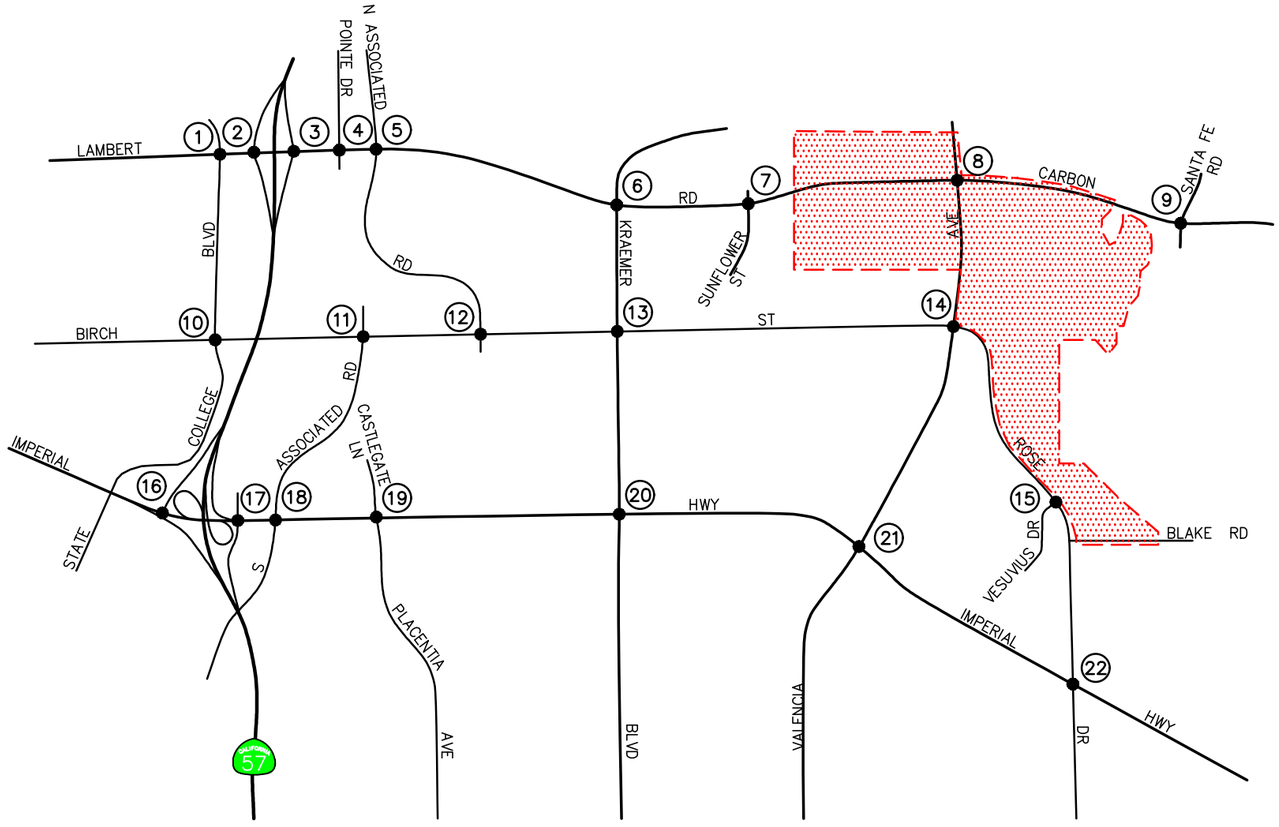
XX,XXX = DAILY TRAFFIC VOLUMES

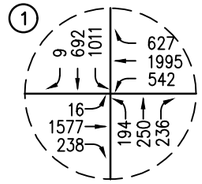
= PROJECT SITE

FIGURE 6-7

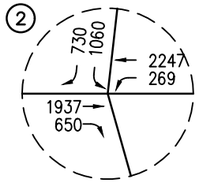
YEAR 2035 PM PEAK HOUR AND DAILY CUMULATIVE TRAFFIC VOLUMES WITH PROJECT

BREA 265 SPECIFIC PLAN, BREA

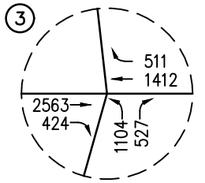




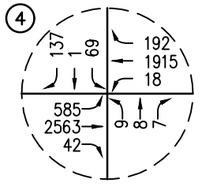
STATE COLLEGE BLVD @ LAMBERT RD



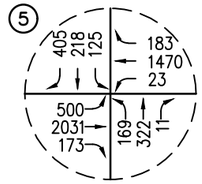
SR-57 SB RAMPS @ LAMBERT RD



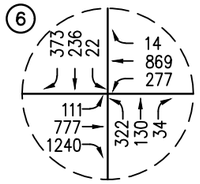
SR-57 NB RAMPS @ LAMBERT RD



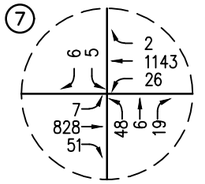
POINTE DR @ LAMBERT RD



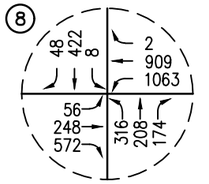
WILDCAT WY/ N ASSOCIATED RD @ LAMBERT RD



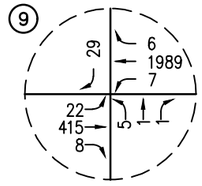
SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



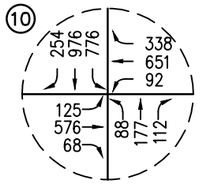
SUNFLOWER ST @ LAMBERT RD



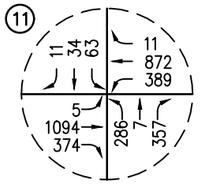
VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



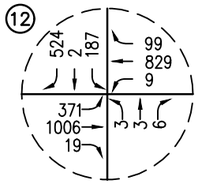
SANTA FE RD @ CARBON CANYON RD



STATE COLLEGE BLVD @ BIRCH ST



S ASSOCIATED RD @ BIRCH ST



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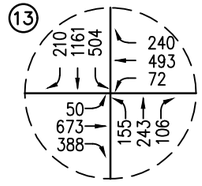
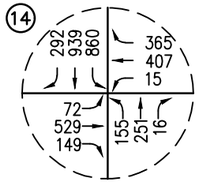
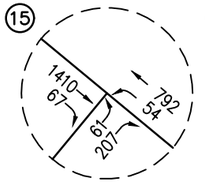


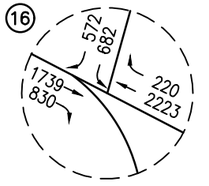
KRAEMER BLVD @ BIRCH ST



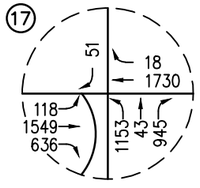
VALENCIA AVE @ BIRCH ST/ ROSE DR



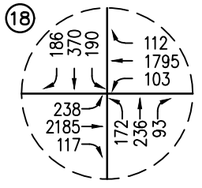
ROSE DR @ VESUVIUS DR



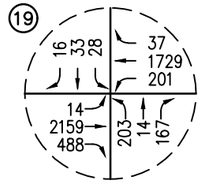
SR-57 SB RAMPS @ IMPERIAL HWY



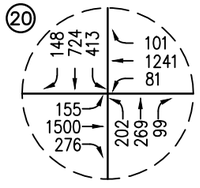
SR-57 NB RAMPS @ IMPERIAL HWY



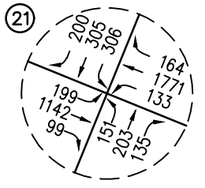
ASSOCIATED RD @ IMPERIAL HWY



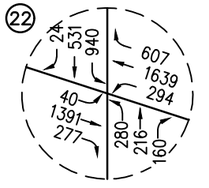
CASTLEGATE LN/ PLACENTIA AVE @



KRAEMER BLVD @ IMPERIAL HWY



VALENCIA AVE @ IMPERIAL HWY



ROSE DR @ IMPERIAL HWY

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

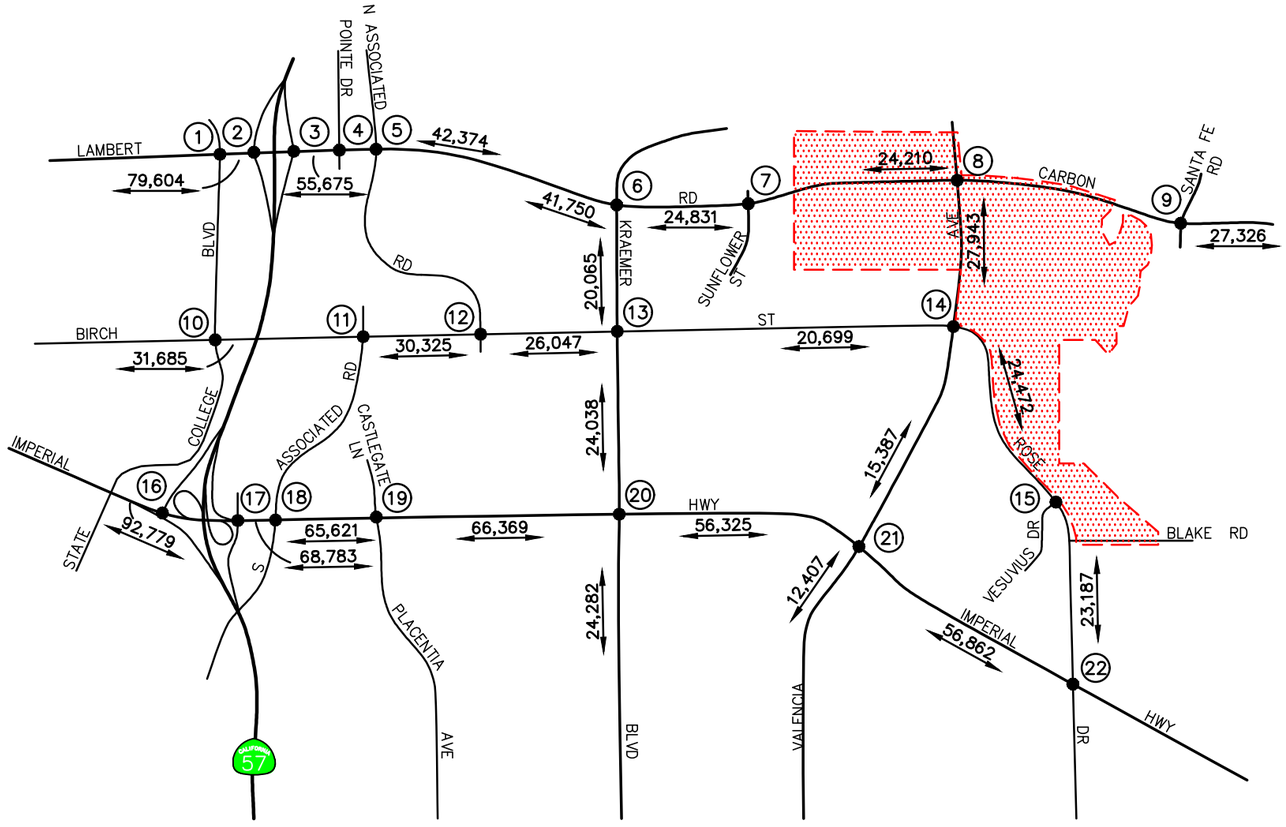
(#) = STUDY INTERSECTION

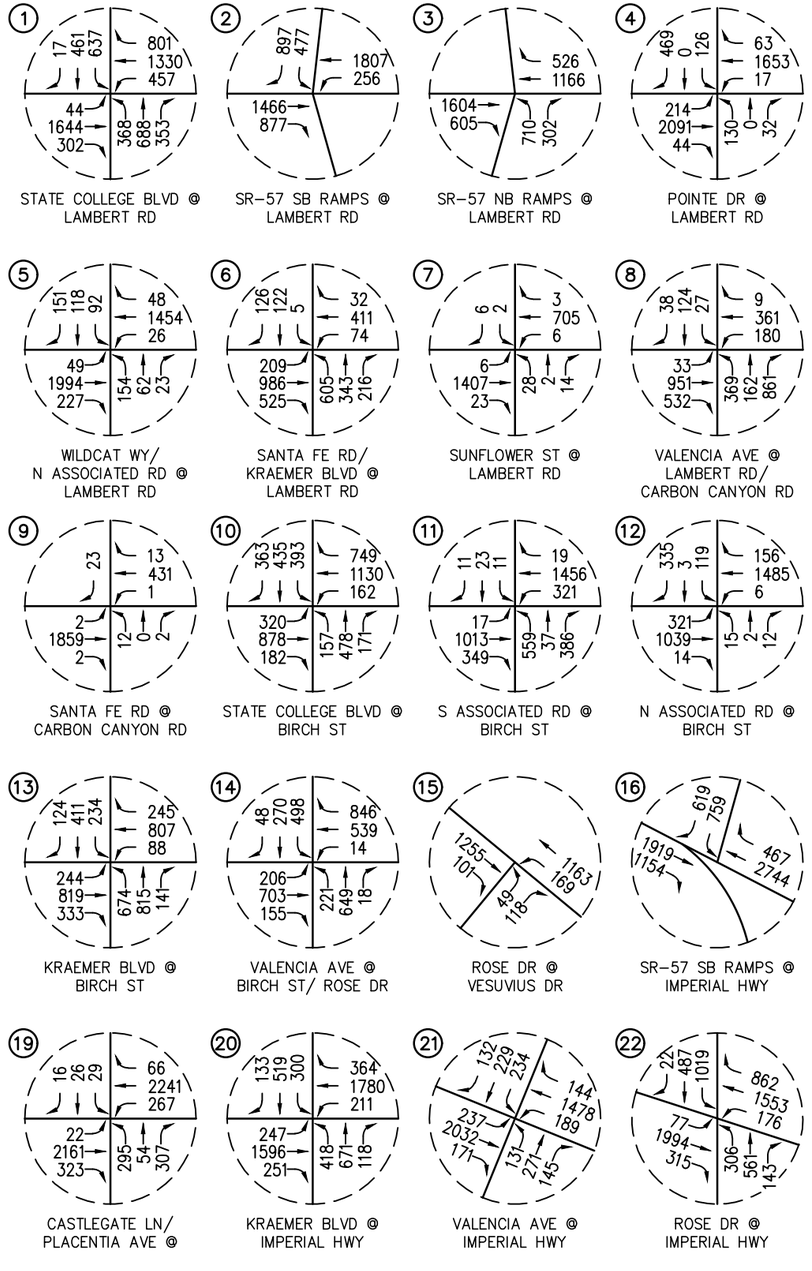
= PROJECT SITE

FIGURE 6-8

YEAR 2045 AM PEAK HOUR TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

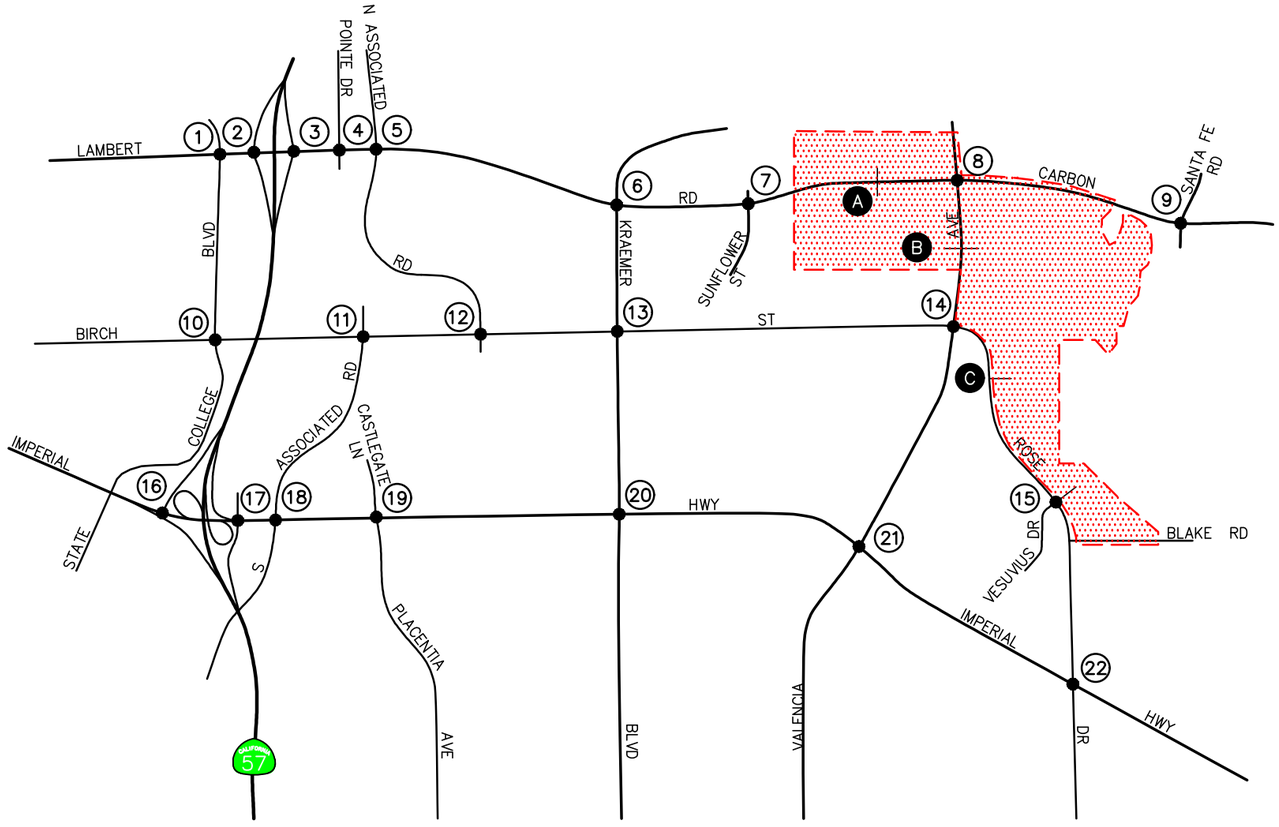
XX,XXX = DAILY TRAFFIC VOLUMES

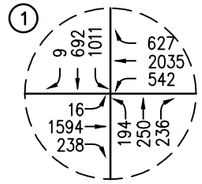
= PROJECT SITE

FIGURE 6-9

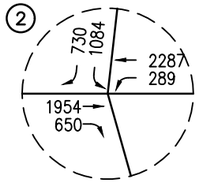
YEAR 2045 PM PEAK HOUR AND DAILY TRAFFIC VOLUMES

BREA 265 SPECIFIC PLAN, BREA

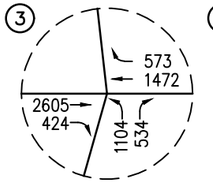




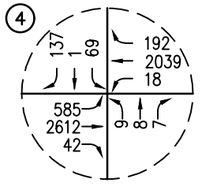
STATE COLLEGE BLVD @ LAMBERT RD



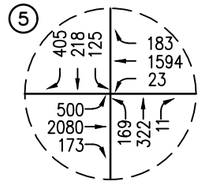
SR-57 SB RAMPS @ LAMBERT RD



SR-57 NB RAMPS @ LAMBERT RD



POINTE DR @ LAMBERT RD



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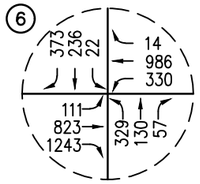
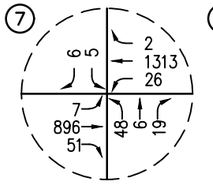
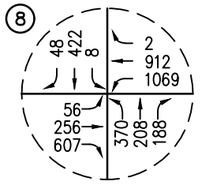


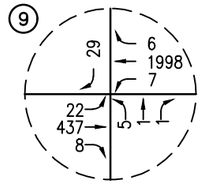
SANTA FE RD/ KRAEMER BLVD @ LAMBERT RD



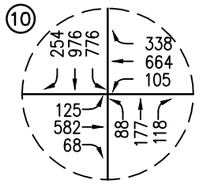
SUNFLOWER ST @ LAMBERT RD



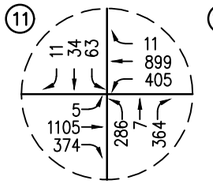
VALENCIA AVE @ LAMBERT RD/ CARBON CANYON RD



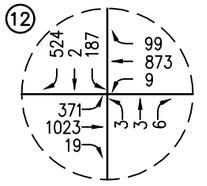
SANTA FE RD @ CARBON CANYON RD



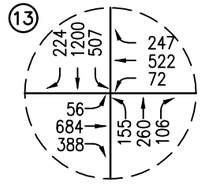
STATE COLLEGE BLVD @ BIRCH ST



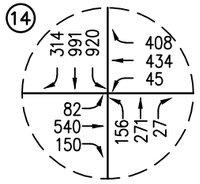
S ASSOCIATED RD @ BIRCH ST



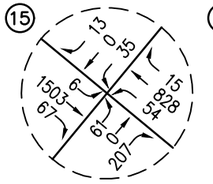
N ASSOCIATED RD @ BIRCH ST



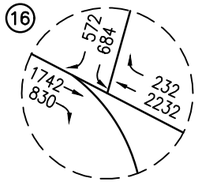
KRAEMER BLVD @ BIRCH ST



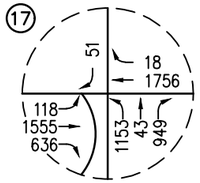
VALENCIA AVE @ BIRCH ST/ ROSE DR



ROSE DR @ VESUVIUS DR



SR-57 SB RAMPS @ IMPERIAL HWY



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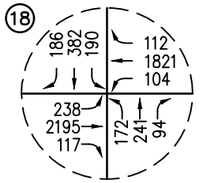
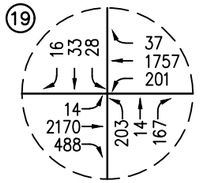
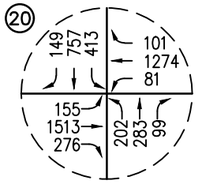


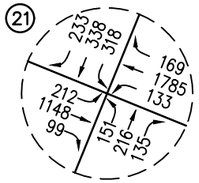
ASSOCIATED RD @ IMPERIAL HWY IMPERIAL HWY



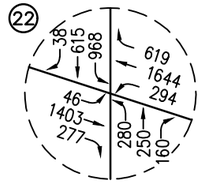
CASTLEGATE LN/ PLACENTIA AVE @



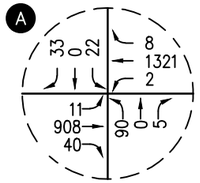
KRAEMER BLVD @ IMPERIAL HWY



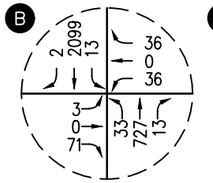
VALENCIA AVE @ IMPERIAL HWY



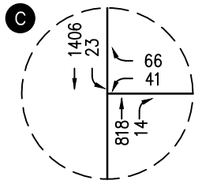
ROSE DR @ IMPERIAL HWY



DRIVEWAY A @ LAMBERT RD



VALENCIA AVE @ DRIVEWAY B



ROSE DR @ DRIVEWAY C

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

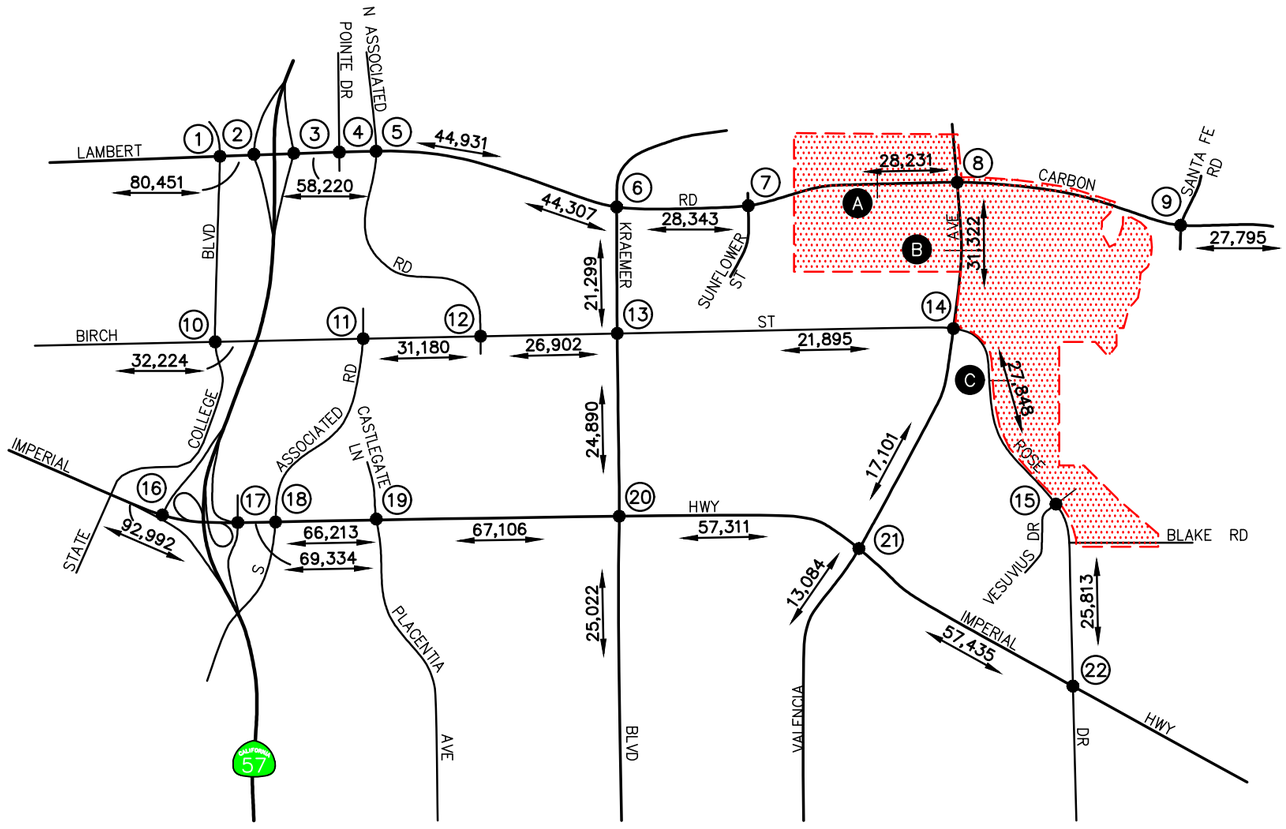
(#) = STUDY INTERSECTION

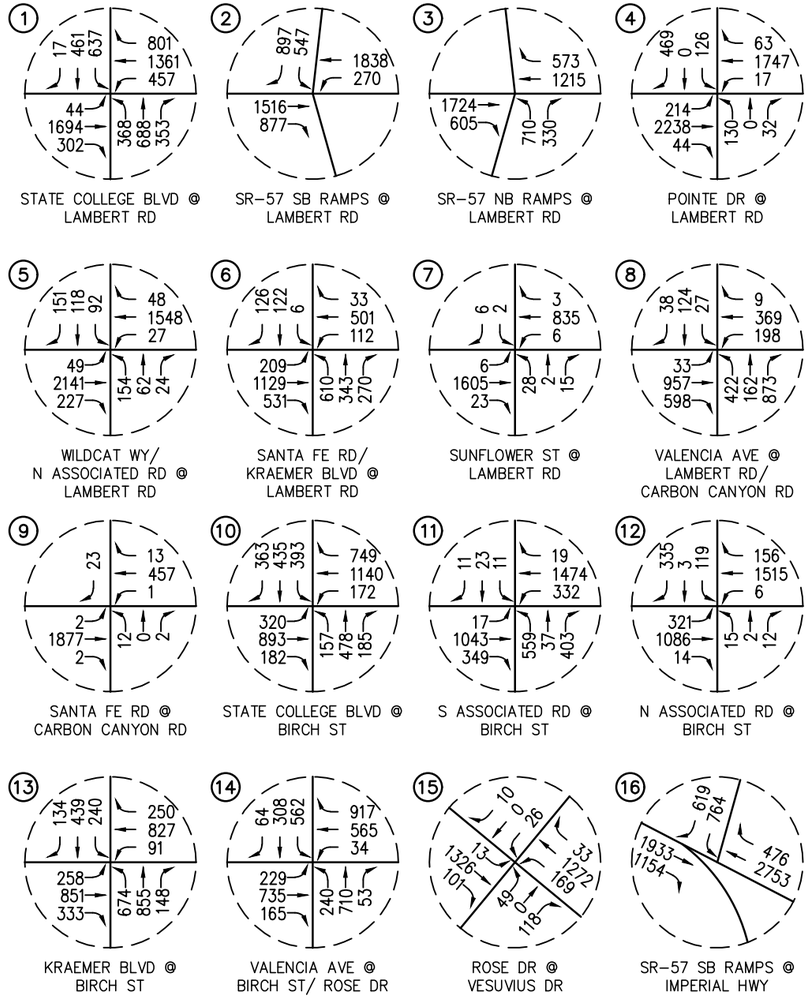
= PROJECT SITE

FIGURE 6-10

YEAR 2045 AM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION

XX,XXX = DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 6-11

YEAR 2045 PM PEAK HOUR AND DAILY TRAFFIC VOLUMES WITH PROJECT

BREA 265 SPECIFIC PLAN, BREA

7.0 TRAFFIC ANALYSIS METHODOLOGY

7.1 Level of Service Consequences and Thresholds

The potential LOS consequences of the added project traffic volumes generated by the proposed Project during the weekday peak hours was evaluated based on analysis of future operating conditions at the twenty-two (22) study intersections, without, then with, the proposed Project. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics at each study intersection. The consequence of added project-related peak hour traffic on the LOS at each study intersection then evaluated using the following criteria.

7.1.1 *City of Brea*

For the ICU analysis, the need for potential Project-related improvements will be assessed based on the following criteria:

- The Project causes an intersection operating at LOS D or better to degrade to LOS E or F, or
- The Project increases traffic demand at a signalized study intersection by 0.020 or greater and the intersection is forecast to operate at LOS E or F.

For the HCM analysis, the need for potential Project-related improvements will be assessed based on the following criteria:

- The Project causes one or more study intersections operating at LOS D or better to degrade to LOS E or F, or
- The Project causes a change in control delay of 4 seconds for intersections already operating at LOS E, or
- The Project causes a change in control delay of 2 seconds for intersections already operating at LOS F.

7.1.2 *City of Placentia*

For the ICU analysis, the need for improvements is identified if the Project causes an intersection at LOS D or better to degrade to LOS E or F, or if the Project increases traffic demand at a signalized study intersection by 0.010 or greater and the intersection is forecast to operate at LOS E or F.

7.2 Traffic Analysis Scenarios

The following scenarios are those for which volume/capacity calculations have been performed at the twenty-two (22) key intersections for existing plus project, near-term (Year 2035) and buildout (Year 2045) traffic conditions:

1. Existing (Year 2021) Traffic Conditions;
2. Near-Term (Year 2035) Background Traffic Conditions (Existing plus Ambient Growth plus Related Projects);
3. Near-Term (Year 2035) Background Plus Project Traffic Conditions;
4. Scenario (3) with improvements to be implemented as conditions of approval (COA), if necessary;
5. General Plan Buildout[26] (Year 2045) Traffic Conditions;
6. General Plan Buildout (Year 2045) Plus Project Traffic Conditions; and
7. Scenario (6) with improvements to be implemented as conditions of approval (COA), if necessary.

7.3 City of Brea Nexus Program

To satisfy the AB 1600 legislative requirement, development impact fees have been established for future traffic improvements within the City of Brea. Ensuring that every development project contributes a fair share of transportation improvements in the community, the City has introduced the "Transportation Improvement Nexus Program". In 2011, the Nexus Program was updated to reflect transportation needs and incorporate capacity improvements in an orderly fashion. The program ensures all future development with the City of Brea contributes on a fair share basis.

[26] It should be noted that the General Plan Buildout assessment has been included since the proposed Project would require an amendment to the General Plan to accommodate a change is Zoning to allow for residential uses.

8.0 PEAK HOUR INTERSECTION CAPACITY ANALYSIS

8.1 Year 2035 Traffic Conditions - ICU

Table 8-1 summarizes the peak hour Level of Service results at the twenty-two (22) study intersections for the Year 2035 horizon year. The first column (1) of ICU/LOS values in *Table 8-1* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists projected cumulative traffic conditions (existing plus ambient plus related projects traffic) based on existing intersection geometry, but without any traffic generated from the proposed Project. The third column (3) presents forecast Year 2035 near-term traffic conditions with the addition of Project traffic. The fourth column (4) shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

It should be noted that the SR-57 Ramps at Lambert Road (Intersections No. 2 and 3) include planned improvements as part of the Year 2035 background traffic conditions which are currently under construction. Additionally, the intersection of Rose Drive at Vesuvius Drive/Driveway D (Intersection No. 15) includes Project design feature improvements.

8.1.1 *Year 2035 Cumulative Traffic Conditions - ICU*

Review of column (2) of *Table 8-1* indicates that four (4) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours under Year 2035 cumulative traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	0.985	E	--	--
14. Valencia Ave at Birch St/Rose Dr	--	--	1.047	F
15. Rose Dr at Vesuvius/Driveway D	0.909	E	--	--
22. Rose Dr at Imperial Hwy	--	--	1.036	F

8.1.2 *Year 2035 Cumulative Plus Project Conditions - ICU*

Review of column (3) of *Table 8-1* indicates that five (5) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2035 cumulative traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	1.039	F	--	--
14. Valencia Ave at Birch St/Rose Dr	0.904	E	1.161	F
15. Rose Dr at Vesuvius/Driveway D	0.984	E	--	--
18. Associated Rd at Imperial Hwy	--	--	0.905	E
22. Rose Dr at Imperial Hwy	--	--	1.099	F

Review of column (4) of *Table 8-1* indicates that all five (5) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. As shown in column (5) of *Table 8-1*, the implementation of recommended improvements at the intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

Appendix C also presents the near-term ICU/LOS calculations for the twenty-two (22) key study intersections.

TABLE 8-1

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2035 Traffic Conditions		(3) Year 2035 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2035 Plus Project with Improvements Traffic Conditions	
			ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
1. State College Boulevard at Lambert Road	D	AM	0.684	B	0.832	D	0.835	D	0.003	No	--	--
		PM	0.657	B	0.829	D	0.836	D	0.007	No	--	--
2. SR-57 SB Ramps at Lambert Road	D	AM	0.729	C	0.796	C	0.813	D	0.017	No	--	--
		PM	0.596	A	0.656	B	0.670	B	0.014	No	--	--
3. SR-57 NB Ramps at Lambert Road	D	AM	0.798	C	0.850	D	0.859	D	0.009	No	--	--
		PM	0.552	A	0.558	A	0.576	A	0.018	No	--	--
4. Pointe Drive at Lambert Road	D	AM	0.560	A	0.677	B	0.701	C	0.024	No	--	--
		PM	0.539	A	0.638	B	0.666	B	0.028	No	--	--
5. Wildcat Way/N Associated Rd at Lambert Road	D	AM	0.671	B	0.784	C	0.809	D	0.025	No	--	--
		PM	0.522	A	0.618	B	0.647	B	0.029	No	--	--
6. Santa Fe Rd/Kraemer Blvd at Lambert Road	D	AM	0.602	B	0.684	B	0.700	C	0.016	No	--	--
		PM	0.506	A	0.611	B	0.665	B	0.054	No	--	--
7. Sunflower Street at Lambert Road	D	AM	0.291	A	0.347	A	0.367	A	0.020	No	--	--
		PM	0.412	A	0.501	A	0.559	A	0.058	No	--	--

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 8-1 (CONTINUED)
YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2035 Traffic Conditions		(3) Year 2035 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2035 Plus Project with Improvements Traffic Conditions	
			ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
8. Valencia Avenue at Lambert Rd/Carbon Canyon Rd	D	AM	0.861	D	**0.985**	**E**	**1.039**	**F**	**0.054**	**Yes**	0.830	D
		PM	0.569	A	0.650	B	0.726	C	0.076	No	0.607	B
9. Santa Fe Road at Carbon Canyon Road	D	AM	0.515	A	0.621	B	0.624	B	0.003	No	--	--
		PM	0.478	A	0.582	A	0.588	A	0.006	No	--	--
10. State College Boulevard at Birch Street	D	AM	0.474	A	0.573	A	0.573	A	0.000	No	--	--
		PM	0.636	B	0.809	D	0.809	D	0.000	No	--	--
11. S Associated Road at Birch Street	D	AM	0.603	B	0.701	C	0.708	C	0.007	No	--	--
		PM	0.602	B	0.705	C	0.717	C	0.012	No	--	--
12. N Associated Road at Birch Street	D	AM	0.529	A	0.607	B	0.620	B	0.013	No	--	--
		PM	0.626	B	0.727	C	0.736	C	0.009	No	--	--
13. Kraemer Boulevard at Birch Street	D	AM	0.542	A	0.613	B	0.624	B	0.011	No	--	--
		PM	0.614	B	0.714	C	0.736	C	0.022	No	--	--
14. Valencia Avenue at Birch Street/Rose Drive	D	AM	0.731	C	0.831	D	**0.904**	**E**	**0.073**	**Yes**	0.727	C
		PM	**0.914**	**E**	**1.047**	**F**	**1.161**	**F**	**0.114**	**Yes**	0.845	D
15. Rose Drive at Vesuvius Drive/Driveway D	D	AM	0.787	C	**0.909**	**E**	**0.984**	**E**	**0.075**	**Yes**	0.548	A
		PM	0.704	C	0.810	D	0.867	D	0.057	No	0.489	A

Notes:
- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 8-1 (CONTINUED)
YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2035 Traffic Conditions		(3) Year 2035 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2035 Plus Project with Improvements Traffic Conditions	
			ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
16. SR-57 SB Ramps at Imperial Highway	D	AM	0.558	A	0.703	C	0.705	C	0.002	No	--	--
		PM	0.680	B	0.826	D	0.829	D	0.003	No	--	--
17. SR-57 NB Ramps at Imperial Highway	D	AM	0.571	A	0.692	B	0.696	B	0.004	No	--	--
		PM	0.761	C	0.880	D	0.885	D	0.005	No	--	--
18. Associated Road at Imperial Highway	D	AM	0.691	B	0.803	D	0.812	D	0.009	No	0.755	C
		PM	0.763	C	0.893	D	**0.905**	**E**	**0.012**	**Yes**	0.873	D
19. Castlegate Ln/Placentia Ave at Imperial Highway	D	AM	0.590	A	0.688	B	0.690	B	0.002	No	--	--
		PM	0.684	B	0.804	D	0.813	D	0.009	No	--	--
20. Kraemer Boulevard at Imperial Highway	D	AM	0.574	A	0.667	B	0.679	B	0.012	No	--	--
		PM	0.717	C	0.835	D	0.853	D	0.018	No	--	--
21. Valencia Avenue at Imperial Highway	D	AM	0.526	A	0.613	B	0.639	B	0.026	No	--	--
		PM	0.546	A	0.638	B	0.657	B	0.019	No	--	--
22. Rose Drive at Imperial Highway	D	AM	0.688	B	0.801	D	0.812	D	0.011	No	0.800	D
		PM	0.891	D	**1.036**	**F**	**1.099**	**F**	**0.063**	**Yes**	**1.029**	**F**

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

8.2 Year 2035 Traffic Conditions - HCM

Table 8-2 summarizes the peak hour Level of Service results at the twenty-two (22) study intersections for the Year 2035 horizon year. The first column (1) of HCM/LOS values in *Table 8-2* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists projected cumulative traffic conditions (existing plus ambient plus related projects traffic) based on existing intersection geometry, but without any traffic generated from the proposed Project. The third column (3) presents forecast Year 2035 near-term traffic conditions with the addition of Project traffic. The fourth column (4) shows the increase in delay due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

It should be noted that the SR-57 Ramps at Lambert Road (Intersections No. 2 and 3) include planned improvements as part of the Year 2035 background traffic conditions which are currently under construction. Additionally, the intersection of Rose Drive at Vesuvius Drive/Driveway D (Intersection No. 15) includes Project design feature improvements.

8.2.1 *Year 2035 Cumulative Traffic Conditions - HCM*

Review of column (2) of *Table 8-2* indicates that three (3) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours under Year 2035 cumulative traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	144.0	F	--	--
14. Valencia Ave at Birch St/Rose Dr	109.5	F	64.7	E
22. Rose Dr at Imperial Hwy	237.6	F	228.9	F

8.2.2 *Year 2035 Cumulative Plus Project Conditions - HCM*

Review of column (3) of *Table 8-2* indicates that three (3) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2035 cumulative traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

Study Intersection	AM Peak Hour Delay (s/v)	AM Peak Hour LOS	PM Peak Hour Delay (s/v)	PM Peak Hour LOS
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	164.0	F	--	--
14. Valencia Ave at Birch St/Rose Dr	122.5	F	91.1	F
22. Rose Dr at Imperial Hwy	246.4	F	233.5	F

Review of column (4) of *Table 8-2* indicates that all three (3) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. As shown in column (5) of *Table 8-2*, the implementation of recommended improvements at the intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

Appendix D also presents the near-term HCM/LOS calculations for the twenty-two (22) key study intersections.

TABLE 8-2

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2035 Traffic Conditions		(3) Year 2035 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2035 Plus Project with Improvements Traffic Conditions	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
1. State College Boulevard at Lambert Road	D	AM	33.3	C	38.0	D	38.1	D	0.1	No	--	--
		PM	34.7	C	40.0	D	40.2	D	0.2	No	--	--
2. SR-57 SB Ramps at Lambert Road	D	AM	26.3	C	23.5	C	24.9	C	1.4	No	--	--
		PM	19.1	B	18.5	B	18.8	B	0.3	No	--	--
3. SR-57 NB Ramps at Lambert Road	D	AM	25.4	C	19.8	B	20.0	C	0.2	No	--	--
		PM	23.4	C	13.2	B	13.3	B	0.1	No	--	--
4. Pointe Drive at Lambert Road	D	AM	13.0	B	13.9	B	14.1	B	0.2	No	--	--
		PM	14.8	B	14.7	B	14.7	B	0.0	No	--	--
5. Wildcat Way/N Associated Rd at Lambert Road	D	AM	**57.3**	**E**[27]	32.9	C	34.0	C	1.1	No	--	--
		PM	18.3	B	17.1	B	17.3	B	0.2	No	--	--
6. Santa Fe Rd/Kraemer Blvd at Lambert Road	D	AM	28.8	C	28.9	C	30.5	C	1.6	No	--	--
		PM	29.5	C	30.1	C	30.4	C	0.3	No	--	--
7. Sunflower Street at Lambert Road	D	AM	9.3	A	6.9	A	6.7	A	0.0[28]	No	--	--
		PM	6.7	A	5.6	A	5.9	A	0.3	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

[27] Intersection operates adversely under existing traffic conditions due to existing PHF. However, it is assumed that future traffic conditions will experience continuous flow and therefore PHF of 1.0 has been assumed for all future conditions, resulting in improved levels of service.

[28] Theoretical negative increase, which is possible with HCM calculations, are denoted as an increase of 0.0 s/v.

TABLE 8-2 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2035 Traffic Conditions		(3) Year 2035 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2035 Plus Project with Improvements Traffic Conditions	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
8. Valencia Avenue at Lambert Rd/Carbon Canyon Rd	D	AM	**136.6**	**F**	**144.0**	**F**	**164.0**	**F**	**20.0**	**Yes**	**112.0**	**F**
		PM	31.8	C	31.6	C	37.1	D	5.5	No	22.2	C
9. Santa Fe Road at Carbon Canyon Road	D	AM	4.7	A	4.5	A	4.5	A	0.0	No	--	--
		PM	4.0	A	3.4	A	3.4	A	0.0	No	--	--
10. State College Boulevard at Birch Street	D	AM	40.3	D	43.6	D	43.6	D	0.0	No	--	--
		PM	30.2	C	35.8	D	35.9	D	0.1	No	--	--
11. S Associated Road at Birch Street	D	AM	25.6	C	25.8	C	25.9	C	0.1	No	--	--
		PM	25.1	C	27.6	C	27.9	C	0.3	No	--	--
12. N Associated Road at Birch Street	D	AM	25.4	C	24.9	C	25.1	C	0.2	No	--	--
		PM	23.0	C	23.7	C	23.8	C	0.1	No	--	--
13. Kraemer Boulevard at Birch Street	D	AM	36.1	D	35.9	D	36.0	D	0.1	No	--	--
		PM	41.9	D	44.2	D	47.3	D	3.1	No	--	--
14. Valencia Avenue at Birch Street/Rose Drive	D	AM	**105.1**	**F**	**109.5**	**F**	**122.5**	**F**	**13.0**	**Yes**	45.9	D
		PM	**57.7**	**E**	**64.7**	**E**	**91.1**	**F**	**26.4**	**Yes**	37.2	D
15. Rose Drive at Vesuvius Drive/Driveway D	D	AM	6.8	A	6.7	A	9.0	A	2.3	No	--	--
		PM	4.1	A	4.7	A	4.7	A	0.0	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

TABLE 8-2 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2035 Traffic Conditions		(3) Year 2035 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2035 Plus Project with Improvements Traffic Conditions	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
16. SR-57 SB Ramps at Imperial Highway	D	AM	14.9	B	15.2	B	15.3	B	0.1	No	--	--
		PM	15.3	B	17.1	B	17.2	B	0.1	No	--	--
17. SR-57 NB Ramps at Imperial Highway	D	AM	26.7	C	29.2	C	29.3	C	0.1	No	--	--
		PM	29.9	C	37.6	D	38.0	D	0.4	No	--	--
18. Associated Road at Imperial Highway	D	AM	26.7	C	31.1	C	31.8	C	0.7	No	--	--
		PM	39.5	D	43.2	D	43.4	D	0.2	No	--	--
19. Castlegate Ln/Placentia Ave at Imperial Highway	D	AM	17.7	B	17.8	B	17.8	B	0.0	No	--	--
		PM	23.4	C	25.5	C	25.9	C	0.4	No	--	--
20. Kraemer Boulevard at Imperial Highway	D	AM	27.3	C	27.6	C	28.0	C	0.4	No	--	--
		PM	32.1	C	36.7	D	37.5	D	0.8	No	--	--
21. Valencia Avenue at Imperial Highway	D	AM	27.2	C	28.0	C	28.1	C	0.1	No	--	--
		PM	25.4	C	26.3	C	26.9	C	0.6	No	--	--
22. Rose Drive at Imperial Highway	D	AM	**205.0**	**F**	**237.6**	**F**	**246.4**	**F**	**8.8**	**Yes**	31.4	C
		PM	**204.8**	**F**	**228.9**	**F**	**233.5**	**F**	**4.6**	**Yes**	26.4	C

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

8.3 Year 2045 Traffic Conditions - ICU

Table 8-3 summarizes the peak hour Level of Service results at the twenty-two (22) key study intersections for the Year 2045. The first column (1) of ICU/LOS values in *Table 8-3* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists projected Year 2045 buildout traffic conditions based on existing intersection geometry, but without any traffic generated from the proposed Project. The third column (3) presents forecast Year 2045 buildout traffic conditions with the addition of Project traffic. The fourth column (4) shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

It should be noted that the SR-57 Ramps at Lambert Road (Intersections No. 2 and 3) include planned improvements as part of the Year 2045 background traffic conditions which are currently under construction. Additionally, the intersection of Rose Drive at Vesuvius Drive/Driveway D (Intersection No. 15) includes Project design feature improvements.

8.3.1 *Year 2045 Buildout Traffic Conditions - ICU*

Review of column (2) of *Table 8-3* indicates that five (5) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours under Year 2045 buildout traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	1.023	F	--	--
14. Valencia Ave at Birch St/Rose Dr	--	--	1.097	F
15. Rose Dr at Vesuvius/Driveway D	1.069	F	0.986	E
18. Associated Rd at Imperial Hwy	--	--	0.931	E
22. Rose Dr at Imperial Hwy	--	--	1.067	F

8.3.2 *Year 2045 Buildout Plus Project Traffic Conditions - ICU*

Review of column (3) of *Table 8-3* indicates that five (5) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2045 buildout traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	1.077	F	--	--
14. Valencia Ave at Birch St/Rose Dr	0.943	E	1.212	F
15. Rose Dr at Vesuvius/Driveway D	1.144	F	1.043	F
18. Associated Rd at Imperial Hwy	--	--	0.943	E
22. Rose Dr at Imperial Hwy	--	--	1.130	F

Review of column (4) of *Table 8-3* indicates that four (4) of the five (5) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. Although the intersection of Associated Road at Imperial Highway (Intersection No. 18) operates adversely, review of column (4) indicates that the project increment adds less than 0.020 to the ICU value and hence Project-related improvements are not necessary. However, Project-related improvements at the study intersection have been included for informational purposes as well as to provide consistency with Year 2035 improvements.

As shown in column (5) of *Table 8-3*, the implementation of recommended improvements at the four (4) intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

Appendix C presents the buildout ICU/LOS calculations for the twenty-two (22) key study intersections.

TABLE 8-3

YEAR 2045 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2045 Traffic Conditions		(3) Year 2045 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2045 Plus Project with Improvements Traffic Conditions	
			ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
1. State College Boulevard at Lambert Road	D	AM	0.684	B	0.869	D	0.871	D	0.002	No	--	--
		PM	0.657	B	0.862	D	0.869	D	0.007	No	--	--
2. SR-57 SB Ramps at Lambert Road	D	AM	0.729	C	0.821	D	0.837	D	0.016	No	--	--
		PM	0.596	A	0.677	B	0.690	B	0.013	No	--	--
3. SR-57 NB Ramps at Lambert Road	D	AM	0.798	C	0.877	D	0.885	D	0.008	No	--	--
		PM	0.552	A	0.584	A	0.601	B	0.017	No	--	--
4. Pointe Drive at Lambert Road	D	AM	0.560	A	0.690	B	0.714	C	0.024	No	--	--
		PM	0.539	A	0.648	B	0.677	B	0.029	No	--	--
5. Wildcat Way/N Associated Rd at Lambert Road	D	AM	0.671	B	0.804	D	0.828	D	0.024	No	--	--
		PM	0.522	A	0.626	B	0.655	B	0.029	No	--	--
6. Santa Fe Rd/Kraemer Blvd at Lambert Road	D	AM	0.602	B	0.716	C	0.732	C	0.016	No	--	--
		PM	0.506	A	0.614	B	0.669	B	0.055	No	--	--
7. Sunflower Street at Lambert Road	D	AM	0.291	A	0.352	A	0.372	A	0.020	No	--	--
		PM	0.412	A	0.491	A	0.549	A	0.058	No	--	--

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 8-3 (CONTINUED)
YEAR 2045 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2045 Traffic Conditions		(3) Year 2045 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2045 Plus Project with Improvements Traffic Conditions	
			ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
8. Valencia Avenue at Lambert Rd/Carbon Canyon Rd	D	AM	0.861	D	**1.023**	**F**	**1.077**	**F**	**0.054**	**Yes**	0.860	D
		PM	0.569	A	0.681	B	0.756	C	0.075	No	0.480	A
9. Santa Fe Road at Carbon Canyon Road	D	AM	0.515	A	0.652	B	0.655	B	0.003	No	--	--
		PM	0.478	A	0.606	B	0.611	B	0.005	No	--	--
10. State College Boulevard at Birch Street	D	AM	0.474	A	0.599	A	0.599	A	0.000	No	--	--
		PM	0.636	B	0.844	D	0.844	D	0.000	No	--	--
11. S Associated Road at Birch Street	D	AM	0.603	B	0.729	C	0.736	C	0.007	No	--	--
		PM	0.602	B	0.729	C	0.741	C	0.012	No	--	--
12. N Associated Road at Birch Street	D	AM	0.529	A	0.626	B	0.639	B	0.013	No	--	--
		PM	0.626	B	0.754	C	0.763	C	0.009	No	--	--
13. Kraemer Boulevard at Birch Street	D	AM	0.542	A	0.635	B	0.645	B	0.010	No	--	--
		PM	0.614	B	0.734	C	0.756	C	0.022	No	--	--
14. Valencia Avenue at Birch Street/Rose Drive	D	AM	0.731	C	0.870	D	**0.943**	**E**	**0.073**	**Yes**	0.755	C
		PM	**0.914**	**E**	**1.097**	**F**	**1.212**	**F**	**0.115**	**Yes**	0.881	D
15. Rose Drive at Vesuvius Drive/Driveway D	D	AM	0.787	C	**1.069**	**F**	**1.144**	**F**	**0.075**	**Yes**	0.722	C
		PM	0.704	C	**0.986**	**E**	**1.043**	**F**	**0.057**	**Yes**	0.683	B

Notes:
- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 8-3 (CONTINUED)
YEAR 2045 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - ICU

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2045 Traffic Conditions		(3) Year 2045 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2045 Plus Project with Improvements Traffic Conditions	
			ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
16. SR-57 SB Ramps at Imperial Highway	D	AM	0.558	A	0.732	C	0.734	C	0.002	No	--	--
		PM	0.680	B	0.858	D	0.861	D	0.003	No	--	--
17. SR-57 NB Ramps at Imperial Highway	D	AM	0.571	A	0.706	C	0.711	C	0.005	No	--	--
		PM	0.761	C	0.913	E	0.918	E	0.005	No	--	--
18. Associated Road at Imperial Highway	D	AM	0.691	B	0.830	D	0.840	D	0.010	No	0.782	C[29]
		PM	0.763	C	**0.931**	**E**	**0.943**	**E**	0.012	No	**0.911**	**E**[29]
19. Castlegate Ln/Placentia Ave at Imperial Highway	D	AM	0.590	A	0.719	C	0.721	C	0.002	No	--	--
		PM	0.684	B	0.836	D	0.845	D	0.009	No	--	--
20. Kraemer Boulevard at Imperial Highway	D	AM	0.574	A	0.694	B	0.707	C	0.013	No	--	--
		PM	0.717	C	0.863	D	0.881	D	0.018	No	--	--
21. Valencia Avenue at Imperial Highway	D	AM	0.526	A	0.625	B	0.644	B	0.019	No	--	--
		PM	0.546	A	0.658	B	0.672	B	0.014	No	--	--
22. Rose Drive at Imperial Highway	D	AM	0.688	B	0.834	D	0.845	D	0.011	No	0.793	C
		PM	0.891	D	**1.067**	**F**	**1.130**	**F**	**0.063**	**Yes**	**1.013**	**F**

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

[29] Although the intersection operates adversely, the project increment adds less than 0.020 to the ICU value and hence Project-related improvements are not necessary. However, Project-related improvements at the study intersection have been included for informational purposes as well as to provide consistency with Year 2035 improvements.

8.4 Year 2045 Traffic Conditions - HCM

Table 8-4 summarizes the peak hour Level of Service results at the twenty-two (22) key study intersections for the Year 2045. The first column (1) of HCM/LOS values in *Table 8-4* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists projected Year 2045 buildout traffic conditions based on existing intersection geometry, but without any traffic generated from the proposed Project. The third column (3) presents forecast Year 2045 buildout traffic conditions with the addition of Project traffic. The fourth column (4) shows the increase in delay due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

It should be noted that the SR-57 Ramps at Lambert Road (Intersections No. 2 and 3) include planned improvements as part of the Year 2045 background traffic conditions which are currently under construction. Additionally, the intersection of Rose Drive at Vesuvius Drive/Driveway D (Intersection No. 15) includes Project design feature improvements.

8.4.1 *Year 2045 Buildout Traffic Conditions - HCM*

Review of column (2) of *Table 8-4* indicates that three (3) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours under Year 2045 buildout traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	157.3	F	--	--
14. Valencia Ave at Birch St/Rose Dr	118.9	F	74.8	E
22. Rose Dr at Imperial Hwy	242.9	F	237.2	F

8.4.2 *Year 2045 Buildout Plus Project Traffic Conditions – HCM*

Review of column (3) of *Table 8-4* indicates that three (3) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2045 buildout traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	177.7	F	--	--
14. Valencia Ave at Birch St/Rose Dr	132.1	F	103.9	F
22. Rose Dr at Imperial Hwy	251.7	F	276.2	F

Review of column (4) of *Table 8-4* indicates that all three (3) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. As shown in column (5) of *Table 8-4*, the implementation of recommended improvements at the intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

Appendix D presents the buildout HCM/LOS calculations for the twenty-two (22) key study intersections.

TABLE 8-4

YEAR 2045 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2045 Traffic Conditions		(3) Year 2045 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2045 Plus Project with Improvements Traffic Conditions	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
1. State College Boulevard at Lambert Road	D	AM	33.3	C	39.9	D	40.2	D	0.3	No	--	--
		PM	34.7	C	42.1	D	42.4	D	0.3	No	--	--
2. SR-57 SB Ramps at Lambert Road	D	AM	26.3	C	23.5	C	24.9	C	1.4	No	--	--
		PM	19.1	B	19.0	B	19.4	B	0.4	No	--	--
3. SR-57 NB Ramps at Lambert Road	D	AM	25.4	C	21.1	C	22.1	C	1.0	No	--	--
		PM	23.4	C	13.5	B	13.6	B	0.1	No	--	--
4. Pointe Drive at Lambert Road	D	AM	13.0	B	14.7	B	14.9	B	0.2	No	--	--
		PM	14.8	B	15.2	B	15.2	B	0.0	No	--	--
5. Wildcat Way/N Associated Rd at Lambert Road	D	AM	**57.3**	**E**[30]	34.5	C	38.2	D	3.7	No	--	--
		PM	18.3	B	17.7	B	17.9	B	0.2	No	--	--
6. Santa Fe Rd/Kraemer Blvd at Lambert Road	D	AM	28.8	C	29.1	C	30.9	C	1.8	No	--	--
		PM	29.5	C	31.2	C	31.3	C	0.1	No	--	--
7. Sunflower Street at Lambert Road	D	AM	9.3	A	7.1	A	6.9	A	0.0[31]	No	--	--
		PM	6.7	A	5.7	A	5.9	A	0.2	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

[30] Intersection operates adversely under existing traffic conditions due to existing PHF. However, it is assumed that future traffic conditions will experience continuous flow and therefore PHF of 1.0 has been assumed for all future conditions, resulting in improved levels of service.

[31] Theoretical negative increase, which is possible with HCM calculations, are denoted as an increase of 0.0 s/v.

TABLE 8-4 (CONTINUED)
YEAR 2045 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2045 Traffic Conditions		(3) Year 2045 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2045 Plus Project with Improvements Traffic Conditions	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
8. Valencia Avenue at Lambert Rd/Carbon Canyon Rd	D	AM	**136.6**	**F**	**157.3**	**F**	**177.7**	**F**	**20.4**	**Yes**	**124.3**	**F**
		PM	31.8	C	33.6	C	40.2	D	6.6	No	23.3	C
9. Santa Fe Road at Carbon Canyon Road	D	AM	4.7	A	5.2	A	5.2	A	0.0	No	--	--
		PM	4.0	A	4.0	A	4.0	A	0.0	No	--	--
10. State College Boulevard at Birch Street	D	AM	40.3	D	48.7	D	48.7	D	0.0	No	--	--
		PM	30.2	C	39.2	D	39.3	D	0.1	No	--	--
11. S Associated Road at Birch Street	D	AM	25.6	C	26.5	C	26.8	C	0.3	No	--	--
		PM	25.1	C	28.5	C	28.9	C	0.4	No	--	--
12. N Associated Road at Birch Street	D	AM	25.4	C	25.5	C	25.7	C	0.2	No	--	--
		PM	23.0	C	25.2	C	25.4	C	0.2	No	--	--
13. Kraemer Boulevard at Birch Street	D	AM	36.1	D	36.2	D	36.4	D	0.2	No	--	--
		PM	41.9	D	47.5	D	49.1	D	1.6	No	--	--
14. Valencia Avenue at Birch Street/Rose Drive	D	AM	**105.1**	**F**	**118.9**	**F**	**132.1**	**F**	**13.2**	**Yes**	50.7	D
		PM	**57.7**	**E**	**74.8**	**E**	**103.9**	**F**	**29.1**	**Yes**	38.6	D
15. Rose Drive at Vesuvius Drive/Driveway D	D	AM	6.8	A	24.5	C	33.5	C	9.0	No	--	--
		PM	4.1	A	11.3	B	10.4	B	0.0[32]	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.

[32] Theoretical negative increase, which is possible with HCM calculations, are denoted as an increase of 0.0 s/v.

TABLE 8-4 (CONTINUED)
YEAR 2045 PEAK HOUR INTERSECTION CAPACITY ANALYSIS - HCM

Study Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2045 Traffic Conditions		(3) Year 2045 Plus Project Traffic Conditions		(4) Exceed LOS Thresholds		(5) Year 2045 Plus Project with Improvements Traffic Conditions	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
16. SR-57 SB Ramps at Imperial Highway	D	AM	14.9	B	15.7	B	15.8	B	0.1	No	--	--
		PM	15.3	B	17.9	B	18.0	B	0.1	No	--	--
17. SR-57 NB Ramps at Imperial Highway	D	AM	26.7	C	28.7	C	28.8	C	0.1	No	--	--
		PM	29.9	C	39.8	D	40.3	D	0.5	No	--	--
18. Associated Road at Imperial Highway	D	AM	26.7	C	32.5	C	33.4	C	0.9	No	--	--
		PM	39.5	D	47.4	D	48.9	D	1.5	No	--	--
19. Castlegate Ln/Placentia Ave at Imperial Highway	D	AM	17.7	B	18.8	B	18.8	B	0.0	No	--	--
		PM	23.4	C	27.7	C	28.2	C	0.5	No	--	--
20. Kraemer Boulevard at Imperial Highway	D	AM	27.3	C	29.3	C	29.7	C	0.4	No	--	--
		PM	32.1	C	39.3	D	41.8	D	2.5	No	--	--
21. Valencia Avenue at Imperial Highway	D	AM	27.2	C	27.8	C	28.7	C	0.9	No	--	--
		PM	25.4	C	26.2	C	26.7	C	0.5	No	--	--
22. Rose Drive at Imperial Highway	D	AM	**205.0**	**F**	**242.9**	**F**	**251.7**	**F**	**8.8**	**Yes**	31.0	C
		PM	**204.8**	**F**	**237.2**	**F**	**276.2**	**F**	**39.0**	**Yes**	29.3	C

Notes:
- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

9.0 INTERSECTION VEHICLE QUEUEING EVALUATION

A queueing evaluation has been completed for the two (2) SR-57 Ramps on Lambert Road and the seven (7) study intersections along Imperial Highway to assess if the stacking requirements with the proposed Project are adequate. The queueing evaluation includes the following intersections:

Study Intersections:

2. SR-57 SB Ramps at Lambert Road (Brea/Caltrans)
3. SR-57 NB Ramps at Lambert Road (Brea/Caltrans)
16. SR-57 SB Ramps at Imperial Highway (Brea/Caltrans)
17. SR-57 NB Ramps at Imperial Highway (Brea/Caltrans)
18. Associated Road at Imperial Highway (Brea/Caltrans)
19. Castlegate Lane/Placentia Avenue at Imperial Highway (Brea/Caltrans)
20. Kraemer Boulevard at Imperial Highway (Brea/Caltrans)
21. Valencia Avenue at Imperial Highway (Brea/Caltrans)
22. Rose Drive at Imperial Highway (Placentia/Caltrans)

The queuing evaluation was conducted for Year 2035 cumulative and Year 2045 buildout traffic conditions based on the Average Queue methodology, which calculates the average queue value in terms of number of vehicles per lane. At signalized intersections, the storage length for left-turn and right-turn lanes may be based on one and one-half (1½) to two (2) times the average number of vehicles that would store per signal cycle[33]. For the purposes of this traffic analysis, the minimum storage requirement for left-turn lanes and right-turn lanes was calculated by taking 1½ times the average queue length. (Minimum required storage = Q_{av} (feet) x 1.5). The storage lengths at unsignalized intersection locations are based on 95th Percentile methodology.

It should be noted that the Synchro software takes into consideration traffic volume data, lane configurations, traffic signal phasing and potential weaving between intersections in order to calculate the queues for each movement. The existing storage lengths were determined based on a review of aerial maps of the subject intersections obtained from Google Earth and field reviews conducted by LLG Engineers. An average vehicle length of 25 feet is assumed for the purposes of this analysis.

9.1 Year 2035 Traffic Conditions

Table 9-1 presents the AM and PM peak hour queueing analyses results for the nine (9) study intersections for Year 2035. The first column (1) of *Table 9-1* presents the resultant queues for Year 2035 cumulative traffic conditions. The second column (2) presents the resultant queues for Year 2035 cumulative traffic conditions with the addition of Project traffic. The third column (3) presents the resultant queues with the inclusion of recommended traffic improvements, where needed.

[33] Source: Highway Design Manual, Intersections at Grade, page 400-9, CALTRANS

It should be noted that the SR-57 Ramps at Lambert Road (Intersections No. 2 and 3) include planned improvements as part of the Year 2035 background traffic conditions.

9.1.1 *Year 2035 Cumulative Traffic Conditions*

Review of column (1) of *Table 9-1* indicates that two (2) of the nine (9) study intersections have queues which exceed the provided storage capacity for one or more intersection approach under Year 2035 cumulative traffic conditions. The remaining study intersections have queues that are adequately accommodated by the provided storage space. The intersections/approaches with storage deficiencies include the following:

- Intersection No. 18: Associated Road at Imperial Highway
  - Eastbound Left-Turn: PM Peak Hour
  - Westbound Left-Turn: PM Peak Hour
- Intersection No. 22: Rose Drive at Imperial Highway
  - Southbound Left-Turn: AM Peak Hour and PM Peak Hour
  - Westbound Right-Turn: PM Peak Hour

9.1.2 *Year 2035 Cumulative Plus Project Traffic Conditions*

Review of column (2) of *Table 9-1* indicates that two (2) of the nine (9) study intersections have queues which exceed the provided storage capacity for one or more intersection approach with the addition of proposed Project traffic to Year 2035 cumulative traffic conditions. The remaining study intersections have queues that are adequately accommodated by the provided storage space. The intersections/approaches with storage deficiencies include the following:

- Intersection No. 18: Associated Road at Imperial Highway
  - Eastbound Left-Turn: PM Peak Hour
  - Westbound Left-Turn: PM Peak Hour
- Intersection No. 22: Rose Drive at Imperial Highway
  - Southbound Left-Turn: AM Peak Hour and PM Peak Hour
  - Westbound Right-Turn: PM Peak Hour

The addition of Project traffic does not contribute to the eastbound left-turn movement at the intersection of Associated Road at Imperial Highway (Intersection No. 18). Also, the addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue, which is considered nominal. Therefore, Project-related improvements at the intersection of Associated Road at Imperial Highway (Intersection No. 18) are not required to improve the queues.

Review of column (3) of *Table 9-1* indicates that the implementation of recommended improvements at the intersection of Rose Drive at Imperial Highway (Intersection No. 22) will help improve queues for the southbound left-turn and westbound right-turn. After implementation of the recommended improvements, the southbound left-turn and westbound right-turn queues operate better than pre-Project conditions.

Appendix F presents the Synchro queuing worksheets for the study intersections.

9.2 Year 2045 Traffic Conditions

Table 9-2 presents the AM and PM peak hour queueing analyses results for the nine (9) study intersections for Year 2045. The first column (1) of *Table 9-2* presents the resultant queues for Year 2045 buildout traffic conditions. The second column (2) presents the resultant queues for Year 2045 buildout traffic conditions with the addition of Project traffic. The third column (3) presents the resultant queues with the inclusion of recommended traffic improvements, where needed.

It should be noted that the SR-57 Ramps at Lambert Road (Intersections No. 2 and 3) include planned improvements as part of the Year 2035 background traffic conditions.

9.2.1 *Year 2045 Buildout Traffic Conditions*

Review of column (1) of *Table 9-2* indicates that three (3) of the nine (9) study intersections have queues which exceed the provided storage capacity for one or more intersection approach under Year 2045 buildout traffic conditions. The remaining study intersections have queues that are adequately accommodated by the provided storage space. The intersections/approaches with storage deficiencies include the following:

- Intersection No. 18: Associated Road at Imperial Highway
  - Eastbound Left-Turn: PM Peak Hour
  - Westbound Left-Turn: PM Peak Hour
- Intersection No. 19: Castlegate Lane/Placentia Avenue at Imperial Highway
  - Westbound Left-Turn: PM Peak Hour
- Intersection No. 22: Rose Drive at Imperial Highway
  - Southbound Left-Turn: AM Peak Hour and PM Peak Hour
  - Westbound Right-Turn: PM Peak Hour

9.2.2 *Year 2045 Buildout Plus Project Traffic Conditions*

Review of column (2) of *Table 9-2* indicates that four (4) of the nine (9) study intersections have queues which exceed the provided storage capacity for one or more intersection approach with the addition of proposed Project traffic to Year 2045 buildout traffic conditions. The remaining study

intersections have queues that are adequately accommodated by the provided storage space. The intersections/approaches with storage deficiencies include the following:

- Intersection No. 2: SR-57 SB Ramps at Lambert Road
  - Westbound Left-Turn: AM Peak Hour
- Intersection No. 18: Associated Road at Imperial Highway
  - Eastbound Left-Turn: PM Peak Hour
  - Westbound Left-Turn: PM Peak Hour
- Intersection No. 19: Castlegate Lane/Placentia Avenue at Imperial Highway
  - Westbound Left-Turn: PM Peak Hour
- Intersection No. 22: Rose Drive at Imperial Highway
  - Southbound Left-Turn: AM Peak Hour and PM Peak Hour
  - Westbound Right-Turn: PM Peak Hour

The addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue at the intersection of SR-57 SB Ramps at Lambert Road (Intersection No. 2), which is considered nominal. Therefore, Project-related improvements at the intersection are not required to improve the queues.

The addition of Project traffic does not contribute to the eastbound left-turn movement at the intersection of Associated Road at Imperial Highway (Intersection No. 18). Also, the addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue, which is considered nominal. Therefore, Project-related improvements at the intersection of Associated Road at Imperial Highway (Intersection No. 18) are not required to improve the queues.

The addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue at the intersection of Castlegate Lane/Placentia Avenue at Imperial Highway (Intersection No. 19), which is considered nominal. Therefore, Project-related improvements at the intersection are not required to improve the queues.

Review of column (3) of *Table 9-2* indicates that the implementation of recommended improvements at the intersection of Rose Drive at Imperial Highway (Intersection No. 22) will help improve queues for the southbound left-turn and westbound right-turn. After implementation of the recommended improvements, the southbound left-turn and westbound right-turn queues operate better than pre-Project conditions.

Appendix F presents the Synchro queuing worksheets for the study intersections.

TABLE 9-1
YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS

Study Intersection	Estimated Storage Provided (feet)	(1) Year 2035 Traffic Conditions				(2) Year 2035 Plus Project Traffic Conditions				(3) Year 2035 Plus Project Traffic Conditions with Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[34] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[34] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[34] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[34] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[34] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[34] (feet)	Adequate Storage (Yes / No)
2. SR-57 SB Ramps at Lambert Road													
Southbound Left-Turn	1,150[35,36]	582	Yes	197	Yes	603	Yes	234	Yes	--	--	--	--
Southbound Right-Turn	1,150[35,36]	359	Yes	485	Yes	359	Yes	485	Yes	--	--	--	--
Eastbound Right-Turn	375[35,36]	96	Yes	33	Yes	116	Yes	32	Yes	--	--	--	--
Westbound Left-Turn	70[35]	147	Yes[37]	146	Yes[37]	159	Yes[37]	155	Yes[37]	--	--	--	--
3. SR-57 NB Ramps at Lambert Road													
Northbound Left-Turn	1,300[35]	605	Yes	378	Yes	605	Yes	374	Yes	--	--	--	--
Northbound Right-Turn	1,300	560	Yes	294	Yes	572	Yes	336	Yes	--	--	--	--
Eastbound Right-Turn	100[36]	101	Yes[37]	56	Yes	69	Yes	81	Yes	--	--	--	--
16. SR-57 SB Ramps at Imperial Highway													
Southbound Left-Turn	1,300	173	Yes	296	Yes	171	Yes	300	Yes	--	--	--	--
Southbound Left/Right-Turn	1,300	173	Yes	296	Yes	171	Yes	300	Yes	--	--	--	--
Southbound Right-Turn	1,300[38]	170	Yes	302	Yes	173	Yes	302	Yes	--	--	--	--
17. SR-57 NB Ramps at Imperial Highway													
Northbound Left-Turn	955[39]	503	Yes	594	Yes	503	Yes	594	Yes	--	--	--	--
Northbound Left/Through/Right	1,300	455	Yes	630	Yes	455	Yes	654	Yes	--	--	--	--
Northbound Right-Turn	1,300[40]	363	Yes	342	Yes	368	Yes	350	Yes	--	--	--	--
Southbound Right-Turn	145[35]	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Eastbound Left-turn	260	111	Yes	294	Yes[37]	111	Yes	294	Yes[37]	--	--	--	--

34 Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

35 The turn-lane consists of dual lanes.

36 It should be noted that the intersection includes planned improvements and therefore the provided storage is approximated.

37 The remaining queue can be accommodated within the transition area of the turn-lane.

38 The southbound right-turn pocket consists of approximately 265 feet of storage; however, an additional 1,035 feet of storage from the shared left/right-turn lane can accommodate the remaining vehicles.

39 The northbound left-turn consists of dual lanes. The first lane consists of approximately 1,300 feet of storage and the second lane consists of approximately 610 feet of storage. The storage reported is the average of both lanes.

40 The northbound right-turn pocket consists of approximately 500 feet or storage; however, an additional 800 feet of storage from the shared left/thru/right lane can accommodate the remaining vehicles.

TABLE 9-1 (CONTINUED)
YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS

Study Intersection	Estimated Storage Provided (feet)	(1) Year 2035 Traffic Conditions				(2) Year 2035 Plus Project Traffic Conditions				(3) Year 2035 Plus Project Traffic Conditions with Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[41] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[41] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[41] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[41] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[41] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[41] (feet)	Adequate Storage (Yes / No)
18. Associated Road at Imperial Highway													
Northbound Left-Turn	170[42]	101	Yes	164	Yes	101	Yes	164	Yes	--	--	--	--
Southbound Left-Turn	210[43]	116	Yes	252	Yes[44]	116	Yes	254	Yes[44]	--	--	--	--
Southbound Right-Turn	215	84	Yes	29	Yes	87	Yes	29	Yes	--	--	--	--
Eastbound Left-turn	340	273	Yes	**477**	**No**	273	Yes	**477**	**No**	--	--	--	--
Westbound Left-Turn	200	119	Yes	**291**	**No**	120	Yes	**293**	**No**	--	--	--	--
19. Castlegate Ln/Placentia Ave at Imperial Highway													
Northbound Left-Turn	195	113	Yes	183	Yes	113	Yes	183	Yes	--	--	--	--
Northbound Right-Turn	195	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Southbound Left-Turn	85	32	Yes	32	Yes	32	Yes	32	Yes	--	--	--	--
Eastbound Left-turn	140	25	Yes	26	Yes	25	Yes	26	Yes	--	--	--	--
Eastbound Right-Turn	200	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Westbound Left-Turn	225	207	Yes	281	Yes[44]	207	Yes	282	Yes[44]	--	--	--	--
20. Kraemer Boulevard at Imperial Highway													
Northbound Left-Turn	150[43]	113	Yes	240	Yes[44]	113	Yes	240	Yes[44]	--	--	--	--
Southbound Left-Turn	205[43]	146	Yes	182	Yes	149	Yes	182	Yes	--	--	--	--
Southbound Right-Turn	125	25	Yes	25	Yes	25	Yes	30	Yes	--	--	--	--
Eastbound Left-turn	185[43]	80	Yes	134	Yes	80	Yes	134	Yes	--	--	--	--
Westbound Left-Turn	220[43]	45	Yes	126	Yes	45	Yes	126	Yes	--	--	--	--

41 Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

42 The northbound left-turn consists of dual lanes. The first lane consists of approximately 240 feet of storage and the second lane consists of approximately 100 feet of storage. The storage reported is the average of both lanes.

43 The turn-lane consists of dual lanes.

44 The remaining queue can be accommodated within the transition area of the turn-lane.

TABLE 9-1 (CONTINUED)
YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS

Study Intersection	Estimated Storage Provided (feet)	(1) Year 2035 Traffic Conditions				(2) Year 2035 Plus Project Traffic Conditions				(3) Year 2035 Plus Project Traffic Conditions with Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[45] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[45] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[45] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[45] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[45] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[45] (feet)	Adequate Storage (Yes / No)
21. Valencia Avenue at Imperial Highway													
Northbound Left-Turn	150[46]	84	Yes	75	Yes	84	Yes	75	Yes	--	--	--	--
Northbound Right-Turn	150	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Southbound Left-Turn	240[46]	185	Yes	150	Yes	201	Yes	162	Yes	--	--	--	--
Southbound Right-Turn	185	25	Yes	26	Yes	25	Yes	35	Yes	--	--	--	--
Eastbound Left-turn	190[46]	119	Yes	158	Yes	128	Yes	188	Yes	--	--	--	--
Eastbound Right-Turn	315	25	Yes	66	Yes	25	Yes	68	Yes	--	--	--	--
Westbound Left-Turn	260[46]	62	Yes	117	Yes	62	Yes	117	Yes	--	--	--	--
Westbound Right-Turn	305	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
22. Rose Drive at Imperial Highway													
Northbound Left-Turn	135[46]	159	Yes[47]	162	Yes[47]	159	Yes[47]	162	Yes[47]	216	Yes[47]	204	Yes[47]
Northbound Right-Turn	100	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes
Southbound Left-Turn	185[46]	**1,074**	**No**	**1,134**	**No**	**1,089**	**No**	**1,163**	**No**	**408**	**No**	**414**	**No**
Southbound Right-Turn	50	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes
Eastbound Left-turn	220	39	Yes	78	Yes	44	Yes	105	Yes	48	Yes	96	Yes
Westbound Left-Turn	230[46]	246	Yes[47]	108	Yes	246	Yes[47]	108	Yes	233	Yes[47]	98	Yes
Westbound Right-Turn	270	29	Yes	**959**	**No**	30	Yes	**1,121**	**No**	134	Yes	**434**	**No**

45 Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

46 The turn-lane consists of dual lanes.

47 The remaining queue can be accommodated within the transition area of the turn-lane.

TABLE 9-2
YEAR 2045 PEAK HOUR INTERSECTION QUEUING ANALYSIS

Study Intersection	Estimated Storage Provided (feet)	(1) Year 2045 Traffic Conditions				(2) Year 2045 Plus Project Traffic Conditions				(3) Year 2045 Plus Project Traffic Conditions with Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[48] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[48] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[48] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[48] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[48] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[48] (feet)	Adequate Storage (Yes / No)
2. SR-57 SB Ramps at Lambert Road													
Southbound Left-Turn	1,150[49,50]	594	Yes	203	Yes	615	Yes	237	Yes	--	--	--	--
Southbound Right-Turn	1,150[49,50]	386	Yes	509	Yes	386	Yes	507	Yes	--	--	--	--
Eastbound Right-Turn	375[49,50]	116	Yes	38	Yes	117	Yes	38	Yes	--	--	--	--
Westbound Left-Turn	70[49]	156	Yes[51]	149	Yes[51]	**170**	**No**	158	Yes[51]	--	--	--	--
3. SR-57 NB Ramps at Lambert Road													
Northbound Left-Turn	1,300[49]	651	Yes	392	Yes	651	Yes	392	Yes	--	--	--	--
Northbound Right-Turn	1,300	596	Yes	294	Yes	621	Yes	336	Yes	--	--	--	--
Eastbound Right-Turn	100[50]	102	Yes[51]	62	Yes	101	Yes[51]	89	Yes	--	--	--	--
16. SR-57 SB Ramps at Imperial Highway													
Southbound Left-Turn	1,300	182	Yes	314	Yes	183	Yes	317	Yes	--	--	--	--
Southbound Left/Right-Turn	1,300	182	Yes	314	Yes	183	Yes	317	Yes	--	--	--	--
Southbound Right-Turn	1,300[52]	182	Yes	324	Yes	182	Yes	324	Yes	--	--	--	--
17. SR-57 NB Ramps at Imperial Highway													
Northbound Left-Turn	955[53]	540	Yes	633	Yes	540	Yes	633	Yes	--	--	--	--
Northbound Left/Through/Right	1,300	563	Yes	695	Yes	566	Yes	702	Yes	--	--	--	--
Northbound Right-Turn	1,300[54]	398	Yes	365	Yes	402	Yes	381	Yes	--	--	--	--
Southbound Right-Turn	145[49]	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Eastbound Left-turn	260	116	Yes	299	Yes[51]	116	Yes	299	Yes[51]	--	--	--	--

48 Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

49 The turn-lane consists of dual lanes.

50 It should be noted that the intersection includes planned improvements and therefore the provided storage is approximated.

51 The remaining queue can be accommodated within the transition area of the turn-lane.

52 The southbound right-turn pocket consists of approximately 265 feet of storage; however, an additional 1,035 feet of storage from the shared left/right-turn lane can accommodate the remaining vehicles.

53 The northbound left-turn consists of dual lanes. The first lane consists of approximately 1,300 feet of storage and the second lane consists of approximately 610 feet of storage. The storage reported is the average of both lanes.

54 The northbound right-turn pocket consists of approximately 500 feet or storage; however, an additional 800 feet of storage from the shared left/thru/right lane can accommodate the remaining vehicles.

TABLE 9-2 (CONTINUED)
YEAR 2045 PEAK HOUR INTERSECTION QUEUING ANALYSIS

Study Intersection	Estimated Storage Provided (feet)	(1) Year 2045 Traffic Conditions				(2) Year 2045 Plus Project Traffic Conditions				(3) Year 2045 Plus Project Traffic Conditions with Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[55] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[55] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[55] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[55] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[55] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[55] (feet)	Adequate Storage (Yes / No)
18. Associated Road at Imperial Highway													
Northbound Left-Turn	170[56]	113	Yes	179	Yes[57]	113	Yes	179	Yes[57]	--	--	--	--
Southbound Left-Turn	210[58]	122	Yes	272	Yes[57]	122	Yes	270	Yes[57]	--	--	--	--
Southbund Right-Turn	215	90	Yes	35	Yes	93	Yes	35	Yes	--	--	--	--
Eastbound Left-turn	340	306	Yes	**515**	**No**	306	Yes	**515**	**No**	--	--	--	--
Westbound Left-Turn	200	129	Yes	**333**	**No**	132	Yes	**338**	**No**	--	--	--	--
19. Castlegate Ln/Placentia Ave at Imperial Highway													
Northbound Left-Turn	195	116	Yes	197	Yes[57]	116	Yes	197	Yes[57]	--	--	--	--
Northbound Right-Turn	195	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Southbound Left-Turn	85	32	Yes	33	Yes	32	Yes	33	Yes	--	--	--	--
Eastbound Left-turn	140	25	Yes	27	Yes	25	Yes	27	Yes	--	--	--	--
Eastbound Right-Turn	200	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Westbound Left-Turn	225	221	Yes	**302**	**No**	221	Yes	**308**	**No**	--	--	--	--
20. Kraemer Boulevard at Imperial Highway													
Northbound Left-Turn	150[58]	120	Yes	267	Yes[57]	120	Yes	267	Yes[57]	--	--	--	--
Southbound Left-Turn	205[58]	191	Yes	194	Yes	194	Yes	192	Yes	--	--	--	--
Southbound Right-Turn	125	25	Yes	25	Yes	25	Yes	30	Yes	--	--	--	--
Eastbound Left-turn	185[58]	84	Yes	141	Yes	84	Yes	143	Yes	--	--	--	--
Westbound Left-Turn	220[58]	47	Yes	132	Yes	47	Yes	132	Yes	--	--	--	--

55 Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

56 The northbound left-turn consists of dual lanes. The first lane consists of approximately 240 feet of storage and the second lane consists of approximately 100 feet of storage. The storage reported is the average of both lanes.

57 The remaining queue can be accommodated within the transition area of the turn-lane.

58 The turn-lane consists of dual lanes.

TABLE 9-2 (CONTINUED)
YEAR 2045 PEAK HOUR INTERSECTION QUEUING ANALYSIS

Study Intersection	Estimated Storage Provided (feet)	(1) Year 2045 Traffic Conditions				(2) Year 2045 Plus Project Traffic Conditions				(3) Year 2045 Plus Project Traffic Conditions with Improvements			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[59] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[59] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[59] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[59] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[59] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[59] (feet)	Adequate Storage (Yes / No)
21. Valencia Avenue at Imperial Highway													
Northbound Left-Turn	150[60]	89	Yes	78	Yes	89	Yes	78	Yes	--	--	--	--
Northbound Right-Turn	150	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
Southbound Left-Turn	240[60]	197	Yes	158	Yes	210	Yes	170	Yes	--	--	--	--
Southbound Right-Turn	185	25	Yes	26	Yes	25	Yes	36	Yes	--	--	--	--
Eastbound Left-turn	190[60]	116	Yes	147	Yes	123	Yes	177	Yes	--	--	--	--
Eastbound Right-Turn	315	25	Yes	72	Yes	25	Yes	74	Yes	--	--	--	--
Westbound Left-Turn	260[60]	66	Yes	128	Yes	66	Yes	129	Yes	--	--	--	--
Westbound Right-Turn	305	25	Yes	25	Yes	25	Yes	25	Yes	--	--	--	--
22. Rose Drive at Imperial Highway													
Northbound Left-Turn	135[60]	167	Yes[61]	185	Yes[61]	167	Yes[61]	185	Yes[61]	233	Yes[61]	213	Yes[61]
Northbound Right-Turn	100	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes
Southbound Left-Turn	185[60]	**1,104**	**No**	**1,179**	**No**	**1,134**	**No**	**1,209**	**No**	**422**	**No**	**447**	**No**
Southbound Right-Turn	50	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes	25	Yes
Eastbound Left-turn	220	33	Yes	84	Yes	47	Yes	114	Yes	51	Yes	102	Yes
Westbound Left-Turn	230[60]	264	Yes[61]	117	Yes	264	Yes[61]	117	Yes	249	Yes[61]	108	Yes
Westbound Right-Turn	270	50	Yes	**1,025**	**No**	59	Yes	**1,181**	**No**	147	Yes	**507**	**No**

59 Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

60 The turn-lane consists of dual lanes.

61 The remaining queue can be accommodated within the transition area of the turn-lane.

10.0 SITE ACCESS AND INTERNAL CIRCULATION EVALUATION

10.1 Site Access

Access to the Project will be provided via one (1) full access signalized driveway on Lambert Road, one (1) full access signalized driveway on Valencia Avenue, one (1) full access signalized driveway on Rose Drive, and one (1) full access signalized driveway at the existing intersection of Rose Drive at Vesuvius Drive. *Figure 2-3* presents the assumed lane configurations and intersection controls at the Project driveways as a result of the Project Design Features summarized in *Section 2.3*.

10.2 Project Driveway Peak Hour Intersection Capacity Analysis – ICU

Table 10-1 summarizes the intersection level of service results for the four (4) proposed Project driveways under near-term (Year 2035) and buildout (Year 2045) traffic conditions at completion and full occupancy of the proposed Project. Please note the values presented for Rose Drive at Vesuvius Drive/Driveway D in this table reflect the values presented in *Tables 8-1 and 8-3.*

As shown, the driveway at the intersection of Rose Drive at Vesuvius Drive/Driveway D is forecast to operate adversely under both Year 2035 Plus Project and Year 2045 Plus Project traffic conditions. However, the implementation of recommended improvements at the driveway will help achieve acceptable service levels. The remaining two (2) signalized Project driveways are forecast to operate at LOS C or better during the AM peak hour and PM peak hour in all traffic conditions.

Appendix G presents the ICU/LOS calculations for the four (4) Project driveways.

10.3 Project Driveway Peak Hour Intersection Capacity Analysis – HCM

Table 10-2 summarizes the intersection level of service results for the four (4) proposed Project driveways under near-term (Year 2035) and buildout (Year 2045) traffic conditions at completion and full occupancy of the proposed Project. Please note the values presented for Rose Drive at Vesuvius Drive in this table reflect the values presented in *Tables 8-2 and 8-4.*

As shown, the driveway at the intersection of Rose Drive at Driveway C is forecast to operate adversely under both Year 2035 Plus Project and Year 2045 Plus Project traffic conditions. However, the implementation of recommended improvements at the driveway will help achieve acceptable service levels. The remaining three (3) Project driveways are forecast to operate at LOS C or better during the AM peak hour and PM peak hour in all traffic conditions.

Appendix H presents the HCM/LOS calculations for the four (4) Project driveways.

TABLE 10-1
PROJECT DRIVEWAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ICU

Study Intersection	Time Period	(1) Year 2035 Plus Project Traffic Conditions		(2) Year 2035 Plus Project With Improvements		(3) Year 2045 Plus Project Traffic Conditions		(4) Year 2045 Plus Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS
15. Rose Drive at Vesuvius Drive/Driveway D	AM	**0.984**	**E**	0.548	A	**1.144**	**F**	0.722	C
	PM	0.867	D	0.489	A	**1.043**	**F**	0.683	B
A. Driveway A at Lambert Road	AM	0.377	A	--	--	0.389	A	--	--
	PM	0.427	A	--	--	0.441	A	--	--
B. Valencia Avenue at Driveway B	AM	0.721	C	--	--	0.750	C	--	--
	PM	0.536	A	--	--	0.556	A	--	--
C. Rose Drive at Driveway C	AM	0.501	A	--	--	0.502	A	--	--
	PM	0.550	A	--	--	0.549	A	--	--

Notes:

- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 10-2
PROJECT DRIVEWAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – HCM

Study Intersection	Time Period	(1) Year 2035 Plus Project Traffic Conditions		(2) Year 2035 Plus Project With Improvements		(3) Year 2045 Plus Project Traffic Conditions		(4) Year 2045 Plus Project With Improvements	
		Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
15. Rose Drive at Vesuvius Drive/Driveway D	AM	9.0	A	--	--	33.5	C	--	--
	PM	4.7	A	--	--	10.4	B	--	--
A. Driveway A at Lambert Road	AM	5.7	A	--	--	5.7	A	--	--
	PM	5.6	A	--	--	5.6	A	--	--
B. Valencia Avenue at Driveway B	AM	9.0	A	--	--	9.3	A	--	--
	PM	8.5	A	--	--	8.5	A	--	--
C. Rose Drive at Driveway C	AM	3.8	A	--	--	3.8	A	--	--
	PM	3.1	A	--	--	3.1	A	--	--

Notes:
- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

10.4 Project Driveway Recommended Improvements

10.4.1 *Year 2035 Plus Project – ICU*

The results of the intersection capacity analyses presented previously in *Table 10-1* show that the proposed Project will require additional improvements at one (1) Project driveway under Year 2035 Plus Project traffic conditions based on ICU analysis. As such, the following intersection improvements are recommended to help achieve acceptable service levels:

- **Rose Drive at Vesuvius Drive/Driveway D:** Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

10.4.2 *Year 2035 Plus Project – HCM*

The results of the intersection capacity analysis presented previously in *Table 10-2* show that the four (4) signalized Project driveways are forecast to operate at acceptable levels of service under Year 2035 Plus Project traffic conditions based on HCM analysis. As such, no intersection improvements are recommended under these conditions.

10.4.3 *Year 2045 Plus Project – ICU*

The results of the intersection capacity analyses presented previously in *Table 10-1* show that the proposed Project will require additional improvements at one (1) Project driveway under Year 2045 Plus Project traffic conditions based on ICU analysis. As such, the following intersection improvements are recommended to help achieve acceptable service levels:

- **Rose Drive at Vesuvius Drive/Driveway D:** *Same as those identified in Section 10.4.1.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

10.4.4 *Year 2045 Plus Project – HCM*

The results of the intersection capacity analysis presented previously in *Table 10-2* show that the four (4) signalized Project driveways are forecast to operate at acceptable levels of service under Year 2045 Plus Project traffic conditions based on HCM analysis. As such, no intersection improvements are recommended under these conditions.

10.5 Internal Circulation Evaluation

The on-site circulation was evaluated in terms of vehicle-pedestrian conflicts. Based on our review of the preliminary site plan, the overall layout does not create any unsafe vehicle-pedestrian conflict points and the driveway throating is sufficient such that access to parking spaces is not impacted by internal vehicle queuing/stacking. The on-site circulation is very good based on our review of the proposed site plan, whereas the alignment, spacing, and throating of the Project driveways is adequate.

As part of the finalization of Project Design Features, it is recommended that a line of sight analysis be completed at the intersection of Rose Drive at Driveway C, as well as all other project driveways to ensure adequate sight distance is provided.

10.6 Gate Queueing Analysis for Project Driveways B and C

As illustrated in *Figure 2-3,* Zone 3 of the proposed Project includes gated entries at Driveway B and Driveway C. Therefore, a gate queueing assessment has been prepared to identify the minimum distance the gate should be placed from the intersection to ensure that the queues do not affect the signal operations along Valencia Avenue and Rose Drive.

10.6.1 *Crommelin Methodology*

It has been assumed that residents of the Project will enter using an electronic gate opener/transponder, similar to that used to access garages, and exit via a vehicle-actuated loop process or similar type technology. It has also been assumed that visitors will use a phone-actuated process (call box) to enter. In order to determine the required storage reservoir for "visitors/guests" at Project Driveways B and C, a queuing analysis has been performed using the Crommelin Methodology.

The Crommelin Methodology determines the minimum storage reservoir required to provide adequate access and control at gated entries. Experience has proven that poorly designed gated entries with inadequate storage capacities often times create an adverse effect on the operating characteristics of street network. The Crommelin Methodology virtually eliminates this scenario as it ensures the design of an efficient, well-working access system with minimum impacts upon the surrounding street system. The methodology is based on a Poisson distribution, peak hour traffic volumes, gate control strategies, processing rates at a control point, and the number of travel lanes. These characteristics are used to calculate a traffic intensity factor value (IF), which is derived by dividing the peak hour traffic volumes by the design processing rate. The IF value is then plotted on the 99% confidence level curve (where storage capacity will not be exceeded 99 times of 100) per the Crommelin Reservoir Needs nomograph. This process ultimately estimates the maximum number of queuing vehicles that will store behind the service position vehicle at the control point. This number is rounded up to the nearest vehicle and added to the single service position vehicle, resulting in the total number of vehicles stored behind the control point.

The required storage capacity, in vehicles, is converted into a length (feet) by multiplying the number of expected vehicles by an average vehicle length of 20 feet. It is noted that typically a minimum of 40 feet of storage is provided between the gate and the back of right of way, thereby ensuring if two (2) vehicles queue on the proposed driveway, pedestrian and vehicular access on the sidewalk and street, respectively, is not blocked.

10.6.2 *Gate Entry Stacking Requirements*

Table 10-3 presents a summary of the vehicular stacking analysis for inbound residents and visitor traffic at the two gated entrances located at Project Driveways B and C. Please note that this queueing analysis conservatively assumes that 25% of the project inbound traffic during the AM and PM peak hours will be visitors. In addition, a conservative design service/processing rate of 60 vehicles per hour was assumed (which is equivalent to a processing rate of one vehicle every 60 seconds) for visitors to the site.

As shown in *Table 10-3,* Driveway B is expected to have a visitor inbound vehicle flow of 7 vehicles and 21 vehicles during the AM and PM peak hour, respectively. Driveway C is expected to have a visitor inbound vehicle flow of 10 vehicles and 31 vehicles during the AM and PM peak hour, respectively. This will require a storage reservoir length of 40 feet between the front of the gate to the Project's right-of-way/property line to satisfy both the AM and PM peak hour traffic at both of the project entrances.

10.6.3 *Gate Exit Stacking Requirements*

Table 10-4 presents a summary of the vehicular stacking requirements for outbound residents and visitor traffic at Project Driveways B and C, which is based on Average Queue methodology. As shown, Project Driveway B will require a storage length of 36 feet between the front of the gate to crosswalk in order for the outbound vehicles to not queue past the gate. Project Driveway C will require a minimum storage length of 59 feet between the front of the gate to the crosswalk in order for the outbound vehicles to not queue past the gate.

Appendix H includes the HCM queueing analysis at the two (2) Project driveways.

TABLE 10-3

PROJECT GATE ENTRY STACKING REQUIREMENTS

Study Intersection	Time Period	(1) Entering Traffic Volumes	(2) Service Rate (veh/hr)	(3) Intensity Factor (I)	(4) Max # of Stacked Vehicles	(5) Required Storage Capacity
B. Valencia Avenue at Driveway B	AM	7	60	0.12	1 vehicle	20 ft
	PM	21	60	0.35	1 vehicle	20 ft
C. Rose Drive at Driveway C	AM	10	60	0.17	1 vehicle	20 ft
	PM	31	60	0.52	2 vehicles	40 ft

TABLE 10-4

PROJECT GATE EXIT STACKING REQUIREMENTS

Study Intersection	(1) Year 2045 Plus Project Traffic Conditions	
	AM Peak Hour	PM Peak Hour
	Max. Queue/ Min. Storage Required[62] (feet)	Max. Queue/ Min. Storage Required[62] (feet)
B. Valencia Avenue at Driveway B		
Westbound Left-Turn	36	25
Westbound Through/Right	35	25
C. Rose Drive at Driveway C		
Westbound Left-Turn	35	27
Westbound Right-Turn	59	44

[62] Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

10.7 Project Driveway B Phased Analysis

As previously noted, Valencia Avenue at Project Driveway B is planned to be a full access signalized driveway that provides access to both Zones 2 and 3. However, it is our understanding that Caltrans may have concerns regarding the installation of a traffic signal at that location. Furthermore, it is also our understanding that the proposed Project may be build out in phases, in which case it is anticipated that Zones 1 and 2 would be completed and occupied prior to the build out of Zone 3. Therefore, a phased LOS analysis has been completed for Valencia Avenue at Driveway B both with and without a traffic signal. This phased analysis includes the following alternatives:

- Zone 2 Only – One-Way Stop Control
- Zone 2 Only – Traffic Signal
- Zones 2 and 3 – Two-Way Stop Control
- Zones 2 and 3 – Traffic Signal *(Consistent with the analysis completed in Sections 10.2 and 10.3)*

Additionally, a traffic signal warrant analysis has also been completed for the Valencia Avenue at Project Driveway B phased assessment to determine the need for signalization at the intersection.

10.7.1 *Peak Hour Intersection Capacity Analysis – ICU*

Table 10-5 summarizes the intersection level of service results for the phased analysis at Valencia Avenue at Driveway B under near-term (Year 2035) and buildout (Year 2045) traffic conditions based on ICU methodology.

Review of columns (1) and (2) of *Table 10-5* indicates that Valencia Avenue at Driveway B is anticipated to operate at acceptable service levels with the installation of a traffic signal for both Zone 2 Only and Zones 2 and 3.

Appendix I presents the ICU/LOS calculations for the Project Driveway B phased analyses.

10.7.2 *Peak Hour Intersection Capacity Analysis – HCM*

Table 10-6 summarizes the intersection level of service results for the phased analysis at Valencia Avenue at Driveway B under near-term (Year 2035) and buildout (Year 2045) traffic conditions based on HCM methodology.

Review of column (1) of *Table 10-6* indicates that Valencia Avenue at Driveway B is anticipated to operate adversely under Year 2035 Plus Project traffic conditions during both the AM and PM peak hours for Zones 2 and 3 with two-way stop control. The intersection is forecast to operate at acceptable service levels for the remaining analysis phases.

Review of column (2) of *Table 10-6* indicates that Valencia Avenue at Driveway B is anticipated to operate adversely under Year 2045 Plus Project traffic conditions during the AM and/or PM peak hours for Zone 2 with one-way stop control and Zones 2 and 3 with two-way stop control. The intersection is forecast to operate at acceptable service levels for the remaining analysis phases.

Appendix I also presents the HCM/LOS calculations for the Project Driveway B phased analyses.

10.7.3 *Traffic Signal Warrant Analysis*

A traffic signal warrant analysis was completed for Valencia Avenue at Driveway B to determine the need for signalization at the intersection. This assessment is made on the basis of signal warrant criteria adopted by Caltrans. For this study, the need for signalization is assessed on the basis of the peak-hour traffic signal warrant, Warrant #3, described in the *California Manual on Uniform Traffic Control Devices (MUTCD).*

Warrant #3 has two parts:

1. *Part A* evaluates peak hour vehicle delay for traffic on the minor street approach with the highest delay, and
2. *Part B* evaluates peak-hour traffic volumes on the major and minor streets.

This method provides an indication of whether peak-hour traffic conditions or peak-hour traffic volume levels are, or would be, sufficient to justify installation of a traffic signal. Other traffic signal warrants are available, however, they cannot be checked under future conditions because they rely on data for which forecasts are not available (such as accidents, pedestrian volume, and four- or eight-hour vehicle volumes).

The decision to install a traffic signal should not be based purely on the warrants alone. Instead, the installation of a signal should be considered and further analysis performed when one or more of the warrants are met. Additionally, engineering judgment is exercised on a case-by-case basis to evaluate the effect a traffic signal will have on certain types of accidents and traffic conditions at the subject intersection as well as at adjacent intersections.

The results of the peak-hour traffic signal warrant analysis for Year 2035 Plus Project and Year 2045 Plus Project traffic conditions are summarized in ***Table 10-7***. The results indicate that Valencia Avenue at Driveway B does not satisfy the criteria for a traffic signal for both Zone 2 only and Zones 2 and 3. However, review of the level of service results presented in *Table 10-6* indicates that the installation of a traffic signal is recommended in order to help achieve acceptable service levels at the Project driveway.

Appendix I also presents the traffic signal warrant worksheets for the Project Driveway B phased analyses.

10.7.4 *Signal Requirements*

Based on the information above, it can be concluded that Zone 2 could be constructed without requiring the installation of a traffic signal at Driveway B under Year 2035 traffic conditions and still operate with acceptable service levels. However, upon completion of Zones 2 and 3 a signal would be required. If desired by Caltrans and the City of Brea the installation of the traffic signal at Driveway B could be deferred to Year 2045 if Zone 3 has yet to be constructed/occupied.

TABLE 10-5
VALENCIA AVENUE AT PROJECT DRIVEWAY B PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ICU

Study Intersection	Time Period	(1) Year 2035 Plus Project Traffic Conditions		(2) Year 2045 Plus Project Traffic Conditions	
		ICU	LOS	ICU	LOS
Zone 2 Only (One-Way Stop Control)					
B. Valencia Avenue at Driveway B	AM	--	--	--	--
	PM	--	--	--	--
Zone 2 Only (Traffic Signal)					
B. Valencia Avenue at Driveway B	AM	0.698	B	0.727	C
	PM	0.482	A	0.501	A
Zones 2 and 3 (Two-Way Stop Control)					
B. Valencia Avenue at Driveway B	AM	--	--	--	--
	PM	--	--	--	--
Zones 2 and 3 (Traffic Signal)					
B. Valencia Avenue at Driveway B	AM	0.721	C	0.750	C
	PM	0.536	A	0.556	A

Notes:
- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 10-6
VALENCIA AVENUE AT PROJECT DRIVEWAY B PEAK HOUR INTERSECTION CAPACITY ANALYSIS – HCM

Study Intersection	Time Period	(1) Year 2035 Plus Project Traffic Conditions		(2) Year 2045 Plus Project Traffic Conditions	
		Delay (s/v)	LOS	Delay (s/v)	LOS
Zone 2 Only (One-Way Stop Control)					
B. Valencia Avenue at Driveway B	AM	31.7	D	**35.6**	**E**
	PM	14.3	B	15.0	B
Zone 2 Only (Traffic Signal)					
B. Valencia Avenue at Driveway B	AM	7.6	A	7.9	A
	PM	5.3	A	5.3	A
Zones 2 and 3 (Two-Way Stop Control)					
B. Valencia Avenue at Driveway B	AM	**196.5**	**F**	**262.2**	**F**
	PM	**195.5**	**F**	**248.3**	**F**
Zones 2 and 3 (Traffic Signal)					
B. Valencia Avenue at Driveway B	AM	9.0	A	9.3	A
	PM	8.5	A	8.5	A

Notes:
- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

TABLE 10-7

VALENCIA AVENUE AT PROJECT DRIVEWAY B TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY[63]

Study Intersection	Time Period	(1) Year 2035 Plus Project Traffic Conditions		(2) Year 2045 Plus Project Traffic Conditions	
		Part A of Warrant 3 Satisfied?	Part B of Warrant 3 Satisfied?	Part A of Warrant 3 Satisfied?	Part B of Warrant 3 Satisfied?
Zone 2 Only (One-Way Stop Control)					
B. Valencia Avenue at Driveway B	AM	No	No	No	No
	PM	No	No	No	No
Zones 2 and 3 (Two-Way Stop Control)					
B. Valencia Avenue at Driveway B	AM	No	No	No	No
	PM	No	No	No	No

63 Signal Warrant checks based on Warrant 3, Part A – Peak Hour Delay Warrant and Part B – Peak Hour Volume Warrant combined in the California MUTCD.

11.0 AREA-WIDE TRAFFIC IMPROVEMENTS

For those intersections where projected traffic volumes are expected to exceed the LOS criteria thresholds, this report recommends traffic improvements that change the intersection geometry to increase capacity. These capacity improvements involve roadway widening and/or re-striping to reconfigure roadways to specific approaches of a study intersection. The identified improvements are expected to improve levels of service at the location which exceed the LOS criteria thresholds.

Figures 11-1 and ***11-2*** present the recommended improvements and intersection controls at the key study intersections for the Year 2035 and Year 2045 traffic conditions per ICU analysis and HCM analysis, respectively. These are discussed in more detail in the sections below.

Table 11-1 identifies the incremental intersection improvements needed by the relevant study years to maintain, where possible, acceptable service levels based on the LOS standards defined in this report, as detailed in the sections below.

11.1 Planned Improvements

The following improvements listed below are part of the SR-57 Lambert Interchange improvement project, now under construction, that have been included in the Year 2035 and Year 2045 background traffic conditions:

- **No. 2 – SR-57 SB Ramps at Lambert Road:** Widen the off-ramp to provide a second exclusive southbound left-turn lane. Restripe the shared southbound left-turn/through/right-turn lane to a second exclusive right-turn lane. Widen to provide a second exclusive eastbound right-turn lane. Modify the existing traffic signal.

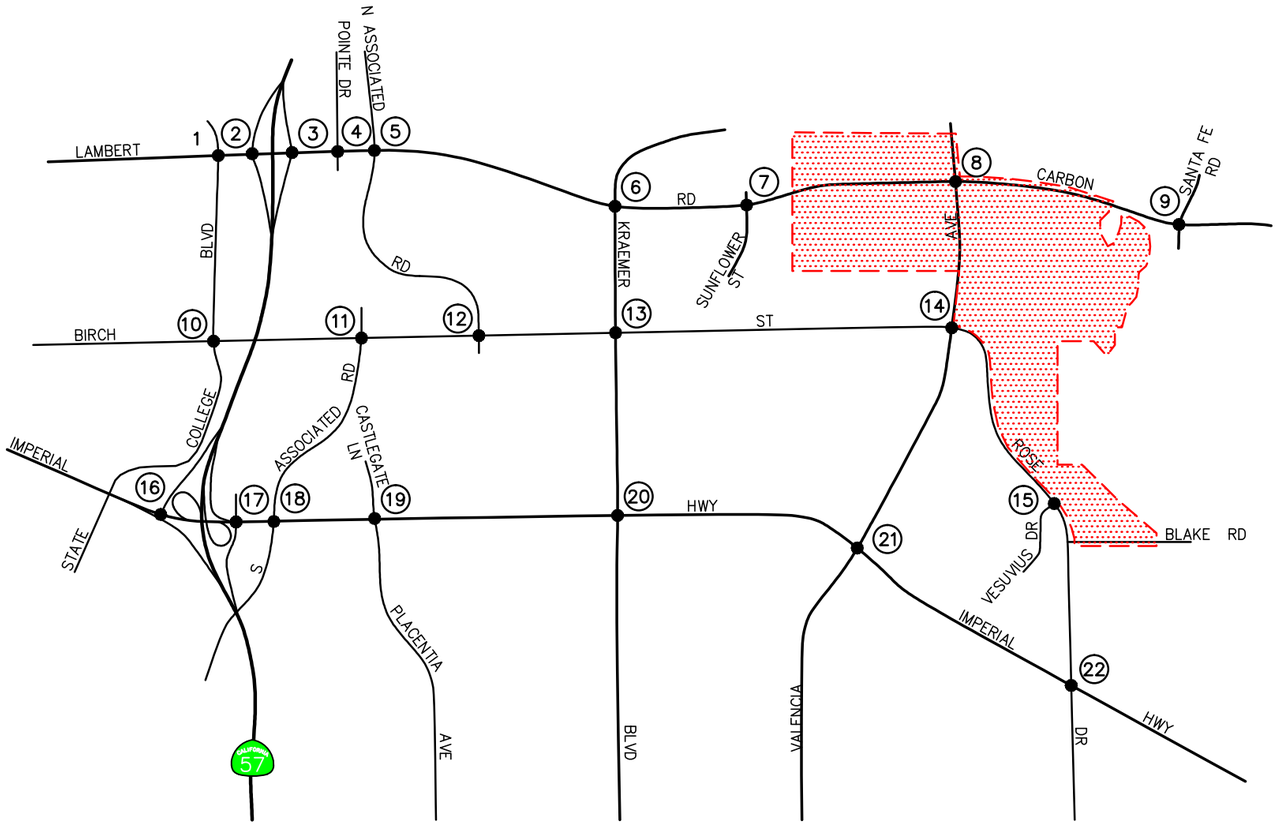
- **No. 3 – SR-57 NB Ramps at Lambert Road:** Construct a loop on-ramp on the south leg. Remove dual eastbound exclusive left-turn lanes. Widen and restripe to provide a shared eastbound through/right-turn lane and an exclusive eastbound right-turn lane. Reconstruct the existing on-ramp for a free westbound right-turn lane. Modify the existing traffic signal.

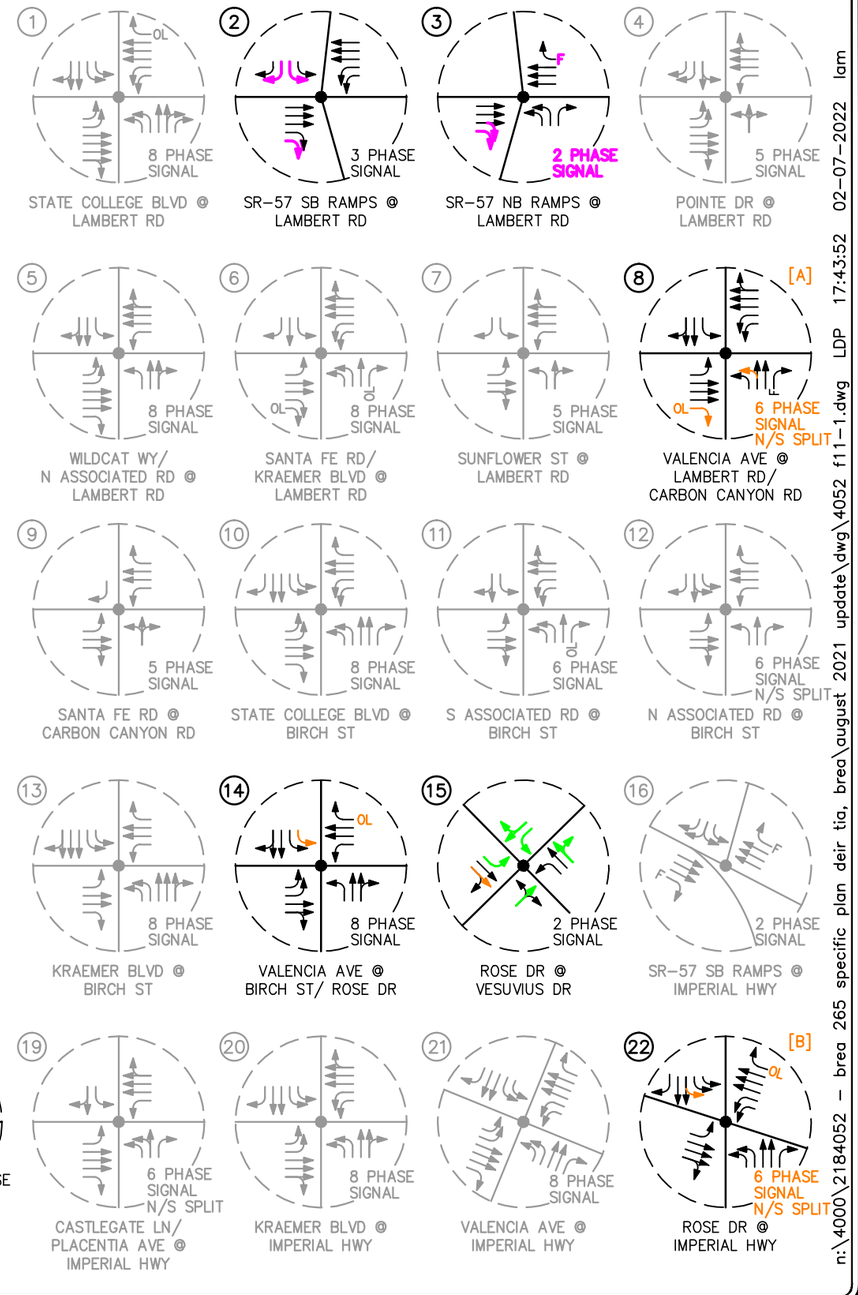
11.2 Year 2035 Plus Project Traffic Conditions Recommended Improvements

11.2.1 *Year 2035 Plus Project – ICU*

The results of the intersection capacity analyses presented previously in *Table 8-1* show that five (5) of the twenty-two (22) study intersections require Project-related improvements under Year 2035 Plus Project traffic conditions based on ICU analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements.

- **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal





NOTES:
[A] = REMOVE CROSSWALK ON WEST LEG
[B] = REMOVE CROSSWALK ON EAST LEG

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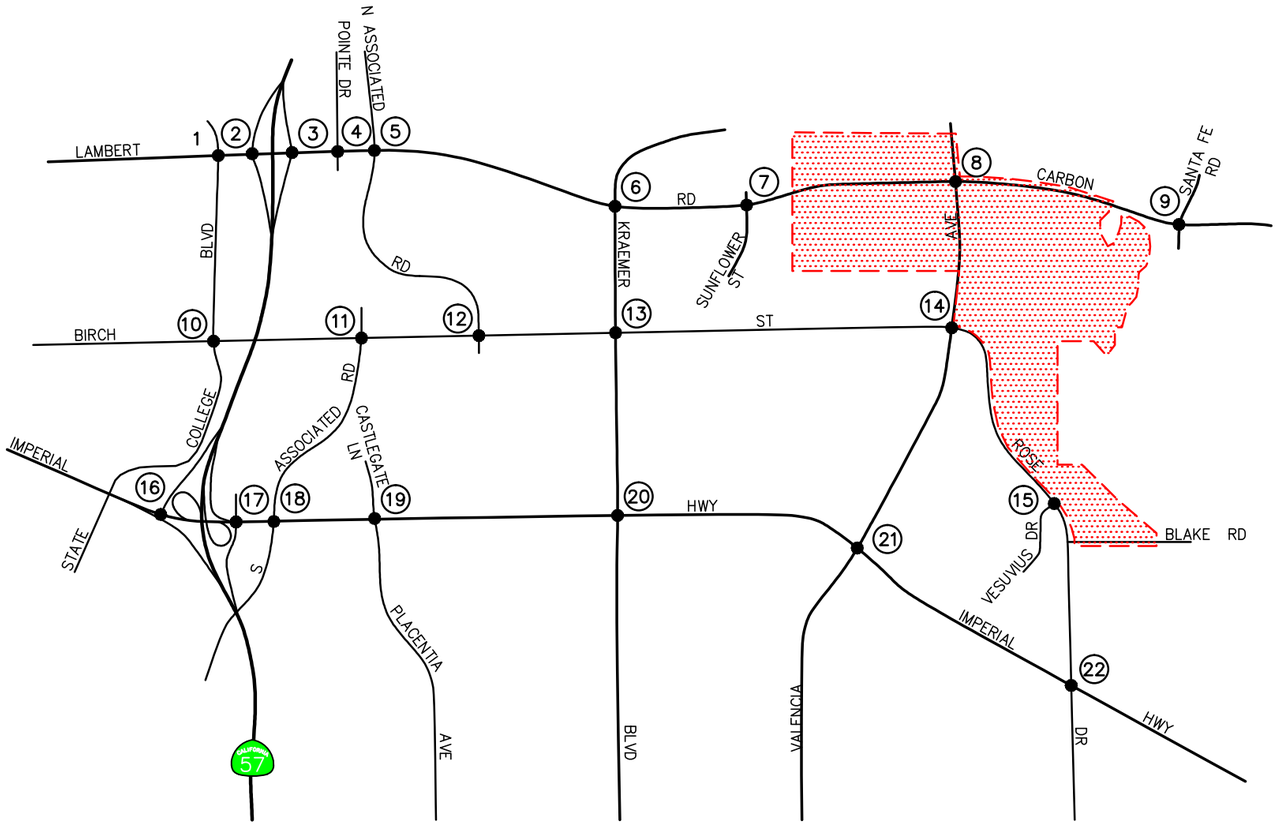
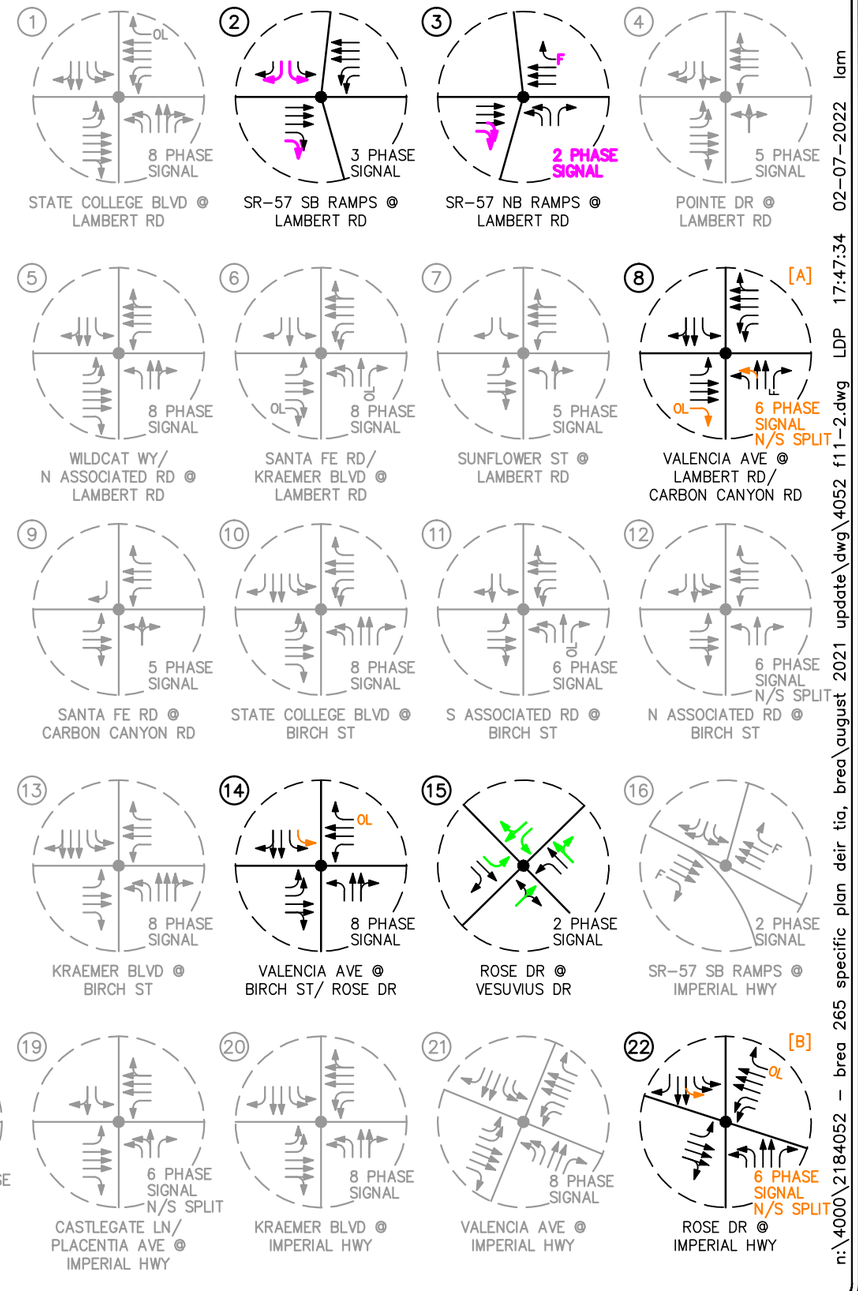
KEY
= APPROACH LANE ASSIGNMENT
= PLANNED IMPROVEMENTS
= RECOMMENDED IMPROVEMENTS
= PROJECT SPECIFIC IMPROVEMENTS
= TRAFFIC SIGNAL, = STOP SIGN
= PROJECT SITE

FIGURE 11-1

PLANNED AND RECOMMENDED IMPROVEMENTS – ICU

BREA 265 SPECIFIC PLAN, BREA





NOTES:
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= RECOMMENDED IMPROVEMENTS
= PROJECT SPECIFIC IMPROVEMENTS
= TRAFFIC SIGNAL, = STOP SIGN
= PROJECT SITE

FIGURE 11-2

PLANNED AND RECOMMENDED IMPROVEMENTS - HCM

BREA 265 SPECIFIC PLAN, BREA

and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 15 – Rose Drive at Vesuvius Drive/Driveway D:** *Same as those identified in Sections 10.4.1 and 10.4.3.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

- **No. 18 – Associated Road at Imperial Highway:** Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Modify the existing traffic signal. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 22 – Rose Drive at Imperial Highway:** Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

11.2.2 *Year 2035 Plus Project – HCM*

The results of the intersection capacity analyses presented previously in *Table 8-2* show that three (3) of the twenty-two (22) study intersections require Project-related improvements under Year 2035 Plus Project traffic conditions based on HCM analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements.

- **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** *Same as those identified in Section 11.2.1.* Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** *Same as those identified in Section 11.2.1.* Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 22 – Rose Drive at Imperial Highway:** *Same as those identified in Section 11.2.1.* Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

11.3 Year 2045 Plus Project Traffic Conditions Recommended Improvements

11.3.1 *Year 2045 Plus Project – ICU*

The results of the intersection capacity analyses presented previously in *Table 8-3* show that four (4) of the twenty-two (22) study intersections require Project-related improvements under Year 2045 Plus Project traffic conditions based on ICU analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements. It should be noted that although the intersection of Associated Road at Imperial Highway (Intersection No. 18) does not require Project-related improvements, improvements at the intersection have been included to provide consistency with Year 2035 improvements.

- **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** *Same as those identified in Sections 11.2.1 and 11.2.2.* Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** *Same as those identified in Sections 11.2.1 and 11.2.2.* Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 15 – Rose Drive at Vesuvius Drive/Driveway D:** *Same as those identified in Sections 10.4.1 and 10.4.3 and 11.2.1.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

- **No. 18 – Associated Road at Imperial Highway:** *Same as those identified in Section 11.2.1.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Modify the existing traffic signal. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 22 – Rose Drive at Imperial Highway:** *Same as those identified in Sections 11.2.1 and 11.2.2.* Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

11.3.2 *Year 2045 Plus Project – HCM*

The results of the intersection capacity analyses presented previously in *Table 8-4* show that three (3) of the twenty-two (22) study intersections require Project-related improvements under Year 2045 Plus Project traffic conditions based on HCM analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements.

- **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** *Same as those identified in Sections 11.2.1 and 11.2.2 and 11.2.3.* Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** *Same as those identified in Sections 11.2.1 and 11.2.2 and 11.2.3.* Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 22 – Rose Drive at Imperial Highway:** *Same as those identified in Sections 11.2.1 and 11.2.2 and 11.2.3.* Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

TABLE 11-1
SUMMARY OF RECOMMENDED IMPROVEMENTS BY SCENARIO

Study Intersection	Jurisdiction (City Location)	Improvement Description	Improvements by Scenario			
			Year 2035 Plus Project		Year 2045 Plus Project	
			ICU Impact	HCM Impact	ICU Impact	HCM Impact
8. Valencia Avenue at Lambert Road/Carbon Canyon Road	Caltrans (Brea)	▪ Restripe the first NB through lane to provide a shared left/through lane. ▪ Widen and/or restripe to provide an exclusive EB right-turn lane. ▪ Remove crosswalk on west leg. ▪ Modify existing traffic signal and provide NB and SB split phasing and an EB right-turn overlap phase.	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	X X X X	X X X X
14. Valencia Avenue at Birch Street/Rose Drive	Caltrans (Brea)	▪ Widen and/or restripe to provide a second exclusive SB left-turn lane. ▪ Modify the existing traffic signal and provide WB right-turn overlap phasing.	✓ ✓	✓ ✓	X X	X X
15. Rose Drive at Vesuvius Drive/Driveway D	Brea	▪ Restripe the SB exclusive right-turn lane to a SB shared through/right-turn lane. ▪ Widen to provide second SB departure lane. ▪ Modify the existing traffic signal.	✓ ✓ ✓	-- -- --	X X X	-- -- --
18. Associated Road at Imperial Highway	Caltrans (Brea)	▪ Restripe the SB exclusive right-turn lane to a SB shared through/right-turn lane. ▪ Modify the existing traffic signal.	✓ ✓	-- --	X X	-- --
22. Rose Drive at Imperial Highway	Caltrans (Placentia)	▪ Restripe the second SB through lane as a SB shared left/through lane. ▪ Modify the existing traffic signal and provide NB and SB split phasing and WB right-turn overlap phasing. ▪ Remove crosswalk on east leg.	✓ ✓ ✓	✓ ✓ ✓	X X X	X X X

Notes:

✓ = Denotes that the improvement is implemented in the scenario.

X = Denotes that the improvement carries over from the previous scenario and is assumed to be already implemented.

11.4 Project-Related Fair-Share Contribution

The Project-related recommended improvements were determined based on the future conditions analysis with and without the proposed Project. The study locations forecast to operate at adverse levels of service are discussed below. As such, the proposed Project's "fair share" of the recommended improvements has been calculated for the study intersections that are forecast to operate at adverse levels of service in the Year 2045 Plus Project traffic conditions.

As such the Project may be expected to construct improvements and/or can be expected to pay a proportional "fair-share" of the improvement costs of the intersection to offset the Project's increment.

Table 11-2 presents Project's fair-share contribution to construct the recommended improvements at the five (5) study intersections projected to operate at an unacceptable LOS and/or inadequate queuing in the Year 2045 Plus Project traffic conditions.

As presented in this *Table 11-2,* the first column (1) presents a total of all intersection peak hour movements for existing conditions. The second column (2) presents project only traffic. The third column (3) presents Year 2045 buildout traffic conditions with Project traffic. The fourth column (4) represents what percentage of total intersection peak hour traffic is Project-related traffic.

TABLE 11-2
YEAR 2045 PROJECT FAIR-SHARE CONTRIBUTION

Study Intersection	City/ Jurisdiction	Time Period	(1) Existing Traffic	(2) Project Traffic	(3) Year 2045 Plus Project Traffic	(4) Project Fair-Share Percent[64]
8. Valencia Avenue at Lambert Rd/Carbon Canyon Rd	Brea/ Caltrans	AM	3,168	120	4,146	12.27%
		PM	--	--	--	--
14. Valencia Avenue at Birch Street/Rose Drive	Brea/ Caltrans	AM	3,320	288	4,338	28.29%
		PM	3,395	415	4,582	**34.96%**
15. Rose Drive at Vesuvius Drive/Driveway D	Brea	AM	1,928	198	2,789	23.00%
		PM	2,127	262	3,117	**26.46%**
18. Associated Road at Imperial Highway	Brea/ Caltrans	AM	--	--	--	--
		PM	5,351	77	6,762	5.46%
22. Rose Drive at Imperial Highway	Placentia/ Caltrans	AM	--	--	--	--
		PM	6,076	266	7,781	15.60%

[64] Project fair-share percentage Column (4) = [Column (2)] / [Column (3) – Column (1)].

11.5 City of Brea Traffic Impact Fees

Based on information published on the City of Brea website, the Brea City Council adopted Ordinance 966 in July 1995, establishing Traffic Impact Fees for all new development in Brea and annexed portions of its sphere-of-influence. Based on a Transportation Improvement Nexus Program study conducted in 2011, the City Council adopted Resolution 2011-096, which updated the impact fees, which became effective February 4, 2012. These fees are required, in part, by Orange County's Measure M, a transportation initiative passed by voters in 1990. More importantly, these are fair-share based fees that will serve to offset, or mitigate, the traffic impacts caused by new development.

Review of ***Table 11-3*** indicates that the City's Traffic Impact Fee rate for residential land uses range from $1,203 per dwelling unit to $1,974 per dwelling unit. For "all other uses", the City's Traffic Impact Fee is $89 per trip end.

Subject to confirmation by City staff, the proposed Project's Traffic Impact Fee (i.e. 450 low density residential units, 650 medium density residential units, and 6 soccer fields totaling 428 daily trips) total **$1,870,842.00**. The precise fee will be determined upon issuance of Project building permits by the City of Brea Community Development Department.

In some cases, a developer may be required to make certain traffic improvements in addition to, or in-lieu of paying traffic impact fees. In this case, however, the total cost of traffic improvements and/or fees will not exceed the development's fair-share toward mitigating its own impacts.

TABLE 11-3
CITY OF BREA TRAFFIC IMPACT FEE RATES [65]

Land Use Category	Unit of Development	Fee
▪ Low density residential	Per dwelling unit	$1,974
▪ Medium density residential	Per dwelling unit	$1,453
▪ High density residential	Per dwelling unit	$1,203
▪ Commercial, general, mixed use	Per gross square foot	$2.53
▪ Regional commercial	Per gross square foot	$2.24
▪ Office / industrial	Per gross square foot	$1.25
▪ School	Student	$0
▪ All other uses	Per trip end	$89

65 Source: City of Brea website - http://www.ci.brea.ca.us/162/Traffic-Impact-Fees

12.0 REDBAY AVENUE AT BIRCH STREET FOCUSED ASSESSMENT

It is our understanding that local residents have brought up concerns to the City regarding congestion at the intersection of Redbay Avenue at Birch Street, which is an existing unsignalized intersection. Residents have requested the installation of a traffic signal at the location. Therefore, this focused assessment for Redbay Avenue at Birch Street has been completed to determine existing service levels, with and without the project, as well as determine whether the installation of a traffic signal is justified. Included in this focused assessment are the following:

- Traffic Signal Warrant Analysis, and
- Weekday AM and PM peak hour capacity analysis for existing conditions, without and with the proposed Project.

12.1 Traffic Signal Warrant Analysis

A traffic signal warrant analysis was completed for Redbay Avenue at Birch Street to determine the need for signalization at the intersection. This assessment is made on the basis of signal warrant criteria adopted by Caltrans. For this study, the need for signalization is assessed on the basis of the peak-hour traffic signal warrant, Warrant #3, described in the *California Manual on Uniform Traffic Control Devices (MUTCD).*

Warrant #3 has two parts:

1. *Part A* evaluates peak hour vehicle delay for traffic on the minor street approach with the highest delay, and
2. *Part B* evaluates peak-hour traffic volumes on the major and minor streets.

This method provides an indication of whether peak-hour traffic conditions or peak-hour traffic volume levels are, or would be, sufficient to justify installation of a traffic signal. Other traffic signal warrants are available, however, they cannot be checked under future conditions because they rely on data for which forecasts are not available (pedestrian volume, and four- or eight-hour vehicle volumes).

The decision to install a traffic signal should not be based purely on the warrants alone. Instead, the installation of a signal should be considered and further analysis performed when one or more of the warrants are met. Additionally, engineering judgment is exercised on a case-by-case basis to evaluate the effect a traffic signal will have on certain types of accidents and traffic conditions at the subject intersection as well as at adjacent intersections.

The results of the peak-hour traffic signal warrant analysis for existing traffic conditions are summarized in ***Table 12-1***. The results indicate that Redbay Avenue at Birch Street does not satisfy the criteria for a traffic signal.

Appendix J presents the traffic signal warrant worksheets for the Redbay Avenue at Birch Street.

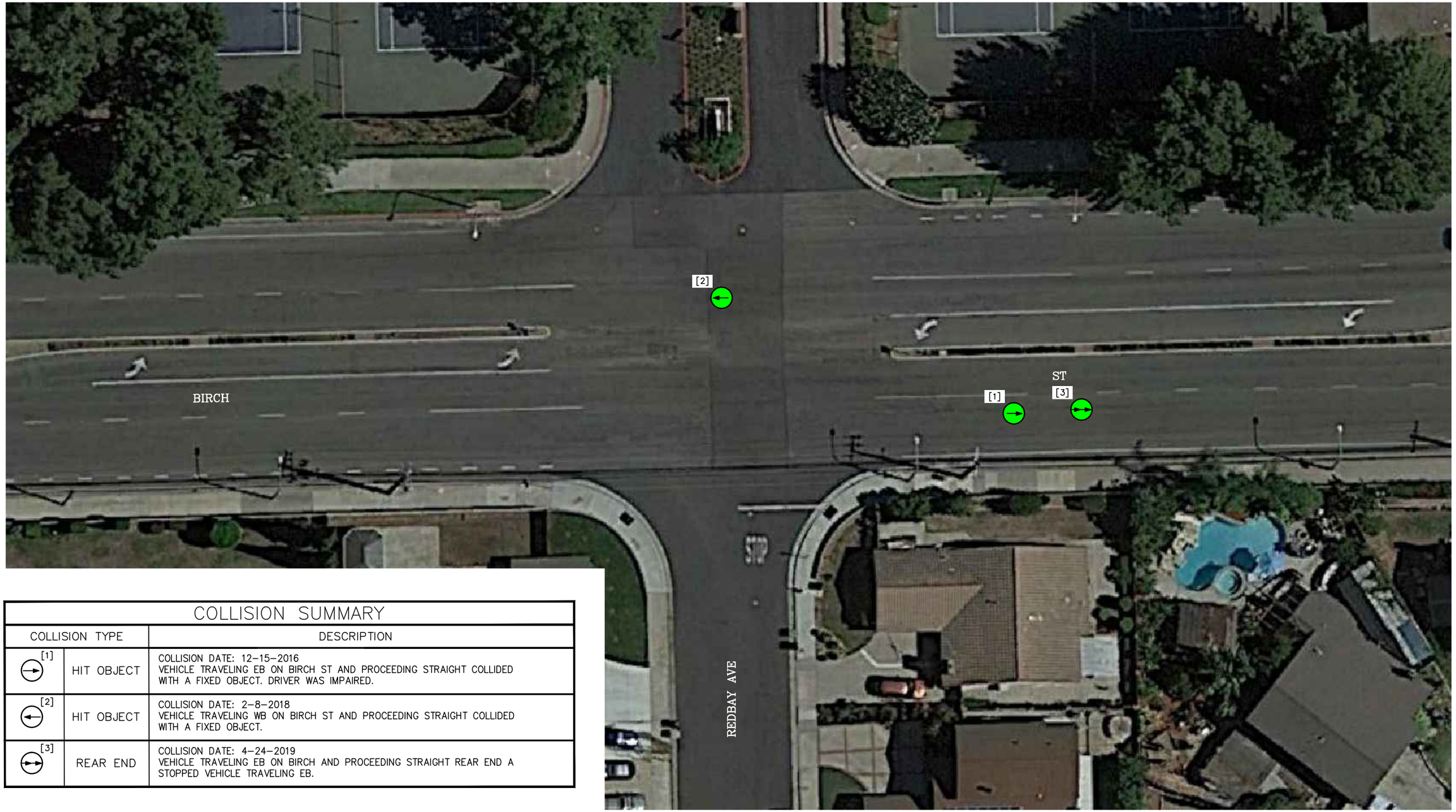
12.2 Peak Hour Intersection Capacity Analysis

Table 12-2 summarizes the peak hour Level of Service results at the intersection of Redbay Avenue at Birch Street for existing traffic conditions. The first column (1) of HCM/LOS values in *Table 12-2* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) presents existing traffic conditions with the addition of Project traffic. The third column (3) shows the increase in delay value due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The fourth column (4) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

Review of column (1) of *Table 12-2* indicates that the intersection of Redbay Avenue at Birch Street currently operates at unacceptable LOS F during both the AM and PM peak hours. Review of column (2) indicates that the intersection is forecast to continue to operate at unacceptable LOS F with the addition of Project traffic. However, although the intersection operates adversely, the intersection does not satisfy the criteria for the installation of a traffic signal and therefore improvements are not required at this location.

Furthermore, it should be noted that five-years of crash data was researched at the intersection of Redbay Avenue at Birch Street via SWITRS, which is a statewide traffic data system used for collecting traffic collisions. Review of the data shows that there have been three (3) crashes at the study intersection within the last five years, none of which are correctable with the installation of a traffic signal. ***Figure 12-1*** summarizes the accident history at the study intersection.

Appendix J also presents the HCM/LOS calculations for the intersection of Redbay Avenue at Birch Street.



COLLISION SUMMARY		
COLLISION TYPE		DESCRIPTION
[1]	HIT OBJECT	COLLISION DATE: 12-15-2016 VEHICLE TRAVELING EB ON BIRCH ST AND PROCEEDING STRAIGHT COLLIDED WITH A FIXED OBJECT. DRIVER WAS IMPAIRED.
[2]	HIT OBJECT	COLLISION DATE: 2-8-2018 VEHICLE TRAVELING WB ON BIRCH ST AND PROCEEDING STRAIGHT COLLIDED WITH A FIXED OBJECT.
[3]	REAR END	COLLISION DATE: 4-24-2019 VEHICLE TRAVELING EB ON BIRCH AND PROCEEDING STRAIGHT REAR END A STOPPED VEHICLE TRAVELING EB.

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FIGURE 12-1

REDBAY AVENUE AT BIRCH STREET ACCIDENT HISTORY

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TABLE 12-1

REDBAY AVENUE AT BIRCH STREET TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY[66]

Study Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing Plus Project Traffic Conditions	
		Part A of Warrant 3 Satisfied?	Part B of Warrant 3 Satisfied?	Part A of Warrant 3 Satisfied?	Part B of Warrant 3 Satisfied?
A. Redbay Avenue at Birch Street	AM	No	No	No	No
	PM	No	No	No	No

[66] Signal Warrant checks based on Warrant 3, Part A – Peak Hour Delay Warrant and Part B – Peak Hour Volume Warrant combined in the California MUTCD.

TABLE 12-2
REDBAY AVENUE AT BIRCH STREET PEAK HOUR INTERSECTION CAPACITY ANALYSIS

Study Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing Plus Project Traffic Conditions		(3) Exceed LOS Thresholds		(4) Existing Plus Project Traffic Conditions with Improvements	
		Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
A. Redbay Avenue at Birch Street	AM	**546.2**	**F**	**609.7**	**F**	63.5	No[67]	--	--
	PM	**--**[68]	**F**	**--**[68]	**F**	--	No	--	--

Notes:
- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

[67] Although the intersection operates adversely, the intersection does not satisfy the criteria for the installation of a traffic signal. Therefore, improvements are not required.

[68] Intersection delay (sec/veh) calculation exceeded the capabilities of HCM 6th Edition, therefore only adverse LOS F was reported.

13.0 VOYAGER AVENUE AT BIRCH STREET AND N. ASSOCIATED ROAD AT BIRCH STREET FOCUSED ASSESSMENT

It is our understanding that local residents have brought up concerns to the City regarding traffic operations and congestion along Birch Street associated with Country Hills Elementary School and Olinda Elementary School. Therefore, this focused assessment will assess traffic flow at the intersections of Voyager Avenue at Birch Street and N. Associated Road at Birch Street (Intersection No. 12) based on the following:

- Weekday AM and PM peak hour capacity analysis for existing conditions, without and with the proposed Project, and
- Intersection queueing evaluation for existing conditions, without and with the proposed Project.

13.1 Peak Hour Intersection Capacity Analysis – ICU

Table 13-1 summarizes the peak hour Level of Service results at the two (2) study intersections for existing traffic conditions based on ICU methodology. The first column (1) of ICU/LOS values in *Table 13-1* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) presents existing traffic conditions with the addition of Project traffic. The third column (3) shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The fourth column (4) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

Review of column (1) of *Table 13-1* indicates that intersections of Voyager Avenue at Birch Street and N. Associated Road at Birch Street (Intersection No. 12) currently operate at acceptable service levels during both the AM and PM peak hours. Review of column (2) indicates that the intersections are forecast to continue to operate at acceptable service levels with the addition of Project traffic. Therefore, it can be concluded that the Project will have little effect on Birch Street as it relates to Country Hills Elementary School and Olinda Elementary School, based on ICU methodology.

Appendix K presents the ICU/LOS calculations for the intersections of Voyager Avenue at Birch Street and N. Associated Road at Birch Street.

13.2 Peak Hour Intersection Capacity Analysis – HCM

Table 13-2 summarizes the peak hour Level of Service results at the two (2) study intersections for existing traffic conditions based on HCM methodology. The first column (1) of HCM/LOS values in *Table 13-2* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) presents existing traffic conditions with the addition of Project traffic. The third column (3) shows the increase in delay value due to the added peak hour Project trips and indicates whether the traffic associated with the proposed Project will exceed the LOS thresholds defined in this report. The four column (4) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

Review of column (1) of *Table 13-2* indicates that intersections of Voyager Avenue at Birch Street and N. Associated Road at Birch Street (Intersection No. 12) currently operate at acceptable service levels during both the AM and PM peak hours. Review of column (2) indicates that the intersections are forecast to continue to operate at acceptable service levels with the addition of Project traffic. Therefore, it can be concluded that the Project will have little effect on Birch Street as it relates to Country Hills Elementary School and Olinda Elementary School, based on HCM methodology.

Appendix K also presents the HCM/LOS calculations for the intersections of Voyager Avenue at Birch Street and N. Associated Road at Birch Street.

13.3 Intersection Queueing Evaluation

The queuing evaluation was conducted for existing traffic conditions based on the Average Queue methodology, which calculates the average queue value in terms of number of vehicles per lane. At signalized intersections, the storage length for left-turn and right-turn lanes may be based on one and one-half (1½) to two (2) times the average number of vehicles that would store per signal cycle[69]. For the purposes of this traffic analysis, the minimum storage requirement for left-turn lanes and right-turn lanes was calculated by taking 1½ times the average queue length. (Minimum required storage = Q_{av} (feet) x 1.5). The storage lengths at unsignalized intersection locations are based on 95th Percentile methodology.

It should be noted that the Synchro software takes into consideration traffic volume data, lane configurations, traffic signal phasing and potential weaving between intersections in order to calculate the queues for each movement. The existing storage lengths were determined based on a review of aerial maps of the subject intersections obtained from Google Earth and field reviews conducted by LLG Engineers. An average vehicle length of 25 feet is assumed for the purposes of this analysis.

Table 13-3 presents the AM and PM peak hour queueing analyses results for the two (2) study intersections for existing conditions. The first column (1) of *Table 13-3* presents the resultant queues for existing traffic conditions. The second column (2) presents the resultant queues for existing conditions with the addition of Project traffic.

Review of columns (1) and (2) of *Table 13-3* indicates that one (1) of the two (2) study intersections have queues which exceed the provided storage capacity for one intersection approach under both existing and existing plus project conditions. The remaining study intersection has queues that are adequately accommodated by the provided storage space. The intersection/approach with storage deficiencies include the following:

- Voyager Avenue at Birch Street
  - Southbound Left/Thru: AM Peak Hour

[69] Source: Highway Design Manual, Intersections at Grade, page 400-9, CALTRANS

Although the queues for the southbound left/through lane at the intersection of Voyager Avenue at Birch Street exceed the provided storage capacity, the remaining queues can be accommodated on-site of the Onlinda Elementary School. Therefore, it can be concluded that Project will have little effect on the queuing along Birch Street as it relates to Country Hills Elementary School and Olinda Elementary School.

Appendix K also presents the Synchro queuing worksheets for the intersections of Voyager Avenue at Birch Street and N. Associated Road at Birch Street.

TABLE 13-1
PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ICU
VOYAGER AVENUE AT BIRCH STREET AND N. ASSOCIATED ROAD AT BIRCH STREET

Study Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing Plus Project Traffic Conditions		(3) Exceed LOS Thresholds		(4) Existing Plus Project Traffic Conditions with Improvements	
		ICU	LOS	ICU	LOS	Increase	Yes/No	ICU	LOS
12. N Associated Road at Birch Street	AM	0.529	A	0.542	A	0.013	No	--	--
	PM	0.626	B	0.635	B	0.009	No	--	--
A. Voyager Avenue at Birch Street	AM	0.330	A	0.336	A	0.006	No	--	--
	PM	0.334	A	0.351	A	0.017	No	--	--

Notes:
- **Bold ICU/LOS** values indicate adverse service levels based on the City LOS standards.

TABLE 13-2
PEAK HOUR INTERSECTION CAPACITY ANALYSIS – HCM
VOYAGER AVENUE AT BIRCH STREET AND N. ASSOCIATED ROAD AT BIRCH STREET

Study Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing Plus Project Traffic Conditions		(3) Exceed LOS Thresholds		(4) Existing Plus Project Traffic Conditions with Improvements	
		Delay (s/v)	LOS	Delay (s/v)	LOS	Increase	Yes/No	Delay (s/v)	LOS
12. N Associated Road at Birch Street	AM	25.4	C	25.5	C	0.1	No	--	--
	PM	23.0	C	23.1	C	0.1	No	--	--
A. Voyager Avenue at Birch Street	AM	17.3	B	17.6	B	0.3	No	--	--
	PM	7.1	A	7.1	A	0.0	No	--	--

Notes:
- **Bold HCM/LOS** values indicate adverse service levels based on the City LOS standards.
- s/v = seconds per vehicle (delay)

TABLE 13-3
EXISTING PEAK HOUR INTERSECTION QUEUING ANALYSIS
VOYAGER AVENUE AT BIRCH STREET AND N. ASSOCIATED ROAD AT BIRCH STREET

Study Intersection	Estimated Storage Provided (feet)	(1) Existing Traffic Conditions				(2) Existing Plus Project Traffic Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[70] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[70] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[70] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[70] (feet)	Adequate Storage (Yes / No)
12. N Associated Road at Birch Street									
Northbound Left-Turn	120	25	Yes	25	Yes	25	Yes	25	Yes
Northbound Through	220	25	Yes	25	Yes	25	Yes	25	Yes
Northbound Right-Turn	65	25	Yes	25	Yes	25	Yes	25	Yes
Southbound Left-Turn	205	80	Yes	56	Yes	80	Yes	56	Yes
Southbound Left/Through	1,240	80	Yes	54	Yes	80	Yes	54	Yes
Southbound Right-Turn	205	188	Yes	198	Yes	189	Yes	194	Yes
Eastbound Left-Turn	195	347	Yes[71]	369	Yes[71]	348	Yes[71]	369	Yes[71]
Westbound Left-Turn	200	25	Yes	25	Yes	25	Yes	25	Yes
Westbound Right-Turn	200	25	Yes	26	Yes	25	Yes	25	Yes
A. Voyager Avenue at Birch Street									
Northbound Left-Turn	120	38	Yes	54	Yes	38	Yes	54	Yes
Northbound Through/Right	565	32	Yes	25	Yes	32	Yes	25	Yes
Southbound Left/Through	95	**167**	**No**	25	Yes	**167**	**No**	25	Yes

[70] Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

[71] The remaining queue can be accommodated within the transition area of the turn-lane.

TABLE 13-3 (CONTINUED)
EXISTING PEAK HOUR INTERSECTION QUEUING ANALYSIS
VOYAGER AVENUE AT BIRCH STREET AND N. ASSOCIATED ROAD AT BIRCH STREET

Study Intersection	Estimated Storage Provided (feet)	(1) Existing Traffic Conditions				(2) Existing Plus Project Traffic Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Max. Queue/ Min. Storage Required[72] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[72] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[72] (feet)	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[72] (feet)	Adequate Storage (Yes / No)
A. Voyager Avenue at Birch Street (Continued)									
Southbound Right-Turn	95	25	Yes	25	Yes	25	Yes	25	Yes
Eastbound Left-Turn	200	155	Yes	36	Yes	155	Yes	36	Yes
Westbound Left-Turn	140	48	Yes	25	Yes	48	Yes	25	Yes
Westbound Right-Turn	225	53	Yes	25	Yes	60	Yes	25	Yes

[72] Maximum queue is calculated by multiplying the *Average Queue* by a factor of 1.5 for signalized intersections. Maximum queue is based on the 95th percentile for unsignalized intersections.

14.0 SUMMARY OF FINDINGS AND CONCLUSIONS

- ***Project Description*** – The Brea 265 Specific Plan is a master planned residential community consisting of 260.7 acres located in the City of Brea and unincorporated Orange County. The proposed Project is generally located east of the State Route (SR) 57 Freeway and north of SR-90 (Imperial Highway), towards the eastern portion of the City. The proposed Project will include a mix of single family and multifamily residential units totaling 1,100 dwelling units along with a 13.0-acre sports park.. The Project is expected to be developed three (3) phases over the next several years, with the Year 2035 utilized to assess the Project's potential traffic impacts at full occupancy. Vehicular access to the Project will be provided via one (1) full access signalized driveway on Lambert Road, one (1) full access signalized driveway on Valencia Avenue, one (1) full access signalized driveway on Rose Drive, and one (1) full access signalized driveway at the existing intersection of Rose Drive at Vesuvius Drive.

- ***Study Scope*** – The following twenty-two (22) key study intersections were selected for detailed peak hour level of service analyses under Existing Traffic Conditions, Year 2035 Cumulative Traffic Conditions, Year 2035 Cumulative Plus Project, Year 2045 Traffic Conditions, and Year 2045 Plus Project Traffic Conditions.

Study Intersection	Applicable Jurisdiction (City Location)		
	Caltrans	City of Brea	City of Placentia
10. State College Boulevard at Lambert Road	--	Brea	--
11. SR-57 SB Ramps at Lambert Road	Caltrans (Brea)	--	--
12. SR-57 NB Ramps at Lambert Road	Caltrans (Brea)	--	--
13. Pointe Drive at Lambert Road	--	Brea	--
14. Wildcat Way/N Associated Road at Lambert Road	--	Brea	--
15. Santa Fe Road/Kraemer Boulevard at Lambert Road	--	Brea	--
16. Sunflower Street at Lambert Road	--	Brea	--
17. Valencia Avenue at Lambert Road/Carbon Canyon Road	Caltrans (Brea)	--	--
18. Santa Fe Road at Carbon Canyon Road	Caltrans (Brea)	--	--
19. State College Boulevard at Birch Street	--	Brea	--
20. S Associated Road at Birch Street	--	Brea	--
21. N Associated Road at Birch Street	--	Brea	--
22. Kraemer Boulevard at Birch Street	--	Brea	--
23. Valencia Avenue at Birch Street/Rose Drive	Caltrans (Brea)	--	--
24. Rose Drive at Vesuvius Drive		Brea	--
23. SR-57 SB Ramps at Imperial Highway	Caltrans (Brea)	--	--
24. SR-57 NB Ramps at Imperial Highway	Caltrans (Brea)	--	--
25. Associated Road at Imperial Highway	Caltrans (Brea)	--	--
26. Castlegate Lane/Placentia Avenue at Imperial Highway	Caltrans (Brea)	--	--
27. Kraemer Boulevard at Imperial Highway	Caltrans (Brea)	--	--
28. Valencia Avenue at Imperial Highway	Caltrans (Brea)	--	--
23. Rose Drive at Imperial Highway	--	--	Caltrans (Placentia)

- ***Existing Traffic Conditions ICU*** – One (1) of the twenty-two (22) study intersections currently operates at an unacceptable LOS during the PM peak hour. The remaining study intersections currently operate at an acceptable LOS D or better during the AM and PM peak hours. The locations identified below currently operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
14. Valencia Ave at Birch St/Rose Dr	--	--	0.914	E

- ***Existing Traffic Conditions HCM*** – Four (4) of the twenty-two (22) study intersections currently operates at an unacceptable LOS during the AM and/or PM peak hours. The remaining study intersections currently operate at an acceptable LOS D or better during the AM and PM peak hours. The locations identified below currently operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
5. Wildcat Way/N. Associated Rd at Lambert Rd	57.3	E	--	--
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	136.6	F	--	--
14. Valencia Ave at Birch St/Rose Dr	105.1	F	57.7	E
29. Rose Dr at Imperial Hwy	205.0	F	204.8	F

- ***Project Trip Generation*** – The proposed Project is forecast to generate approximately 9,351 daily trips, with 634 trips (182 inbound, 452 outbound) produced in the AM peak hour and 893 trips (542 inbound, 351 outbound) produced in the PM peak hour on a "typical" weekday.

- ***Related Projects Traffic Characteristics –*** Thirty-three (33) related projects were considered as part of the cumulative background setting. The thirty-three (33) related projects are forecast to generate 38,572 daily trips, with 3,006 trips (1,547 inbound, 1,459 outbound) anticipated during the AM peak hour and 3,517 trips (1,792 inbound, 1,725 outbound) produced during the PM peak hour.

- ***Year 2035 Cumulative Traffic Conditions Plus Project ICU*** – Five (5) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2035 cumulative traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	1.039	F	--	--
14. Valencia Ave at Birch St/Rose Dr	0.904	E	1.161	F
15. Rose Dr at Vesuvius/Driveway D	0.984	E	--	--

25. Associated Rd at Imperial Hwy	--	--	0.905	E
22. Rose Dr at Imperial Hwy	--	--	1.099	F

All five (5) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. The implementation of recommended improvements at the intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

- ***Year 2035 Cumulative Traffic Conditions Plus Project HCM*** – Three (3) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2035 cumulative traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	164.0	F	--	--
14. Valencia Ave at Birch St/Rose Dr	122.5	F	91.1	F
22. Rose Dr at Imperial Hwy	246.4	F	233.5	F

All three (3) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. The implementation of recommended improvements at the intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

- ***Year 2045 Traffic Conditions Plus Project ICU*** – Five (5) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2045 buildout traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**ICU**	**LOS**	**ICU**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	1.077	F	--	--
14. Valencia Ave at Birch St/Rose Dr	0.943	E	1.212	F
15. Rose Dr at Vesuvius/Driveway D	1.144	F	1.043	F
18. Associated Rd at Imperial Hwy	--	--	0.943	E
22. Rose Dr at Imperial Hwy	--	--	1.130	F

Four (4) of the five (5) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. The implementation of recommended improvements at the four (4) intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

- ***Year 2045 Traffic Conditions Plus Project HCM*** – Three (3) of the twenty-two (22) study intersections are forecast to operate adversely during the AM and/or PM peak hours with the addition of proposed Project traffic to Year 2045 buildout traffic conditions. The remaining study intersections are forecast to operate at acceptable LOS D or better during the weekday AM and PM peak hours. The locations identified below are forecast to operate at unacceptable levels of service:

	AM Peak Hour		PM Peak Hour	
Study Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
8. Valencia Ave at Lambert Rd/Carbon Canyon Rd	177.7	F	--	--
14. Valencia Ave at Birch St/Rose Dr	132.1	F	103.9	F
22. Rose Dr at Imperial Hwy	251.7	F	276.2	F

All three (3) study intersections operating adversely require Project-related improvements based on the LOS thresholds defined in this report. The implementation of recommended improvements at the intersections will help offset the Project's increment. After implementation of the recommended improvements, the intersections are forecast to operate at acceptable service levels and/or operate at better service levels than pre-Project conditions.

- ***Year 2035 Cumulative Traffic Conditions Plus Project Queueing*** **–** Two (2) of the nine (9) study intersections have queues which exceed the provided storage capacity for one or more intersection approach with the addition of proposed Project traffic to Year 2035 cumulative traffic conditions. The remaining study intersections have queues that are adequately accommodated by the provided storage space. The intersections/approaches with storage deficiencies include the following:

  - Intersection No. 18: Associated Road at Imperial Highway
    - Eastbound Left-Turn: PM Peak Hour
    - Westbound Left-Turn: PM Peak Hour

  - Intersection No. 22: Rose Drive at Imperial Highway
    - Southbound Left-Turn: AM Peak Hour and PM Peak Hour
    - Westbound Right-Turn: PM Peak Hour

The addition of Project traffic does not contribute to the eastbound left-turn movement at the intersection of Associated Road at Imperial Highway (Intersection No. 18). Also, the addition of

Project traffic adds less than one (1) vehicle to the westbound left-turn queue, which is considered nominal. Therefore, Project-related improvements at the intersection of Associated Road at Imperial Highway (Intersection No. 18) are not required to improve the queues.

The implementation of recommended improvements at the intersection of Rose Drive at Imperial Highway (Intersection No. 22) will help improve queues for the southbound left-turn and westbound right-turn. After implementation of the recommended improvements, the southbound left-turn and westbound right-turn queues operate better than pre-Project conditions.

- ***Year 2045 Traffic Conditions Plus Project Queueing*** – Four (4) of the nine (9) study intersections have queues which exceed the provided storage capacity for one or more intersection approach with the addition of proposed Project traffic to Year 2045 buildout traffic conditions. The remaining study intersections have queues that are adequately accommodated by the provided storage space. The intersections/approaches with storage deficiencies include the following:

  - Intersection No. 2: SR-57 SB Ramps at Lambert Road
    - Westbound Left-Turn: AM Peak Hour
  - Intersection No. 18: Associated Road at Imperial Highway
    - Eastbound Left-Turn: PM Peak Hour
    - Westbound Left-Turn: PM Peak Hour
  - Intersection No. 19: Castlegate Lane/Placentia Avenue at Imperial Highway
    - Westbound Left-Turn: PM Peak Hour
  - Intersection No. 22: Rose Drive at Imperial Highway
    - Southbound Left-Turn: AM Peak Hour and PM Peak Hour
    - Westbound Right-Turn: PM Peak Hour

  The addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue at the intersection of SR-57 SB Ramps at Lambert Road (Intersection No. 2), which is considered nominal. Therefore, Project-related improvements at the intersection are not required to improve the queues.

  The addition of Project traffic does not contribute to the eastbound left-turn movement at the intersection of Associated Road at Imperial Highway (Intersection No. 18). Also, the addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue, which is considered nominal. Therefore, Project-related improvements at the intersection of Associated Road at Imperial Highway (Intersection No. 18) are not required to improve the queues.

The addition of Project traffic adds less than one (1) vehicle to the westbound left-turn queue at the intersection of Castlegate Lane/Placentia Avenue at Imperial Highway (Intersection No. 19), which is considered nominal. Therefore, Project-related improvements at the intersection are not required to improve the queues.

The implementation of recommended improvements at the intersection of Rose Drive at Imperial Highway (Intersection No. 22) will help improve queues for the southbound left-turn and westbound right-turn. After implementation of the recommended improvements, the southbound left-turn and westbound right-turn queues operate better than pre-Project conditions.

- ***Site Access Assessment*** **–** One (1) of the four (4) Project driveways require recommended improvements. After implementation of the recommended mitigation measures, all four (4) Project driveways are forecast to operate at acceptable service levels. Motorists entering and exiting the Project site will be able to do so comfortably, safely, and without undue congestion. The following intersection improvements are recommended to help achieve acceptable service levels:

  - **Rose Drive at Vesuvius Drive/Driveway D:** Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

- ***Project Driveway B and C Gate Queueing Analysis*** **–** A storage reservoir length of 40 feet between the front of the gate to the Project's right-of-way/property line is required to satisfy both the AM and PM peak hour traffic at both of the project entrances.

  Project Driveway B will require a storage length of 36 feet between the front of the gate to crosswalk in order for the outbound vehicles to not queue past the gate. Project Driveway C will require a minimum storage length of 59 feet between the front of the gate to the crosswalk in order for the outbound vehicles to not queue past the gate.

- ***Project Driveway B Phased Analysis*** **–** Zone 2 could be constructed without requiring the installation of a traffic signal at Driveway B under Year 2035 traffic conditions and still operate with acceptable service levels. However, upon completion of Zones 2 and 3 a signal would be required. If desired by Caltrans and the City of Brea the installation of the traffic signal at Driveway B could be deferred to Year 2045 if Zone 3 has yet to be constructed/occupied.

- ***Planned Improvements*** **–** The following improvements listed below are part of the SR-57 Lambert Interchange improvement project, now under construction, that have been included in the Year 2035 and Year 2045 background traffic conditions:

  - **No. 2 – SR-57 SB Ramps at Lambert Road:** Widen the off-ramp to provide a second exclusive southbound left-turn lane. Restripe the shared southbound left-turn/through/right-turn lane to a second exclusive right-turn lane. Widen to provide a second exclusive eastbound right-turn lane. Modify the existing traffic signal.

- **No. 3 – SR-57 NB Ramps at Lambert Road:** Construct a loop on-ramp on the south leg. Remove dual eastbound exclusive left-turn lanes. Widen and restripe to provide a shared eastbound through/right-turn lane and an exclusive eastbound right-turn lane. Reconstruct the existing on-ramp for a free westbound right-turn lane. Modify the existing traffic signal.

- ***Year 2035 Cumulative Plus Project Recommended Improvements (ICU)*** – Five (5) of the twenty-two (22) study intersections require Project-related improvements under Year 2035 Plus Project traffic conditions based on ICU analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements.

  - **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

  - **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

  - **No. 15 – Rose Drive at Vesuvius Drive/Driveway D:** *Same as those previously identified.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

  - **No. 18 – Associated Road at Imperial Highway:** Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Modify the existing traffic signal. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

  - **No. 22 – Rose Drive at Imperial Highway:** Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- ***Year 2035 Cumulative Plus Project Recommended Improvements (HCM)*** – Three (3) of the twenty-two (22) study intersections require Project-related improvements under Year 2035 Plus Project traffic conditions based on HCM analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements.

  - **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** *Same as those previously identified.* Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

  - **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** *Same as those previously identified.* Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

  - **No. 22 – Rose Drive at Imperial Highway:** *Same as those previously identified.* Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- ***Year 2045 Plus Project Recommended Improvements (ICU)*** **–** Four (4) of the twenty-two (22) study intersections require Project-related improvements under Year 2045 Plus Project traffic conditions based on ICU analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements. It should be noted that although the intersection of Associated Road at Imperial Highway (Intersection No. 18) does not require Project-related improvements, improvements at the intersection have been included to provide consistency with Year 2035 improvements.

  - **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** *Same as those previously identified.* Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will

require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** *Same as those previously identified.* Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 15 – Rose Drive at Vesuvius Drive/Driveway D:** *Same as those previously identified.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Widen to provide a second southbound departure lane. Modify the existing traffic signal.

- **No. 18 – Associated Road at Imperial Highway:** *Same as those previously identified.* Restripe the southbound exclusive right-turn as a shared southbound through/right-turn lane. Modify the existing traffic signal. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 22 – Rose Drive at Imperial Highway:** *Same as those previously identified.* Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- ***Year 2045 Plus Project Recommended Improvements (HCM)*** – Three (3) of the twenty-two (22) study intersections require Project-related improvements under Year 2045 Plus Project traffic conditions based on HCM analysis. As such, the following intersection improvements are recommended. Per City requirements, the Project may be expected to pay a fair-share/local fee to cover the Project's fair share of the full construction costs needed to implement these improvements.

  - **No. 8 – Valencia Avenue at Lambert Road/Carbon Canyon Road:** *Same as those previously identified.* Restripe the first northbound through lane to provide a shared left/through lane. Widen and/or restripe the eastbound approach to provide an exclusive eastbound right-turn lane. Remove the existing pedestrian crosswalk on the west leg of the intersection. Modify the existing traffic signal and provide split phasing in the northbound and southbound directions and an eastbound right-turn overlap phase. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

  - **No. 14 – Valencia Avenue at Birch Street/Rose Drive:** *Same as those previously identified.* Widen and/or restripe the southbound approach to provide a second exclusive southbound left-turn lane. Modify the existing traffic signal and provide westbound right-turn overlap

phasing. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- **No. 22 – Rose Drive at Imperial Highway:** *Same as those previously identified.* Restripe the second southbound through lane as a shared southbound left/through lane. Modify the existing traffic signal and provide northbound and southbound split phasing and westbound right-turn overlap phasing. Remove crosswalk on the east leg. This improvement will require design concurrence from Caltrans and construction will occur under standard Caltrans permitting process.

- ***Project-Related Fair Share Contribution*** – The implementation of recommended improvements ensures acceptable operating conditions are achieved/maintained. The Project can be expected to pay a proportional "fair-share" of the recommended improvements, which is identified below.

Key Intersection	City/ Jurisdiction	Project Fair-Share Contribution
8. Valencia Avenue at Lambert Road/Carbon Canyon Road	Brea/Caltrans	12.27%
15. Valencia Avenue at Birch Street/Rose Drive	Brea/Caltrans	34.96%
16. Rose Drive at Vesuvius Drive	Brea	26.46%
20. Associated Road at Imperial Highway	Brea/Caltrans	5.46%
26. Rose Drive at Imperial Highway	Placentia/Caltrans	15.60%

- ***Traffic Impact Fees*** –Subject to confirmation by City staff, the proposed Project's Traffic Impact Fee (i.e. 450 low density residential units, 650 medium density residential units, and 6 soccer fields totaling 428 daily trips) total **$1,870,842.00**. The precise fee will be determined upon issuance of Project building permits by the City of Brea Community Development Department.

- ***Redbay Avenue at Birch Street Focused Assessment*** – The intersection of Redbay Avenue at Birch Street does not satisfy the criteria for the installation of a traffic signal. Furthermore, five-years of crash data was researched at the intersection; there have been three (3) crashes at the study intersection within the last five years, none of which are correctable with the installation of a traffic signal.

- ***Voyager Avenue at Birch Street and N. Associated Road at Birch Street Focused Assessment*** – The proposed Project will have little effect on the congestion and queueing along Birch Street as it relates to Country Hills Elementary School and Olinda Elementary School.

APPENDIX A

TRAFFIC STUDY SCOPE OF WORK

MEMORANDUM

To:	Dave Roseman, P.E., City Traffic Engineer City of Brea	Date:	December 21, 2021
From:	Richard E. Barretto, P.E., Principal Linscott, Law & Greenspan, Engineers	LLG Ref:	2.18.4052.1
Subject:	***Traffic Circulation Assessment Scope of Work for Brea 265 Specific Plan Brea, California***		

Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit the following Scope of Work for the Traffic Circulation Assessment for the proposed Brea 265 Specific Plan Project in the City of Brea for your review and approval. It is our understanding that a Traffic Circulation Assessment is required to provide consistency with the General Plan. The work program summarized below is based on our current experience within the City, prior coordination efforts with City staff on this project, as well as our understanding of the City's requirements.

Circulation Assessment Scope of Work

A. Project Location: The Brea 265 Specific Plan is a master planned residential community consisting of 260.7 acres located in the City of Brea and unincorporated Orange County; although not a part of the Specific Plan, an additional 1.4 acres of open space located on the northeast corner of Valencia Avenue and Rose Drive has been included this resulting in a total overall acreage of 262.1 acres. The proposed Project is generally located east of the State Route (SR) 57 Freeway and north of SR-90 (Imperial Highway), towards the eastern portion of the City and is surrounded by existing residential neighborhood communities, the Brea Sports Park and Carbon Canyon Regional Park. The Specific Plan area is bisected by Valencia Avenue which runs in a north-south direction, and by Lambert Road which runs in an east-west direction. The Project site is located to the south of Lambert Road/Carbon Canyon Road, north of Rose Drive, east of Valencia Avenue and west of Carbon Canyon Regional Park. Of the 217.7 acres located within unincorporated Orange County, 123.2 acres is currently designated as "Hillside Residential" and 94.5 acres is designated as "Low Density Residential" land use in the City's General Plan. The 43-acre portion of the Project that is located within the City is designated as "Hillside Residential".

Figure 1-1 presents a Vicinity Map that illustrates the general location of the Project and surrounding street system. ***Figure 2-1*** is an existing aerial photograph of the Project site.

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B. Project Description:

General Plan Zoning

As indicated previously, the Projects General Plan zoning for the site is to be developed with 166.2 acres of "Hillside Residential" uses, which equates to 332 single family dwelling units (DU) at an assumed density of 2 DU per acre (166.2 acres x 2 DU/acre). For 94.5 acres of "Low Density Residential" use, the Project zoned to develop with a maximum density of up to 6 DU per acre. However, based on surrounding residential development, a density of 3 DU per acre has been utilized for the "Low Density Residential" uses, which translates to 283 single family dwelling units (94.5 acres x 3 DU/acre). Therefore, the Project site has a zoning development of up to 615 single family dwelling units.

Proposed Project

The proposed Project is a master planned residential community of low-density, medium-density, and high-density residential neighborhoods, parks, recreational amenities, and open space within thirteen (13) planning areas (PA) of the proposed specific plan. The Project will include a mix of approximately 1,100 residential dwelling units on 197.5 acres, up to 15.1 acres of parks/recreations uses, including up to 13 acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.1-acre Trail Staging Area, and 47.5 acres of open space/slopes. The proposed Project allows for a fire station and police substation on a 1.0 acre site on the northwest corner of Lambert and Valencia. Inclusion of 2.0 acres of Master Plan Right-of-way results in a total project acreage of 262.1 acreas. Affordable housing units are also included as part of the total dwelling units proposed for the Project. The proposed Project would be phased and constructed based on market conditions. The proposed land uses would be linked together by an extensive trail network that will connect to the Tracks at Brea and other regional systems, as well as to the adjacent neighborhoods and off-site parks, open space, and surrounding employment centers and retail venues.

Per the Project's development tabulation, two (2) residential land use categories are proposed and consists of 450 "low density" DU, and 650 "medium density" DU, with 15.1 acres of parks/recreations uses, including up to 13 acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.1-acre Trail Staging Area. From review of the Project's details, the above-referenced land uses translate to the development of 450 single family detached DU, and 650 single family attached DU (i.e. townhomes, row homes, detached cluster homes, attached motorcourt homes, etc.). The proposed Sports Park component of the Project is essentially an expansion of the existing Brea Sports Park, that together

will provide the Brea community and new residents of the Project with recreational opportunities.

For the purposes of this analysis, the Project site was split into three (3) zones. Zone 1 is the portion of the Project site located north of Lambert Road. Zone 2 is the portion located south of Lambert Road, west of Valencia Avenue (includes proposed Sports Park). Zone 3 is the portion located east of Valencia Avenue and east of Rose Drive. ***Table 2-1*** provides the Project development summary. ***Figure 2-2*** illustrates the Brea Specific Plan Land Use Plan for the Project. This figure generally illustrates the Parks and Open Space plan for the Project as well.

For our understanding, units may be transferred between land use designations and locations so long as the total number of units does not exceed 1,100 units and the number of units in the planning area does not exceed the maximum number of dwelling units per acre permitted for the planning area's land use designation.

Vehicular Site Access

Subject to confirmation and review of the Project's access and circulation plan, it is our understanding that vehicular access to the Project from the public streets bordering the subject property will be provided via one (1) full access signalized driveway on Lambert Road, one (1) full access signalized driveway on Valencia Avenue, one (1) full access unsignalized driveway on Rose Drive, and one (1) full access signalized driveway at the existing intersection of Rose Drive at Vesuvius Drive. Vehicular circulation internal to the various proposed neighborhoods will be provided by a system of local residential streets.

For the proposed Sports Park, it is assumed that primary vehicular access will be provided via the proposed signalized Project entries on Valencia Avenue and on Lambert Road, with additional vehicular access provided through the existing Brea Sports Park via the unsignalized easterly park driveway located on Birch Street. It is assumed that the "loop" road, which now serves as a "fire lane" and is used by authorized park service vehicles, will be open to through traffic as well as provide for pedestrian and bicycle connectivity.

Project-sponsored proposed intersection lane configurations and traffic controls for the Project's vehicular access points noted above, subject to confirmation, includes the following Project Design Features:

- Lambert Road, from Valencia Avenue west along Project frontage to just east of Sunflower Street - widen and construct Lambert Road along project frontage to Major Arterial Highway Standards per the City's requirements, providing three 12-foot travel lanes and an 8-foot bike lane in each direction,

separated by a 14-foot median within 88-feet of paved width and a right-of way of 120-feet. Lambert Road currently includes two travel lanes in each direction, midblock along the Project frontage.

- Carbon Canyon Road (SR-142), from Valencia Avenue east along Project frontage - widen and construct the south side of Carbon Canyon Road along project frontage to ultimate half-section width per the City's Major Arterial Highway standard and provide three 12-foot travel lanes and an 8-foot bike lane in the eastbound direction, separated by a 14-foot median within 88-feet of paved width and a right-of way of 120-feet. Carbon Canyon Road currently includes three travel lanes, narrowing to two lanes in the easterly direction along the Project frontage.

- Valencia Avenue (SR-142), from Lambert Road/Carbon Canyon Road south to along project frontage - this state route is currently improved to the City's Primary Arterial standards, and now provides two travel lanes and an 8-foot bike lane in each direction, separated by a 14-foot median within 84-feet of paved width and a right-of way of 100-feet; no additional travel lanes are proposed with the Project.

- Rose Drive, from Valencia Avenue south along Project frontage to Vesuvius Drive - widen and construct the east side of Rose Drive along project frontage to Primary Arterial Standards per the City's requirements, providing two foot travel lanes and an 8-foot bike lane in the northbound, separated by a median within 42-feet of half-paved width and a 50-foot half right-of way. To achieve two southbound travels lane along the Project's entire frontage, modifications to the future median and/or lane widths may be needed. Subject to the City's review/approval, it is expected that the design of second southbound through lane will require motorist to merge left to continue through and be terminated as a right-turn lane at the intersection of Rose Drive and Vesuvius Drive to align with the existing southbound right-turn lane at this intersection. Rose Drive currently includes one travel lane in each direction and bike lanes, separated by a painted median.

Figure 2-3 illustrates the Project's Circulation Plan as presented in the Brea 265 Specific Plan.

Pedestrian and Bicycle Circulation

Figure 2-4 illustrates the Non-Vehicular Circulation Plan that identifies the existing trails/sidewalks adjacent to the Project site and the proposed trails within the Project site as presented in the Brea 265 Specific Plan. In addition to the trail

and pedestrian connectivity proposed by the Project, a planned bikeway system will facilitate continuous bicycle access throughout the Project site, linking the site the current bicycle facilities in the immediate area. On-street bike plane will be provided on both sides of Lambert Road, Valencia Avenue, and Rose Drive, and on the south side of Carbon Canyon Road upon completion of proposed Project Design Features.

C. **Traffic Study Locations:** The following twenty-two (22) key study intersections, along with the applicable jurisdiction and/or City location, have been identified based on coordination with the City, for which the Project's potential traffic impact is to be assessed. *Figure 1-1* identifies the study locations.

As a result of SB743, traffic studies are no longer a CEQA requirement. Hence, subject to confirmation by the City Traffic Engineer, Level of Service (LOS) calculations would be prepared at these locations:

TABLE 1-1
KEY STUDY INTERSECTIONS

Key Intersection	Applicable Jurisdiction (City Location)	
	Caltrans	City of Brea
1. State College Boulevard at Lambert Road	--	Brea
2. SR-57 SB Ramps at Lambert Road	Caltrans (Brea)	--
3. SR-57 NB Ramps at Lambert Road	Caltrans (Brea)	--
4. Pointe Drive at Lambert Road	--	Brea
5. Wildcat Way/N Associated Road at Lambert Road	--	Brea
6. Santa Fe Road/Kraemer Boulevard at Lambert Road	--	Brea
7. Sunflower Street at Lambert Road	--	Brea
8. Valencia Avenue at Lambert Road/Carbon Canyon Road	Caltrans (Brea)	--
9. Santa Fe Road at Carbon Canyon Road	Caltrans (Brea)	--
10. State College Boulevard at Birch Street	--	Brea
11. S Associated Road at Birch Street	--	Brea
12. N Associated Road at Birch Street	--	Brea
13. Kraemer Boulevard at Birch Street	--	Brea
14. Valencia Avenue at Birch Street/Rose Drive	Caltrans (Brea)	--
15. Rose Drive at Vesuvius Drive	--	Brea
16. SR-57 SB Ramps at Imperial Highway	Caltrans (Brea)	--
17. SR-57 NB Ramps at Imperial Highway	Caltrans (Brea)	--
18. Associated Road at Imperial Highway	Caltrans (Brea)	--
19. Castlegate Lane/Placentia Avenue at Imperial Highway	Caltrans (Brea)	--
20. Kraemer Boulevard at Imperial Highway	Caltrans (Brea)	--
21. Valencia Avenue at Imperial Highway	Caltrans (Brea)	--
22. Rose Drive at Imperial Highway	Caltrans (Placentia)	--

D. Traffic Counts: Based on current conditions, due to COVID-19 pandemic, the ability to collect traffic counts to establish baseline conditions is not possible. As such, to establish existing "baseline" traffic conditions, pre-COVID-19, LLG has researched historical data and was able to obtain Year 2018 counts at all twenty-two (22) key study locations. As such, to establish existing "baseline" traffic conditions, an annual growth factor of 1% per year will be applied to the Year 2018 conditions to establish Year 2021 pre-COVID-19 baseline traffic conditions.

E. Project Traffic Generation: The trip generation potential of the proposed Project will be estimated using trip rates contained in the 11th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE), [Washington, D.C., 2021]. ***Table 5-1*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project and also presents the project's forecast peak hour and daily traffic volumes.

Based on the Project description, the upper portion of *Table 5-1* identifies land use categories and trip rates which were considered in forecasting the trip generation of the Project. The land uses include ITE Land Use 210: Single Family Detached Housing, 215: Single Family Attached Housing, ITE Land Use 220: Multifamily Housing (Low-Rise), and ITE Land Use 488: Soccer Complex. The trip generation potential of both the Project's medium density ("multifamily" and "single family attached") components will be forecast based on ITE Land Use 215: Single Family Attached trip rates. Given the description of the Project's proposed Sports Park component, the trip generation potential will be forecast based on ITE Land Use 488: Soccer Complex[1] trip rates.

A review of the lower portion of this table indicates that the proposed Project is forecast to generate approximately 9,351 daily trips, with 634 trips (182 inbound, 452 outbound) produced in the AM peak hour and 893 trips (542 inbound, 351 outbound) produced in the PM peak hour on a "typical" weekday.

F. Project Trip Distribution Pattern: ***Tables 5-2 and 5-3*** present the overall directional north/south/east/west distribution pattern for the residential and sports park components, respectively. ***Figures 5-1 through 5-5*** present the detailed Project Trip Distribution for Zone 1, Zone 2A, Zone 2B, Zone 3A and Zone 3B for review by the City. Project traffic volumes, both entering and exiting the site,

[1] Per Trip Generation, a soccer complex is an outdoor facility that is used for non-professional soccer games. It may consist of multiple fields. The size of each field within the land use may vary to accommodate games for different age groups. On-site amenities may include stadium seating, a fitness trail, an activities shelter, aquatic center, picnic grounds, basketball and tennis courts, and a playground, similar to the proposed Project's Sports Park component. For this analysis, it is assumed up to two (2) full-sized soccer fields will be provided. However, when taking into consideration that a full-sized soccer field can be subdivided into approximately 2-3 child-sized fields, this analysis will conservatively analyze a total of six (6) soccer fields.

have been distributed and assigned to the adjacent street system based on Project Select Zone model runs and were further refined based on the following considerations:

- location of site access points in relation to the surrounding street system,
- the site's proximity to major traffic carriers and regional access routes,
- physical characteristics of the circulation system such as lane channelization and presence of traffic signals that affect travel patterns,
- presence of traffic congestion in the surrounding vicinity,
- ingress/egress availability at the project site, and
- prior discussions with City Staff.

G. Near-Term Cumulative Background Traffic:

- Project Completion Year: 2035. The proposed Project is expected to development in several phases between 2023 and 2030, but is dependent on several factors, including the timing of Project approval, Project funding, market conditions, site preparation and/or the current COVID-19 environment which could delay the Project. As such, the Year 2035 has been utilized to assess the Project's potential traffic impacts at full occupancy *(to be confirmed by the applicant).*

- Ambient Growth Rate: 1% per year
- Cumulative Projects: Planned and/or approved projects are presented in ***Table 6-1.***

H. General Plan Buildout Traffic: General Plan Buildout (Year 2045) traffic volume forecasts will be developed based on OCTAM 5.0 approved computer traffic model runs for baseline conditions and buildout conditions for the AM and PM peak periods and daily traffic conditions. Forecast future buildout traffic volumes using the following methodology:

a. Peak period traffic volumes will be converted to peak hour (i.e., one-hour) traffic volumes using a conversion factor of 0.3566 for the AM peak hour and 0.2662 for the PM peak hour;

b. Calculate the difference between the baseline and buildout peak period traffic volumes and convert to AM and PM peak hour (i.e., one-hour) link traffic volumes;

c. Link traffic volumes (i.e., two-way directional traffic volumes on each roadway segment) will be post-processed using the "b-turns" program and the relationship of the base year validation model run output to the

base year "ground" traffic counts to develop buildout AM and PM peak hour traffic volumes.

I. Analysis Scenarios: Prepare AM peak hour and PM peak hour Level of Service (LOS) calculations at up to twenty-two (22) study intersections to determine the potential impacts of the proposed Project. The following traffic scenarios will be prepared.

1. Existing Traffic Conditions;
2. Near-Term (Year 2035 to be confirmed) Background Traffic Conditions (Existing plus Ambient Growth plus Related Projects);
3. Near-Term (Year 2035 to be confirmed) Background Plus Project Traffic Conditions;
4. Scenario (3) with improvements to be implemented as conditions of approval (COA), if necessary;
5. General Plan Buildout (Year 2045) Traffic Conditions;
6. General Plan Buildout (Year 2045) Plus Project Traffic Conditions; and
7. Scenario (6) with improvements to be implemented as conditions of approval (COA), if necessary.

J. LOS Methodology: The LOS calculations will be based on the HCM 6th Edition methodology for both signalized and unsignalized intersections to be consistent with the City of Brea Transportation Impact Analysis (TIA) Guidelines. Additionally, the LOS calculations will also be based on the Intersection Capacity Utilization (ICU) methodology for signalized intersections to be consistent with the City of Brea General Plan.

The HCM calculations will utilize the following parameters:

- Utilization of exiting cycle length and pedestrian timing parameters,
- Minimum left-turn split time, including clearance interval timing = 10 seconds
- Saturation flow rates:
  - Thru and Right-turns = 1,900 vehicles per hour (vph)
  - Left-turns = Single Lane: 1,800 vph, Dual Lanes = 3,500 vph

The ICU calculations will utilize the following parameters:

- Lane capacity of 1,700 vph for through and all turn lanes with a clearance adjustment factor of 0.05

Subject to confirmation by the City Traffic Engineer, the following LOS review criteria will be used to assess the need for potential Project-related improvements in relation to the guidance provided in the City of Brea General Plan:

- HCM Methodology:
  - The Project causes one or more study intersections operating at LOS D or better to degrade to LOS E or F, or
  - The Project causes a change in control delay of 4 seconds for intersections already operating at LOS E, or
  - The Project causes a change in control delay of 2 seconds for intersections already operating at LOS F.

- ICU Methodology:
  - The Project causes an intersection operating at LOS D or better to degrade to LOS E or F, or
  - The Project increases traffic demand at a signalized study intersection by 0.020 or greater and the intersection is forecast to operate at LOS E or F.

K. Other Issues:

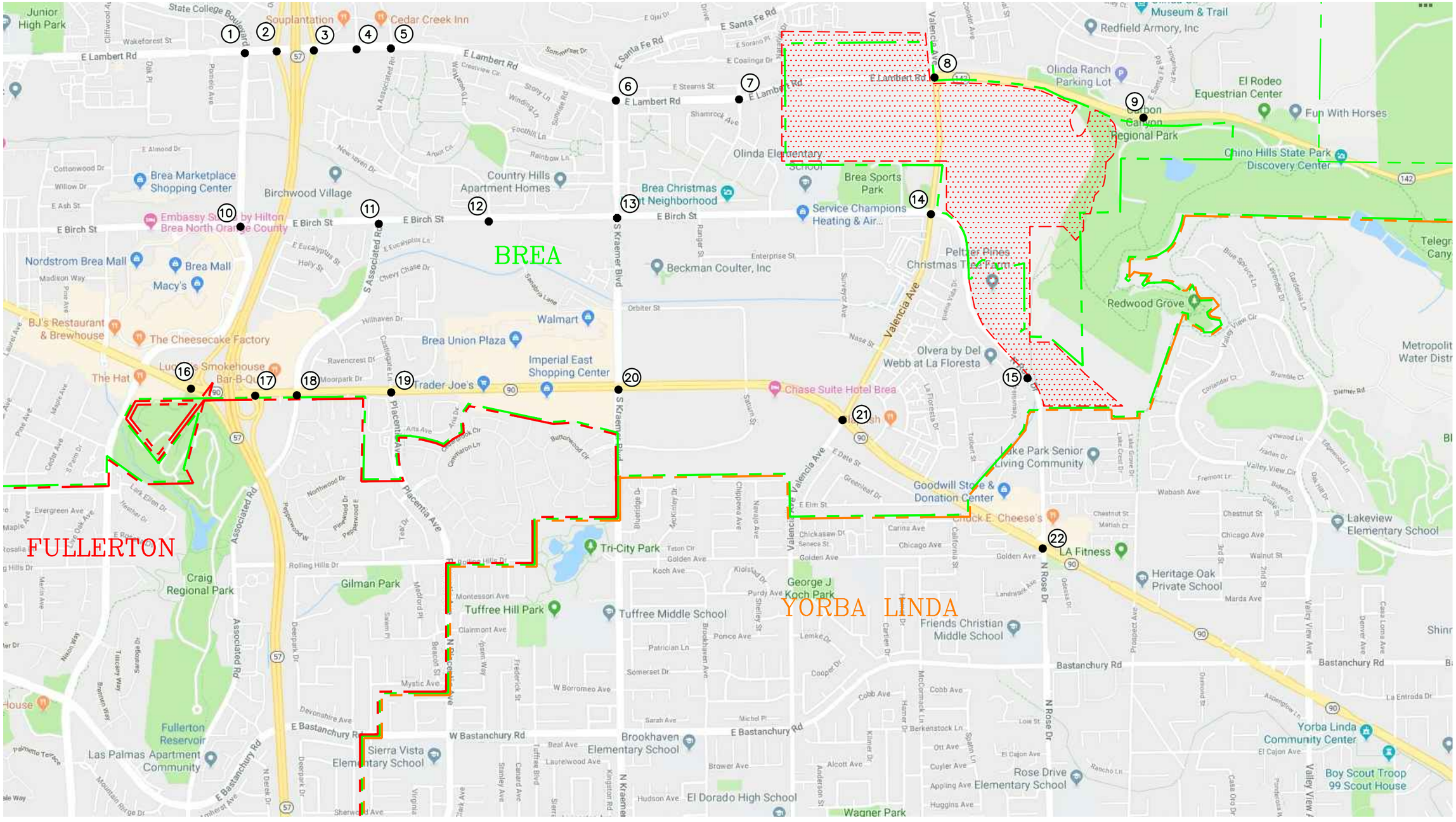
- Conduct a traffic signal warrant evaluation of the intersection of the Redbay Avenue at Birch Street, inclusive of existing and future LOS calculations.
- Assess traffic flow at the intersection of N. Associated Road at Birch Street and Voyager Avenue at Birch Street as it relates to traffic operations and congestion associated with Country Hills Elementary School and Olinda Elementary School, inclusive of LOS calculations.
- Perform LOS analysis at the four (4) project access points. At Project Driveway B located along Valencia Avenue, perform a phased LOS analysis both with and without a traffic signal. Conduct a traffic signal warrant evaluation at Project Driveway B.
- Assess the impact of the project access points based on the results of the peak hour intersection analyses and the City's LOS standards. Based on this assessment, determine the improvements which may be required to be implemented by the Project as a Condition of Approval. Recommended improvements may include striping modifications, intersection and/or signalization improvements, inclusive of Automated Traffic Surveillance Control and/or Adaptive Traffic System Control improvements.
- Conduct a queuing evaluation at all key study intersections located along Imperial Highway, inclusive of the SR-57 off-ramps to Imperial Highway and Lambert Road, to address potential Caltrans concerns/comments.
- Perform an active transportation facilities assessment of the near-by roadways as it relates to pedestrian mobility and bicycle mobility.
- Provide documentation of existing near-by transit facilities and transit routes that provide services to the site, as well as document existing bikeway facilities/trails.

- Prepare a gate queuing study at Project Driveways B and C to identify the distance the gate should be placed to ensure that it does not affect the signal operations along Valencia Avenue and Rose Drive.

* * * * * * * * * * * *

We appreciate the opportunity to provide this scope of work. Should you have any questions, please call us at (949)825-6175. Thank you.

cc. File
Shane Green, P.E., LLG



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N NO SCALE

SOURCE: GOOGLE

KEY

(#) = STUDY INTERSECTION

= ROADWAY SEGMENT

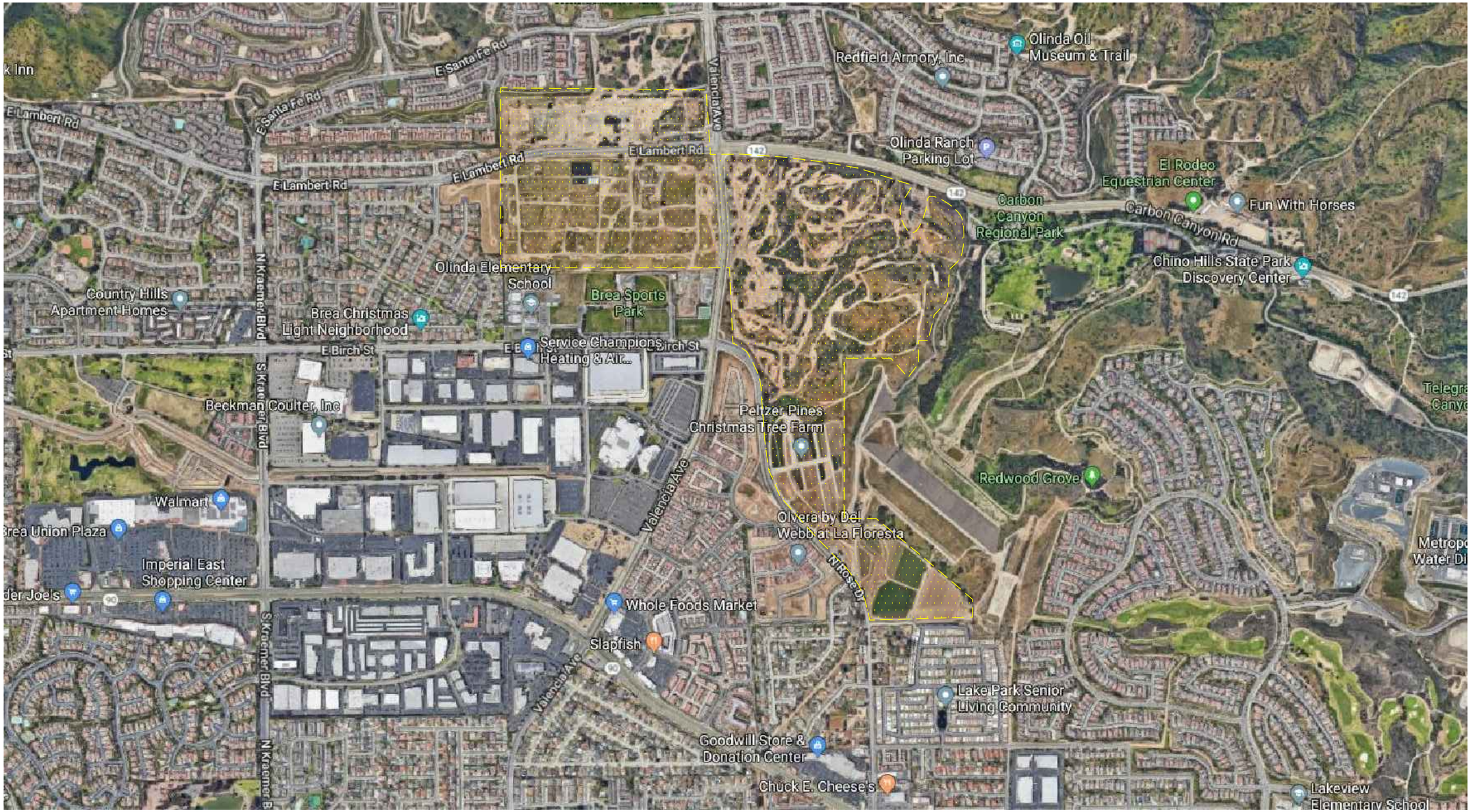
= PROJECT SITE

N:161

FIGURE 1-1

VICINITY MAP

BREA 265 SPECIFIC PLAN, BREA



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SOURCE: GOOGLE

KEY

= PROJECT SITE

FIGURE 2-1

EXISTING SITE AERIAL

BREA 265 SPECIFIC PLAN, BREA

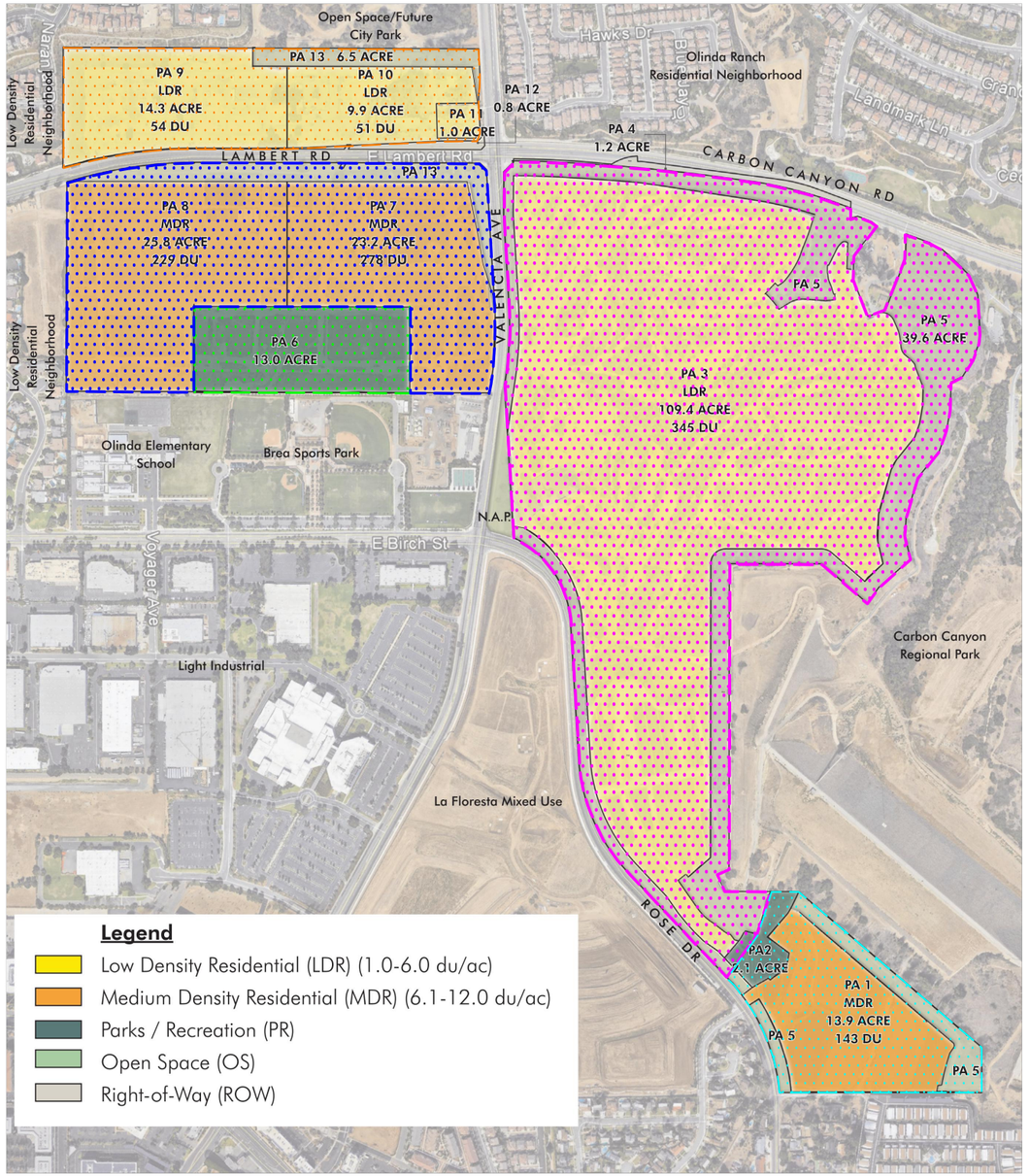
Table 3-1 Proposed Land Use Summary

Land Use	Gross Area (Acres)	Density Range (DU/AC)	Dwelling Units
Residential[1]			
Low Density Residential (LDR)	134.6	1.0 – 6.0	450
Medium Density Residential (MDR)	62.9	6.1 – 12.0	650
Residential Subtotal	197.5		1,100
Nonresidential			
Park/Recreation (PR)	15.1	n/a	n/a
Open Space (OS)[2]	47.5	n/a	n/a
Master Plan Right-of-Way	2.0	n/a	n/a
Nonresidential Subtotal	64.6	n/a	n/a
Total	262.1 acres	4.2	1,100 Units

[1] Units may be transferred between density designations and locations.
[2] Open Space category does not include private open space and recreation areas.

Table 3-2 Proposed Land Use Category Statistical Summary by Planning Area

Planning Area (PA)	Land Use Category	Gross Area (AC)	Density Range (DU/AC)[1]	Target Density (DU/AC)[2]	Dwelling Units (DU)[3]
1	MDR	13.9	6.1 – 12.0	10.3	143
2	PR	2.1	n/a	n/a	n/a
3	LDR	109.4	1.0 – 6.0	3.2	345
4	ROW	1.2	n/a	n/a	n/a
5	OS	39.6	n/a	n/a	n/a
6	PR	13.0	n/a	n/a	n/a
7	MDR	23.2	6.1 – 12.0	12.0	278
8	MDR	25.8	6.1 – 12.0	8.9	229
9	LDR	14.3	1.0 – 6.0	3.8	54
10	LDR	9.9	1.0 – 6.0	5.2	51
11[4]	LDR	1.0	1.0 – 6.0	n/a	n/a
12	ROW	0.8	n/a	n/a	n/a
13	OS	6.5	n/a	n/a	n/a
	Specific Plan Total	**260.7 acres**		**4.2**	**1,100**
Not-a-Part	OS	1.4	n/a	n/a	n/a
	Proposed Project Total	**262.1**	**n/a**	**n/a**	**1,100**



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N NO SCALE

SOURCE: KTGY ARCHITECTURE+PLANNING

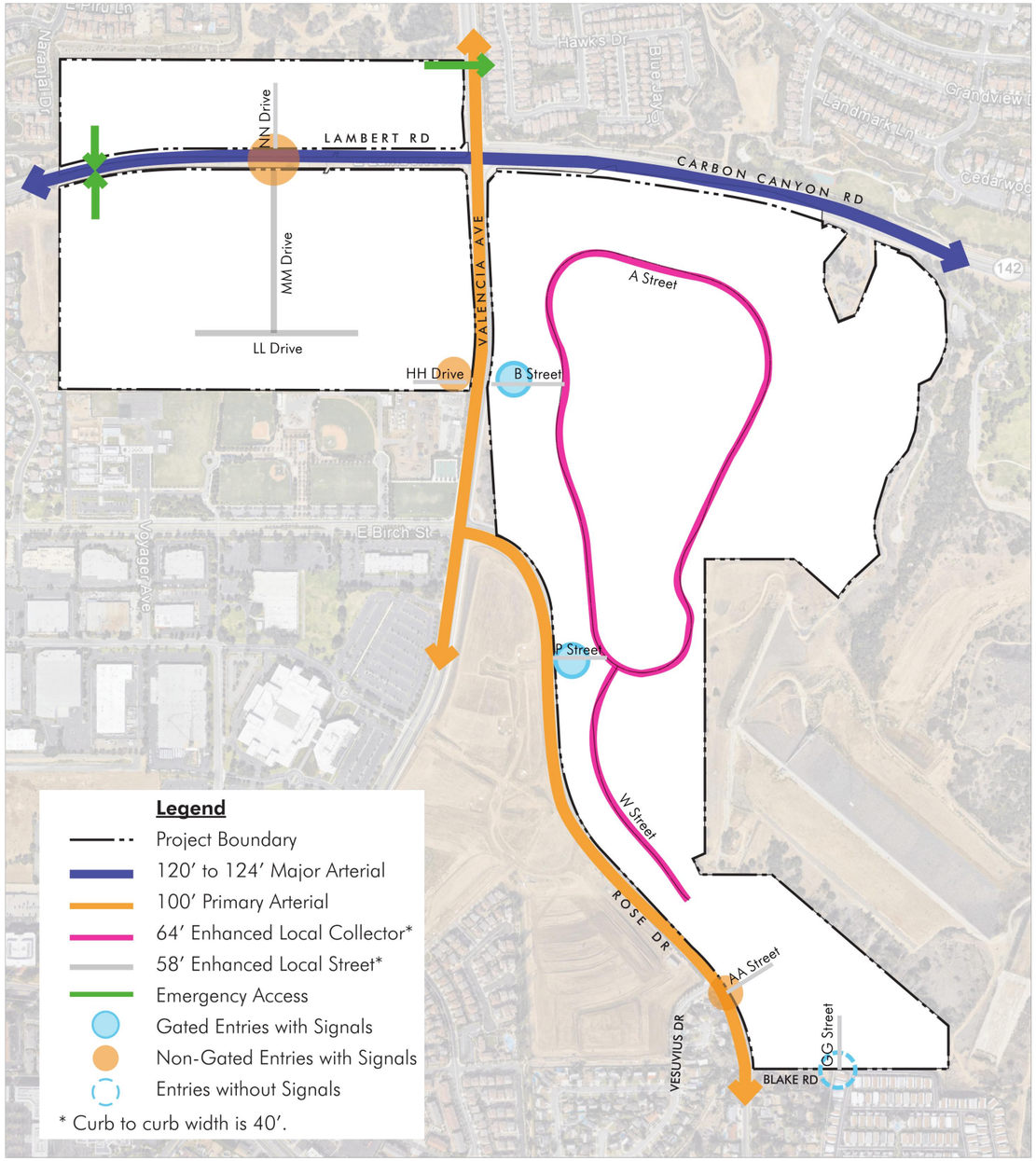
KEY
= ZONE 1
= ZONE 2A
= ZONE 2B
= ZONE 3A
= ZONE 3B

N:163

FIGURE 2–2

PROPOSED SITE PLAN

BREA 265 SPECIFIC PLAN, BREA



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: KTGY ARCHITECTURE+PLANNING

FIGURE 2-3

CIRCULATION PLAN

BREA 265 SPECIFIC PLAN, BREA

LEGEND

Public Multi-Purpose Trails:

20' Wide Dual Tread Multi-Purpose Trail
10' Asphalt + 10' D.G.

14' Wide Trail - AC Paving Center Striped
10' Asphalt + (x2) 2' Shoulder

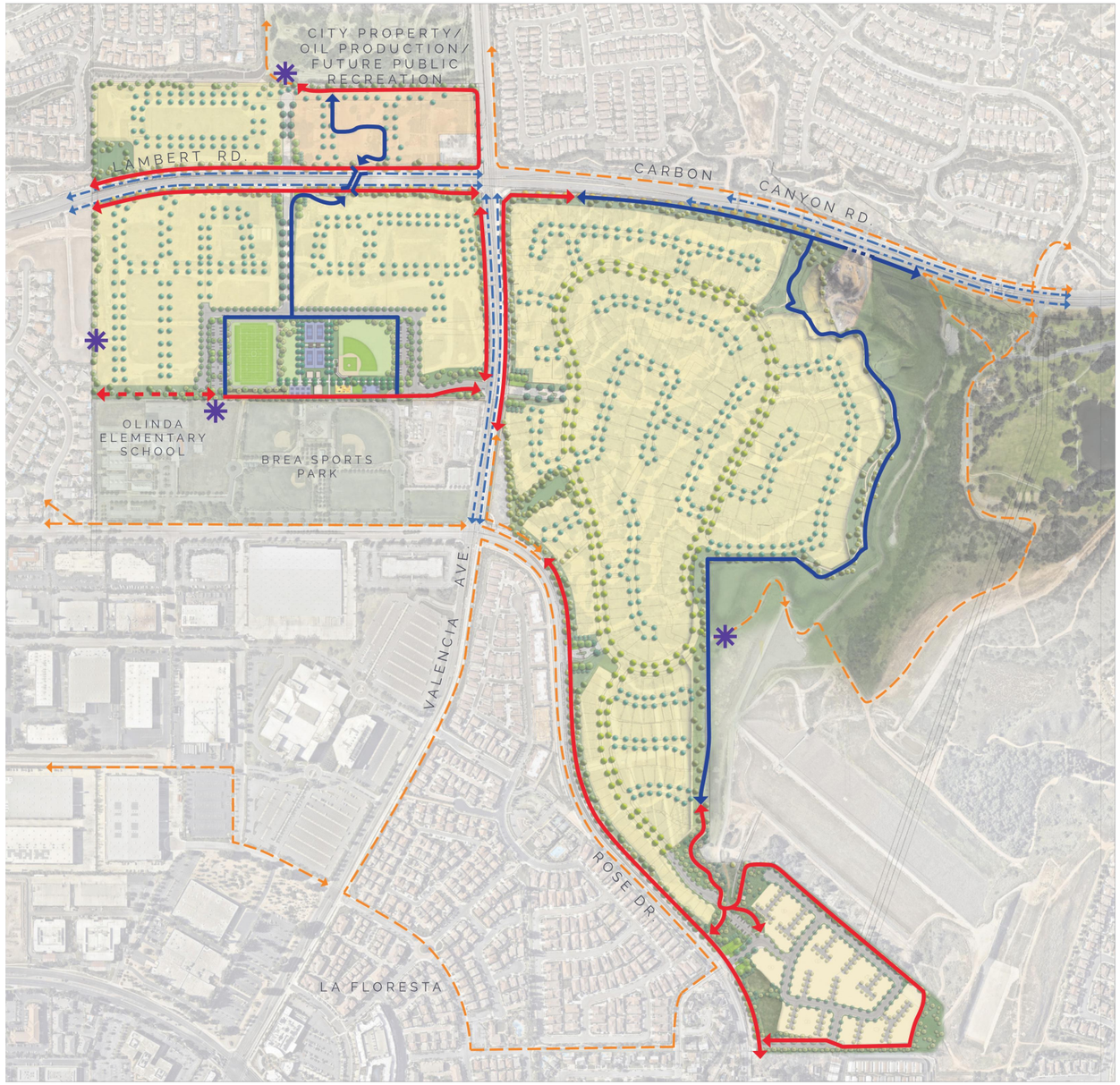
On-street Bikeway

Existing Trail

N.A.P- Potential Future Trail Access

Pedestrian Under Crossing

Potential Future Access



SOURCE: KTGY ARCHITECTURE+PLANNING

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FIGURE 2-4

NON-VEHICULAR CIRCULATION PLAN

BREA 265 SPECIFIC PLAN, BREA

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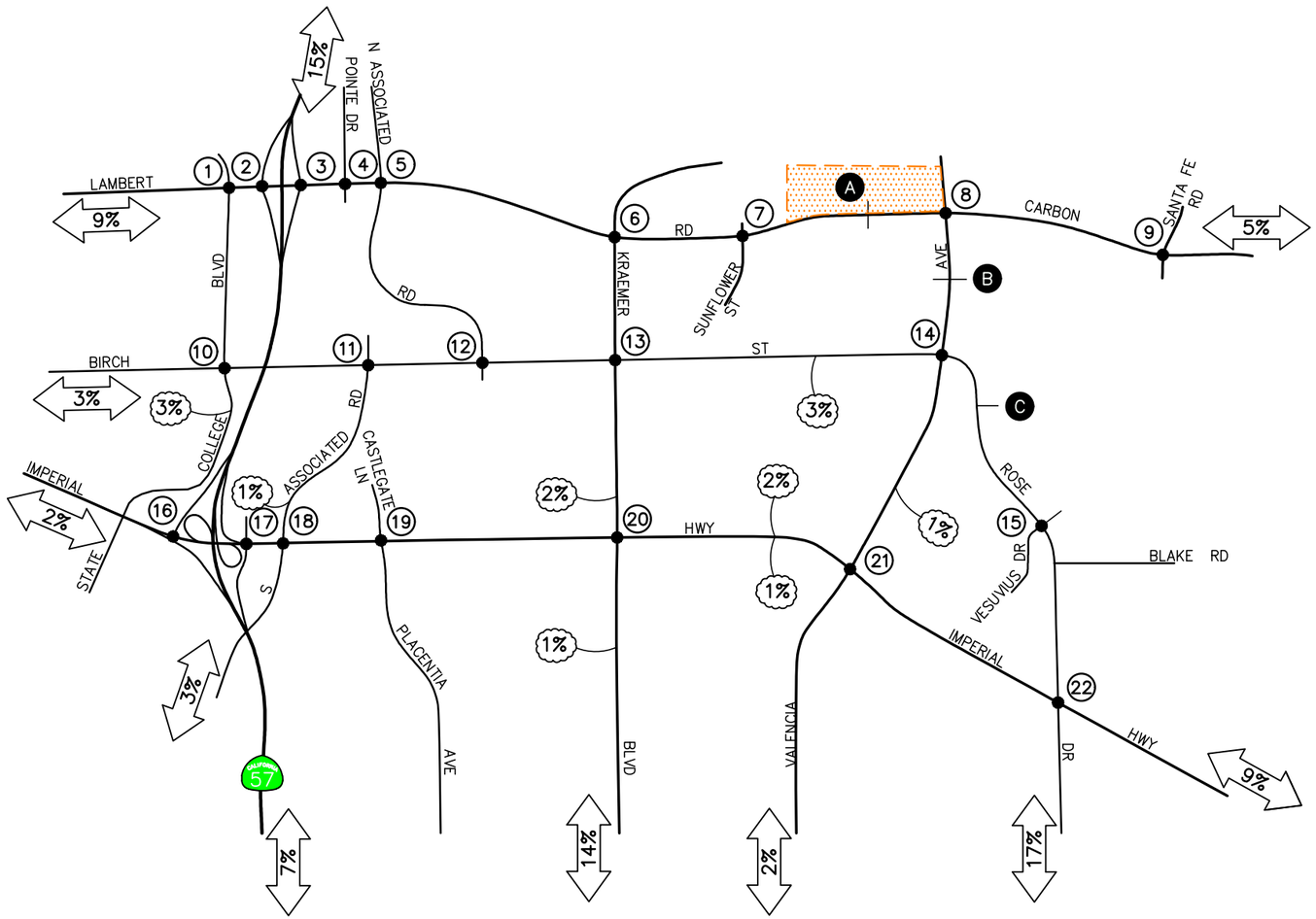

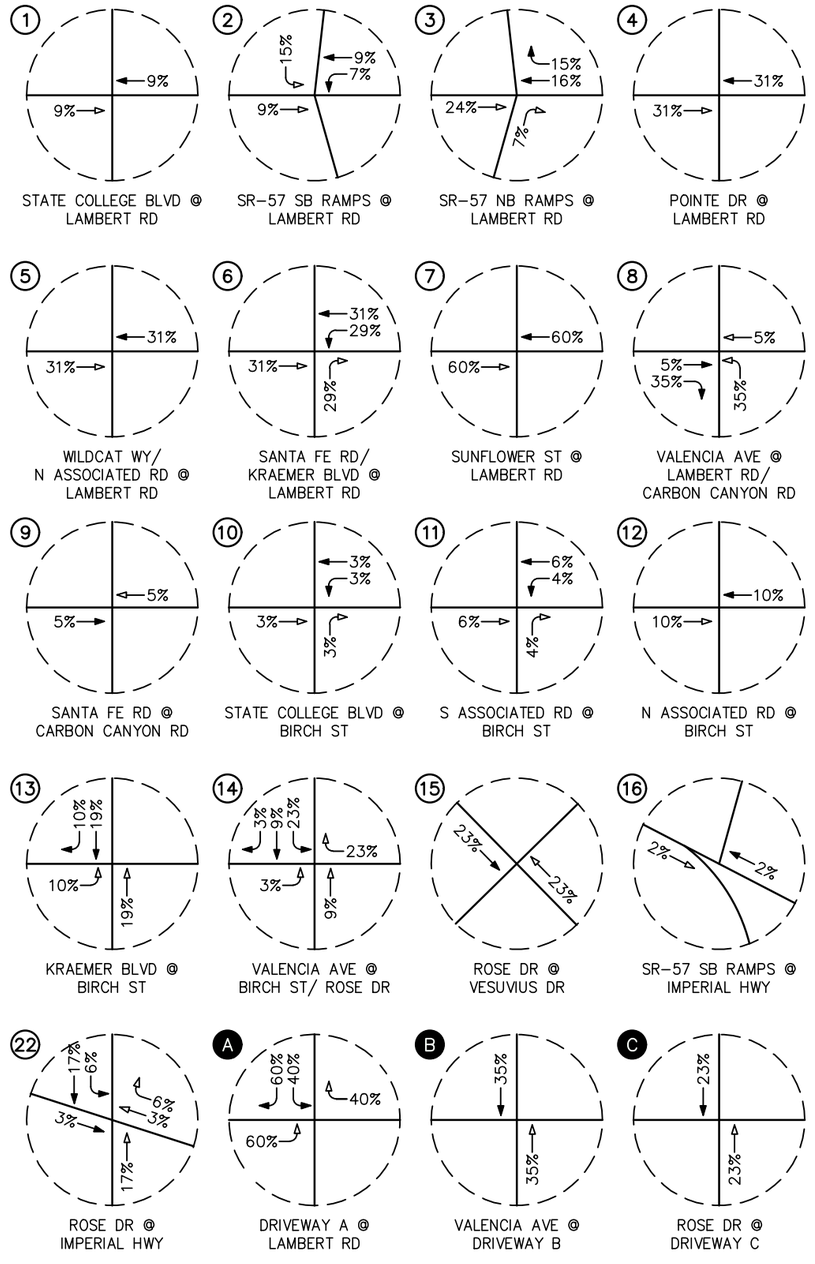

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

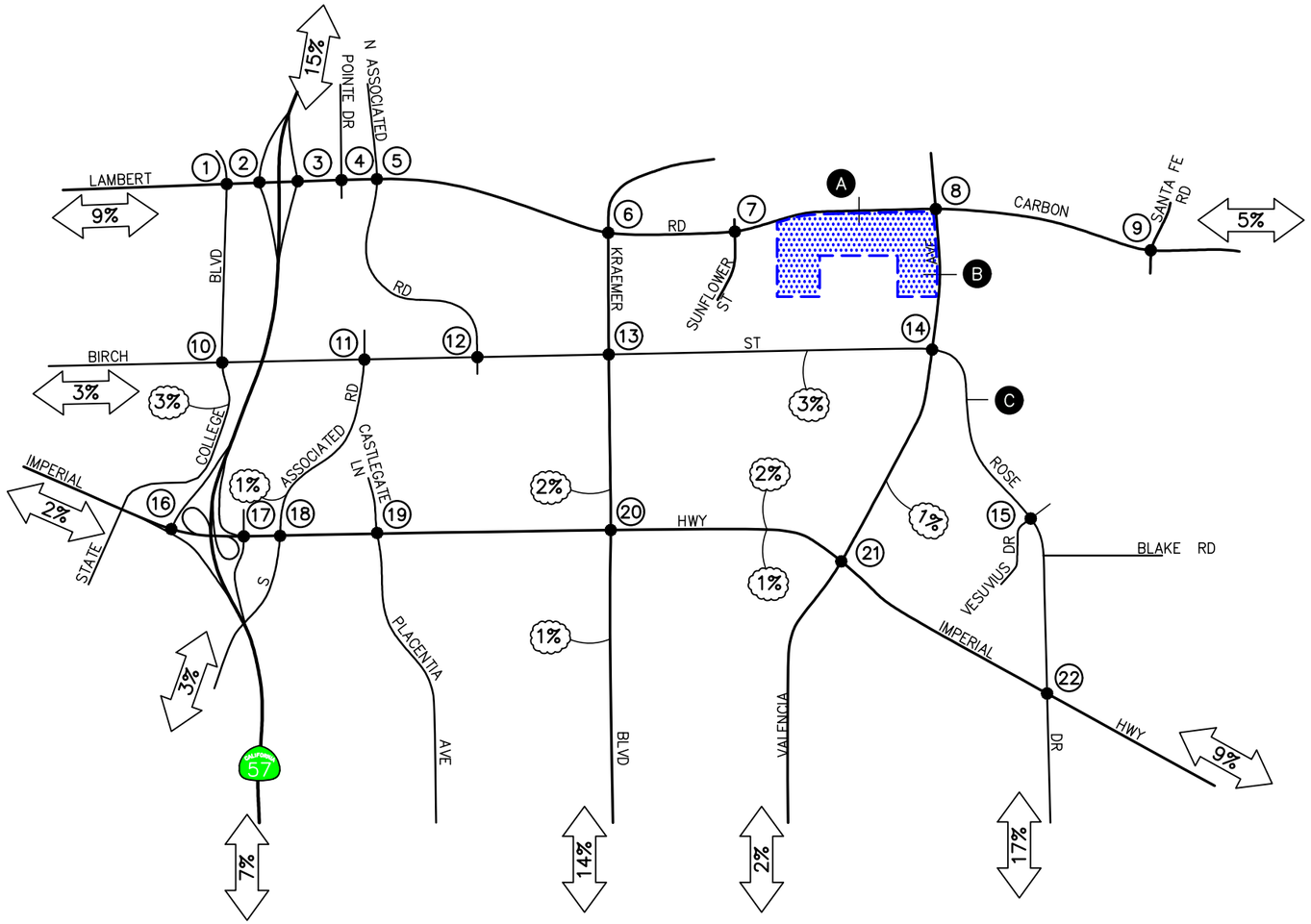
KEY

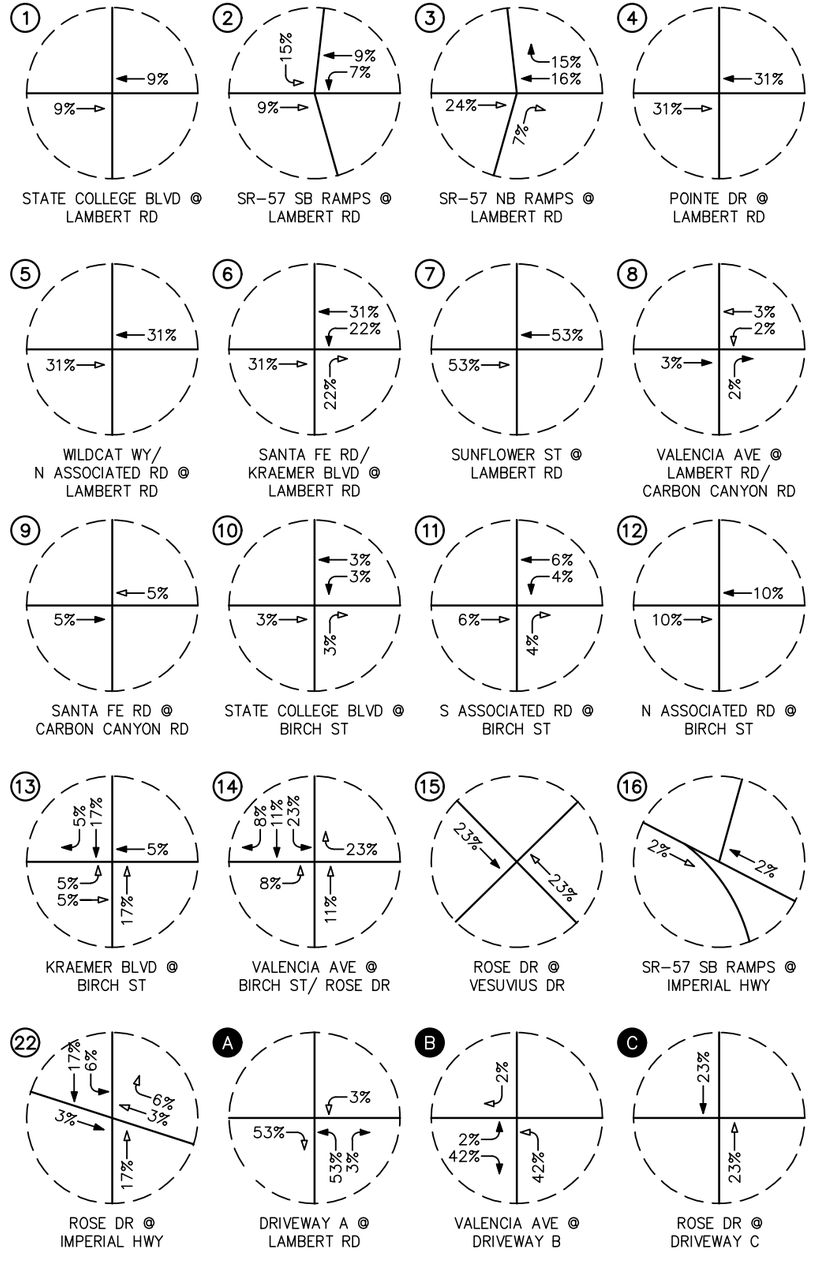
(#) = STUDY INTERSECTION
= INBOUND PERCENTAGE
= OUTBOUND PERCENTAGE
ZONE 1

FIGURE 5-1

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 1

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

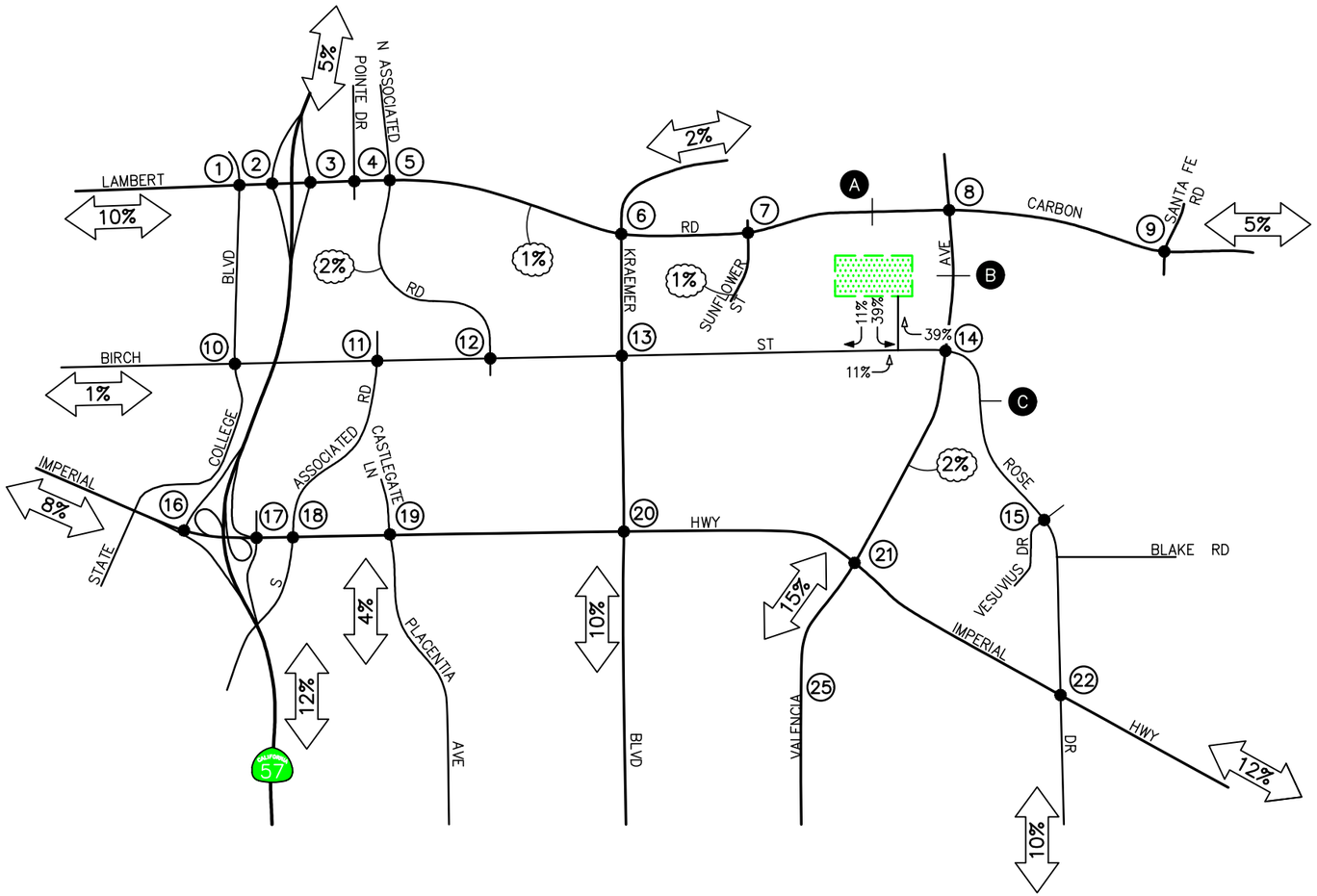
KEY

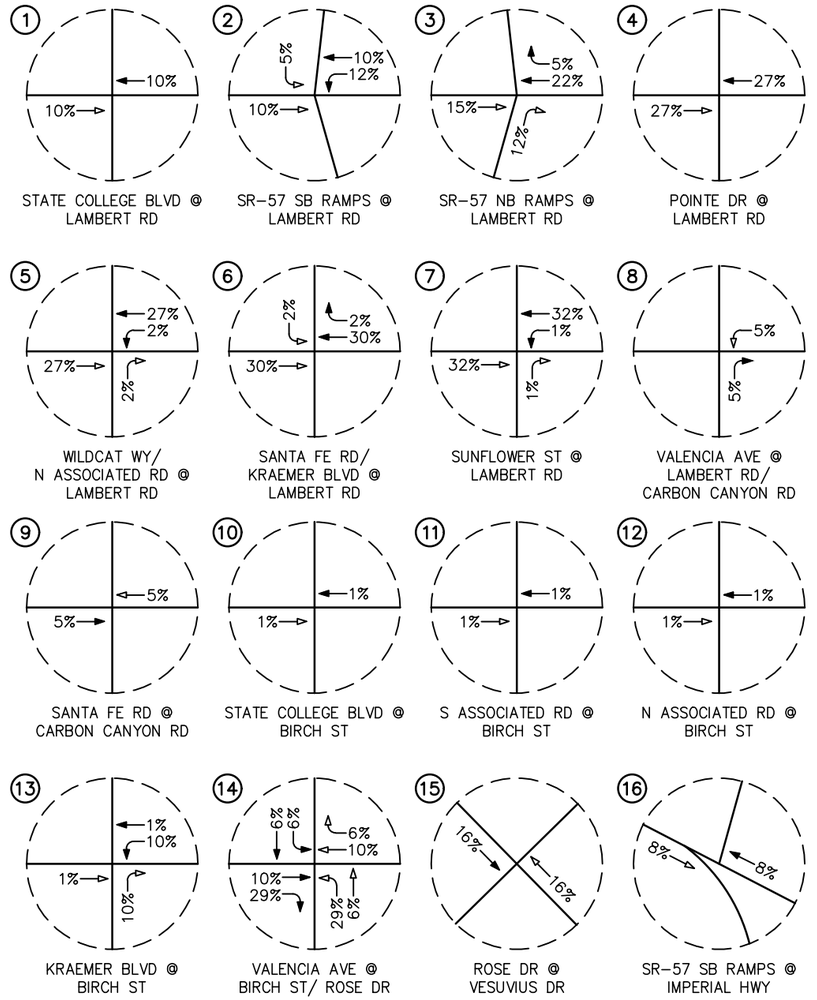
(#) = STUDY INTERSECTION
⇦ = INBOUND PERCENTAGE
⇦ = OUTBOUND PERCENTAGE
= ZONE 2A

FIGURE 5-2

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 2A

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

NO SCALE

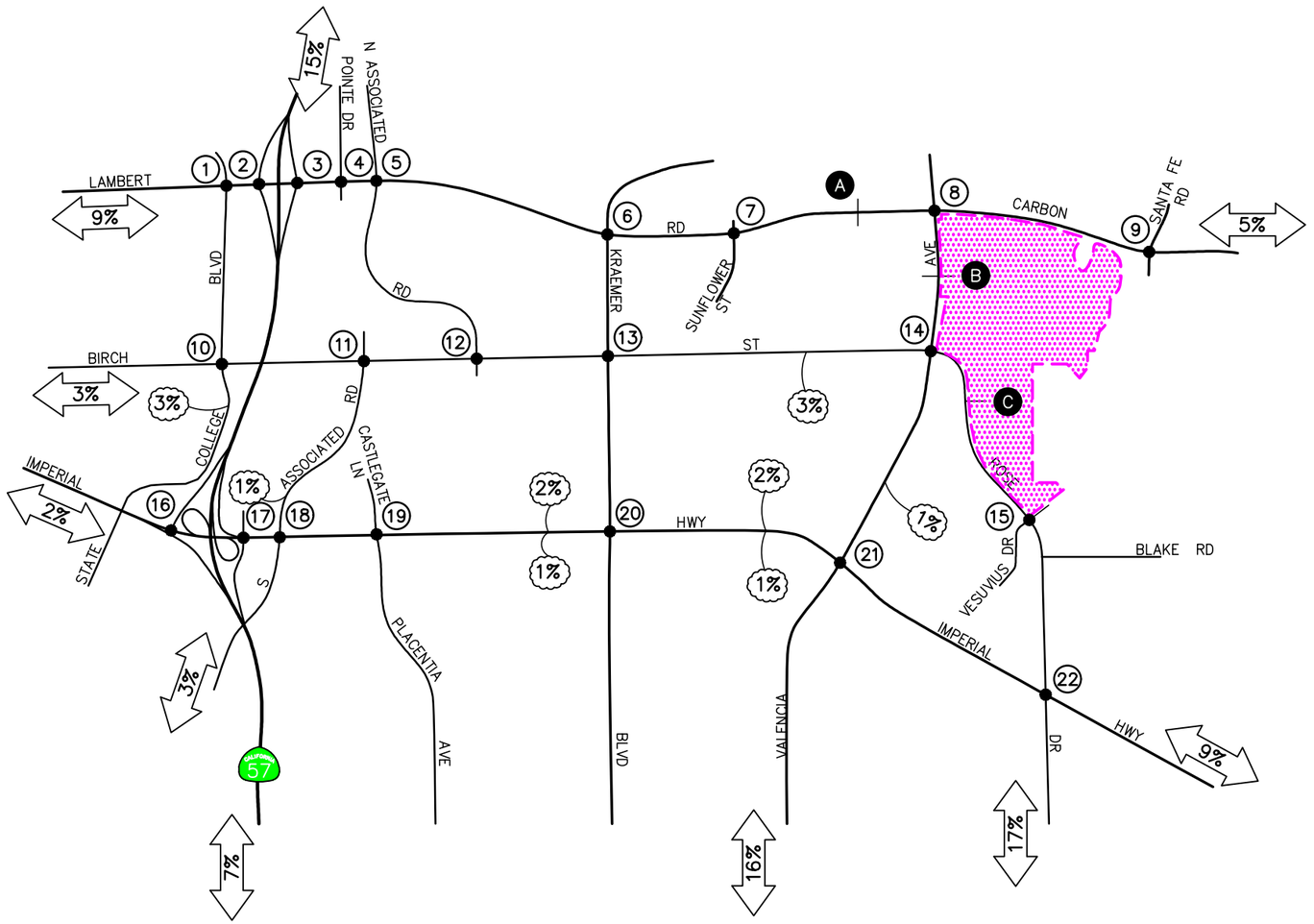
KEY

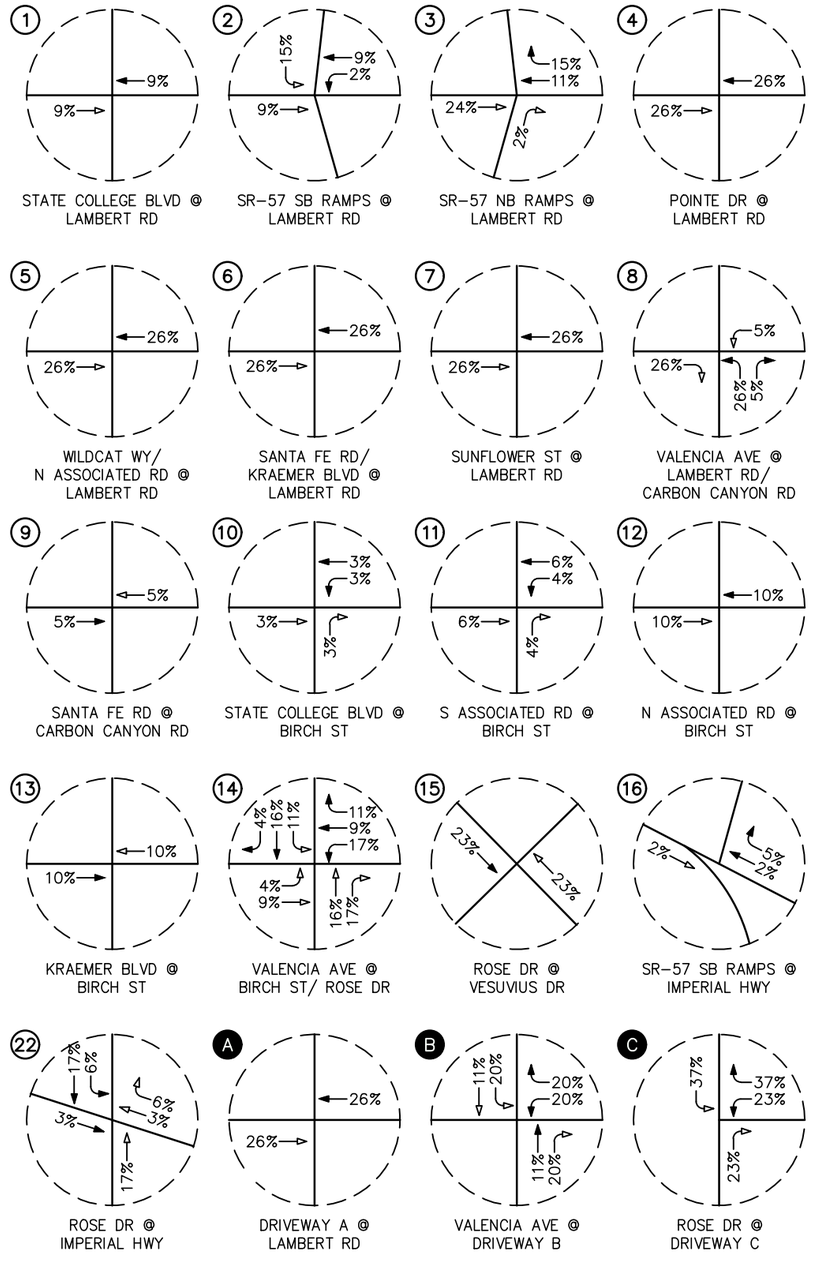
(#) = STUDY INTERSECTION
= INBOUND PERCENTAGE
= OUTBOUND PERCENTAGE
= ZONE 2B

FIGURE 5-3

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 2B

BREA 265 SPECIFIC PLAN, BREA





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

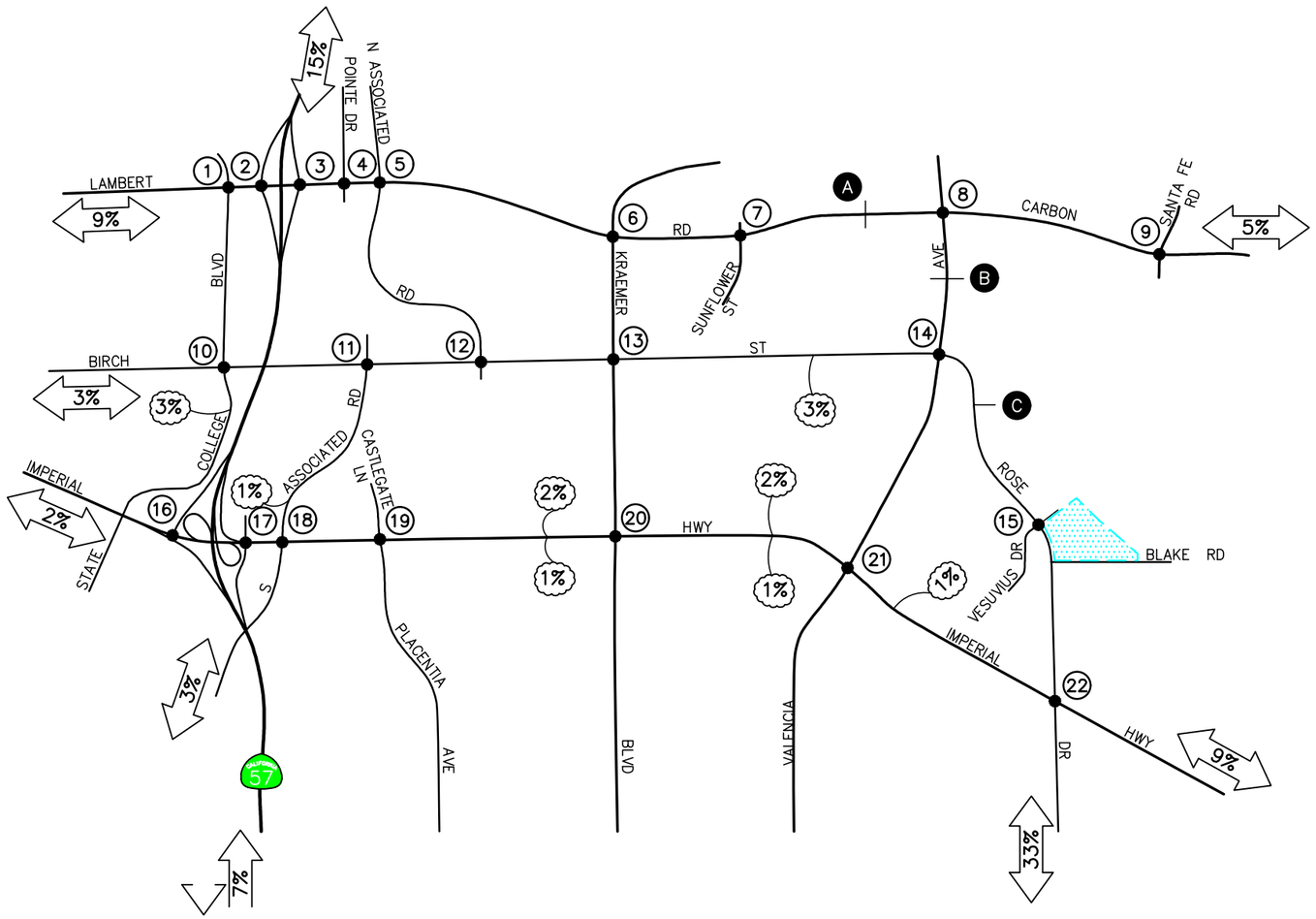
KEY

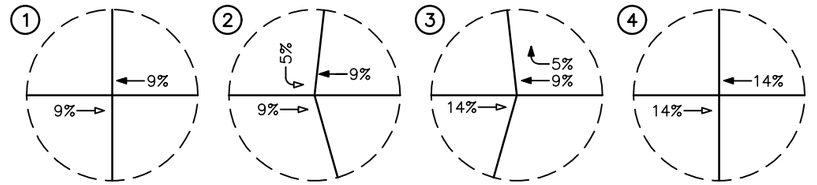
(#) = STUDY INTERSECTION
⟵ = INBOUND PERCENTAGE
⟵ = OUTBOUND PERCENTAGE
= ZONE 3A

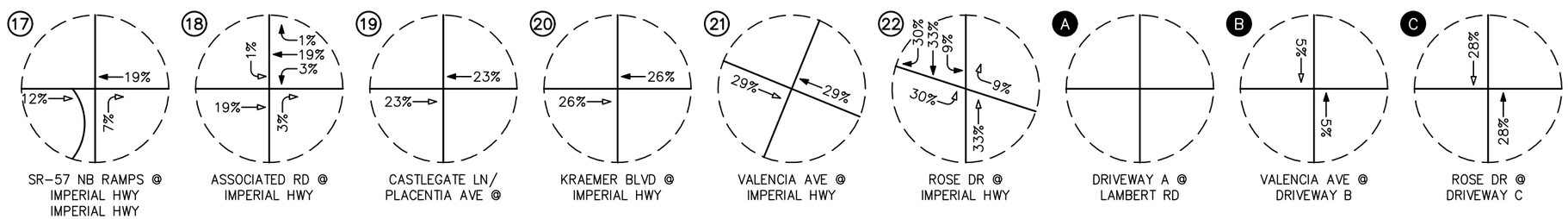
FIGURE 5-4

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 3A

BREA 265 SPECIFIC PLAN, BREA







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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION
= INBOUND PERCENTAGE
= OUTBOUND PERCENTAGE
= ZONE 3B

FIGURE 5-5

PROJECT TRIP DISTRIBUTION PATTERN – ZONE 3B

BREA 265 SPECIFIC PLAN, BREA

TABLE 2-1
PROJECT DEVELOPMENT SUMMARY

Land Use/Project Description	Project Development Totals No. of Dwelling Units (DU) / Acres
Proposed Project Zone 1 (north of Lambert, west of Valencia):	
▪ Single Family Detached Residential	105 DU
▪ Public Facility	1.0 acre
Zone 1 Subtotal	*105 DU*
Proposed Project Zone 2 (south of Lambert, west of Valencia:	
▪ Multifamily /Single Family Attached Residential	507 DU
▪ Sport Park	13.0 acres[2]
Zone 2 Subtotal	*507 DU*
Proposed Project Zone 3 (south of Carbon Canyon Road, east of Valencia and east of Rose :	
▪ Single Family Detached Residential	345 DU
▪ Multifamily/Single Family Attached Residential	143 DU
Zone 3 Subtotal	*488 DU*
Total Proposed Project	**1,100 Units 13.0 acre Sports Park**

[2] Subject to confirmation, for the Sports Park component of the Project assumed to developed with a combination of a baseball/softball field and multi-purpose field that can be used for football or soccer. Other on-site amenities include a fitness trail, an activities shelter, basketball and tennis courts, and a playground plus pickleball courts, For this analysis, it is assumed up to two (2) full-sized soccer fields will be provided. However, when taking into consideration that a full-sized soccer field can be subdivided into approximately 2-3 child-sized fields, this analysis will conservatively analyze a total of six (6) soccer fields.

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TABLE 5-1

PRELIMINARY PROJECT TRAFFIC GENERATION RATES AND FORECAST[3]

Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Rates:							
▪ 210: Single Family Detached Housing (TE/DU)	9.43	26%	74%	0.70	63%	37%	0.94
▪ 215: Single Family Attached Housing (TE/DU)	7.20	31%	69%	0.48	57%	43%	0.57
▪ 220: Multifamily Housing (Low-Rise[4]) (TE/DU)	6.74	24%	76%	0.40	63%	37%	0.51
▪ 488: Soccer Complex (TE/Field)[5]	71.33	61%	39%	0.99	66%	34%	16.43
Proposed Project Zone 1:							
▪ Single Family Homes (105 DU)	990	19	55	74	62	37	99
Proposed Project Zone 2:							
▪ Multifamily/Single Family Attached (507 DU)	3,650	75	168	243	165	124	289
▪ Sports Park (6 soccer fields)	428	4	2	6	65	34	99
Zone 2 Subtotal	*4,078*	*79*	*170*	*249*	*230*	*158*	*388*
Proposed Project Zone 3:							
▪ Single Family Homes (345 DU)	3,253	63	179	242	204	120	324
▪ Multifamily/Single Family Attached (143 DU)	1,030	21	48	69	46	36	82
Zone 3 Subtotal	*4,283*	*84*	*227*	*311*	*250*	*156*	*406*
Total Proposed Project	**9,351**	**182**	**452**	**634**	**542**	**351**	**893**

Notes:
TE/DU = Trip End per Dwelling Unit

[3] Source: *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2021).

[4] Low-Rise Multifamily Housing consists of buildings that are less than 3 levels. .

[5] A soccer complex is an outdoor facility that is used for non-professional soccer games. It may consist of multiple fields. The size of each field within the land use may vary to accommodate games for different age groups. On-site amenities may include stadium seating, a fitness trail, an activities shelter, aquatic center, picnic grounds, basketball and tennis courts, and a playground.

TABLE 5-2

PROJECT DIRECTIONAL DISTRIBUTION PATTERN – RESIDENTIAL COMPONENT[6]

Distribution Percentage	Orientation/Direction
15%	To/from the north
43%	To/from the south
14%	To/from the east
14%	To/from the west
14%	To/from a local destination
100%	**Total**

[6] Residential component of the project includes Zones 1,2A, 3A and 3B.

TABLE 5-3

PROJECT DIRECTIONAL DISTRIBUTION PATTERN – SPORTS PARK COMPONENT[7]

Distribution Percentage	Orientation/Direction
7%	To/from the north
51%	To/from the south
17%	To/from the east
19%	To/from the west
6%	To/from a local destination
100%	**Total**

[7] Residential component of the project includes Zone 2B.

TABLE 6-1
LOCATION AND DESCRIPTION OF CUMULATIVE PROJECTS[8]

No.	Description	Location/Address	Size
City of Brea			
1.	CVS	390 N. Brea Boulevard	13,000 SF Pharmacy with Drive-Through, 1,700 SF Coffee Shop with Drive-through
2.	Brea Place	State College Boulevard at Birch Street	653 DU Apartments, 5,000 SF Office, 150 Room Hotel[9]
3.	Downtown Hotel	220 S. Brea Boulevard	116 Room Hotel, 4,000 SF High Turnover Sit Down Restaurant
4.	Mercury Apartments	Southeast corner of Berry Street at Mercury Lane	120 DU Apartments
5.	Brea Mall Mixed-Use Project	1065 Brea Mall	Demolish existing 161,990 SF Sears department store and construct 119,415 SF additional retail space, a 128,000 SF health club, and 383 DU medium density residential units
6.	Brea Plaza	409-477 S. Associated Road and 1555, 1609, 1623, 1643 E. Imperial Highway	Demolition of an existing 18,450 SF movie theater and the construction of a mixed-use development with 21,355 SF of office space and 229[10] apartment units
7.	Central Park Village	340-420 W. Central Avenue	62 DU townhomes and 20 DU apartments[11]
8.	New Industrial Building	201 N. Berry Street	109,125 SF warehouse
9.	Alvero Assisted Living	251 S. Randolph Avenue	80 rooms with 82 beds residential care facility
10.	Extra Space Self Storage	2700 E. Imperial Highway	126,546 self-storage facility
11.	Brea Imperial Center	391 S. State College Boulevard	5,000 SF restaurant, 2,300 SF bagel/coffee shop, 1,600 SF café, 3,867 SF In-N-Out, 28,145 SF retail, and 4,400 SF bank to replace existing land uses which include 4,050 SF food uses, 24,481 SF retail, 4,400 SF bank, 2,325 SF medical office, 10,074 SF health studio spa.
12.	Transwestern	285 S. Berry Street and 711 W. Imperial Highway	126,797 SF warehouse
13.	The Phoenix Club	375 W. Central Avenue	8,350 SF restaurant with banquet hall
14.	Aldi Grocery Store	2395 E. Imperial Highway	21,106 SF grocery store
15.	Starbucks with Drive-Thru	2 Pointe Drive	2,400 SF coffee shop with drive-thru
16.	Lambert Road Condos	700-800 W. Lambert Road	24 DU condominiums

8 Source: City of Brea, Fullerton, and Chino Hills Planning Departments.

9 The traffic impact analysis conservatively evaluated 790 units as originally planned, which would result in higher traffic volumes in the cumulative scenarios.

10 Fifteen (15) of the proposed apartments are considered co-living units, which include five (5) 3-bedroom units and ten (10) four-bedroom units, therefore, to provide a conservative assessment, the co-living unit bedrooms have been counted as individual units for a total apartment count of 229 units.

11 The project has already built and occupied 206 DU apartments and 83 DU townhomes.

TABLE 6-1(CONTINUED)
LOCATION AND DESCRIPTION OF CUMULATIVE PROJECTS[12]

No.	Description	Location/Address	Size
City of Brea (Continued)			
17.	Brea Metro Office Condos	330 E. Lambert Road	33 DU condominiums
18.	Father's House	245 W. Birch Street	299 seat religious assembly
19.	Cha Cha's Expansion	110 W. Birch Street	Existing restaurant expansion of 2,710 SF
20.	Western Realco	2929 E. Imperial Highway	131,500 SF industrial building
21.	CAMP Transformation	910 E. Birch Street, Suite 250	4,100 SF Fitness Center
22.	Brea Express Wash	300 S. Brea Boulevard	4,254 SF express car wash
23.	Raising Cane's	255 E. Imperial Highway	Demolish existing 9,588 SF office building and construction of a 4,047 SF fast food restaurant with drive-through
City of Fullerton			
24.	3105 Yorba Linda Boulevard	3105 Yorba Linda Boulevard	4,840 SF drive-through car wash
25.	Beckman Business Center	4300 North Harbor Boulevard	522,250 SF Warehousing, 166,185 SF General Light Industrial, 105,880 SF Manufacturing, 42,000 SF Office, and 142,350 SF fulfillment center
City of Chino Hills			
26.	Woodbridge Pacific Group (Canyon Hills/Hillcrest)	Northwest of Carbon Canyon Road and west of Canyon Hills Road	38 DU Single Family Detached
27.	Stonefield Development	Northwest of Carbon Canyon Road and east of Fairway Drive	28 DU single-family
28.	Morningfield Estates and Loving Savior of the Hills Lutheran Church and School Master Plan Addendum	South of Morningfield Drive, west of Peyton Drive, north of Chino Hills Parkway, adjacent to San Bernardino County Flood Channel	7-Lot Subdivision with semi-custom single-family homes, plus 3 classrooms/71 student addition to the Lutheran School
29.	Coptic Orthodox Church	East side of Peyton Drive, north of the Chino Creek Drainage Channel and south of the Chino Valley Community Church property	14,695 SF multi-purpose room, 8,645 SF Sanctuary and 555 SF Bookstore
30.	Buddhist Temple of Chino Hills	Northeast of Chino Hills Parkway and Rustic Drive	23,400 SF Buddhist temple expansion
31.	Hidden Oaks	East of Carbon Canyon Road at Canyon Hills Road	53 DU Single Family
32.	Greening Los Serranos Golf Course Project	15656 Yorba Avenue	124 DU single family, 532 DU multifamily
33.	Paradise Ranch	East of Canyon Hills Road and south of Esquilime Drive	51 DU single-family

12 Source: City of Brea, Fullerton, and Chino Hills Planning Departments.

APPENDIX B

EXISTING TRAFFIC COUNT DATA

APPENDIX B-I

EXISTING INTERSECTION TRAFFIC COUNT DATA

National Data & Surveying Services

Intersection Turning Movement Count

Location: N State College Blvd & E Lambert Rd
City: Brea
Control: Signalized

Project ID: 19-01101-003
Date: 5/22/2019

Total

NS/EW Streets:	N State College Blvd				N State College Blvd				E Lambert Rd				E Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	1.5	1.5	0	2	2	0	0	2	3.5	0.5	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	12	28	19	0	131	119	0	0	1	228	41	0	79	257	75	0	990
7:15 AM	16	22	32	0	158	146	0	0	4	235	38	1	102	344	99	1	1198
7:30 AM	17	24	22	0	158	144	0	0	0	258	59	0	92	369	114	1	1258
7:45 AM	32	36	29	0	192	162	1	0	2	291	64	0	116	391	105	2	1423
8:00 AM	47	47	29	0	210	109	3	0	1	272	46	0	102	355	124	1	1346
8:15 AM	37	53	34	0	201	148	2	0	3	305	48	0	101	378	141	0	1451
8:30 AM	28	47	34	0	221	134	2	0	7	294	29	0	87	323	139	0	1345
8:45 AM	13	21	25	0	183	122	1	0	1	262	37	0	118	343	139	0	1265
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	202	278	224	0	1454	1084	9	0	19	2145	362	1	797	2760	936	5	10276
APPROACH %'s :	28.69%	39.49%	31.82%	0.00%	57.09%	42.56%	0.35%	0.00%	0.75%	84.88%	14.33%	0.04%	17.72%	61.36%	20.81%	0.11%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	144	183	126	0	824	553	8	0	13	1162	187	0	406	1447	509	3	5565
PEAK HR FACTOR :	0.766	0.863	0.926	0.000	0.932	0.853	0.667	0.000	0.464	0.952	0.730	0.000	0.875	0.925	0.902	0.375	0.959
	0.913				0.970				0.954				0.954				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	1.5	1.5	0	2	2	0	0	2	3.5	0.5	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	62	117	64	0	108	65	0	0	2	307	34	2	56	270	213	4	1304
4:15 PM	59	152	67	0	115	57	3	0	2	278	48	1	58	279	180	7	1306
4:30 PM	66	123	74	0	131	67	0	0	1	264	53	0	71	297	178	4	1329
4:45 PM	75	162	44	0	110	84	3	0	6	196	52	0	68	298	170	0	1268
5:00 PM	55	142	49	0	114	82	3	0	14	198	58	0	83	231	154	5	1188
5:15 PM	84	131	50	0	148	89	3	0	11	334	60	0	60	243	158	3	1374
5:30 PM	71	141	66	0	122	87	4	0	5	312	64	0	78	241	163	1	1355
5:45 PM	78	133	72	0	135	94	4	0	6	242	51	0	66	245	178	1	1305
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	550	1101	486	0	983	625	20	0	47	2131	420	3	540	2104	1394	25	10429
APPROACH %'s :	25.74%	51.52%	22.74%	0.00%	60.38%	38.39%	1.23%	0.00%	1.81%	81.93%	16.15%	0.12%	13.29%	51.78%	34.31%	0.62%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	288	547	237	0	519	352	14	0	36	1086	233	0	287	960	653	10	5222
PEAK HR FACTOR :	0.857	0.963	0.823	0.000	0.877	0.936	0.875	0.000	0.643	0.813	0.910	0.000	0.864	0.980	0.917	0.500	0.950
	0.947				0.922				0.836				0.974				

Prepared by National Data & Surveying Services

N State College Blvd & E Lambert Rd

Peak Hour Turning Movement Count

ID: 19-01101-003
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS		COUNT PERIODS
AM	07:45 AM - 08:45 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

N State College Blvd — SOUTHBOUND

AM	8	553	824	0	705	AM
NOON	0	0	0	0	0	NOON
PM	14	352	519	0	1236	PM

EASTBOUND — E Lambert Rd

AM	NOON	PM		
1599	0	1262	⇦	
0	0	0	↶	0
13	0	36	↱	2
1162	0	1086	→	3.5
187	0	233	↴	0.5
AM	NOON	PM		

WESTBOUND — E Lambert Rd

PM	NOON	AM		
653	0	509	↰	1
960	0	1447	←	3
287	0	406	↰	2
10	0	3	↶	0
1852	0	2115	⇨	
PM	NOON	AM		

N State College Blvd — NORTHBOUND

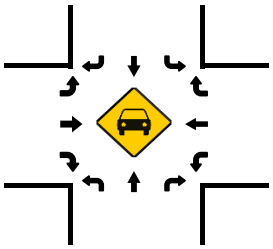
PM	872	0	288	547	237	PM
NOON	0	0	0	0	0	NOON
AM	1146	0	144	183	126	AM
⇩		0	2	1.5	1.5	

CONTROL

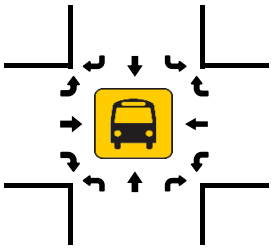
Signalized

TEV	5565 AM	0 NOON	5222 PM
PHF	0.96		0.95

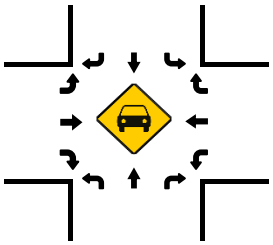
Total Vehicles (AM)



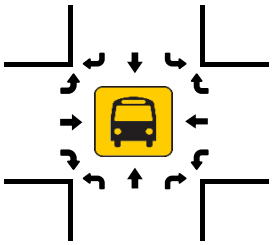
Total Vehicles (AM)



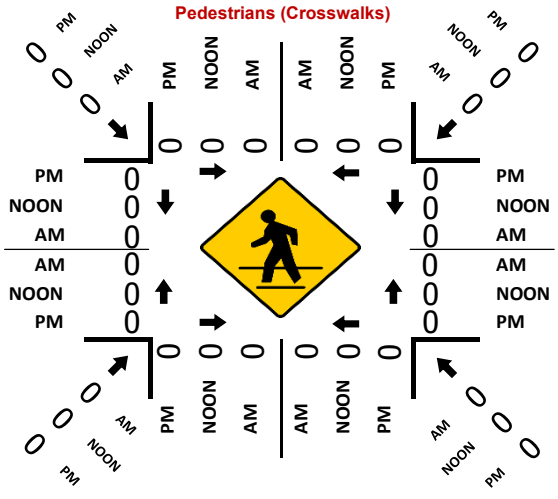
Total Vehicles (NOON)



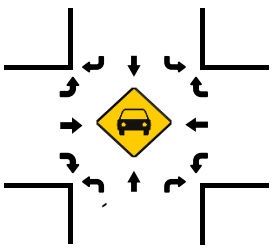
Total Vehicles (NOON)



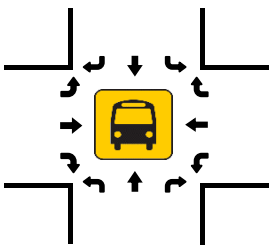
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR-57 SB Ramps & E Lambert Rd
City: Brea
Control: Signalized

Project ID: 19-01101-004
Date: 5/22/2019

Total

NS/EW Streets:	SR-57 SB Ramps				SR-57 SB Ramps				E Lambert Rd				E Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	1.5	0	0	2.5	1.5	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	230	1	125	0	0	241	132	0	33	308	0	0	1070
7:15 AM	0	0	0	0	267	0	149	0	0	312	128	0	36	385	0	0	1277
7:30 AM	0	0	0	0	270	0	150	0	0	296	129	0	58	413	0	0	1316
7:45 AM	0	0	0	0	288	0	136	0	0	375	126	0	38	485	0	1	1449
8:00 AM	0	0	0	0	223	0	116	0	0	404	120	0	53	476	0	1	1393
8:15 AM	0	0	0	0	257	0	121	0	0	397	132	0	59	522	0	0	1488
8:30 AM	0	0	0	0	209	1	115	0	0	403	160	0	54	446	0	1	1389
8:45 AM	0	0	0	0	235	0	149	0	0	345	136	0	64	458	0	1	1388
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	1979	2	1061	0	0	2773	1063	0	395	3493	0	4	10770
APPROACH %'s :					65.06%	0.07%	34.88%	0.00%	0.00%	72.29%	27.71%	0.00%	10.15%	89.75%	0.00%	0.10%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	977	1	488	0	0	1579	538	0	204	1929	0	3	5719
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.848	0.250	0.897	0.000	0.000	0.977	0.841	0.000	0.864	0.924	0.000	0.750	0.961
					0.864				0.940				0.919				

NS/EW Streets:	SR-57 SB Ramps				SR-57 SB Ramps				E Lambert Rd				E Lambert Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	1.5	0	0	2.5	1.5	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	116	1	143	0	0	292	209	0	52	391	0	1	1205
4:15 PM	0	0	0	0	114	1	172	0	0	301	151	0	45	362	0	2	1148
4:30 PM	0	0	0	0	92	1	183	0	0	256	195	0	63	372	0	0	1162
4:45 PM	0	0	0	0	100	1	164	0	0	209	155	0	52	406	0	0	1087
5:00 PM	0	0	0	0	100	6	165	0	0	172	185	0	85	292	0	0	1005
5:15 PM	0	0	0	0	150	2	149	0	0	359	200	0	70	322	0	1	1253
5:30 PM	0	0	0	0	144	1	168	0	0	322	172	0	55	325	0	0	1187
5:45 PM	0	0	0	0	98	0	151	0	0	314	148	0	60	358	0	0	1129
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	914	13	1295	0	0	2225	1415	0	482	2828	0	4	9176
APPROACH %'s :					41.13%	0.59%	58.28%	0.00%	0.00%	61.13%	38.87%	0.00%	14.54%	85.33%	0.00%	0.12%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	422	4	662	0	0	1058	710	0	212	1531	0	3	4602
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.909	1.000	0.904	0.000	0.000	0.879	0.849	0.000	0.841	0.943	0.000	0.375	0.955
					0.948				0.882				0.953				

Prepared by National Data & Surveying Services

SR-57 SB Ramps & E Lambert Rd

Peak Hour Turning Movement Count

ID: 19-01101-004
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	07:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	04:00 PM - 06:00 PM

SR-57 SB Ramps — SOUTHBOUND

AM	488	1	977	0	0	AM
NOON	0	0	0	0	0	NOON
PM	662	4	422	0	0	PM
	1.5	0	1.5	0		

EASTBOUND — E Lambert Rd

AM	NOON	PM	
2417	0	2193	
0	0	0	0
0	0	0	0
1579	0	1058	2.5
538	0	710	1.5
AM	NOON	PM	

WESTBOUND — E Lambert Rd

PM	NOON	AM	
0	0	0	0
1531	0	1929	3
212	0	204	2
3	0	3	0
1483	0	2559	
PM	NOON	AM	

CONTROL

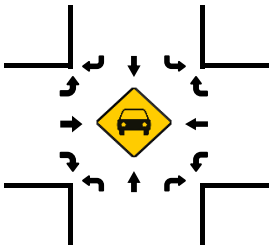
Signalized

TEV	5719	0	4602
	AM	NOON	PM
PHF	0.96		0.95

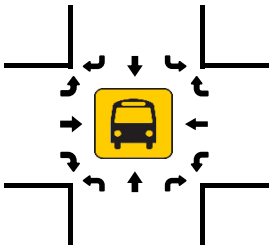
SR-57 SB Ramps — NORTHBOUND

PM	926	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	743	0	0	0	0	AM
		0	0	0	0	

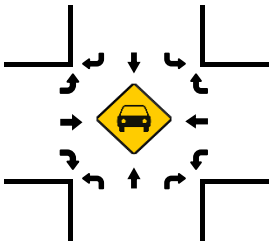
Total Vehicles (AM)



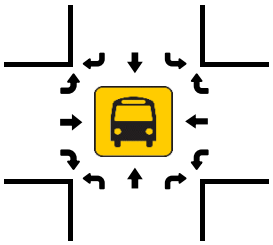
Total Vehicles (AM)



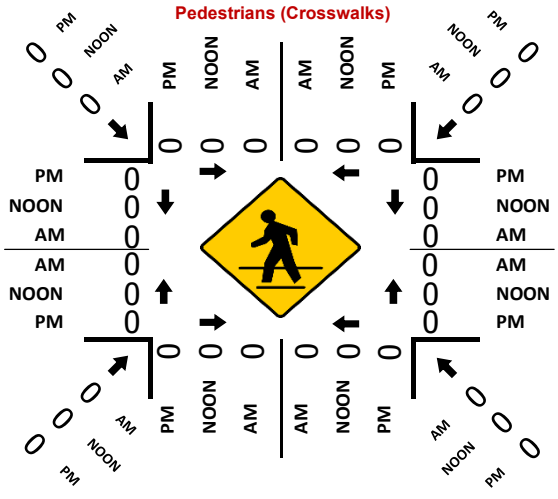
Total Vehicles (NOON)



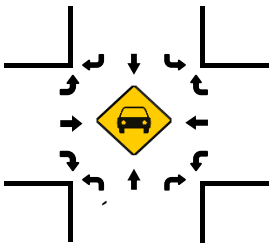
Total Vehicles (NOON)



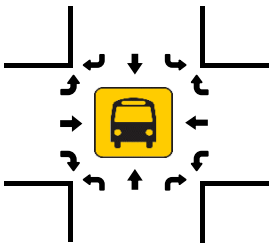
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR-57 NB Ramps & E Lambert Rd
City: Brea
Control: Signalized

Project ID: 19-01101-005
Date: 5/22/2019

Total

NS/EW Streets:	SR-57 NB Ramps				SR-57 NB Ramps				E Lambert Rd				E Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	0	1	0	0	0	0	0	2	3	0	0	0	2.5	1.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	189	0	88	0	0	0	0	0	72	409	0	0	0	143	124	0	1025
7:15 AM	265	0	100	0	0	0	0	0	75	497	0	1	0	169	118	0	1225
7:30 AM	243	0	93	0	0	0	0	0	60	520	0	1	0	220	128	0	1265
7:45 AM	276	0	124	0	0	0	0	0	58	596	0	2	0	253	111	0	1420
8:00 AM	231	0	115	0	0	0	0	0	53	588	0	1	0	305	108	0	1401
8:15 AM	236	0	106	0	0	0	0	0	86	557	0	0	0	337	124	0	1446
8:30 AM	227	1	114	0	0	0	0	0	62	544	0	0	0	282	109	0	1339
8:45 AM	239	0	124	0	0	0	0	0	66	528	0	0	0	287	113	0	1357
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1906	1	864	0	0	0	0	0	532	4239	0	5	0	1996	935	0	10478
APPROACH %'s :	68.78%	0.04%	31.18%	0.00%					11.14%	88.76%	0.00%	0.10%	0.00%	68.10%	31.90%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	970	1	459	0	0	0	0	0	259	2285	0	3	0	1177	452	0	5606
PEAK HR FACTOR :	0.879	0.250	0.925	0.000	0.000	0.000	0.000	0.000	0.753	0.958	0.000	0.375	0.000	0.873	0.911	0.000	0.969
	0.894								0.971				0.883				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	0	1	0	0	0	0	0	2	3	0	0	0	2.5	1.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	223	0	95	0	0	0	0	0	57	329	0	1	0	242	115	0	1062
4:15 PM	202	0	72	0	0	0	0	0	81	349	0	1	0	233	122	0	1060
4:30 PM	172	1	72	0	0	0	0	0	77	265	0	0	0	242	127	0	956
4:45 PM	176	1	69	0	0	0	0	0	57	232	0	0	0	253	121	0	909
5:00 PM	127	1	46	0	0	0	0	0	54	231	0	1	0	264	119	0	843
5:15 PM	141	0	63	0	0	0	0	0	85	411	0	0	0	247	125	0	1072
5:30 PM	176	1	78	0	0	0	0	0	95	363	0	0	0	222	112	0	1047
5:45 PM	162	1	61	0	0	0	0	0	101	333	0	0	0	240	131	0	1029
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1379	5	556	0	0	0	0	0	607	2513	0	3	0	1943	972	0	7978
APPROACH %'s :	71.08%	0.26%	28.66%	0.00%					19.44%	80.47%	0.00%	0.10%	0.00%	66.66%	33.34%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	606	3	248	0	0	0	0	0	335	1338	0	1	0	973	487	0	3991
PEAK HR FACTOR :	0.861	0.750	0.795	0.000	0.000	0.000	0.000	0.000	0.829	0.814	0.000	0.250	0.000	0.921	0.929	0.000	0.931
	0.840								0.844				0.953				

Prepared by National Data & Surveying Services

SR-57 NB Ramps & E Lambert Rd

Peak Hour Turning Movement Count

ID: 19-01101-005
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

SR-57 NB Ramps — SOUTHBOUND

AM	0	0	0	0	712	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	825	PM

EASTBOUND — E Lambert Rd

AM	NOON	PM		
2150	0	1580	⇦	
3	0	1	↶	0
259	0	335	↱	2
2285	0	1338	→	3
0	0	0	↷	0
AM	NOON	PM		

CONTROL

Signalized

TEV	5606 AM	0 NOON	3991 PM
PHF	0.97		0.93

WESTBOUND — E Lambert Rd

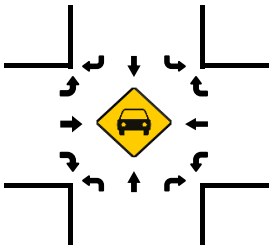
1.5	↰	487	0	452
2.5	←	973	0	1177
0	↰	0	0	0
0	↶	0	0	0
⇨		1586	0	2744
		PM	NOON	AM

NORTHBOUND — SR-57 NB Ramps

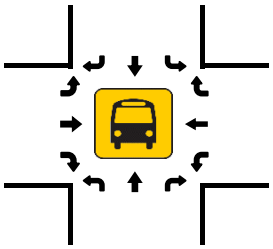
PM	0	0	606	3	248	PM
NOON	0	0	0	0	0	NOON
AM	0	0	970	1	459	AM

0 2 0 1

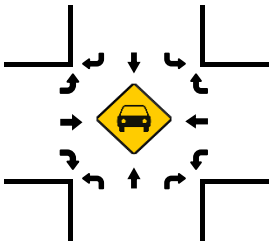
Total Vehicles (AM)



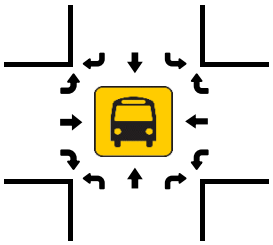
Total Vehicles (AM)



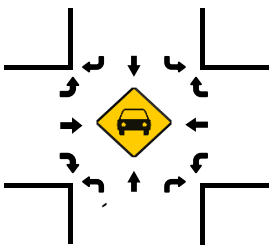
Total Vehicles (NOON)



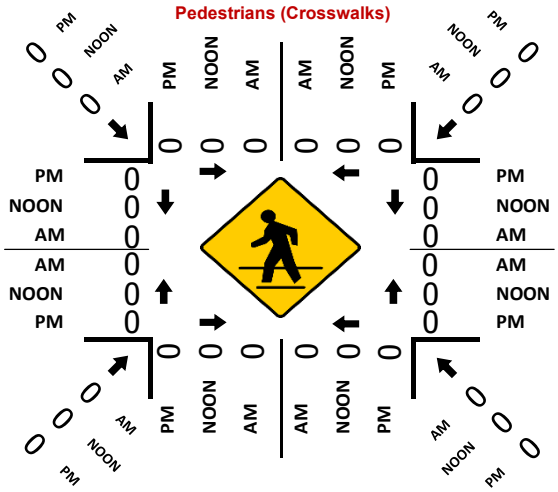
Total Vehicles (NOON)



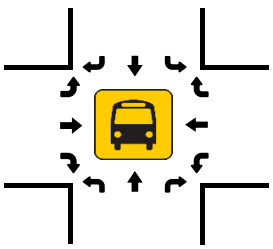
Total Vehicles (PM)



Pedestrians (Crosswalks)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Pointe Dr & Lambert Rd
City: Brea
Control: Signalized

Project ID: 18-01231-001
Date: 11/13/2018

Total

NS/EW Streets:	Pointe Dr				Pointe Dr				Lambert Rd				Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0.5	0.5	2	0	2	3	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	1	1	1	0	5	0	23	0	67	374	2	1	1	279	17	1	773
7:15 AM	1	0	0	0	5	0	24	0	63	460	6	0	0	285	18	0	862
7:30 AM	2	2	0	0	8	0	23	0	70	563	1	0	3	351	24	0	1047
7:45 AM	2	2	3	0	11	0	17	0	125	581	1	0	5	424	37	0	1208
8:00 AM	3	2	0	0	6	1	18	0	120	514	13	0	3	409	36	0	1125
8:15 AM	1	1	3	0	16	0	25	0	131	394	19	0	4	348	44	0	986
8:30 AM	9	0	3	0	4	1	13	0	113	434	13	2	2	296	31	0	921
8:45 AM	11	0	3	0	11	0	21	0	90	382	13	0	6	310	12	1	860
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	30	8	13	0	66	2	164	0	779	3702	68	3	24	2702	219	2	7782
APPROACH %'s :	58.82%	15.69%	25.49%	0.00%	28.45%	0.86%	70.69%	0.00%	17.11%	81.33%	1.49%	0.07%	0.81%	91.69%	7.43%	0.07%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	8	7	6	0	41	1	83	0	446	2052	34	0	15	1532	141	0	4366
PEAK HR FACTOR :	0.667	0.875	0.500	0.000	0.641	0.250	0.830	0.000	0.851	0.883	0.447	0.000	0.750	0.903	0.801	0.000	0.904
	0.750				0.762				0.895				0.906				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0.5	0.5	2	0	2	3	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	19	0	7	0	21	1	93	0	36	401	3	3	3	327	4	0	918
4:15 PM	12	1	3	0	24	0	71	0	33	396	13	1	2	331	10	0	897
4:30 PM	28	0	8	0	14	0	92	0	38	422	6	1	5	354	13	0	981
4:45 PM	15	0	3	0	27	0	79	0	39	425	11	1	5	326	11	0	942
5:00 PM	38	0	8	0	31	0	111	0	35	405	8	3	0	334	6	0	979
5:15 PM	25	0	6	0	20	0	79	0	37	421	11	0	3	301	11	1	915
5:30 PM	17	0	5	0	29	0	109	0	60	395	6	1	4	267	21	0	914
5:45 PM	16	1	4	0	20	0	67	0	46	417	3	3	1	260	13	0	851
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	170	2	44	0	186	1	701	0	324	3282	61	13	23	2500	89	1	7397
APPROACH %'s :	78.70%	0.93%	20.37%	0.00%	20.95%	0.11%	78.94%	0.00%	8.80%	89.18%	1.66%	0.35%	0.88%	95.68%	3.41%	0.04%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	106	0	25	0	92	0	361	0	149	1673	36	5	13	1315	41	1	3817
PEAK HR FACTOR :	0.697	0.000	0.781	0.000	0.742	0.000	0.813	0.000	0.955	0.984	0.818	0.417	0.650	0.929	0.788	0.250	0.973
	0.712				0.798				0.978				0.921				

Prepared by National Data & Surveying Services

Pointe Dr & Lambert Rd

Peak Hour Turning Movement Count

ID: 18-01231-001
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS

AM: 07:30 AM - 08:30 AM
NOON: NONE
PM: 04:30 PM - 05:30 PM

COUNT PERIODS

AM: 07:00 AM - 09:00 AM
NOON: NONE
PM: 04:00 PM - 06:00 PM

SOUTHBOUND (Pointe Dr)

AM	83	1	41	0	594	AM
NOON	0	0	0	0	0	NOON
PM	361	0	92	0	190	PM
	2	0.5	0.5	0		

EASTBOUND (Lambert Rd)

AM	NOON	PM	
1623	0	1787	
0	0	5	0
446	0	149	2
2052	0	1673	3
34	0	36	0

WESTBOUND (Lambert Rd)

PM	NOON	AM	
41	0	141	0
1315	0	1532	3
13	0	15	1
1	0	0	0
1791	0	2099	

CONTROL

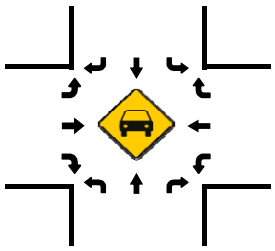
Signalized

TEV	4366	0	3817
	AM	NOON	PM
PHF	0.90		0.97

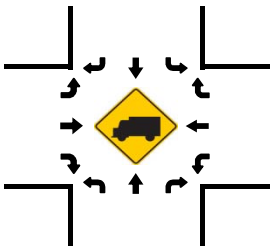
NORTHBOUND (Pointe Dr)

	0	0	1	0		
PM	49	0	106	0	25	PM
NOON	0	0	0	0	0	NOON
AM	50	0	8	7	6	AM

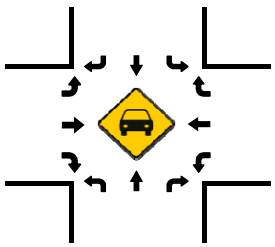
Total Vehicles (AM)



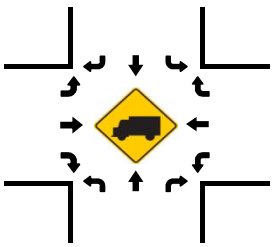
2axle (AM)



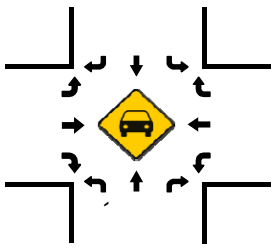
Total Vehicles (Noon)



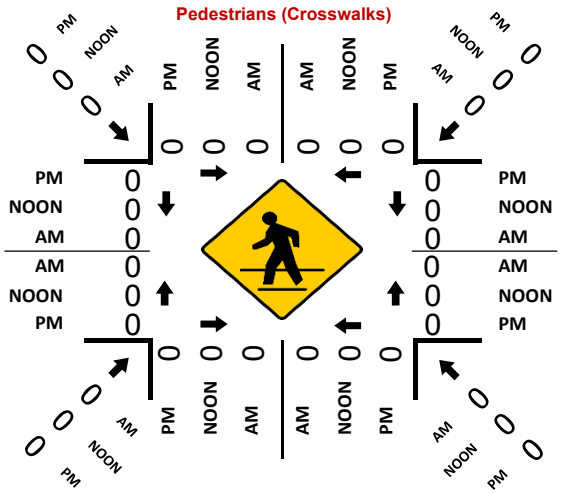
2axle (NOON)



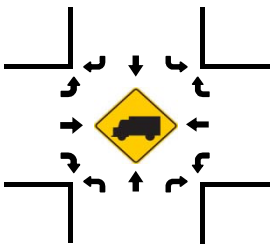
Total Vehicles (PM)



Pedestrians (Crosswalks)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Wildcat Way/N Associated Rd & Lambert Rd
City: Brea
Control: Signalized

Project ID: 18-01231-002
Date: 11/13/2018

Total

NS/EW Streets:	Wildcat Way/N Associated Rd				Wildcat Way/N Associated Rd				Lambert Rd				Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	2	3	1	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	20	12	0	0	25	28	62	0	37	316	22	0	1	212	7	0	742
7:15 AM	26	35	5	0	9	6	27	0	60	403	14	0	2	266	15	0	868
7:30 AM	40	88	3	1	18	42	84	0	141	390	23	0	2	248	46	0	1126
7:45 AM	34	130	1	0	47	97	153	0	173	397	42	0	8	288	77	0	1447
8:00 AM	32	7	1	0	27	32	65	0	31	421	57	0	6	358	11	0	1048
8:15 AM	43	7	7	0	6	8	12	0	17	370	45	0	6	327	8	0	856
8:30 AM	28	5	5	0	2	1	4	0	21	376	24	1	7	300	5	0	779
8:45 AM	30	8	0	0	4	1	10	0	25	356	27	0	6	289	18	0	774
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	253	292	22	1	138	215	417	0	505	3029	254	1	38	2288	187	0	7640
APPROACH %'s :	44.54%	51.41%	3.87%	0.18%	17.92%	27.92%	54.16%	0.00%	13.33%	79.94%	6.70%	0.03%	1.51%	91.05%	7.44%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	132	260	10	1	101	177	329	0	405	1611	136	0	18	1160	149	0	4489
PEAK HR FACTOR :	0.825	0.500	0.500	0.250	0.537	0.456	0.538	0.000	0.585	0.957	0.596	0.000	0.563	0.810	0.484	0.000	0.776
	0.611				0.511				0.879				0.885				

NS/EW Streets:	Wildcat Way/N Associated Rd				Wildcat Way/N Associated Rd				Lambert Rd				Lambert Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	2	3	1	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	23	8	2	0	23	29	40	0	18	363	39	0	5	281	13	0	844
4:15 PM	25	12	3	0	12	23	40	0	12	369	33	1	5	264	7	1	807
4:30 PM	34	4	4	0	15	11	26	0	13	394	51	1	4	304	7	0	868
4:45 PM	32	8	3	0	20	10	21	0	11	405	34	1	4	305	5	0	859
5:00 PM	20	18	8	0	23	34	48	0	7	388	41	0	6	287	13	0	893
5:15 PM	34	17	3	1	17	36	26	0	6	398	55	1	8	251	14	0	867
5:30 PM	31	11	4	0	18	25	31	0	10	384	50	2	5	229	9	0	809
5:45 PM	19	6	5	0	11	12	25	0	21	377	41	0	1	218	19	0	755
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	218	84	32	1	139	180	257	0	98	3078	344	6	38	2139	87	1	6702
APPROACH %'s :	65.07%	25.07%	9.55%	0.30%	24.13%	31.25%	44.62%	0.00%	2.78%	87.29%	9.76%	0.17%	1.68%	94.44%	3.84%	0.04%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	120	47	18	1	75	91	121	0	37	1585	181	3	22	1147	39	0	3487
PEAK HR FACTOR :	0.882	0.653	0.563	0.250	0.815	0.632	0.630	0.000	0.712	0.978	0.823	0.750	0.688	0.940	0.696	0.000	0.976
	0.845				0.683				0.982				0.959				

Prepared by National Data & Surveying Services

Wildcat Way/N Associated Rd & Lambert Rd

Peak Hour Turning Movement Count

ID: 18-01231-002
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS		COUNT PERIODS
AM	07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	04:00 PM - 06:00 PM

Wildcat Way/N Associated Rd — SOUTHBOUND

AM	329	177	101	0	814	AM
NOON	0	0	0	0	0	NOON
PM	121	91	75	0	123	PM

Lambert Rd — EASTBOUND

AM	NOON	PM		
1621	0	1391	⇦	
0	0	3	↶	0
405	0	37	↱	2
1611	0	1585	→	3
136	0	181	↴	1
AM	NOON	PM		

CONTROL

Signalized

TEV	4489 AM	0 NOON	3487 PM
PHF	0.78		0.98

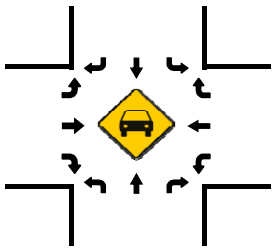
WESTBOUND — Lambert Rd

PM	NOON	AM		
39	0	149	↰	0
1147	0	1160	←	3
22	0	18	↰	1
0	0	0	↰	0
1678	0	1722	⇨	
PM	NOON	AM		

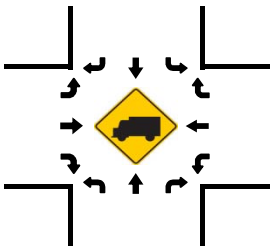
Wildcat Way/N Associated Rd — NORTHBOUND

PM	295	1	120	47	18	PM
NOON	0	0	0	0	0	NOON
AM	332	1	132	260	10	AM

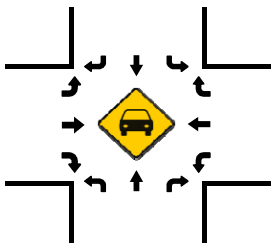
Total Vehicles (AM)



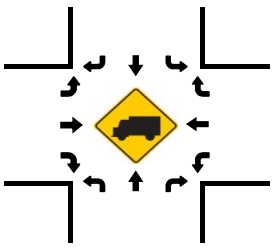
2axle (AM)



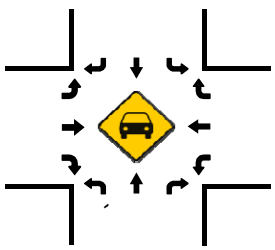
Total Vehicles (Noon)



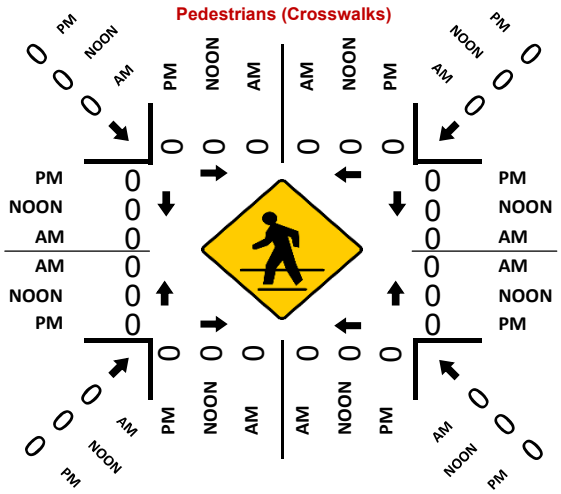
2axle (NOON)



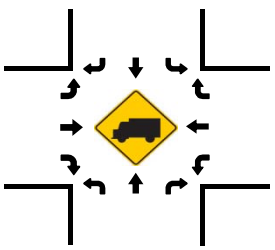
Total Vehicles (PM)



Pedestrians (Crosswalks)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: N Kraemer Blvd & E Lambert Rd
City: Brea
Control: Signalized

Project ID: 19-01101-006
Date: 5/22/2019

Total

NS/EW Streets:	N Kraemer Blvd				N Kraemer Blvd				E Lambert Rd				E Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	1	1	0	1	1	1	0	1	2	2	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	49	7	2	0	0	35	35	0	11	130	242	0	53	139	1	0	704
7:15 AM	57	7	2	0	0	43	59	0	10	154	244	0	50	168	2	0	796
7:30 AM	53	14	5	0	5	69	59	0	8	156	251	0	69	176	4	0	869
7:45 AM	73	47	9	0	12	63	71	0	23	152	283	0	71	152	5	0	961
8:00 AM	85	29	7	0	0	22	98	0	20	136	226	0	66	181	3	0	873
8:15 AM	61	15	8	0	1	46	74	0	39	158	228	0	42	168	0	0	840
8:30 AM	77	13	6	0	0	41	64	0	34	147	239	0	45	191	1	0	858
8:45 AM	58	17	4	0	0	39	82	0	31	145	223	0	35	164	1	0	799
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	513	149	43	0	18	358	542	0	176	1178	1936	0	431	1339	17	0	6700
APPROACH %'s :	72.77%	21.13%	6.10%	0.00%	1.96%	39.00%	59.04%	0.00%	5.35%	35.81%	58.84%	0.00%	24.12%	74.93%	0.95%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	272	105	29	0	18	200	302	0	90	602	988	0	248	677	12	0	3543
PEAK HR FACTOR :	0.800	0.559	0.806	0.000	0.375	0.725	0.770	0.000	0.577	0.953	0.873	0.000	0.873	0.935	0.600	0.000	0.922
	0.787				0.890				0.917				0.937				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	1	1	0	1	1	1	0	1	2	2	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	152	48	45	0	0	26	19	0	34	185	128	0	28	123	12	0	800
4:15 PM	101	41	51	0	0	29	31	0	44	211	141	0	19	78	7	0	753
4:30 PM	137	44	63	0	0	28	23	0	23	155	105	0	12	74	4	0	668
4:45 PM	133	58	60	0	1	27	28	0	36	144	84	0	10	71	7	0	659
5:00 PM	115	65	55	0	3	17	24	0	33	133	93	0	3	72	8	0	621
5:15 PM	102	83	54	0	1	29	26	0	51	247	136	0	18	83	8	0	838
5:30 PM	128	78	47	0	0	29	22	0	44	212	102	0	27	59	2	0	750
5:45 PM	120	48	47	0	0	17	34	0	41	180	107	0	25	92	7	0	718
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	988	465	422	0	5	202	207	0	306	1467	896	0	142	652	55	0	5807
APPROACH %'s :	52.69%	24.80%	22.51%	0.00%	1.21%	48.79%	50.00%	0.00%	11.46%	54.96%	33.57%	0.00%	16.73%	76.80%	6.48%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	465	274	203	0	4	92	106	0	169	772	438	0	73	306	25	0	2927
PEAK HR FACTOR :	0.908	0.825	0.923	0.000	0.333	0.793	0.779	0.000	0.828	0.781	0.805	0.000	0.676	0.832	0.781	0.000	0.873
	0.931				0.902				0.794				0.815				

Prepared by National Data & Surveying Services

N Kraemer Blvd & E Lambert Rd

Peak Hour Turning Movement Count

ID: 19-01101-006
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

SOUTHBOUND — N Kraemer Blvd

AM	302	200	18	0	207	AM
NOON	0	0	0	0	0	NOON
PM	106	92	4	0	468	PM

EASTBOUND — E Lambert Rd

AM	NOON	PM		
1251	0	877	⇦	
0	0	0	↶	0
90	0	169	↱	1
602	0	772	→	2
988	0	438	↴	2
AM	NOON	PM		

WESTBOUND — E Lambert Rd

PM	NOON	AM		
25	0	12	↰	0
306	0	677	←	3
73	0	248	↰	2
0	0	0	↶	0
979	0	649	⇨	
PM	NOON	AM		

NORTHBOUND — N Kraemer Blvd

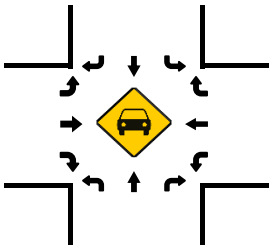
PM	603	0	465	274	203	PM
NOON	0	0	0	0	0	NOON
AM	1436	0	272	105	29	AM

CONTROL

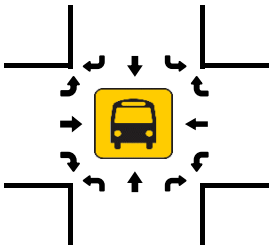
Signalized

TEV	3543 AM	0 NOON	2927 PM
PHF	0.92		0.87

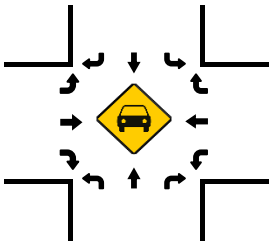
Total Vehicles (AM)



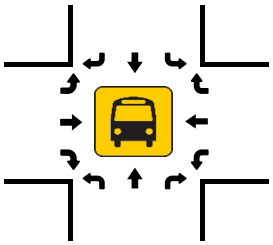
Total Vehicles (AM)



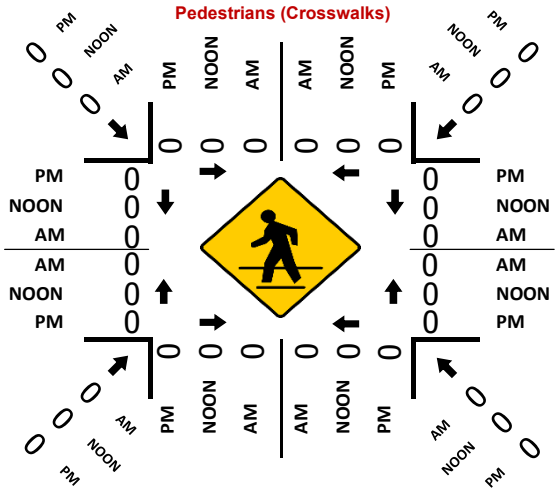
Total Vehicles (NOON)



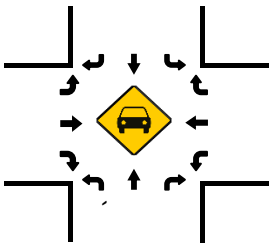
Total Vehicles (NOON)



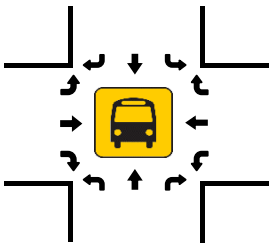
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Sunflower St & Lambert Rd
City: Brea
Control: Signalized

Project ID: 18-01231-003
Date: 11/13/2018

Total

NS/EW Streets:	Sunflower St				Sunflower St				Lambert Rd				Lambert Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	0	1	0	1	2	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	2	0	1	0	1	1	0	0	0	144	0	0	3	174	1	0	327
7:15 AM	3	0	1	0	3	0	3	0	0	170	3	0	1	200	1	0	385
7:30 AM	11	0	4	0	1	0	1	0	1	166	12	1	3	220	1	0	421
7:45 AM	14	3	11	0	1	2	4	0	3	153	22	0	12	201	0	0	426
8:00 AM	9	1	1	0	1	1	0	0	1	160	7	0	3	254	0	0	438
8:15 AM	5	1	0	0	1	0	0	0	0	156	1	0	3	230	1	0	398
8:30 AM	2	0	0	0	2	0	0	0	0	132	2	2	2	254	0	0	396
8:45 AM	6	0	0	0	2	0	0	0	0	160	4	0	2	245	2	1	422
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	52	5	18	0	12	4	8	0	5	1241	51	3	29	1778	6	1	3213
APPROACH %'s :	69.33%	6.67%	24.00%	0.00%	50.00%	16.67%	33.33%	0.00%	0.38%	95.46%	3.92%	0.23%	1.60%	98.02%	0.33%	0.06%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	39	5	16	0	4	3	5	0	5	635	42	1	21	905	2	0	1683
PEAK HR FACTOR :	0.696	0.417	0.364	0.000	1.000	0.375	0.313	0.000	0.417	0.956	0.477	0.250	0.438	0.891	0.500	0.000	0.961
	0.536				0.429				0.949				0.903				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	0	1	0	1	2	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	3	1	4	0	0	0	1	0	0	272	3	0	2	116	0	1	403
4:15 PM	13	1	3	0	0	0	2	0	1	290	6	0	1	143	1	0	461
4:30 PM	4	0	1	0	1	0	2	0	1	287	3	1	1	141	1	0	443
4:45 PM	3	0	3	0	1	0	0	0	2	271	6	0	0	147	1	0	434
5:00 PM	4	0	1	0	1	0	1	0	2	244	2	0	0	118	1	0	374
5:15 PM	3	0	2	0	1	0	0	0	2	268	3	0	1	108	2	1	391
5:30 PM	0	1	0	0	4	0	1	0	2	256	3	1	0	101	0	0	369
5:45 PM	2	1	2	0	0	0	1	0	0	236	5	0	1	118	3	0	369
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	4	16	0	8	0	8	0	10	2124	31	2	6	992	9	2	3244
APPROACH %'s :	61.54%	7.69%	30.77%	0.00%	50.00%	0.00%	50.00%	0.00%	0.46%	98.02%	1.43%	0.09%	0.59%	98.32%	0.89%	0.20%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	23	2	11	0	2	0	5	0	4	1120	18	1	4	547	3	1	1741
PEAK HR FACTOR :	0.442	0.500	0.688	0.000	0.500	0.000	0.625	0.000	0.500	0.966	0.750	0.250	0.500	0.930	0.750	0.250	0.944
	0.529				0.583				0.962				0.938				

Prepared by National Data & Surveying Services

Sunflower St & Lambert Rd

Peak Hour Turning Movement Count

ID: 18-01231-003
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS

AM: 07:30 AM - 08:30 AM
NOON: NONE
PM: 04:00 PM - 05:00 PM

COUNT PERIODS

AM: 07:00 AM - 09:00 AM
NOON: NONE
PM: 04:00 PM - 06:00 PM

Sunflower St — SOUTHBOUND

AM	5	3	4	0	12	AM
NOON	0	0	0	0	0	NOON
PM	5	0	2	0	9	PM

Lambert Rd — EASTBOUND

AM	NOON	PM		
950	0	576	⇦	
1	0	1	↶	0
5	0	4	↱	1
635	0	1120	→	2
42	0	18	↴	0
AM	NOON	PM		

CONTROL

Signalized

TEV	1683 AM	0 NOON	1741 PM
PHF	0.96		0.94

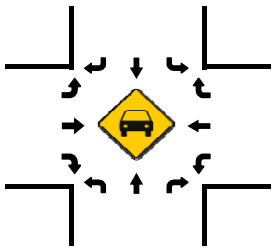
WESTBOUND — Lambert Rd

PM	NOON	AM		
3	0	2	↶	0
547	0	905	←	3
4	0	21	↰	1
1	0	0	↰	0
1134	0	655	⇨	
PM	NOON	AM		

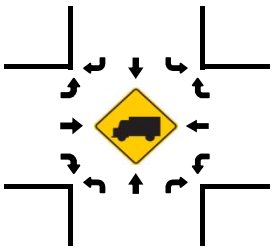
NORTHBOUND — Sunflower St

PM	22	0	23	2	11	PM
NOON	0	0	0	0	0	NOON
AM	66	0	39	5	16	AM

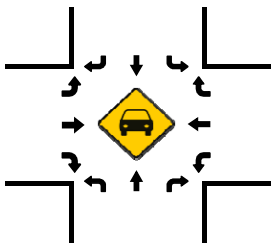
Total Vehicles (AM)



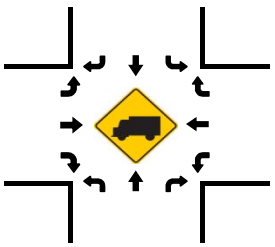
2axle (AM)



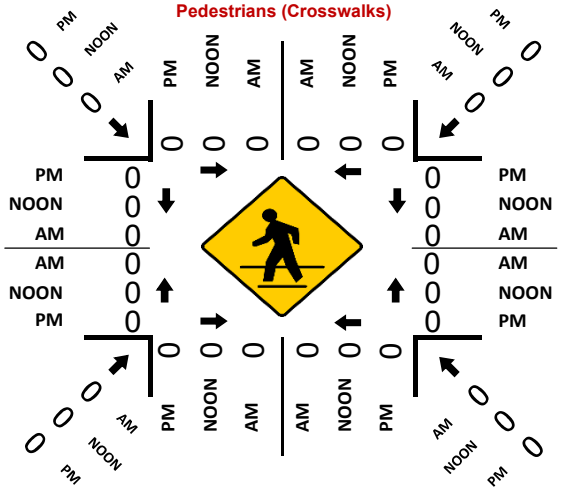
Total Vehicles (Noon)



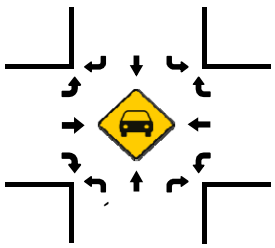
2axle (NOON)



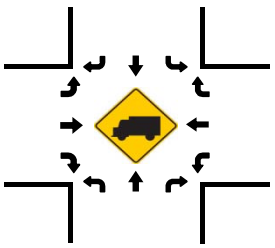
Pedestrians (Crosswalks)



Total Vehicles (PM)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Valencia Ave & Lambert Rd/Carbon Canyon Rd
City: Brea
Control: Signalized

Project ID: 18-01231-021
Date: 11/13/2018

Total

NS/EW Streets:	Valencia Ave				Valencia Ave				Lambert Rd/Carbon Canyon Rd				Lambert Rd/Carbon Canyon Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	1	3	0	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	59	15	5	0	2	42	2	0	13	25	115	0	237	129	0	0	644
7:15 AM	53	27	22	0	1	49	1	0	3	27	129	0	220	133	2	0	667
7:30 AM	58	27	31	0	2	120	11	0	6	25	132	0	214	166	0	0	792
7:45 AM	52	42	33	0	2	127	16	0	14	28	139	0	219	151	0	0	823
8:00 AM	76	66	35	0	2	57	6	0	20	37	100	0	199	162	2	1	763
8:15 AM	70	33	29	0	1	38	4	0	3	54	103	0	204	160	0	0	699
8:30 AM	59	30	24	0	5	30	6	0	6	32	89	0	218	202	0	0	701
8:45 AM	64	32	20	0	2	59	2	0	14	27	119	0	188	174	3	1	705
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	491	272	199	0	17	522	48	0	79	255	926	0	1699	1277	7	2	5794
APPROACH %'s :	51.04%	28.27%	20.69%	0.00%	2.90%	88.93%	8.18%	0.00%	6.27%	20.24%	73.49%	0.00%	56.92%	42.78%	0.23%	0.07%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	256	168	128	0	7	342	37	0	43	144	474	0	836	639	2	1	3077
PEAK HR FACTOR :	0.842	0.636	0.914	0.000	0.875	0.673	0.578	0.000	0.538	0.667	0.853	0.000	0.954	0.962	0.250	0.250	0.935
	0.780				0.666				0.913				0.972				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	1	3	0	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	67	26	186	0	7	38	13	0	8	172	88	0	30	41	2	0	678
4:15 PM	87	22	155	0	2	14	9	0	9	190	105	1	32	51	5	0	682
4:30 PM	76	29	178	0	4	19	5	0	5	167	105	0	37	60	1	0	686
4:45 PM	69	51	155	0	9	25	2	0	0	138	134	1	27	70	0	0	681
5:00 PM	73	42	167	0	9	23	8	0	2	143	101	0	24	44	2	0	638
5:15 PM	56	44	192	0	13	13	6	0	9	139	125	0	26	49	3	0	675
5:30 PM	54	41	158	0	6	23	5	0	3	159	111	0	33	46	0	0	639
5:45 PM	65	44	158	0	4	18	3	0	12	140	87	0	31	54	2	0	618
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	547	299	1349	0	54	173	51	0	48	1248	856	2	240	415	15	0	5297
APPROACH %'s :	24.92%	13.62%	61.46%	0.00%	19.42%	62.23%	18.35%	0.00%	2.23%	57.94%	39.74%	0.09%	35.82%	61.94%	2.24%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	299	128	674	0	22	96	29	0	22	667	432	2	126	222	8	0	2727
PEAK HR FACTOR :	0.859	0.627	0.906	0.000	0.611	0.632	0.558	0.000	0.611	0.878	0.806	0.500	0.851	0.793	0.400	0.000	0.994
	0.973				0.634				0.920				0.908				

Prepared by National Data & Surveying Services

Valencia Ave & Lambert Rd/Carbon Canyon Rd

Peak Hour Turning Movement Count

ID: 18-01231-021
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	04:00 PM - 06:00 PM

Valencia Ave — SOUTHBOUND

AM	37	342	7	0	213	AM
NOON	0	0	0	0	0	NOON
PM	29	96	22	0	158	PM

Lambert Rd/Carbon Canyon Rd — EASTBOUND

AM	NOON	PM	
932	0	552	
0	0	2	0
43	0	22	1
144	0	667	3
474	0	432	0

Lambert Rd/Carbon Canyon Rd — WESTBOUND

PM	NOON	AM	
8	0	2	0
222	0	639	3
126	0	836	2
0	0	1	0
1363	0	280	

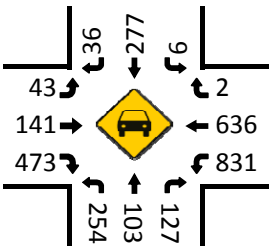
Valencia Ave — NORTHBOUND

PM	654	0	299	128	674	PM
NOON	0	0	0	0	0	NOON
AM	1652	0	256	168	128	AM

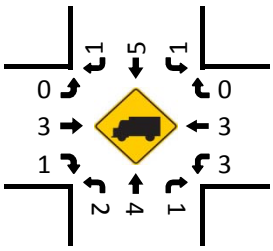
CONTROL: Signalized

TEV	3077	0	2727
	AM	NOON	PM
PHF	0.93		0.99

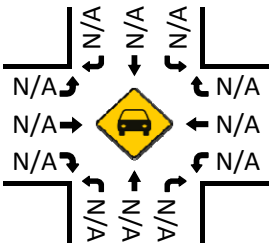
Cars (AM)



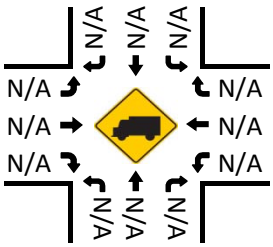
2axle (AM)



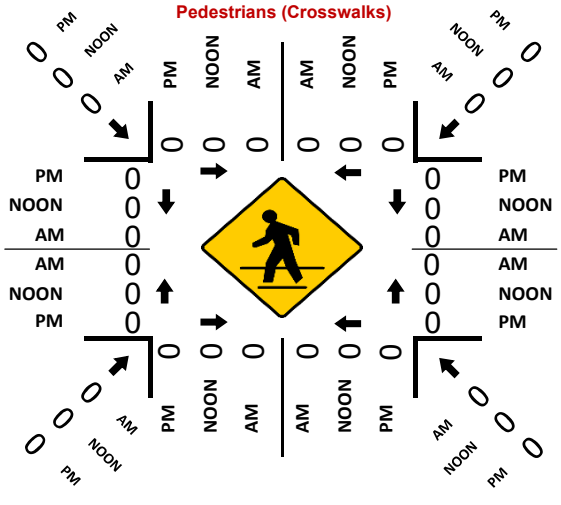
Cars (NOON)



2axle (NOON)



Pedestrians (Crosswalks)


PM
NOON
AM
0
0
0

National Data & Surveying Services

Intersection Turning Movement Count

Location: Santa Fe Rd & Carbon Canyon Rd
City: Brea
Control: Signalized

Project ID: 18-01231-004
Date: 11/13/2018

Total

NS/EW Streets:	Santa Fe Rd				Santa Fe Rd				Carbon Canyon Rd				Carbon Canyon Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	2	47	1	0	0	371	0	0	421
7:15 AM	0	0	0	0	0	0	7	0	1	46	1	0	0	361	1	0	417
7:30 AM	0	0	0	0	0	0	11	0	3	48	2	0	0	363	0	0	427
7:45 AM	0	0	0	0	0	0	8	0	7	65	1	0	2	370	1	0	454
8:00 AM	0	0	0	0	0	0	7	0	2	76	1	0	4	364	0	0	454
8:15 AM	2	0	1	0	0	0	3	0	1	79	3	0	0	384	2	0	475
8:30 AM	2	1	0	0	0	0	3	0	3	65	2	0	0	379	1	0	456
8:45 AM	1	0	1	0	0	0	2	0	2	48	4	0	2	366	1	0	427
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	5	1	2	0	0	0	41	0	21	474	15	0	8	2958	6	0	3531
APPROACH %'s :	62.50%	12.50%	25.00%	0.00%	0.00%	0.00%	100.00%	0.00%	4.12%	92.94%	2.94%	0.00%	0.27%	99.53%	0.20%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	4	1	1	0	0	0	21	0	13	285	7	0	6	1497	4	0	1839
PEAK HR FACTOR :	0.500	0.250	0.250	0.000	0.000	0.000	0.656	0.000	0.464	0.902	0.583	0.000	0.375	0.975	0.500	0.000	0.968
	0.500				0.656				0.919				0.976				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	2	0	0	0	2	0	3	314	5	0	0	70	0	0	396
4:15 PM	1	0	0	0	0	0	3	0	0	296	1	0	0	80	0	0	381
4:30 PM	7	0	2	0	1	0	8	0	2	308	2	0	1	80	0	0	411
4:45 PM	6	0	0	0	0	0	5	0	0	293	3	0	0	91	2	0	400
5:00 PM	3	0	2	0	0	0	0	0	0	310	1	0	0	65	0	0	381
5:15 PM	4	0	0	0	0	0	7	0	0	378	0	0	1	58	2	0	450
5:30 PM	0	0	0	0	0	0	4	0	1	342	1	0	0	72	3	0	423
5:45 PM	3	0	0	0	0	0	3	0	0	354	0	0	0	85	2	0	447
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	24	0	6	0	1	0	32	0	6	2595	13	0	2	601	9	0	3289
APPROACH %'s :	80.00%	0.00%	20.00%	0.00%	3.03%	0.00%	96.97%	0.00%	0.23%	99.27%	0.50%	0.00%	0.33%	98.20%	1.47%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	10	0	2	0	0	0	14	0	1	1384	2	0	1	280	7	0	1701
PEAK HR FACTOR :	0.625	0.000	0.250	0.000	0.000	0.000	0.500	0.000	0.250	0.915	0.500	0.000	0.250	0.824	0.583	0.000	0.945
	0.600				0.500				0.917				0.828				

Prepared by National Data & Surveying Services

Santa Fe Rd & Carbon Canyon Rd

Peak Hour Turning Movement Count

ID: 18-01231-004
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

Santa Fe Rd — SOUTHBOUND

AM	21	0	0	0	18	AM
NOON	0	0	0	0	0	NOON
PM	14	0	0	0	8	PM

Carbon Canyon Rd — EASTBOUND

AM	NOON	PM		
1522	0	304	⇦	1
0	0	0	↶	0
13	0	1	↱	1
285	0	1384	→	2
7	0	2	↴	0
AM	NOON	PM		

CONTROL

Signalized

TEV	1839 AM	0 NOON	1701 PM
PHF	0.97		0.95

Carbon Canyon Rd — WESTBOUND

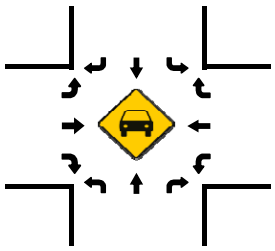
PM	NOON	AM		
7	0	4	↰	1
280	0	1497	←	2
1	0	6	↰	1
0	0	0	↰	0
1386	0	286	⇨	
PM	NOON	AM		

Santa Fe Rd — NORTHBOUND

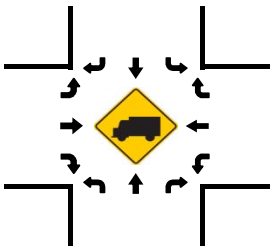
PM	3	0	10	0	2	PM
NOON	0	0	0	0	0	NOON
AM	13	0	4	1	1	AM

1	0	0	0		0	0	1	0

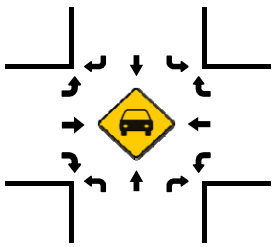
Total Vehicles (AM)



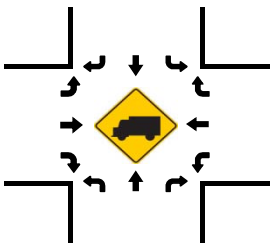
2axle (AM)



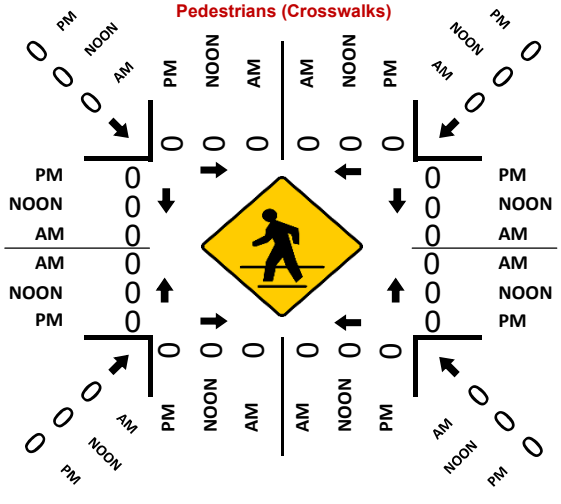
Total Vehicles (Noon)



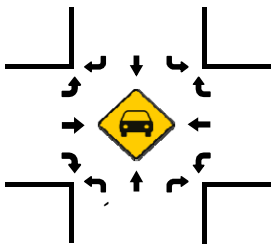
2axle (NOON)



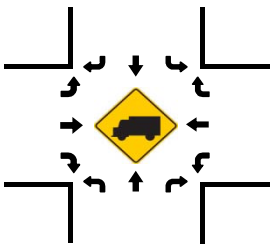
Pedestrians (Crosswalks)



Total Vehicles (PM)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: State College Blvd & Birch St
City: Brea
Control: Signalized

Project ID: 18-01231-005
Date: 11/13/2018

Total

NS/EW Streets:	State College Blvd				State College Blvd				Birch St				Birch St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2 NL	2 NT	1 NR	0 NU	2 SL	2 ST	0 SR	0 SU	2 EL	2 ET	1 ER	0 EU	2 WL	2 WT	1 WR	0 WU	TOTAL
7:00 AM	12	23	11	0	116	168	22	0	16	95	7	0	20	76	40	0	606
7:15 AM	21	19	19	0	131	235	13	0	9	89	10	0	20	85	43	0	694
7:30 AM	14	22	24	0	160	220	30	0	20	137	14	0	10	114	58	0	823
7:45 AM	20	34	27	0	184	144	49	0	23	121	8	0	19	172	88	0	889
8:00 AM	16	37	20	0	117	134	45	0	18	126	13	0	23	153	68	0	770
8:15 AM	17	35	17	0	99	104	44	0	27	84	10	0	34	137	55	0	663
8:30 AM	11	39	15	0	64	81	51	0	28	65	11	0	18	127	43	0	553
8:45 AM	20	33	9	0	73	84	59	0	12	82	17	0	23	117	43	0	572
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	131	242	142	0	944	1170	313	0	153	799	90	0	167	981	438	0	5570
APPROACH %'s :	25.44%	46.99%	27.57%	0.00%	38.90%	48.21%	12.90%	0.00%	14.68%	76.68%	8.64%	0.00%	10.53%	61.85%	27.62%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	71	112	90	0	592	733	137	0	70	473	45	0	72	524	257	0	3176
PEAK HR FACTOR :	0.845	0.757	0.833	0.000	0.804	0.780	0.699	0.000	0.761	0.863	0.804	0.000	0.783	0.762	0.730	0.000	0.893
	0.843				0.891				0.860				0.764				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2 NL	2 NT	1 NR	0 NU	2 SL	2 ST	0 SR	0 SU	2 EL	2 ET	1 ER	0 EU	2 WL	2 WT	1 WR	0 WU	TOTAL
4:00 PM	27	67	34	0	62	71	55	0	54	139	44	0	28	163	82	0	826
4:15 PM	33	83	36	0	67	65	64	0	43	153	29	0	33	150	102	0	858
4:30 PM	33	71	47	0	70	79	58	0	32	138	31	0	27	200	116	0	902
4:45 PM	31	75	35	0	87	72	58	0	35	161	29	0	33	238	145	0	999
5:00 PM	24	75	43	0	62	72	65	0	48	170	46	0	33	231	153	0	1022
5:15 PM	31	85	41	0	70	83	56	0	43	184	30	0	29	223	146	0	1021
5:30 PM	45	92	27	0	72	73	64	1	57	184	41	0	36	203	123	0	1018
5:45 PM	34	84	34	0	54	71	77	2	48	158	39	0	46	168	101	0	916
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	258	632	297	0	544	586	497	3	360	1287	289	0	265	1576	968	0	7562
APPROACH %'s :	21.74%	53.24%	25.02%	0.00%	33.37%	35.95%	30.49%	0.18%	18.60%	66.48%	14.93%	0.00%	9.43%	56.11%	34.46%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	131	327	146	0	291	300	243	1	183	699	146	0	131	895	567	0	4060
PEAK HR FACTOR :	0.728	0.889	0.849	0.000	0.836	0.904	0.935	0.250	0.803	0.950	0.793	0.000	0.910	0.940	0.926	0.000	0.993
	0.921				0.962				0.911				0.955				

Prepared by National Data & Surveying Services

State College Blvd & Birch St

Peak Hour Turning Movement Count

ID: 18-01231-005
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS	
AM	07:15 AM - 08:15 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

State College Blvd — SOUTHBOUND

AM	137	733	592	0	439	AM
NOON	0	0	0	0	0	NOON
PM	243	300	291	1	1078	PM

EASTBOUND — Birch St

AM	NOON	PM		
732	0	1269	⇦	
0	0	0	↶	0
70	0	183	↱	2
473	0	699	→	2
45	0	146	↴	1
AM	NOON	PM		

WESTBOUND — Birch St

PM	NOON	AM		
567	0	257	↰	1
895	0	524	←	2
131	0	72	↩	2
0	0	0	↷	0
1136	0	1155	⇨	
PM	NOON	AM		

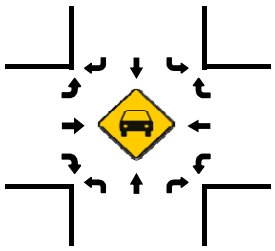
CONTROL: Signalized

TEV	3176 AM	0 NOON	4060 PM
PHF	0.89		0.99

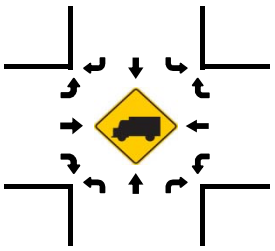
NORTHBOUND — State College Blvd

PM	577	0	131	327	146	PM
NOON	0	0	0	0	0	NOON
AM	850	0	71	112	90	AM

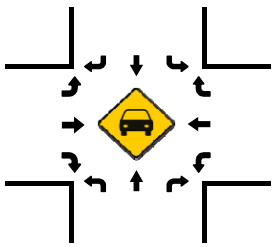
Total Vehicles (AM)



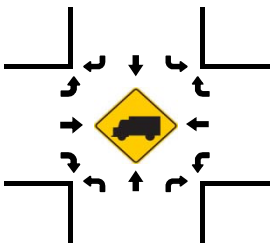
2axle (AM)



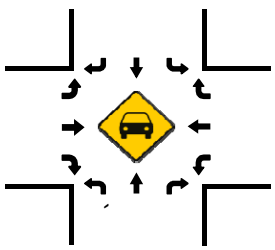
Total Vehicles (Noon)



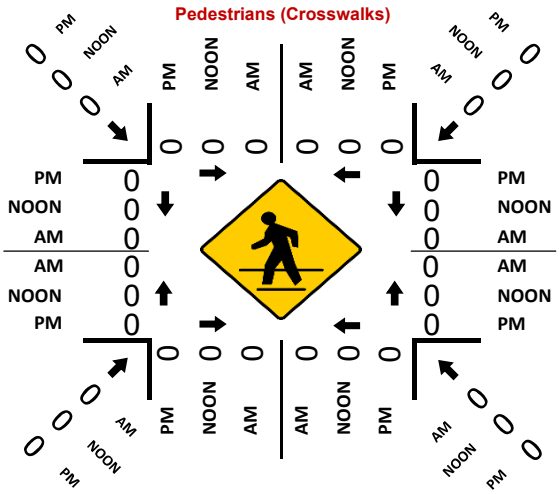
2axle (NOON)



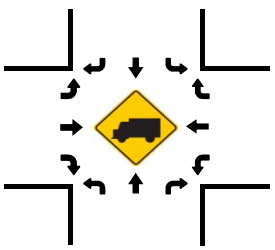
Total Vehicles (PM)



Pedestrians (Crosswalks)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: S Associated Rd & Birch St
City: Brea
Control: Signalized

Project ID: 18-01231-006
Date: 11/13/2018

Total

NS/EW Streets:	S Associated Rd				S Associated Rd				Birch St				Birch St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	1	1	0	1	1	0	0	1	2	0	0	2	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	20	0	51	4	5	4	0	0	0	155	71	0	74	88	1	0	473
7:15 AM	23	0	45	0	10	4	5	0	0	157	73	0	66	104	0	0	487
7:30 AM	40	1	58	7	9	13	3	0	1	220	86	0	80	134	4	0	656
7:45 AM	50	1	66	6	14	6	1	0	0	249	85	0	77	206	0	0	761
8:00 AM	47	3	69	10	6	3	2	0	0	228	68	0	84	194	1	0	715
8:15 AM	54	1	96	7	22	5	2	0	1	160	46	0	81	169	5	0	649
8:30 AM	53	1	47	8	5	3	2	0	3	99	52	0	75	120	3	0	471
8:45 AM	43	0	41	6	5	5	2	0	1	101	60	0	45	138	2	0	449
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	330	7	473	48	76	43	17	0	6	1369	541	0	582	1153	16	0	4661
APPROACH %'s :	38.46%	0.82%	55.13%	5.59%	55.88%	31.62%	12.50%	0.00%	0.31%	71.45%	28.24%	0.00%	33.24%	65.85%	0.91%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	191	6	289	30	51	27	8	0	2	857	285	0	322	703	10	0	2781
PEAK HR FACTOR :	0.884	0.500	0.753	0.750	0.580	0.519	0.667	0.000	0.500	0.860	0.828	0.000	0.958	0.853	0.500	0.000	0.914
	0.816				0.741				0.856				0.914				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	1	1	0	1	1	0	0	1	2	0	0	2	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	81	4	56	2	2	2	2	0	0	167	58	1	66	199	6	0	646
4:15 PM	86	2	68	2	1	2	2	0	0	186	62	0	59	194	3	0	667
4:30 PM	99	4	67	3	3	1	1	0	0	200	60	0	60	260	5	0	763
4:45 PM	124	7	74	5	3	3	1	0	5	196	66	0	60	276	5	0	825
5:00 PM	120	9	77	4	2	6	2	0	1	196	76	1	76	279	5	0	854
5:15 PM	95	7	87	2	3	5	2	0	1	209	61	2	77	299	2	0	852
5:30 PM	81	7	85	3	2	4	1	0	2	203	67	0	54	288	4	0	801
5:45 PM	80	5	74	3	5	4	2	0	3	181	53	0	57	217	6	0	690
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	766	45	588	24	21	27	13	0	12	1538	503	4	509	2012	36	0	6098
APPROACH %'s :	53.83%	3.16%	41.32%	1.69%	34.43%	44.26%	21.31%	0.00%	0.58%	74.77%	24.45%	0.19%	19.91%	78.69%	1.41%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	420	30	323	14	10	18	6	0	9	804	270	3	267	1142	16	0	3332
PEAK HR FACTOR :	0.847	0.833	0.928	0.700	0.833	0.750	0.750	0.000	0.450	0.962	0.888	0.375	0.867	0.955	0.800	0.000	0.975
	0.937				0.850				0.991				0.942				

Prepared by National Data & Surveying Services

S Associated Rd & Birch St

Peak Hour Turning Movement Count

ID: 18-01231-006
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

S Associated Rd — SOUTHBOUND

AM	8	27	51	0	18	AM
NOON	0	0	0	0	0	NOON
PM	6	18	10	0	55	PM

EASTBOUND — Birch St

AM	NOON	PM		
902	0	1571	⇦	
0	0	3	↶	0
2	0	9	↱	1
857	0	804	→	2
285	0	270	↴	0
AM	NOON	PM		

WESTBOUND — Birch St

PM	NOON	AM		
16	0	10	↰	0
1142	0	703	←	2
267	0	322	↰	2
0	0	0	↶	0
1137	0	1197	⇨	
PM	NOON	AM		

	0	1	1	0
	0	2	1	1

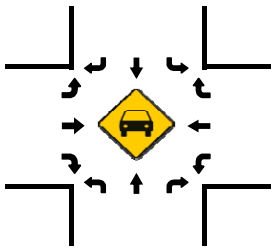
CONTROL: Signalized

TEV	2781 AM	0 NOON	3332 PM
PHF	0.91		0.98

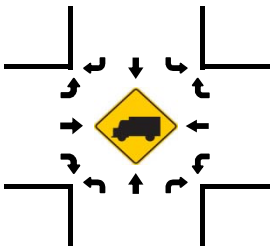
NORTHBOUND — S Associated Rd

PM	569	14	420	30	323	PM
NOON	0	0	0	0	0	NOON
AM	664	30	191	6	289	AM

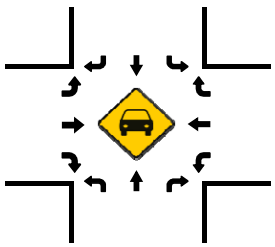
Total Vehicles (AM)



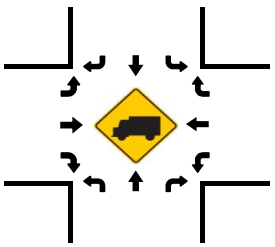
2axle (AM)



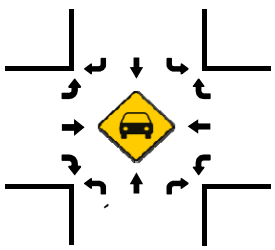
Total Vehicles (Noon)



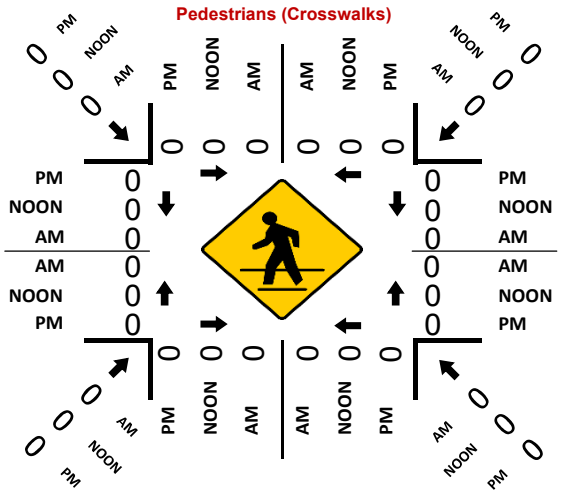
2axle (NOON)



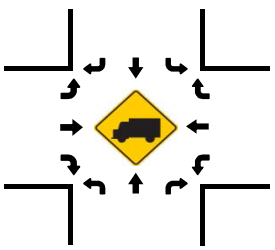
Total Vehicles (PM)



Pedestrians (Crosswalks)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: N Associated Rd & Birch St
City: Brea
Control: Signalized

Project ID: 18-01231-007
Date: 11/13/2018

Total

NS/EW Streets:	N Associated Rd				N Associated Rd				Birch St				Birch St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	3	0	0	0	23	2	72	0	22	183	3	0	1	92	11	0	412
7:15 AM	0	0	0	0	15	1	60	0	44	167	0	0	4	117	9	1	418
7:30 AM	1	1	0	0	22	0	108	0	85	201	1	0	1	140	28	0	588
7:45 AM	1	0	0	0	55	0	114	0	79	225	6	0	3	190	23	0	696
8:00 AM	1	2	2	0	31	2	101	0	55	203	3	0	3	181	13	0	597
8:15 AM	0	0	3	0	40	0	101	0	81	157	6	0	1	165	12	0	566
8:30 AM	0	0	1	0	19	0	67	0	15	123	5	0	1	132	14	0	377
8:45 AM	0	1	1	0	16	2	52	0	25	108	2	0	0	143	6	0	356
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	6	4	7	0	221	7	675	0	406	1367	26	0	14	1160	116	1	4010
APPROACH %'s :	35.29%	23.53%	41.18%	0.00%	24.47%	0.78%	74.75%	0.00%	22.57%	75.99%	1.45%	0.00%	1.08%	89.85%	8.99%	0.08%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	3	3	5	0	148	2	424	0	300	786	16	0	8	676	76	0	2447
PEAK HR FACTOR :	0.750	0.375	0.417	0.000	0.673	0.250	0.930	0.000	0.882	0.873	0.667	0.000	0.667	0.889	0.679	0.000	0.879
	0.550				0.849				0.889				0.880				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	3	0	4	0	20	1	61	0	51	174	0	0	1	202	22	0	539
4:15 PM	4	1	1	0	22	2	58	0	41	206	2	0	1	204	34	0	576
4:30 PM	1	2	5	0	24	1	66	0	54	190	5	0	2	271	38	0	659
4:45 PM	1	1	2	0	22	0	50	0	61	189	1	0	1	287	34	0	649
5:00 PM	5	0	3	0	25	1	67	0	63	204	2	0	2	329	30	0	731
5:15 PM	3	0	4	0	22	1	89	0	63	230	5	0	2	291	27	0	737
5:30 PM	3	1	1	0	24	1	61	0	70	216	3	0	0	271	32	0	683
5:45 PM	0	0	1	0	18	2	59	0	56	195	0	0	0	225	24	0	580
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	20	5	21	0	177	9	511	0	459	1604	18	0	9	2080	241	0	5154
APPROACH %'s :	43.48%	10.87%	45.65%	0.00%	25.39%	1.29%	73.31%	0.00%	22.06%	77.08%	0.86%	0.00%	0.39%	89.27%	10.34%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	12	2	10	0	93	3	267	0	257	839	11	0	5	1178	123	0	2800
PEAK HR FACTOR :	0.600	0.500	0.625	0.000	0.930	0.750	0.750	0.000	0.918	0.912	0.550	0.000	0.625	0.895	0.904	0.000	0.950
	0.750				0.810				0.929				0.904				

Prepared by National Data & Surveying Services

N Associated Rd & Birch St

Peak Hour Turning Movement Count

ID: 18-01231-007
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

N Associated Rd — SOUTHBOUND

AM	424	2	148	0	379	AM
NOON	0	0	0	0	0	NOON
PM	267	3	93	0	382	PM
	1	0.5	1.5	0		

EASTBOUND — Birch St

AM	NOON	PM		
1103	0	1457	⇦	
0	0	0	↶	0
300	0	257	↱	1
786	0	839	→	2
16	0	11	↳	0
AM	NOON	PM		

CONTROL

Signalized

TEV	2447 AM	0 NOON	2800 PM
PHF	0.88		0.95

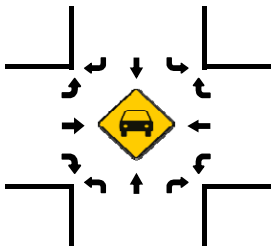
WESTBOUND — Birch St

PM	NOON	AM		
123	0	76	↰	1
1178	0	676	←	2
5	0	8	↰	1
0	0	0	↶	0
942	0	939	⇨	
PM	NOON	AM		

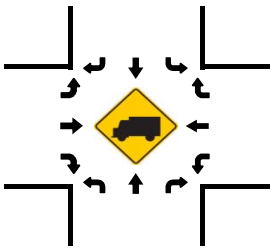
N Associated Rd — NORTHBOUND

PM	19	0	12	2	10	PM
NOON	0	0	0	0	0	NOON
AM	26	0	3	3	5	AM
		0	1	1	1	

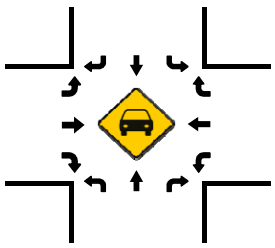
Total Vehicles (AM)



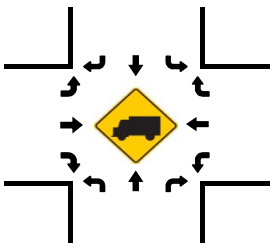
2axle (AM)



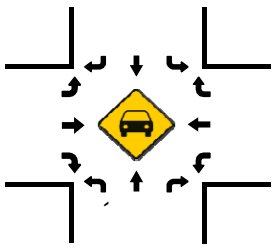
Total Vehicles (Noon)



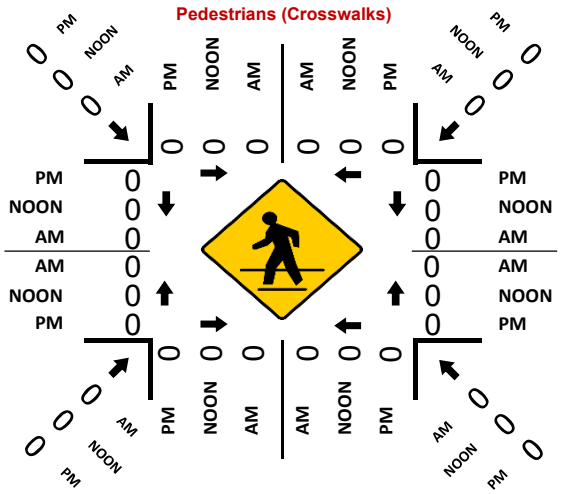
2axle (NOON)



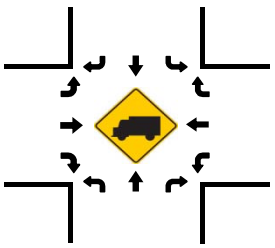
Total Vehicles (PM)



Pedestrians (Crosswalks)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: S Kraemer Blvd & E Birch St
City: Brea
Control: Signalized

Project ID: 19-01101-009
Date: 5/22/2019

Total

NS/EW Streets:	S Kraemer Blvd				S Kraemer Blvd				E Birch St				E Birch St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	3	0	0	2	3	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	8	25	10	0	66	238	30	0	3	121	52	0	5	44	22	0	624
7:15 AM	11	37	17	0	82	226	30	0	6	109	68	0	16	68	20	0	690
7:30 AM	28	34	20	0	118	252	41	0	6	152	87	0	9	74	31	0	852
7:45 AM	33	59	31	0	138	264	44	0	6	143	82	0	28	122	80	0	1030
8:00 AM	35	60	20	0	94	202	42	0	9	133	67	0	16	121	66	0	865
8:15 AM	31	52	16	0	69	221	41	0	14	95	92	0	6	86	28	0	751
8:30 AM	17	51	26	0	70	225	47	0	10	87	83	0	8	73	33	0	730
8:45 AM	19	47	14	0	66	203	37	0	13	96	70	0	14	59	32	0	670
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	182	365	154	0	703	1831	312	0	67	936	601	0	102	647	312	0	6212
APPROACH %'s :	25.96%	52.07%	21.97%	0.00%	24.70%	64.34%	10.96%	0.00%	4.18%	58.35%	37.47%	0.00%	9.61%	60.98%	29.41%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	127	205	87	0	419	939	168	0	35	523	328	0	59	403	205	0	3498
PEAK HR FACTOR :	0.907	0.854	0.702	0.000	0.759	0.889	0.955	0.000	0.625	0.860	0.891	0.000	0.527	0.826	0.641	0.000	0.849
	0.852				0.855				0.904				0.725				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	3	0	0	2	3	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	77	143	19	0	45	113	20	0	34	139	52	0	15	197	63	0	917
4:15 PM	75	141	19	0	58	124	20	0	32	108	58	0	13	135	39	1	823
4:30 PM	144	172	37	0	56	90	15	0	34	117	62	0	16	196	58	0	997
4:45 PM	109	165	27	0	43	69	29	0	41	167	59	1	13	138	62	0	923
5:00 PM	150	145	29	0	50	61	12	0	53	164	60	0	24	198	57	0	1003
5:15 PM	139	189	26	0	58	102	25	0	60	173	87	0	23	148	46	0	1076
5:30 PM	154	184	33	0	49	114	29	0	45	161	67	0	12	150	32	0	1030
5:45 PM	122	182	33	0	53	76	24	0	32	146	55	0	11	111	38	0	883
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	970	1321	223	0	412	749	174	0	331	1175	500	1	127	1273	395	1	7652
APPROACH %'s :	38.58%	52.55%	8.87%	0.00%	30.86%	56.10%	13.03%	0.00%	16.49%	58.55%	24.91%	0.05%	7.07%	70.88%	21.99%	0.06%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	552	683	115	0	200	346	95	0	199	665	273	1	72	634	197	0	4032
PEAK HR FACTOR :	0.896	0.903	0.871	0.000	0.862	0.759	0.819	0.000	0.829	0.961	0.784	0.250	0.750	0.801	0.794	0.000	0.937
	0.910				0.835				0.889				0.809				

Prepared by National Data & Surveying Services

S Kraemer Blvd & E Birch St

Peak Hour Turning Movement Count

ID: 19-01101-009
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

S Kraemer Blvd — SOUTHBOUND

AM	168	939	419	0	445	AM
NOON	0	0	0	0	0	NOON
PM	95	346	200	0	1079	PM
	0	3	2	0		

E Birch St — EASTBOUND

AM	NOON	PM		
698	0	1282		
0	0	1	0	
35	0	199	1	
523	0	665	2	
328	0	273	1	
AM	NOON	PM		

CONTROL

Signalized

TEV	3498 AM	0 NOON	4032 PM
PHF	0.85		0.94

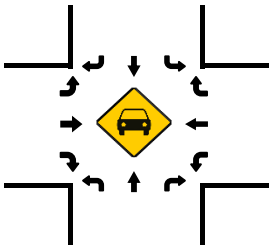
E Birch St — WESTBOUND

PM	NOON	AM		
197	0	205	1	
634	0	403	2	
72	0	59	1	
0	0	0	0	
980	0	1029		
PM	NOON	AM		

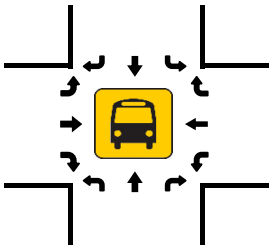
S Kraemer Blvd — NORTHBOUND

	0	2	3	0		
PM	691	0	552	683	115	PM
NOON	0	0	0	0	0	NOON
AM	1326	0	127	205	87	AM

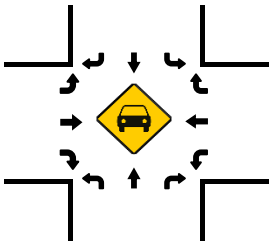
Total Vehicles (AM)



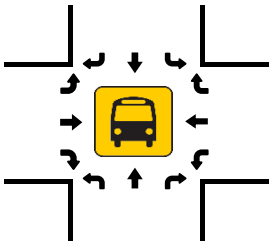
Total Vehicles (AM)



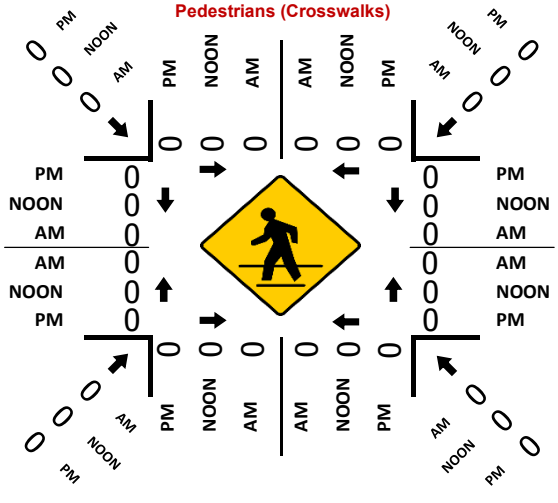
Total Vehicles (NOON)



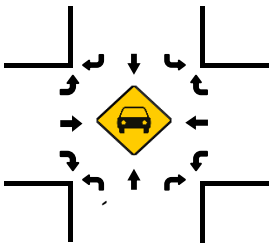
Total Vehicles (NOON)



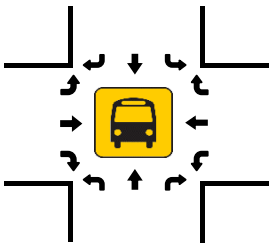
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Valencia Ave & Birch St/Rose Dr
City: Brea
Control: Signalized

Project ID: 18-01058-002
Date: 3/27/2018

Total

NS/EW Streets:	Valencia Ave				Valencia Ave				Birch St/Rose Dr				Birch St/Rose Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	2	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	11	29	2	0	196	185	25	0	6	86	20	0	4	55	63	0	682
7:15 AM	18	37	3	0	194	187	22	0	8	99	16	0	5	78	66	0	733
7:30 AM	33	43	5	0	178	204	79	0	14	110	25	0	1	85	66	0	843
7:45 AM	57	48	1	0	152	178	115	0	14	91	50	0	3	99	79	0	887
8:00 AM	16	62	4	2	173	164	20	0	22	106	35	0	3	68	85	0	760
8:15 AM	22	55	2	1	158	153	17	0	7	60	20	0	3	91	83	0	672
8:30 AM	19	48	3	0	164	156	13	0	2	67	12	0	4	55	80	0	623
8:45 AM	15	56	3	2	148	135	19	2	8	67	23	0	2	74	65	0	619
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	191	378	23	5	1363	1362	310	2	81	686	201	0	25	605	587	0	5819
APPROACH %'s :	31.99%	63.32%	3.85%	0.84%	44.88%	44.85%	10.21%	0.07%	8.37%	70.87%	20.76%	0.00%	2.05%	49.71%	48.23%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	124	190	13	2	697	733	236	0	58	406	126	0	12	330	296	0	3223
PEAK HR FACTOR :	0.544	0.766	0.650	0.250	0.898	0.898	0.513	0.000	0.659	0.923	0.630	0.000	0.600	0.833	0.871	0.000	0.908
	0.776				0.903				0.905				0.881				

NS/EW Streets:	Valencia Ave				Valencia Ave				Birch St/Rose Dr				Birch St/Rose Dr				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	2	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	23	129	2	0	98	57	5	0	35	103	21	0	3	77	179	0	732
4:15 PM	38	124	1	0	100	54	5	0	34	142	20	0	1	91	157	0	767
4:30 PM	48	125	4	0	86	46	8	0	44	131	32	0	3	103	151	0	781
4:45 PM	40	93	2	2	110	39	12	0	40	125	27	0	4	98	199	0	791
5:00 PM	46	159	2	0	99	66	10	0	43	148	32	0	0	85	178	0	868
5:15 PM	43	118	6	2	107	48	5	2	36	161	35	0	4	131	158	0	856
5:30 PM	37	102	9	0	91	43	14	0	37	129	25	0	6	95	141	0	729
5:45 PM	32	76	2	1	94	59	10	0	24	119	28	0	1	90	140	0	676
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	307	926	28	5	785	412	69	2	293	1058	220	0	22	770	1303	0	6200
APPROACH %'s :	24.25%	73.14%	2.21%	0.39%	61.91%	32.49%	5.44%	0.16%	18.65%	67.35%	14.00%	0.00%	1.05%	36.75%	62.20%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	177	495	14	4	402	199	35	2	163	565	126	0	11	417	686	0	3296
PEAK HR FACTOR :	0.922	0.778	0.583	0.500	0.914	0.754	0.729	0.250	0.926	0.877	0.900	0.000	0.688	0.796	0.862	0.000	0.949
	0.833				0.911				0.920				0.925				

Prepared by National Data & Surveying Services

Valencia Ave & Birch St/Rose Dr

Peak Hour Turning Movement Count

ID: 18-01058-002
City: Brea

Day: Tuesday
Date: 03/27/2018

PEAK HOURS	
AM	07:15 AM - 08:15 AM
NOON	NONE
PM	04:30 PM - 05:30 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

Valencia Ave — SOUTHBOUND

AM	236	733	697	0	544	AM
NOON	0	0	0	0	0	NOON
PM	35	199	402	2	1346	PM

EASTBOUND — Birch St/Rose Dr

AM	NOON	PM		
690	0	629	⇦	
0	0	0	↶	0
58	0	163	↱	2
406	0	565	→	2
126	0	126	↴	0
AM	NOON	PM		

WESTBOUND — Birch St/Rose Dr

PM	NOON	AM		
686	0	296	↰	1
417	0	330	←	2
11	0	12	↰	1
0	0	0	↶	0
981	0	1116	⇨	
PM	NOON	AM		

CONTROL

Signalized

TEV	3223 AM	0 NOON	3296 PM
PHF	0.91		0.95

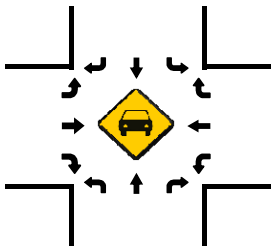
NORTHBOUND — Valencia Ave

PM	340	4	177	495	14	PM
NOON	0	0	0	0	0	NOON
AM	873	2	124	190	13	AM

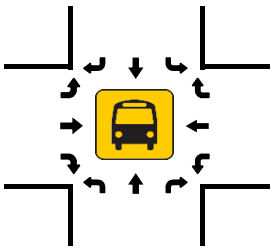
0 2 1 0 (EASTBOUND turning movements)

0 1 2 0 (NORTHBOUND turning movements)

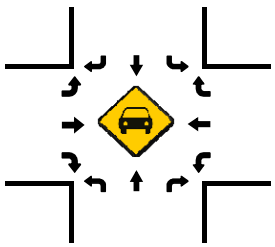
Total Vehicles (AM)



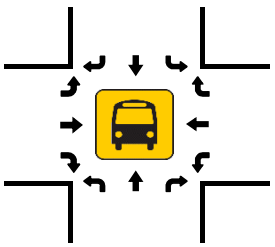
Total Vehicles (AM)



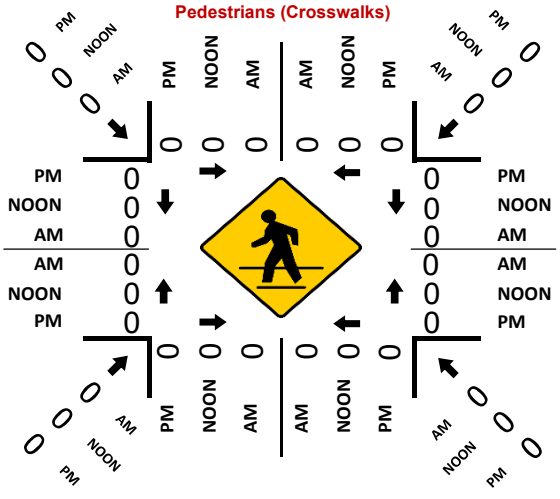
Total Vehicles (NOON)



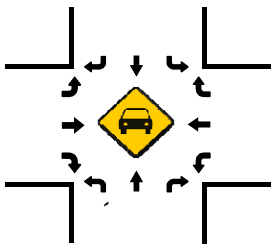
Total Vehicles (NOON)



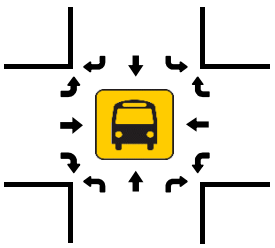
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Rose Dr & Vesuvius Dr
City: Brea
Control: Signalized

Project ID: 18-01231-008
Date: 11/13/2018

Total

NS/EW Streets:	Rose Dr				Rose Dr				Vesuvius Dr				Vesuvius Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	3	131	0	0	1	293	1	0	3	0	7	0	0	0	0	0	439
7:15 AM	0	141	0	0	0	313	1	0	2	0	5	0	0	0	0	0	462
7:30 AM	4	154	0	0	0	287	2	0	2	0	16	0	0	0	0	0	465
7:45 AM	5	160	0	0	0	297	4	0	4	0	6	0	0	0	0	0	476
8:00 AM	1	191	0	0	0	270	3	0	0	0	5	0	0	0	0	0	470
8:15 AM	2	170	0	0	0	273	1	0	1	0	5	0	0	0	0	0	452
8:30 AM	3	151	1	0	0	225	1	0	1	0	5	0	0	0	0	0	387
8:45 AM	0	158	1	0	0	240	0	0	2	0	6	0	0	0	0	0	407
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	18	1256	2	0	1	2198	13	0	15	0	55	0	0	0	0	0	3558
APPROACH %'s :	1.41%	98.43%	0.16%	0.00%	0.05%	99.37%	0.59%	0.00%	21.43%	0.00%	78.57%	0.00%					
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	10	646	0	0	0	1167	10	0	8	0	32	0	0	0	0	0	1873
PEAK HR FACTOR :	0.500	0.846	0.000	0.000	0.000	0.932	0.625	0.000	0.500	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.984
		0.854				0.937				0.556							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	8	217	0	0	0	227	3	0	3	0	3	0	0	0	0	0	461
4:15 PM	9	231	0	0	0	223	3	0	2	0	4	0	0	0	0	0	472
4:30 PM	4	241	0	0	0	265	6	0	0	0	4	0	0	0	0	0	520
4:45 PM	5	250	0	0	0	278	3	0	3	0	3	0	0	0	0	0	542
5:00 PM	8	243	0	0	0	256	4	0	1	0	7	0	0	0	0	0	519
5:15 PM	7	237	0	1	0	231	2	0	3	0	3	0	0	0	0	0	484
5:30 PM	6	230	1	0	0	256	3	0	3	0	9	0	0	0	0	0	508
5:45 PM	10	251	0	0	0	217	1	0	0	0	6	0	1	0	0	0	486
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	57	1900	1	1	0	1953	25	0	15	0	39	0	1	0	0	0	3992
APPROACH %'s :	2.91%	96.99%	0.05%	0.05%	0.00%	98.74%	1.26%	0.00%	27.78%	0.00%	72.22%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	24	971	0	1	0	1030	15	0	7	0	17	0	0	0	0	0	2065
PEAK HR FACTOR :	0.750	0.971	0.000	0.250	0.000	0.926	0.625	0.000	0.583	0.000	0.607	0.000	0.000	0.000	0.000	0.000	0.952
		0.976				0.930				0.750							

Prepared by National Data & Surveying Services

Rose Dr & Vesuvius Dr

Peak Hour Turning Movement Count

ID: 18-01231-008
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NONE	NONE
04:30 PM - 05:30 PM	04:00 PM - 06:00 PM

Rose Dr — SOUTHBOUND

AM	10	1167	0	0	654	AM
NOON	0	0	0	0	0	NOON
PM	15	1030	0	0	978	PM

EASTBOUND — Vesuvius Dr

AM	NOON	PM	
20	0	39	
0	0	0	0
8	0	7	0
0	0	0	1
32	0	17	0
AM	NOON	PM	

WESTBOUND — Vesuvius Dr

PM	NOON	AM	
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	
PM	NOON	AM	

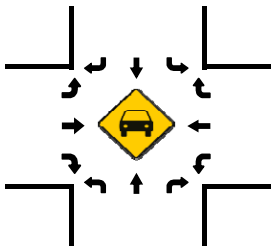
NORTHBOUND — Rose Dr

PM	1048	1	24	971	0	PM
NOON	0	0	0	0	0	NOON
AM	1199	0	10	646	0	AM

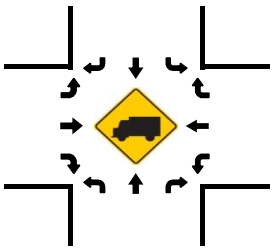
	1	1	0	0
	0	1	1	0

CONTROL			
Signalized			
TEV	1873	0	2065
	AM	NOON	PM
PHF	0.98		0.95

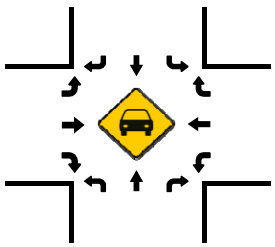
Total Vehicles (AM)



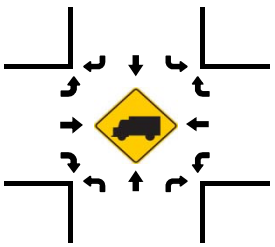
2axle (AM)



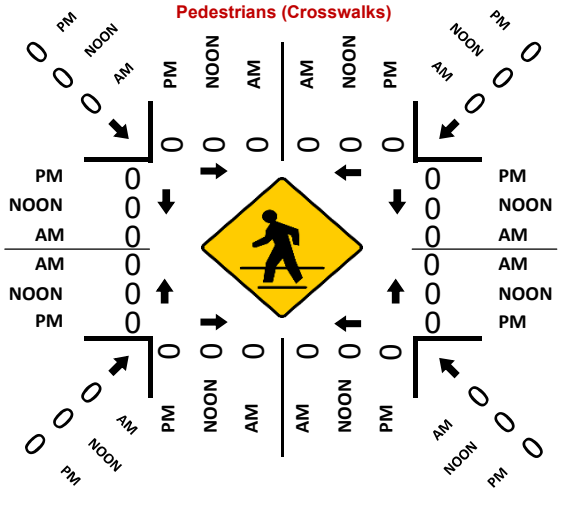
Total Vehicles (Noon)



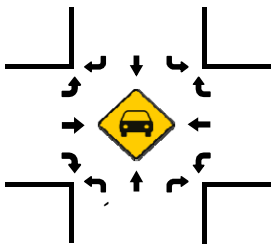
2axle (NOON)



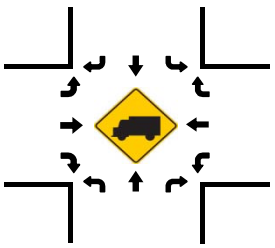
Pedestrians (Crosswalks)



Total Vehicles (PM)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR-57 SB Ramps & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 19-01101-015
Date: 5/22/2019

Total

NS/EW Streets:	SR-57 SB Ramps				SR-57 SB Ramps				Imperial Hwy				Imperial Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	1.5	0	0	3	1	0	0	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	145	0	89	0	0	316	142	0	0	305	30	0	1027
7:15 AM	0	0	0	0	145	0	107	0	0	343	138	0	0	363	35	0	1131
7:30 AM	0	0	0	0	164	0	115	0	0	367	158	0	0	417	43	0	1264
7:45 AM	0	0	0	0	123	0	128	0	0	312	155	0	0	391	35	0	1144
8:00 AM	0	0	0	0	115	0	86	0	0	317	156	0	0	387	58	0	1119
8:15 AM	0	0	0	0	102	0	83	0	0	328	162	0	0	328	47	0	1050
8:30 AM	0	0	0	0	89	0	80	0	0	326	130	0	0	332	64	0	1021
8:45 AM	0	0	0	0	102	0	99	0	0	284	105	0	0	394	61	0	1045
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	985	0	787	0	0	2593	1146	0	0	2917	373	0	8801
APPROACH %'s :					55.59%	0.00%	44.41%	0.00%	0.00%	69.35%	30.65%	0.00%	0.00%	88.66%	11.34%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	547	0	436	0	0	1339	607	0	0	1558	171	0	4658
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.834	0.000	0.852	0.000	0.000	0.912	0.960	0.000	0.000	0.934	0.737	0.000	0.921
					0.881				0.927				0.940				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	1.5	0	0	3	1	0	0	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	131	0	102	0	0	340	161	0	0	527	111	0	1372
4:15 PM	0	0	0	0	142	0	108	0	0	385	134	0	0	459	104	0	1332
4:30 PM	0	0	0	0	102	0	97	0	0	343	169	0	0	502	101	0	1314
4:45 PM	0	0	0	0	129	0	117	0	0	327	175	0	0	522	137	0	1407
5:00 PM	0	0	0	0	150	0	135	0	0	345	248	0	0	517	100	0	1495
5:15 PM	0	0	0	0	169	0	127	0	0	411	213	0	0	496	86	0	1502
5:30 PM	0	0	0	0	161	0	120	0	0	396	194	0	0	507	82	0	1460
5:45 PM	0	0	0	0	140	0	110	0	0	384	190	0	0	518	100	0	1442
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	1124	0	916	0	0	2931	1484	0	0	4048	821	0	11324
APPROACH %'s :					55.10%	0.00%	44.90%	0.00%	0.00%	66.39%	33.61%	0.00%	0.00%	83.14%	16.86%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	620	0	492	0	0	1536	845	0	0	2038	368	0	5899
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.917	0.000	0.911	0.000	0.000	0.934	0.852	0.000	0.000	0.984	0.920	0.000	0.982
					0.939				0.954				0.973				

Prepared by National Data & Surveying Services

SR-57 SB Ramps & Imperial Hwy

Peak Hour Turning Movement Count

ID: 19-01101-015
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

SR-57 SB Ramps — SOUTHBOUND

AM	436	0	547	0	171	AM
NOON	0	0	0	0	0	NOON
PM	492	0	620	0	368	PM
	1.5	0	1.5	0		

Imperial Hwy — EASTBOUND

AM	NOON	PM	
1994	0	2530	
0	0	0	0
0	0	0	0
1339	0	1536	3
607	0	845	1
AM	NOON	PM	

CONTROL

Signalized

TEV	4658	0	5899
	AM	NOON	PM
PHF	0.92		0.98

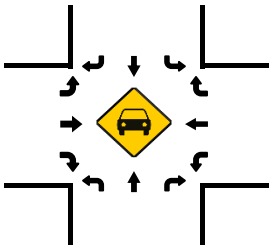
Imperial Hwy — WESTBOUND

PM	NOON	AM	
368	0	171	1
2038	0	1558	3
0	0	0	0
0	0	0	0
2156	0	1886	
PM	NOON	AM	

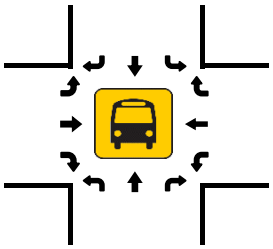
SR-57 SB Ramps — NORTHBOUND

	0	0	0	0		
PM	845	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	607	0	0	0	0	AM

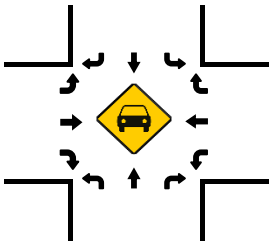
Total Vehicles (AM)



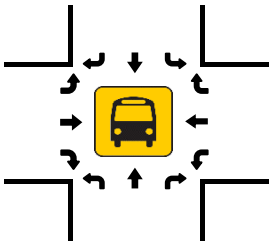
Total Vehicles (AM)



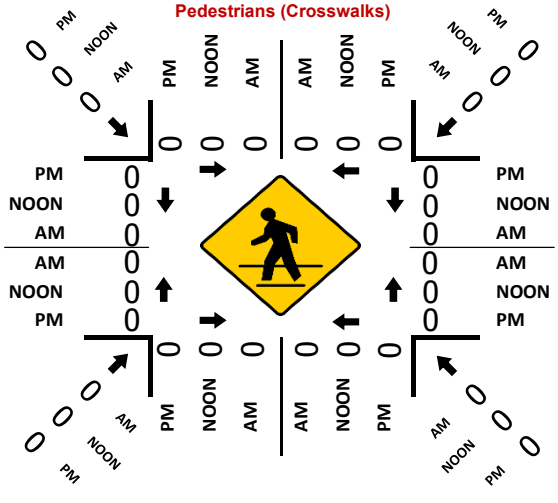
Total Vehicles (NOON)



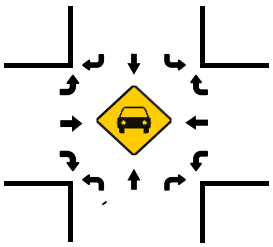
Total Vehicles (NOON)



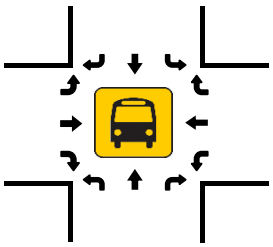
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR-57 NB Ramps & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 19-01101-016
Date: 5/22/2019

Total

NS/EW Streets:	SR-57 NB Ramps					SR-57 NB Ramps					Imperial Hwy					Imperial Hwy									
AM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					SOUTHBOUND2					
	2.3	0.3	1.3	0	0	0	0	2	0	0	1	3	1	0	0	0	4	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
7:00 AM	152	46	165	0	0	0	0	14	0	6	23	318	132	0	0	0	167	3	0	125	0	0	0	0	0	1151
7:15 AM	207	50	192	0	0	0	0	16	0	17	29	312	133	0	0	0	177	2	0	105	0	0	0	0	0	1240
7:30 AM	245	50	173	0	0	0	0	12	0	9	34	366	133	0	0	0	203	3	0	119	0	0	0	0	0	1347
7:45 AM	174	43	204	0	1	0	0	12	0	7	65	264	122	0	0	0	240	1	0	111	0	0	0	0	0	1244
8:00 AM	160	24	177	0	0	0	0	12	0	5	24	275	117	0	0	0	253	0	0	120	0	0	0	0	0	1167
8:15 AM	187	24	187	0	1	0	0	12	0	13	15	302	109	0	0	0	200	3	0	124	0	0	0	0	0	1177
8:30 AM	171	34	212	0	1	0	0	18	0	5	29	274	116	0	0	0	203	3	0	108	0	0	0	0	0	1174
8:45 AM	223	28	203	0	0	0	0	15	0	9	39	242	97	0	0	0	226	4	0	93	0	0	0	0	0	1179
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	1519	299	1513	0	3	0	0	111	0	71	258	2353	959	0	0	0	1669	19	0	905	0	0	0	0	0	9679
APPROACH %'s :	45.56%	8.97%	45.38%	0.00%	0.09%	0.00%	0.00%	60.99%	0.00%	39.01%	7.23%	65.91%	26.86%	0.00%	0.00%	0.00%	64.37%	0.73%	0.00%	34.90%						
PEAK HR :	07:15 AM - 08:15 AM																									TOTAL
PEAK HR VOL :	786	167	746	0	1	0	0	52	0	38	152	1217	505	0	0	0	873	6	0	455	0	0	0	0	0	4998
PEAK HR FACTOR :	0.802	0.835	0.914	0.000	0.250	0.000	0.000	0.813	0.000	0.559	0.585	0.831	0.949	0.000	0.000	0.000	0.863	0.500	0.000	0.948	0.000	0.000	0.000	0.000	0.000	0.928
			0.908					0.682					0.879					0.894								

PM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					SOUTHBOUND2					
	2.3	0.3	1.3	0	0	0	0	2	0	0	1	3	1	0	0	0	4	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
4:00 PM	258	15	128	0	1	0	0	51	0	8	38	392	44	0	0	0	327	9	0	88	0	0	0	0	0	1359
4:15 PM	195	12	112	0	2	0	0	30	0	14	37	417	70	0	0	0	345	14	0	133	0	0	0	0	0	1381
4:30 PM	188	21	117	0	1	0	0	39	0	13	48	358	63	0	0	0	371	6	0	149	0	0	0	0	0	1374
4:45 PM	215	26	120	0	3	0	0	51	0	17	45	327	55	0	0	0	393	11	0	174	0	0	0	0	0	1437
5:00 PM	200	6	125	0	6	0	0	51	0	15	40	394	79	0	0	0	366	8	0	176	0	0	0	0	0	1466
5:15 PM	205	15	84	0	6	0	0	37	0	18	43	425	99	0	0	0	332	12	0	201	0	0	0	0	0	1477
5:30 PM	208	16	82	0	4	0	0	59	0	10	47	422	80	0	0	0	347	8	0	180	0	0	0	0	0	1463
5:45 PM	200	22	98	0	2	0	0	41	0	13	52	396	80	0	0	0	360	15	0	181	0	0	0	0	0	1460
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	1669	133	866	0	25	0	0	359	0	108	350	3131	570	0	0	0	2841	83	0	1282	0	0	0	0	0	11417
APPROACH %'s :	61.98%	4.94%	32.16%	0.00%	0.93%	0.00%	0.00%	76.87%	0.00%	23.13%	8.64%	77.29%	14.07%	0.00%	0.00%	0.00%	67.55%	1.97%	0.00%	30.48%						
PEAK HR :	05:00 PM - 06:00 PM																									TOTAL
PEAK HR VOL :	813	59	389	0	18	0	0	188	0	56	182	1637	338	0	0	0	1405	43	0	738	0	0	0	0	0	5866
PEAK HR FACTOR :	0.977	0.670	0.778	0.000	0.750	0.000	0.000	0.797	0.000	0.778	0.875	0.963	0.854	0.000	0.000	0.000	0.960	0.717	0.000	0.918	0.000	0.000	0.000	0.000	0.000	0.993
			0.949					0.884					0.951					0.983								

Prepared by National Data & Surveying Services

SR-57 NB Ramps & Imperial Hwy

Peak Hour Turning Movement Count

ID: 19-01101-016
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

SR-57 NB Ramps — SOUTHBOUND

AM	52	0	0	0	325	AM
NOON	0	0	0	0	0	NOON
PM	188	0	0	0	284	PM

EASTBOUND — Imperial Hwy

AM	NOON	PM	
1711	0	2406	⇦
0	0	0	0 ↩
152	0	182	1 ↱
1217	0	1637	3 →
505	0	338	1 ↳

WESTBOUND — Imperial Hwy

PM	NOON	AM	
43	0	6	0 ↪
1405	0	873	4 ←
0	0	0	0 ↰
0	0	0	0 ↩
2026	0	1963	⇨

CONTROL

Signalized

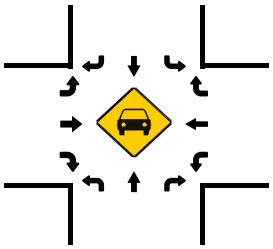
TEV	4504	0	5054
	AM	NOON	PM
PHF	0.93		0.99

NORTHBOUND — SR-57 NB Ramps

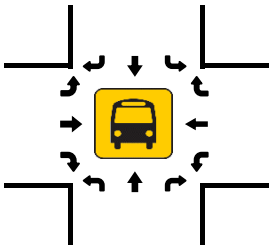
		0	2.3	0.3	1.3	
PM	338	0	813	59	389	PM
NOON	0	0	0	0	0	NOON
AM	505	0	786	167	746	AM

2 0 0 0

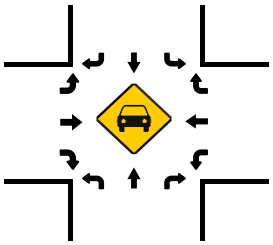
Total Vehicles (AM)



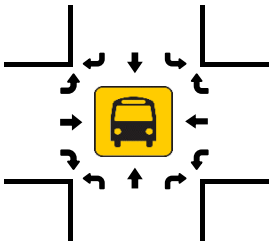
Total Vehicles (AM)



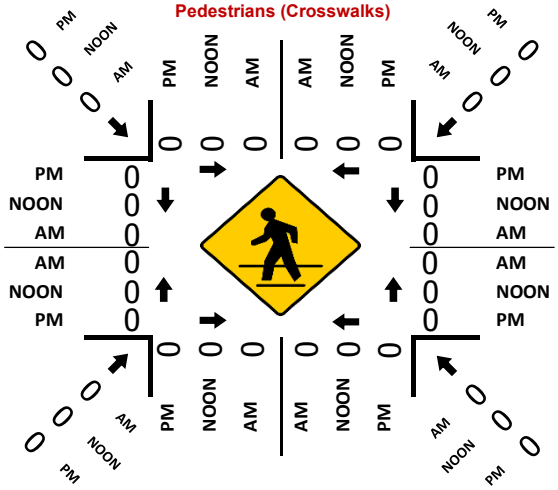
Total Vehicles (NOON)



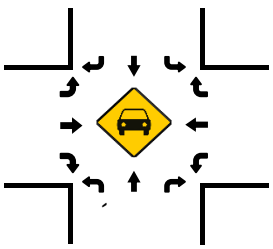
Total Vehicles (NOON)



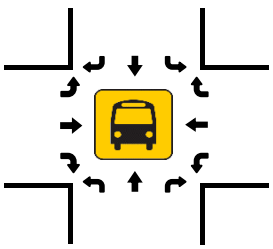
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Associated Rd & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 18-01231-009
Date: 11/13/2018

Total

NS/EW Streets:	Associated Rd				Associated Rd				Imperial Hwy				Imperial Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	0	0	2	1	1	0	1	3	0	0	1	4	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	34	29	10	0	27	78	24	0	35	385	21	0	15	278	10	0	946
7:15 AM	50	32	12	0	32	65	26	0	37	376	32	1	23	297	10	0	993
7:30 AM	33	44	13	0	24	86	37	0	32	386	27	1	20	347	17	0	1067
7:45 AM	28	62	21	0	29	66	31	0	38	464	29	0	12	388	22	0	1190
8:00 AM	43	47	15	0	47	68	34	1	38	422	17	0	23	378	21	0	1154
8:15 AM	32	39	17	0	36	85	33	1	29	435	19	0	30	348	18	0	1122
8:30 AM	38	20	14	0	50	68	30	0	28	464	26	0	21	286	14	0	1059
8:45 AM	40	33	33	0	43	51	17	0	25	418	18	1	21	284	17	0	1001
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	298	306	135	0	288	567	232	2	262	3350	189	3	165	2606	129	0	8532
APPROACH %'s :	40.32%	41.41%	18.27%	0.00%	26.45%	52.07%	21.30%	0.18%	6.89%	88.07%	4.97%	0.08%	5.69%	89.86%	4.45%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	136	192	66	0	136	305	135	2	137	1707	92	1	85	1461	78	0	4533
PEAK HR FACTOR :	0.791	0.774	0.786	0.000	0.723	0.887	0.912	0.500	0.901	0.920	0.793	0.250	0.708	0.941	0.886	0.000	0.952
	0.887				0.932				0.912				0.962				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	0	0	2	1	1	0	1	3	0	0	1	4	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	36	48	23	0	60	60	44	1	47	389	32	1	33	392	29	0	1195
4:15 PM	50	57	24	0	49	76	58	1	49	415	35	0	32	378	39	0	1263
4:30 PM	48	56	16	0	55	67	37	0	45	406	22	0	29	412	46	1	1240
4:45 PM	52	41	17	0	75	97	69	0	55	410	31	0	37	362	55	0	1301
5:00 PM	52	56	21	1	73	87	52	0	56	383	29	1	38	346	36	0	1231
5:15 PM	55	67	20	0	60	63	48	0	65	431	34	0	45	422	33	0	1343
5:30 PM	39	76	20	0	62	76	37	0	56	424	34	0	42	420	34	0	1320
5:45 PM	50	48	21	1	63	62	42	0	62	433	41	1	32	383	41	0	1280
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	382	449	162	2	497	588	387	2	435	3291	258	3	288	3115	313	1	10173
APPROACH %'s :	38.39%	45.13%	16.28%	0.20%	33.72%	39.89%	26.26%	0.14%	10.91%	82.54%	6.47%	0.08%	7.75%	83.80%	8.42%	0.03%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	198	240	78	1	270	323	206	0	232	1648	128	1	162	1550	158	0	5195
PEAK HR FACTOR :	0.900	0.789	0.929	0.250	0.900	0.832	0.746	0.000	0.892	0.956	0.941	0.250	0.900	0.918	0.718	0.000	0.967
	0.910				0.829				0.948				0.935				

Prepared by National Data & Surveying Services

Associated Rd & Imperial Hwy

Peak Hour Turning Movement Count

ID: 18-01231-009
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS

AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS

AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

SOUTHBOUND — Associated Rd

AM	135	305	136	2	409	AM
NOON	0	0	0	0	0	NOON
PM	206	323	270	0	630	PM

EASTBOUND — Imperial Hwy

AM	NOON	PM		
1733	0	1955	⇦	
1	0	1	↶	0
137	0	232	↱	1
1707	0	1648	→	3
92	0	128	↳	0
AM	NOON	PM		

WESTBOUND — Imperial Hwy

PM	NOON	AM		
158	0	78	↰	0
1550	0	1461	←	4
162	0	85	↰	1
0	0	0	↰	0
1996	0	1909	⇨	
PM	NOON	AM		

NORTHBOUND — Associated Rd

PM	614	1	198	240	78	PM
NOON	0	0	0	0	0	NOON
AM	482	0	136	192	66	AM

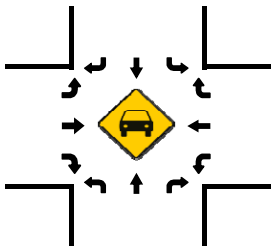
	1	1	2	0
	0	2	2	0

CONTROL

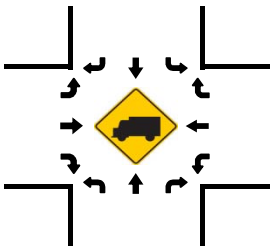
Signalized

TEV	4533 AM	0 NOON	5195 PM
PHF	0.95		0.97

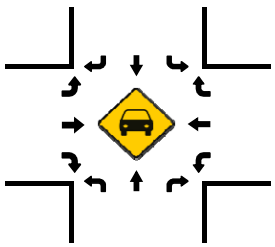
Total Vehicles (AM)



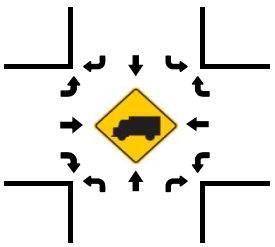
2axle (AM)



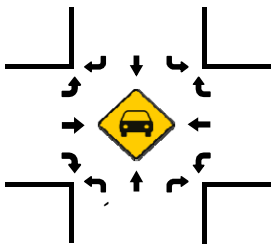
Total Vehicles (Noon)



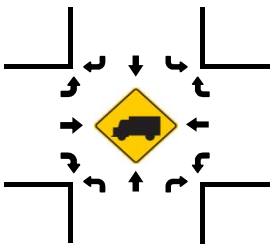
2axle (NOON)



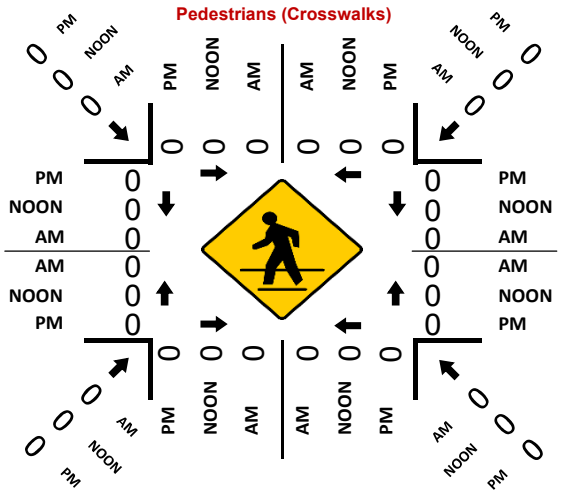
Total Vehicles (PM)



2axle (PM)



Pedestrians (Crosswalks)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Castlegate Ln/Placentia Ave & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 18-01231-010
Date: 11/13/2018

Total

NS/EW Streets:	Castlegate Ln/Placentia Ave				Castlegate Ln/Placentia Ave				Imperial Hwy				Imperial Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.5	0.5	1	0	1	1	0	0	1	3	1	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	27	1	19	0	6	1	0	0	0	363	55	0	21	289	5	0	787
7:15 AM	30	5	27	0	8	6	4	0	0	356	50	0	30	292	5	0	813
7:30 AM	49	5	40	0	4	2	5	0	1	362	85	0	34	312	1	0	900
7:45 AM	54	5	32	0	6	12	5	0	4	429	78	1	42	377	9	0	1054
8:00 AM	25	3	24	0	5	6	2	0	2	415	83	0	46	346	7	0	964
8:15 AM	42	1	30	0	4	5	3	0	2	392	77	0	26	338	9	0	929
8:30 AM	37	2	48	0	8	3	3	0	3	435	91	0	48	276	5	0	959
8:45 AM	34	1	32	0	8	5	3	0	2	424	72	0	32	292	7	1	913
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	298	23	252	0	49	40	25	0	14	3176	591	1	279	2522	48	1	7319
APPROACH %'s :	52.01%	4.01%	43.98%	0.00%	42.98%	35.09%	21.93%	0.00%	0.37%	83.98%	15.63%	0.03%	9.79%	88.49%	1.68%	0.04%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	158	11	134	0	23	26	13	0	11	1671	329	1	162	1337	30	0	3906
PEAK HR FACTOR :	0.731	0.550	0.698	0.000	0.719	0.542	0.650	0.000	0.688	0.960	0.904	0.250	0.844	0.887	0.833	0.000	0.926
	0.832				0.674				0.951				0.893				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.5	0.5	1	0	1	1	0	0	1	3	1	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	41	6	35	0	8	6	2	0	3	409	61	1	40	425	12	2	1051
4:15 PM	50	8	54	0	6	3	5	0	3	421	47	0	40	433	7	1	1078
4:30 PM	66	9	56	0	2	3	2	0	5	411	54	0	48	447	7	0	1110
4:45 PM	47	4	55	0	8	12	2	0	7	425	59	0	48	405	9	0	1081
5:00 PM	49	11	63	0	7	3	5	0	3	398	65	0	56	417	14	4	1095
5:15 PM	56	20	72	0	6	3	4	0	2	429	77	0	53	444	22	4	1192
5:30 PM	41	7	54	0	5	2	2	0	4	421	77	0	38	414	15	1	1081
5:45 PM	44	10	41	0	7	4	2	0	0	445	56	2	48	404	13	1	1077
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	394	75	430	0	49	36	24	0	27	3359	496	3	371	3389	99	13	8765
APPROACH %'s :	43.83%	8.34%	47.83%	0.00%	44.95%	33.03%	22.02%	0.00%	0.69%	86.46%	12.77%	0.08%	9.58%	87.53%	2.56%	0.34%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	218	44	246	0	23	21	13	0	17	1663	255	0	205	1713	52	8	4478
PEAK HR FACTOR :	0.826	0.550	0.854	0.000	0.719	0.438	0.650	0.000	0.607	0.969	0.828	0.000	0.915	0.958	0.591	0.500	0.939
	0.858				0.648				0.952				0.946				

Prepared by National Data & Surveying Services

Castlegate Ln/Placentia Ave & Imperial Hwy

Peak Hour Turning Movement Count

ID: 18-01231-010
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS

AM	07:45 AM - 08:45 AM
NOON	NONE
PM	04:30 PM - 05:30 PM

COUNT PERIODS

AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

Castlegate Ln/Placentia Ave — SOUTHBOUND

AM	13	26	23	0	52	AM
NOON	0	0	0	0	0	NOON
PM	13	21	23	0	113	PM

EASTBOUND — Imperial Hwy

AM	NOON	PM		
1509	0	1944		
1	0	0	0	
11	0	17	1	
1671	0	1663	3	
329	0	255	1	
AM	NOON	PM		

WESTBOUND — Imperial Hwy

PM	NOON	AM	
52	0	30	0
1713	0	1337	3
205	0	162	1
8	0	0	0
1940	0	1828	
PM	NOON	AM	

CONTROL: Signalized

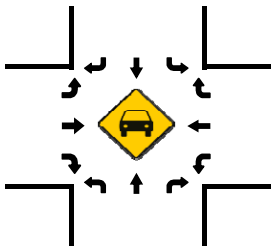
TEV	3906 AM	0 NOON	4478 PM
PHF	0.93		0.94

NORTHBOUND — Castlegate Ln/Placentia Ave

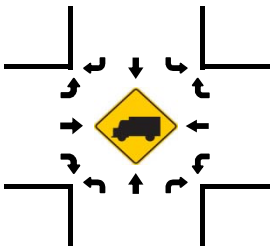
PM	481	0	218	44	246	PM
NOON	0	0	0	0	0	NOON
AM	517	0	158	11	134	AM

0 1 1 0 — 0 1.5 0.5 1

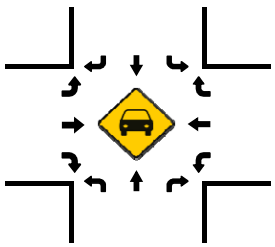
Total Vehicles (AM)



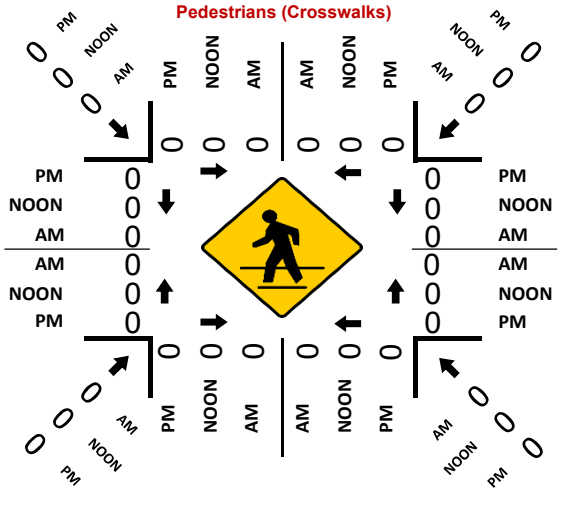
2axle (AM)



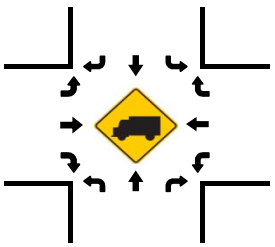
Total Vehicles (Noon)



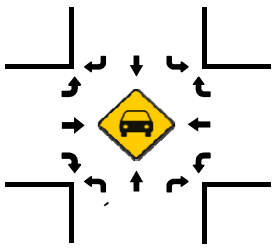
Pedestrians (Crosswalks)



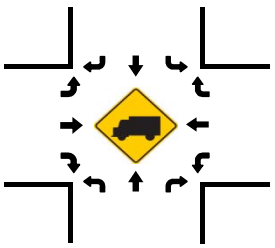
2axle (NOON)



Total Vehicles (PM)



2axle (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: N Kraemer Blvd & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 19-01101-017
Date: 5/22/2019

Total

NS/EW Streets:	N Kraemer Blvd				N Kraemer Blvd				Imperial Hwy				Imperial Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	0	0	2	2	1	0	2	3	0	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	32	45	9	0	64	125	20	0	33	298	49	0	10	176	18	0	879
7:15 AM	29	36	7	0	72	153	22	0	38	272	52	0	21	226	13	0	941
7:30 AM	33	41	11	0	80	177	19	0	30	289	47	0	14	205	20	0	966
7:45 AM	47	76	22	0	73	163	32	0	36	337	50	1	8	251	21	0	1117
8:00 AM	34	49	21	0	89	155	24	0	30	296	65	1	19	234	25	0	1042
8:15 AM	35	55	14	0	61	127	20	0	31	248	56	1	22	246	16	0	932
8:30 AM	44	46	22	0	79	151	27	0	23	283	52	2	17	232	20	0	998
8:45 AM	49	41	16	2	72	107	15	0	28	325	41	2	11	210	15	0	934
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	303	389	122	2	590	1158	179	0	249	2348	412	7	122	1780	148	0	7809
APPROACH %'s :	37.13%	47.67%	14.95%	0.25%	30.62%	60.09%	9.29%	0.00%	8.26%	77.85%	13.66%	0.23%	5.95%	86.83%	7.22%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	160	226	79	0	302	596	103	0	120	1164	223	5	66	963	82	0	4089
PEAK HR FACTOR :	0.851	0.743	0.898	0.000	0.848	0.914	0.805	0.000	0.833	0.864	0.858	0.625	0.750	0.959	0.820	0.000	0.915
	0.802				0.934				0.892				0.978				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	0	0	2	2	1	0	2	3	0	0	2	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	61	99	18	0	54	128	27	1	20	264	31	0	30	246	41	0	1020
4:15 PM	54	85	21	0	65	127	27	2	29	307	51	0	22	290	35	1	1116
4:30 PM	70	130	20	0	69	129	29	0	39	334	39	3	35	337	67	2	1303
4:45 PM	76	137	19	0	50	113	28	0	47	290	47	2	44	350	67	2	1272
5:00 PM	90	115	28	0	46	106	28	0	46	301	54	3	42	322	62	1	1244
5:15 PM	85	141	20	0	52	113	24	0	53	325	47	1	38	343	63	1	1306
5:30 PM	79	158	22	0	77	125	27	0	45	323	48	3	50	338	74	2	1371
5:45 PM	77	155	25	0	71	92	26	0	46	298	45	1	34	375	98	3	1346
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	592	1020	173	0	484	933	216	3	325	2442	362	13	295	2601	507	12	9978
APPROACH %'s :	33.17%	57.14%	9.69%	0.00%	29.58%	57.03%	13.20%	0.18%	10.34%	77.72%	11.52%	0.41%	8.64%	76.16%	14.85%	0.35%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	331	569	95	0	246	436	105	0	190	1247	194	8	164	1378	297	7	5267
PEAK HR FACTOR :	0.919	0.900	0.848	0.000	0.799	0.872	0.938	0.000	0.896	0.959	0.898	0.667	0.820	0.919	0.758	0.583	0.960
	0.960				0.859				0.962				0.905				

Prepared by National Data & Surveying Services

N Kraemer Blvd & Imperial Hwy

Peak Hour Turning Movement Count

ID: 19-01101-017
City: Brea

Day: Wednesday
Date: 05/22/2019

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

SOUTHBOUND (N Kraemer Blvd)

AM	103	596	302	0	428	AM
NOON	0	0	0	0	0	NOON
PM	105	436	246	0	1056	PM
	1	2	2	0		

EASTBOUND (Imperial Hwy)

AM	NOON	PM	
1231	0	1822	
5	0	8	0
120	0	190	2
1164	0	1247	3
223	0	194	0

WESTBOUND (Imperial Hwy)

PM	NOON	AM	
297	0	82	0
1378	0	963	3
164	0	66	2
7	0	0	0
1595	0	1545	

NORTHBOUND (N Kraemer Blvd)

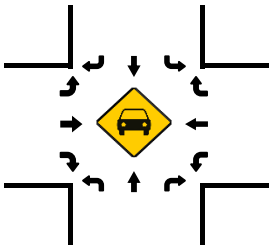
PM	794	0	331	569	95	PM
NOON	0	0	0	0	0	NOON
AM	885	0	160	226	79	AM
		0	2	2	0	

CONTROL

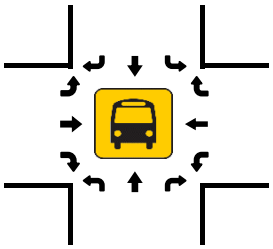
Signalized

TEV	4089 AM	0 NOON	5267 PM
PHF	0.92		0.96

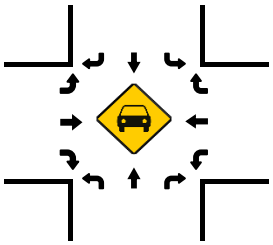
Total Vehicles (AM)



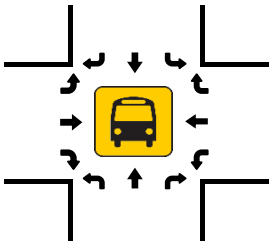
Total Vehicles (AM)



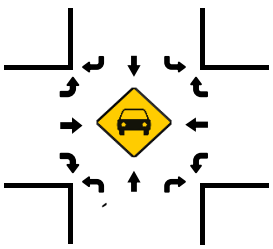
Total Vehicles (NOON)



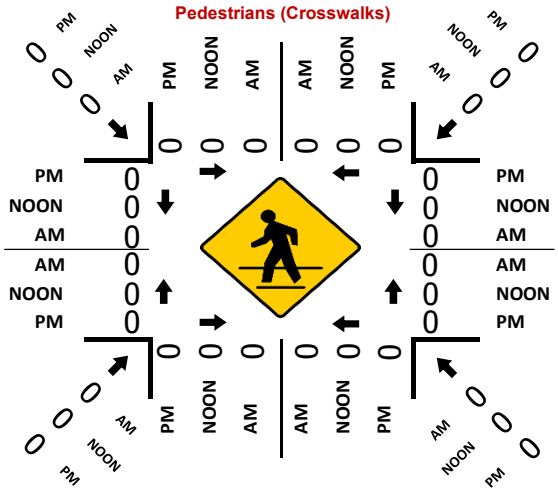
Total Vehicles (NOON)



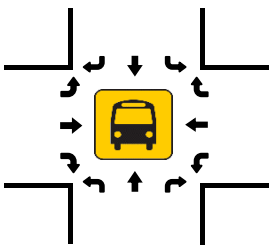
Total Vehicles (PM)



Pedestrians (Crosswalks)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Valencia Ave & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 18-01231-022
Date: 11/13/2018

Total

NS/EW Streets:	Valencia Ave				Valencia Ave				Imperial Hwy				Imperial Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	2	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	16	30	15	0	32	57	42	0	24	235	19	3	15	232	24	0	744
7:15 AM	34	20	15	0	51	54	39	0	28	236	13	2	20	298	36	2	848
7:30 AM	26	40	31	0	76	72	39	0	37	208	24	5	28	315	18	1	920
7:45 AM	30	47	40	0	66	60	43	0	48	250	16	7	22	383	37	5	1054
8:00 AM	28	41	21	0	63	53	57	0	34	246	22	2	16	340	30	0	953
8:15 AM	33	34	18	0	43	62	40	0	40	179	20	1	31	345	45	5	896
8:30 AM	17	19	22	0	40	45	40	0	48	246	21	5	27	288	25	3	846
8:45 AM	32	31	28	0	43	58	60	0	37	183	26	6	31	277	23	4	839
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	216	262	190	0	414	461	360	0	296	1783	161	31	190	2478	238	20	7100
APPROACH %'s :	32.34%	39.22%	28.44%	0.00%	33.52%	37.33%	29.15%	0.00%	13.03%	78.51%	7.09%	1.37%	6.49%	84.69%	8.13%	0.68%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	117	162	110	0	248	247	179	0	159	883	82	15	97	1383	130	11	3823
PEAK HR FACTOR :	0.886	0.862	0.688	0.000	0.816	0.858	0.785	0.000	0.828	0.883	0.854	0.536	0.782	0.903	0.722	0.550	0.907
	0.831				0.901				0.887				0.907				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	2	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	18	38	27	0	51	46	39	0	40	332	22	7	25	262	23	3	933
4:15 PM	15	43	22	0	48	31	27	0	48	370	29	3	21	267	34	2	960
4:30 PM	22	61	22	0	48	41	20	0	58	404	45	5	32	341	42	3	1144
4:45 PM	21	40	31	0	37	42	43	0	34	378	23	7	30	251	24	5	966
5:00 PM	28	57	39	0	58	59	28	0	50	404	45	6	30	279	24	4	1111
5:15 PM	29	62	25	0	47	42	27	0	43	404	17	7	46	298	25	3	1075
5:30 PM	22	45	35	0	51	50	22	0	50	365	24	7	30	269	36	4	1010
5:45 PM	13	39	26	0	25	27	19	0	42	365	23	2	27	279	26	2	915
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	168	385	227	0	365	338	225	0	365	3022	228	44	241	2246	234	26	8114
APPROACH %'s :	21.54%	49.36%	29.10%	0.00%	39.33%	36.42%	24.25%	0.00%	9.98%	82.59%	6.23%	1.20%	8.77%	81.76%	8.52%	0.95%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	100	220	117	0	190	184	118	0	185	1590	130	25	138	1169	115	15	4296
PEAK HR FACTOR :	0.862	0.887	0.750	0.000	0.819	0.780	0.686	0.000	0.797	0.984	0.722	0.893	0.750	0.857	0.685	0.750	0.939
	0.881				0.848				0.942				0.859				

Prepared by National Data & Surveying Services

Valencia Ave & Imperial Hwy

Peak Hour Turning Movement Count

ID: 18-01231-022
City: Brea

Day: Tuesday
Date: 11/13/2018

PEAK HOURS

AM: 07:30 AM - 08:30 AM
NOON: NONE
PM: 04:30 PM - 05:30 PM

COUNT PERIODS

AM: 07:00 AM - 09:00 AM
NOON: NONE
PM: 04:00 PM - 06:00 PM

SOUTHBOUND (Valencia Ave)

AM	179	247	248	0	451	AM
NOON	0	0	0	0	0	NOON
PM	118	184	190	0	520	PM

EASTBOUND (Imperial Hwy)

AM	NOON	PM		
1694	0	1412	⇦	
15	0	25	↶	0
159	0	185	↱	2
883	0	1590	→	3
82	0	130	↴	1
AM	NOON	PM		

WESTBOUND (Imperial Hwy)

PM	NOON	AM		
115	0	130	↰	1
1169	0	1383	←	3
138	0	97	↰	2
15	0	11	↶	0
1912	0	1252	⇨	
PM	NOON	AM		

NORTHBOUND (Valencia Ave)

PM	452	0	100	220	117	PM
NOON	0	0	0	0	0	NOON
AM	426	0	117	162	110	AM

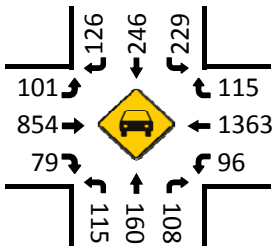
1	2	2	0	
0	2	2	1	

CONTROL

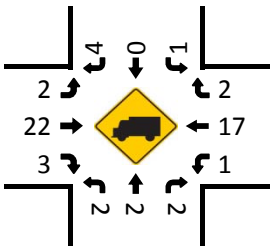
Signalized

TEV	3823 AM	0 NOON	4296 PM
PHF	0.91		0.94

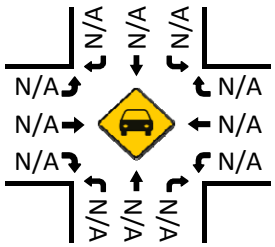
Cars (AM)



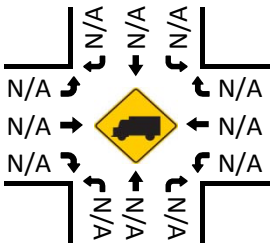
2axle (AM)



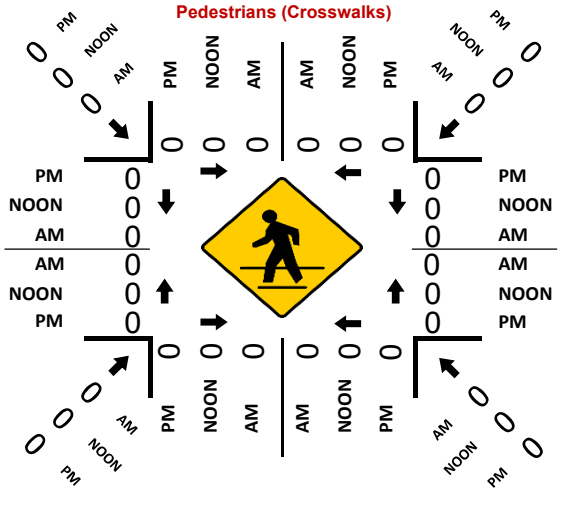
Cars (NOON)



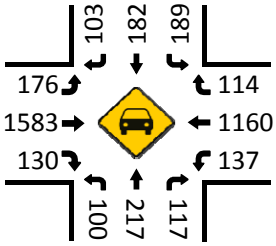
2axle (NOON)



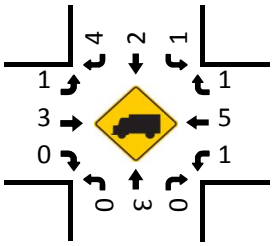
Pedestrians (Crosswalks)



Cars (PM)



2axle (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Rose Dr & Imperial Hwy
City: Brea
Control: Signalized

Project ID: 18-01058-004
Date: 3/27/2018

Total

NS/EW Streets:	Rose Dr				Rose Dr				Imperial Hwy				Imperial Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	2	1.5	0.5	0	1	3	0	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	31	38	16	0	158	112	4	0	7	254	45	0	26	214	95	2	1002
7:15 AM	43	33	22	0	208	131	7	0	5	237	48	0	28	242	106	0	1110
7:30 AM	53	44	36	0	192	104	5	0	9	269	50	0	92	314	126	1	1295
7:45 AM	65	58	40	0	204	110	5	0	4	301	52	0	58	316	116	1	1330
8:00 AM	47	36	26	0	192	105	5	0	9	264	56	2	42	337	132	2	1255
8:15 AM	62	38	27	0	164	112	4	0	6	240	54	2	42	290	112	1	1154
8:30 AM	41	38	23	0	160	80	8	0	3	231	36	0	28	273	120	1	1042
8:45 AM	50	46	23	0	163	91	6	0	10	185	49	2	46	272	100	3	1046
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	392	331	213	0	1441	845	44	0	53	1981	390	6	362	2258	907	11	9234
APPROACH %'s :	41.88%	35.36%	22.76%	0.00%	61.85%	36.27%	1.89%	0.00%	2.18%	81.52%	16.05%	0.25%	10.23%	63.82%	25.64%	0.31%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	227	176	129	0	752	431	19	0	28	1074	212	4	234	1257	486	5	5034
PEAK HR FACTOR :	0.873	0.759	0.806	0.000	0.922	0.962	0.950	0.000	0.778	0.892	0.946	0.500	0.636	0.932	0.920	0.625	0.946
	0.816				0.942				0.923				0.930				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	2	1.5	0.5	0	1	3	0	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	54	84	28	0	165	64	3	0	17	273	61	2	54	247	201	3	1256
4:15 PM	63	92	31	0	219	74	6	0	10	312	48	1	28	270	173	3	1330
4:30 PM	72	101	25	0	162	90	6	0	11	303	49	5	41	256	172	2	1295
4:45 PM	54	120	24	0	183	90	7	0	9	362	79	3	30	316	188	3	1468
5:00 PM	61	124	30	0	218	106	3	0	6	396	59	3	23	301	175	3	1508
5:15 PM	55	104	27	0	209	107	5	0	14	437	55	2	38	305	173	4	1535
5:30 PM	61	106	29	0	208	92	2	0	22	346	62	3	41	260	154	1	1387
5:45 PM	64	94	21	0	217	69	3	0	9	380	52	1	35	225	133	6	1309
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	484	825	215	0	1581	692	35	0	98	2809	465	20	290	2180	1369	25	11088
APPROACH %'s :	31.76%	54.13%	14.11%	0.00%	68.50%	29.98%	1.52%	0.00%	2.89%	82.81%	13.71%	0.59%	7.51%	56.42%	35.43%	0.65%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	231	454	110	0	818	395	17	0	51	1541	255	11	132	1182	690	11	5898
PEAK HR FACTOR :	0.947	0.915	0.917	0.000	0.938	0.923	0.607	0.000	0.580	0.882	0.807	0.917	0.805	0.935	0.918	0.688	0.961
	0.924				0.940				0.914				0.938				

Prepared by National Data & Surveying Services

Rose Dr & Imperial Hwy

Peak Hour Turning Movement Count

ID: 18-01058-004
City: Brea

Day: Tuesday
Date: 03/27/2018

PEAK HOURS

AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS

AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

Rose Dr — SOUTHBOUND

AM	19	431	752	0	690	AM
NOON	0	0	0	0	0	NOON
PM	17	395	818	0	1195	PM
	0.5	1.5	2	0		

Imperial Hwy — EASTBOUND

AM	NOON	PM		
1507	0	1441		
4	0	11	0	
28	0	51	1	
1074	0	1541	3	
212	0	255	0	
AM	NOON	PM		

CONTROL

Signalized

TEV	5034 AM	0 NOON	5898 PM
PHF	0.95		0.96

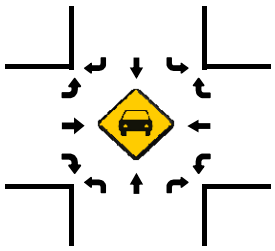
Imperial Hwy — WESTBOUND

PM	NOON	AM		
690	0	486	1	
1182	0	1257	3	
132	0	234	2	
11	0	5	0	
2480	0	1960		
PM	NOON	AM		

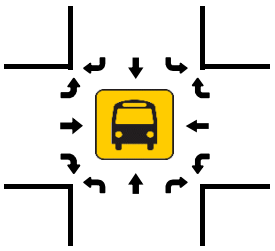
Rose Dr — NORTHBOUND

PM	782	0	231	454	110	PM
NOON	0	0	0	0	0	NOON
AM	877	0	227	176	129	AM
		0	2	2	1	

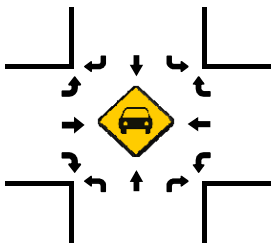
Total Vehicles (AM)



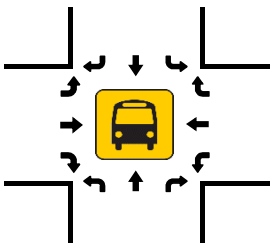
Total Vehicles (AM)



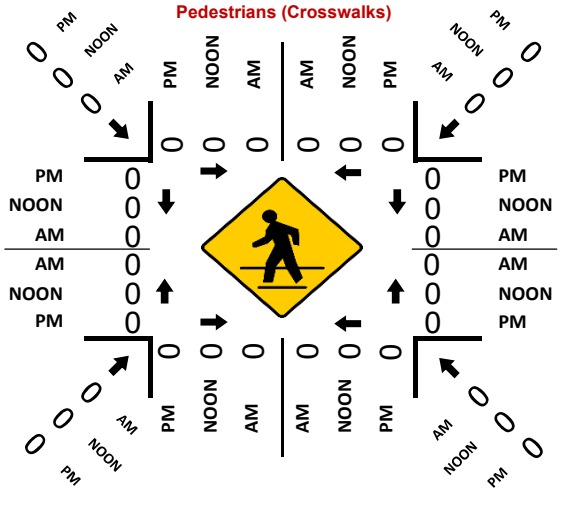
Total Vehicles (NOON)



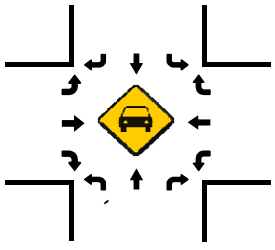
Total Vehicles (NOON)



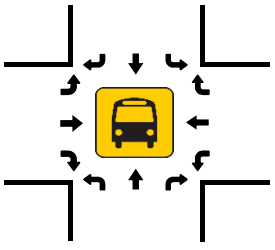
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



Transportation Studies, Inc
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City :Brea
N-S Direction :Redbay Ave
E-W Direction:Birch St

File Name : H2112007
Site Code : 00000000
Start Date : 12/8/2021
Page No : 1

Groups Printed- Turning Movements

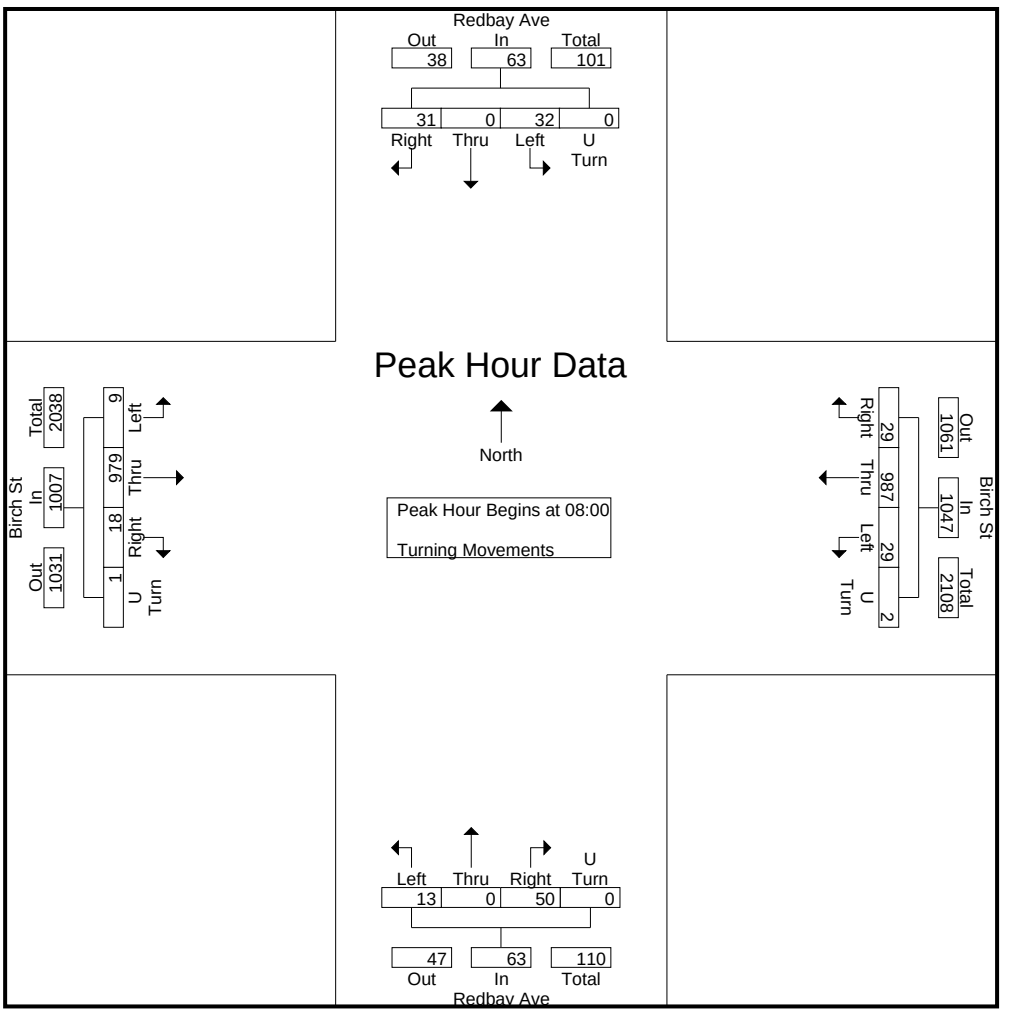
	Redbay Ave Southbound				Birch St Westbound				Redbay Ave Northbound				Birch St Eastbound				
Start Time	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Int. Total
07:00	11	0	9	0	2	88	3	0	2	0	4	0	0	110	1	0	230
07:15	5	0	4	0	1	126	0	0	3	0	1	0	2	143	1	0	286
07:30	12	0	2	0	3	141	2	0	0	0	7	0	0	176	1	0	344
07:45	10	0	2	0	4	219	1	0	3	0	9	0	0	200	3	0	451
Total	38	0	17	0	10	574	6	0	8	0	21	0	2	629	6	0	1311
08:00	13	0	6	0	4	243	4	1	11	0	2	0	5	273	2	0	564
08:15	6	0	8	0	3	296	9	1	18	0	6	0	2	221	3	1	574
08:30	6	0	11	0	13	204	11	0	8	0	2	0	7	219	2	0	483
08:45	6	0	7	0	9	244	5	0	13	0	3	0	4	266	2	0	559
Total	31	0	32	0	29	987	29	2	50	0	13	0	18	979	9	1	2180
16:00	7	0	2	0	5	253	8	1	6	0	2	0	11	301	10	0	606
16:15	7	0	4	0	12	325	3	1	10	0	4	0	6	308	1	0	681
16:30	3	0	3	0	11	288	5	0	7	0	3	0	7	292	12	0	631
16:45	7	0	5	0	9	329	2	1	6	0	3	0	4	321	11	0	698
Total	24	0	14	0	37	1195	18	3	29	0	12	0	28	1222	34	0	2616
17:00	13	0	1	0	6	363	3	2	5	0	8	0	11	305	9	0	726
17:15	4	0	4	0	10	343	2	0	9	0	7	0	10	335	12	1	737
17:30	8	0	5	0	13	335	4	0	7	0	2	0	13	329	13	0	729
17:45	6	0	3	0	12	305	7	1	8	0	6	0	9	306	12	0	675
Total	31	0	13	0	41	1346	16	3	29	0	23	0	43	1275	46	1	2867
Grand Total	124	0	76	0	117	4102	69	8	116	0	69	0	91	4105	95	2	8974
Apprch %	62	0	38	0	2.7	95.5	1.6	0.2	62.7	0	37.3	0	2.1	95.6	2.2	0	
Total %	1.4	0	0.8	0	1.3	45.7	0.8	0.1	1.3	0	0.8	0	1	45.7	1.1	0	

Transportation Studies, Inc
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City :Brea
N-S Direction :Redbay Ave
E-W Direction:Birch St

File Name : H2112007
Site Code : 00000000
Start Date : 12/8/2021
Page No : 2

	Redbay Ave Southbound					Birch St Westbound					Redbay Ave Northbound					Birch St Eastbound					
Start Time	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	**13**				**19**	4	243	4	**1**								**273**	2	0	**280**	564
08:15	6	0	8	0	14	3	**296**	9	1	**309**	**18**		**6**		**24**	2	221	**3**	**1**		**574**
08:30	6	0	**11**			**13**		**11**								**7**					
08:45	**6**	**0**	**7**	**0**	**13**	**9**	**244**	**5**	**0**	**258**	**13**	**0**	**3**	**0**	**16**	**4**	**266**	**2**	**0**	**272**	**559**
Total Volume	31	0	32	0	63	29	987	29	2	1047	50	0	13	0	63	18	979	9	1	1007	2180
% App. Total	49.2	0	50.8	0		2.8	94.3	2.8	0.2		79.4	0	20.6	0		1.8	97.2	0.9	0.1		
PHF	.596	.000	.727	.000	.829	.558	.834	.659	.500	.847	.694	.000	.542	.000	.656	.643	.897	.750	.250	.899	.949

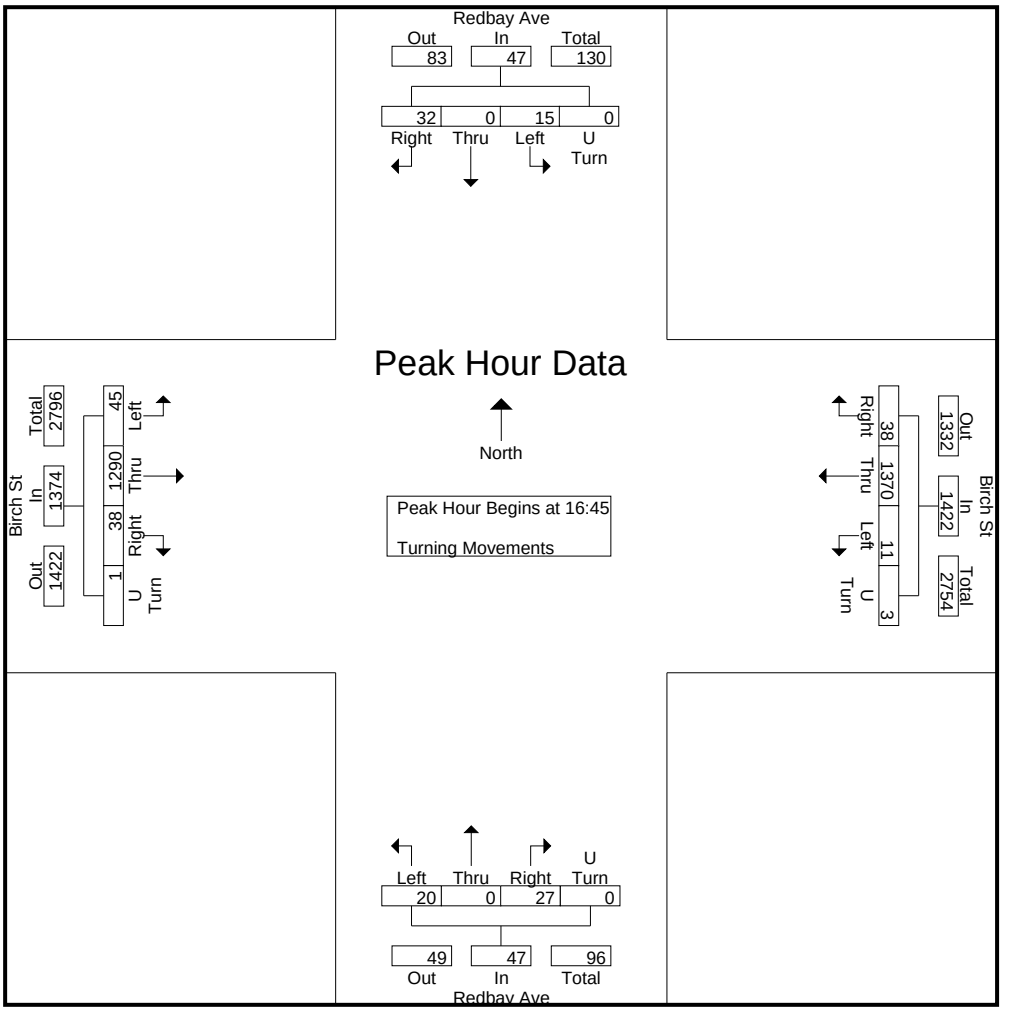


Transportation Studies, Inc
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City :Brea
N-S Direction :Redbay Ave
E-W Direction:Birch St

File Name : H2112007
Site Code : 00000000
Start Date : 12/8/2021
Page No : 3

	Redbay Ave Southbound					Birch St Westbound					Redbay Ave Northbound					Birch St Eastbound					
Start Time	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:45																					
16:45	7	0	**5**																		
17:00	**13**	**0**	**1**	**0**	**14**	6	**363**	3	**2**	**374**	5	0	**8**	**0**	**13**	**11**	**305**	**9**	**0**	**325**	**726**
17:15	**4**	**0**	**4**	**0**	**8**	**10**	**343**	**2**	**0**	**355**	**9**	**0**	**7**	**0**	**16**	10	**335**	12	**1**	**358**	**737**
17:30	8	0	5	0	13	**13**		**4**								**13**		**13**			
Total Volume	32	0	15	0	47	38	1370	11	3	1422	27	0	20	0	47	38	1290	45	1	1374	2890
% App. Total	68.1	0	31.9	0		2.7	96.3	0.8	0.2		57.4	0	42.6	0		2.8	93.9	3.3	0.1		
PHF	.615	.000	.750	.000	.839	.731	.944	.688	.375	.951	.750	.000	.625	.000	.734	.731	.963	.865	.250	.959	.980



Transportation Studies, Inc
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City :Brea
N-S Direction :Voyager Ave
E-W Direction:Birch St

File Name : H2112008
Site Code : 00000000
Start Date : 12/8/2021
Page No : 1

Groups Printed- Turning Movements

	Voyager Ave Southbound				Birch St Westbound				Voyager Ave Northbound				Birch St Eastbound				
Start Time	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Int. Total
07:00	3	0	1	0	9	73	3	0	3	0	4	0	13	62	7	0	178
07:15	5	0	2	0	11	85	6	0	2	0	3	0	8	97	14	0	233
07:30	29	0	18	0	51	78	8	0	4	0	10	0	28	137	34	0	397
07:45	50	2	47	0	55	122	10	1	3	22	3	0	22	162	37	0	536
Total	87	2	68	0	126	358	27	1	12	22	20	0	71	458	92	0	1344
08:00	6	0	6	0	6	121	5	0	7	0	10	0	14	112	7	0	294
08:15	3	0	0	0	3	106	4	0	5	0	2	0	2	104	0	0	229
08:30	2	0	1	0	0	100	2	0	2	0	7	0	6	99	1	0	220
08:45	3	0	0	0	4	86	3	0	1	0	2	0	8	104	4	0	215
Total	14	0	7	0	13	413	14	0	15	0	21	0	30	419	12	0	958
16:00	4	0	1	0	0	134	2	0	13	0	10	0	1	181	1	0	347
16:15	6	0	2	0	3	122	0	0	11	1	9	0	2	211	4	1	372
16:30	4	0	6	0	4	113	0	0	8	0	11	0	1	183	4	0	334
16:45	2	0	2	0	2	160	2	0	9	0	7	0	4	193	6	0	387
Total	16	0	11	0	9	529	4	0	41	1	37	0	8	768	15	1	1440
17:00	5	0	1	0	2	174	0	0	10	0	19	0	3	166	10	0	390
17:15	1	1	0	0	3	133	0	0	3	0	2	0	0	194	2	1	340
17:30	0	1	3	0	4	159	2	0	2	0	2	0	3	166	10	1	353
17:45	2	1	4	0	3	138	0	0	2	0	3	0	2	161	6	2	324
Total	8	3	8	0	12	604	2	0	17	0	26	0	8	687	28	4	1407
Grand Total	125	5	94	0	160	1904	47	1	85	23	104	0	117	2332	147	5	5149
Apprch %	55.8	2.2	42	0	7.6	90.2	2.2	0	40.1	10.8	49.1	0	4.5	89.7	5.7	0.2	
Total %	2.4	0.1	1.8	0	3.1	37	0.9	0	1.7	0.4	2	0	2.3	45.3	2.9	0.1	

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File Name : H2112008
Site Code : 00000000
Start Date : 12/8/2021
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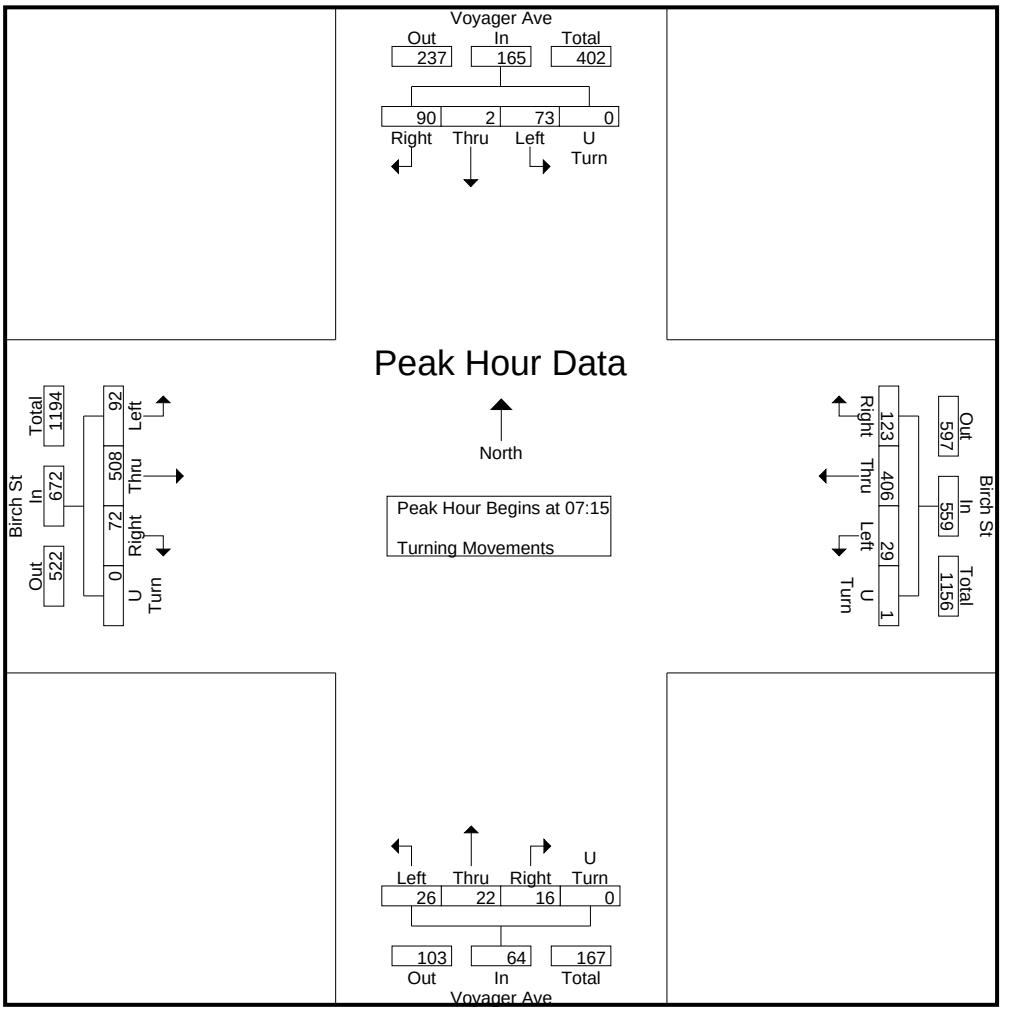
	Voyager Ave Southbound					Birch St Westbound					Voyager Ave Northbound					Birch St Eastbound					
Start Time	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	5	0	2	0	7	11	85	6	0	102	2	0	3	0	5	8	97	14	0	119	233
07:30	29	0	18	0	47	51	78	8	0	137	4	0	**10**			**28**					
07:45	**50**	**2**	**47**	**0**	**99**	**55**	**122**	**10**	**1**	**188**	3	**22**	3	0	**28**	22	**162**	**37**	**0**	**221**	**536**
08:00	6	0	6	0	12	6	121	5	0	132	**7**										
Total Volume	90	2	73	0	165	123	406	29	1	559	16	22	26	0	64	72	508	92	0	672	1460
% App. Total	54.5	1.2	44.2	0		22	72.6	5.2	0.2		25	34.4	40.6	0		10.7	75.6	13.7	0		
PHF	.450	.250	.388	.000	.417	.559	.832	.725	.250	.743	.571	.250	.650	.000	.571	.643	.784	.622	.000	.760	.681



Transportation Studies, Inc
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City :Brea
N-S Direction :Voyager Ave
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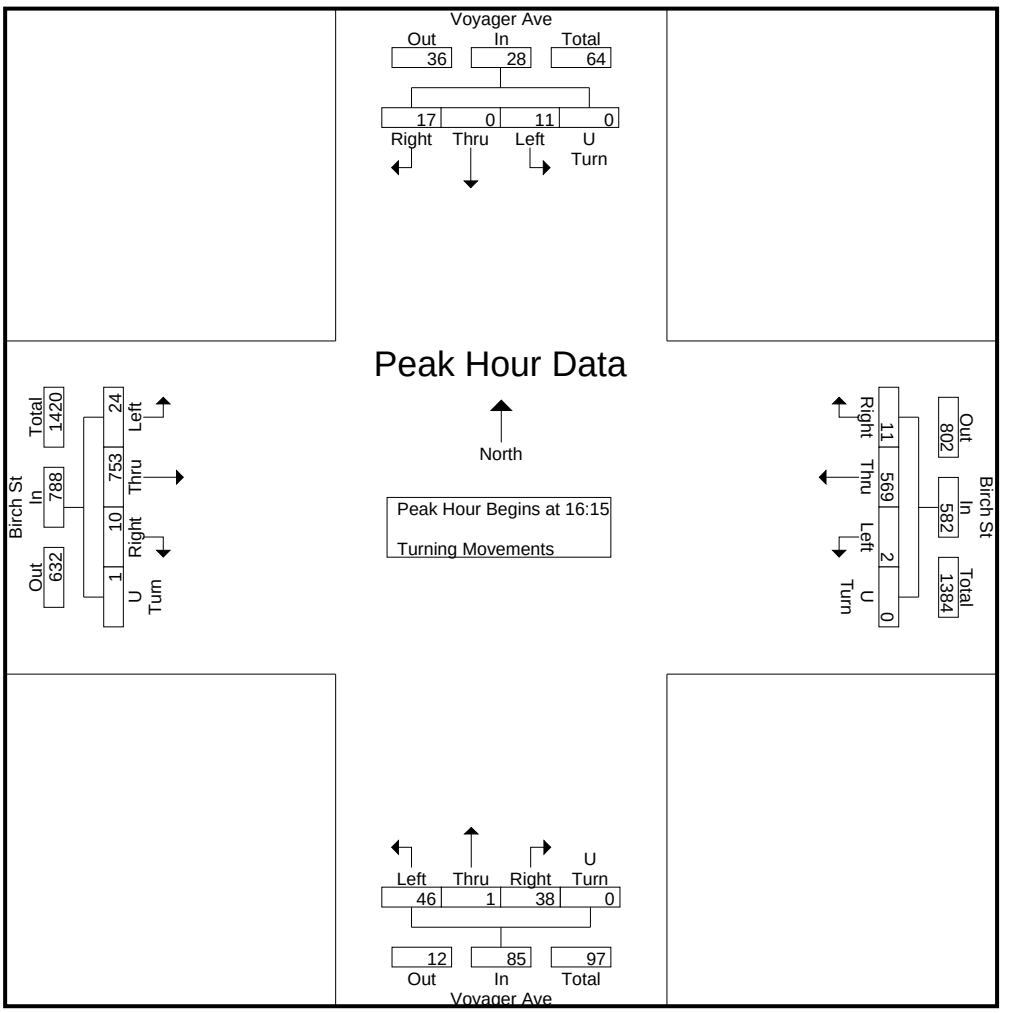
File Name : H2112008
Site Code : 00000000
Start Date : 12/8/2021
Page No : 3

	Voyager Ave Southbound					Birch St Westbound					Voyager Ave Northbound					Birch St Eastbound					
Start Time	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Right	Thru	Left	U Turn	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:15																					
16:15	**6**										**11**	**1**	9	0	21	2	**211**	4	**1**	**218**	372
16:30	4	0	**6**		**10**	**4**															
16:45	**2**	**0**	**2**	**0**	**4**	**2**	**160**	**2**	**0**	**164**	**9**	**0**	**7**	**0**	**16**	**4**	**193**	**6**	**0**	**203**	**387**
17:00	**5**	**0**	**1**	**0**	**6**	**2**	**174**	0	0	**176**	10	0	**19**	**0**	**29**	3	166	**10**	**0**	**179**	**390**
Total Volume	17	0	11	0	28	11	569	2	0	582	38	1	46	0	85	10	753	24	1	788	1483
% App. Total	60.7	0	39.3	0		1.9	97.8	0.3	0		44.7	1.2	54.1	0		1.3	95.6	3	0.1		
PHF	.708	.000	.458	.000	.700	.688	.818	.250	.000	.827	.864	.250	.605	.000	.733	.625	.892	.600	.250	.904	.951



APPENDIX B-II

EXISTING ROADWAY SEGMENT TRAFFIC COUNT DATA

Prepared by NDS/ATD

VOLUME

Lambert Rd E/O N State College Blvd

Day: Thursday
Date: 4/19/2018

City: Brea
Project #: CA18_1082_004

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,963	32,016	58,979

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			84		56		140		12:00			401		470		871	
00:15			34		40		74		12:15			377		406		783	
00:30			43		41		84		12:30			389		451		840	
00:45			31	192	39	176	70	368	12:45			418	1585	448	1775	866	3360
01:00			38		31		69		13:00			393		442		835	
01:15			20		22		42		13:15			506		479		985	
01:30			20		41		61		13:30			528		466		994	
01:45			21	99	26	120	47	219	13:45			462	1889	535	1922	997	3811
02:00			35		27		62		14:00			503		460		963	
02:15			9		29		38		14:15			451		479		930	
02:30			30		43		73		14:30			522		508		1030	
02:45			36	110	38	137	74	247	14:45			480	1956	581	2028	1061	3984
03:00			32		46		78		15:00			537		504		1041	
03:15			36		62		98		15:15			458		552		1010	
03:30			32		119		151		15:30			501		529		1030	
03:45			29	129	119	346	148	475	15:45			465	1961	597	2182	1062	4143
04:00			42		62		104		16:00			418		587		1005	
04:15			67		92		159		16:15			391		626		1017	
04:30			117		181		298		16:30			488		615		1103	
04:45			112	338	259	594	371	932	16:45			501	1798	661	2489	1162	4287
05:00			117		142		259		17:00			521		571		1092	
05:15			216		187		403		17:15			518		620		1138	
05:30			209		230		439		17:30			478		575		1053	
05:45			275	817	295	854	570	1671	17:45			455	1972	607	2373	1062	4345
06:00			263		269		532		18:00			497		528		1025	
06:15			338		312		650		18:15			468		547		1015	
06:30			401		383		784		18:30			479		496		975	
06:45			425	1427	550	1514	975	2941	18:45			375	1819	477	2048	852	3867
07:00			342		526		868		19:00			370		427		797	
07:15			371		550		921		19:15			365		376		741	
07:30			469		554		1023		19:30			299		346		645	
07:45			485	1667	659	2289	1144	3956	19:45			233	1267	332	1481	565	2748
08:00			455		565		1020		20:00			192		269		461	
08:15			389		482		871		20:15			229		279		508	
08:30			322		493		815		20:30			162		236		398	
08:45			395	1561	487	2027	882	3588	20:45			198	781	225	1009	423	1790
09:00			381		441		822		21:00			231		223		454	
09:15			305		469		774		21:15			216		245		461	
09:30			365		462		827		21:30			187		181		368	
09:45			336	1387	411	1783	747	3170	21:45			144	778	180	829	324	1607
10:00			299		404		703		22:00			151		176		327	
10:15			395		409		804		22:15			121		148		269	
10:30			348		370		718		22:30			113		133		246	
10:45			322	1364	367	1550	689	2914	22:45			78	463	122	579	200	1042
11:00			311		365		676		23:00			89		94		183	
11:15			292		423		715		23:15			45		64		109	
11:30			388		436		824		23:30			66		78		144	
11:45			358	1349	393	1617	751	2966	23:45			54	254	58	294	112	548
TOTALS				10440		13007		**23447**	**TOTALS**				16523		19009		**35532**
SPLIT %				44.5%		55.5%		**39.8%**	**SPLIT %**				46.5%		53.5%		**60.2%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,963	32,016	58,979

AM Peak Hour			07:30	07:15	**07:15**	**PM Peak Hour**			16:30	16:00	**16:30**
AM Pk Volume			1798	2328	**4108**	**PM Pk Volume**			2028	2489	**4495**
Pk Hr Factor			0.927	0.883	**0.898**	**Pk Hr Factor**			0.973	0.941	**0.967**
7 - 9 Volume	0	0	3228	4316	**7544**	**4 - 6 Volume**	0	0	3770	4862	**8632**
7 - 9 Peak Hour			07:30	07:15	**07:15**	**4 - 6 Peak Hour**			16:30	16:00	**16:30**
7 - 9 Pk Volume	0	0	1798	2328	**4108**	**4 - 6 Pk Volume**	0	0	2028	2489	**4495**
Pk Hr Factor	0.000	0.000	0.927	0.883	**0.898**	**Pk Hr Factor**	0.000	0.000	0.973	0.941	**0.967**

Prepared by NDS/ATD

VOLUME

Lambert Rd W/O Pointe Dr

Day: Tuesday
Date: 11/27/2018

City: Brea
Project #: CA18_1232_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	24,151	19,827	43,978

AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			27	15	42	12:00			235	303	538
00:15			25	9	34	12:15			222	301	523
00:30			16	9	25	12:30			250	270	520
00:45			20	88	10	43	30	131	12:45			262	969	265	1139	527	2108
01:00			16	11	27	13:00			291	299	590
01:15			15	6	21	13:15			309	258	567
01:30			10	6	16	13:30			352	354	706
01:45			20	61	2	25	22	86	13:45			374	1326	302	1213	676	2539
02:00			11	4	15	14:00			324	278	602
02:15			13	9	22	14:15			352	268	620
02:30			11	11	22	14:30			437	370	807
02:45			12	47	14	38	26	85	14:45			479	1592	447	1363	926	2955
03:00			8	8	16	15:00			496	340	836
03:15			12	8	20	15:15			409	341	750
03:30			13	17	30	15:30			403	403	806
03:45			20	53	20	53	40	106	15:45			412	1720	383	1467	795	3187
04:00			20	27	47	16:00			422	451	873
04:15			32	48	80	16:15			409	405	814
04:30			66	64	130	16:30			418	487	905
04:45			103	221	98	237	201	458	16:45			431	1680	439	1782	870	3462
05:00			73	120	193	17:00			473	439	912
05:15			99	161	260	17:15			519	309	828
05:30			143	210	353	17:30			550	419	969
05:45			257	572	207	698	464	1270	17:45			508	2050	341	1508	849	3558
06:00			237	207	444	18:00			441	370	811
06:15			288	214	502	18:15			403	368	771
06:30			507	220	727	18:30			407	274	681
06:45			548	1580	379	1020	927	2600	18:45			379	1630	243	1255	622	2885
07:00			469	299	768	19:00			331	245	576
07:15			510	304	814	19:15			298	170	468
07:30			577	349	926	19:30			251	176	427
07:45			636	2192	439	1391	1075	3583	19:45			226	1106	162	753	388	1859
08:00			608	441	1049	20:00			242	236	478
08:15			579	350	929	20:15			210	204	414
08:30			510	309	819	20:30			158	141	299
08:45			498	2195	317	1417	815	3612	20:45			157	767	123	704	280	1471
09:00			388	331	719	21:00			138	98	236
09:15			328	310	638	21:15			146	78	224
09:30			278	312	590	21:30			127	71	198
09:45			296	1290	276	1229	572	2519	21:45			105	516	67	314	172	830
10:00			224	285	509	22:00			96	63	159
10:15			240	214	454	22:15			100	40	140
10:30			248	189	437	22:30			77	35	112
10:45			262	974	230	918	492	1892	22:45			64	337	44	182	108	519
11:00			213	253	466	23:00			60	45	105
11:15			267	245	512	23:15			46	26	72
11:30			241	245	486	23:30			41	31	72
11:45			280	1001	205	948	485	1949	23:45			37	184	28	130	65	314
TOTALS				10274	8017	18291	TOTALS				13877	11810	25687
SPLIT %				56.2%	43.8%	41.6%	SPLIT %				54.0%	46.0%	58.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	24,151	19,827	43,978

AM Peak Hour			07:30	07:30	07:30	PM Peak Hour			17:00	16:00	16:45
AM Pk Volume			2400	1579	3979	PM Pk Volume			2050	1782	3579
Pk Hr Factor			0.943	0.895	0.925	Pk Hr Factor			0.932	0.915	0.923
7 - 9 Volume	0	0	4387	2808	7195	4 - 6 Volume	0	0	3730	3290	7020
7 - 9 Peak Hour			07:30	07:30	07:30	4 - 6 Peak Hour			17:00	16:00	16:45
7 - 9 Pk Volume	0	0	2400	1579	3979	4 - 6 Pk Volume	0	0	2050	1782	3579
Pk Hr Factor	0.000	0.000	0.943	0.895	0.925	Pk Hr Factor	0.000	0.000	0.932	0.915	0.923

Prepared by NDS/ATD

VOLUME

Lambert Rd E/O Associated Rd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	18,544	14,983	33,527

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			25		16		41		12:00			188		202		390	
00:15			22		8		30		12:15			226		174		400	
00:30			22		9		31		12:30			192		192		384	
00:45			17	86	7	40	24	126	12:45			190	796	190	758	380	1554
01:00			13		9		22		13:00			250		226		476	
01:15			6		6		12		13:15			222		182		404	
01:30			17		2		19		13:30			241		259		500	
01:45			8	44	1	18	9	62	13:45			211	924	190	857	401	1781
02:00			4		3		7		14:00			223		191		414	
02:15			8		10		18		14:15			232		226		458	
02:30			11		8		19		14:30			286		267		553	
02:45			3	26	13	34	16	60	14:45			350	1091	263	947	613	2038
03:00			9		5		14		15:00			327		214		541	
03:15			9		7		16		15:15			350		237		587	
03:30			10		14		24		15:30			361		246		607	
03:45			11	39	14	40	25	79	15:45			385	1423	250	947	635	2370
04:00			21		22		43		16:00			369		281		650	
04:15			34		37		71		16:15			361		263		624	
04:30			58		56		114		16:30			403		327		730	
04:45			89	202	89	204	178	406	16:45			403	1536	297	1168	700	2704
05:00			52		110		162		17:00			398		328		726	
05:15			74		171		245		17:15			401		259		660	
05:30			122		209		331		17:30			391		232		623	
05:45			198	446	198	688	396	1134	17:45			376	1566	231	1050	607	2616
06:00			154		203		357		18:00			375		264		639	
06:15			234		191		425		18:15			326		263		589	
06:30			329		220		549		18:30			360		207		567	
06:45			416	1133	293	907	709	2040	18:45			323	1384	174	908	497	2292
07:00			324		219		543		19:00			320		137		457	
07:15			391		271		662		19:15			251		124		375	
07:30			384		326		710		19:30			227		122		349	
07:45			426	1525	360	1176	786	2701	19:45			203	1001	95	478	298	1479
08:00			417		350		767		20:00			188		152		340	
08:15			377		325		702		20:15			161		166		327	
08:30			348		318		666		20:30			159		101		260	
08:45			339	1481	306	1299	645	2780	20:45			159	667	71	490	230	1157
09:00			301		252		553		21:00			139		71		210	
09:15			199		267		466		21:15			107		67		174	
09:30			189		267		456		21:30			88		47		135	
09:45			176	865	252	1038	428	1903	21:45			68	402	42	227	110	629
10:00			183		233		416		22:00			84		47		131	
10:15			179		181		360		22:15			58		35		93	
10:30			190		176		366		22:30			67		22		89	
10:45			180	732	173	763	353	1495	22:45			48	257	27	131	75	388
11:00			196		186		382		23:00			42		37		79	
11:15			179		189		368		23:15			35		19		54	
11:30			202		172		374		23:30			35		29		64	
11:45			207	784	163	710	370	1494	23:45			22	134	20	105	42	239
TOTALS				7363		6917		14280	TOTALS				11181		8066		19247
SPLIT %				51.6%		48.4%		42.6%	SPLIT %				58.1%		41.9%		57.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	18,544	14,983	33,527

AM Peak Hour			07:15	07:30	07:30	PM Peak Hour			16:30	16:15	16:30
AM Pk Volume			1618	1361	2965	PM Pk Volume			1605	1215	2816
Pk Hr Factor			0.950	0.945	0.943	Pk Hr Factor			0.996	0.926	0.964
7 - 9 Volume	0	0	3006	2475	5481	4 - 6 Volume	0	0	3102	2218	5320
7 - 9 Peak Hour			07:15	07:30	07:30	4 - 6 Peak Hour			16:30	16:15	16:30
7 - 9 Pk Volume	0	0	1618	1361	2965	4 - 6 Pk Volume	0	0	1605	1215	2816
Pk Hr Factor	0.000	0.000	0.950	0.945	0.943	Pk Hr Factor	0.000	0.000	0.996	0.926	0.964

Prepared by NDS/ATD

VOLUME

Lambert Rd W/O Santa Fe Rd/Kraemer Blvd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_003

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	18,802	14,273	33,075

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00					25		8		33		12:00					191		204		395	
00:15					20		2		22		12:15					227		175		402	
00:30					24		8		32		12:30					185		193		378	
00:45					15	84	9	27	24	111	12:45					183	786	181	753	364	1539
01:00					15		6		21		13:00					239		220		459	
01:15					6		6		12		13:15					220		178		398	
01:30					14		1		15		13:30					232		241		473	
01:45					10	45	1	14	11	59	13:45					218	909	188	827	406	1736
02:00					5		3		8		14:00					230		197		427	
02:15					9		9		18		14:15					224		205		429	
02:30					12		8		20		14:30					258		264		522	
02:45					4	30	13	33	17	63	14:45					329	1041	220	886	549	1927
03:00					8		5		13		15:00					320		216		536	
03:15					9		7		16		15:15					337		230		567	
03:30					11		14		25		15:30					383		242		625	
03:45					12	40	13	39	25	79	15:45					366	1406	243	931	609	2337
04:00					19		22		41		16:00					374		286		660	
04:15					35		35		70		16:15					346		271		617	
04:30					55		57		112		16:30					423		305		728	
04:45					99	208	80	194	179	402	16:45					417	1560	291	1153	708	2713
05:00					53		95		148		17:00					407		326		733	
05:15					81		152		233		17:15					398		243		641	
05:30					126		195		321		17:30					397		223		620	
05:45					208	468	173	615	381	1083	17:45					447	1649	230	1022	677	2671
06:00					164		185		349		18:00					390		249		639	
06:15					232		165		397		18:15					342		235		577	
06:30					326		213		539		18:30					398		201		599	
06:45					442	1164	267	830	709	1994	18:45					308	1438	176	861	484	2299
07:00					358		207		565		19:00					311		134		445	
07:15					417		249		666		19:15					273		113		386	
07:30					400		301		701		19:30					211		115		326	
07:45					412	1587	318	1075	730	2662	19:45					200	995	87	449	287	1444
08:00					462		340		802		20:00					185		163		348	
08:15					368		312		680		20:15					160		153		313	
08:30					368		283		651		20:30					146		101		247	
08:45					341	1539	287	1222	628	2761	20:45					159	650	66	483	225	1133
09:00					289		239		528		21:00					135		71		206	
09:15					212		268		480		21:15					124		79		203	
09:30					201		255		456		21:30					79		41		120	
09:45					184	886	225	987	409	1873	21:45					72	410	42	233	114	643
10:00					188		236		424		22:00					81		40		121	
10:15					175		171		346		22:15					59		37		96	
10:30					188		161		349		22:30					67		22		89	
10:45					187	738	171	739	358	1477	22:45					48	255	23	122	71	377
11:00					201		169		370		23:00					42		35		77	
11:15					182		187		369		23:15					29		19		48	
11:30					196		163		359		23:30					33		25		58	
11:45					208	787	162	681	370	1468	23:45					23	127	18	97	41	224
TOTALS						7576		6456		14032	TOTALS						11226		7817		19043
SPLIT %						54.0%		46.0%		42.4%	SPLIT %						59.0%		41.0%		57.6%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	18,802	14,273	33,075

AM Peak Hour			07:15	07:30	07:30	PM Peak Hour			17:00	16:15	16:30
AM Pk Volume			1691	1271	2913	PM Pk Volume			1649	1193	2810
Pk Hr Factor			0.915	0.935	0.908	Pk Hr Factor			0.922	0.915	0.958
7 - 9 Volume	0	0	3126	2297	5423	4 - 6 Volume	0	0	3209	2175	5384
7 - 9 Peak Hour			07:15	07:30	07:30	4 - 6 Peak Hour			17:00	16:15	16:30
7 - 9 Pk Volume	0	0	1691	1271	2913	4 - 6 Pk Volume	0	0	1649	1193	2810
Pk Hr Factor	0.000	0.000	0.915	0.935	0.908	Pk Hr Factor	0.000	0.000	0.922	0.915	0.958

Prepared by NDS/ATD

VOLUME

Lambert Rd E/O Kraemer Blvd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_004

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,682	8,969	19,651

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			17		6		23		12:00			92		97		189	
00:15			18		2		20		12:15			127		115		242	
00:30			14		2		16		12:30			113		126		239	
00:45			9	58	7	17	16	75	12:45			95	427	108	446	203	873
01:00			11		4		15		13:00			118		112		230	
01:15			3		4		7		13:15			124		107		231	
01:30			10		0		10		13:30			135		109		244	
01:45			5	29	0	8	5	37	13:45			139	516	97	425	236	941
02:00			1		2		3		14:00			136		115		251	
02:15			5		5		10		14:15			191		112		303	
02:30			6		4		10		14:30			194		110		304	
02:45			1	13	10	21	11	34	14:45			237	758	107	444	344	1202
03:00			5		6		11		15:00			233		106		339	
03:15			3		7		10		15:15			238		130		368	
03:30			5		10		15		15:30			295		108		403	
03:45			5	18	12	35	17	53	15:45			279	1045	124	468	403	1513
04:00			9		16		25		16:00			265		119		384	
04:15			15		29		44		16:15			269		160		429	
04:30			21		44		65		16:30			282		147		429	
04:45			27	72	51	140	78	212	16:45			284	1100	138	564	422	1664
05:00			23		75		98		17:00			229		120		349	
05:15			35		150		185		17:15			272		113		385	
05:30			65		186		251		17:30			251		107		358	
05:45			92	215	175	586	267	801	17:45			226	978	114	454	340	1432
06:00			65		174		239		18:00			250		132		382	
06:15			73		166		239		18:15			239		122		361	
06:30			128		190		318		18:30			235		92		327	
06:45			155	421	181	711	336	1132	18:45			210	934	87	433	297	1367
07:00			152		170		322		19:00			219		71		290	
07:15			167		202		369		19:15			199		57		256	
07:30			167		219		386		19:30			154		59		213	
07:45			160	646	227	818	387	1464	19:45			123	695	49	236	172	931
08:00			160		246		406		20:00			110		71		181	
08:15			155		232		387		20:15			101		61		162	
08:30			160		262		422		20:30			89		52		141	
08:45			137	612	242	982	379	1594	20:45			112	412	40	224	152	636
09:00			124		196		320		21:00			78		48		126	
09:15			101		205		306		21:15			70		43		113	
09:30			90		191		281		21:30			65		30		95	
09:45			89	404	182	774	271	1178	21:45			35	248	21	142	56	390
10:00			101		166		267		22:00			48		19		67	
10:15			81		116		197		22:15			34		20		54	
10:30			97		118		215		22:30			43		13		56	
10:45			102	381	111	511	213	892	22:45			27	152	11	63	38	215
11:00			106		110		216		23:00			27		19		46	
11:15			110		116		226		23:15			24		8		32	
11:30			119		92		211		23:30			21		8		29	
11:45			123	458	102	420	225	878	23:45			18	90	12	47	30	137
TOTALS				3327		5023		8350	TOTALS				7355		3946		11301
SPLIT %				39.8%		60.2%		42.5%	SPLIT %				65.1%		34.9%		57.5%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,682	8,969	19,651

AM Peak Hour			07:15	08:00	07:45	PM Peak Hour			15:30	16:15	16:00
AM Pk Volume			654	982	1602	PM Pk Volume			1108	565	1664
Pk Hr Factor			0.979	0.937	0.949	Pk Hr Factor			0.939	0.883	0.970
7 - 9 Volume	0	0	1258	1800	3058	4 - 6 Volume	0	0	2078	1018	3096
7 - 9 Peak Hour			07:15	08:00	07:45	4 - 6 Peak Hour			16:00	16:15	16:00
7 - 9 Pk Volume	0	0	654	982	1602	4 - 6 Pk Volume	0	0	1100	565	1664
Pk Hr Factor	0.000	0.000	0.979	0.937	0.949	Pk Hr Factor	0.000	0.000	0.968	0.883	0.970

Prepared by NDS/ATD

VOLUME

Lambert Rd W/O Valencia Ave

Day: Tuesday
Date: 11/27/2018

City: Brea
Project #: CA18_1232_005

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,535	8,710	19,245

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			17		3		20		12:00			91		122		213	
00:15			19		11		30		12:15			118		102		220	
00:30			14		7		21		12:30			118		91		209	
00:45			8	58	1	22	9	80	12:45			96	423	120	435	216	858
01:00			12		4		16		13:00			114		89		203	
01:15			3		4		7		13:15			120		103		223	
01:30			10		1		11		13:30			132		88		220	
01:45			5	30	3	12	8	42	13:45			131	497	122	402	253	899
02:00			3		3		6		14:00			127		123		250	
02:15			5		3		8		14:15			193		126		319	
02:30			6		7		13		14:30			189		113		302	
02:45			1	15	10	23	11	38	14:45			232	741	111	473	343	1214
03:00			5		3		8		15:00			225		123		348	
03:15			3		4		7		15:15			232		113		345	
03:30			5		5		10		15:30			282		131		413	
03:45			5	18	8	20	13	38	15:45			264	1003	127	494	391	1497
04:00			9		20		29		16:00			285		118		403	
04:15			15		37		52		16:15			261		149		410	
04:30			21		50		71		16:30			274		104		378	
04:45			26	71	48	155	74	226	16:45			278	1098	103	474	381	1572
05:00			24		74		98		17:00			230		127		357	
05:15			34		101		135		17:15			271		124		395	
05:30			65		161		226		17:30			251		123		374	
05:45			92	215	159	495	251	710	17:45			224	976	138	512	362	1488
06:00			65		166		231		18:00			242		124		366	
06:15			74		155		229		18:15			236		118		354	
06:30			124		154		278		18:30			236		104		340	
06:45			151	414	163	638	314	1052	18:45			208	922	76	422	284	1344
07:00			145		186		331		19:00			222		86		308	
07:15			176		200		376		19:15			201		70		271	
07:30			162		216		378		19:30			145		51		196	
07:45			156	639	223	825	379	1464	19:45			127	695	38	245	165	940
08:00			157		233		390		20:00			115		80		195	
08:15			153		256		409		20:15			100		54		154	
08:30			152		265		417		20:30			79		49		128	
08:45			143	605	219	973	362	1578	20:45			113	407	48	231	161	638
09:00			120		168		288		21:00			82		44		126	
09:15			97		192		289		21:15			70		50		120	
09:30			89		163		252		21:30			71		30		101	
09:45			89	395	148	671	237	1066	21:45			32	255	22	146	54	401
10:00			92		115		207		22:00			48		48		96	
10:15			81		112		193		22:15			32		28		60	
10:30			93		85		178		22:30			43		29		72	
10:45			101	367	129	441	230	808	22:45			25	148	9	114	34	262
11:00			110		116		226		23:00			27		7		34	
11:15			103		121		224		23:15			24		12		36	
11:30			111		104		215		23:30			21		7		28	
11:45			130	454	115	456	245	910	23:45			17	89	5	31	22	120
TOTALS				3281		4731		8012	TOTALS				7254		3979		11233
SPLIT %				41.0%		59.0%		41.6%	SPLIT %				64.6%		35.4%		58.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,535	8,710	19,245

AM Peak Hour			07:15	07:45	07:45	PM Peak Hour			16:00	15:30	15:30
AM Pk Volume			651	977	1595	PM Pk Volume			1098	525	1617
Pk Hr Factor			0.925	0.922	0.956	Pk Hr Factor			0.963	0.881	0.979
7 - 9 Volume	0	0	1244	1798	3042	4 - 6 Volume	0	0	2074	986	3060
7 - 9 Peak Hour			07:15	07:45	07:45	4 - 6 Peak Hour			16:00	17:00	16:00
7 - 9 Pk Volume	0	0	651	977	1595	4 - 6 Pk Volume	0	0	1098	512	1572
Pk Hr Factor	0.000	0.000	0.925	0.922	0.956	Pk Hr Factor	0.000	0.000	0.963	0.928	0.959

Prepared by NDS/ATD

VOLUME

Carbon Canyon Rd E/O Santa Fe Rd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_006

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,225	9,881	20,106

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			18		3		21		12:00			92		66		158	
00:15			19		5		24		12:15			87		88		175	
00:30			12		1		13		12:30			92		91		183	
00:45			6	55	6	15	12	70	12:45			92	363	81	326	173	689
01:00			13		3		16		13:00			129		74		203	
01:15			4		4		8		13:15			109		75		184	
01:30			11		2		13		13:30			124		69		193	
01:45			7	35	0	9	7	44	13:45			125	487	94	312	219	799
02:00			1		1		2		14:00			171		97		268	
02:15			4		4		8		14:15			236		64		300	
02:30			7		4		11		14:30			327		68		395	
02:45			1	13	8	17	9	30	14:45			339	1073	73	302	412	1375
03:00			7		6		13		15:00			323		68		391	
03:15			4		6		10		15:15			315		82		397	
03:30			2		13		15		15:30			408		71		479	
03:45			3	16	12	37	15	53	15:45			366	1412	70	291	436	1703
04:00			3		14		17		16:00			309		69		378	
04:15			3		32		35		16:15			306		81		387	
04:30			6		55		61		16:30			315		90		405	
04:45			5	17	73	174	78	191	16:45			299	1229	99	339	398	1568
05:00			5		107		112		17:00			322		64		386	
05:15			18		222		240		17:15			381		65		446	
05:30			19		277		296		17:30			359		81		440	
05:45			20	62	362	968	382	1030	17:45			344	1406	81	291	425	1697
06:00			16		330		346		18:00			251		62		313	
06:15			39		352		391		18:15			266		67		333	
06:30			41		360		401		18:30			259		49		308	
06:45			60	156	354	1396	414	1552	18:45			205	981	39	217	244	1198
07:00			46		365		411		19:00			256		41		297	
07:15			45		363		408		19:15			211		27		238	
07:30			56		366		422		19:30			175		31		206	
07:45			72	219	362	1456	434	1675	19:45			107	749	23	122	130	871
08:00			77		375		452		20:00			113		18		131	
08:15			84		380		464		20:15			114		23		137	
08:30			58		374		432		20:30			74		20		94	
08:45			53	272	373	1502	426	1774	20:45			91	392	23	84	114	476
09:00			65		251		316		21:00			68		28		96	
09:15			64		262		326		21:15			89		14		103	
09:30			50		238		288		21:30			66		16		82	
09:45			60	239	199	950	259	1189	21:45			38	261	13	71	51	332
10:00			58		165		223		22:00			43		10		53	
10:15			56		123		179		22:15			36		13		49	
10:30			60		130		190		22:30			45		10		55	
10:45			60	234	126	544	186	778	22:45			25	149	8	41	33	190
11:00			89		91		180		23:00			23		4		27	
11:15			91		106		197		23:15			23		5		28	
11:30			66		95		161		23:30			16		6		22	
11:45			82	328	103	395	185	723	23:45			15	77	7	22	22	99
TOTALS				1646		7463		9109	TOTALS				8579		2418		10997
SPLIT %				18.1%		81.9%		45.3%	SPLIT %				78.0%		22.0%		54.7%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,225	9,881	20,106

AM Peak Hour			11:45	08:00	07:45	PM Peak Hour			15:00	16:00	15:00
AM Pk Volume			353	1502	1782	PM Pk Volume			1412	339	1703
Pk Hr Factor			0.959	0.988	0.960	Pk Hr Factor			0.865	0.856	0.889
7 - 9 Volume	0	0	491	2958	3449	4 - 6 Volume	0	0	2635	630	3265
7 - 9 Peak Hour			07:45	08:00	07:45	4 - 6 Peak Hour			17:00	16:00	17:00
7 - 9 Pk Volume	0	0	291	1502	1782	4 - 6 Pk Volume	0	0	1406	339	1697
Pk Hr Factor	0.000	0.000	0.866	0.988	0.960	Pk Hr Factor	0.000	0.000	0.923	0.856	0.951

Prepared by NDS/ATD

VOLUME

Kraemer Blvd Bet. Lambert Rd & Birch St

Day: Tuesday
Date: 3/27/2018

City: Brea
Project #: CA18_1059_006

DAILY TOTALS	NB	SB	EB	WB	Total
	7,290	9,280	0	0	16,570

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	5		2						7		12:00	103		108						211	
00:15	5		3						8		12:15	100		117						217	
00:30	6		2						8		12:30	92		110						202	
00:45	5	21	4	11					9	32	12:45	97	392	109	444					206	836
01:00	2		4						6		13:00	91		123						214	
01:15	2		0						2		13:15	70		108						178	
01:30	3		3						6		13:30	123		122						245	
01:45	2	9	3	10					5	19	13:45	110	394	129	482					239	876
02:00	2		4						6		14:00	97		120						217	
02:15	4		2						6		14:15	142		113						255	
02:30	0		0						0		14:30	153		120						273	
02:45	2	8	5	11					7	19	14:45	128	520	138	491					266	1011
03:00	0		5						5		15:00	125		122						247	
03:15	2		1						3		15:15	154		123						277	
03:30	5		7						12		15:30	179		117						296	
03:45	2	9	10	23					12	32	15:45	195	653	159	521					354	1174
04:00	4		15						19		16:00	182		113						295	
04:15	3		8						11		16:15	192		142						334	
04:30	6		35						41		16:30	202		118						320	
04:45	18	31	52	110					70	141	16:45	236	812	173	546					409	1358
05:00	13		28						41		17:00	219		166						385	
05:15	10		51						61		17:15	223		206						429	
05:30	17		98						115		17:30	204		166						370	
05:45	15	55	145	322					160	377	17:45	182	828	152	690					334	1518
06:00	18		118						136		18:00	164		117						281	
06:15	32		161						193		18:15	186		117						303	
06:30	30		234						264		18:30	150		114						264	
06:45	63	143	241	754					304	897	18:45	130	630	98	446					228	1076
07:00	59		302						361		19:00	137		102						239	
07:15	62		257						319		19:15	122		66						188	
07:30	69		302						371		19:30	106		68						174	
07:45	117	307	266	1127					383	1434	19:45	111	476	81	317					192	793
08:00	95		234						329		20:00	88		57						145	
08:15	86		236						322		20:15	105		59						164	
08:30	78		205						283		20:30	60		50						110	
08:45	83	342	202	877					285	1219	20:45	77	330	46	212					123	542
09:00	78		182						260		21:00	51		42						93	
09:15	74		150						224		21:15	84		44						128	
09:30	66		119						185		21:30	44		33						77	
09:45	68	286	135	586					203	872	21:45	50	229	34	153					84	382
10:00	80		105						185		22:00	28		21						49	
10:15	86		120						206		22:15	20		17						37	
10:30	65		128						193		22:30	29		14						43	
10:45	99	330	137	490					236	820	22:45	14	91	12	64					26	155
11:00	92		125						217		23:00	19		10						29	
11:15	75		143						218		23:15	9		10						19	
11:30	100		138						238		23:30	12		9						21	
11:45	77	344	151	557					228	901	23:45	10	50	7	36					17	86
TOTALS		1885		4878						6763	TOTALS		5405		4402						9807
SPLIT %		27.9%		72.1%						40.8%	SPLIT %		55.1%		44.9%						59.2%

DAILY TOTALS	NB	SB	EB	WB	Total
	7,290	9,280	0	0	16,570

AM Peak Hour	11:30	07:00			07:00	PM Peak Hour	16:45	16:45			16:45
AM Pk Volume	380	1127			1434	PM Pk Volume	882	711			1593
Pk Hr Factor	0.922	0.933			0.936	Pk Hr Factor	0.934	0.863			0.928
7 - 9 Volume	649	2004	0	0	2653	4 - 6 Volume	1640	1236	0	0	2876
7 - 9 Peak Hour	07:45	07:00			07:00	4 - 6 Peak Hour	16:45	16:45			16:45
7 - 9 Pk Volume	376	1127	0	0	1434	4 - 6 Pk Volume	882	711	0	0	1593
Pk Hr Factor	0.803	0.933	0.000	0.000	0.936	Pk Hr Factor	0.934	0.863	0.000	0.000	0.928

Prepared by NDS/ATD

VOLUME

Valencia Ave Bet. Lambert Rd & Birch St

Day: Tuesday
Date: 3/27/2018

City: Brea
Project #: CA18_1059_001

DAILY TOTALS	NB	SB	EB	WB	Total
	12,160	12,600	0	0	24,760

AM Period	NB		SB		EB		WB		TOTAL	
00:00	11		11						22	
00:15	4		9						13	
00:30	10		4						14	
00:45	1	26	6	30					7	56
01:00	3		2						5	
01:15	6		6						12	
01:30	2		4						6	
01:45	4	15	4	16					8	31
02:00	0		3						3	
02:15	0		1						1	
02:30	3		2						5	
02:45	4	7	2	8					6	15
03:00	6		0						6	
03:15	5		7						12	
03:30	6		3						9	
03:45	4	21	9	19					13	40
04:00	9		6						15	
04:15	7		19						26	
04:30	8		28						36	
04:45	11	35	44	97					55	132
05:00	18		55						73	
05:15	14		85						99	
05:30	22		167						189	
05:45	27	81	256	563					283	644
06:00	174		270						444	
06:15	51		277						328	
06:30	74		415						489	
06:45	96	395	435	1397					531	1792
07:00	83		398						481	
07:15	104		413						517	
07:30	112		476						588	
07:45	142	441	455	1742					597	2183
08:00	164		319						483	
08:15	165		358						523	
08:30	155		350						505	
08:45	148	632	320	1347					468	1979
09:00	153		211						364	
09:15	167		236						403	
09:30	144		225						369	
09:45	134	598	198	870					332	1468
10:00	145		172						317	
10:15	149		191						340	
10:30	143		165						308	
10:45	143	580	190	718					333	1298
11:00	162		177						339	
11:15	178		171						349	
11:30	166		166						332	
11:45	141	647	196	710					337	1357
TOTALS		3478		7517						**10995**
SPLIT %		31.6%		68.4%						**44.4%**

PM Period	NB		SB		EB		WB		TOTAL	
12:00	154		185						339	
12:15	196		163						359	
12:30	163		137						300	
12:45	167	680	165	650					332	1330
13:00	175		109						284	
13:15	164		137						301	
13:30	174		157						331	
13:45	184	697	163	566					347	1263
14:00	202		179						381	
14:15	283		158						441	
14:30	285		170						455	
14:45	317	1087	157	664					474	1751
15:00	261		194						455	
15:15	307		177						484	
15:30	385		165						550	
15:45	328	1281	143	679					471	1960
16:00	325		177						502	
16:15	313		177						490	
16:30	314		143						457	
16:45	331	1283	172	669					503	1952
17:00	350		163						513	
17:15	315		158						473	
17:30	249		138						387	
17:45	251	1165	162	621					413	1786
18:00	262		123						385	
18:15	264		100						364	
18:30	214		132						346	
18:45	206	946	98	453					304	1399
19:00	155		77						232	
19:15	163		70						233	
19:30	148		62						210	
19:45	110	576	58	267					168	843
20:00	155		50						205	
20:15	138		51						189	
20:30	115		50						165	
20:45	110	518	46	197					156	715
21:00	73		54						127	
21:15	68		46						114	
21:30	51		50						101	
21:45	46	238	30	180					76	418
22:00	57		29						86	
22:15	33		22						55	
22:30	36		14						50	
22:45	19	145	22	87					41	232
23:00	20		13						33	
23:15	20		16						36	
23:30	11		10						21	
23:45	15	66	11	50					26	116
TOTALS		8682		5083						**13765**
SPLIT %		63.1%		36.9%						**55.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	12,160	12,600	0	0	24,760

AM Peak Hour	11:30	07:00			**07:30**
AM Pk Volume	657	1742			**2191**
Pk Hr Factor	0.838	0.915			**0.918**
7 - 9 Volume	1073	3089	0	0	**4162**
7 - 9 Peak Hour	08:00	07:00			**07:30**
7 - 9 Pk Volume	632	1742	0	0	**2191**
Pk Hr Factor	0.958	0.915	0.000	0.000	**0.918**

PM Peak Hour	15:30	14:30			**15:30**
PM Pk Volume	1351	698			**2013**
Pk Hr Factor	0.877	0.899			**0.915**
4 - 6 Volume	2448	1290	0	0	**3738**
4 - 6 Peak Hour	16:30	16:00			**16:15**
4 - 6 Pk Volume	1310	669	0	0	**1963**
Pk Hr Factor	0.936	0.945	0.000	0.000	**0.957**

Prepared by NDS/ATD

VOLUME

Birch St E/O State College Blvd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_007

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	12,499	11,971	24,470

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			14		7		21		12:00			220		192		412	
00:15			6		10		16		12:15			205		191		396	
00:30			8		2		10		12:30			199		182		381	
00:45			4	32	6	25	10	57	12:45			230	854	215	780	445	1634
01:00			4		2		6		13:00			193		179		372	
01:15			10		2		12		13:15			199		164		363	
01:30			2		2		4		13:30			219		166		385	
01:45			5	21	1	7	6	28	13:45			242	853	177	686	419	1539
02:00			1		3		4		14:00			255		159		414	
02:15			1		4		5		14:15			231		190		421	
02:30			1		0		1		14:30			246		214		460	
02:45			2	5	1	8	3	13	14:45			246	978	268	831	514	1809
03:00			1		2		3		15:00			303		247		550	
03:15			1		7		8		15:15			314		230		544	
03:30			2		8		10		15:30			252		243		495	
03:45			4	8	13	30	17	38	15:45			228	1097	282	1002	510	2099
04:00			3		8		11		16:00			225		271		496	
04:15			8		18		26		16:15			272		277		549	
04:30			18		11		29		16:30			250		358		608	
04:45			22	51	24	61	46	112	16:45			275	1022	400	1306	675	2328
05:00			11		18		29		17:00			266		384		650	
05:15			25		24		49		17:15			295		388		683	
05:30			29		34		63		17:30			272		360		632	
05:45			77	142	58	134	135	276	17:45			244	1077	300	1432	544	2509
06:00			62		29		91		18:00			244		263		507	
06:15			101		70		171		18:15			245		217		462	
06:30			171		92		263		18:30			194		213		407	
06:45			226	560	94	285	320	845	18:45			216	899	174	867	390	1766
07:00			211		128		339		19:00			163		133		296	
07:15			228		145		373		19:15			151		135		286	
07:30			308		190		498		19:30			136		98		234	
07:45			318	1065	278	741	596	1806	19:45			115	565	103	469	218	1034
08:00			285		246		531		20:00			116		76		192	
08:15			187		220		407		20:15			114		83		197	
08:30			143		185		328		20:30			125		74		199	
08:45			159	774	194	845	353	1619	20:45			115	470	76	309	191	779
09:00			146		156		302		21:00			73		51		124	
09:15			103		138		241		21:15			68		25		93	
09:30			112		131		243		21:30			58		26		84	
09:45			110	471	178	603	288	1074	21:45			47	246	28	130	75	376
10:00			110		158		268		22:00			52		33		85	
10:15			119		121		240		22:15			34		25		59	
10:30			140		156		296		22:30			36		19		55	
10:45			134	503	138	573	272	1076	22:45			17	139	12	89	29	228
11:00			150		152		302		23:00			25		15		40	
11:15			144		167		311		23:15			18		10		28	
11:30			158		200		358		23:30			8		7		15	
11:45			154	606	199	718	353	1324	23:45			10	61	8	40	18	101
TOTALS				4238		4030		8268	TOTALS				8261		7941		16202
SPLIT %				51.3%		48.7%		33.8%	SPLIT %				51.0%		49.0%		66.2%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	12,499	11,971	24,470

AM Peak Hour			07:15	07:30	07:30	PM Peak Hour			14:45	16:45	16:45
AM Pk Volume			1139	934	2032	PM Pk Volume			1115	1532	2640
Pk Hr Factor			0.895	0.840	0.852	Pk Hr Factor			0.888	0.958	0.966
7 - 9 Volume	0	0	1839	1586	3425	4 - 6 Volume	0	0	2099	2738	4837
7 - 9 Peak Hour			07:15	07:30	07:30	4 - 6 Peak Hour			16:45	16:45	16:45
7 - 9 Pk Volume	0	0	1139	934	2032	4 - 6 Pk Volume	0	0	1108	1532	2640
Pk Hr Factor	0.000	0.000	0.895	0.840	0.852	Pk Hr Factor	0.000	0.000	0.939	0.958	0.966

Prepared by NDS/ATD

VOLUME

Birch St E/O S Associated Rd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_008

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	12,383	11,595	23,978

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			13		6		19		12:00			201		199		400	
00:15			10		10		20		12:15			187		185		372	
00:30			6		1		7		12:30			175		147		322	
00:45			3	32	3	20	6	52	12:45			215	778	177	708	392	1486
01:00			6		4		10		13:00			163		161		324	
01:15			4		3		7		13:15			215		145		360	
01:30			2		4		6		13:30			205		180		385	
01:45			5	17	2	13	7	30	13:45			242	825	160	646	402	1471
02:00			0		2		2		14:00			248		153		401	
02:15			3		2		5		14:15			239		166		405	
02:30			2		1		3		14:30			278		206		484	
02:45			6	11	1	6	7	17	14:45			256	1021	307	832	563	1853
03:00			6		4		10		15:00			310		233		543	
03:15			1		9		10		15:15			280		185		465	
03:30			4		15		19		15:30			242		266		508	
03:45			5	16	10	38	15	54	15:45			237	1069	248	932	485	2001
04:00			2		7		9		16:00			218		268		486	
04:15			16		13		29		16:15			254		264		518	
04:30			32		18		50		16:30			265		320		585	
04:45			31	81	24	62	55	143	16:45			265	1002	324	1176	589	2178
05:00			18		20		38		17:00			269		365		634	
05:15			29		26		55		17:15			294		368		662	
05:30			31		47		78		17:30			284		344		628	
05:45			92	170	64	157	156	327	17:45			263	1110	278	1355	541	2465
06:00			75		49		124		18:00			235		224		459	
06:15			97		97		194		18:15			242		193		435	
06:30			214		108		322		18:30			186		193		379	
06:45			256	642	147	401	403	1043	18:45			208	871	141	751	349	1622
07:00			202		164		366		19:00			173		112		285	
07:15			215		165		380		19:15			137		123		260	
07:30			282		223		505		19:30			123		96		219	
07:45			335	1034	296	848	631	1882	19:45			96	529	87	418	183	947
08:00			292		271		563		20:00			114		81		195	
08:15			275		246		521		20:15			109		77		186	
08:30			148		188		336		20:30			112		57		169	
08:45			147	862	182	887	329	1749	20:45			93	428	65	280	158	708
09:00			133		157		290		21:00			75		50		125	
09:15			101		126		227		21:15			68		22		90	
09:30			107		134		241		21:30			48		31		79	
09:45			110	451	158	575	268	1026	21:45			54	245	27	130	81	375
10:00			97		145		242		22:00			45		23		68	
10:15			111		122		233		22:15			38		32		70	
10:30			124		148		272		22:30			35		22		57	
10:45			126	458	142	557	268	1015	22:45			17	135	15	92	32	227
11:00			133		135		268		23:00			27		15		42	
11:15			125		159		284		23:15			14		14		28	
11:30			123		189		312		23:30			13		15		28	
11:45			154	535	175	658	329	1193	23:45			7	61	9	53	16	114
TOTALS				4309		4222		8531	TOTALS				8074		7373		15447
SPLIT %				50.5%		49.5%		35.6%	SPLIT %				52.3%		47.7%		64.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	12,383	11,595	23,978

AM Peak Hour			07:30	07:30	07:30	PM Peak Hour			14:30	16:45	16:45
AM Pk Volume			1184	1036	2220	PM Pk Volume			1124	1401	2513
Pk Hr Factor			0.884	0.875	0.880	Pk Hr Factor			0.906	0.952	0.949
7 - 9 Volume	0	0	1896	1735	3631	4 - 6 Volume	0	0	2112	2531	4643
7 - 9 Peak Hour			07:30	07:30	07:30	4 - 6 Peak Hour			16:45	16:45	16:45
7 - 9 Pk Volume	0	0	1184	1036	2220	4 - 6 Pk Volume	0	0	1112	1401	2513
Pk Hr Factor	0.000	0.000	0.884	0.875	0.880	Pk Hr Factor	0.000	0.000	0.946	0.952	0.949

Prepared by NDS/ATD

VOLUME

Birch St E/O N Associated Rd

Day: Tuesday
Date: 11/27/2018

City: Brea
Project #: CA18_1232_009

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,589	9,936	20,525

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			2		4		6		12:00			168		172		340	
00:15			6		5		11		12:15			163		164		327	
00:30			5		8		13		12:30			185		154		339	
00:45			6	19	10	27	16	46	12:45			202	718	159	649	361	1367
01:00			4		0		4		13:00			181		139		320	
01:15			2		0		2		13:15			196		152		348	
01:30			3		3		6		13:30			177		147		324	
01:45			1	10	1	4	2	14	13:45			160	714	132	570	292	1284
02:00			0		1		1		14:00			175		161		336	
02:15			1		2		3		14:15			160		200		360	
02:30			2		0		2		14:30			163		200		363	
02:45			4	7	5	8	9	15	14:45			199	697	194	755	393	1452
03:00			2		3		5		15:00			200		212		412	
03:15			0		1		1		15:15			209		160		369	
03:30			4		4		8		15:30			195		253		448	
03:45			3	9	3	11	6	20	15:45			174	778	205	830	379	1608
04:00			5		7		12		16:00			203		256		459	
04:15			13		5		18		16:15			215		224		439	
04:30			29		11		40		16:30			201		287		488	
04:45			45	92	13	36	58	128	16:45			257	876	285	1052	542	1928
05:00			19		12		31		17:00			242		321		563	
05:15			22		16		38		17:15			256		340		596	
05:30			28		21		49		17:30			260		283		543	
05:45			94	163	56	105	150	268	17:45			237	995	266	1210	503	2205
06:00			82		37		119		18:00			211		232		443	
06:15			105		51		156		18:15			212		235		447	
06:30			151		86		237		18:30			174		198		372	
06:45			219	557	95	269	314	826	18:45			141	738	133	798	274	1536
07:00			173		84		257		19:00			142		119		261	
07:15			198		128		326		19:15			134		87		221	
07:30			213		136		349		19:30			105		99		204	
07:45			255	839	234	582	489	1421	19:45			109	490	52	357	161	847
08:00			229		207		436		20:00			119		86		205	
08:15			180		162		342		20:15			106		55		161	
08:30			159		135		294		20:30			90		59		149	
08:45			149	717	145	649	294	1366	20:45			75	390	40	240	115	630
09:00			132		113		245		21:00			82		69		151	
09:15			99		113		212		21:15			70		42		112	
09:30			94		95		189		21:30			50		37		87	
09:45			126	451	117	438	243	889	21:45			45	247	21	169	66	416
10:00			102		107		209		22:00			42		29		71	
10:15			97		123		220		22:15			33		18		51	
10:30			93		65		158		22:30			24		11		35	
10:45			112	404	140	435	252	839	22:45			20	119	13	71	33	190
11:00			139		118		257		23:00			15		11		26	
11:15			103		146		249		23:15			12		10		22	
11:30			131		176		307		23:30			14		17		31	
11:45			142	515	179	619	321	1134	23:45			3	44	14	52	17	96
TOTALS				3783		3183		6966	TOTALS				6806		6753		13559
SPLIT %				54.3%		45.7%		33.9%	SPLIT %				50.2%		49.8%		66.1%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	10,589	9,936	20,525

AM Peak Hour			07:15	07:30	07:30	PM Peak Hour			16:45	16:30	16:45
AM Pk Volume			895	739	1616	PM Pk Volume			1015	1233	2244
Pk Hr Factor			0.877	0.790	0.826	Pk Hr Factor			0.976	0.907	0.941
7 - 9 Volume	0	0	1556	1231	2787	4 - 6 Volume	0	0	1871	2262	4133
7 - 9 Peak Hour			07:15	07:30	07:30	4 - 6 Peak Hour			16:45	16:30	16:45
7 - 9 Pk Volume	0	0	895	739	1616	4 - 6 Pk Volume	0	0	1015	1233	2244
Pk Hr Factor	0.000	0.000	0.877	0.790	0.826	Pk Hr Factor	0.000	0.000	0.976	0.907	0.941

Prepared by NDS/ATD

VOLUME

Birch St Bet. Kraemer Blvd & Valencia Ave

Day: Tuesday
Date: 3/27/2018

City: Brea
Project #: CA18_1059_008

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,162	8,337	16,499

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			5		5		10		12:00			103		130		233	
00:15			3		3		6		12:15			94		117		211	
00:30			4		2		6		12:30			105		121		226	
00:45			4	16	5	15	9	31	12:45			111	413	128	496	239	909
01:00			4		2		6		13:00			105		107		212	
01:15			4		0		4		13:15			101		105		206	
01:30			2		0		2		13:30			109		163		272	
01:45			0	10	0	2	0	12	13:45			147	462	130	505	277	967
02:00			0		0		0		14:00			146		137		283	
02:15			1		1		2		14:15			136		185		321	
02:30			0		0		0		14:30			133		162		295	
02:45			2	3	1	2	3	5	14:45			143	558	155	639	298	1197
03:00			2		4		6		15:00			163		142		305	
03:15			3		2		5		15:15			124		162		286	
03:30			3		1		4		15:30			173		197		370	
03:45			8	16	0	7	8	23	15:45			151	611	169	670	320	1281
04:00			2		2		4		16:00			153		203		356	
04:15			8		3		11		16:15			206		202		408	
04:30			31		10		41		16:30			200		254		454	
04:45			35	76	8	23	43	99	16:45			189	748	238	897	427	1645
05:00			18		14		32		17:00			246		251		497	
05:15			21		14		35		17:15			219		229		448	
05:30			40		20		60		17:30			199		219		418	
05:45			93	172	28	76	121	248	17:45			179	843	194	893	373	1736
06:00			48		35		83		18:00			151		160		311	
06:15			65		37		102		18:15			165		174		339	
06:30			128		45		173		18:30			126		136		262	
06:45			173	414	84	201	257	615	18:45			117	559	136	606	253	1165
07:00			134		80		214		19:00			119		106		225	
07:15			154		101		255		19:15			106		130		236	
07:30			195		135		330		19:30			103		109		212	
07:45			229	712	160	476	389	1188	19:45			100	428	55	400	155	828
08:00			165		166		331		20:00			68		92		160	
08:15			106		142		248		20:15			69		96		165	
08:30			105		112		217		20:30			67		53		120	
08:45			113	489	149	569	262	1058	20:45			62	266	29	270	91	536
09:00			82		101		183		21:00			57		57		114	
09:15			85		106		191		21:15			43		47		90	
09:30			68		100		168		21:30			49		60		109	
09:45			66	301	102	409	168	710	21:45			28	177	24	188	52	365
10:00			66		116		182		22:00			38		27		65	
10:15			90		98		188		22:15			20		20		40	
10:30			74		97		171		22:30			17		9		26	
10:45			96	326	79	390	175	716	22:45			16	91	9	65	25	156
11:00			82		100		182		23:00			7		7		14	
11:15			117		134		251		23:15			12		7		19	
11:30			112		119		231		23:30			8		25		33	
11:45			128	439	143	496	271	935	23:45			5	32	3	42	8	74
TOTALS				2974		2666		5640	TOTALS				5188		5671		10859
SPLIT %				52.7%		47.3%		34.2%	SPLIT %				47.8%		52.2%		65.8%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,162	8,337	16,499

AM Peak Hour			07:15	07:30	07:15	PM Peak Hour			16:30	16:30	16:30
AM Pk Volume			743	603	1305	PM Pk Volume			854	972	1826
Pk Hr Factor			0.811	0.908	0.839	Pk Hr Factor			0.868	0.957	0.919
7 - 9 Volume	0	0	1201	1045	2246	4 - 6 Volume	0	0	1591	1790	3381
7 - 9 Peak Hour			07:15	07:30	07:15	4 - 6 Peak Hour			16:30	16:30	16:30
7 - 9 Pk Volume	0	0	743	603	1305	4 - 6 Pk Volume	0	0	854	972	1826
Pk Hr Factor	0.000	0.000	0.811	0.908	0.839	Pk Hr Factor	0.000	0.000	0.868	0.957	0.919

Prepared by NDS/ATD

VOLUME

Kraemer Blvd Bet. Birch St & Imperial Hwy

Day: Tuesday
Date: 3/27/2018

City: Brea
Project #: CA18_1059_007

DAILY TOTALS	NB	SB	EB	WB	Total
	8,819	10,869	0	0	19,688

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	5		5						10		12:00	165		259						424	
00:15	7		4						11		12:15	176		226						402	
00:30	4		2						6		12:30	182		203						385	
00:45	4	20	6	17					10	37	12:45	139	662	202	890					341	1552
01:00	8		3						11		13:00	153		210						363	
01:15	2		0						2		13:15	135		155						290	
01:30	4		2						6		13:30	155		151						306	
01:45	2	16	5	10					7	26	13:45	142	585	132	648					274	1233
02:00	5		5						10		14:00	155		144						299	
02:15	5		1						6		14:15	129		159						288	
02:30	1		1						2		14:30	180		155						335	
02:45	2	13	3	10					5	23	14:45	150	614	162	620					312	1234
03:00	0		5						5		15:00	125		161						286	
03:15	1		3						4		15:15	164		178						342	
03:30	6		4						10		15:30	221		124						345	
03:45	4	11	6	18					10	29	15:45	179	689	181	644					360	1333
04:00	6		12						18		16:00	222		158						380	
04:15	7		7						14		16:15	188		172						360	
04:30	9		23						32		16:30	235		151						386	
04:45	27	49	33	75					60	124	16:45	211	856	211	692					422	1548
05:00	17		12						29		17:00	259		206						465	
05:15	20		40						60		17:15	239		226						465	
05:30	17		49						66		17:30	236		176						412	
05:45	43	97	89	190					132	287	17:45	201	935	167	775					368	1710
06:00	36		89						125		18:00	213		141						354	
06:15	39		133						172		18:15	188		151						339	
06:30	55		176						231		18:30	175		138						313	
06:45	96	226	202	600					298	826	18:45	143	719	100	530					243	1249
07:00	71		250						321		19:00	157		125						282	
07:15	82		229						311		19:15	122		96						218	
07:30	81		235						316		19:30	128		99						227	
07:45	143	377	305	1019					448	1396	19:45	114	521	85	405					199	926
08:00	138		283						421		20:00	77		98						175	
08:15	128		258						386		20:15	79		74						153	
08:30	109		235						344		20:30	60		66						126	
08:45	128	503	222	998					350	1501	20:45	77	293	69	307					146	600
09:00	100		197						297		21:00	54		59						113	
09:15	95		184						279		21:15	63		44						107	
09:30	98		133						231		21:30	47		45						92	
09:45	95	388	176	690					271	1078	21:45	43	207	34	182					77	389
10:00	107		122						229		22:00	28		28						56	
10:15	100		156						256		22:15	21		21						42	
10:30	109		175						284		22:30	24		16						40	
10:45	115	431	168	621					283	1052	22:45	15	88	16	81					31	169
11:00	102		190						292		23:00	16		10						26	
11:15	116		176						292		23:15	13		7						20	
11:30	124		218						342		23:30	7		8						15	
11:45	133	475	228	812					361	1287	23:45	8	44	10	35					18	79
TOTALS		2606		5060						7666	TOTALS		6213		5809						12022
SPLIT %		34.0%		66.0%						38.9%	SPLIT %		51.7%		48.3%						61.1%

DAILY TOTALS	NB	SB	EB	WB	Total
	8,819	10,869	0	0	19,688

AM Peak Hour	11:45	07:30			07:45	PM Peak Hour	16:45	12:00			16:45
AM Pk Volume	656	1081			1599	PM Pk Volume	945	890			1764
Pk Hr Factor	0.901	0.886			0.892	Pk Hr Factor	0.912	0.859			0.948
7 - 9 Volume	880	2017	0	0	2897	4 - 6 Volume	1791	1467	0	0	3258
7 - 9 Peak Hour	07:45	07:30			07:45	4 - 6 Peak Hour	16:45	16:45			16:45
7 - 9 Pk Volume	518	1081	0	0	1599	4 - 6 Pk Volume	945	819	0	0	1764
Pk Hr Factor	0.906	0.886	0.000	0.000	0.892	Pk Hr Factor	0.912	0.906	0.000	0.000	0.948

Prepared by NDS/ATD

VOLUME

Valencia Ave S/O Birch St/Rose Dr

Day: Tuesday
Date: 11/27/2018

City: Brea
Project #: CA18_1232_010

DAILY TOTALS	NB	SB	EB	WB	Total
	6,182	6,577	0	0	12,759

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	6		2				8		12:00	94		120				214	
00:15	2		1				3		12:15	90		100				190	
00:30	2		2				4		12:30	114		110				224	
00:45	0	10	2	7			2	17	12:45	104	402	103	433			207	835
01:00	2		2				4		13:00	145		110				255	
01:15	1		2				3		13:15	91		118				209	
01:30	1		4				5		13:30	104		144				248	
01:45	4	8	2	10			6	18	13:45	98	438	103	475			201	913
02:00	1		1				2		14:00	100		78				178	
02:15	1		0				1		14:15	138		97				235	
02:30	1		1				2		14:30	183		97				280	
02:45	1	4	4	6			5	10	14:45	140	561	96	368			236	929
03:00	1		0				1		15:00	138		126				264	
03:15	0		4				4		15:15	103		105				208	
03:30	0		1				1		15:30	106		118				224	
03:45	2	3	6	11			8	14	15:45	113	460	125	474			238	934
04:00	2		2				4		16:00	104		103				207	
04:15	1		7				8		16:15	111		93				204	
04:30	6		16				22		16:30	148		108				256	
04:45	8	17	18	43			26	60	16:45	136	499	126	430			262	929
05:00	8		19				27		17:00	154		144				298	
05:15	18		19				37		17:15	109		114				223	
05:30	15		49				64		17:30	123		108				231	
05:45	33	74	79	166			112	240	17:45	107	493	103	469			210	962
06:00	129		71				200		18:00	103		100				203	
06:15	75		95				170		18:15	100		90				190	
06:30	66		148				214		18:30	90		89				179	
06:45	86	356	160	474			246	830	18:45	66	359	73	352			139	711
07:00	61		155				216		19:00	65		75				140	
07:15	53		174				227		19:15	60		57				117	
07:30	108		176				284		19:30	56		56				112	
07:45	127	349	159	664			286	1013	19:45	36	217	42	230			78	447
08:00	109		183				292		20:00	59		62				121	
08:15	113		148				261		20:15	48		49				97	
08:30	96		142				238		20:30	26		29				55	
08:45	89	407	152	625			241	1032	20:45	27	160	29	169			56	329
09:00	98		124				222		21:00	44		23				67	
09:15	118		93				211		21:15	25		19				44	
09:30	78		86				164		21:30	22		14				36	
09:45	94	388	105	408			199	796	21:45	19	110	26	82			45	192
10:00	105		86				191		22:00	16		13				29	
10:15	107		80				187		22:15	15		7				22	
10:30	125		80				205		22:30	11		5				16	
10:45	89	426	70	316			159	742	22:45	11	53	7	32			18	85
11:00	100		77				177		23:00	11		4				15	
11:15	93		77				170		23:15	4		1				5	
11:30	87		76				163		23:30	3		5				8	
11:45	81	361	87	317			168	678	23:45	9	27	6	16			15	43
TOTALS		2403		3047				5450	TOTALS		3779		3530				7309
SPLIT %		44.1%		55.9%				42.7%	SPLIT %		51.7%		48.3%				57.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	6,182	6,577	0	0	12,759

AM Peak Hour	07:30	07:15				07:30	PM Peak Hour	14:15	16:30				16:30
AM Pk Volume	457	692				1123	PM Pk Volume	599	492				1039
Pk Hr Factor	0.900	0.945				0.961	Pk Hr Factor	0.818	0.854				0.872
7 - 9 Volume	756	1289	0	0		2045	4 - 6 Volume	992	899	0	0		1891
7 - 9 Peak Hour	07:30	07:15				07:30	4 - 6 Peak Hour	16:15	16:30				16:30
7 - 9 Pk Volume	457	692	0	0		1123	4 - 6 Pk Volume	549	492	0	0		1039
Pk Hr Factor	0.900	0.945	0.000	0.000		0.961	Pk Hr Factor	0.891	0.854	0.000	0.000		0.872

Prepared by NDS/ATD

VOLUME

Rose Dr S/O Valencia Ave

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_011

DAILY TOTALS	NB	SB	EB	WB	Total
	9,204	11,171	0	0	20,375

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	3		5				8		12:00	123		121				244	
00:15	2		3				5		12:15	119		123				242	
00:30	3		5				8		12:30	106		118				224	
00:45	5	13	4	17			9	30	12:45	110	458	109	471			219	929
01:00	5		1				6		13:00	113		114				227	
01:15	1		2				3		13:15	98		112				210	
01:30	1		3				4		13:30	114		125				239	
01:45	1	8	0	6			1	14	13:45	126	451	147	498			273	949
02:00	2		1				3		14:00	107		140				247	
02:15	4		0				4		14:15	140		157				297	
02:30	2		2				4		14:30	158		156				314	
02:45	5	13	1	4			6	17	14:45	170	575	180	633			350	1208
03:00	2		2				4		15:00	203		188				391	
03:15	3		2				5		15:15	206		218				424	
03:30	9		3				12		15:30	199		183				382	
03:45	6	20	6	13			12	33	15:45	243	851	196	785			439	1636
04:00	6		4				10		16:00	228		224				452	
04:15	10		12				22		16:15	226		230				456	
04:30	9		27				36		16:30	241		258				499	
04:45	11	36	24	67			35	103	16:45	258	953	291	1003			549	1956
05:00	21		41				62		17:00	245		258				503	
05:15	27		66				93		17:15	243		233				476	
05:30	51		98				149		17:30	236		262				498	
05:45	63	162	140	345			203	507	17:45	249	973	216	969			465	1942
06:00	61		174				235		18:00	237		205				442	
06:15	59		214				273		18:15	198		173				371	
06:30	89		245				334		18:30	163		159				322	
06:45	135	344	273	906			408	1250	18:45	141	739	156	693			297	1432
07:00	129		291				420		19:00	147		107				254	
07:15	153		305				458		19:15	116		111				227	
07:30	156		314				470		19:30	93		65				158	
07:45	170	608	294	1204			464	1812	19:45	90	446	82	365			172	811
08:00	190		266				456		20:00	74		77				151	
08:15	173		267				440		20:15	62		70				132	
08:30	148		226				374		20:30	56		85				141	
08:45	162	673	251	1010			413	1683	20:45	60	252	87	319			147	571
09:00	118		184				302		21:00	59		74				133	
09:15	104		149				253		21:15	57		52				109	
09:30	116		161				277		21:30	39		46				85	
09:45	120	458	120	614			240	1072	21:45	34	189	29	201			63	390
10:00	103		114				217		22:00	27		37				64	
10:15	102		103				205		22:15	22		25				47	
10:30	99		106				205		22:30	18		20				38	
10:45	110	414	118	441			228	855	22:45	10	77	15	97			25	174
11:00	113		113				226		23:00	14		17				31	
11:15	98		100				198		23:15	14		13				27	
11:30	116		128				244		23:30	5		10				15	
11:45	123	450	115	456			238	906	23:45	8	41	14	54			22	95
TOTALS		3199		5083				8282	TOTALS		6005		6088				12093
SPLIT %		38.6%		61.4%				40.6%	SPLIT %		49.7%		50.3%				59.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	9,204	11,171	0	0	20,375

AM Peak Hour	07:30	07:00				07:15	PM Peak Hour	16:30	16:45				16:30
AM Pk Volume	689	1204				1848	PM Pk Volume	987	1044				2027
Pk Hr Factor	0.907	0.959				0.983	Pk Hr Factor	0.956	0.897				0.923
7 - 9 Volume	1281	2214	0	0		3495	4 - 6 Volume	1926	1972	0	0		3898
7 - 9 Peak Hour	07:30	07:00				07:15	4 - 6 Peak Hour	16:30	16:45				16:30
7 - 9 Pk Volume	689	1204	0	0		1848	4 - 6 Pk Volume	987	1044	0	0		2027
Pk Hr Factor	0.907	0.959	0.000	0.000		0.983	Pk Hr Factor	0.956	0.897	0.000	0.000		0.923

Prepared by NDS/ATD

VOLUME

Rose Dr N/O Imperial Hwy

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_012

DAILY TOTALS	NB	SB	EB	WB	Total
	10,000	9,746	0	0	19,746

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	2		7				9		12:00	125		125				250	
00:15	6		1				7		12:15	121		132				253	
00:30	7		3				10		12:30	120		133				253	
00:45	5	20	5	16			10	36	12:45	130	496	121	511			251	1007
01:00	5		2				7		13:00	130		134				264	
01:15	2		1				3		13:15	113		124				237	
01:30	2		4				6		13:30	142		129				271	
01:45	1	10	1	8			2	18	13:45	139	524	155	542			294	1066
02:00	3		0				3		14:00	135		164				299	
02:15	5		0				5		14:15	183		140				323	
02:30	4		3				7		14:30	161		129				290	
02:45	4	16	1	4			5	20	14:45	183	662	142	575			325	1237
03:00	1		3				4		15:00	225		150				375	
03:15	3		1				4		15:15	238		166				404	
03:30	14		7				21		15:30	218		176				394	
03:45	4	22	5	16			9	38	15:45	258	939	179	671			437	1610
04:00	6		7				13		16:00	246		183				429	
04:15	9		13				22		16:15	247		174				421	
04:30	10		22				32		16:30	247		191				438	
04:45	16	41	27	69			43	110	16:45	260	1000	191	739			451	1739
05:00	26		36				62		17:00	271		178				449	
05:15	35		65				100		17:15	263		172				435	
05:30	56		90				146		17:30	253		171				424	
05:45	70	187	137	328			207	515	17:45	262	1049	166	687			428	1736
06:00	61		140				201		18:00	252		158				410	
06:15	65		170				235		18:15	205		153				358	
06:30	95		196				291		18:30	181		147				328	
06:45	128	349	200	706			328	1055	18:45	143	781	118	576			261	1357
07:00	138		187				325		19:00	140		106				246	
07:15	143		202				345		19:15	133		85				218	
07:30	158		206				364		19:30	118		68				186	
07:45	181	620	229	824			410	1444	19:45	93	484	60	319			153	803
08:00	201		223				424		20:00	84		79				163	
08:15	170		224				394		20:15	67		75				142	
08:30	159		170				329		20:30	64		70				134	
08:45	164	694	183	800			347	1494	20:45	59	274	71	295			130	569
09:00	126		209				335		21:00	73		72				145	
09:15	115		190				305		21:15	59		62				121	
09:30	132		137				269		21:30	41		36				77	
09:45	123	496	141	677			264	1173	21:45	36	209	30	200			66	409
10:00	120		138				258		22:00	28		27				55	
10:15	113		130				243		22:15	28		30				58	
10:30	130		126				256		22:30	17		16				33	
10:45	128	491	135	529			263	1020	22:45	14	87	11	84			25	171
11:00	116		134				250		23:00	19		16				35	
11:15	126		148				274		23:15	13		11				24	
11:30	126		134				260		23:30	7		6				13	
11:45	133	501	115	531			248	1032	23:45	9	48	6	39			15	87
TOTALS		3447		4508				**7955**	**TOTALS**		6553		5238				**11791**
SPLIT %		43.3%		56.7%				**40.3%**	**SPLIT %**		55.6%		44.4%				**59.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	10,000	9,746	0	0	19,746

AM Peak Hour	07:45	07:30					**07:30**		**PM Peak Hour**	17:00	16:00					**16:30**		
AM Pk Volume	711	882					**1592**		**PM Pk Volume**	1049	739					**1773**		
Pk Hr Factor	0.884	0.963					**0.939**		**Pk Hr Factor**	0.968	0.967					**0.983**		
7 - 9 Volume	1314	1624	0	0			**2938**		**4 - 6 Volume**	2049	1426	0	0			**3475**		
7 - 9 Peak Hour	07:45	07:30					**07:30**		**4 - 6 Peak Hour**	17:00	16:00					**16:30**		
7 - 9 Pk Volume	711	882	0	0			**1592**		**4 - 6 Pk Volume**	1049	739	0	0			**1773**		
Pk Hr Factor	0.884	0.963	0.000	0.000			**0.939**		**Pk Hr Factor**	0.968	0.967	0.000	0.000			**0.983**		

Prepared by NDS/ATD

VOLUME

Imperial Hwy E/O State College Blvd

Day: Thursday
Date: 4/19/2018

City: Brea
Project #: CA18_1082_013

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	33,879	37,392	71,271

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00					51		60		111		12:00					498		559		1057	
00:15					51		59		110		12:15					497		622		1119	
00:30					47		41		88		12:30					551		639		1190	
00:45					44	193	38	198	82	391	12:45					519	2065	618	2438	1137	4503
01:00					37		34		71		13:00					550		572		1122	
01:15					30		33		63		13:15					480		606		1086	
01:30					27		45		72		13:30					510		610		1120	
01:45					29	123	40	152	69	275	13:45					536	2076	547	2335	1083	4411
02:00					24		36		60		14:00					500		521		1021	
02:15					35		33		68		14:15					506		542		1048	
02:30					54		49		103		14:30					527		605		1132	
02:45					38	151	78	196	116	347	14:45					538	2071	597	2265	1135	4336
03:00					33		39		72		15:00					539		636		1175	
03:15					56		62		118		15:15					541		550		1091	
03:30					78		84		162		15:30					547		563		1110	
03:45					61	228	97	282	158	510	15:45					588	2215	645	2394	1233	4609
04:00					79		93		172		16:00					627		649		1276	
04:15					97		148		245		16:15					641		719		1360	
04:30					138		113		251		16:30					646		691		1337	
04:45					147	461	209	563	356	1024	16:45					632	2546	646	2705	1278	5251
05:00					139		153		292		17:00					617		688		1305	
05:15					157		202		359		17:15					653		684		1337	
05:30					214		225		439		17:30					633		683		1316	
05:45					302	812	305	885	607	1697	17:45					625	2528	724	2779	1349	5307
06:00					208		235		443		18:00					548		715		1263	
06:15					263		276		539		18:15					586		640		1226	
06:30					317		344		661		18:30					525		597		1122	
06:45					446	1234	441	1296	887	2530	18:45					533	2192	591	2543	1124	4735
07:00					372		402		774		19:00					513		563		1076	
07:15					474		528		1002		19:15					497		484		981	
07:30					530		512		1042		19:30					452		497		949	
07:45					518	1894	545	1987	1063	3881	19:45					420	1882	490	2034	910	3916
08:00					460		477		937		20:00					406		432		838	
08:15					496		501		997		20:15					361		433		794	
08:30					465		505		970		20:30					316		419		735	
08:45					464	1885	528	2011	992	3896	20:45					297	1380	352	1636	649	3016
09:00					446		417		863		21:00					326		348		674	
09:15					495		528		1023		21:15					272		253		525	
09:30					462		488		950		21:30					239		235		474	
09:45					538	1941	571	2004	1109	3945	21:45					212	1049	241	1077	453	2126
10:00					449		553		1002		22:00					168		215		383	
10:15					480		559		1039		22:15					190		182		372	
10:30					440		524		964		22:30					165		173		338	
10:45					473	1842	591	2227	1064	4069	22:45					123	646	132	702	255	1348
11:00					493		531		1024		23:00					93		98		191	
11:15					529		545		1074		23:15					71		138		209	
11:30					565		607		1172		23:30					76		101		177	
11:45					556	2143	572	2255	1128	4398	23:45					82	322	91	428	173	750
TOTALS						12907		14056		26963	TOTALS						20972		23336		44308
SPLIT %						47.9%		52.1%		37.8%	SPLIT %						47.3%		52.7%		62.2%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	33,879	37,392	71,271

AM Peak Hour			11:15	11:45	11:45	PM Peak Hour			16:30	17:15	17:00
AM Pk Volume			2148	2392	4494	PM Pk Volume			2548	2806	5307
Pk Hr Factor			0.950	0.936	0.944	Pk Hr Factor			0.975	0.969	0.984
7 - 9 Volume	0	0	3779	3998	7777	4 - 6 Volume	0	0	5074	5484	10558
7 - 9 Peak Hour			07:30	07:15	07:15	4 - 6 Peak Hour			16:30	17:00	17:00
7 - 9 Pk Volume	0	0	2004	2062	4044	4 - 6 Pk Volume	0	0	2548	2779	5307
Pk Hr Factor	0.000	0.000	0.945	0.946	0.951	Pk Hr Factor	0.000	0.000	0.975	0.960	0.984

Prepared by NDS/ATD

VOLUME

Imperial Hwy E/O SR-57 NB Ramps

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1233_013

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,754	26,304	53,058

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			44		32		76		12:00			363		466		829	
0:15			36		32		68		12:15			394		437		831	
0:30			34		23		57		12:30			365		461		826	
0:45			16	130	11	98	27	228	12:45			394	1516	454	1818	848	3334
1:00			22		27		49		13:00			390		438		828	
1:15			17		9		26		13:15			428		431		859	
1:30			19		29		48		13:30			409		449		858	
1:45			19	77	18	83	37	160	13:45			429	1656	404	1722	833	3378
2:00			14		17		31		14:00			412		426		838	
2:15			14		16		30		14:15			378		441		819	
2:30			18		12		30		14:30			393		456		849	
2:45			26	72	14	59	40	131	14:45			396	1579	414	1737	810	3316
3:00			14		21		35		15:00			398		484		882	
3:15			10		21		31		15:15			465		450		915	
3:30			25		43		68		15:30			491		480		971	
3:45			35	84	38	123	73	207	15:45			473	1827	517	1931	990	3758
4:00			32		47		79		16:00			469		473		942	
4:15			38		50		88		16:15			499		486		985	
4:30			107		89		196		16:30			473		497		970	
4:45			153	330	87	273	240	603	16:45			496	1937	483	1939	979	3876
5:00			88		98		186		17:00			469		451		920	
5:15			133		117		250		17:15			530		525		1055	
5:30			177		188		365		17:30			514		496		1010	
5:45			235	633	179	582	414	1215	17:45			537	2050	476	1948	1013	3998
6:00			249		228		477		18:00			464		436		900	
6:15			260		233		493		18:15			477		418		895	
6:30			404		255		659		18:30			418		378		796	
6:45			417	1330	310	1026	727	2356	18:45			389	1748	347	1579	736	3327
7:00			441		336		777		19:00			380		340		720	
7:15			446		374		820		19:15			358		346		704	
7:30			446		418		864		19:30			292		310		602	
7:45			531	1864	447	1575	978	3439	19:45			268	1298	276	1272	544	2570
8:00			477		455		932		20:00			253		301		554	
8:15			483		413		896		20:15			254		247		501	
8:30			518		354		872		20:30			242		245		487	
8:45			462	1940	342	1564	804	3504	20:45			205	954	247	1040	452	1994
9:00			413		297		710		21:00			180		230		410	
9:15			359		295		654		21:15			176		222		398	
9:30			369		290		659		21:30			141		164		305	
9:45			374	1515	376	1258	750	2773	21:45			137	634	163	779	300	1413
10:00			362		349		711		22:00			142		145		287	
10:15			412		339		751		22:15			127		98		225	
10:30			352		408		760		22:30			106		94		200	
10:45			355	1481	416	1512	771	2993	22:45			78	453	96	433	174	886
11:00			366		389		755		23:00			52		61		113	
11:15			363		441		804		23:15			57		61		118	
11:30			349		453		802		23:30			41		57		98	
11:45			382	1460	455	1738	837	3198	23:45			36	186	36	215	72	401
TOTALS				10916		9891		**20807**	**TOTALS**				15838		16413		**32251**
SPLIT %				52.5%		47.5%		**39.2%**	**SPLIT %**				49.1%		50.9%		**60.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,754	26,304	53,058

AM Peak Hour			7:45	11:45	**7:45**	**PM Peak Hour**			17:00	15:45	**17:00**
AM Pk Volume			2009	1819	**3678**	**PM Pk Volume**			2050	1973	**3998**
Pk Hr Factor			0.946	0.976	**0.940**	**Pk Hr Factor**			0.954	0.954	**0.947**
7 - 9 Volume	0	0	3804	3139	**6943**	**4 - 6 Volume**	0	0	3987	3887	**7874**
7 - 9 Peak Hour			7:45	7:30	**7:45**	**4 - 6 Peak Hour**			17:00	16:30	**17:00**
7 - 9 Pk Volume	0	0	2009	1733	**3678**	**4 - 6 Pk Volume**	0	0	2050	1956	**3998**
Pk Hr Factor	0.000	0.000	0.946	0.952	**0.940**	**Pk Hr Factor**	0.000	0.000	0.954	0.931	**0.947**

Prepared by NDS/ATD

VOLUME

Imperial Hwy E/O Associated Rd

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1233_014

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,549	24,435	50,984

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			31		23		54		12:00			390		434		824	
0:15			26		22		48		12:15			434		435		869	
0:30			28		19		47		12:30			414		427		841	
0:45			13	98	11	75	24	173	12:45			464	1702	436	1732	900	3434
1:00			18		22		40		13:00			428		413		841	
1:15			13		6		19		13:15			452		417		869	
1:30			17		20		37		13:30			417		445		862	
1:45			16	64	12	60	28	124	13:45			468	1765	388	1663	856	3428
2:00			14		15		29		14:00			431		400		831	
2:15			11		13		24		14:15			395		424		819	
2:30			16		10		26		14:30			408		438		846	
2:45			22	63	10	48	32	111	14:45			394	1628	384	1646	778	3274
3:00			11		12		23		15:00			412		451		863	
3:15			7		17		24		15:15			478		425		903	
3:30			23		28		51		15:30			480		472		952	
3:45			35	76	28	85	63	161	15:45			479	1849	472	1820	951	3669
4:00			31		38		69		16:00			472		454		926	
4:15			31		39		70		16:15			488		449		937	
4:30			89		68		157		16:30			478		488		966	
4:45			141	292	64	209	205	501	16:45			502	1940	454	1845	956	3785
5:00			87		65		152		17:00			477		420		897	
5:15			128		86		214		17:15			511		500		1011	
5:30			164		143		307		17:30			506		496		1002	
5:45			217	596	148	442	365	1038	17:45			517	2011	456	1872	973	3883
6:00			238		187		425		18:00			462		425		887	
6:15			245		183		428		18:15			468		422		890	
6:30			372		235		607		18:30			410		366		776	
6:45			402	1257	271	876	673	2133	18:45			352	1692	333	1546	685	3238
7:00			422		303		725		19:00			357		325		682	
7:15			420		330		750		19:15			342		332		674	
7:30			423		384		807		19:30			285		291		576	
7:45			514	1779	422	1439	936	3218	19:45			267	1251	250	1198	517	2449
8:00			484		422		906		20:00			238		293		531	
8:15			488		396		884		20:15			236		216		452	
8:30			528		321		849		20:30			238		216		454	
8:45			494	1994	322	1461	816	3455	20:45			183	895	219	944	402	1839
9:00			425		275		700		21:00			146		209		355	
9:15			351		294		645		21:15			161		191		352	
9:30			356		267		623		21:30			125		139		264	
9:45			346	1478	365	1201	711	2679	21:45			112	544	139	678	251	1222
10:00			367		351		718		22:00			133		116		249	
10:15			412		320		732		22:15			105		83		188	
10:30			373		375		748		22:30			80		82		162	
10:45			360	1512	418	1464	778	2976	22:45			64	382	78	359	142	741
11:00			387		360		747		23:00			36		48		84	
11:15			368		418		786		23:15			50		38		88	
11:30			365		423		788		23:30			32		35		67	
11:45			409	1529	428	1629	837	3158	23:45			34	152	22	143	56	295
TOTALS				10738		8989		**19727**	**TOTALS**				15811		15446		**31257**
SPLIT %				54.4%		45.6%		**38.7%**	**SPLIT %**				50.6%		49.4%		**61.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,549	24,435	50,984

AM Peak Hour			7:45	11:45	**7:45**	**PM Peak Hour**			17:00	17:15	**17:00**
AM Pk Volume			2014	1724	**3575**	**PM Pk Volume**			2011	1877	**3883**
Pk Hr Factor			0.954	0.991	**0.955**	**Pk Hr Factor**			0.972	0.939	**0.960**
7 - 9 Volume	0	0	3773	2900	**6673**	**4 - 6 Volume**	0	0	3951	3717	**7668**
7 - 9 Peak Hour			7:45	7:30	**7:45**	**4 - 6 Peak Hour**			17:00	17:00	**17:00**
7 - 9 Pk Volume	0	0	2014	1624	**3575**	**4 - 6 Pk Volume**	0	0	2011	1872	**3883**
Pk Hr Factor	0.000	0.000	0.954	0.962	**0.955**	**Pk Hr Factor**	0.000	0.000	0.972	0.936	**0.960**

Prepared by NDS/ATD

VOLUME

Imperial Hwy E/O Castlegate Ln/Placentia Ave

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1233_015

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,188	24,966	51,154

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			27		20		47		12:00			398		437		835	
0:15			18		18		36		12:15			448		429		877	
0:30			24		15		39		12:30			419		457		876	
0:45			11	80	8	61	19	141	12:45			495	1760	415	1738	910	3498
1:00			11		19		30		13:00			450		421		871	
1:15			16		3		19		13:15			464		428		892	
1:30			13		18		31		13:30			434		464		898	
1:45			17	57	13	53	30	110	13:45			456	1804	412	1725	868	3529
2:00			15		14		29		14:00			444		439		883	
2:15			10		6		16		14:15			415		430		845	
2:30			15		7		22		14:30			426		456		882	
2:45			20	60	9	36	29	96	14:45			419	1704	399	1724	818	3428
3:00			10		12		22		15:00			447		434		881	
3:15			7		14		21		15:15			485		448		933	
3:30			21		30		51		15:30			491		478		969	
3:45			31	69	25	81	56	150	15:45			500	1923	468	1828	968	3751
4:00			33		36		69		16:00			454		479		933	
4:15			31		40		71		16:15			482		481		963	
4:30			80		63		143		16:30			469		502		971	
4:45			129	273	57	196	186	469	16:45			488	1893	462	1924	950	3817
5:00			78		62		140		17:00			472		491		963	
5:15			114		72		186		17:15			511		523		1034	
5:30			175		136		311		17:30			481		468		949	
5:45			248	615	131	401	379	1016	17:45			494	1958	466	1948	960	3906
6:00			231		191		422		18:00			431		445		876	
6:15			227		164		391		18:15			438		452		890	
6:30			331		236		567		18:30			450		422		872	
6:45			403	1192	295	886	698	2078	18:45			334	1653	331	1650	665	3303
7:00			388		315		703		19:00			342		341		683	
7:15			391		327		718		19:15			324		338		662	
7:30			406		347		753		19:30			266		304		570	
7:45			467	1652	428	1417	895	3069	19:45			258	1190	260	1243	518	2433
8:00			444		399		843		20:00			236		307		543	
8:15			426		373		799		20:15			213		251		464	
8:30			491		329		820		20:30			213		221		434	
8:45			465	1826	332	1433	797	3259	20:45			162	824	227	1006	389	1830
9:00			411		325		736		21:00			121		228		349	
9:15			364		312		676		21:15			143		197		340	
9:30			393		271		664		21:30			107		151		258	
9:45			376	1544	368	1276	744	2820	21:45			106	477	141	717	247	1194
10:00			381		355		736		22:00			103		106		209	
10:15			418		315		733		22:15			85		91		176	
10:30			380		381		761		22:30			68		80		148	
10:45			376	1555	413	1464	789	3019	22:45			49	305	73	350	122	655
11:00			384		378		762		23:00			35		52		87	
11:15			411		411		822		23:15			48		40		88	
11:30			393		432		825		23:30			32		34		66	
11:45			440	1628	439	1660	879	3288	23:45			31	146	23	149	54	295
TOTALS				10551		8964		**19515**	**TOTALS**				15637		16002		**31639**
SPLIT %				54.1%		45.9%		**38.1%**	**SPLIT %**				49.4%		50.6%		**61.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	26,188	24,966	51,154

AM Peak Hour			7:45	11:45	**11:45**	**PM Peak Hour**			17:00	16:30	**16:30**
AM Pk Volume			1828	1762	**3467**	**PM Pk Volume**			1958	1978	**3918**
Pk Hr Factor			0.931	0.964	**0.986**	**Pk Hr Factor**			0.958	0.946	**0.947**
7 - 9 Volume	0	0	3478	2850	**6328**	**4 - 6 Volume**	0	0	3851	3872	**7723**
7 - 9 Peak Hour			7:45	7:30	**7:45**	**4 - 6 Peak Hour**			17:00	16:30	**16:30**
7 - 9 Pk Volume	0	0	1828	1547	**3357**	**4 - 6 Pk Volume**	0	0	1958	1978	**3918**
Pk Hr Factor	0.000	0.000	0.931	0.904	**0.938**	**Pk Hr Factor**	0.000	0.000	0.958	0.946	**0.947**

Prepared by NDS/ATD

VOLUME

Kraemer Blvd S/O Imperial Hwy

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_016

DAILY TOTALS	NB	SB	EB	WB	Total
	9,387	10,302	0	0	19,689

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	2		10						12		12:00	163		209						372	
00:15	6		6						12		12:15	202		141						343	
00:30	1		7						8		12:30	199		176						375	
00:45	3	12	3	26					6	38	12:45	211	775	164	690					375	1465
01:00	0		2						2		13:00	194		154						348	
01:15	1		1						2		13:15	163		173						336	
01:30	2		1						3		13:30	174		164						338	
01:45	1	4	2	6					3	10	13:45	165	696	166	657					331	1353
02:00	2		6						8		14:00	140		179						319	
02:15	0		4						4		14:15	171		170						341	
02:30	0		1						1		14:30	186		162						348	
02:45	3	5	2	13					5	18	14:45	158	655	213	724					371	1379
03:00	2		0						2		15:00	206		198						404	
03:15	4		2						6		15:15	189		189						378	
03:30	6		4						10		15:30	186		227						413	
03:45	8	20	1	7					9	27	15:45	194	775	213	827					407	1602
04:00	9		5						14		16:00	166		247						413	
04:15	5		2						7		16:15	178		204						382	
04:30	17		7						24		16:30	257		248						505	
04:45	29	60	8	22					37	82	16:45	189	790	238	937					427	1727
05:00	14		5						19		17:00	187		288						475	
05:15	20		20						40		17:15	197		259						456	
05:30	39		25						64		17:30	179		238						417	
05:45	67	140	54	104					121	244	17:45	181	744	206	991					387	1735
06:00	55		67						122		18:00	141		208						349	
06:15	53		99						152		18:15	151		192						343	
06:30	76		141						217		18:30	127		163						290	
06:45	118	302	151	458					269	760	18:45	115	534	140	703					255	1237
07:00	107		197						304		19:00	77		134						211	
07:15	113		215						328		19:15	100		114						214	
07:30	132		277						409		19:30	61		102						163	
07:45	243	595	177	866					420	1461	19:45	69	307	94	444					163	751
08:00	186		141						327		20:00	76		86						162	
08:15	170		147						317		20:15	54		80						134	
08:30	180		153						333		20:30	44		71						115	
08:45	176	712	138	579					314	1291	20:45	38	212	68	305					106	517
09:00	178		124						302		21:00	39		85						124	
09:15	147		121						268		21:15	35		61						96	
09:30	131		113						244		21:30	28		37						65	
09:45	152	608	117	475					269	1083	21:45	32	134	29	212					61	346
10:00	141		133						274		22:00	15		35						50	
10:15	144		110						254		22:15	15		27						42	
10:30	127		110						237		22:30	11		29						40	
10:45	148	560	124	477					272	1037	22:45	10	51	20	111					30	162
11:00	170		144						314		23:00	12		28						40	
11:15	150		142						292		23:15	10		13						23	
11:30	157		164						321		23:30	8		10						18	
11:45	183	660	158	608					341	1268	23:45	6	36	9	60					15	96
TOTALS		3678		3641						7319	TOTALS		5709		6661						12370
SPLIT %		50.3%		49.7%						37.2%	SPLIT %		46.2%		53.8%						62.8%

DAILY TOTALS	NB	SB	EB	WB	Total
	9,387	10,302	0	0	19,689

AM Peak Hour	07:45	07:00			07:15	PM Peak Hour	16:30	16:30			16:30
AM Pk Volume	779	866			1484	PM Pk Volume	830	1033			1863
Pk Hr Factor	0.801	0.782			0.883	Pk Hr Factor	0.807	0.897			0.922
7 - 9 Volume	1307	1445	0	0	2752	4 - 6 Volume	1534	1928	0	0	3462
7 - 9 Peak Hour	07:45	07:00			07:15	4 - 6 Peak Hour	16:30	16:30			16:30
7 - 9 Pk Volume	779	866	0	0	1484	4 - 6 Pk Volume	830	1033	0	0	1863
Pk Hr Factor	0.801	0.782	0.000	0.000	0.883	Pk Hr Factor	0.807	0.897	0.000	0.000	0.922

Prepared by NDS/ATD

VOLUME

Valencia Ave S/O Imperial Hwy

Day: Tuesday
Date: 11/13/2018

City: Brea
Project #: CA18_1232_017

DAILY TOTALS	NB	SB	EB	WB	Total
	4,701	5,146	0	0	9,847

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	6		8				14		12:00	81		92				173	
00:15	2		5				7		12:15	74		87				161	
00:30	5		2				7		12:30	68		70				138	
00:45	1	14	3	18			4	32	12:45	71	294	67	316			138	610
01:00	0		1				1		13:00	80		82				162	
01:15	2		0				2		13:15	64		73				137	
01:30	0		2				2		13:30	71		82				153	
01:45	4	6	2	5			6	11	13:45	78	293	84	321			162	614
02:00	0		0				0		14:00	75		87				162	
02:15	2		0				2		14:15	95		65				160	
02:30	1		0				1		14:30	86		86				172	
02:45	0	3	1	1			1	4	14:45	84	340	71	309			155	649
03:00	2		0				2		15:00	89		73				162	
03:15	1		0				1		15:15	69		84				153	
03:30	0		1				1		15:30	96		97				193	
03:45	6	9	2	3			8	12	15:45	102	356	75	329			177	685
04:00	3		4				7		16:00	83		90				173	
04:15	1		5				6		16:15	80		93				173	
04:30	7		8				15		16:30	96		122				218	
04:45	11	22	10	27			21	49	16:45	89	348	98	403			187	751
05:00	7		8				15		17:00	121		143				264	
05:15	11		17				28		17:15	112		111				223	
05:30	20		30				50		17:30	115		116				231	
05:45	35	73	37	92			72	165	17:45	72	420	80	450			152	870
06:00	33		60				93		18:00	70		89				159	
06:15	43		58				101		18:15	69		77				146	
06:30	59		79				138		18:30	84		73				157	
06:45	86	221	83	280			169	501	18:45	62	285	50	289			112	574
07:00	60		99				159		19:00	63		67				130	
07:15	73		94				167		19:15	46		49				95	
07:30	111		127				238		19:30	47		47				94	
07:45	120	364	107	427			227	791	19:45	38	194	45	208			83	402
08:00	89		106				195		20:00	37		67				104	
08:15	83		110				193		20:15	44		32				76	
08:30	66		92				158		20:30	30		33				63	
08:45	97	335	113	421			210	756	20:45	25	136	28	160			53	296
09:00	63		93				156		21:00	24		28				52	
09:15	74		74				148		21:15	28		28				56	
09:30	61		77				138		21:30	16		28				44	
09:45	70	268	64	308			134	576	21:45	11	79	25	109			36	188
10:00	60		62				122		22:00	13		27				40	
10:15	65		77				142		22:15	9		10				19	
10:30	63		64				127		22:30	17		8				25	
10:45	63	251	52	255			115	506	22:45	7	46	7	52			14	98
11:00	77		78				155		23:00	6		10				16	
11:15	88		79				167		23:15	8		7				15	
11:30	57		91				148		23:30	3		4				7	
11:45	100	322	90	338			190	660	23:45	5	22	4	25			9	47
TOTALS		1888		2175				**4063**	**TOTALS**		2813		2971				**5784**
SPLIT %		46.5%		53.5%				**41.3%**	**SPLIT %**		48.6%		51.4%				**58.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	4,701	5,146	0	0	9,847

AM Peak Hour	07:30	07:30						**07:30**	**PM Peak Hour**	16:45	16:30						**16:45**
AM Pk Volume	403	450						**853**	**PM Pk Volume**	437	474						**905**
Pk Hr Factor	0.840	0.886						**0.896**	**Pk Hr Factor**	0.903	0.829						**0.857**
7 - 9 Volume	699	848	0	0				**1547**	**4 - 6 Volume**	768	853	0	0				**1621**
7 - 9 Peak Hour	07:30	07:30						**07:30**	**4 - 6 Peak Hour**	16:45	16:30						**16:45**
7 - 9 Pk Volume	403	450	0	0				**853**	**4 - 6 Pk Volume**	437	474	0	0				**905**
Pk Hr Factor	0.840	0.886	0.000	0.000				**0.896**	**Pk Hr Factor**	0.903	0.829	0.000	0.000				**0.857**

APPENDIX C

INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS – ICU

APPENDIX C-I

EXISTING TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.684

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	147	187	129	840	564	8	13	1185	191	417	1476	519
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	187	129	840	564	8	13	1185	191	417	1476	519
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	47	32	210	141	2	3	296	48	104	369	130
Total Analysis Volume [veh/h]	147	187	129	840	564	8	13	1185	191	417	1476	519
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.06	0.06	0.25	0.17	0.17	0.00	0.20	0.20	0.12	0.29	0.06
Intersection LOS	B											
Intersection V/C	0.684											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.729

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	997	0	498	0	1611	549	211	1968	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	997	0	498	0	1611	549	211	1968	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	249	0	125	0	403	137	53	492	0
Total Analysis Volume [veh/h]	0	0	0	997	0	498	0	1611	549	211	1968	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.29	0.00	0.29	0.00	0.32	0.32	0.06	0.39	0.00
Intersection LOS	C											
Intersection V/C	0.729											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.798

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	989	0	468	0	0	0	267	2331	0	0	1201	461
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	989	0	468	0	0	0	267	2331	0	0	1201	461
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	247	0	117	0	0	0	67	583	0	0	300	115
Total Analysis Volume [veh/h]	989	0	468	0	0	0	267	2331	0	0	1201	461
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.29	0.00	0.28	0.00	0.00	0.00	0.08	0.46	0.00	0.00	0.24	0.24
Intersection LOS	C											
Intersection V/C	0.798											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.560

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	8	7	6	42	1	85	459	2114	35	15	1578	145
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	7	6	42	1	85	459	2114	35	15	1578	145
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	2	11	0	21	115	529	9	4	395	36
Total Analysis Volume [veh/h]	8	7	6	42	1	85	459	2114	35	15	1578	145
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.01	0.02	0.03	0.03	0.14	0.42	0.42	0.01	0.34	0.34
Intersection LOS	A											
Intersection V/C	0.560											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.671

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	137	268	10	104	182	339	417	1659	140	19	1195	153
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	268	10	104	182	339	417	1659	140	19	1195	153
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	67	3	26	46	85	104	415	35	5	299	38
Total Analysis Volume [veh/h]	137	268	10	104	182	339	417	1659	140	19	1195	153
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.08	0.08	0.06	0.15	0.15	0.12	0.33	0.08	0.01	0.26	0.26
Intersection LOS	B											
Intersection V/C	0.671											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.602

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	277	107	30	18	204	308	92	614	1008	253	691	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	277	107	30	18	204	308	92	614	1008	253	691	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	69	27	8	5	51	77	23	154	252	63	173	3
Total Analysis Volume [veh/h]	277	107	30	18	204	308	92	614	1008	253	691	12
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.06	0.00	0.01	0.12	0.18	0.05	0.18	0.22	0.07	0.14	0.14
Intersection LOS	B											
Intersection V/C	0.602											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.291

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	40	5	16	4	0	5	6	654	43	22	932	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	40	5	16	4	0	5	6	654	43	22	932	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	1	4	1	0	1	2	164	11	6	233	1
Total Analysis Volume [veh/h]	40	5	16	4	0	5	6	654	43	22	932	2
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.21	0.21	0.01	0.18	0.18
Intersection LOS	A											
Intersection V/C	0.291											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.861
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	69	Level Of Service:	D

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	0 2	0 1	1	0 1	1 0	1	0 2	1 0	2	0 2	1 0
Volume Module:												
Base Vol:	264	173	132	7	352	38	44	148	488	862	658	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	264	173	132	7	352	38	44	148	488	862	658	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	264	173	132	7	352	38	44	148	488	862	658	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	264	173	0	7	352	38	44	148	488	862	658	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	264	173	0	7	352	38	44	148	488	862	658	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	264	173	0	7	352	38	44	148	488	862	658	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.81	0.19	1.00	2.00	1.00	2.00	2.99	0.01
Final Sat.:	1700	3400	1700	1700	3069	331	1700	3400	1700	3400	5085	15
Capacity Analysis Module:												
Vol/Sat:	0.16	0.05	0.00	0.00	0.11	0.11	0.03	0.04	0.29	0.25	0.13	0.13
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.515

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	4	1	1	0	0	22	13	294	7	6	1542	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	1	1	0	0	22	13	294	7	6	1542	4
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	6	3	74	2	2	386	1
Total Analysis Volume [veh/h]	4	1	1	0	0	22	13	294	7	6	1542	4
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.09	0.09	0.00	0.45	0.00
Intersection LOS	A											
Intersection V/C	0.515											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.474

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	73	115	93	610	755	141	72	487	46	74	540	265
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	73	115	93	610	755	141	72	487	46	74	540	265
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	29	23	153	189	35	18	122	12	19	135	66
Total Analysis Volume [veh/h]	73	115	93	610	755	141	72	487	46	74	540	265
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.03	0.05	0.18	0.22	0.08	0.02	0.14	0.03	0.02	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.474											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.603

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	228	6	298	53	28	8	2	883	294	332	724	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	228	6	298	53	28	8	2	883	294	332	724	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	2	75	13	7	2	1	221	74	83	181	3
Total Analysis Volume [veh/h]	228	6	298	53	28	8	2	883	294	332	724	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.08	0.03	0.02	0.02	0.00	0.35	0.35	0.10	0.22	0.22
Intersection LOS	B											
Intersection V/C	0.603											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.529

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	38	1	109	77	203	4	2	174	20
Total Analysis Volume [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.08	0.18	0.24	0.24	0.00	0.20	0.05
Intersection LOS	A											
Intersection V/C	0.529											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.542

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	130	209	89	427	958	171	36	533	335	60	411	209
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	209	89	427	958	171	36	533	335	60	411	209
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	52	22	107	240	43	9	133	84	15	103	52
Total Analysis Volume [veh/h]	130	209	89	427	958	171	36	533	335	60	411	209
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.06	0.06	0.13	0.22	0.22	0.02	0.16	0.20	0.04	0.12	0.12
Intersection LOS	A											
Intersection V/C	0.542											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	130	196	13	718	755	243	60	418	130	12	340	305
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	196	13	718	755	243	60	418	130	12	340	305
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	49	3	180	189	61	15	105	33	3	85	76
Total Analysis Volume [veh/h]	130	196	13	718	755	243	60	418	130	12	340	305
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.06	0.06	0.42	0.29	0.29	0.02	0.16	0.16	0.01	0.10	0.18
Intersection LOS	C											
Intersection V/C	0.731											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.787

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	10	665	1202	10	8	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	665	1202	10	8	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	166	301	3	2	8
Total Analysis Volume [veh/h]	10	665	1202	10	8	33
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.39	0.71	0.01	0.00	0.02
Intersection LOS	C					
Intersection V/C	0.787					

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.558

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	558	0	445	0	1366	619	0	1589	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	558	0	445	0	1366	619	0	1589	174
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	140	0	111	0	342	155	0	397	44
Total Analysis Volume [veh/h]	0	0	0	558	0	445	0	1366	619	0	1589	174
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

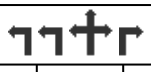
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.16	0.00	0.20	0.00	0.27	0.00	0.00	0.31	0.00
Intersection LOS	A											
Intersection V/C	0.558											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.571

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	803	43	761	0	0	50	116	1241	515	0	1355	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	803	43	761	0	0	50	116	1241	515	0	1355	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	201	11	190	0	0	13	29	310	129	0	339	5
Total Analysis Volume [veh/h]	803	43	761	0	0	50	116	1241	515	0	1355	18
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.24	0.24	0.00	0.00	0.01	0.07	0.24	0.00	0.00	0.20	0.20
Intersection LOS	A											
Intersection V/C	0.571											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.691

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	140	198	68	142	314	139	142	1758	95	88	1505	80
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	140	198	68	142	314	139	142	1758	95	88	1505	80
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	50	17	36	79	35	36	440	24	22	376	20
Total Analysis Volume [veh/h]	140	198	68	142	314	139	142	1758	95	88	1505	80
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.08	0.08	0.04	0.18	0.08	0.08	0.36	0.36	0.05	0.23	0.23
Intersection LOS	B											
Intersection V/C	0.691											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.590

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	163	11	138	24	27	13	12	1721	339	167	1377	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	11	138	24	27	13	12	1721	339	167	1377	31
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	3	35	6	7	3	3	430	85	42	344	8
Total Analysis Volume [veh/h]	163	11	138	24	27	13	12	1721	339	167	1377	31
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

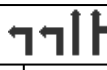
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.05	0.08	0.01	0.02	0.02	0.01	0.34	0.20	0.10	0.28	0.28
Intersection LOS	A											
Intersection V/C	0.590											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.574

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	163	231	81	308	608	105	128	1187	227	67	982	84
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	231	81	308	608	105	128	1187	227	67	982	84
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	58	20	77	152	26	32	297	57	17	246	21
Total Analysis Volume [veh/h]	163	231	81	308	608	105	128	1187	227	67	982	84
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.09	0.09	0.09	0.18	0.06	0.04	0.28	0.28	0.02	0.21	0.21
Intersection LOS	A											
Intersection V/C	0.574											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.526

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	121	167	113	255	254	184	179	909	84	111	1424	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	121	167	113	255	254	184	179	909	84	111	1424	134
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	42	28	64	64	46	45	227	21	28	356	34
Total Analysis Volume [veh/h]	121	167	113	255	254	184	179	909	84	111	1424	134
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.05	0.07	0.08	0.07	0.11	0.05	0.18	0.05	0.03	0.28	0.08
Intersection LOS	A											
Intersection V/C	0.526											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.688

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	234	181	133	775	444	20	33	1106	218	246	1295	501
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	234	181	133	775	444	20	33	1106	218	246	1295	501
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	45	33	194	111	5	8	277	55	62	324	125
Total Analysis Volume [veh/h]	234	181	133	775	444	20	33	1106	218	246	1295	501
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.05	0.08	0.23	0.13	0.01	0.02	0.26	0.26	0.07	0.25	0.29
Intersection LOS	B											
Intersection V/C	0.688											

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.657

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	294	558	242	529	359	14	37	1108	238	303	979	666
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	294	558	242	529	359	14	37	1108	238	303	979	666
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	74	140	61	132	90	4	9	277	60	76	245	167
Total Analysis Volume [veh/h]	294	558	242	529	359	14	37	1108	238	303	979	666
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.16	0.14	0.16	0.11	0.11	0.01	0.20	0.20	0.09	0.19	0.24
Intersection LOS	B											
Intersection V/C	0.657											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	430	0	675	0	1079	724	219	1562	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	430	0	675	0	1079	724	219	1562	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	108	0	169	0	270	181	55	391	0
Total Analysis Volume [veh/h]	0	0	0	430	0	675	0	1079	724	219	1562	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.13	0.00	0.22	0.00	0.27	0.27	0.06	0.31	0.00
Intersection LOS	A											
Intersection V/C	0.596											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.552

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	618	0	253	0	0	0	343	1365	0	0	992	497
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	618	0	253	0	0	0	343	1365	0	0	992	497
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	155	0	63	0	0	0	86	341	0	0	248	124
Total Analysis Volume [veh/h]	618	0	253	0	0	0	343	1365	0	0	992	497
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.00	0.15	0.00	0.00	0.00	0.10	0.27	0.00	0.00	0.22	0.22
Intersection LOS	A											
Intersection V/C	0.552											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.539

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	109	0	26	95	0	372	159	1723	37	14	1354	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	109	0	26	95	0	372	159	1723	37	14	1354	42
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	0	7	24	0	93	40	431	9	4	339	11
Total Analysis Volume [veh/h]	109	0	26	95	0	372	159	1723	37	14	1354	42
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.08	0.06	0.00	0.11	0.05	0.35	0.35	0.01	0.27	0.27
Intersection LOS	A											
Intersection V/C	0.539											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.522

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	125	48	19	77	94	125	41	1633	186	23	1181	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	48	19	77	94	125	41	1633	186	23	1181	40
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	12	5	19	24	31	10	408	47	6	295	10
Total Analysis Volume [veh/h]	125	48	19	77	94	125	41	1633	186	23	1181	40
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.02	0.02	0.05	0.06	0.06	0.01	0.32	0.11	0.01	0.24	0.24
Intersection LOS	A											
Intersection V/C	0.522											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	474	279	207	4	94	108	172	787	447	74	312	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	474	279	207	4	94	108	172	787	447	74	312	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	119	70	52	1	24	27	43	197	112	19	78	7
Total Analysis Volume [veh/h]	474	279	207	4	94	108	172	787	447	74	312	26
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.16	0.10	0.00	0.06	0.06	0.10	0.23	0.00	0.02	0.07	0.07
Intersection LOS	A											
Intersection V/C	0.506											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.412

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	24	2	11	2	0	5	5	1154	19	5	563	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	2	11	2	0	5	5	1154	19	5	563	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	3	1	0	1	1	289	5	1	141	1
Total Analysis Volume [veh/h]	24	2	11	2	0	5	5	1154	19	5	563	3
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.35	0.35	0.00	0.11	0.11
Intersection LOS	A											
Intersection V/C	0.412											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.569
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	27	Level Of Service:	A

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	0 2	0 1	1	0 1	1 0	1	0 2	1 0	2	0 2	1 0
Volume Module:												
Base Vol:	308	132	694	23	99	30	25	687	445	130	229	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	308	132	694	23	99	30	25	687	445	130	229	8
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	308	132	694	23	99	30	25	687	445	130	229	8
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	308	132	0	23	99	30	25	687	445	130	229	8
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	308	132	0	23	99	30	25	687	445	130	229	8
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	308	132	0	23	99	30	25	687	445	130	229	8
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.53	0.47	1.00	2.00	1.00	2.00	2.90	0.10
Final Sat.:	1700	3400	1700	1700	2609	791	1700	3400	1700	3400	4928	172
Capacity Analysis Module:												
Vol/Sat:	0.18	0.04	0.00	0.01	0.04	0.04	0.01	0.20	0.26	0.04	0.05	0.05
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.478

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	10	0	2	0	0	14	1	1426	2	1	288	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	2	0	0	14	1	1426	2	1	288	7
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	0	0	4	0	357	1	0	72	2
Total Analysis Volume [veh/h]	10	0	2	0	0	14	1	1426	2	1	288	7
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.42	0.42	0.00	0.08	0.00
Intersection LOS	A											
Intersection V/C	0.478											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.636

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	135	337	150	301	309	250	188	720	150	135	922	584
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	337	150	301	309	250	188	720	150	135	922	584
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	84	38	75	77	63	47	180	38	34	231	146
Total Analysis Volume [veh/h]	135	337	150	301	309	250	188	720	150	135	922	584
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.10	0.09	0.09	0.09	0.15	0.06	0.21	0.09	0.04	0.27	0.34
Intersection LOS	B											
Intersection V/C	0.636											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.602

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	447	31	333	10	19	6	12	828	278	275	1176	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	447	31	333	10	19	6	12	828	278	275	1176	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	112	8	83	3	5	2	3	207	70	69	294	4
Total Analysis Volume [veh/h]	447	31	333	10	19	6	12	828	278	275	1176	16
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.02	0.12	0.01	0.01	0.01	0.01	0.33	0.33	0.08	0.35	0.35
Intersection LOS	B											
Intersection V/C	0.602											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.626

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	3	24	1	69	66	216	3	1	303	32
Total Analysis Volume [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.06	0.00	0.01	0.16	0.26	0.26	0.00	0.36	0.07
Intersection LOS	B											
Intersection V/C	0.626											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.614

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	563	697	117	204	353	97	204	678	278	73	647	201
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	563	697	117	204	353	97	204	678	278	73	647	201
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	141	174	29	51	88	24	51	170	70	18	162	50
Total Analysis Volume [veh/h]	563	697	117	204	353	97	204	678	278	73	647	201
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.17	0.16	0.16	0.06	0.09	0.09	0.12	0.20	0.16	0.04	0.19	0.12
Intersection LOS	B											
Intersection V/C	0.614											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.914

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	186	510	14	416	205	36	168	582	130	11	430	707
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	186	510	14	416	205	36	168	582	130	11	430	707
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	128	4	104	51	9	42	146	33	3	108	177
Total Analysis Volume [veh/h]	186	510	14	416	205	36	168	582	130	11	430	707
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.15	0.15	0.24	0.07	0.07	0.05	0.21	0.21	0.01	0.13	0.42
Intersection LOS	E											
Intersection V/C	0.914											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	26	1000	1061	15	7	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	1000	1061	15	7	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	250	265	4	2	5
Total Analysis Volume [veh/h]	26	1000	1061	15	7	18
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.59	0.62	0.01	0.00	0.01
Intersection LOS	C					
Intersection V/C	0.704					

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.680

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	632	0	502	0	1567	862	0	2079	375
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	632	0	502	0	1567	862	0	2079	375
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	158	0	126	0	392	216	0	520	94
Total Analysis Volume [veh/h]	0	0	0	632	0	502	0	1567	862	0	2079	375
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.19	0.00	0.22	0.00	0.31	0.00	0.00	0.41	0.00
Intersection LOS	B											
Intersection V/C	0.680											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.761

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	848	72	397	0	0	231	206	1670	345	0	2186	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	848	72	397	0	0	231	206	1670	345	0	2186	46
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	212	18	99	0	0	58	52	418	86	0	547	12
Total Analysis Volume [veh/h]	848	72	397	0	0	231	206	1670	345	0	2186	46
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.17	0.19	0.19	0.00	0.00	0.07	0.12	0.33	0.00	0.00	0.33	0.33
Intersection LOS	C											
Intersection V/C	0.761											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.763

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	205	247	80	278	333	212	240	1697	132	167	1597	163
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	247	80	278	333	212	240	1697	132	167	1597	163
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	62	20	70	83	53	60	424	33	42	399	41
Total Analysis Volume [veh/h]	205	247	80	278	333	212	240	1697	132	167	1597	163
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.10	0.10	0.08	0.20	0.12	0.14	0.36	0.36	0.10	0.26	0.26
Intersection LOS	C											
Intersection V/C	0.763											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.684

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	225	45	253	24	22	13	18	1713	263	219	1764	54
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	225	45	253	24	22	13	18	1713	263	219	1764	54
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	11	63	6	6	3	5	428	66	55	441	14
Total Analysis Volume [veh/h]	225	45	253	24	22	13	18	1713	263	219	1764	54
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

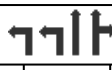
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.15	0.01	0.02	0.02	0.01	0.34	0.15	0.13	0.36	0.36
Intersection LOS	B											
Intersection V/C	0.684											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.717

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	338	580	97	251	445	107	202	1272	198	174	1406	303
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	338	580	97	251	445	107	202	1272	198	174	1406	303
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	145	24	63	111	27	51	318	50	44	352	76
Total Analysis Volume [veh/h]	338	580	97	251	445	107	202	1272	198	174	1406	303
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.20	0.20	0.07	0.13	0.06	0.06	0.29	0.29	0.05	0.34	0.34
Intersection LOS	C											
Intersection V/C	0.717											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.546

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	103	227	121	196	190	122	216	1638	134	158	1204	118
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	103	227	121	196	190	122	216	1638	134	158	1204	118
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	57	30	49	48	31	54	410	34	40	301	30
Total Analysis Volume [veh/h]	103	227	121	196	190	122	216	1638	134	158	1204	118
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.07	0.07	0.06	0.06	0.07	0.06	0.32	0.08	0.05	0.24	0.07
Intersection LOS	A											
Intersection V/C	0.546											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.891

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	238	468	113	843	407	18	64	1587	263	147	1217	711
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	238	468	113	843	407	18	64	1587	263	147	1217	711
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	117	28	211	102	5	16	397	66	37	304	178
Total Analysis Volume [veh/h]	238	468	113	843	407	18	64	1587	263	147	1217	711
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.14	0.07	0.25	0.12	0.01	0.04	0.36	0.36	0.04	0.24	0.42
Intersection LOS	D											
Intersection V/C	0.891											

APPENDIX C-II

YEAR 2035 CUMULATIVE TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.832

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	185	238	225	963	659	9	15	1511	230	517	1929	597
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	185	238	225	963	659	9	15	1511	230	517	1929	597
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	60	56	241	165	2	4	378	58	129	482	149
Total Analysis Volume [veh/h]	185	238	225	963	659	9	15	1511	230	517	1929	597
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.09	0.09	0.28	0.20	0.20	0.00	0.26	0.26	0.15	0.38	0.07
Intersection LOS	D											
Intersection V/C	0.832											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.796

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	1045	0	695	0	1855	619	256	2169	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	1045	0	695	0	1855	619	256	2169	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	261	0	174	0	464	155	64	542	0
Total Analysis Volume [veh/h]	0	0	0	1045	0	695	0	1855	619	256	2169	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.31	0.00	0.20	0.00	0.36	0.18	0.08	0.43	0.00
Intersection LOS	C											
Intersection V/C	0.796											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.850

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	1051	0	506	0	0	0	0	2505	404	0	1386	487
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1051	0	506	0	0	0	0	2505	404	0	1386	487
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	263	0	127	0	0	0	0	626	101	0	347	0
Total Analysis Volume [veh/h]	1051	0	506	0	0	0	0	2505	404	0	1386	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.31	0.00	0.30	0.00	0.00	0.00	0.00	0.49	0.24	0.00	0.27	0.00
Intersection LOS	D											
Intersection V/C	0.850											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	66	1	130	557	2469	40	17	1907	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	66	1	130	557	2469	40	17	1907	183
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	2	17	0	33	139	617	10	4	477	46
Total Analysis Volume [veh/h]	9	8	7	66	1	130	557	2469	40	17	1907	183
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.04	0.04	0.04	0.16	0.49	0.49	0.01	0.41	0.41
Intersection LOS	B											
Intersection V/C	0.677											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.784

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	161	307	11	119	208	386	476	1962	165	22	1483	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	161	307	11	119	208	386	476	1962	165	22	1483	174
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	77	3	30	52	97	119	491	41	6	371	44
Total Analysis Volume [veh/h]	161	307	11	119	208	386	476	1962	165	22	1483	174
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.09	0.09	0.07	0.17	0.17	0.14	0.38	0.10	0.01	0.32	0.32
Intersection LOS	C											
Intersection V/C	0.784											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.684

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	316	124	42	21	236	355	109	765	1150	294	901	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	316	124	42	21	236	355	109	765	1150	294	901	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	79	31	11	5	59	89	27	191	288	74	225	4
Total Analysis Volume [veh/h]	316	124	42	21	236	355	109	765	1150	294	901	14
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.07	0.00	0.01	0.14	0.21	0.06	0.23	0.25	0.09	0.18	0.18
Intersection LOS	B											
Intersection V/C	0.684											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.347

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	46	6	18	5	0	6	7	819	49	25	1181	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	6	18	5	0	6	7	819	49	25	1181	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	205	12	6	295	1
Total Analysis Volume [veh/h]	46	6	18	5	0	6	7	819	49	25	1181	2
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.26	0.26	0.01	0.23	0.23
Intersection LOS	A											
Intersection V/C	0.347											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.985
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	301	198	166	8	402	46	53	240	556	1016	867	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	301	198	166	8	402	46	53	240	556	1016	867	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	301	198	166	8	402	46	53	240	556	1016	867	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	301	198	0	8	402	46	53	240	556	1016	867	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	301	198	0	8	402	46	53	240	556	1016	867	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	301	198	0	8	402	46	53	240	556	1016	867	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.79	0.21	1.00	2.00	1.00	2.00	2.99	0.01
Final Sat.:	1700	3400	1700	1700	3051	349	1700	3400	1700	3400	5088	12
Capacity Analysis Module:												
Vol/Sat:	0.18	0.06	0.00	0.00	0.13	0.13	0.03	0.07	0.33	0.30	0.17	0.17
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.621

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	5	1	1	0	0	25	15	412	8	7	1899	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	25	15	412	8	7	1899	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	6	4	103	2	2	475	1
Total Analysis Volume [veh/h]	5	1	1	0	0	25	15	412	8	7	1899	5
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.12	0.12	0.00	0.56	0.00
Intersection LOS	B											
Intersection V/C	0.621											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.573

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	84	169	110	739	930	242	119	574	53	88	630	322
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	169	110	739	930	242	119	574	53	88	630	322
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	21	42	28	185	233	61	30	144	13	22	158	81
Total Analysis Volume [veh/h]	84	169	110	739	930	242	119	574	53	88	630	322
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.05	0.06	0.22	0.27	0.14	0.04	0.17	0.03	0.03	0.19	0.19
Intersection LOS	A											
Intersection V/C	0.573											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.701

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	272	7	344	60	32	10	5	1049	356	380	850	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	272	7	344	60	32	10	5	1049	356	380	850	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	2	86	15	8	3	1	262	89	95	213	3
Total Analysis Volume [veh/h]	272	7	344	60	32	10	5	1049	356	380	850	11
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.09	0.04	0.02	0.02	0.00	0.41	0.41	0.11	0.25	0.25
Intersection LOS	C											
Intersection V/C	0.701											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.607

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	178	2	499	353	969	18	9	820	94
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	178	2	499	353	969	18	9	820	94
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	45	1	125	88	242	5	2	205	24
Total Analysis Volume [veh/h]	3	3	6	178	2	499	353	969	18	9	820	94
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.10	0.00	0.09	0.21	0.29	0.29	0.01	0.24	0.06
Intersection LOS	B											
Intersection V/C	0.607											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	148	239	101	487	1095	202	50	649	382	69	493	238
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	148	239	101	487	1095	202	50	649	382	69	493	238
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	60	25	122	274	51	13	162	96	17	123	60
Total Analysis Volume [veh/h]	148	239	101	487	1095	202	50	649	382	69	493	238
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.07	0.07	0.14	0.25	0.25	0.03	0.19	0.22	0.04	0.15	0.14
Intersection LOS	B											
Intersection V/C	0.613											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.831

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	148	239	15	819	894	278	69	509	148	14	403	348
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	148	239	15	819	894	278	69	509	148	14	403	348
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	60	4	205	224	70	17	127	37	4	101	87
Total Analysis Volume [veh/h]	148	239	15	819	894	278	69	509	148	14	403	348
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.07	0.07	0.48	0.34	0.34	0.02	0.19	0.19	0.01	0.12	0.20
Intersection LOS	D											
Intersection V/C	0.831											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.909

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	11	773	1402	11	9	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	773	1402	11	9	38
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	193	351	3	2	10
Total Analysis Volume [veh/h]	11	773	1402	11	9	38
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.45	0.82	0.01	0.01	0.03
Intersection LOS	E					
Intersection V/C	0.909					

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.703

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	651	0	551	0	1671	792	0	2127	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	651	0	551	0	1671	792	0	2127	221
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	163	0	138	0	418	198	0	532	55
Total Analysis Volume [veh/h]	0	0	0	651	0	551	0	1671	792	0	2127	221
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.19	0.00	0.24	0.00	0.33	0.00	0.00	0.42	0.00
Intersection LOS	C											
Intersection V/C	0.703											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.692

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1099	36	904	0	0	92	113	1545	606	0	1674	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1099	36	904	0	0	92	113	1545	606	0	1674	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	275	9	226	0	0	23	28	386	152	0	419	4
Total Analysis Volume [veh/h]	1099	36	904	0	0	92	113	1545	606	0	1674	16
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.30	0.30	0.00	0.00	0.03	0.07	0.30	0.00	0.00	0.25	0.25
Intersection LOS	B											
Intersection V/C	0.692											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.803

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	164	227	79	181	360	177	227	2100	112	100	1818	108
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	227	79	181	360	177	227	2100	112	100	1818	108
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	57	20	45	90	44	57	525	28	25	455	27
Total Analysis Volume [veh/h]	164	227	79	181	360	177	227	2100	112	100	1818	108
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.09	0.09	0.05	0.21	0.10	0.13	0.43	0.43	0.06	0.28	0.28
Intersection LOS	D											
Intersection V/C	0.803											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.688

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	199	13	159	27	31	15	14	2066	398	191	1675	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	13	159	27	31	15	14	2066	398	191	1675	35
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	3	40	7	8	4	4	517	100	48	419	9
Total Analysis Volume [veh/h]	199	13	159	27	31	15	14	2066	398	191	1675	35
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

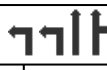
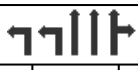
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.06	0.09	0.02	0.03	0.03	0.01	0.41	0.23	0.11	0.34	0.34
Intersection LOS	B											
Intersection V/C	0.688											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.667

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	192	263	94	352	693	122	148	1441	263	77	1216	96
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	192	263	94	352	693	122	148	1441	263	77	1216	96
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	66	24	88	173	31	37	360	66	19	304	24
Total Analysis Volume [veh/h]	192	263	94	352	693	122	148	1441	263	77	1216	96
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.11	0.11	0.10	0.20	0.07	0.04	0.33	0.33	0.02	0.26	0.26
Intersection LOS	B											
Intersection V/C	0.667											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	144	201	129	299	314	214	205	1100	99	127	1706	158
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	201	129	299	314	214	205	1100	99	127	1706	158
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	50	32	75	79	54	51	275	25	32	427	40
Total Analysis Volume [veh/h]	144	201	129	299	314	214	205	1100	99	127	1706	158
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.06	0.08	0.09	0.09	0.13	0.06	0.22	0.06	0.04	0.33	0.09
Intersection LOS	B											
Intersection V/C	0.613											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.801

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	267	206	152	916	506	23	38	1333	249	280	1564	586
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	267	206	152	916	506	23	38	1333	249	280	1564	586
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	52	38	229	127	6	10	333	62	70	391	147
Total Analysis Volume [veh/h]	267	206	152	916	506	23	38	1333	249	280	1564	586
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.06	0.09	0.27	0.15	0.01	0.02	0.31	0.31	0.08	0.31	0.34
Intersection LOS	D											
Intersection V/C	0.801											

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.829

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	350	655	337	607	439	16	42	1599	288	436	1286	763
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	350	655	337	607	439	16	42	1599	288	436	1286	763
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	164	84	152	110	4	11	400	72	109	322	191
Total Analysis Volume [veh/h]	350	655	337	607	439	16	42	1599	288	436	1286	763
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.19	0.19	0.18	0.13	0.13	0.01	0.28	0.28	0.13	0.25	0.27
Intersection LOS	D											
Intersection V/C	0.829											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.656

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	454	0	855	0	1430	835	251	1740	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	454	0	855	0	1430	835	251	1740	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	114	0	214	0	358	209	63	435	0
Total Analysis Volume [veh/h]	0	0	0	454	0	855	0	1430	835	251	1740	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.13	0.00	0.25	0.00	0.28	0.25	0.07	0.34	0.00
Intersection LOS	B											
Intersection V/C	0.656											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.558

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	676	0	301	0	0	0	0	1528	576	0	1137	523
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	676	0	301	0	0	0	0	1528	576	0	1137	523
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	169	0	75	0	0	0	0	382	144	0	284	0
Total Analysis Volume [veh/h]	676	0	301	0	0	0	0	1528	576	0	1137	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.00	0.18	0.00	0.00	0.00	0.00	0.31	0.31	0.00	0.22	0.00
Intersection LOS	A											
Intersection V/C	0.558											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.638

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	124	0	30	120	0	447	204	2085	42	16	1629	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	124	0	30	120	0	447	204	2085	42	16	1629	60
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	0	8	30	0	112	51	521	11	4	407	15
Total Analysis Volume [veh/h]	124	0	30	120	0	447	204	2085	42	16	1629	60
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.09	0.07	0.00	0.13	0.06	0.42	0.42	0.01	0.33	0.33
Intersection LOS	B											
Intersection V/C	0.638											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	147	59	22	88	112	144	47	1992	216	26	1439	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	59	22	88	112	144	47	1992	216	26	1439	46
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	15	6	22	28	36	12	498	54	7	360	12
Total Analysis Volume [veh/h]	147	59	22	88	112	144	47	1992	216	26	1439	46
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.02	0.02	0.05	0.08	0.08	0.01	0.39	0.13	0.02	0.29	0.29
Intersection LOS	B											
Intersection V/C	0.618											

Intersection Level Of Service Report

Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.611

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	542	327	238	5	116	126	199	1022	510	90	440	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	542	327	238	5	116	126	199	1022	510	90	440	30
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	136	82	60	1	29	32	50	256	128	23	110	8
Total Analysis Volume [veh/h]	542	327	238	5	116	126	199	1022	510	90	440	30
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.19	0.11	0.00	0.07	0.07	0.12	0.30	0.00	0.03	0.09	0.09
Intersection LOS	B											
Intersection V/C	0.611											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.501

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	27	2	13	2	0	6	6	1444	22	6	732	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	2	13	2	0	6	6	1444	22	6	732	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	1	3	1	0	2	2	361	6	2	183	1
Total Analysis Volume [veh/h]	27	2	13	2	0	6	6	1444	22	6	732	3
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.43	0.43	0.00	0.14	0.14
Intersection LOS	A											
Intersection V/C	0.501											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.650
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	33	Level Of Service:	B

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	351	154	828	26	118	36	31	909	507	171	349	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	351	154	828	26	118	36	31	909	507	171	349	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	351	154	828	26	118	36	31	909	507	171	349	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	351	154	0	26	118	36	31	909	507	171	349	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	351	154	0	26	118	36	31	909	507	171	349	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	351	154	0	26	118	36	31	909	507	171	349	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.53	0.47	1.00	2.00	1.00	2.00	2.92	0.08
Final Sat.:	1700	3400	1700	1700	2605	795	1700	3400	1700	3400	4972	128
Capacity Analysis Module:												
Vol/Sat:	0.21	0.05	0.00	0.02	0.05	0.05	0.02	0.27	0.30	0.05	0.07	0.07
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.582

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	11	0	2	0	0	16	1	1780	2	1	430	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	2	0	0	16	1	1780	2	1	430	8
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	0	0	4	0	445	1	0	108	2
Total Analysis Volume [veh/h]	11	0	2	0	0	16	1	1780	2	1	430	8
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.52	0.52	0.00	0.13	0.00
Intersection LOS	A											
Intersection V/C	0.582											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.809

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	456	174	374	415	346	305	848	173	161	1083	713
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	456	174	374	415	346	305	848	173	161	1083	713
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	114	44	94	104	87	76	212	43	40	271	178
Total Analysis Volume [veh/h]	157	456	174	374	415	346	305	848	173	161	1083	713
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.13	0.10	0.11	0.12	0.20	0.09	0.25	0.10	0.05	0.32	0.42
Intersection LOS	D											
Intersection V/C	0.809											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.705

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	532	35	379	11	22	10	16	987	332	313	1399	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	532	35	379	11	22	10	16	987	332	313	1399	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	133	9	95	3	6	3	4	247	83	78	350	5
Total Analysis Volume [veh/h]	532	35	379	11	22	10	16	987	332	313	1399	18
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.02	0.13	0.01	0.02	0.02	0.01	0.39	0.39	0.09	0.42	0.42
Intersection LOS	C											
Intersection V/C	0.705											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.727

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	11	113	3	319	306	1023	13	6	1435	149
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	11	113	3	319	306	1023	13	6	1435	149
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	28	1	80	77	256	3	2	359	37
Total Analysis Volume [veh/h]	14	2	11	113	3	319	306	1023	13	6	1435	149
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.07	0.00	0.01	0.18	0.30	0.30	0.00	0.42	0.09
Intersection LOS	C											
Intersection V/C	0.727											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.714

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	642	801	134	233	406	122	240	807	317	84	784	229
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	642	801	134	233	406	122	240	807	317	84	784	229
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	200	34	58	102	31	60	202	79	21	196	57
Total Analysis Volume [veh/h]	642	801	134	233	406	122	240	807	317	84	784	229
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.18	0.18	0.07	0.10	0.10	0.14	0.24	0.19	0.05	0.23	0.13
Intersection LOS	C											
Intersection V/C	0.714											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.047

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	212	618	16	474	257	46	196	686	148	13	524	806
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	212	618	16	474	257	46	196	686	148	13	524	806
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	53	155	4	119	64	12	49	172	37	3	131	202
Total Analysis Volume [veh/h]	212	618	16	474	257	46	196	686	148	13	524	806
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.19	0.19	0.28	0.09	0.09	0.06	0.25	0.25	0.01	0.15	0.47
Intersection LOS	F											
Intersection V/C	1.047											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	30	1174	1233	17	8	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	1174	1233	17	8	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	294	308	4	2	5
Total Analysis Volume [veh/h]	30	1174	1233	17	8	21
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.69	0.73	0.01	0.00	0.02
Intersection LOS	D					
Intersection V/C	0.810					

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.826

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	730	0	605	0	1898	1100	0	2623	451
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	730	0	605	0	1898	1100	0	2623	451
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	183	0	151	0	475	275	0	656	113
Total Analysis Volume [veh/h]	0	0	0	730	0	605	0	1898	1100	0	2623	451
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.21	0.00	0.26	0.00	0.37	0.00	0.00	0.51	0.00
Intersection LOS	D											
Intersection V/C	0.826											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.880

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1110	72	482	0	0	217	205	2041	410	0	2686	43
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1110	72	482	0	0	217	205	2041	410	0	2686	43
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	278	18	121	0	0	54	51	510	103	0	672	11
Total Analysis Volume [veh/h]	1110	72	482	0	0	217	205	2041	410	0	2686	43
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.24	0.24	0.00	0.00	0.06	0.12	0.40	0.00	0.00	0.40	0.40
Intersection LOS	D											
Intersection V/C	0.880											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.893

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	240	282	92	320	380	280	296	2073	153	191	1967	203
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	282	92	320	380	280	296	2073	153	191	1967	203
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	71	23	80	95	70	74	518	38	48	492	51
Total Analysis Volume [veh/h]	240	282	92	320	380	280	296	2073	153	191	1967	203
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.09	0.22	0.16	0.17	0.44	0.44	0.11	0.32	0.32
Intersection LOS	D											
Intersection V/C	0.893											

Intersection Level Of Service Report

Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.804

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	276	51	292	28	25	15	21	2088	308	254	2154	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	276	51	292	28	25	15	21	2088	308	254	2154	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	69	13	73	7	6	4	5	522	77	64	539	16
Total Analysis Volume [veh/h]	276	51	292	28	25	15	21	2088	308	254	2154	63
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.10	0.17	0.02	0.02	0.02	0.01	0.41	0.18	0.15	0.43	0.43
Intersection LOS	D											
Intersection V/C	0.804											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.835

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	398	661	112	286	507	127	235	1557	239	201	1718	347
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	398	661	112	286	507	127	235	1557	239	201	1718	347
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	100	165	28	72	127	32	59	389	60	50	430	87
Total Analysis Volume [veh/h]	398	661	112	286	507	127	235	1557	239	201	1718	347
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.23	0.23	0.08	0.15	0.07	0.07	0.35	0.35	0.06	0.40	0.40
Intersection LOS	D											
Intersection V/C	0.835											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.638

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	125	284	138	229	233	141	252	1957	163	180	1457	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	284	138	229	233	141	252	1957	163	180	1457	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	71	35	57	58	35	63	489	41	45	364	36
Total Analysis Volume [veh/h]	125	284	138	229	233	141	252	1957	163	180	1457	143
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.08	0.08	0.07	0.07	0.08	0.07	0.38	0.10	0.05	0.29	0.08
Intersection LOS	B											
Intersection V/C	0.638											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.036

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	271	534	129	984	464	21	73	1905	300	168	1479	845
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	271	534	129	984	464	21	73	1905	300	168	1479	845
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	134	32	246	116	5	18	476	75	42	370	211
Total Analysis Volume [veh/h]	271	534	129	984	464	21	73	1905	300	168	1479	845
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.16	0.08	0.29	0.14	0.01	0.04	0.43	0.43	0.05	0.29	0.50
Intersection LOS	F											
Intersection V/C	1.036											

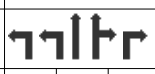
APPENDIX C-III

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.835

Intersection Setup

Name	St Co			St Co			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	St Co			St Co			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	185	238	225	963	659	9	15	152	230	517	196	597
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	185	238	225	963	659	9	15	152	230	517	196	597
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	46	60	56	241	165	2	4	382	58	129	492	149
Total Analysis Volume [veh/h]	185	238	225	963	659	9	15	152	230	517	196	597
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Ove
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.09	0.09	0.28	0.20	0.20	0.00	0.26	0.26	0.15	0.39	0.07
Intersection LOS	D											
Intersection V/C	0.835											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.813

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	106	0	695	0	187	619	276	220	0
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	106	0	695	0	187	619	276	220	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	267	0	174	0	468	155	69	552	0
Total Analysis Volume [veh/h]	0	0	0	106	0	695	0	187	619	276	220	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Per	Prot	Per	Per
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.31	0.00	0.20	0.00	0.37	0.18	0.08	0.43	0.00
Intersection LOS	D											
Intersection V/C	0.813											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.859

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	105	0	513	0	0	0	0	254	404	0	144	549
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	105	0	513	0	0	0	0	254	404	0	144	549
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Total 15-Minute Volume [veh/h]	263	0	128	0	0	0	0	637	101	0	362	0
Total Analysis Volume [veh/h]	105	0	513	0	0	0	0	254	404	0	144	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Per	Split	Per	Per	Per	Prot	Per	Per	Per	Per	Unsi
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.31	0.00	0.30	0.00	0.00	0.00	0.00	0.50	0.24	0.00	0.28	0.00
Intersection LOS	D											
Intersection V/C	0.859											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.701

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	66	1	130	557	251	40	17	203	183
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	66	1	130	557	251	40	17	203	183
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	2	2	2	17	0	33	139	630	10	4	508	46
Total Analysis Volume [veh/h]	9	8	7	66	1	130	557	251	40	17	203	183
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.04	0.04	0.04	0.16	0.50	0.50	0.01	0.43	0.43
Intersection LOS	C											
Intersection V/C	0.701											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.809

Intersection Setup

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	161	307	11	119	208	386	476	201	165	22	160	174
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	161	307	11	119	208	386	476	201	165	22	160	174
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	40	77	3	30	52	97	119	503	41	6	402	44
Total Analysis Volume [veh/h]	161	307	11	119	208	386	476	201	165	22	160	174
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

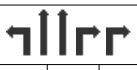
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.09	0.09	0.07	0.17	0.17	0.14	0.39	0.10	0.01	0.35	0.35
Intersection LOS	D											
Intersection V/C	0.809											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.700

Intersection Setup

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	323	124	65	21	236	355	109	811	115	347	101	14
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	323	124	65	21	236	355	109	811	115	347	101	14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	81	31	16	5	59	89	27	203	288	87	255	4
Total Analysis Volume [veh/h]	323	124	65	21	236	355	109	811	115	347	101	14
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Ove	Prot	Per	Per	Prot	Per	Ove	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.07	0.00	0.01	0.14	0.21	0.06	0.24	0.24	0.10	0.20	0.20
Intersection LOS	C											
Intersection V/C	0.700											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.367

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	46	6	18	5	0	6	7	887	49	25	135	2
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	6	18	5	0	6	7	887	49	25	135	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	222	12	6	338	1
Total Analysis Volume [veh/h]	46	6	18	5	0	6	7	887	49	25	135	2
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.28	0.28	0.01	0.27	0.27
Intersection LOS	A											
Intersection V/C	0.367											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	1.039
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	355	198	180	8	402	46	53	248	591	1022	870	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	355	198	180	8	402	46	53	248	591	1022	870	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	355	198	180	8	402	46	53	248	591	1022	870	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	355	198	0	8	402	46	53	248	591	1022	870	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	355	198	0	8	402	46	53	248	591	1022	870	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	355	198	0	8	402	46	53	248	591	1022	870	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.79	0.21	1.00	2.00	1.00	2.00	2.99	0.01
Final Sat.:	1700	3400	1700	1700	3051	349	1700	3400	1700	3400	5088	12
Capacity Analysis Module:												
Vol/Sat:	0.21	0.06	0.00	0.00	0.13	0.13	0.03	0.07	0.35	0.30	0.17	0.17
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.624

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Base Volume Input [veh/h]	5	1	1	0	0	25	15	434	8	7	190	5
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	25	15	434	8	7	190	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	1	0	0	0	0	6	4	109	2	2	477	1
Total Analysis Volume [veh/h]	5	1	1	0	0	25	15	434	8	7	190	5
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

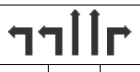
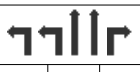
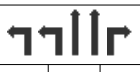
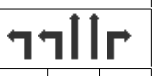
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.13	0.13	0.00	0.56	0.00
Intersection LOS	B											
Intersection V/C	0.624											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.573

Intersection Setup

Name	St Co			St Co			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	St Co			St Co			Birch Street			Birch Street		
Base Volume Input [veh/h]	84	169	116	739	930	242	119	580	53	101	643	322
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	169	116	739	930	242	119	580	53	101	643	322
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	21	42	29	185	233	61	30	145	13	25	161	81
Total Analysis Volume [veh/h]	84	169	116	739	930	242	119	580	53	101	643	322
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

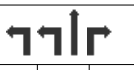
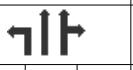
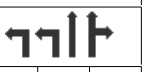
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.05	0.07	0.22	0.27	0.14	0.04	0.17	0.03	0.03	0.19	0.19
Intersection LOS	A											
Intersection V/C	0.573											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.708

Intersection Setup

Name	S As			S As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S As			S As			Birch Street			Birch Street		
Base Volume Input [veh/h]	272	7	351	60	32	10	5	106	356	396	877	11
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	272	7	351	60	32	10	5	106	356	396	877	11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	68	2	88	15	8	3	1	265	89	99	219	3
Total Analysis Volume [veh/h]	272	7	351	60	32	10	5	106	356	396	877	11
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Ove	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.09	0.04	0.02	0.02	0.00	0.42	0.42	0.12	0.26	0.26
Intersection LOS	C											
Intersection V/C	0.708											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.620

Intersection Setup

Name	N As			N As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N As			N As			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	178	2	499	353	986	18	9	864	94
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	178	2	499	353	986	18	9	864	94
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	1	1	2	45	1	125	88	247	5	2	216	24
Total Analysis Volume [veh/h]	3	3	6	178	2	499	353	986	18	9	864	94
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Ove	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

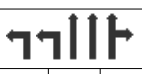
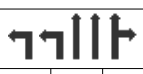
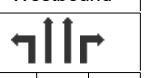
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.10	0.00	0.09	0.21	0.30	0.30	0.01	0.25	0.06
Intersection LOS	B											
Intersection V/C	0.620											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.624

Intersection Setup

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Base Volume Input [veh/h]	148	256	101	490	113	216	56	660	382	69	522	245
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	148	256	101	490	113	216	56	660	382	69	522	245
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	37	64	25	123	284	54	14	165	96	17	131	61
Total Analysis Volume [veh/h]	148	256	101	490	113	216	56	660	382	69	522	245
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.07	0.07	0.14	0.26	0.26	0.03	0.19	0.22	0.04	0.15	0.14
Intersection LOS	B											
Intersection V/C	0.624											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.904

Intersection Setup

Name	Va Av			Va Av			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Birch Street			Rose Drive		
Base Volume Input [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	37	65	7	220	237	75	20	130	37	11	108	98
Total Analysis Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.08	0.08	0.52	0.37	0.37	0.02	0.20	0.20	0.03	0.13	0.23
Intersection LOS	E											
Intersection V/C	0.904											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.984

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	202	4	2	374	3	2	0	10	9	0	3
Total Analysis Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.24	0.24	0.00	0.88	0.01	0.01	0.00	0.03	0.02	0.00	0.01
Intersection LOS	E											
Intersection V/C	0.984											

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.705

Intersection Setup

Name				SR-57			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57			Im Hi			Im Hi		
Base Volume Input [veh/h]	0	0	0	653	0	551	0	167	792	0	213	233
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	653	0	551	0	167	792	0	213	233
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	163	0	138	0	419	198	0	534	58
Total Analysis Volume [veh/h]	0	0	0	653	0	551	0	167	792	0	213	233
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Unsi	Per	Per	Unsi
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.19	0.00	0.24	0.00	0.33	0.00	0.00	0.42	0.00
Intersection LOS	C											
Intersection V/C	0.705											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.696

Intersection Setup

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Base Volume Input [veh/h]	109	36	908	0	0	92	113	155	606	0	170	16
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	109	36	908	0	0	92	113	155	606	0	170	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	275	9	227	0	0	23	28	388	152	0	425	4
Total Analysis Volume [veh/h]	109	36	908	0	0	92	113	155	606	0	170	16
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Per	Split	Prot	Per	Unsi	Per	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.30	0.30	0.00	0.00	0.03	0.07	0.30	0.00	0.00	0.25	0.25
Intersection LOS	B											
Intersection V/C	0.696											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.812

Intersection Setup

Name	As Ro			As Ro			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	As Ro			As Ro			Im Hi			Im Hi		
Base Volume Input [veh/h]	164	232	80	181	372	177	227	211	112	101	184	108
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	232	80	181	372	177	227	211	112	101	184	108
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	41	58	20	45	93	44	57	528	28	25	461	27
Total Analysis Volume [veh/h]	164	232	80	181	372	177	227	211	112	101	184	108
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.09	0.09	0.05	0.22	0.10	0.13	0.44	0.44	0.06	0.29	0.29
Intersection LOS	D											
Intersection V/C	0.812											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.690

Intersection Setup

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Base Volume Input [veh/h]	199	13	159	27	31	15	14	207	398	191	170	35
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	13	159	27	31	15	14	207	398	191	170	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	50	3	40	7	8	4	4	519	100	48	426	9
Total Analysis Volume [veh/h]	199	13	159	27	31	15	14	207	398	191	170	35
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.06	0.09	0.02	0.03	0.03	0.01	0.41	0.23	0.11	0.34	0.34
Intersection LOS	B											
Intersection V/C	0.690											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.679

Intersection Setup

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Base Volume Input [veh/h]	192	277	94	352	726	123	148	145	263	77	124	96
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	192	277	94	352	726	123	148	145	263	77	124	96
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	48	69	24	88	182	31	37	364	66	19	312	24
Total Analysis Volume [veh/h]	192	277	94	352	726	123	148	145	263	77	124	96
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

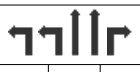
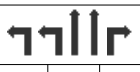
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.11	0.11	0.10	0.21	0.07	0.04	0.34	0.34	0.02	0.26	0.26
Intersection LOS	B											
Intersection V/C	0.679											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.639

Intersection Setup

Name	Va Av			Va Av			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Im Hi			Im Hi		
Base Volume Input [veh/h]	144	214	129	311	347	247	218	110	99	127	172	163
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	214	129	311	347	247	218	110	99	127	172	163
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	36	54	32	78	87	62	55	277	25	32	430	41
Total Analysis Volume [veh/h]	144	214	129	311	347	247	218	110	99	127	172	163
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.06	0.08	0.09	0.10	0.15	0.06	0.22	0.06	0.04	0.34	0.10
Intersection LOS	B											
Intersection V/C	0.639											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.812

Intersection Setup

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Base Volume Input [veh/h]	267	240	152	944	590	37	44	134	249	280	156	598
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	267	240	152	944	590	37	44	134	249	280	156	598
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	67	60	38	236	148	9	11	336	62	70	392	150
Total Analysis Volume [veh/h]	267	240	152	944	590	37	44	134	249	280	156	598
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.07	0.09	0.28	0.17	0.02	0.03	0.31	0.31	0.08	0.31	0.35
Intersection LOS	D											
Intersection V/C	0.812											

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.836

Intersection Setup

Name	St Co			St Co			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	St Co			St Co			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	350	655	337	607	439	16	42	164	288	436	131	763
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	350	655	337	607	439	16	42	164	288	436	131	763
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	88	164	84	152	110	4	11	412	72	109	329	191
Total Analysis Volume [veh/h]	350	655	337	607	439	16	42	164	288	436	131	763
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Ove
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.19	0.19	0.18	0.13	0.13	0.01	0.28	0.28	0.13	0.26	0.27
Intersection LOS	D											
Intersection V/C	0.836											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	524	0	855	0	148	835	265	177	0
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	524	0	855	0	148	835	265	177	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	131	0	214	0	370	209	66	443	0
Total Analysis Volume [veh/h]	0	0	0	524	0	855	0	148	835	265	177	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Per	Prot	Per	Per
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.15	0.00	0.25	0.00	0.29	0.25	0.08	0.35	0.00
Intersection LOS	B											
Intersection V/C	0.670											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.576

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	676	0	329	0	0	0	0	164	576	0	118	570
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	676	0	329	0	0	0	0	164	576	0	118	570
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Total 15-Minute Volume [veh/h]	169	0	82	0	0	0	0	412	144	0	297	0
Total Analysis Volume [veh/h]	676	0	329	0	0	0	0	164	576	0	118	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Per	Split	Per	Per	Per	Prot	Per	Per	Per	Per	Unsi
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.00	0.19	0.00	0.00	0.00	0.00	0.33	0.33	0.00	0.23	0.00
Intersection LOS	A											
Intersection V/C	0.576											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.666

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	124	0	30	120	0	447	204	223	42	16	172	60
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	124	0	30	120	0	447	204	223	42	16	172	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	31	0	8	30	0	112	51	558	11	4	431	15
Total Analysis Volume [veh/h]	124	0	30	120	0	447	204	223	42	16	172	60
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.09	0.07	0.00	0.13	0.06	0.45	0.45	0.01	0.35	0.35
Intersection LOS	B											
Intersection V/C	0.666											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.647

Intersection Setup

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	147	59	23	88	112	144	47	213	216	27	153	46
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	59	23	88	112	144	47	213	216	27	153	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	37	15	6	22	28	36	12	535	54	7	383	12
Total Analysis Volume [veh/h]	147	59	23	88	112	144	47	213	216	27	153	46
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

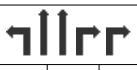
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.02	0.02	0.05	0.08	0.08	0.01	0.42	0.13	0.02	0.31	0.31
Intersection LOS	B											
Intersection V/C	0.647											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.665

Intersection Setup

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	547	327	292	6	116	126	199	116	516	128	530	31
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	547	327	292	6	116	126	199	116	516	128	530	31
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	137	82	73	2	29	32	50	291	129	32	133	8
Total Analysis Volume [veh/h]	547	327	292	6	116	126	199	116	516	128	530	31
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Ove	Prot	Per	Per	Prot	Per	Ove	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.19	0.13	0.00	0.07	0.07	0.12	0.34	0.00	0.04	0.11	0.11
Intersection LOS	B											
Intersection V/C	0.665											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	27	2	14	2	0	6	6	164	22	6	862	3
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	2	14	2	0	6	6	164	22	6	862	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	7	1	4	1	0	2	2	411	6	2	216	1
Total Analysis Volume [veh/h]	27	2	14	2	0	6	6	164	22	6	862	3
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.49	0.49	0.00	0.17	0.17
Intersection LOS	A											
Intersection V/C	0.559											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.726
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	40	Level Of Service:	C

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	404	154	840	26	118	36	31	915	573	189	357	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	404	154	840	26	118	36	31	915	573	189	357	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	404	154	840	26	118	36	31	915	573	189	357	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	404	154	0	26	118	36	31	915	573	189	357	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	404	154	0	26	118	36	31	915	573	189	357	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	404	154	0	26	118	36	31	915	573	189	357	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.53	0.47	1.00	2.00	1.00	2.00	2.93	0.07
Final Sat.:	1700	3400	1700	1700	2605	795	1700	3400	1700	3400	4975	125
Capacity Analysis Module:												
Vol/Sat:	0.24	0.05	0.00	0.02	0.05	0.05	0.02	0.27	0.34	0.06	0.07	0.07
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Base Volume Input [veh/h]	11	0	2	0	0	16	1	179	2	1	456	8
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	2	0	0	16	1	179	2	1	456	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	0	1	0	0	4	0	450	1	0	114	2
Total Analysis Volume [veh/h]	11	0	2	0	0	16	1	179	2	1	456	8
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

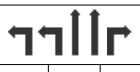
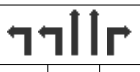
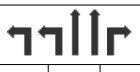
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.53	0.53	0.00	0.13	0.00
Intersection LOS	A											
Intersection V/C	0.588											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.809

Intersection Setup

Name	St Co			St Co			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	St Co			St Co			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	456	188	374	415	346	305	863	173	171	109	713
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	456	188	374	415	346	305	863	173	171	109	713
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	39	114	47	94	104	87	76	216	43	43	273	178
Total Analysis Volume [veh/h]	157	456	188	374	415	346	305	863	173	171	109	713
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

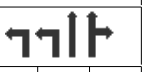
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.13	0.11	0.11	0.12	0.20	0.09	0.25	0.10	0.05	0.32	0.42
Intersection LOS	D											
Intersection V/C	0.809											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.717

Intersection Setup

Name	S As			S As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S As			S As			Birch Street			Birch Street		
Base Volume Input [veh/h]	532	35	396	11	22	10	16	101	332	324	141	18
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	532	35	396	11	22	10	16	101	332	324	141	18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	133	9	99	3	6	3	4	254	83	81	354	5
Total Analysis Volume [veh/h]	532	35	396	11	22	10	16	101	332	324	141	18
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Ove	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.02	0.14	0.01	0.02	0.02	0.01	0.40	0.40	0.10	0.42	0.42
Intersection LOS	C											
Intersection V/C	0.717											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.736

Intersection Setup

Name	N As			N As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N As			N As			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	11	113	3	319	306	107	13	6	146	149
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	11	113	3	319	306	107	13	6	146	149
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	4	1	3	28	1	80	77	268	3	2	366	37
Total Analysis Volume [veh/h]	14	2	11	113	3	319	306	107	13	6	146	149
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Ove	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

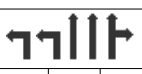
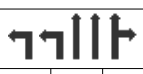
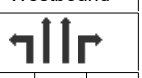
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.07	0.00	0.01	0.18	0.32	0.32	0.00	0.43	0.09
Intersection LOS	C											
Intersection V/C	0.736											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.736

Intersection Setup

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Base Volume Input [veh/h]	642	841	141	239	434	132	254	839	317	87	804	234
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	642	841	141	239	434	132	254	839	317	87	804	234
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	161	210	35	60	109	33	64	210	79	22	201	59
Total Analysis Volume [veh/h]	642	841	141	239	434	132	254	839	317	87	804	234
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.19	0.19	0.07	0.11	0.11	0.15	0.25	0.19	0.05	0.24	0.14
Intersection LOS	C											
Intersection V/C	0.736											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.161

Intersection Setup

Name	Va Av			Va Av			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Birch Street			Rose Drive		
Base Volume Input [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	58	170	13	135	74	16	55	180	40	8	138	219
Total Analysis Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.21	0.21	0.32	0.11	0.11	0.06	0.26	0.26	0.02	0.16	0.52
Intersection LOS	F											
Intersection V/C	1.161											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.867

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	321	8	3	326	4	2	0	5	7	0	3
Total Analysis Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.39	0.39	0.01	0.77	0.01	0.00	0.00	0.02	0.02	0.00	0.01
Intersection LOS	D											
Intersection V/C	0.867											

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.829

Intersection Setup

Name				SR-57			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57			Im Hi			Im Hi		
Base Volume Input [veh/h]	0	0	0	735	0	605	0	191	110	0	263	460
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	735	0	605	0	191	110	0	263	460
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	184	0	151	0	478	275	0	658	115
Total Analysis Volume [veh/h]	0	0	0	735	0	605	0	191	110	0	263	460
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Unsi	Per	Per	Unsi
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	-	-	-

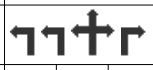
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.22	0.00	0.26	0.00	0.37	0.00	0.00	0.52	0.00
Intersection LOS	D											
Intersection V/C	0.829											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.885

Intersection Setup

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Base Volume Input [veh/h]	111	72	495	0	0	217	205	206	410	0	270	43
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	72	495	0	0	217	205	206	410	0	270	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	278	18	124	0	0	54	51	515	103	0	677	11
Total Analysis Volume [veh/h]	111	72	495	0	0	217	205	206	410	0	270	43
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Per	Split	Prot	Per	Unsi	Per	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.25	0.25	0.00	0.00	0.06	0.12	0.40	0.00	0.00	0.40	0.40
Intersection LOS	D											
Intersection V/C	0.885											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.905

Intersection Setup

Name	As Ro			As Ro			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	As Ro			As Ro			Im Hi			Im Hi		
Base Volume Input [veh/h]	240	295	93	320	389	280	296	210	153	192	198	203
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	295	93	320	389	280	296	210	153	192	198	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	60	74	23	80	97	70	74	526	38	48	497	51
Total Analysis Volume [veh/h]	240	295	93	320	389	280	296	210	153	192	198	203
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.09	0.23	0.16	0.17	0.44	0.44	0.11	0.32	0.32
Intersection LOS	E											
Intersection V/C	0.905											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.813

Intersection Setup

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Base Volume Input [veh/h]	276	51	295	28	25	15	21	212	308	255	217	63
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	276	51	295	28	25	15	21	212	308	255	217	63
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	69	13	74	7	6	4	5	531	77	64	544	16
Total Analysis Volume [veh/h]	276	51	295	28	25	15	21	212	308	255	217	63
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.10	0.17	0.02	0.02	0.02	0.01	0.42	0.18	0.15	0.44	0.44
Intersection LOS	D											
Intersection V/C	0.813											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.853

Intersection Setup

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Base Volume Input [veh/h]	398	702	112	286	535	128	236	160	239	201	174	347
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	398	702	112	286	535	128	236	160	239	201	174	347
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	100	176	28	72	134	32	59	400	60	50	436	87
Total Analysis Volume [veh/h]	398	702	112	286	535	128	236	160	239	201	174	347
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.24	0.24	0.08	0.16	0.08	0.07	0.36	0.36	0.06	0.41	0.41
Intersection LOS	D											
Intersection V/C	0.853											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.657

Intersection Setup

Name	Va Av			Va Av			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Im Hi			Im Hi		
Base Volume Input [veh/h]	125	331	138	240	260	168	297	197	163	180	146	160
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	331	138	240	260	168	297	197	163	180	146	160
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	31	83	35	60	65	42	74	493	41	45	367	40
Total Analysis Volume [veh/h]	125	331	138	240	260	168	297	197	163	180	146	160
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.10	0.08	0.07	0.08	0.10	0.09	0.39	0.10	0.05	0.29	0.09
Intersection LOS	B											
Intersection V/C	0.657											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.099

Intersection Setup

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Base Volume Input [veh/h]	271	630	129	100	526	32	87	191	300	168	149	879
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	271	630	129	100	526	32	87	191	300	168	149	879
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	68	158	32	251	132	8	22	479	75	42	374	220
Total Analysis Volume [veh/h]	271	630	129	100	526	32	87	191	300	168	149	879
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.19	0.08	0.30	0.15	0.02	0.05	0.43	0.43	0.05	0.29	0.52
Intersection LOS	F											
Intersection V/C	1.099											

APPENDIX C-IV

YEAR 2035 CUMULATIVE PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.830
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	59	Level Of Service:	D

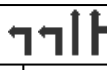
Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	1	1 0 1	1	0	1 1 0	1	0	3 0 1	2	0	2 1 0
Volume Module:												
Base Vol:	355	198	180	8	402	46	53	248	591	1022	870	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	355	198	180	8	402	46	53	248	591	1022	870	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	355	198	180	8	402	46	53	248	591	1022	870	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	355	198	0	8	402	46	53	248	591	1022	870	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	355	198	0	8	402	46	53	248	591	1022	870	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	355	198	0	8	402	46	53	248	591	1022	870	2
OvlAdjVol:									407			
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.93	1.07	1.00	1.00	1.79	0.21	1.00	3.00	1.00	2.00	2.99	0.01
Final Sat.:	3274	1826	1700	1700	3051	349	1700	5100	1700	3400	5088	12
Capacity Analysis Module:												
Vol/Sat:	0.11	0.11	0.00	0.00	0.13	0.13	0.03	0.05	0.35	0.30	0.17	0.17
OvlAdjV/S:									0.24			
Crit Moves:	****					****			****	****		

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to LLG Costa Mesa, CA

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.727

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	65	7	220	237	75	20	130	37	11	108	98
Total Analysis Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.08	0.08	0.26	0.37	0.37	0.02	0.20	0.20	0.03	0.13	0.00
Intersection LOS	C											
Intersection V/C	0.727											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.548

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	11	809	15	6	1495	11	9	0	38	35	0	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	809	15	6	1495	11	9	0	38	35	0	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	202	4	2	374	3	2	0	10	9	0	3
Total Analysis Volume [veh/h]	11	809	15	6	1495	11	9	0	38	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.24	0.24	0.00	0.44	0.44	0.01	0.00	0.03	0.02	0.00	0.01
Intersection LOS	A											
Intersection V/C	0.548											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	164	232	80	181	372	177	227	2110	112	101	1844	108
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	232	80	181	372	177	227	2110	112	101	1844	108
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	58	20	45	93	44	57	528	28	25	461	27
Total Analysis Volume [veh/h]	164	232	80	181	372	177	227	2110	112	101	1844	108
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.09	0.09	0.05	0.16	0.16	0.13	0.44	0.44	0.06	0.29	0.29
Intersection LOS	C											
Intersection V/C	0.755											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.800

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	267	240	152	944	590	37	44	1345	249	280	1569	598
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	267	240	152	944	590	37	44	1345	249	280	1569	598
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	60	38	236	148	9	11	336	62	70	392	150
Total Analysis Volume [veh/h]	267	240	152	944	590	37	44	1345	249	280	1569	598
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.07	0.09	0.19	0.23	0.02	0.03	0.31	0.31	0.08	0.31	0.17
Intersection LOS	D											
Intersection V/C	0.800											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.607
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	29	Level Of Service:	B

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	1	1 0 1	1	0	1 1 0	1	0	3 0 1	2	0	2 1 0
Volume Module:												
Base Vol:	404	154	840	26	118	36	31	915	573	189	357	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	404	154	840	26	118	36	31	915	573	189	357	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	404	154	840	26	118	36	31	915	573	189	357	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	404	154	0	26	118	36	31	915	573	189	357	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	404	154	0	26	118	36	31	915	573	189	357	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	404	154	0	26	118	36	31	915	573	189	357	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.53	0.47	1.00	3.00	1.00	2.00	2.93	0.07
Final Sat.:	3400	1700	1700	1700	2605	795	1700	5100	1700	3400	4975	125
Capacity Analysis Module:												
Vol/Sat:	0.12	0.09	0.00	0.02	0.05	0.05	0.02	0.18	0.34	0.06	0.07	0.07
Crit Moves:	****					****			****	****		

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Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.845

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	58	170	13	135	74	16	55	180	40	8	138	219
Total Analysis Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.21	0.21	0.16	0.11	0.11	0.06	0.26	0.26	0.02	0.16	0.36
Intersection LOS	D											
Intersection V/C	0.845											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.489

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	30	1283	33	13	1304	17	8	0	21	26	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	1283	33	13	1304	17	8	0	21	26	0	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	321	8	3	326	4	2	0	5	7	0	3
Total Analysis Volume [veh/h]	30	1283	33	13	1304	17	8	0	21	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.39	0.39	0.01	0.39	0.39	0.00	0.00	0.02	0.02	0.00	0.01
Intersection LOS	A											
Intersection V/C	0.489											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.873

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	240	295	93	320	389	280	296	2105	153	192	1988	203
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	295	93	320	389	280	296	2105	153	192	1988	203
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	74	23	80	97	70	74	526	38	48	497	51
Total Analysis Volume [veh/h]	240	295	93	320	389	280	296	2105	153	192	1988	203
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.09	0.20	0.20	0.17	0.44	0.44	0.11	0.32	0.32
Intersection LOS	D											
Intersection V/C	0.873											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.029

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	271	630	129	1005	526	32	87	1916	300	168	1496	879
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	271	630	129	1005	526	32	87	1916	300	168	1496	879
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	158	32	251	132	8	22	479	75	42	374	220
Total Analysis Volume [veh/h]	271	630	129	1005	526	32	87	1916	300	168	1496	879
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.19	0.08	0.20	0.31	0.02	0.05	0.43	0.43	0.05	0.29	0.32
Intersection LOS	F											
Intersection V/C	1.029											

APPENDIX C-V

YEAR 2045 TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	194	250	236	1011	692	9	16	1577	238	542	1995	627
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	194	250	236	1011	692	9	16	1577	238	542	1995	627
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	63	59	253	173	2	4	394	60	136	499	157
Total Analysis Volume [veh/h]	194	250	236	1011	692	9	16	1577	238	542	1995	627
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.10	0.10	0.30	0.21	0.21	0.00	0.27	0.27	0.16	0.39	0.07
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.821

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	1060	0	730	0	1937	650	269	2247	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	1060	0	730	0	1937	650	269	2247	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	265	0	183	0	484	163	67	562	0
Total Analysis Volume [veh/h]	0	0	0	1060	0	730	0	1937	650	269	2247	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.31	0.00	0.21	0.00	0.38	0.19	0.08	0.44	0.00
Intersection LOS	D											
Intersection V/C	0.821											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.877

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	1104	0	527	0	0	0	0	2563	424	0	1412	511
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1104	0	527	0	0	0	0	2563	424	0	1412	511
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	276	0	132	0	0	0	0	641	106	0	353	0
Total Analysis Volume [veh/h]	1104	0	527	0	0	0	0	2563	424	0	1412	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.32	0.00	0.31	0.00	0.00	0.00	0.00	0.50	0.25	0.00	0.28	0.00
Intersection LOS	D											
Intersection V/C	0.877											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.690

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	69	1	137	585	2563	42	18	1915	192
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	69	1	137	585	2563	42	18	1915	192
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	2	17	0	34	146	641	11	5	479	48
Total Analysis Volume [veh/h]	9	8	7	69	1	137	585	2563	42	18	1915	192
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.04	0.04	0.04	0.17	0.51	0.51	0.01	0.41	0.41
Intersection LOS	B											
Intersection V/C	0.690											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.804

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	169	322	11	125	218	405	500	2031	173	23	1470	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	322	11	125	218	405	500	2031	173	23	1470	183
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	81	3	31	55	101	125	508	43	6	368	46
Total Analysis Volume [veh/h]	169	322	11	125	218	405	500	2031	173	23	1470	183
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.10	0.07	0.18	0.18	0.15	0.40	0.10	0.01	0.32	0.32
Intersection LOS	D											
Intersection V/C	0.804											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.716

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	322	130	34	22	236	373	111	777	1240	277	869	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	322	130	34	22	236	373	111	777	1240	277	869	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	81	33	9	6	59	93	28	194	310	69	217	4
Total Analysis Volume [veh/h]	322	130	34	22	236	373	111	777	1240	277	869	14
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.08	0.00	0.01	0.14	0.22	0.07	0.23	0.27	0.08	0.17	0.17
Intersection LOS	C											
Intersection V/C	0.716											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.352

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	48	6	19	5	0	6	7	828	51	26	1143	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	6	19	5	0	6	7	828	51	26	1143	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	207	13	7	286	1
Total Analysis Volume [veh/h]	48	6	19	5	0	6	7	828	51	26	1143	2
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.26	0.26	0.02	0.22	0.22
Intersection LOS	A											
Intersection V/C	0.352											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	1.023
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	316	208	174	8	422	48	56	248	572	1063	909	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	316	208	174	8	422	48	56	248	572	1063	909	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	316	208	174	8	422	48	56	248	572	1063	909	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	316	208	0	8	422	48	56	248	572	1063	909	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	316	208	0	8	422	48	56	248	572	1063	909	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	316	208	0	8	422	48	56	248	572	1063	909	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.80	0.20	1.00	2.00	1.00	2.00	2.99	0.01
Final Sat.:	1700	3400	1700	1700	3053	347	1700	3400	1700	3400	5089	11
Capacity Analysis Module:												
Vol/Sat:	0.19	0.06	0.00	0.00	0.14	0.14	0.03	0.07	0.34	0.31	0.18	0.18
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.652

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	5	1	1	0	0	29	22	415	8	7	1989	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	29	22	415	8	7	1989	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	7	6	104	2	2	497	2
Total Analysis Volume [veh/h]	5	1	1	0	0	29	22	415	8	7	1989	6
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.12	0.12	0.00	0.59	0.00
Intersection LOS	B											
Intersection V/C	0.652											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.599

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	88	177	112	776	976	254	125	576	68	92	651	338
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	177	112	776	976	254	125	576	68	92	651	338
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	44	28	194	244	64	31	144	17	23	163	85
Total Analysis Volume [veh/h]	88	177	112	776	976	254	125	576	68	92	651	338
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.07	0.23	0.29	0.15	0.04	0.17	0.04	0.03	0.19	0.20
Intersection LOS	A											
Intersection V/C	0.599											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.729

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	286	7	357	63	34	11	5	1094	374	389	872	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	7	357	63	34	11	5	1094	374	389	872	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	2	89	16	9	3	1	274	94	97	218	3
Total Analysis Volume [veh/h]	286	7	357	63	34	11	5	1094	374	389	872	11
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.10	0.04	0.03	0.03	0.00	0.43	0.43	0.11	0.26	0.26
Intersection LOS	C											
Intersection V/C	0.729											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.626

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	187	2	524	371	1006	19	9	829	99
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	187	2	524	371	1006	19	9	829	99
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	47	1	131	93	252	5	2	207	25
Total Analysis Volume [veh/h]	3	3	6	187	2	524	371	1006	19	9	829	99
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.11	0.00	0.09	0.22	0.30	0.30	0.01	0.24	0.06
Intersection LOS	B											
Intersection V/C	0.626											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	155	243	106	504	1161	210	50	673	388	72	493	240
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	243	106	504	1161	210	50	673	388	72	493	240
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	61	27	126	290	53	13	168	97	18	123	60
Total Analysis Volume [veh/h]	155	243	106	504	1161	210	50	673	388	72	493	240
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.07	0.07	0.15	0.27	0.27	0.03	0.20	0.23	0.04	0.15	0.14
Intersection LOS	B											
Intersection V/C	0.635											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.870

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	155	251	16	860	939	292	72	529	149	15	407	365
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	251	16	860	939	292	72	529	149	15	407	365
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	63	4	215	235	73	18	132	37	4	102	91
Total Analysis Volume [veh/h]	155	251	16	860	939	292	72	529	149	15	407	365
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.08	0.08	0.51	0.36	0.36	0.02	0.20	0.20	0.01	0.12	0.21
Intersection LOS	D											
Intersection V/C	0.870											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.069

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	54	792	1410	67	61	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	792	1410	67	61	207
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	198	353	17	15	52
Total Analysis Volume [veh/h]	54	792	1410	67	61	207
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.47	0.83	0.04	0.04	0.16
Intersection LOS	F					
Intersection V/C	1.069					

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.732

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	682	0	572	0	1739	830	0	2223	220
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	682	0	572	0	1739	830	0	2223	220
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	171	0	143	0	435	208	0	556	55
Total Analysis Volume [veh/h]	0	0	0	682	0	572	0	1739	830	0	2223	220
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.20	0.00	0.25	0.00	0.34	0.00	0.00	0.44	0.00
Intersection LOS	C											
Intersection V/C	0.732											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.706

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1153	43	945	0	0	51	118	1549	636	0	1730	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1153	43	945	0	0	51	118	1549	636	0	1730	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	288	11	236	0	0	13	30	387	159	0	433	5
Total Analysis Volume [veh/h]	1153	43	945	0	0	51	118	1549	636	0	1730	18
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.31	0.31	0.00	0.00	0.02	0.07	0.30	0.00	0.00	0.26	0.26
Intersection LOS	C											
Intersection V/C	0.706											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.830

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	172	236	93	190	370	186	238	2185	117	103	1795	112
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	172	236	93	190	370	186	238	2185	117	103	1795	112
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	59	23	48	93	47	60	546	29	26	449	28
Total Analysis Volume [veh/h]	172	236	93	190	370	186	238	2185	117	103	1795	112
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.10	0.10	0.06	0.22	0.11	0.14	0.45	0.45	0.06	0.28	0.28
Intersection LOS	D											
Intersection V/C	0.830											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.719

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	203	14	167	28	33	16	14	2159	488	201	1729	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	14	167	28	33	16	14	2159	488	201	1729	37
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	4	42	7	8	4	4	540	122	50	432	9
Total Analysis Volume [veh/h]	203	14	167	28	33	16	14	2159	488	201	1729	37
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

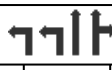
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.06	0.10	0.02	0.03	0.03	0.01	0.42	0.29	0.12	0.35	0.35
Intersection LOS	C											
Intersection V/C	0.719											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.694

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	202	269	99	413	724	148	155	1500	276	81	1241	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	269	99	413	724	148	155	1500	276	81	1241	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	67	25	103	181	37	39	375	69	20	310	25
Total Analysis Volume [veh/h]	202	269	99	413	724	148	155	1500	276	81	1241	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.11	0.11	0.12	0.21	0.09	0.05	0.35	0.35	0.02	0.26	0.26
Intersection LOS	B											
Intersection V/C	0.694											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	151	203	135	306	305	200	199	1142	99	133	1771	164
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	203	135	306	305	200	199	1142	99	133	1771	164
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	51	34	77	76	50	50	286	25	33	443	41
Total Analysis Volume [veh/h]	151	203	135	306	305	200	199	1142	99	133	1771	164
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.06	0.08	0.09	0.09	0.12	0.06	0.22	0.06	0.04	0.35	0.10
Intersection LOS	B											
Intersection V/C	0.625											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.834

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	280	216	160	940	531	24	40	1391	277	294	1639	607
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	280	216	160	940	531	24	40	1391	277	294	1639	607
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	54	40	235	133	6	10	348	69	74	410	152
Total Analysis Volume [veh/h]	280	216	160	940	531	24	40	1391	277	294	1639	607
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.06	0.09	0.28	0.16	0.01	0.02	0.33	0.33	0.09	0.32	0.36
Intersection LOS	D											
Intersection V/C	0.834											

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.862

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	368	688	353	637	461	17	44	1644	302	457	1330	801
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	368	688	353	637	461	17	44	1644	302	457	1330	801
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	172	88	159	115	4	11	411	76	114	333	200
Total Analysis Volume [veh/h]	368	688	353	637	461	17	44	1644	302	457	1330	801
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.20	0.20	0.19	0.14	0.14	0.01	0.29	0.29	0.13	0.26	0.28
Intersection LOS	D											
Intersection V/C	0.862											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	427	0	897	0	1466	877	256	1807	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	427	0	897	0	1466	877	256	1807	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	107	0	224	0	367	219	64	452	0
Total Analysis Volume [veh/h]	0	0	0	427	0	897	0	1466	877	256	1807	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.13	0.00	0.26	0.00	0.29	0.26	0.08	0.35	0.00
Intersection LOS	B											
Intersection V/C	0.677											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.571

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	710	0	302	0	0	0	0	1519	605	0	1166	526
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	710	0	302	0	0	0	0	1519	605	0	1166	526
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	178	0	76	0	0	0	0	380	151	0	292	0
Total Analysis Volume [veh/h]	710	0	302	0	0	0	0	1519	605	0	1166	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.21	0.00	0.18	0.00	0.00	0.00	0.00	0.31	0.31	0.00	0.23	0.00
Intersection LOS	A											
Intersection V/C	0.571											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.648

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	130	0	32	126	0	469	214	2091	44	17	1653	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	0	32	126	0	469	214	2091	44	17	1653	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	0	8	32	0	117	54	523	11	4	413	16
Total Analysis Volume [veh/h]	130	0	32	126	0	469	214	2091	44	17	1653	63
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.10	0.07	0.00	0.14	0.06	0.42	0.42	0.01	0.34	0.34
Intersection LOS	B											
Intersection V/C	0.648											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.626

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	154	62	23	92	118	151	49	1994	227	26	1454	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	154	62	23	92	118	151	49	1994	227	26	1454	48
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	16	6	23	30	38	12	499	57	7	364	12
Total Analysis Volume [veh/h]	154	62	23	92	118	151	49	1994	227	26	1454	48
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.03	0.03	0.05	0.08	0.08	0.01	0.39	0.13	0.02	0.29	0.29
Intersection LOS	B											
Intersection V/C	0.626											

Intersection Level Of Service Report

Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.614

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	605	343	216	5	122	126	209	986	525	74	411	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	605	343	216	5	122	126	209	986	525	74	411	32
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	151	86	54	1	31	32	52	247	131	19	103	8
Total Analysis Volume [veh/h]	605	343	216	5	122	126	209	986	525	74	411	32
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.20	0.11	0.00	0.07	0.07	0.12	0.29	0.00	0.02	0.09	0.09
Intersection LOS	B											
Intersection V/C	0.614											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.491

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	28	2	14	2	0	6	6	1407	23	6	705	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	2	14	2	0	6	6	1407	23	6	705	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	1	4	1	0	2	2	352	6	2	176	1
Total Analysis Volume [veh/h]	28	2	14	2	0	6	6	1407	23	6	705	3
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.42	0.42	0.00	0.14	0.14
Intersection LOS	A											
Intersection V/C	0.491											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.681
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	35	Level Of Service:	B

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	369	162	861	27	124	38	33	951	532	180	361	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	369	162	861	27	124	38	33	951	532	180	361	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	369	162	861	27	124	38	33	951	532	180	361	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	369	162	0	27	124	38	33	951	532	180	361	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	369	162	0	27	124	38	33	951	532	180	361	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	369	162	0	27	124	38	33	951	532	180	361	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.53	0.47	1.00	2.00	1.00	2.00	2.93	0.07
Final Sat.:	1700	3400	1700	1700	2602	798	1700	3400	1700	3400	4976	124
Capacity Analysis Module:												
Vol/Sat:	0.22	0.05	0.00	0.02	0.05	0.05	0.02	0.28	0.31	0.05	0.07	0.07
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.606

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	12	0	2	0	0	23	2	1859	2	1	431	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	0	2	0	0	23	2	1859	2	1	431	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	0	0	6	1	465	1	0	108	3
Total Analysis Volume [veh/h]	12	0	2	0	0	23	2	1859	2	1	431	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.55	0.55	0.00	0.13	0.01
Intersection LOS	B											
Intersection V/C	0.606											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.844

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	478	171	393	435	363	320	878	182	162	1130	749
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	478	171	393	435	363	320	878	182	162	1130	749
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	120	43	98	109	91	80	220	46	41	283	187
Total Analysis Volume [veh/h]	157	478	171	393	435	363	320	878	182	162	1130	749
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.14	0.10	0.12	0.13	0.21	0.09	0.26	0.11	0.05	0.33	0.44
Intersection LOS	D											
Intersection V/C	0.844											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.729

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	559	37	386	11	23	11	17	1013	349	321	1456	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	559	37	386	11	23	11	17	1013	349	321	1456	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	140	9	97	3	6	3	4	253	87	80	364	5
Total Analysis Volume [veh/h]	559	37	386	11	23	11	17	1013	349	321	1456	19
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.02	0.13	0.01	0.02	0.02	0.01	0.40	0.40	0.09	0.43	0.43
Intersection LOS	C											
Intersection V/C	0.729											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.754

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	15	2	12	119	3	335	321	1039	14	6	1485	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	2	12	119	3	335	321	1039	14	6	1485	156
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	30	1	84	80	260	4	2	371	39
Total Analysis Volume [veh/h]	15	2	12	119	3	335	321	1039	14	6	1485	156
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.07	0.00	0.01	0.19	0.31	0.31	0.00	0.44	0.09
Intersection LOS	C											
Intersection V/C	0.754											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.734

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	674	815	141	234	411	124	244	819	333	88	807	245
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	674	815	141	234	411	124	244	819	333	88	807	245
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	169	204	35	59	103	31	61	205	83	22	202	61
Total Analysis Volume [veh/h]	674	815	141	234	411	124	244	819	333	88	807	245
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.19	0.19	0.07	0.10	0.10	0.14	0.24	0.20	0.05	0.24	0.14
Intersection LOS	C											
Intersection V/C	0.734											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.097

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	221	649	18	498	270	48	206	703	155	14	539	846
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	221	649	18	498	270	48	206	703	155	14	539	846
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	162	5	125	68	12	52	176	39	4	135	212
Total Analysis Volume [veh/h]	221	649	18	498	270	48	206	703	155	14	539	846
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.20	0.20	0.29	0.09	0.09	0.06	0.25	0.25	0.01	0.16	0.50
Intersection LOS	F											
Intersection V/C	1.097											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.986

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	169	1163	1255	101	49	118
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	1163	1255	101	49	118
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	291	314	25	12	30
Total Analysis Volume [veh/h]	169	1163	1255	101	49	118
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.68	0.74	0.06	0.03	0.10
Intersection LOS	E					
Intersection V/C	0.986					

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.858

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	759	0	619	0	1919	1154	0	2744	467
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	759	0	619	0	1919	1154	0	2744	467
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	190	0	155	0	480	289	0	686	117
Total Analysis Volume [veh/h]	0	0	0	759	0	619	0	1919	1154	0	2744	467
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.22	0.00	0.27	0.00	0.38	0.00	0.00	0.54	0.00
Intersection LOS	D											
Intersection V/C	0.858											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.913

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1163	72	493	0	0	232	207	2126	430	0	2800	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1163	72	493	0	0	232	207	2126	430	0	2800	46
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	291	18	123	0	0	58	52	532	108	0	700	12
Total Analysis Volume [veh/h]	1163	72	493	0	0	232	207	2126	430	0	2800	46
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.25	0.25	0.00	0.00	0.07	0.12	0.42	0.00	0.00	0.42	0.42
Intersection LOS	E											
Intersection V/C	0.913											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.931

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	252	286	101	335	393	294	311	2147	161	209	1983	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	252	286	101	335	393	294	311	2147	161	209	1983	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	72	25	84	98	74	78	537	40	52	496	53
Total Analysis Volume [veh/h]	252	286	101	335	393	294	311	2147	161	209	1983	213
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.10	0.23	0.17	0.18	0.45	0.45	0.12	0.32	0.32
Intersection LOS	E											
Intersection V/C	0.931											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.836

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	295	54	307	29	26	16	22	2161	323	267	2241	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	54	307	29	26	16	22	2161	323	267	2241	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	74	14	77	7	7	4	6	540	81	67	560	17
Total Analysis Volume [veh/h]	295	54	307	29	26	16	22	2161	323	267	2241	66
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

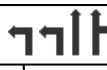
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.10	0.18	0.02	0.02	0.02	0.01	0.42	0.19	0.16	0.45	0.45
Intersection LOS	D											
Intersection V/C	0.836											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.863

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	418	671	118	300	519	133	247	1596	251	211	1780	364
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	418	671	118	300	519	133	247	1596	251	211	1780	364
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	105	168	30	75	130	33	62	399	63	53	445	91
Total Analysis Volume [veh/h]	418	671	118	300	519	133	247	1596	251	211	1780	364
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.23	0.23	0.09	0.15	0.08	0.07	0.36	0.36	0.06	0.42	0.42
Intersection LOS	D											
Intersection V/C	0.863											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.658

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	131	271	145	234	229	132	237	2032	171	189	1478	144
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	271	145	234	229	132	237	2032	171	189	1478	144
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	68	36	59	57	33	59	508	43	47	370	36
Total Analysis Volume [veh/h]	131	271	145	234	229	132	237	2032	171	189	1478	144
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.08	0.09	0.07	0.07	0.08	0.07	0.40	0.10	0.06	0.29	0.08
Intersection LOS	B											
Intersection V/C	0.658											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.067

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	306	561	143	1019	487	22	77	1994	315	176	1553	862
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	306	561	143	1019	487	22	77	1994	315	176	1553	862
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	77	140	36	255	122	6	19	499	79	44	388	216
Total Analysis Volume [veh/h]	306	561	143	1019	487	22	77	1994	315	176	1553	862
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.17	0.08	0.30	0.14	0.01	0.05	0.45	0.45	0.05	0.30	0.51
Intersection LOS	F											
Intersection V/C	1.067											

APPENDIX C-VI

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.871

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	194	250	236	1011	692	9	16	1594	238	542	2035	627
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	194	250	236	1011	692	9	16	1594	238	542	2035	627
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	63	59	253	173	2	4	399	60	136	509	157
Total Analysis Volume [veh/h]	194	250	236	1011	692	9	16	1594	238	542	2035	627
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.10	0.10	0.30	0.21	0.21	0.00	0.27	0.27	0.16	0.40	0.07
Intersection LOS	D											
Intersection V/C	0.871											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.837

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	1084	0	730	0	1954	650	289	2287	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	1084	0	730	0	1954	650	289	2287	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	271	0	183	0	489	163	72	572	0
Total Analysis Volume [veh/h]	0	0	0	1084	0	730	0	1954	650	289	2287	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.32	0.00	0.21	0.00	0.38	0.19	0.09	0.45	0.00
Intersection LOS	D											
Intersection V/C	0.837											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.885

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	1104	0	534	0	0	0	0	2605	424	0	1472	573
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1104	0	534	0	0	0	0	2605	424	0	1472	573
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	276	0	134	0	0	0	0	651	106	0	368	0
Total Analysis Volume [veh/h]	1104	0	534	0	0	0	0	2605	424	0	1472	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.32	0.00	0.31	0.00	0.00	0.00	0.00	0.51	0.25	0.00	0.29	0.00
Intersection LOS	D											
Intersection V/C	0.885											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.714

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	69	1	137	585	2612	42	18	2039	192
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	69	1	137	585	2612	42	18	2039	192
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	2	17	0	34	146	653	11	5	510	48
Total Analysis Volume [veh/h]	9	8	7	69	1	137	585	2612	42	18	2039	192
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.04	0.04	0.04	0.17	0.52	0.52	0.01	0.44	0.44
Intersection LOS	C											
Intersection V/C	0.714											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.828

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	169	322	11	125	218	405	500	2080	173	23	1594	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	322	11	125	218	405	500	2080	173	23	1594	183
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	81	3	31	55	101	125	520	43	6	399	46
Total Analysis Volume [veh/h]	169	322	11	125	218	405	500	2080	173	23	1594	183
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.10	0.07	0.18	0.18	0.15	0.41	0.10	0.01	0.35	0.35
Intersection LOS	D											
Intersection V/C	0.828											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.732

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	329	130	57	22	236	373	111	823	1243	330	986	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	329	130	57	22	236	373	111	823	1243	330	986	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	82	33	14	6	59	93	28	206	311	83	247	4
Total Analysis Volume [veh/h]	329	130	57	22	236	373	111	823	1243	330	986	14
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.08	0.00	0.01	0.14	0.22	0.07	0.24	0.27	0.10	0.20	0.20
Intersection LOS	C											
Intersection V/C	0.732											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.372

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	48	6	19	5	0	6	7	896	51	26	1313	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	6	19	5	0	6	7	896	51	26	1313	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	224	13	7	328	1
Total Analysis Volume [veh/h]	48	6	19	5	0	6	7	896	51	26	1313	2
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.28	0.28	0.02	0.26	0.26
Intersection LOS	A											
Intersection V/C	0.372											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	1.077
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	370	208	188	8	422	48	56	256	607	1069	912	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	370	208	188	8	422	48	56	256	607	1069	912	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	370	208	188	8	422	48	56	256	607	1069	912	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	370	208	0	8	422	48	56	256	607	1069	912	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	370	208	0	8	422	48	56	256	607	1069	912	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	370	208	0	8	422	48	56	256	607	1069	912	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.80	0.20	1.00	2.00	1.00	2.00	2.99	0.01
Final Sat.:	1700	3400	1700	1700	3053	347	1700	3400	1700	3400	5089	11
Capacity Analysis Module:												
Vol/Sat:	0.22	0.06	0.00	0.00	0.14	0.14	0.03	0.08	0.36	0.31	0.18	0.18
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.655

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	5	1	1	0	0	29	22	437	8	7	1998	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	29	22	437	8	7	1998	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	7	6	109	2	2	500	2
Total Analysis Volume [veh/h]	5	1	1	0	0	29	22	437	8	7	1998	6
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.13	0.13	0.00	0.59	0.00
Intersection LOS	B											
Intersection V/C	0.655											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.599

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	88	177	118	776	976	254	125	582	68	105	664	338
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	177	118	776	976	254	125	582	68	105	664	338
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	44	30	194	244	64	31	146	17	26	166	85
Total Analysis Volume [veh/h]	88	177	118	776	976	254	125	582	68	105	664	338
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.07	0.23	0.29	0.15	0.04	0.17	0.04	0.03	0.20	0.20
Intersection LOS	A											
Intersection V/C	0.599											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.736

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	286	7	364	63	34	11	5	1105	374	405	899	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	7	364	63	34	11	5	1105	374	405	899	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	2	91	16	9	3	1	276	94	101	225	3
Total Analysis Volume [veh/h]	286	7	364	63	34	11	5	1105	374	405	899	11
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.10	0.04	0.03	0.03	0.00	0.44	0.44	0.12	0.27	0.27
Intersection LOS	C											
Intersection V/C	0.736											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.639

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	187	2	524	371	1023	19	9	873	99
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	187	2	524	371	1023	19	9	873	99
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	47	1	131	93	256	5	2	218	25
Total Analysis Volume [veh/h]	3	3	6	187	2	524	371	1023	19	9	873	99
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.11	0.00	0.09	0.22	0.31	0.31	0.01	0.26	0.06
Intersection LOS	B											
Intersection V/C	0.639											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.645

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	155	260	106	507	1200	224	56	684	388	72	522	247
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	260	106	507	1200	224	56	684	388	72	522	247
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	65	27	127	300	56	14	171	97	18	131	62
Total Analysis Volume [veh/h]	155	260	106	507	1200	224	56	684	388	72	522	247
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.07	0.07	0.15	0.28	0.28	0.03	0.20	0.23	0.04	0.15	0.15
Intersection LOS	B											
Intersection V/C	0.645											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.943

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	68	7	230	248	79	21	135	38	11	109	102
Total Analysis Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.09	0.09	0.54	0.38	0.38	0.02	0.20	0.20	0.03	0.13	0.24
Intersection LOS	E											
Intersection V/C	0.943											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.144

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	207	4	2	376	17	15	0	52	9	0	3
Total Analysis Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.25	0.25	0.00	0.88	0.04	0.04	0.00	0.16	0.02	0.00	0.01
Intersection LOS	F											
Intersection V/C	1.144											

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.734

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	684	0	572	0	1742	830	0	2232	232
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	684	0	572	0	1742	830	0	2232	232
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	171	0	143	0	436	208	0	558	58
Total Analysis Volume [veh/h]	0	0	0	684	0	572	0	1742	830	0	2232	232
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.20	0.00	0.25	0.00	0.34	0.00	0.00	0.44	0.00
Intersection LOS	C											
Intersection V/C	0.734											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.711

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1153	43	949	0	0	51	118	1555	636	0	1756	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1153	43	949	0	0	51	118	1555	636	0	1756	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	288	11	237	0	0	13	30	389	159	0	439	5
Total Analysis Volume [veh/h]	1153	43	949	0	0	51	118	1555	636	0	1756	18
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.32	0.32	0.00	0.00	0.02	0.07	0.30	0.00	0.00	0.26	0.26
Intersection LOS	C											
Intersection V/C	0.711											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.840

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	172	241	94	190	382	186	238	2195	117	104	1821	112
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	172	241	94	190	382	186	238	2195	117	104	1821	112
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	60	24	48	96	47	60	549	29	26	455	28
Total Analysis Volume [veh/h]	172	241	94	190	382	186	238	2195	117	104	1821	112
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.10	0.10	0.06	0.22	0.11	0.14	0.45	0.45	0.06	0.28	0.28
Intersection LOS	D											
Intersection V/C	0.840											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.721

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	203	14	167	28	33	16	14	2170	488	201	1757	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	14	167	28	33	16	14	2170	488	201	1757	37
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	4	42	7	8	4	4	543	122	50	439	9
Total Analysis Volume [veh/h]	203	14	167	28	33	16	14	2170	488	201	1757	37
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

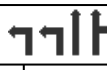
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.06	0.10	0.02	0.03	0.03	0.01	0.43	0.29	0.12	0.35	0.35
Intersection LOS	C											
Intersection V/C	0.721											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.707

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	202	283	99	413	757	149	155	1513	276	81	1274	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	283	99	413	757	149	155	1513	276	81	1274	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	71	25	103	189	37	39	378	69	20	319	25
Total Analysis Volume [veh/h]	202	283	99	413	757	149	155	1513	276	81	1274	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.11	0.11	0.12	0.22	0.09	0.05	0.35	0.35	0.02	0.27	0.27
Intersection LOS	C											
Intersection V/C	0.707											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	151	216	135	318	338	233	212	1148	99	133	1785	169
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	216	135	318	338	233	212	1148	99	133	1785	169
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	54	34	80	85	58	53	287	25	33	446	42
Total Analysis Volume [veh/h]	151	216	135	318	338	233	212	1148	99	133	1785	169
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.06	0.08	0.09	0.10	0.14	0.06	0.23	0.06	0.04	0.35	0.10
Intersection LOS	B											
Intersection V/C	0.644											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.845

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	63	40	242	154	10	12	351	69	74	411	155
Total Analysis Volume [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.07	0.09	0.28	0.18	0.02	0.03	0.33	0.33	0.09	0.32	0.36
Intersection LOS	D											
Intersection V/C	0.845											

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name	St Co			St Co			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	St Co			St Co			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	368	688	353	637	461	17	44	169	302	457	136	801
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	368	688	353	637	461	17	44	169	302	457	136	801
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	92	172	88	159	115	4	11	424	76	114	340	200
Total Analysis Volume [veh/h]	368	688	353	637	461	17	44	169	302	457	136	801
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Ove
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

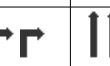
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.20	0.20	0.19	0.14	0.14	0.01	0.29	0.29	0.13	0.27	0.28
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.690

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	547	0	897	0	151	877	270	183	0
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	547	0	897	0	151	877	270	183	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	137	0	224	0	379	219	68	460	0
Total Analysis Volume [veh/h]	0	0	0	547	0	897	0	151	877	270	183	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Per	Prot	Per	Per
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.16	0.00	0.26	0.00	0.30	0.26	0.08	0.36	0.00
Intersection LOS	B											
Intersection V/C	0.690											

Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.601

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	710	0	330	0	0	0	0	172	605	0	121	573
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	710	0	330	0	0	0	0	172	605	0	121	573
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Total 15-Minute Volume [veh/h]	178	0	83	0	0	0	0	431	151	0	304	0
Total Analysis Volume [veh/h]	710	0	330	0	0	0	0	172	605	0	121	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Per	Split	Per	Per	Per	Prot	Per	Per	Per	Per	Unsi
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.21	0.00	0.19	0.00	0.00	0.00	0.00	0.34	0.34	0.00	0.24	0.00
Intersection LOS	B											
Intersection V/C	0.601											

Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	130	0	32	126	0	469	214	223	44	17	174	63
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	0	32	126	0	469	214	223	44	17	174	63
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	33	0	8	32	0	117	54	560	11	4	437	16
Total Analysis Volume [veh/h]	130	0	32	126	0	469	214	223	44	17	174	63
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.10	0.07	0.00	0.14	0.06	0.45	0.45	0.01	0.35	0.35
Intersection LOS	B											
Intersection V/C	0.677											

Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.655

Intersection Setup

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	154	62	24	92	118	151	49	214	227	27	154	48
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	154	62	24	92	118	151	49	214	227	27	154	48
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	39	16	6	23	30	38	12	535	57	7	387	12
Total Analysis Volume [veh/h]	154	62	24	92	118	151	49	214	227	27	154	48
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

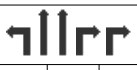
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.03	0.03	0.05	0.08	0.08	0.01	0.42	0.13	0.02	0.31	0.31
Intersection LOS	B											
Intersection V/C	0.655											

Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.669

Intersection Setup

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	610	343	270	6	122	126	209	112	531	112	501	33
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	610	343	270	6	122	126	209	112	531	112	501	33
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	153	86	68	2	31	32	52	282	133	28	125	8
Total Analysis Volume [veh/h]	610	343	270	6	122	126	209	112	531	112	501	33
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Ove	Prot	Per	Per	Prot	Per	Ove	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.20	0.13	0.00	0.07	0.07	0.12	0.33	0.00	0.03	0.10	0.10
Intersection LOS	B											
Intersection V/C	0.669											

Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.549

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	28	2	15	2	0	6	6	160	23	6	835	3
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	2	15	2	0	6	6	160	23	6	835	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	7	1	4	1	0	2	2	401	6	2	209	1
Total Analysis Volume [veh/h]	28	2	15	2	0	6	6	160	23	6	835	3
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.48	0.48	0.00	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.549											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.756
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	44	Level Of Service:	C

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	422	162	873	27	124	38	33	957	598	198	369	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	422	162	873	27	124	38	33	957	598	198	369	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	422	162	873	27	124	38	33	957	598	198	369	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	422	162	0	27	124	38	33	957	598	198	369	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	422	162	0	27	124	38	33	957	598	198	369	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	422	162	0	27	124	38	33	957	598	198	369	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.53	0.47	1.00	2.00	1.00	2.00	2.93	0.07
Final Sat.:	1700	3400	1700	1700	2602	798	1700	3400	1700	3400	4979	121
Capacity Analysis Module:												
Vol/Sat:	0.25	0.05	0.00	0.02	0.05	0.05	0.02	0.28	0.35	0.06	0.07	0.07
Crit Moves:	****				****				****	****		

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Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.611

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Base Volume Input [veh/h]	12	0	2	0	0	23	2	187	2	1	457	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	0	2	0	0	23	2	187	2	1	457	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	0	1	0	0	6	1	469	1	0	114	3
Total Analysis Volume [veh/h]	12	0	2	0	0	23	2	187	2	1	457	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

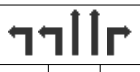
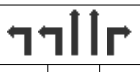
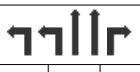
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.55	0.55	0.00	0.13	0.01
Intersection LOS	B											
Intersection V/C	0.611											

Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.844

Intersection Setup

Name	St Co			St Co			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	St Co			St Co			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	478	185	393	435	363	320	893	182	172	114	749
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	478	185	393	435	363	320	893	182	172	114	749
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	39	120	46	98	109	91	80	223	46	43	285	187
Total Analysis Volume [veh/h]	157	478	185	393	435	363	320	893	182	172	114	749
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

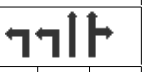
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.14	0.11	0.12	0.13	0.21	0.09	0.26	0.11	0.05	0.34	0.44
Intersection LOS	D											
Intersection V/C	0.844											

Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.741

Intersection Setup

Name	S As			S As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S As			S As			Birch Street			Birch Street		
Base Volume Input [veh/h]	559	37	403	11	23	11	17	104	349	332	147	19
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	559	37	403	11	23	11	17	104	349	332	147	19
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	140	9	101	3	6	3	4	261	87	83	369	5
Total Analysis Volume [veh/h]	559	37	403	11	23	11	17	104	349	332	147	19
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Ove	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.02	0.14	0.01	0.02	0.02	0.01	0.41	0.41	0.10	0.44	0.44
Intersection LOS	C											
Intersection V/C	0.741											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.763

Intersection Setup

Name	N As			N As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N As			N As			Birch Street			Birch Street		
Base Volume Input [veh/h]	15	2	12	119	3	335	321	108	14	6	151	156
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	2	12	119	3	335	321	108	14	6	151	156
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	4	1	3	30	1	84	80	272	4	2	379	39
Total Analysis Volume [veh/h]	15	2	12	119	3	335	321	108	14	6	151	156
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Ove	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

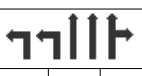
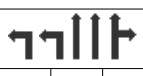
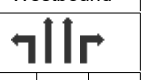
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.07	0.00	0.01	0.19	0.32	0.32	0.00	0.45	0.09
Intersection LOS	C											
Intersection V/C	0.763											

Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.756

Intersection Setup

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Base Volume Input [veh/h]	674	855	148	240	439	134	258	851	333	91	827	250
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	674	855	148	240	439	134	258	851	333	91	827	250
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	169	214	37	60	110	34	65	213	83	23	207	63
Total Analysis Volume [veh/h]	674	855	148	240	439	134	258	851	333	91	827	250
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.20	0.20	0.07	0.11	0.11	0.15	0.25	0.20	0.05	0.24	0.15
Intersection LOS	C											
Intersection V/C	0.756											

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.212

Intersection Setup

Name	Va Av			Va Av			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Birch Street			Rose Drive		
Base Volume Input [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	60	178	13	141	77	16	57	184	41	9	141	229
Total Analysis Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.22	0.22	0.33	0.11	0.11	0.07	0.26	0.26	0.02	0.17	0.54
Intersection LOS	F											
Intersection V/C	1.212											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.043

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	169	127	33	13	132	101	49	0	118	26	0	10
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	127	33	13	132	101	49	0	118	26	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	42	318	8	3	332	25	12	0	30	7	0	3
Total Analysis Volume [veh/h]	169	127	33	13	132	101	49	0	118	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.38	0.38	0.01	0.78	0.06	0.03	0.00	0.10	0.02	0.00	0.01
Intersection LOS	F											
Intersection V/C	1.043											

Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.861

Intersection Setup

Name				SR-57			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57			Im Hi			Im Hi		
Base Volume Input [veh/h]	0	0	0	764	0	619	0	193	115	0	275	476
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	764	0	619	0	193	115	0	275	476
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	191	0	155	0	483	289	0	688	119
Total Analysis Volume [veh/h]	0	0	0	764	0	619	0	193	115	0	275	476
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Unsi	Per	Per	Unsi
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	-	-	-

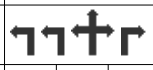
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.22	0.00	0.27	0.00	0.38	0.00	0.00	0.54	0.00
Intersection LOS	D											
Intersection V/C	0.861											

Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.918

Intersection Setup

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Base Volume Input [veh/h]	116	72	506	0	0	232	207	214	430	0	282	46
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	116	72	506	0	0	232	207	214	430	0	282	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	291	18	127	0	0	58	52	536	108	0	705	12
Total Analysis Volume [veh/h]	116	72	506	0	0	232	207	214	430	0	282	46
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Per	Split	Prot	Per	Unsi	Per	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.26	0.26	0.00	0.00	0.07	0.12	0.42	0.00	0.00	0.42	0.42
Intersection LOS	E											
Intersection V/C	0.918											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.943

Intersection Setup

Name	As Ro			As Ro			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	As Ro			As Ro			Im Hi			Im Hi		
Base Volume Input [veh/h]	252	299	102	335	402	294	311	217	161	210	200	213
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	252	299	102	335	402	294	311	217	161	210	200	213
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	63	75	26	84	101	74	78	545	40	53	501	53
Total Analysis Volume [veh/h]	252	299	102	335	402	294	311	217	161	210	200	213
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.12	0.12	0.10	0.24	0.17	0.18	0.46	0.46	0.12	0.33	0.33
Intersection LOS	E											
Intersection V/C	0.943											

Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.845

Intersection Setup

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Base Volume Input [veh/h]	295	54	310	29	26	16	22	219	323	268	226	66
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	54	310	29	26	16	22	219	323	268	226	66
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	74	14	78	7	7	4	6	549	81	67	566	17
Total Analysis Volume [veh/h]	295	54	310	29	26	16	22	219	323	268	226	66
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.10	0.18	0.02	0.02	0.02	0.01	0.43	0.19	0.16	0.46	0.46
Intersection LOS	D											
Intersection V/C	0.845											

Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.881

Intersection Setup

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Base Volume Input [veh/h]	418	712	118	300	547	134	248	163	251	211	180	364
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	418	712	118	300	547	134	248	163	251	211	180	364
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	105	178	30	75	137	34	62	410	63	53	452	91
Total Analysis Volume [veh/h]	418	712	118	300	547	134	248	163	251	211	180	364
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

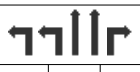
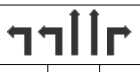
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.24	0.24	0.09	0.16	0.08	0.07	0.37	0.37	0.06	0.43	0.43
Intersection LOS	D											
Intersection V/C	0.881											

Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.672

Intersection Setup

Name	Va Av			Va Av			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Im Hi			Im Hi		
Base Volume Input [veh/h]	131	318	145	245	256	159	282	204	171	189	148	161
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	318	145	245	256	159	282	204	171	189	148	161
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	33	80	36	61	64	40	71	511	43	47	372	40
Total Analysis Volume [veh/h]	131	318	145	245	256	159	282	204	171	189	148	161
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.09	0.09	0.07	0.08	0.09	0.08	0.40	0.10	0.06	0.29	0.09
Intersection LOS	B											
Intersection V/C	0.672											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.130

Intersection Setup

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Base Volume Input [veh/h]	306	657	143	104	549	33	91	200	315	176	157	896
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	306	657	143	104	549	33	91	200	315	176	157	896
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	77	164	36	260	137	8	23	501	79	44	393	224
Total Analysis Volume [veh/h]	306	657	143	104	549	33	91	200	315	176	157	896
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.19	0.08	0.31	0.16	0.02	0.05	0.45	0.45	0.05	0.31	0.53
Intersection LOS	F											
Intersection V/C	1.130											

APPENDIX C-VII

YEAR 2045 PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.860
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	68	Level Of Service:	D

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	1	1 0 1	1	0	1 1 0	1	0	3 0 1	2	0	2 1 0
Volume Module:												
Base Vol:	335	208	175	8	422	48	56	256	607	1069	912	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	335	208	175	8	422	48	56	256	607	1069	912	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	335	208	175	8	422	48	56	256	607	1069	912	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	335	208	0	8	422	48	56	256	607	1069	912	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	335	208	0	8	422	48	56	256	607	1069	912	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	335	208	0	8	422	48	56	256	607	1069	912	2
OvlAdjVol:									426			
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.85	1.15	1.00	1.00	1.80	0.20	1.00	3.00	1.00	2.00	2.99	0.01
Final Sat.:	3146	1954	1700	1700	3053	347	1700	5100	1700	3400	5089	11
Capacity Analysis Module:												
Vol/Sat:	0.11	0.11	0.00	0.00	0.14	0.14	0.03	0.05	0.36	0.31	0.18	0.18
OvlAdjV/S:									0.25			
Crit Moves:	****					****			****	****		

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to LLG Costa Mesa, CA

Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	68	7	230	248	79	21	135	38	11	109	102
Total Analysis Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.09	0.09	0.27	0.38	0.38	0.02	0.20	0.20	0.03	0.13	0.00
Intersection LOS	C											
Intersection V/C	0.755											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.722

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	207	4	2	376	17	15	0	52	9	0	3
Total Analysis Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.25	0.25	0.00	0.46	0.46	0.04	0.00	0.16	0.02	0.00	0.01
Intersection LOS	C											
Intersection V/C	0.722											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.782

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	172	241	94	190	382	186	238	2195	117	104	1821	112
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	172	241	94	190	382	186	238	2195	117	104	1821	112
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	60	24	48	96	47	60	549	29	26	455	28
Total Analysis Volume [veh/h]	172	241	94	190	382	186	238	2195	117	104	1821	112
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.10	0.10	0.06	0.17	0.17	0.14	0.45	0.45	0.06	0.28	0.28
Intersection LOS	C											
Intersection V/C	0.782											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.793

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	63	40	242	154	10	12	351	69	74	411	155
Total Analysis Volume [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.07	0.09	0.19	0.23	0.02	0.03	0.33	0.33	0.09	0.32	0.17
Intersection LOS	C											
Intersection V/C	0.793											

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Valencia Ave at Lambert Road/Carbon Canyon Road

Cycle (sec):	100	Critical Vol./Cap.(X):	0.480
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	23	Level Of Service:	A

Street Name:	Valencia Ave						Lambert Rd/Carbon Canyon Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	1	1 0 1	1	0	1 1 0	1	0	3 0 1	2	0	2 1 0
Volume Module:												
Base Vol:	399	162	873	27	124	38	33	957	558	183	369	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	399	162	873	27	124	38	33	957	558	183	369	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	399	162	873	27	124	38	33	957	558	183	369	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	399	162	0	27	124	38	33	957	558	183	369	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	399	162	0	27	124	38	33	957	558	183	369	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	399	162	0	27	124	38	33	957	558	183	369	9
OvlAdjVol:									359			
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.53	0.47	1.00	3.00	1.00	2.00	2.93	0.07
Final Sat.:	3400	1700	1700	1700	2602	798	1700	5100	1700	3400	4979	121
Capacity Analysis Module:												
Vol/Sat:	0.12	0.10	0.00	0.02	0.05	0.05	0.02	0.19	0.33	0.05	0.07	0.07
OvlAdjV/S:									0.21			
Crit Moves:	****					****			****	****		

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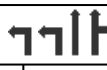
Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.881

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	178	13	141	77	16	57	184	41	9	141	229
Total Analysis Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.22	0.22	0.17	0.11	0.11	0.07	0.26	0.26	0.02	0.17	0.37
Intersection LOS	D											
Intersection V/C	0.881											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.683

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	318	8	3	332	25	12	0	30	7	0	3
Total Analysis Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.38	0.38	0.01	0.42	0.42	0.03	0.00	0.10	0.02	0.00	0.01
Intersection LOS	B											
Intersection V/C	0.683											

Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.911

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	252	299	102	335	402	294	311	2179	161	210	2004	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	252	299	102	335	402	294	311	2179	161	210	2004	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	75	26	84	101	74	78	545	40	53	501	53
Total Analysis Volume [veh/h]	252	299	102	335	402	294	311	2179	161	210	2004	213
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.12	0.12	0.10	0.20	0.20	0.18	0.46	0.46	0.12	0.33	0.33
Intersection LOS	E											
Intersection V/C	0.911											

Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.013

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	77	164	36	260	137	8	23	501	79	44	393	224
Total Analysis Volume [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.19	0.08	0.20	0.23	0.02	0.05	0.45	0.45	0.05	0.31	0.32
Intersection LOS	F											
Intersection V/C	1.013											

APPENDIX D

INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS – HCM

APPENDIX D-I

EXISTING TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	33.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.724

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	147	187	129	840	564	8	13	1185	191	417	1476	519
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	187	129	840	564	8	13	1185	191	417	1476	519
Peak Hour Factor	0.9130	0.9130	0.9130	0.9700	0.9700	0.9700	0.9540	0.9540	0.9540	0.9540	0.9540	0.9540
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	51	35	216	145	2	3	311	50	109	387	136
Total Analysis Volume [veh/h]	161	205	141	866	581	8	14	1242	200	437	1547	544
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	12	10	0	46	44	0	10	39	0	25	54	54
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	7	10	10	10	34	37	37	2	43	43	17	58	96
g / C, Green / Cycle	0.06	0.08	0.08	0.08	0.28	0.31	0.31	0.02	0.36	0.36	0.14	0.48	0.80
(v / s)_i Volume / Saturation Flow Rate	0.05	0.06	0.06	0.06	0.25	0.16	0.15	0.00	0.19	0.19	0.12	0.27	0.29
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	219	158	158	158	997	580	580	69	2023	674	504	2733	1515
d1, Uniform Delay [s]	55.31	53.94	53.80	53.50	40.81	34.30	34.28	57.93	30.82	30.88	50.25	22.33	3.45
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.78	7.77	6.74	5.06	2.48	0.69	0.69	1.45	1.01	3.07	4.64	0.86	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.77	0.74	0.68	0.87	0.51	0.51	0.20	0.53	0.54	0.87	0.57	0.36
d, Delay for Lane Group [s/veh]	60.09	61.71	60.54	58.56	43.29	34.99	34.96	59.38	31.83	33.95	54.89	23.19	4.11
Lane Group LOS	E	E	E	E	D	C	C	E	C	C	D	C	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.54	3.94	3.75	3.37	12.41	7.19	7.16	0.22	8.44	8.93	6.73	10.44	3.21
50th-Percentile Queue Length [ft/ln]	63.51	98.57	93.81	84.18	310.18	179.87	179.10	5.58	211.11	223.13	168.29	261.02	80.25
95th-Percentile Queue Length [veh/ln]	4.57	7.10	6.75	6.06	18.18	11.59	11.55	0.40	13.21	13.82	10.99	15.74	5.78
95th-Percentile Queue Length [ft/ln]	114.3	177.4	168.8	151.5	454.60	289.85	288.83	10.05	330.25	345.62	274.67	393.51	144.45

Movement, Approach, & Intersection Results

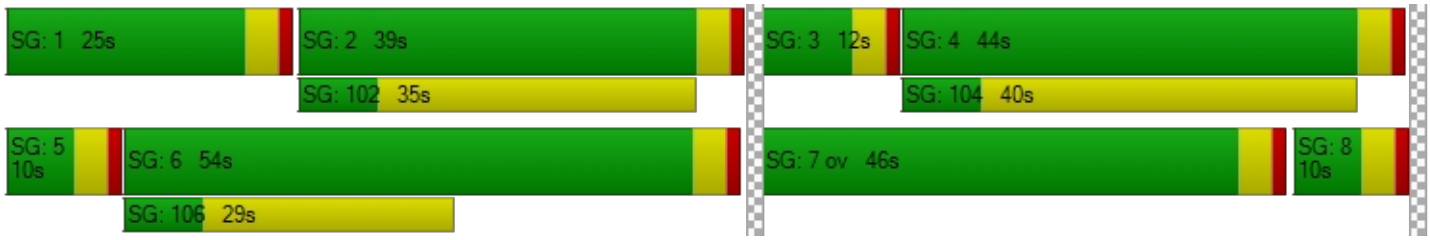
d_M, Delay for Movement [s/veh]	60.09	61.24	58.95	43.29	34.98	34.96	59.38	32.11	33.95	54.89	23.19	4.11
Movement LOS	E	E	E	D	C	C	E	C	C	D	C	A
d_A, Approach Delay [s/veh]	60.26			39.92			32.62			24.56		
Approach LOS	E			D			C			C		
d_I, Intersection Delay [s/veh]	33.34											
Intersection LOS	C											
Intersection V/C	0.724											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.848	2.827	3.207	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	666	583	833
d_b, Bicycle Delay [s]	54.17	26.68	30.12	20.43
l_b,int, Bicycle LOS Score for Intersection	1.978	2.760	2.160	2.950
Bicycle LOS	A	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	26.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.807

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	997	0	498	0	1611	549	211	1968	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	997	0	498	0	1611	549	211	1968	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.8640	1.0000	0.8640	1.0000	0.9400	0.9400	0.9190	0.9190	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	288	0	144	0	428	146	57	535	0
Total Analysis Volume [veh/h]	0	0	0	1154	0	576	0	1714	584	230	2141	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	60	0	0	0	23	0	12	35	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C	R	L	C
C, Cycle Length [s]		95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		36	36	36	39	39	39	8	51
g / C, Green / Cycle		0.38	0.38	0.38	0.41	0.41	0.41	0.08	0.53
(v / s)_i Volume / Saturation Flow Rate		0.33	0.33	0.30	0.30	0.30	0.30	0.07	0.38
s, saturation flow rate [veh/h]		1750	1750	1900	3800	1900	1900	3500	5700
c, Capacity [veh/h]		671	671	729	1540	770	770	298	3034
d1, Uniform Delay [s]		26.94	26.94	25.91	24.10	24.10	24.10	42.57	16.65
k, delay calibration		0.14	0.14	0.11	0.50	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		4.29	4.29	1.97	3.34	6.51	6.51	4.27	1.41
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.86	0.86	0.79	0.75	0.75	0.75	0.77	0.71
d, Delay for Lane Group [s/veh]		31.23	31.23	27.88	27.44	30.61	30.61	46.84	18.06
Lane Group LOS		C	C	C	C	C	C	D	B
Critical Lane Group		Yes	No	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		12.32	12.32	11.47	11.26	11.94	11.94	2.80	11.21
50th-Percentile Queue Length [ft/ln]		308.12	308.12	286.63	281.45	298.38	298.38	69.88	280.17
95th-Percentile Queue Length [veh/ln]		18.08	18.08	17.02	16.76	17.60	17.60	5.03	16.70
95th-Percentile Queue Length [ft/ln]		452.06	452.06	425.45	419.02	440.03	440.03	125.78	417.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	31.23	0.00	27.88	0.00	27.78	30.61	46.84	18.06	0.00
Movement LOS				C		C		C	C	D	B	
d_A, Approach Delay [s/veh]	0.00			30.12			29.03			20.85		
Approach LOS	A			C			C			C		
d_I, Intersection Delay [s/veh]	26.29											
Intersection LOS	C											
Intersection V/C	0.807											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.114	2.505	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1179	400	653
d_b, Bicycle Delay [s]	47.51	8.01	30.41	21.56
l_b,int, Bicycle LOS Score for Intersection	4.132	4.414	2.824	2.864
Bicycle LOS	D	E	C	C

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.838

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	989	0	468	0	0	0	267	2331	0	0	1201	461
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	989	0	468	0	0	0	267	2331	0	0	1201	461
Peak Hour Factor	0.8940	1.0000	0.8940	1.0000	1.0000	1.0000	0.9710	0.9710	1.0000	1.0000	0.8830	0.8830
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	277	0	131	0	0	0	69	600	0	0	340	131
Total Analysis Volume [veh/h]	1106	0	523	0	0	0	275	2401	0	0	1360	522
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	6	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	30	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	65	0	0	0	0	0	14	35	0	0	21	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	14	0	0	0	0	0	0	16	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No						No	No			No	
Maximum Recall	No						No	No			No	
Pedestrian Recall	No						No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		L	C	C	C	R
C, Cycle Length [s]	100	100		100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	37		10	55	41	41	41
g / C, Green / Cycle	0.37	0.37		0.10	0.55	0.41	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.32	0.28		0.08	0.42	0.25	0.25	0.25
s, saturation flow rate [veh/h]	3500	1900		3500	5700	3800	1900	1900
c, Capacity [veh/h]	1302	707		342	3124	1560	780	780
d1, Uniform Delay [s]	28.84	27.22		44.18	17.64	23.10	23.10	23.10
k, delay calibration	0.11	0.11		0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.65	1.55		4.45	1.88	1.74	3.44	3.44
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.74		0.80	0.77	0.60	0.60	0.60
d, Delay for Lane Group [s/veh]	30.49	28.77		48.63	19.52	24.84	26.55	26.55
Lane Group LOS	C	C		D	B	C	C	C
Critical Lane Group	Yes	No		No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	12.07	10.81		3.52	13.91	8.81	9.18	9.18
50th-Percentile Queue Length [ft/ln]	301.83	270.35		88.06	347.82	220.25	229.49	229.49
95th-Percentile Queue Length [veh/ln]	17.77	16.21		6.34	20.03	13.68	14.15	14.15
95th-Percentile Queue Length [ft/ln]	444.29	405.18		158.51	500.75	341.95	353.71	353.71

Movement, Approach, & Intersection Results

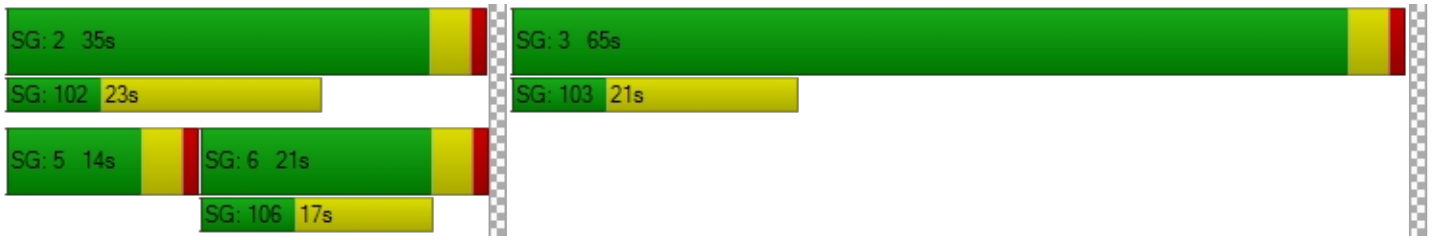
d_M, Delay for Movement [s/veh]	30.49	0.00	28.77	0.00	0.00	0.00	48.63	19.52	0.00	0.00	24.97	26.55
Movement LOS	C		C				D	B			C	C
d_A, Approach Delay [s/veh]	29.94			0.00			22.51			25.69		
Approach LOS	C			A			C			C		
d_I, Intersection Delay [s/veh]	25.43											
Intersection LOS	C											
Intersection V/C	0.838											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.474	2.108	0.000	3.268
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1220	0	620	340
d_b, Bicycle Delay [s]	7.61	50.00	23.81	34.45
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	3.031	2.595
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	13.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.577

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	8	7	6	42	1	85	459	2114	35	15	1578	145
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	7	6	42	1	85	459	2114	35	15	1578	145
Peak Hour Factor	0.7500	0.7500	0.7500	0.7620	0.7620	0.7620	0.8950	0.8950	0.8950	0.9060	0.9060	0.9060
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	2	2	14	0	28	128	591	10	4	435	40
Total Analysis Volume [veh/h]	11	9	8	55	1	112	513	2362	39	17	1742	160
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	44	0	0	44	0	35	39	0	27	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	19	90	90	2	73	73
g / C, Green / Cycle	0.05	0.05	0.05	0.17	0.81	0.81	0.02	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.02	0.03	0.03	0.15	0.41	0.44	0.01	0.33	0.34
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	144	163	208	603	3092	1546	41	2523	1261
d1, Uniform Delay [s]	49.92	50.72	50.64	44.14	3.26	3.38	53.04	9.31	9.36
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.65	1.24	2.17	3.48	0.60	1.33	6.71	0.71	1.45
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.19	0.34	0.54	0.85	0.51	0.53	0.42	0.50	0.51
d, Delay for Lane Group [s/veh]	50.57	51.96	52.81	47.62	3.86	4.71	59.75	10.02	10.81
Lane Group LOS	D	D	D	D	A	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.77	1.56	1.56	7.03	4.01	4.66	0.54	7.24	7.60
50th-Percentile Queue Length [ft/ln]	19.14	38.98	39.08	175.63	100.36	116.55	13.47	180.89	190.04
95th-Percentile Queue Length [veh/ln]	1.38	2.81	2.81	11.37	7.23	8.20	0.97	11.65	12.12
95th-Percentile Queue Length [ft/ln]	34.46	70.17	70.34	284.30	180.65	205.07	24.25	291.18	303.08

Movement, Approach, & Intersection Results

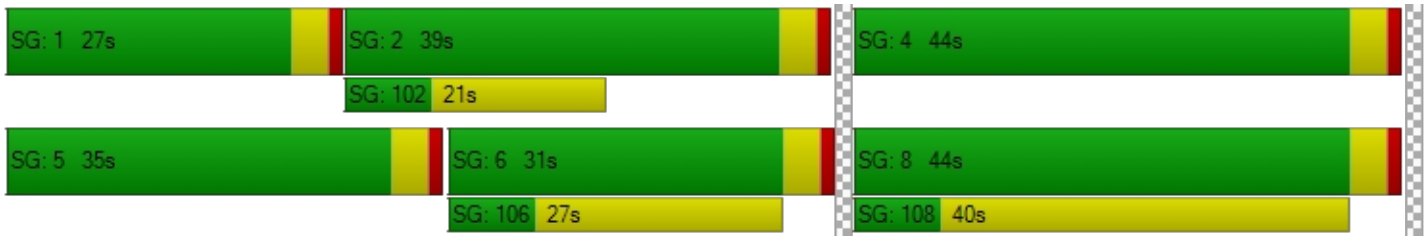
d_M, Delay for Movement [s/veh]	50.57	50.57	50.57	51.96	51.96	52.81	47.62	4.14	4.71	59.75	10.24	10.81
Movement LOS	D	D	D	D	D	D	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	50.57			52.52			11.81			10.72		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	12.97											
Intersection LOS	B											
Intersection V/C	0.577											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	0.00	44.55
l_p,int, Pedestrian LOS Score for Intersection	1.766	2.475	0.000	3.287
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	727	727	636	491
d_b, Bicycle Delay [s]	22.27	22.27	25.56	31.31
l_b,int, Bicycle LOS Score for Intersection	1.606	1.837	3.162	2.615
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	57.3
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.012

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	137	268	10	104	182	339	417	1659	140	19	1195	153
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	268	10	104	182	339	417	1659	140	19	1195	153
Peak Hour Factor	0.6110	0.6110	0.6110	0.5110	0.5110	0.5110	0.8790	0.8790	0.8790	0.8850	0.8850	0.8850
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	110	4	51	89	166	119	472	40	5	338	43
Total Analysis Volume [veh/h]	224	439	16	204	356	663	474	1887	159	21	1350	173
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	27	0	37	45	0	20	43	0	13	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	40	40	16	41	41	16	45	45	3	32	32
g / C, Green / Cycle	0.13	0.34	0.34	0.13	0.34	0.34	0.13	0.38	0.38	0.03	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.12	0.11	0.19	0.35	0.14	0.33	0.08	0.01	0.27	0.27
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	225	636	636	236	647	647	467	2142	714	45	1017	508
d1, Uniform Delay [s]	52.47	30.19	30.15	51.10	32.10	39.56	52.00	34.95	25.52	57.69	43.94	43.82
k, delay calibration	0.11	0.11	0.11	0.11	0.13	0.48	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	26.79	0.34	0.34	9.19	0.85	40.96	23.32	5.63	0.72	7.15	28.59	38.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.00	0.36	0.36	0.87	0.55	1.02	1.02	0.88	0.22	0.46	1.00	0.99
d, Delay for Lane Group [s/veh]	79.26	30.54	30.49	60.29	32.95	80.52	75.32	40.59	26.24	64.84	72.53	81.86
Lane Group LOS	E	C	C	E	C	F	F	D	C	E	F	F
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.40	5.07	5.01	6.60	8.51	26.09	8.51	17.99	3.26	0.72	19.00	20.17
50th-Percentile Queue Length [ft/ln]	209.98	126.87	125.24	165.07	212.78	652.32	212.86	449.63	81.40	17.98	474.89	504.27
95th-Percentile Queue Length [veh/ln]	13.15	8.77	8.68	10.82	13.30	35.06	13.39	24.94	5.86	1.29	26.17	27.54
95th-Percentile Queue Length [ft/ln]	328.80	219.23	217.01	270.43	332.39	876.41	334.76	623.51	146.51	32.37	654.22	688.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	79.26	30.51	30.49	60.29	32.95	80.52	75.32	40.59	26.24	64.84	74.82	81.86
Movement LOS	E	C	C	E	C	F	F	D	C	E	E	F
d_A, Approach Delay [s/veh]	46.59			63.30			46.21			75.48		
Approach LOS	D			E			D			E		
d_I, Intersection Delay [s/veh]	57.33											
Intersection LOS	E											
Intersection V/C	1.012											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.551	2.764	3.378	3.116
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	383	683	650	533
d_b, Bicycle Delay [s]	39.21	26.01	27.34	32.27
l_b,int, Bicycle LOS Score for Intersection	2.120	2.569	2.946	2.409
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	28.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.713

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	277	107	30	18	204	308	92	614	1008	253	691	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	277	107	30	18	204	308	92	614	1008	253	691	12
Peak Hour Factor	0.7870	0.7870	0.7870	0.8900	0.8900	0.8900	0.9170	0.9170	0.9170	0.9370	0.9370	0.9370
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	34	10	5	57	87	25	167	275	68	184	3
Total Analysis Volume [veh/h]	352	136	38	20	229	346	100	670	1099	270	737	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	17	49	49	10	42	0	12	37	37	14	39	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	33	47	3	23	23	8	48	65	10	50	50
g / C, Green / Cycle	0.12	0.30	0.43	0.03	0.21	0.21	0.07	0.44	0.59	0.09	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.10	0.07	0.02	0.01	0.12	0.18	0.06	0.18	0.29	0.08	0.13	0.14
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	415	571	814	47	395	395	127	1659	2248	320	1739	870
d1, Uniform Delay [s]	47.54	29.00	18.35	52.81	39.27	42.22	50.38	21.22	12.92	49.23	18.60	18.72
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.86	0.21	0.02	6.06	1.35	6.36	10.42	0.73	0.76	6.00	0.41	0.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.24	0.05	0.43	0.58	0.88	0.79	0.40	0.49	0.84	0.28	0.30
d, Delay for Lane Group [s/veh]	52.40	29.22	18.37	58.87	40.62	48.58	60.80	21.95	13.69	55.23	19.01	19.58
Lane Group LOS	D	C	B	E	D	D	E	C	B	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.99	2.74	0.57	0.62	5.70	9.72	3.07	5.99	7.65	3.91	3.97	4.27
50th-Percentile Queue Length [ft/ln]	124.73	68.57	14.28	15.57	142.59	243.10	76.79	149.81	191.25	97.72	99.27	106.72
95th-Percentile Queue Length [veh/ln]	8.65	4.94	1.03	1.12	9.62	14.84	5.53	10.01	12.19	7.04	7.15	7.66
95th-Percentile Queue Length [ft/ln]	216.31	123.43	25.70	28.03	240.50	370.95	138.22	250.18	304.65	175.90	178.69	191.44

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.40	29.22	18.37	58.87	40.62	48.58	60.80	21.95	13.69	55.23	19.20	19.58
Movement LOS	D	C	B	E	D	D	E	C	B	E	B	B
d_A, Approach Delay [s/veh]	43.95			45.86			19.17			28.74		
Approach LOS	D			D			B			C		
d_I, Intersection Delay [s/veh]	28.82											
Intersection LOS	C											
Intersection V/C	0.713											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.808	2.346	3.138	2.847
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	818	691	600	636
d_b, Bicycle Delay [s]	19.23	23.59	26.97	25.59
l_b,int, Bicycle LOS Score for Intersection	2.428	2.541	3.102	2.121
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.285

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	40	5	16	4	0	5	6	654	43	22	932	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	40	5	16	4	0	5	6	654	43	22	932	2
Peak Hour Factor	0.5360	0.5360	0.5360	0.4290	1.0000	0.4290	0.9490	0.9490	0.9490	0.9030	0.9030	0.9030
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	2	7	2	0	3	2	172	11	6	258	1
Total Analysis Volume [veh/h]	75	9	30	9	0	12	6	689	45	24	1032	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	41	0	40	0	0	11	29	0	10	28	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	7	3	3	1	91	91	3	93	93
g / C, Green / Cycle	0.06	0.06	0.03	0.03	0.01	0.75	0.75	0.03	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.04	0.02	0.01	0.01	0.00	0.20	0.19	0.01	0.18	0.19
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	106	112	46	49	17	1433	1433	50	2936	1468
d1, Uniform Delay [s]	55.48	54.28	57.26	57.34	59.07	4.50	4.48	57.47	3.77	3.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.40	1.86	2.03	2.59	11.67	0.44	0.43	6.82	0.18	0.39
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.35	0.20	0.25	0.35	0.26	0.25	0.48	0.23	0.24
d, Delay for Lane Group [s/veh]	63.88	56.14	59.29	59.93	70.74	4.94	4.91	64.29	3.96	4.21
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.48	1.19	0.29	0.39	0.24	2.61	2.54	0.81	2.00	2.21
50th-Percentile Queue Length [ft/ln]	61.93	29.81	7.35	9.81	5.93	65.25	63.61	20.34	50.09	55.14
95th-Percentile Queue Length [veh/ln]	4.46	2.15	0.53	0.71	0.43	4.70	4.58	1.46	3.61	3.97
95th-Percentile Queue Length [ft/ln]	111.48	53.65	13.22	17.67	10.67	117.45	114.50	36.62	90.16	99.25

Movement, Approach, & Intersection Results

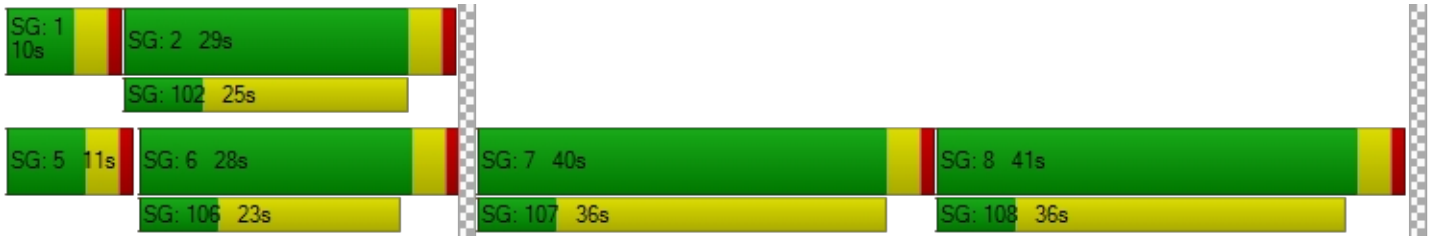
d_M, Delay for Movement [s/veh]	63.88	56.14	56.14	59.29	0.00	59.93	70.74	4.92	4.91	64.29	4.04	4.21
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	61.23			59.66			5.46			5.41		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	9.31											
Intersection LOS	A											
Intersection V/C	0.285											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.013	1.966	2.769	2.757
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	617	600	417	400
d_b, Bicycle Delay [s]	28.71	29.41	37.61	38.41
l_b,int, Bicycle LOS Score for Intersection	1.748	1.560	2.170	2.142
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	136.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.014

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	264	173	132	7	352	38	44	148	488	862	658	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	264	173	132	7	352	38	44	148	488	862	658	2
Peak Hour Factor	0.7800	0.7800	0.7800	0.6660	0.6660	0.6660	0.9130	0.9130	0.9130	0.9720	0.9720	0.9720
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	55	42	3	132	14	12	41	134	222	169	1
Total Analysis Volume [veh/h]	338	222	169	11	529	57	48	162	535	887	677	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	51	0	10	43	0	11	36	0	23	48	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	34	2	22	22	5	49	49	19	64	64
g / C, Green / Cycle	0.12	0.28	0.02	0.18	0.18	0.04	0.41	0.41	0.16	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.19	0.06	0.01	0.16	0.15	0.03	0.04	0.28	0.25	0.12	0.12
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	211	1067	29	342	342	73	1562	781	555	2010	1005
d1, Uniform Delay [s]	53.00	32.98	58.45	47.85	47.60	56.75	21.75	28.99	50.51	15.09	15.19
k, delay calibration	0.27	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	283.12	0.10	7.73	6.78	5.70	9.45	0.13	4.85	270.88	0.25	0.54
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.60	0.21	0.37	0.87	0.84	0.65	0.10	0.69	1.60	0.22	0.23
d, Delay for Lane Group [s/veh]	336.12	33.07	66.18	54.64	53.30	66.20	21.89	33.83	321.39	15.35	15.73
Lane Group LOS	F	C	E	D	D	E	C	C	F	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	22.92	2.50	0.39	9.27	8.87	1.63	1.45	13.52	29.19	3.30	3.56
50th-Percentile Queue Length [ft/ln]	573.07	62.52	9.86	231.63	221.75	40.71	36.13	337.90	729.75	82.50	89.00
95th-Percentile Queue Length [veh/ln]	36.12	4.50	0.71	14.26	13.75	2.93	2.60	19.55	45.54	5.94	6.41
95th-Percentile Queue Length [ft/ln]	902.99	112.53	17.74	356.43	343.86	73.28	65.03	488.63	1138.50	148.50	160.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	336.12	33.07	0.00	66.18	54.05	53.30	66.20	21.89	33.83	321.39	15.48	15.73
Movement LOS	F	C		E	D	D	E	C	C	F	B	B
d_A, Approach Delay [s/veh]	215.98			54.21			33.32			188.75		
Approach LOS	F			D			C			F		
d_I, Intersection Delay [s/veh]	136.60											
Intersection LOS	F											
Intersection V/C	1.014											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.875	2.483	2.861	2.951
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	783	650	533	733
d_b, Bicycle Delay [s]	22.22	27.35	32.28	24.08
l_b,int, Bicycle LOS Score for Intersection	2.022	2.052	1.969	2.421
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	4.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.498

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	4	1	1	0	0	22	13	294	7	6	1542	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	1	1	0	0	22	13	294	7	6	1542	4
Peak Hour Factor	0.5000	0.5000	0.5000	1.0000	1.0000	0.6560	0.9190	0.9190	0.9190	0.9760	0.9760	0.9760
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	1	0	0	8	4	80	2	2	395	1
Total Analysis Volume [veh/h]	8	2	2	0	0	34	14	320	8	6	1580	4
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	60	0	10	60	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	2	88	88	1	87	87
g / C, Green / Cycle	0.04	0.04	0.02	0.84	0.84	0.01	0.83	0.83
(v / s)_i Volume / Saturation Flow Rate	0.01	0.02	0.01	0.09	0.09	0.00	0.42	0.00
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	123	69	35	1595	1595	18	3153	1576
d1, Uniform Delay [s]	49.07	49.63	50.85	1.48	1.48	51.65	2.61	1.53
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.34	5.30	7.00	0.13	0.13	9.84	0.57	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.49	0.40	0.10	0.10	0.33	0.50	0.00
d, Delay for Lane Group [s/veh]	49.41	54.93	57.85	1.61	1.61	61.48	3.18	1.53
Lane Group LOS	D	D	E	A	A	E	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.32	0.98	0.43	0.38	0.38	0.21	3.05	0.01
50th-Percentile Queue Length [ft/ln]	7.91	24.38	10.79	9.44	9.39	5.17	76.27	0.24
95th-Percentile Queue Length [veh/ln]	0.57	1.76	0.78	0.68	0.68	0.37	5.49	0.02
95th-Percentile Queue Length [ft/ln]	14.24	43.89	19.43	17.00	16.91	9.31	137.28	0.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.41	49.41	49.41	0.00	0.00	54.93	57.85	1.61	1.61	61.48	3.18	1.53
Movement LOS	D	D	D			D	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	49.41			54.93			3.91			3.40		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	4.65											
Intersection LOS	A											
Intersection V/C	0.498											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.07	42.07	0.00	42.07
l_p,int, Pedestrian LOS Score for Intersection	1.735	1.748	0.000	2.771
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	590	590	1067	1067
d_b, Bicycle Delay [s]	26.07	26.07	11.43	11.43
l_b,int, Bicycle LOS Score for Intersection	1.579	1.560	1.842	2.871
Bicycle LOS	A	A	A	C

Sequence

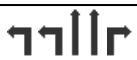
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	40.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.785

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	73	115	93	610	755	141	72	487	46	74	540	265
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	73	115	93	610	755	141	72	487	46	74	540	265
Peak Hour Factor	0.8430	0.8430	0.8430	0.8910	0.8910	0.8910	0.8600	0.8600	0.8600	0.7640	0.7640	0.7640
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	34	28	171	212	40	21	142	13	24	177	87
Total Analysis Volume [veh/h]	87	136	110	685	847	158	84	566	53	97	707	347
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	32	61	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	35	35	26	55	55	6	37	37	6	37	37
g / C, Green / Cycle	0.05	0.29	0.29	0.21	0.46	0.46	0.05	0.31	0.31	0.05	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	0.06	0.20	0.45	0.08	0.02	0.15	0.03	0.03	0.19	0.18
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	165	1113	556	750	874	874	164	1184	592	168	1188	594
d1, Uniform Delay [s]	55.85	31.12	31.85	46.05	31.59	19.09	55.84	33.42	29.26	55.92	34.83	34.69
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.58	0.05	0.17	4.85	8.66	0.10	2.44	1.39	0.30	3.10	2.20	4.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	0.12	0.20	0.91	0.97	0.18	0.51	0.48	0.09	0.58	0.60	0.58
d, Delay for Lane Group [s/veh]	58.43	31.17	32.03	50.90	40.25	19.19	58.28	34.80	29.56	59.03	37.04	38.85
Lane Group LOS	E	C	C	D	D	B	E	C	C	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.35	1.47	2.44	10.43	12.60	2.63	1.30	6.90	1.14	1.51	9.07	9.19
50th-Percentile Queue Length [ft/ln]	33.68	36.65	61.03	260.73	314.96	65.70	32.47	172.57	28.59	37.79	226.65	229.86
95th-Percentile Queue Length [veh/ln]	2.43	2.64	4.39	15.73	18.42	4.73	2.34	11.21	2.06	2.72	14.00	14.17
95th-Percentile Queue Length [ft/ln]	60.63	65.97	109.86	393.14	460.49	118.26	58.44	280.30	51.46	68.02	350.10	354.18

Movement, Approach, & Intersection Results

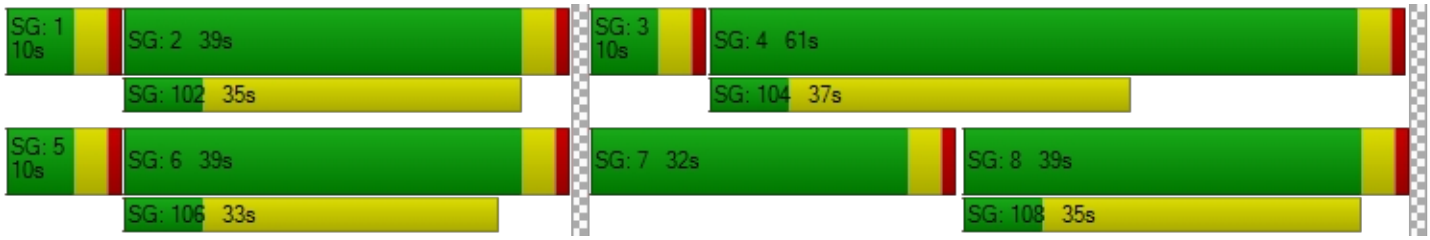
d_M, Delay for Movement [s/veh]	58.43	31.17	32.03	50.90	40.25	19.19	58.28	34.80	29.56	59.03	37.04	38.85
Movement LOS	E	C	C	D	D	B	E	C	C	E	D	D
d_A, Approach Delay [s/veh]	38.58			42.60			37.21			39.44		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	40.34											
Intersection LOS	D											
Intersection V/C	0.785											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.793	2.922	2.838	2.958
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	950	583	583
d_b, Bicycle Delay [s]	30.10	16.54	30.10	30.10
l_b,int, Bicycle LOS Score for Intersection	1.834	2.954	2.140	2.509
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	228	6	298	53	28	8	2	883	294	332	724	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	228	6	298	53	28	8	2	883	294	332	724	10
Peak Hour Factor	0.8160	0.8160	0.8160	0.7410	0.7410	0.7410	0.8560	0.8560	0.8560	0.9140	0.9140	0.9140
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	2	91	18	9	3	1	258	86	91	198	3
Total Analysis Volume [veh/h]	279	7	365	72	38	11	2	1032	343	363	792	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	21	58	58	0	37	0	10	38	0	19	47	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	22	41	7	7	0	66	66	15	81	81
g / C, Green / Cycle	0.10	0.19	0.36	0.06	0.06	0.00	0.57	0.57	0.13	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.19	0.04	0.03	0.00	0.38	0.35	0.10	0.21	0.21
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	349	365	680	135	110	8	1088	1088	458	1329	1329
d1, Uniform Delay [s]	50.69	37.69	29.37	53.20	52.43	57.12	16.81	16.13	48.50	6.60	6.59
k, delay calibration	0.11	0.11	0.26	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.27	0.02	1.57	3.26	2.81	17.13	3.08	2.54	3.14	0.59	0.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.02	0.54	0.53	0.45	0.26	0.65	0.61	0.79	0.30	0.30
d, Delay for Lane Group [s/veh]	54.96	37.71	30.94	56.47	55.24	74.25	19.89	18.67	51.65	7.19	7.18
Lane Group LOS	D	D	C	E	E	E	B	B	D	A	A
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.13	0.16	8.28	2.16	1.46	0.09	13.18	11.70	5.24	3.63	3.61
50th-Percentile Queue Length [ft/ln]	103.31	4.08	206.93	54.12	36.39	2.36	329.53	292.39	131.04	90.82	90.28
95th-Percentile Queue Length [veh/ln]	7.44	0.29	13.00	3.90	2.62	0.17	19.14	17.30	9.00	6.54	6.50
95th-Percentile Queue Length [ft/ln]	185.96	7.35	324.89	97.41	65.51	4.25	478.38	432.61	224.91	163.48	162.51

Movement, Approach, & Intersection Results

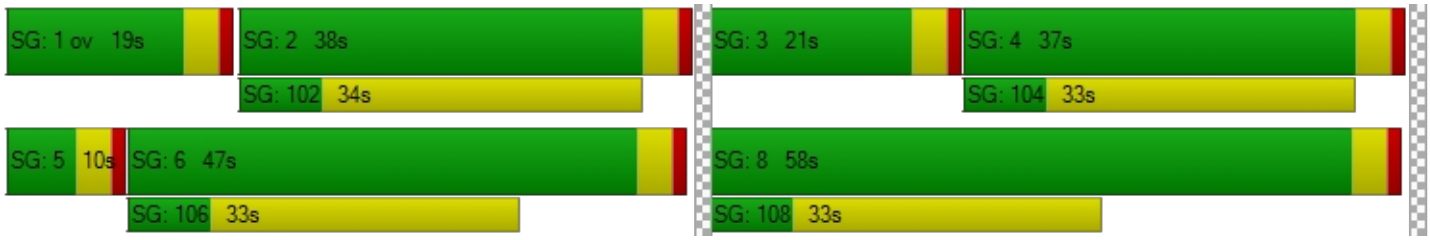
d_M, Delay for Movement [s/veh]	54.96	37.71	30.94	56.47	55.24	55.24	74.25	19.51	18.67	51.65	7.18	7.18
Movement LOS	D	D	C	E	E	E	E	B	B	D	A	A
d_A, Approach Delay [s/veh]	41.31			55.97			19.38			21.03		
Approach LOS	D			E			B			C		
d_I, Intersection Delay [s/veh]	25.60											
Intersection LOS	C											
Intersection V/C	0.746											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.691	1.998	2.791	2.995
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	939	574	591	748
d_b, Bicycle Delay [s]	16.19	29.25	28.54	22.56
l_b,int, Bicycle LOS Score for Intersection	2.634	1.759	2.696	2.522
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.707

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Peak Hour Factor	0.5500	0.5500	0.5500	0.8490	0.8490	0.8490	0.8890	0.8890	0.8890	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	45	1	129	87	228	4	2	198	22
Total Analysis Volume [veh/h]	5	5	9	179	2	515	348	911	18	9	791	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	37	0	39	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	3	25	25	62	27	75	75	2	50	50
g / C, Green / Cycle	0.02	0.02	0.02	0.21	0.21	0.52	0.22	0.62	0.62	0.01	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.27	0.19	0.25	0.24	0.01	0.21	0.05
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	79	46	46	370	370	986	401	1184	1184	25	1574	787
d1, Uniform Delay [s]	57.30	57.29	57.41	39.90	39.90	19.04	44.97	11.31	11.28	58.67	26.01	21.61
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.15	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.33	1.01	2.01	0.34	0.34	1.98	7.82	0.98	0.97	8.46	1.15	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.11	0.19	0.24	0.24	0.52	0.87	0.39	0.39	0.36	0.50	0.11
d, Delay for Lane Group [s/veh]	57.63	58.30	59.42	40.24	40.24	21.02	52.80	12.29	12.26	67.12	27.16	21.90
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.16	0.16	0.29	2.28	2.28	9.84	10.81	6.29	6.24	0.33	8.56	1.62
50th-Percentile Queue Length [ft/ln]	3.90	4.04	7.35	57.06	57.11	245.92	270.27	157.32	156.03	8.26	214.05	40.43
95th-Percentile Queue Length [veh/ln]	0.28	0.29	0.53	4.11	4.11	14.98	16.20	10.41	10.34	0.59	13.36	2.91
95th-Percentile Queue Length [ft/ln]	7.02	7.28	13.23	102.70	102.79	374.51	405.07	260.17	258.45	14.86	334.01	72.78

Movement, Approach, & Intersection Results

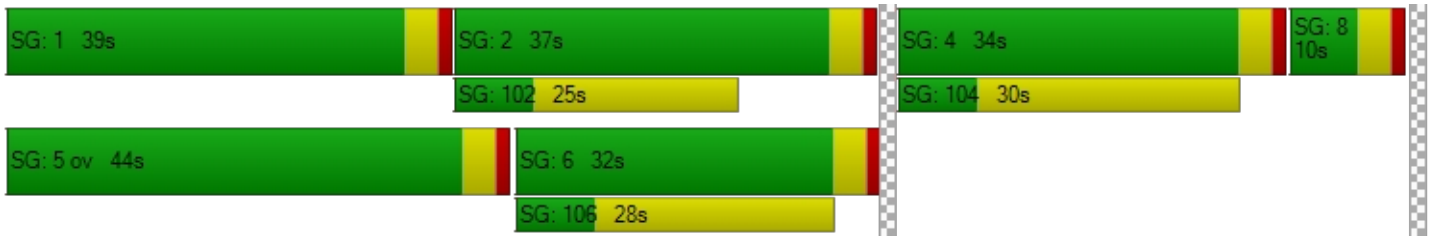
d_M, Delay for Movement [s/veh]	57.63	58.30	59.42	40.24	40.24	21.02	52.80	12.28	12.26	67.12	27.16	21.90
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	58.66			26.02			23.32			27.04		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	25.35											
Intersection LOS	C											
Intersection V/C	0.707											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.157	2.422	2.825	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	550	467
d_b, Bicycle Delay [s]	54.17	33.76	31.55	35.28
l_b,int, Bicycle LOS Score for Intersection	1.591	2.708	2.613	2.293
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	36.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	130	209	89	427	958	171	36	533	335	60	411	209
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	209	89	427	958	171	36	533	335	60	411	209
Peak Hour Factor	0.8520	0.8520	0.8520	0.8550	0.8550	0.8550	0.8890	0.8890	0.8890	0.8090	0.8090	0.8090
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	61	26	125	280	50	10	150	94	19	127	65
Total Analysis Volume [veh/h]	153	245	104	499	1120	200	40	600	377	74	508	258
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	37	0	34	60	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	20	20	20	33	33	4	58	58	6	60	60
g / C, Green / Cycle	0.06	0.16	0.16	0.17	0.27	0.27	0.04	0.49	0.49	0.05	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.06	0.14	0.23	0.23	0.02	0.16	0.20	0.04	0.13	0.14
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	207	626	313	581	1032	516	68	1844	922	91	1894	947
d1, Uniform Delay [s]	55.58	44.64	44.53	48.71	41.55	41.24	56.85	18.88	19.84	56.41	17.44	17.48
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.14	0.37	0.70	3.86	2.23	3.73	7.89	0.47	1.34	15.38	0.35	0.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.38	0.36	0.86	0.86	0.84	0.59	0.33	0.41	0.81	0.27	0.27
d, Delay for Lane Group [s/veh]	60.72	45.02	45.23	52.58	43.78	44.97	64.75	19.35	21.18	71.79	17.79	18.19
Lane Group LOS	E	D	D	D	D	D	E	B	C	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.43	3.17	3.07	7.57	12.71	12.53	1.34	5.20	7.05	2.61	4.14	4.31
50th-Percentile Queue Length [ft/ln]	60.69	79.25	76.77	189.17	317.66	313.28	33.60	129.92	176.15	65.28	103.53	107.76
95th-Percentile Queue Length [veh/ln]	4.37	5.71	5.53	12.08	18.55	18.34	2.42	8.94	11.40	4.70	7.45	7.72
95th-Percentile Queue Length [ft/ln]	109.24	142.64	138.18	301.95	463.81	458.42	60.48	223.39	284.98	117.50	186.36	192.88

Movement, Approach, & Intersection Results

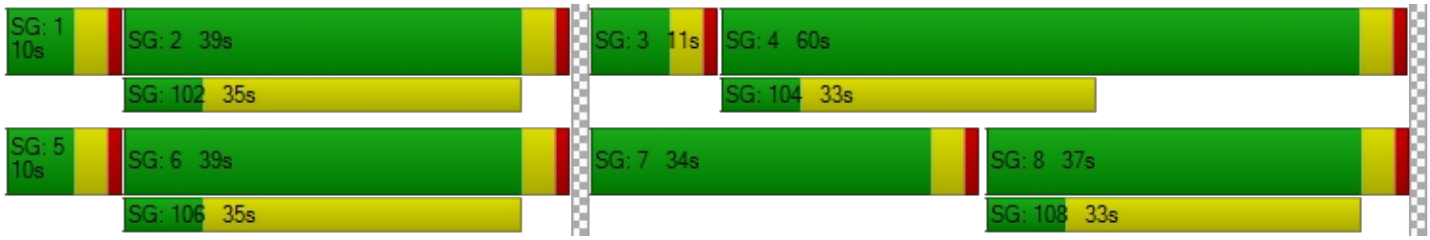
d_M, Delay for Movement [s/veh]	60.72	45.03	45.23	52.58	44.02	44.97	64.75	19.35	21.18	71.79	17.79	18.19
Movement LOS	E	D	D	D	D	D	E	B	C	E	B	B
d_A, Approach Delay [s/veh]	49.85			46.47			21.82			22.67		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	36.09											
Intersection LOS	D											
Intersection V/C	0.596											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.992	3.027	2.772	2.799
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	550	933	583	583
d_b, Bicycle Delay [s]	31.55	17.08	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.836	2.560	2.399	2.253
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	105.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.824

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	130	196	13	718	755	243	60	418	130	12	340	305
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	196	13	718	755	243	60	418	130	12	340	305
Peak Hour Factor	0.7760	0.7760	0.7760	0.9030	0.9030	0.9030	0.9050	0.9050	0.9050	0.8810	0.8810	0.8810
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	63	4	199	209	67	17	115	36	3	96	87
Total Analysis Volume [veh/h]	168	253	17	795	836	269	66	462	144	14	386	346
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	38	0	36	56	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	20	20	32	39	39	5	50	50	2	47	47
g / C, Green / Cycle	0.11	0.16	0.16	0.27	0.32	0.32	0.04	0.42	0.42	0.02	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.07	0.44	0.29	0.29	0.02	0.17	0.15	0.01	0.10	0.18
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	196	310	310	480	610	610	158	793	793	35	1488	744
d1, Uniform Delay [s]	52.58	45.26	45.21	44.04	39.09	38.97	55.77	24.42	24.07	58.15	24.73	27.16
k, delay calibration	0.11	0.11	0.11	0.50	0.22	0.21	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.30	0.97	0.95	305.06	10.28	9.55	1.74	1.48	1.31	7.08	0.42	2.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.44	0.43	1.66	0.91	0.90	0.42	0.40	0.37	0.40	0.26	0.46
d, Delay for Lane Group [s/veh]	62.88	46.24	46.16	349.09	49.37	48.51	57.51	25.91	25.39	65.23	25.15	29.25
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.53	3.75	3.69	54.75	17.22	16.92	1.01	6.55	5.98	0.49	3.82	7.78
50th-Percentile Queue Length [ft/ln]	138.33	93.78	92.21	1368.68	430.52	423.11	25.31	163.79	149.42	12.25	95.50	194.53
95th-Percentile Queue Length [veh/ln]	9.39	6.75	6.64	84.37	24.03	23.67	1.82	10.75	9.99	0.88	6.88	12.36
95th-Percentile Queue Length [ft/ln]	234.78	168.81	165.98	2109.33	600.66	591.78	45.56	268.74	249.66	22.05	171.90	308.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.88	46.20	46.16	349.09	49.08	48.51	57.51	25.74	25.39	65.23	25.15	29.25
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	52.60			174.53			28.78			27.80		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	105.09											
Intersection LOS	F											
Intersection V/C	0.824											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.593	2.814	2.710	2.795
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	866	533	533
d_b, Bicycle Delay [s]	30.83	19.28	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	1.921	3.127	2.114	2.175
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	6.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.767

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	10	665	1202	10	8	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	665	1202	10	8	33
Peak Hour Factor	0.8540	0.8540	0.9370	0.9370	0.5560	0.5560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	195	321	3	4	15
Total Analysis Volume [veh/h]	12	779	1283	11	14	59
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	6	6	0	6	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	82	82	0	38	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C
C, Cycle Length [s]	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	106	106	106	106	6
g / C, Green / Cycle	0.88	0.88	0.88	0.88	0.05
(v / s)_i Volume / Saturation Flow Rate	0.01	0.41	0.68	0.01	0.04
s, saturation flow rate [veh/h]	1800	1900	1900	1900	1800
c, Capacity [veh/h]	1151	1673	1673	1673	95
d1, Uniform Delay [s]	0.86	1.45	2.64	0.86	56.05
k, delay calibration	0.50	0.50	0.50	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.93	3.43	0.01	12.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.47	0.77	0.01	0.77
d, Delay for Lane Group [s/veh]	0.88	2.39	6.07	0.87	68.10
Lane Group LOS	A	A	A	A	E
Critical Lane Group	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.02	1.89	5.94	0.02	2.50
50th-Percentile Queue Length [ft/ln]	0.46	47.13	148.40	0.39	62.51
95th-Percentile Queue Length [veh/ln]	0.03	3.39	9.93	0.03	4.50
95th-Percentile Queue Length [ft/ln]	0.83	84.83	248.29	0.70	112.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.88	2.39	6.07	0.87	68.10	68.10
Movement LOS	A	A	A	A	E	E
d_A, Approach Delay [s/veh]	2.37		6.03		68.10	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	6.78					
Intersection LOS	A					
Intersection V/C	0.767					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	0.00	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.647	0.000	1.792
Crosswalk LOS	B	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1301	1301	567
d_b, Bicycle Delay [s]	7.34	7.34	30.79
l_b,int, Bicycle LOS Score for Intersection	2.865	3.695	1.680
Bicycle LOS	C	D	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	14.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.557

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	558	0	445	0	1366	619	0	1589	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	558	0	445	0	1366	619	0	1589	174
Peak Hour Factor	1.0000	1.0000	1.0000	0.8810	1.0000	0.8810	1.0000	0.9270	0.9270	1.0000	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	158	0	126	0	368	167	0	423	46
Total Analysis Volume [veh/h]	0	0	0	633	0	505	0	1474	668	0	1690	185
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		23	23	23	59	59
g / C, Green / Cycle		0.26	0.26	0.26	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate		0.21	0.21	0.20	0.26	0.30
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		461	461	486	3734	3734
d1, Uniform Delay [s]		31.51	31.51	31.08	7.21	7.60
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.77	3.77	2.76	0.31	0.40
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.82	0.82	0.78	0.39	0.45
d, Delay for Lane Group [s/veh]		35.28	35.28	33.84	7.52	7.99
Lane Group LOS		D	D	C	A	A
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		8.02	8.02	7.81	3.91	4.74
50th-Percentile Queue Length [ft/ln]		200.54	200.54	195.22	97.85	118.39
95th-Percentile Queue Length [veh/ln]		12.67	12.67	12.39	7.04	8.30
95th-Percentile Queue Length [ft/ln]		316.66	316.66	309.79	176.12	207.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	35.28	0.00	34.20	0.00	7.52	0.00	0.00	7.99	0.00
Movement LOS				D		C		A			A	
d_A, Approach Delay [s/veh]	0.00			34.80			7.52			7.99		
Approach LOS	A			C			A			A		
d_I, Intersection Delay [s/veh]	14.92											
Intersection LOS	B											
Intersection V/C	0.557											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.408	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.437	2.370	2.489
Bicycle LOS	D	C	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	803	43	761	0	0	50	116	1241	515	0	1355	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	803	43	761	0	0	50	116	1241	515	0	1355	18
Peak Hour Factor	0.9080	0.9080	0.9080	1.0000	1.0000	0.6820	0.8790	0.8790	0.8790	1.0000	0.8940	0.8940
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	221	12	210	0	0	18	33	353	146	0	379	5
Total Analysis Volume [veh/h]	884	47	838	0	0	73	132	1412	586	0	1516	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	47	0	0	0	10	13	43	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	5	9	52	39	39
g / C, Green / Cycle	0.31	0.31	0.31	0.05	0.09	0.52	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.25	0.25	0.24	0.02	0.07	0.25	0.20	0.20
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	1080	555	586	202	163	2955	2211	737
d1, Uniform Delay [s]	31.88	31.89	31.34	45.77	44.69	15.43	23.51	23.51
k, delay calibration	0.11	0.15	0.12	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.48	3.80	2.41	1.09	9.18	0.56	0.88	2.62
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.81	0.77	0.36	0.81	0.48	0.52	0.52
d, Delay for Lane Group [s/veh]	33.36	35.69	33.75	46.85	53.87	15.99	24.39	26.13
Lane Group LOS	C	D	C	D	D	B	C	C
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	9.70	10.35	9.99	0.90	3.61	6.71	6.97	7.32
50th-Percentile Queue Length [ft/ln]	242.58	258.87	249.82	22.58	90.18	167.80	174.18	183.09
95th-Percentile Queue Length [veh/ln]	14.81	15.63	15.18	1.63	6.49	10.96	11.30	11.76
95th-Percentile Queue Length [ft/ln]	370.29	390.81	379.43	40.64	162.33	274.02	282.40	294.05

Movement, Approach, & Intersection Results

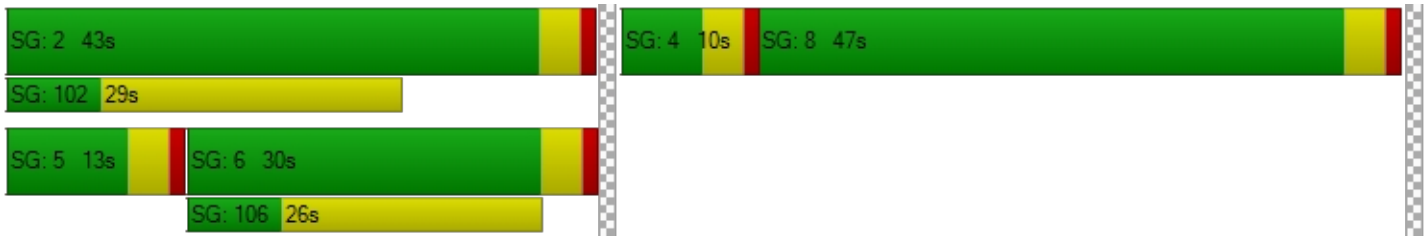
d_M, Delay for Movement [s/veh]	33.36	35.69	34.67	0.00	0.00	46.85	53.87	15.99	0.00	0.00	24.81	26.13
Movement LOS	C	D	C			D	D	B			C	C
d_A, Approach Delay [s/veh]	34.05			46.85			19.23			24.82		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	26.71											
Intersection LOS	C											
Intersection V/C	0.618											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.650	2.033	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	859	120	779	520
d_b, Bicycle Delay [s]	16.27	44.22	18.63	27.41
l_b,int, Bicycle LOS Score for Intersection	4.478	1.560	2.409	2.193
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.758

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	140	198	68	142	314	139	142	1758	95	88	1505	80
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	140	198	68	142	314	139	142	1758	95	88	1505	80
Peak Hour Factor	0.8870	0.8870	0.8870	0.9320	0.9320	0.9320	0.9120	0.9120	0.9120	0.9620	0.9620	0.9620
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	56	19	38	84	37	39	482	26	23	391	21
Total Analysis Volume [veh/h]	158	223	77	152	337	149	156	1928	104	91	1564	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	11	40	0	14	40	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	20	20	6	20	20	10	52	52	6	48	48
g / C, Green / Cycle	0.06	0.20	0.20	0.06	0.20	0.20	0.10	0.52	0.52	0.06	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.05	0.08	0.08	0.04	0.18	0.08	0.09	0.35	0.36	0.05	0.21	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	213	383	383	220	387	387	181	1957	978	110	2708	903
d1, Uniform Delay [s]	46.25	34.76	34.57	45.96	38.61	34.46	44.34	18.21	18.51	46.51	17.53	17.85
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.03	0.69	0.62	3.83	6.15	0.63	11.28	1.98	4.28	14.62	0.54	1.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.40	0.38	0.69	0.87	0.39	0.86	0.69	0.71	0.83	0.45	0.48
d, Delay for Lane Group [s/veh]	51.28	35.45	35.18	49.79	44.76	35.09	55.62	20.18	22.79	61.14	18.07	19.66
Lane Group LOS	D	D	D	D	D	D	E	C	C	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.07	3.33	3.10	1.96	8.55	3.18	4.35	11.49	12.63	2.67	6.15	6.98
50th-Percentile Queue Length [ft/ln]	51.77	83.29	77.53	48.96	213.82	79.55	108.66	287.29	315.78	66.79	153.70	174.43
95th-Percentile Queue Length [veh/ln]	3.73	6.00	5.58	3.53	13.35	5.73	7.77	17.05	18.46	4.81	10.21	11.31
95th-Percentile Queue Length [ft/ln]	93.19	149.91	139.55	88.13	333.72	143.20	194.14	426.28	461.50	120.23	255.36	282.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.28	35.37	35.18	49.79	44.76	35.09	55.62	20.98	22.79	61.14	18.42	19.66
Movement LOS	D	D	D	D	D	D	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	40.83			43.70			23.53			20.72		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	26.70											
Intersection LOS	C											
Intersection V/C	0.758											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.498	2.636	3.225	3.205
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	719	719	640
d_b, Bicycle Delay [s]	21.16	20.51	20.51	23.15
l_b,int, Bicycle LOS Score for Intersection	1.937	2.612	2.763	2.277
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	17.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.656

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	163	11	138	24	27	13	12	1721	339	167	1377	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	11	138	24	27	13	12	1721	339	167	1377	31
Peak Hour Factor	0.8320	0.8320	0.8320	0.6740	0.6740	0.6740	0.9510	0.9510	0.9510	0.8930	0.8930	0.8930
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	3	41	9	10	5	3	452	89	47	385	9
Total Analysis Volume [veh/h]	196	13	166	36	40	19	13	1810	356	187	1542	35
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	22	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	5	5	2	47	47	11	56	56
g / C, Green / Cycle	0.12	0.12	0.12	0.06	0.06	0.02	0.52	0.52	0.13	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.09	0.02	0.03	0.01	0.32	0.19	0.10	0.27	0.28
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	209	209	221	111	117	36	2956	985	227	2374	1187
d1, Uniform Delay [s]	37.38	37.39	38.59	40.52	40.98	43.63	15.32	12.86	38.42	8.73	8.86
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.83	1.85	5.10	1.68	3.33	6.05	0.96	1.03	7.30	0.59	1.26
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.50	0.75	0.32	0.50	0.36	0.61	0.36	0.82	0.44	0.45
d, Delay for Lane Group [s/veh]	39.21	39.24	43.68	42.19	44.31	49.68	16.27	13.89	45.72	9.32	10.12
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.23	2.25	3.81	0.81	1.36	0.34	8.33	4.28	4.43	4.81	5.28
50th-Percentile Queue Length [ft/ln]	55.86	56.21	95.31	20.22	34.08	8.60	208.37	107.06	110.63	120.30	132.10
95th-Percentile Queue Length [veh/ln]	4.02	4.05	6.86	1.46	2.45	0.62	13.07	7.68	7.87	8.41	9.05
95th-Percentile Queue Length [ft/ln]	100.55	101.18	171.55	36.40	61.35	15.47	326.74	191.90	196.87	210.24	226.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.23	39.24	43.68	42.19	44.31	44.31	49.68	16.27	13.89	45.72	9.58	10.12
Movement LOS	D	D	D	D	D	D	D	B	B	D	A	B
d_A, Approach Delay [s/veh]	41.20			43.51			16.08			13.42		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.74											
Intersection LOS	B											
Intersection V/C	0.656											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	0.00	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.364	1.990	0.000	3.119
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	488	133	622	888
d_b, Bicycle Delay [s]	25.73	39.24	21.40	13.92
l_b,int, Bicycle LOS Score for Intersection	2.178	1.716	2.758	2.530
Bicycle LOS	B	A	C	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	27.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.637

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	163	231	81	308	608	105	128	1187	227	67	982	84
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	231	81	308	608	105	128	1187	227	67	982	84
Peak Hour Factor	0.8020	0.8020	0.8020	0.9340	0.9340	0.9340	0.8920	0.8920	0.8920	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	72	25	82	163	28	36	333	64	17	251	21
Total Analysis Volume [veh/h]	203	288	101	330	651	112	143	1331	254	69	1004	86
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	0	16	35	0	10	38	0	11	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	15	15	11	19	19	6	48	48	5	47	47
g / C, Green / Cycle	0.07	0.16	0.16	0.12	0.20	0.20	0.06	0.50	0.50	0.05	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.06	0.11	0.10	0.09	0.17	0.06	0.04	0.28	0.27	0.02	0.19	0.19
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	261	310	310	405	777	388	219	1896	948	189	1863	932
d1, Uniform Delay [s]	43.26	37.28	36.95	41.08	36.34	32.00	43.59	16.62	16.42	43.43	15.27	15.31
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.99	2.31	1.88	4.03	2.50	0.41	3.26	1.22	2.26	1.17	0.61	1.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.65	0.60	0.81	0.84	0.29	0.65	0.56	0.55	0.36	0.39	0.39
d, Delay for Lane Group [s/veh]	48.25	39.59	38.83	45.11	38.84	32.41	46.84	17.84	18.68	44.60	15.89	16.55
Lane Group LOS	D	D	D	D	D	C	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.50	4.54	4.15	3.96	7.39	2.20	1.73	7.98	7.93	0.81	4.88	5.10
50th-Percentile Queue Length [ft/ln]	62.62	113.62	103.70	98.96	184.85	55.06	43.26	199.55	198.32	20.23	121.95	127.53
95th-Percentile Queue Length [veh/ln]	4.51	8.04	7.47	7.13	11.85	3.96	3.12	12.62	12.55	1.46	8.50	8.81
95th-Percentile Queue Length [ft/ln]	112.72	201.03	186.67	178.13	296.34	99.10	77.88	315.39	313.80	36.41	212.50	220.14

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.25	39.36	38.83	45.11	38.84	32.41	46.84	18.00	18.68	44.60	16.07	16.55
Movement LOS	D	D	D	D	D	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	42.32			40.08			20.49			17.81		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	27.32											
Intersection LOS	C											
Intersection V/C	0.637											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	37.18	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.710	2.820	3.099	3.084
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	652	715	736
d_b, Bicycle Delay [s]	25.09	21.59	19.62	18.98
l_b,int, Bicycle LOS Score for Intersection	2.048	2.461	2.510	2.197
Bicycle LOS	B	B	B	B

Sequence

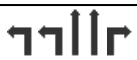
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	27.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.564

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	121	167	113	255	254	184	179	909	84	111	1424	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	121	167	113	255	254	184	179	909	84	111	1424	134
Peak Hour Factor	0.8310	0.8310	0.8310	0.9010	0.9010	0.9010	0.8870	0.8870	0.8870	0.9070	0.9070	0.9070
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	50	34	71	70	51	50	256	24	31	393	37
Total Analysis Volume [veh/h]	146	201	136	283	282	204	202	1025	95	122	1570	148
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	46	0	17	51	0	13	39	0	13	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	11	11	11	15	15	9	71	71	6	68	68
g / C, Green / Cycle	0.06	0.09	0.09	0.10	0.13	0.13	0.07	0.62	0.62	0.05	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.07	0.08	0.07	0.11	0.06	0.18	0.05	0.03	0.28	0.08
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	206	359	179	346	510	255	262	3510	1170	182	3380	1127
d1, Uniform Delay [s]	53.18	49.83	50.83	50.85	46.59	48.32	52.26	10.35	8.94	53.58	13.16	10.34
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.41	1.37	6.42	4.81	0.94	5.74	4.77	0.21	0.14	4.22	0.46	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.56	0.76	0.82	0.55	0.80	0.77	0.29	0.08	0.67	0.46	0.13
d, Delay for Lane Group [s/veh]	57.59	51.20	57.25	55.66	47.53	54.06	57.03	10.57	9.08	57.80	13.62	10.58
Lane Group LOS	E	D	E	E	D	D	E	B	A	E	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.20	2.83	4.14	4.22	3.84	6.07	3.03	3.97	0.98	1.84	7.44	1.70
50th-Percentile Queue Length [ft/ln]	54.96	70.85	103.45	105.55	96.05	151.80	75.86	99.23	24.51	46.00	185.92	42.40
95th-Percentile Queue Length [veh/ln]	3.96	5.10	7.45	7.59	6.92	10.11	5.46	7.14	1.76	3.31	11.91	3.05
95th-Percentile Queue Length [ft/ln]	98.93	127.53	186.20	189.79	172.89	252.83	136.54	178.62	44.12	82.79	297.72	76.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.59	51.20	57.25	55.66	47.53	54.06	57.03	10.57	9.08	57.80	13.62	10.58
Movement LOS	E	D	E	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	54.83			52.25			17.56			16.30		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	27.16											
Intersection LOS	C											
Intersection V/C	0.564											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.742	2.790	3.212	3.217
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	730	817	608	608
d_b, Bicycle Delay [s]	23.19	20.12	27.84	27.84
l_b,int, Bicycle LOS Score for Intersection	1.958	2.194	2.287	2.572
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	205.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.751

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	234	181	133	775	444	20	33	1106	218	246	1295	501
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	234	181	133	775	444	20	33	1106	218	246	1295	501
Peak Hour Factor	0.8160	0.8160	0.8160	0.9420	0.9420	0.9420	0.9230	0.9230	0.9230	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	55	41	206	118	5	9	300	59	66	348	135
Total Analysis Volume [veh/h]	287	222	163	823	471	21	36	1198	236	265	1392	539
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	16	53	0	12	49	0	11	45	0	10	44	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	21	21	8	18	18	4	69	69	6	70	70
g / C, Green / Cycle	0.10	0.18	0.18	0.07	0.15	0.15	0.04	0.57	0.57	0.05	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.08	0.06	0.09	0.24	0.12	0.01	0.02	0.25	0.25	0.08	0.24	0.28
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	343	675	337	236	558	279	64	2170	1085	178	3340	1113
d1, Uniform Delay [s]	53.20	43.12	44.41	55.99	49.87	44.18	56.95	14.82	14.64	56.98	13.62	14.37
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.40	0.28	1.07	1123.47	3.58	0.11	7.35	0.67	1.25	227.75	0.38	1.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.33	0.48	3.49	0.84	0.08	0.56	0.45	0.43	1.49	0.42	0.48
d, Delay for Lane Group [s/veh]	58.59	43.40	45.49	1179.46	53.46	44.29	64.29	15.48	15.89	284.73	14.00	15.87
Lane Group LOS	E	D	D	F	D	D	E	B	B	F	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.51	2.92	4.48	40.35	7.15	0.55	1.21	7.59	7.42	8.31	6.81	8.66
50th-Percentile Queue Length [ft/ln]	112.71	72.98	111.90	1008.68	178.76	13.79	30.18	189.85	185.48	207.80	170.15	216.56
95th-Percentile Queue Length [veh/ln]	7.99	5.25	7.95	61.86	11.54	0.99	2.17	12.11	11.89	14.35	11.08	13.49
95th-Percentile Queue Length [ft/ln]	199.77	131.37	198.64	1546.51	288.40	24.83	54.32	302.83	297.15	358.79	277.11	337.23

Movement, Approach, & Intersection Results

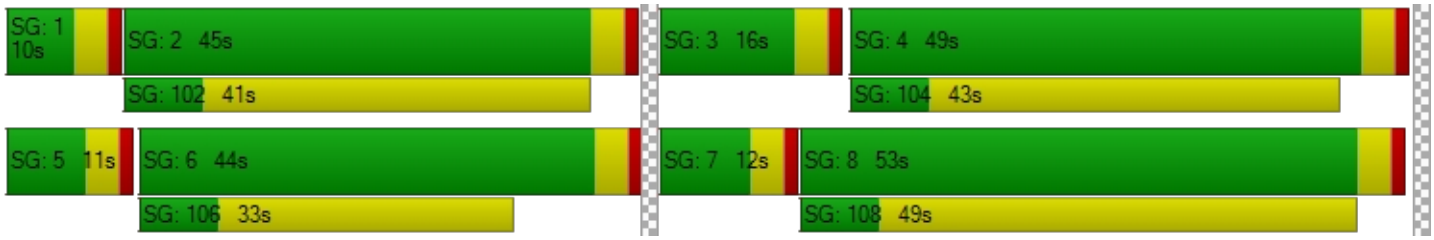
d_M, Delay for Movement [s/veh]	58.59	43.40	45.49	1179.46	53.46	44.29	64.29	15.56	15.89	284.73	14.00	15.87
Movement LOS	E	D	D	F	D	D	E	B	B	F	B	B
d_A, Approach Delay [s/veh]	50.40			758.02			16.81			47.13		
Approach LOS	D			F			B			D		
d_I, Intersection Delay [s/veh]	205.00											
Intersection LOS	F											
Intersection V/C	0.751											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.837	2.902	3.049	3.338
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	750	683	666
d_b, Bicycle Delay [s]	21.02	23.45	26.02	26.68
l_b,int, Bicycle LOS Score for Intersection	2.114	2.644	2.368	2.767
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	34.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.722

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	294	558	242	529	359	14	37	1108	238	303	979	666
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	294	558	242	529	359	14	37	1108	238	303	979	666
Peak Hour Factor	0.9470	0.9470	0.9470	0.9220	0.9220	0.9220	0.8360	0.8360	0.8360	0.9740	0.9740	0.9740
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	78	147	64	143	97	4	11	331	71	78	251	171
Total Analysis Volume [veh/h]	310	589	256	574	389	15	44	1325	285	311	1005	684
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	16	33	0	27	44	0	10	39	0	16	45	45
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	12	21	21	21	23	32	32	5	43	43	12	50	77
g / C, Green / Cycle	0.10	0.18	0.18	0.18	0.20	0.28	0.28	0.04	0.37	0.37	0.10	0.44	0.67
(v / s)_i Volume / Saturation Flow Rate	0.09	0.16	0.16	0.13	0.16	0.11	0.11	0.01	0.21	0.21	0.09	0.18	0.36
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	367	348	348	348	700	529	529	141	2125	708	367	2493	1277
d1, Uniform Delay [s]	50.58	45.47	45.46	44.28	44.04	33.55	33.49	53.67	28.76	28.61	50.60	22.12	9.66
k, delay calibration	0.11	0.16	0.15	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.34	8.17	8.06	2.90	2.45	0.46	0.45	1.24	1.12	3.18	5.44	0.49	1.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.85	0.85	0.73	0.82	0.38	0.38	0.31	0.57	0.56	0.85	0.40	0.54
d, Delay for Lane Group [s/veh]	55.93	53.64	53.52	47.19	46.49	34.00	33.94	54.92	29.89	31.79	56.04	22.61	11.28
Lane Group LOS	E	D	D	D	D	C	C	D	C	C	E	C	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.65	8.94	8.91	7.06	8.02	4.66	4.59	0.64	9.03	9.21	4.67	6.24	8.67
50th-Percentile Queue Length [ft/ln]	116.2	223.4	222.8	176.5	200.60	116.50	114.80	16.09	225.84	230.34	116.71	156.11	216.65
95th-Percentile Queue Length [veh/ln]	8.18	13.84	13.81	11.42	12.67	8.20	8.11	1.16	13.96	14.19	8.21	10.34	13.49
95th-Percentile Queue Length [ft/ln]	204.5	346.0	345.2	285.4	316.74	205.01	202.66	28.97	349.07	354.79	205.30	258.56	337.34

Movement, Approach, & Intersection Results

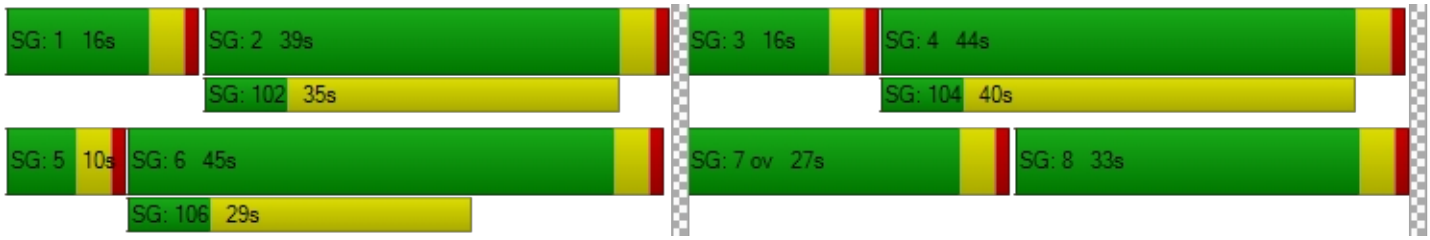
d_M, Delay for Movement [s/veh]	55.93	53.58	47.19	46.49	33.97	33.94	54.92	30.05	31.79	56.04	22.61	11.28
Movement LOS	E	D	D	D	C	C	D	C	C	E	C	B
d_A, Approach Delay [s/veh]	52.81			41.32			31.01			23.93		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	34.66											
Intersection LOS	C											
Intersection V/C	0.722											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.904	2.838	3.184	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	504	695	608	713
d_b, Bicycle Delay [s]	32.18	24.47	27.84	23.83
l_b,int, Bicycle LOS Score for Intersection	2.512	2.366	2.242	2.660
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	19.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.642

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	430	0	675	0	1079	724	219	1562	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	430	0	675	0	1079	724	219	1562	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9480	1.0000	0.9480	1.0000	0.8820	0.8820	0.9530	0.9530	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	113	0	178	0	306	205	57	410	0
Total Analysis Volume [veh/h]	0	0	0	454	0	712	0	1223	821	230	1639	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	45	0	0	0	33	0	12	45	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C	R	L	C
C, Cycle Length [s]		90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		24	24	24	46	46	46	8	58
g / C, Green / Cycle		0.27	0.27	0.27	0.51	0.51	0.51	0.09	0.64
(v / s)_i Volume / Saturation Flow Rate		0.22	0.22	0.20	0.27	0.27	0.27	0.07	0.29
s, saturation flow rate [veh/h]		1750	1750	1900	3800	1900	1900	3500	5700
c, Capacity [veh/h]		470	470	510	1943	971	971	305	3664
d1, Uniform Delay [s]		30.98	30.98	30.30	14.71	14.71	14.71	40.16	8.06
k, delay calibration		0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.79	3.79	2.39	1.02	2.04	2.04	3.78	0.40
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.76	0.53	0.53	0.53	0.75	0.45
d, Delay for Lane Group [s/veh]		34.78	34.78	32.69	15.73	16.75	16.75	43.94	8.46
Lane Group LOS		C	C	C	B	B	B	D	A
Critical Lane Group		Yes	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]		8.20	8.20	7.87	6.79	7.07	7.07	2.62	4.77
50th-Percentile Queue Length [ft/ln]		204.93	204.93	196.79	169.85	176.68	176.68	65.41	119.24
95th-Percentile Queue Length [veh/ln]		12.89	12.89	12.47	11.07	11.43	11.43	4.71	8.35
95th-Percentile Queue Length [ft/ln]		322.32	322.32	311.82	276.71	285.68	285.68	117.73	208.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	34.78	0.00	33.64	0.00	15.73	16.75	43.94	8.46	0.00
Movement LOS				C		C		B	B	D	A	
d_A, Approach Delay [s/veh]	0.00			34.08			16.24			12.83		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	19.08											
Intersection LOS	B											
Intersection V/C	0.642											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.227	2.319	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	911	644	911
d_b, Bicycle Delay [s]	45.01	13.35	20.68	13.35
l_b,int, Bicycle LOS Score for Intersection	4.132	3.484	2.684	2.588
Bicycle LOS	D	C	B	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	23.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.797

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	618	0	253	0	0	0	343	1365	0	0	992	497
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	618	0	253	0	0	0	343	1365	0	0	992	497
Peak Hour Factor	0.8400	1.0000	0.8400	1.0000	1.0000	1.0000	0.8440	0.8440	1.0000	1.0000	0.5300	0.5300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	184	0	75	0	0	0	102	404	0	0	468	234
Total Analysis Volume [veh/h]	736	0	301	0	0	0	406	1617	0	0	1872	938
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	0	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	6	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	30	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	52	0	0	0	0	0	22	43	0	0	21	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	14	0	0	0	0	0	0	16	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No						No	No			No	
Maximum Recall	No						No	No			No	
Pedestrian Recall	No						No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		L	C	C	C	R
C, Cycle Length [s]	95	95		95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	24	24		13	63	45	45	45
g / C, Green / Cycle	0.25	0.25		0.14	0.66	0.48	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.21	0.16		0.12	0.28	0.37	0.37	0.37
s, saturation flow rate [veh/h]	3500	1900		3500	5700	3800	1900	1900
c, Capacity [veh/h]	891	484		492	3769	1818	909	909
d1, Uniform Delay [s]	33.42	31.36		39.69	7.62	20.51	20.51	20.51
k, delay calibration	0.11	0.11		0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.02	1.31		3.55	0.36	3.27	6.35	6.35
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.62		0.82	0.43	0.77	0.77	0.77
d, Delay for Lane Group [s/veh]	35.44	32.68		43.23	7.97	23.78	26.86	26.86
Lane Group LOS	D	C		D	A	C	C	C
Critical Lane Group	Yes	No		Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.07	6.18		4.79	4.68	12.95	13.73	13.73
50th-Percentile Queue Length [ft/ln]	201.83	154.53		119.74	117.07	323.69	343.14	343.14
95th-Percentile Queue Length [veh/ln]	12.73	10.26		8.38	8.23	18.85	19.80	19.80
95th-Percentile Queue Length [ft/ln]	318.33	256.47		209.47	205.79	471.22	495.04	495.04

Movement, Approach, & Intersection Results

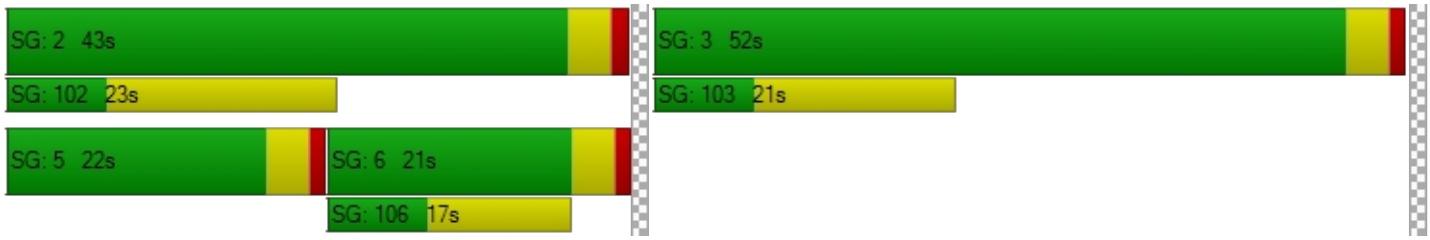
d_M, Delay for Movement [s/veh]	35.44	0.00	32.68	0.00	0.00	0.00	43.23	7.97	0.00	0.00	23.78	26.86
Movement LOS	D		C				D	A			C	C
d_A, Approach Delay [s/veh]	34.64			0.00			15.05			25.32		
Approach LOS	C			A			B			C		
d_I, Intersection Delay [s/veh]	23.43											
Intersection LOS	C											
Intersection V/C	0.797											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
l_p,int, Pedestrian LOS Score for Intersection	2.279	2.372	0.000	3.255
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1010	0	821	358
d_b, Bicycle Delay [s]	11.63	47.51	16.51	32.03
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	2.672	3.105
Bicycle LOS	A	D	B	C

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	14.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.525

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	109	0	26	95	0	372	159	1723	37	14	1354	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	109	0	26	95	0	372	159	1723	37	14	1354	42
Peak Hour Factor	0.7120	0.7120	0.7120	0.7980	0.7980	0.7980	0.9780	0.9780	0.9780	0.9210	0.9210	0.9210
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	0	9	30	0	117	41	440	9	4	368	11
Total Analysis Volume [veh/h]	153	0	37	119	0	466	163	1762	38	15	1470	46
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	49	0	0	49	0	10	31	0	10	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	6	62	62	2	58	58
g / C, Green / Cycle	0.16	0.16	0.16	0.07	0.69	0.69	0.02	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.11	0.07	0.12	0.05	0.31	0.32	0.01	0.26	0.27
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	355	363	597	236	2613	1306	40	2440	1220
d1, Uniform Delay [s]	35.77	34.26	36.46	41.06	6.38	6.50	43.42	7.82	7.92
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.26	0.52	2.27	3.56	0.57	1.22	5.79	0.51	1.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.54	0.33	0.78	0.69	0.45	0.47	0.38	0.41	0.42
d, Delay for Lane Group [s/veh]	37.02	34.78	38.73	44.62	6.95	7.73	49.20	8.33	9.00
Lane Group LOS	D	C	D	D	A	A	D	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.99	2.37	5.02	1.86	4.43	4.92	0.39	4.27	4.66
50th-Percentile Queue Length [ft/ln]	99.75	59.30	125.54	46.61	110.70	122.94	9.76	106.84	116.48
95th-Percentile Queue Length [veh/ln]	7.18	4.27	8.70	3.36	7.88	8.55	0.70	7.66	8.20
95th-Percentile Queue Length [ft/ln]	179.54	106.73	217.41	83.91	196.98	213.87	17.57	191.60	204.98

Movement, Approach, & Intersection Results

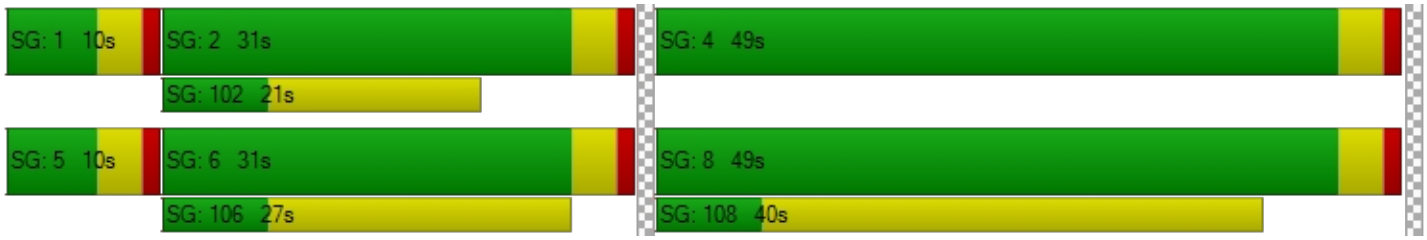
d_M, Delay for Movement [s/veh]	37.02	37.02	37.02	34.78	34.78	38.73	44.62	7.21	7.73	49.20	8.55	9.00
Movement LOS	D	D	D	C	C	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	37.02			37.93			10.32			8.96		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	14.81											
Intersection LOS	B											
Intersection V/C	0.525											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.833	2.454	0.000	3.243
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	600	600
d_b, Bicycle Delay [s]	11.26	11.26	22.06	22.06
l_b,int, Bicycle LOS Score for Intersection	1.873	2.525	2.639	2.402
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	18.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	125	48	19	77	94	125	41	1633	186	23	1181	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	48	19	77	94	125	41	1633	186	23	1181	40
Peak Hour Factor	0.8450	0.8450	0.8450	0.6830	0.6830	0.6830	0.9820	0.9820	0.9820	0.9590	0.9590	0.9590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	14	6	28	34	46	10	416	47	6	308	10
Total Analysis Volume [veh/h]	148	57	22	113	138	183	42	1663	189	24	1231	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	27	0	22	30	0	10	31	0	10	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	13	13	7	11	11	4	51	51	3	50	50
g / C, Green / Cycle	0.10	0.15	0.15	0.08	0.12	0.12	0.04	0.56	0.56	0.03	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.08	0.02	0.02	0.06	0.07	0.10	0.01	0.29	0.10	0.01	0.22	0.23
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	185	278	278	147	238	238	156	3210	1070	57	2090	1045
d1, Uniform Delay [s]	39.53	33.57	33.54	40.57	37.22	38.20	41.65	12.15	9.56	42.87	11.73	11.84
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.67	0.24	0.23	8.15	2.24	5.23	0.91	0.60	0.36	4.94	0.58	1.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.14	0.14	0.77	0.58	0.77	0.27	0.52	0.18	0.42	0.40	0.41
d, Delay for Lane Group [s/veh]	47.21	33.81	33.77	48.72	39.47	43.43	42.56	12.75	9.92	47.80	12.30	13.05
Lane Group LOS	D	C	C	D	D	D	D	B	A	D	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.55	0.78	0.75	2.76	2.98	4.20	0.47	6.45	1.79	0.60	4.66	5.04
50th-Percentile Queue Length [ft/ln]	88.81	19.49	18.70	68.95	74.48	104.94	11.67	161.15	44.70	14.94	116.50	125.93
95th-Percentile Queue Length [veh/ln]	6.39	1.40	1.35	4.96	5.36	7.56	0.84	10.61	3.22	1.08	8.20	8.72
95th-Percentile Queue Length [ft/ln]	159.86	35.09	33.66	124.10	134.06	188.90	21.01	265.25	80.45	26.89	205.00	217.96

Movement, Approach, & Intersection Results

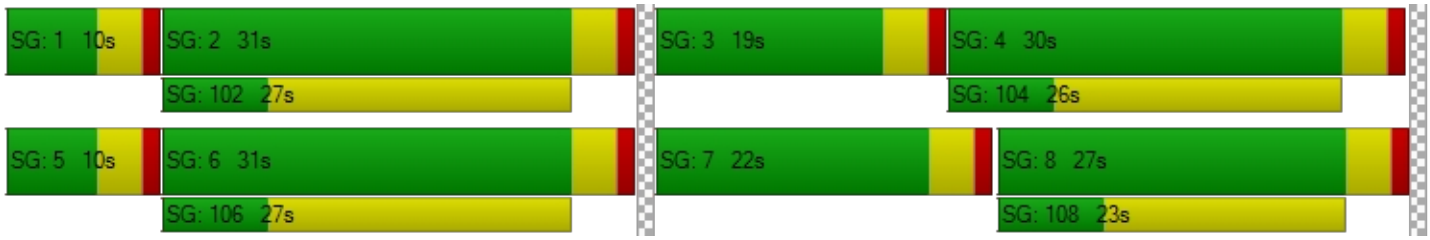
d_M, Delay for Movement [s/veh]	47.21	33.80	33.77	48.72	39.47	43.43	42.56	12.75	9.92	47.80	12.54	13.05
Movement LOS	D	C	C	D	D	D	D	B	A	D	B	B
d_A, Approach Delay [s/veh]	42.54			43.55			13.13			13.21		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.32											
Intersection LOS	B											
Intersection V/C	0.588											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	34.72	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.412	2.412	3.223	3.025
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	577	599	599
d_b, Bicycle Delay [s]	24.98	22.80	22.09	22.09
l_b,int, Bicycle LOS Score for Intersection	1.747	1.918	2.601	2.273
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	29.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.572

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	474	279	207	4	94	108	172	787	447	74	312	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	474	279	207	4	94	108	172	787	447	74	312	26
Peak Hour Factor	0.9310	0.9310	0.9310	0.9020	0.9020	0.9020	0.7940	0.7940	0.7940	0.8150	0.8150	0.8150
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	127	75	56	1	26	30	54	248	141	23	96	8
Total Analysis Volume [veh/h]	509	300	222	4	104	120	217	991	563	91	383	32
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	25	57	57	10	42	0	21	43	43	10	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	29	39	1	10	10	16	68	92	6	58	58
g / C, Green / Cycle	0.17	0.24	0.33	0.01	0.08	0.08	0.14	0.57	0.77	0.05	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.15	0.16	0.12	0.00	0.05	0.06	0.12	0.26	0.15	0.03	0.07	0.07
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	581	460	620	13	158	158	245	2153	2911	178	1830	915
d1, Uniform Delay [s]	48.86	40.95	30.86	59.30	53.36	53.84	50.97	15.25	3.86	55.54	17.39	17.43
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.39	1.57	0.35	12.82	4.57	7.21	10.40	0.71	0.15	2.28	0.17	0.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.65	0.36	0.31	0.66	0.76	0.89	0.46	0.19	0.51	0.15	0.15
d, Delay for Lane Group [s/veh]	53.26	42.52	31.21	72.12	57.93	61.05	61.37	15.96	4.01	57.81	17.56	17.78
Lane Group LOS	D	D	C	E	E	E	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.78	8.17	4.99	0.17	3.25	3.86	7.11	7.95	1.68	1.40	2.17	2.28
50th-Percentile Queue Length [ft/ln]	194.47	204.37	124.63	4.19	81.18	96.59	177.64	198.67	41.97	35.01	54.23	56.94
95th-Percentile Queue Length [veh/ln]	12.35	12.86	8.65	0.30	5.84	6.95	11.48	12.57	3.02	2.52	3.90	4.10
95th-Percentile Queue Length [ft/ln]	308.82	321.60	216.18	7.53	146.12	173.86	286.93	314.25	75.55	63.02	97.61	102.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.26	42.52	31.21	72.12	57.93	61.05	61.37	15.96	4.01	57.81	17.63	17.78
Movement LOS	D	D	C	E	E	E	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	45.39			59.82			17.72			24.86		
Approach LOS	D			E			B			C		
d_I, Intersection Delay [s/veh]	29.53											
Intersection LOS	C											
Intersection V/C	0.572											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.757	2.334	3.078	2.848
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	883	633	650	467
d_b, Bicycle Delay [s]	18.72	28.03	27.35	35.28
l_b,int, Bicycle LOS Score for Intersection	3.261	1.936	3.021	1.838
Bicycle LOS	C	A	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	6.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.394

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	24	2	11	2	0	5	5	1154	19	5	563	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	2	11	2	0	5	5	1154	19	5	563	3
Peak Hour Factor	0.5290	0.5290	0.5290	0.5830	1.0000	0.5830	0.9620	0.9620	0.9620	0.9380	0.9380	0.9380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	1	5	1	0	2	1	300	5	1	150	1
Total Analysis Volume [veh/h]	45	4	21	3	0	9	5	1200	20	5	600	3
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	2	2	1	96	96	1	96	96
g / C, Green / Cycle	0.05	0.05	0.02	0.02	0.01	0.80	0.80	0.01	0.80	0.80
(v / s)_i Volume / Saturation Flow Rate	0.03	0.01	0.00	0.00	0.00	0.32	0.32	0.00	0.10	0.11
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	82	87	31	32	15	1512	1512	15	3025	1512
d1, Uniform Delay [s]	56.07	55.40	58.09	58.27	59.20	3.68	3.67	59.20	2.79	2.80
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.61	1.81	1.38	4.61	13.08	0.81	0.80	13.08	0.09	0.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.55	0.29	0.10	0.28	0.34	0.40	0.40	0.34	0.13	0.14
d, Delay for Lane Group [s/veh]	61.68	57.21	59.48	62.88	72.29	4.49	4.47	72.29	2.88	2.99
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.46	0.78	0.10	0.31	0.20	3.85	3.82	0.20	0.90	0.99
50th-Percentile Queue Length [ft/ln]	36.59	19.42	2.54	7.79	5.12	96.27	95.50	5.12	22.43	24.65
95th-Percentile Queue Length [veh/ln]	2.63	1.40	0.18	0.56	0.37	6.93	6.88	0.37	1.62	1.77
95th-Percentile Queue Length [ft/ln]	65.86	34.96	4.57	14.02	9.21	173.29	171.91	9.21	40.38	44.37

Movement, Approach, & Intersection Results

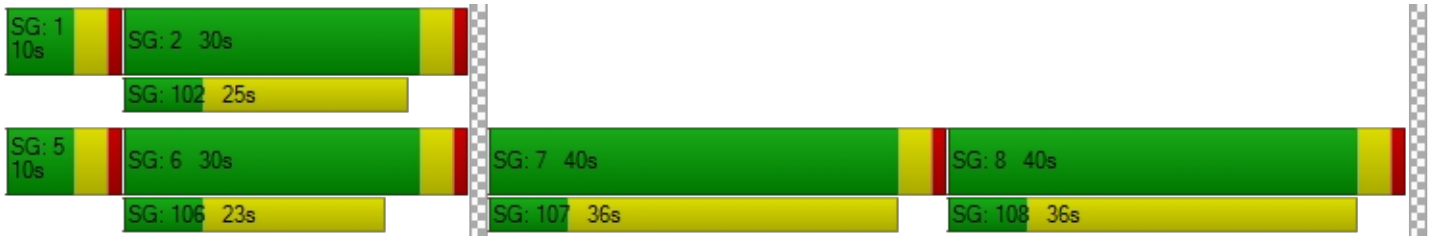
d_M, Delay for Movement [s/veh]	61.68	57.21	57.21	59.48	0.00	62.88	72.29	4.48	4.47	72.29	2.92	2.99
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	60.09			62.03			4.76			3.49		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	6.74											
Intersection LOS	A											
Intersection V/C	0.394											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	1.985	1.962	2.772	2.764
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.675	1.560	2.570	1.894
Bicycle LOS	A	A	B	A

Sequence

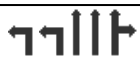
Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	31.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.607

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	308	132	694	23	99	30	25	687	445	130	229	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	308	132	694	23	99	30	25	687	445	130	229	8
Peak Hour Factor	0.9730	0.9730	0.9730	0.6340	0.6340	0.6340	0.9200	0.9200	0.9200	0.9080	0.9080	0.9080
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	79	34	178	9	39	12	7	187	121	36	63	2
Total Analysis Volume [veh/h]	317	136	713	36	156	47	27	747	484	143	252	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	30	60	0	13	43	0	10	36	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	28	4	9	9	4	65	65	7	69	69
g / C, Green / Cycle	0.19	0.23	0.04	0.07	0.07	0.03	0.54	0.54	0.06	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.18	0.04	0.02	0.05	0.05	0.02	0.20	0.25	0.04	0.05	0.05
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	346	875	64	141	141	55	2065	1033	200	2166	1083
d1, Uniform Delay [s]	47.57	36.88	56.95	54.42	54.31	57.27	15.57	16.79	55.64	11.62	11.65
k, delay calibration	0.23	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.15	0.08	7.35	7.18	6.39	6.61	0.49	1.53	4.72	0.07	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.16	0.56	0.73	0.71	0.49	0.36	0.47	0.72	0.08	0.08
d, Delay for Lane Group [s/veh]	65.72	36.97	64.29	61.60	60.71	63.88	16.06	18.31	60.37	11.69	11.80
Lane Group LOS	E	D	E	E	E	E	B	B	E	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	11.00	1.62	1.21	3.34	3.20	0.91	5.86	8.43	2.26	1.05	1.12
50th-Percentile Queue Length [ft/ln]	275.01	40.41	30.18	83.46	79.91	22.71	146.62	210.84	56.51	26.20	27.91
95th-Percentile Queue Length [veh/ln]	16.44	2.91	2.17	6.01	5.75	1.64	9.84	13.20	4.07	1.89	2.01
95th-Percentile Queue Length [ft/ln]	410.99	72.74	54.32	150.24	143.83	40.88	245.90	329.90	101.72	47.16	50.24

Movement, Approach, & Intersection Results

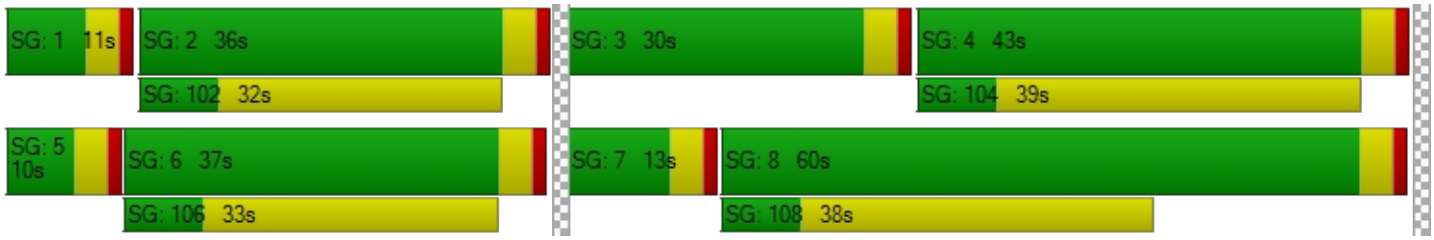
d_M, Delay for Movement [s/veh]	65.72	36.97	0.00	64.29	61.30	60.71	63.88	16.06	18.31	60.37	11.73	11.80
Movement LOS	E	D		E	E	E	E	B	B	E	B	B
d_A, Approach Delay [s/veh]	57.08			61.63			17.96			28.94		
Approach LOS	E			E			B			C		
d_I, Intersection Delay [s/veh]	31.81											
Intersection LOS	C											
Intersection V/C	0.607											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.668	2.394	2.869	2.884
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	650	533	550
d_b, Bicycle Delay [s]	17.08	27.35	32.28	31.55
l_b,int, Bicycle LOS Score for Intersection	1.933	1.757	2.252	1.782
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	4.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.475

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	10	0	2	0	0	14	1	1426	2	1	288	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	2	0	0	14	1	1426	2	1	288	7
Peak Hour Factor	0.6000	0.6000	0.6000	1.0000	1.0000	0.5000	0.9170	0.9170	0.9170	0.8280	0.8280	0.8280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	0	1	0	0	7	0	389	1	0	87	2
Total Analysis Volume [veh/h]	17	0	3	0	0	28	1	1555	2	1	348	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	70	0	10	70	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	0	99	99	0	99	99
g / C, Green / Cycle	0.03	0.03	0.00	0.86	0.86	0.00	0.86	0.86
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.00	0.41	0.41	0.00	0.09	0.00
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	114	59	4	1638	1638	4	3276	1638
d1, Uniform Delay [s]	54.55	54.76	57.27	1.85	1.85	57.27	1.20	1.10
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	5.70	32.14	0.99	0.99	28.64	0.07	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.18	0.47	0.26	0.48	0.48	0.25	0.11	0.00
d, Delay for Lane Group [s/veh]	55.28	60.46	89.41	2.84	2.84	85.91	1.27	1.10
Lane Group LOS	E	E	F	A	A	F	A	A
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.59	0.89	0.06	2.43	2.43	0.06	0.32	0.01
50th-Percentile Queue Length [ft/ln]	14.76	22.29	1.59	60.79	60.76	1.54	7.93	0.36
95th-Percentile Queue Length [veh/ln]	1.06	1.60	0.11	4.38	4.37	0.11	0.57	0.03
95th-Percentile Queue Length [ft/ln]	26.57	40.12	2.86	109.43	109.37	2.76	14.28	0.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.28	55.28	55.28	0.00	0.00	60.46	89.41	2.84	2.84	85.91	1.27	1.10
Movement LOS	E	E	E			E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	55.28			60.46			2.90			1.50		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	4.00											
Intersection LOS	A											
Intersection V/C	0.475											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.02	47.02	0.00	47.02
l_p,int, Pedestrian LOS Score for Intersection	1.738	1.745	0.000	2.776
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	539	539	1148	1148
d_b, Bicycle Delay [s]	30.67	30.67	10.43	10.43
l_b,int, Bicycle LOS Score for Intersection	1.593	1.560	2.845	1.854
Bicycle LOS	A	A	C	A

Sequence

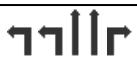
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	30.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.698

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	135	337	150	301	309	250	188	720	150	135	922	584
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	337	150	301	309	250	188	720	150	135	922	584
Peak Hour Factor	0.9210	0.9210	0.9210	0.9620	0.9620	0.9620	0.9110	0.9110	0.9110	0.9550	0.9550	0.9550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	91	41	78	80	65	52	198	41	35	241	153
Total Analysis Volume [veh/h]	147	366	163	313	321	260	206	790	165	141	965	612
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	17	46	0	12	39	0	10	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	15	15	11	21	21	8	56	56	6	54	54
g / C, Green / Cycle	0.06	0.14	0.14	0.11	0.20	0.20	0.08	0.54	0.54	0.06	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.04	0.10	0.09	0.09	0.17	0.14	0.06	0.21	0.09	0.04	0.25	0.32
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	203	552	276	382	373	373	269	2035	1017	203	1963	981
d1, Uniform Delay [s]	48.69	42.50	42.01	45.81	40.85	39.33	47.59	14.32	12.42	48.60	16.47	18.12
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.85	1.38	2.01	4.39	5.88	2.36	4.51	0.56	0.34	4.24	0.88	2.99
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.72	0.66	0.59	0.82	0.86	0.70	0.77	0.39	0.16	0.69	0.49	0.62
d, Delay for Lane Group [s/veh]	53.54	43.88	44.02	50.20	46.73	41.69	52.10	14.88	12.76	52.84	17.35	21.11
Lane Group LOS	D	D	D	D	D	D	D	B	B	D	B	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.03	4.58	4.09	4.21	4.28	6.44	2.80	5.46	2.02	1.93	7.48	10.92
50th-Percentile Queue Length [ft/ln]	50.64	114.38	102.25	105.18	106.97	161.07	70.06	136.61	50.48	48.20	187.02	273.01
95th-Percentile Queue Length [veh/ln]	3.65	8.08	7.36	7.57	7.67	10.61	5.04	9.30	3.63	3.47	11.97	16.34
95th-Percentile Queue Length [ft/ln]	91.15	202.08	184.04	189.28	191.78	265.14	126.11	232.45	90.87	86.76	299.16	408.50

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.54	43.88	44.02	50.20	46.73	41.69	52.10	14.88	12.76	52.84	17.35	21.11
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	C
d_A, Approach Delay [s/veh]	46.01			46.48			21.18			21.60		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	30.20											
Intersection LOS	C											
Intersection V/C	0.698											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.11	42.11	42.11	42.11
l_p,int, Pedestrian LOS Score for Intersection	2.783	2.891	2.954	3.017
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	666	800	666	628
d_b, Bicycle Delay [s]	23.36	18.93	23.36	24.71
l_b,int, Bicycle LOS Score for Intersection	2.117	2.297	2.517	2.977
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.642

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	447	31	333	10	19	6	12	828	278	275	1176	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	447	31	333	10	19	6	12	828	278	275	1176	16
Peak Hour Factor	0.9370	0.9370	0.9370	0.8500	0.8500	0.8500	0.9910	0.9910	0.9910	0.9420	0.9420	0.9420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	119	8	89	3	6	2	3	209	70	73	312	4
Total Analysis Volume [veh/h]	477	33	355	12	22	7	12	836	281	292	1248	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	23	60	60	0	37	0	10	38	0	17	45	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	26	43	4	4	2	64	64	13	75	75
g / C, Green / Cycle	0.15	0.23	0.37	0.04	0.04	0.02	0.56	0.56	0.11	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.14	0.02	0.19	0.01	0.02	0.01	0.31	0.28	0.08	0.33	0.33
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	538	431	713	79	73	31	1055	1055	396	1238	1238
d1, Uniform Delay [s]	47.69	34.97	27.62	53.53	53.99	55.94	16.41	15.83	49.34	10.48	10.47
k, delay calibration	0.11	0.11	0.24	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.12	0.07	1.21	0.87	3.43	7.82	2.08	1.74	2.68	1.51	1.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.08	0.50	0.15	0.40	0.39	0.55	0.51	0.74	0.51	0.51
d, Delay for Lane Group [s/veh]	52.81	35.04	28.83	54.39	57.43	63.76	18.49	17.56	52.03	12.00	11.97
Lane Group LOS	D	D	C	D	E	E	B	B	D	B	B
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.05	0.74	7.70	0.36	0.89	0.41	10.11	8.92	4.20	8.34	8.31
50th-Percentile Queue Length [ft/ln]	176.33	18.54	192.56	8.89	22.24	10.29	252.86	222.92	105.04	208.60	207.64
95th-Percentile Queue Length [veh/ln]	11.41	1.34	12.25	0.64	1.60	0.74	15.33	13.81	7.56	13.08	13.03
95th-Percentile Queue Length [ft/ln]	285.22	33.38	306.35	16.00	40.04	18.52	383.25	345.34	189.07	327.04	325.79

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.81	35.04	28.83	54.39	57.43	57.43	63.76	18.21	17.56	52.03	11.98	11.97
Movement LOS	D	D	C	D	E	E	E	B	B	D	B	B
d_A, Approach Delay [s/veh]	42.29			56.54			18.53			19.49		
Approach LOS	D			E			B			B		
d_I, Intersection Delay [s/veh]	25.10											
Intersection LOS	C											
Intersection V/C	0.642											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.04	47.04	47.04	47.04
l_p,int, Pedestrian LOS Score for Intersection	2.702	1.985	2.869	2.930
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	974	574	591	713
d_b, Bicycle Delay [s]	15.14	29.24	28.54	23.82
l_b,int, Bicycle LOS Score for Intersection	2.987	1.627	2.491	2.844
Bicycle LOS	C	A	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	23.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.776

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Peak Hour Factor	0.7500	0.7500	0.7500	0.8100	0.8100	0.8100	0.9290	0.9290	0.9290	0.9040	0.9040	0.9040
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	30	1	85	71	233	3	1	335	35
Total Analysis Volume [veh/h]	16	3	13	119	4	340	285	930	12	6	1342	140
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	34	56	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	16	16	49	20	73	73	1	53	53
g / C, Green / Cycle	0.03	0.03	0.03	0.15	0.15	0.44	0.18	0.66	0.66	0.01	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.18	0.16	0.25	0.25	0.00	0.35	0.07
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	101	67	67	269	269	840	333	1254	1254	18	1844	922
d1, Uniform Delay [s]	51.72	51.34	51.61	41.23	41.24	20.88	43.46	8.47	8.46	54.11	22.54	15.74
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.20	0.14	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	0.28	1.41	0.43	0.43	0.58	8.21	0.86	0.86	9.93	2.55	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.05	0.20	0.23	0.23	0.40	0.86	0.38	0.37	0.33	0.73	0.15
d, Delay for Lane Group [s/veh]	52.44	51.61	53.02	41.66	41.66	21.45	51.67	9.33	9.32	64.04	25.10	16.09
Lane Group LOS	D	D	D	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.45	0.09	0.37	1.50	1.51	6.01	8.22	5.00	4.98	0.22	13.97	2.03
50th-Percentile Queue Length [ft/ln]	11.25	2.13	9.37	37.52	37.65	150.25	205.58	125.11	124.41	5.39	349.23	50.73
95th-Percentile Queue Length [veh/ln]	0.81	0.15	0.67	2.70	2.71	10.03	12.93	8.67	8.63	0.39	20.10	3.65
95th-Percentile Queue Length [ft/ln]	20.26	3.83	16.86	67.54	67.76	250.77	323.15	216.83	215.87	9.70	502.47	91.32

Movement, Approach, & Intersection Results

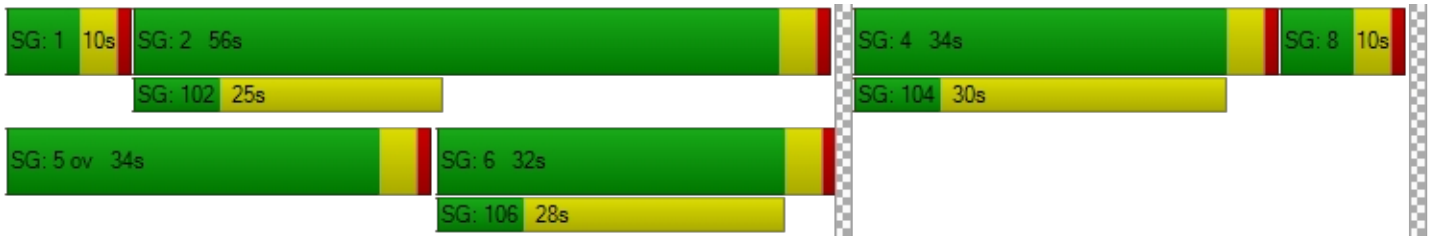
d_M, Delay for Movement [s/veh]	52.44	51.61	53.02	41.66	41.66	21.45	51.67	9.33	9.32	64.04	25.10	16.09
Movement LOS	D	D	D	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	52.60			26.82			19.16			24.41		
Approach LOS	D			C			B			C		
d_I, Intersection Delay [s/veh]	23.03											
Intersection LOS	C											
Intersection V/C	0.776											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.154	2.358	2.903	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	109	545	945	509
d_b, Bicycle Delay [s]	49.19	29.11	15.31	30.59
l_b,int, Bicycle LOS Score for Intersection	1.612	2.324	2.572	2.787
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	41.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	563	697	117	204	353	97	204	678	278	73	647	201
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	563	697	117	204	353	97	204	678	278	73	647	201
Peak Hour Factor	0.9100	0.9100	0.9100	0.8350	0.8350	0.8350	0.8890	0.8890	0.8890	0.8090	0.8090	0.8090
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	155	191	32	61	106	29	57	191	78	23	200	62
Total Analysis Volume [veh/h]	619	766	129	244	423	116	229	763	313	90	800	248
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	25	48	0	14	37	0	19	39	0	19	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	25	25	10	14	14	15	61	61	8	54	54
g / C, Green / Cycle	0.18	0.21	0.21	0.08	0.12	0.12	0.13	0.51	0.51	0.06	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.18	0.16	0.15	0.07	0.10	0.09	0.13	0.20	0.16	0.05	0.21	0.13
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	613	803	402	294	456	228	226	1928	964	115	1695	847
d1, Uniform Delay [s]	49.51	44.36	44.15	54.15	51.40	51.20	52.50	18.22	17.43	55.37	23.34	21.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.23	1.43	2.57	6.01	3.24	5.35	31.45	0.61	0.89	10.90	0.95	0.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.01	0.75	0.73	0.83	0.80	0.77	1.01	0.40	0.32	0.78	0.47	0.29
d, Delay for Lane Group [s/veh]	68.75	45.79	46.72	60.16	54.64	56.54	83.96	18.83	18.33	66.27	24.28	22.06
Lane Group LOS	F	D	D	E	D	E	F	B	B	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	10.79	8.53	8.41	3.87	5.53	5.44	8.76	6.62	5.30	3.03	8.11	4.65
50th-Percentile Queue Length [ft/ln]	269.75	213.19	210.15	96.85	138.26	136.04	218.93	165.39	132.62	75.83	202.79	116.19
95th-Percentile Queue Length [veh/ln]	16.25	13.32	13.16	6.97	9.39	9.27	13.69	10.83	9.08	5.46	12.78	8.18
95th-Percentile Queue Length [ft/ln]	406.34	332.92	329.03	174.33	234.68	231.68	342.37	270.84	227.05	136.49	319.56	204.57

Movement, Approach, & Intersection Results

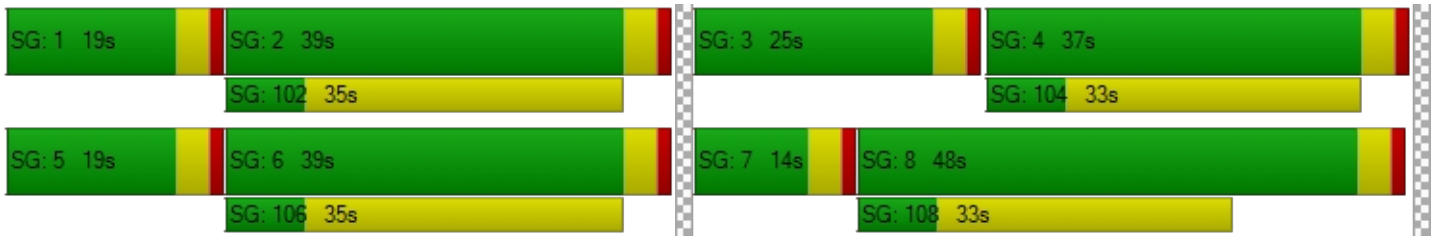
d_M, Delay for Movement [s/veh]	68.75	45.99	46.72	60.16	54.91	56.54	83.96	18.83	18.33	66.27	24.28	22.06
Movement LOS	F	D	D	E	D	E	F	B	B	E	C	C
d_A, Approach Delay [s/veh]	55.36			56.79			30.14			27.12		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	41.87											
Intersection LOS	D											
Intersection V/C	0.704											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.024	2.986	2.928	2.836
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	733	550	583	583
d_b, Bicycle Delay [s]	24.08	31.55	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	2.392	1.990	2.636	2.498
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	57.7
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.009

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	186	510	14	416	205	36	168	582	130	11	430	707
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	186	510	14	416	205	36	168	582	130	11	430	707
Peak Hour Factor	0.8330	0.8330	0.8330	0.9110	0.9110	0.9110	0.9200	0.9200	0.9200	0.9250	0.9250	0.9250
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	153	4	114	56	10	46	158	35	3	116	191
Total Analysis Volume [veh/h]	223	612	17	457	225	40	183	633	141	12	465	764
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	38	41	0	33	36	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	23	23	29	35	35	6	50	50	2	46	46
g / C, Green / Cycle	0.14	0.19	0.19	0.24	0.29	0.29	0.05	0.42	0.42	0.02	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.12	0.17	0.16	0.25	0.07	0.07	0.05	0.21	0.20	0.01	0.12	0.40
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	256	361	361	435	550	550	178	794	794	31	1461	731
d1, Uniform Delay [s]	50.43	47.26	47.17	45.53	32.65	32.53	56.98	25.76	25.34	58.35	25.91	36.95
k, delay calibration	0.11	0.12	0.11	0.46	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.96	7.32	6.69	55.56	0.23	0.22	39.36	2.27	2.01	7.47	0.57	45.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.88	0.87	1.05	0.25	0.24	1.03	0.50	0.47	0.38	0.32	1.05
d, Delay for Lane Group [s/veh]	59.39	54.58	53.86	101.09	32.88	32.75	96.34	28.03	27.35	65.82	26.48	82.79
Lane Group LOS	E	D	D	F	C	C	F	C	C	E	C	F
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.18	9.88	9.71	19.55	3.08	2.92	3.66	8.85	8.14	0.43	4.78	30.22
50th-Percentile Queue Length [ft/ln]	179.62	246.99	242.87	488.86	76.96	72.95	91.60	221.25	203.60	10.66	119.62	755.55
95th-Percentile Queue Length [veh/ln]	11.58	15.03	14.83	27.61	5.54	5.25	6.59	13.73	12.82	0.77	8.37	40.54
95th-Percentile Queue Length [ft/ln]	289.51	375.86	370.66	690.20	138.53	131.30	164.87	343.22	320.60	19.18	209.30	1013.47

Movement, Approach, & Intersection Results

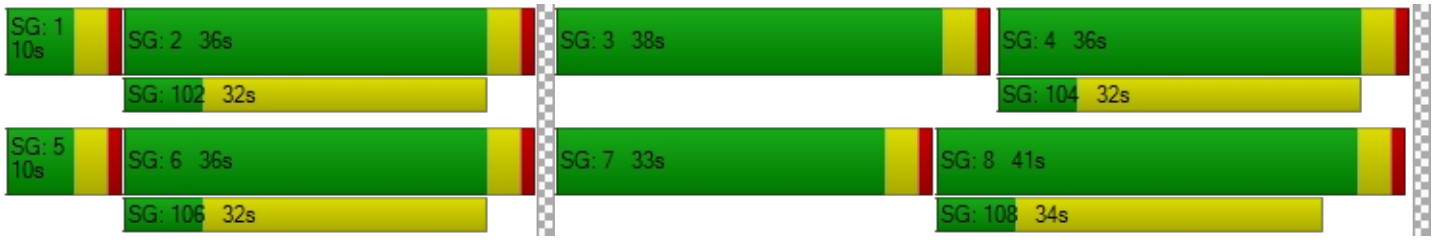
d_M, Delay for Movement [s/veh]	59.39	54.23	53.86	101.09	32.83	32.75	96.34	27.78	27.35	65.82	26.48	82.79
Movement LOS	E	D	D	F	C	C	F	C	C	E	C	F
d_A, Approach Delay [s/veh]	55.57			76.03			40.83			61.53		
Approach LOS	E			E			D			E		
d_I, Intersection Delay [s/veh]	57.71											
Intersection LOS	E											
Intersection V/C	1.009											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.553	2.758	2.740	2.848
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	617	533	533	533
d_b, Bicycle Delay [s]	28.72	32.28	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	2.263	2.155	2.349	2.583
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	4.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.663

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	26	1000	1061	15	7	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	1000	1061	15	7	18
Peak Hour Factor	0.9760	0.9760	0.9300	0.9300	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	256	285	4	2	6
Total Analysis Volume [veh/h]	27	1025	1141	16	9	24
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	6	6	0	6	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	94	94	0	26	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C
C, Cycle Length [s]	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	108	108	108	108	4
g / C, Green / Cycle	0.90	0.90	0.90	0.90	0.03
(v / s)_i Volume / Saturation Flow Rate	0.02	0.54	0.60	0.01	0.02
s, saturation flow rate [veh/h]	1800	1900	1900	1900	1800
c, Capacity [veh/h]	1361	1709	1709	1709	61
d1, Uniform Delay [s]	0.61	1.31	1.51	0.61	57.02
k, delay calibration	0.50	0.50	0.50	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.03	1.56	2.09	0.01	7.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.60	0.67	0.01	0.54
d, Delay for Lane Group [s/veh]	0.64	2.88	3.60	0.62	64.42
Lane Group LOS	A	A	A	A	E
Critical Lane Group	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.02	1.75	2.29	0.01	1.11
50th-Percentile Queue Length [ft/ln]	0.56	43.86	57.21	0.30	27.75
95th-Percentile Queue Length [veh/ln]	0.04	3.16	4.12	0.02	2.00
95th-Percentile Queue Length [ft/ln]	1.02	78.94	102.99	0.54	49.96

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.64	2.88	3.60	0.62	64.42	64.42
Movement LOS	A	A	A	A	E	E
d_A, Approach Delay [s/veh]	2.82		3.56		64.42	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	4.11					
Intersection LOS	A					
Intersection V/C	0.663					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	0.00	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.674	0.000	1.804
Crosswalk LOS	B	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1501	1501	367
d_b, Bicycle Delay [s]	3.74	3.74	39.99
l_b,int, Bicycle LOS Score for Intersection	3.295	3.469	1.614
Bicycle LOS	C	C	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	15.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.657

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	632	0	502	0	1567	862	0	2079	375
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	632	0	502	0	1567	862	0	2079	375
Peak Hour Factor	1.0000	1.0000	1.0000	0.9390	1.0000	0.9390	1.0000	0.9540	0.9540	1.0000	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	168	0	134	0	411	226	0	534	96
Total Analysis Volume [veh/h]	0	0	0	673	0	535	0	1643	904	0	2137	385
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		24	24	24	58	58
g / C, Green / Cycle		0.27	0.27	0.27	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate		0.22	0.22	0.21	0.29	0.37
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		487	487	514	3652	3652
d1, Uniform Delay [s]		30.81	30.81	30.35	8.15	9.28
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.66	3.66	2.68	0.40	0.69
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.78	0.45	0.59
d, Delay for Lane Group [s/veh]		34.47	34.47	33.02	8.55	9.97
Lane Group LOS		C	C	C	A	A
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		8.44	8.44	8.21	4.83	7.19
50th-Percentile Queue Length [ft/ln]		211.12	211.12	205.32	120.81	179.74
95th-Percentile Queue Length [veh/ln]		13.21	13.21	12.91	8.44	11.59
95th-Percentile Queue Length [ft/ln]		330.27	330.27	322.82	210.94	289.68

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	34.47	0.00	33.38	0.00	8.55	0.00	0.00	9.97	0.00
Movement LOS				C		C		A			A	
d_A, Approach Delay [s/veh]	0.00			33.99			8.55			9.97		
Approach LOS	A			C			A			A		
d_I, Intersection Delay [s/veh]	15.32											
Intersection LOS	B											
Intersection V/C	0.657											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.425	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.553	2.463	2.735
Bicycle LOS	D	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	29.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.777

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	848	72	397	0	0	231	206	1670	345	0	2186	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	848	72	397	0	0	231	206	1670	345	0	2186	46
Peak Hour Factor	0.9490	0.9490	0.9490	1.0000	1.0000	0.8840	0.9510	0.9510	0.9510	1.0000	0.9830	0.9830
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	223	19	105	0	0	65	54	439	91	0	556	12
Total Analysis Volume [veh/h]	894	76	418	0	0	261	217	1756	363	0	2224	47
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	30	0	0	0	12	23	58	0	0	35	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	23	8	14	57	39	39
g / C, Green / Cycle	0.23	0.23	0.23	0.08	0.14	0.57	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.20	0.20	0.19	0.07	0.12	0.31	0.30	0.30
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	799	411	434	307	253	3255	2226	742
d1, Uniform Delay [s]	37.06	37.07	36.60	45.43	42.04	13.31	26.53	26.53
k, delay calibration	0.11	0.20	0.17	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.77	9.01	5.72	6.57	8.15	0.65	2.57	7.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.86	0.81	0.85	0.86	0.54	0.77	0.77
d, Delay for Lane Group [s/veh]	39.83	46.08	42.32	52.01	50.18	13.96	29.11	33.93
Lane Group LOS	D	D	D	D	D	B	C	C
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.19	9.14	8.70	3.46	5.76	7.86	11.92	12.91
50th-Percentile Queue Length [ft/ln]	204.64	228.61	217.57	86.45	143.95	196.38	298.00	322.84
95th-Percentile Queue Length [veh/ln]	12.88	14.10	13.54	6.22	9.69	12.45	17.58	18.81
95th-Percentile Queue Length [ft/ln]	321.94	352.60	338.52	155.61	242.34	311.29	439.56	470.17

Movement, Approach, & Intersection Results

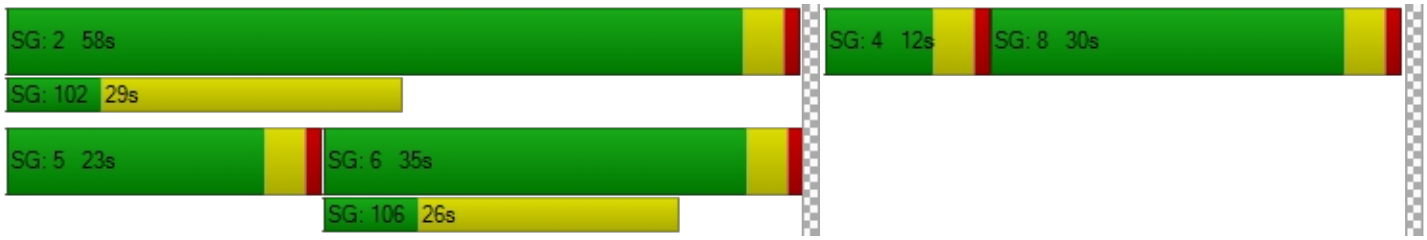
d_M, Delay for Movement [s/veh]	41.26	46.08	42.96	0.00	0.00	52.01	50.18	13.96	0.00	0.00	30.24	33.93
Movement LOS	D	D	D			D	D	B			C	C
d_A, Approach Delay [s/veh]	42.05			52.01			17.94			30.31		
Approach LOS	D			D			B			C		
d_I, Intersection Delay [s/veh]	29.89											
Intersection LOS	C											
Intersection V/C	0.777											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.575	2.140	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	520	160	1079	620
d_b, Bicycle Delay [s]	27.41	42.35	10.60	23.84
l_b,int, Bicycle LOS Score for Intersection	3.850	1.560	2.645	2.496
Bicycle LOS	D	A	B	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	39.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.829

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	205	247	80	278	333	212	240	1697	132	167	1597	163
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	247	80	278	333	212	240	1697	132	167	1597	163
Peak Hour Factor	0.9100	0.9100	0.9100	0.8290	0.8290	0.8290	0.9480	0.9480	0.9480	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	68	22	84	100	64	63	448	35	45	427	44
Total Analysis Volume [veh/h]	225	271	88	335	402	256	253	1790	139	179	1708	174
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	39	0	17	43	0	23	47	0	17	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	24	24	13	28	28	19	54	54	13	48	48
g / C, Green / Cycle	0.08	0.20	0.20	0.11	0.23	0.23	0.16	0.45	0.45	0.11	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.06	0.10	0.09	0.10	0.21	0.13	0.14	0.34	0.34	0.10	0.25	0.25
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	265	382	382	381	445	445	280	1702	851	196	2287	762
d1, Uniform Delay [s]	54.82	42.47	42.14	52.72	44.64	40.67	49.82	27.56	27.86	52.94	28.52	28.85
k, delay calibration	0.11	0.11	0.11	0.11	0.20	0.11	0.13	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.48	0.96	0.84	6.64	12.01	1.17	12.24	3.09	6.53	15.13	1.23	3.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.49	0.45	0.88	0.90	0.57	0.90	0.75	0.77	0.91	0.61	0.63
d, Delay for Lane Group [s/veh]	62.30	43.43	42.98	59.36	56.64	41.85	62.06	30.65	34.39	68.07	29.75	32.84
Lane Group LOS	E	D	D	E	E	D	E	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.64	5.00	4.61	5.32	13.03	6.85	8.39	15.64	16.94	6.16	10.80	11.89
50th-Percentile Queue Length [ft/ln]	90.88	125.01	115.24	133.06	325.78	171.13	209.84	390.97	423.44	153.95	270.12	297.32
95th-Percentile Queue Length [veh/ln]	6.54	8.67	8.13	9.11	18.95	11.14	13.15	22.12	23.69	10.23	16.20	17.55
95th-Percentile Queue Length [ft/ln]	163.58	216.69	203.26	227.64	473.79	278.40	328.63	553.11	592.18	255.69	404.89	438.71

Movement, Approach, & Intersection Results

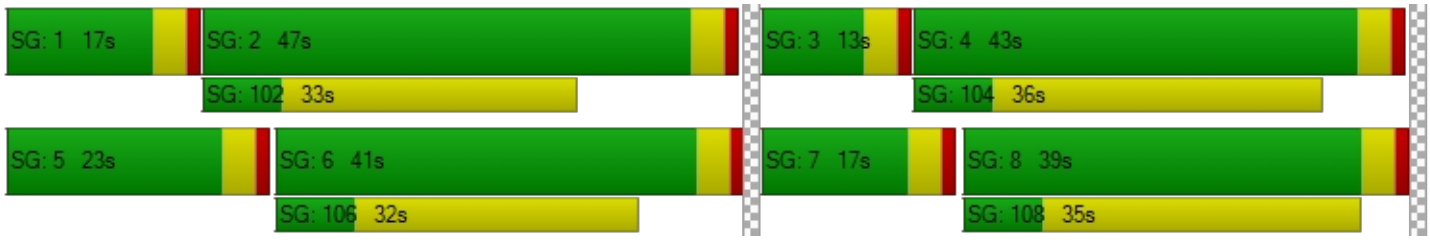
d_M, Delay for Movement [s/veh]	62.30	43.29	42.98	59.36	56.64	41.85	62.06	31.72	34.39	68.07	30.31	32.84
Movement LOS	E	D	D	E	E	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	50.57			53.74			35.41			33.80		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	39.49											
Intersection LOS	D											
Intersection V/C	0.829											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.568	2.741	3.272	3.260
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	650	716	617
d_b, Bicycle Delay [s]	30.12	27.35	24.72	28.72
l_b,int, Bicycle LOS Score for Intersection	2.041	3.198	2.760	2.410
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	23.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.764

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	225	45	253	24	22	13	18	1713	263	219	1764	54
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	225	45	253	24	22	13	18	1713	263	219	1764	54
Peak Hour Factor	0.8580	0.8580	0.8580	0.6480	0.6480	0.6480	0.9520	0.9520	0.9520	0.9460	0.9460	0.9460
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	66	13	74	9	8	5	5	450	69	58	466	14
Total Analysis Volume [veh/h]	262	52	295	37	34	20	19	1799	276	232	1865	57
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	22	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	17	5	5	2	38	38	14	50	50
g / C, Green / Cycle	0.18	0.18	0.18	0.06	0.06	0.03	0.43	0.43	0.15	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.16	0.02	0.03	0.01	0.32	0.15	0.13	0.33	0.35
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	331	331	349	110	116	48	2431	810	272	2094	1047
d1, Uniform Delay [s]	32.88	32.93	35.56	40.59	40.92	43.18	21.67	17.35	37.28	13.62	13.88
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.04	1.07	5.60	1.79	2.90	5.23	2.07	1.14	7.39	1.30	2.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.47	0.48	0.84	0.34	0.47	0.40	0.74	0.34	0.85	0.60	0.63
d, Delay for Lane Group [s/veh]	33.92	34.00	41.16	42.39	43.82	48.40	23.74	18.50	44.67	14.92	16.73
Lane Group LOS	C	C	D	D	D	D	C	B	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.09	3.14	6.67	0.83	1.24	0.48	10.50	3.95	5.45	8.27	9.18
50th-Percentile Queue Length [ft/ln]	77.19	78.48	166.68	20.85	30.99	12.06	262.43	98.85	136.28	206.87	229.58
95th-Percentile Queue Length [veh/ln]	5.56	5.65	10.90	1.50	2.23	0.87	15.81	7.12	9.28	12.99	14.15
95th-Percentile Queue Length [ft/ln]	138.94	141.26	272.55	37.53	55.79	21.70	395.26	177.93	232.01	324.81	353.82

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.95	34.00	41.16	42.39	43.82	43.82	48.40	23.74	18.50	44.67	15.50	16.73
Movement LOS	C	C	D	D	D	D	D	C	B	D	B	B
d_A, Approach Delay [s/veh]	37.45			43.24			23.28			18.68		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	23.38											
Intersection LOS	C											
Intersection V/C	0.764											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	0.00	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.411	2.011	0.000	3.190
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	488	133	622	888
d_b, Bicycle Delay [s]	25.73	39.24	21.40	13.92
l_b,int, Bicycle LOS Score for Intersection	2.564	1.710	2.711	2.744
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	32.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.803

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	338	580	97	251	445	107	202	1272	198	174	1406	303
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	338	580	97	251	445	107	202	1272	198	174	1406	303
Peak Hour Factor	0.9600	0.9600	0.9600	0.8590	0.8590	0.8590	0.9620	0.9620	0.9620	0.9050	0.9050	0.9050
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	151	25	73	130	31	52	331	51	48	388	84
Total Analysis Volume [veh/h]	352	604	101	292	518	125	210	1322	206	192	1554	335
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	32	0	13	30	0	11	40	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	21	21	9	19	19	7	43	43	6	42	42
g / C, Green / Cycle	0.12	0.22	0.22	0.10	0.20	0.20	0.07	0.45	0.45	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.10	0.19	0.18	0.08	0.14	0.07	0.06	0.27	0.26	0.05	0.33	0.33
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	409	416	416	336	753	377	264	1718	859	227	1678	839
d1, Uniform Delay [s]	41.32	35.89	35.49	42.48	35.47	32.79	43.35	19.59	19.47	44.09	22.32	22.04
k, delay calibration	0.11	0.16	0.14	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.37	8.04	5.31	6.81	1.13	0.51	5.45	1.54	2.92	8.34	3.24	5.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.87	0.83	0.87	0.69	0.33	0.80	0.60	0.59	0.85	0.76	0.74
d, Delay for Lane Group [s/veh]	46.69	43.93	40.80	49.29	36.60	33.31	48.80	21.13	22.39	52.43	25.56	27.78
Lane Group LOS	D	D	D	D	D	C	D	C	C	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.31	8.86	8.07	3.67	5.61	2.50	2.61	8.48	8.61	2.48	12.05	12.20
50th-Percentile Queue Length [ft/ln]	107.79	221.42	201.70	91.69	140.29	62.62	65.25	211.90	215.20	62.08	301.18	304.96
95th-Percentile Queue Length [veh/ln]	7.72	13.74	12.73	6.60	9.50	4.51	4.70	13.25	13.42	4.47	17.74	17.93
95th-Percentile Queue Length [ft/ln]	192.93	343.43	318.15	165.03	237.42	112.72	117.46	331.27	335.50	111.74	443.49	448.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	46.69	42.67	40.80	49.29	36.60	33.31	48.80	21.41	22.39	52.43	25.97	27.78
Movement LOS	D	D	D	D	D	C	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	43.83			40.12			24.84			28.70		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.14											
Intersection LOS	C											
Intersection V/C	0.803											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.22	37.22	37.22	37.22
l_p,int, Pedestrian LOS Score for Intersection	2.776	2.887	3.187	3.190
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	588	546	757	736
d_b, Bicycle Delay [s]	23.70	25.13	18.39	19.02
l_b,int, Bicycle LOS Score for Intersection	2.432	2.331	2.516	2.704
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.576

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	103	227	121	196	190	122	216	1638	134	158	1204	118
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	103	227	121	196	190	122	216	1638	134	158	1204	118
Peak Hour Factor	0.8810	0.8810	0.8810	0.8480	0.8480	0.8480	0.9420	0.9420	0.9420	0.8590	0.8590	0.8590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	64	34	58	56	36	57	435	36	46	350	34
Total Analysis Volume [veh/h]	117	258	137	231	224	144	229	1739	142	184	1402	137
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	46	0	15	48	0	15	42	0	12	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	11	11	10	15	15	10	70	70	8	69	69
g / C, Green / Cycle	0.05	0.10	0.10	0.08	0.13	0.13	0.08	0.61	0.61	0.07	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.03	0.07	0.07	0.07	0.06	0.08	0.07	0.31	0.07	0.05	0.25	0.07
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	181	365	182	293	486	243	291	3487	1162	244	3410	1137
d1, Uniform Delay [s]	53.53	50.45	50.68	51.73	46.51	47.35	51.76	12.48	9.37	52.58	12.32	10.01
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.83	2.53	6.11	4.73	0.68	2.30	4.71	0.51	0.22	4.73	0.37	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	0.71	0.75	0.79	0.46	0.59	0.79	0.50	0.12	0.76	0.41	0.12
d, Delay for Lane Group [s/veh]	57.36	52.99	56.80	56.45	47.19	49.65	56.47	12.99	9.59	57.31	12.69	10.23
Lane Group LOS	E	D	E	E	D	D	E	B	A	E	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.76	3.73	4.15	3.46	3.02	4.05	3.43	8.08	1.53	2.77	6.27	1.53
50th-Percentile Queue Length [ft/ln]	43.91	93.21	103.76	86.45	75.51	101.22	85.70	202.12	38.16	69.20	156.73	38.36
95th-Percentile Queue Length [veh/ln]	3.16	6.71	7.47	6.22	5.44	7.29	6.17	12.75	2.75	4.98	10.38	2.76
95th-Percentile Queue Length [ft/ln]	79.04	167.78	186.77	155.60	135.92	182.20	154.25	318.70	68.70	124.57	259.39	69.04

Movement, Approach, & Intersection Results

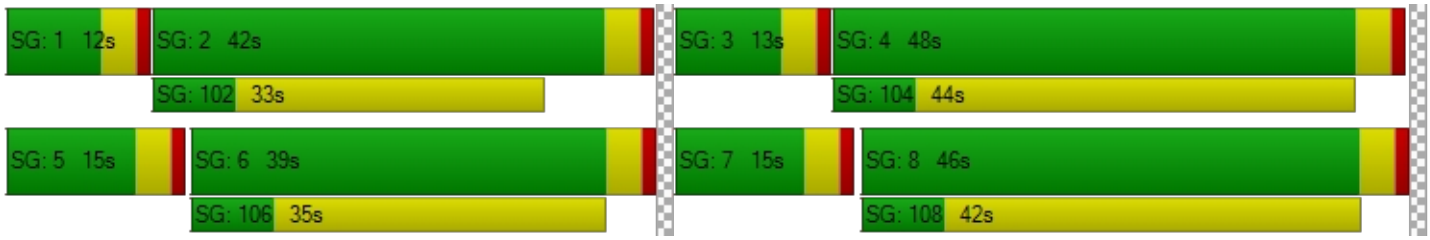
d_M, Delay for Movement [s/veh]	57.36	52.99	56.80	56.45	47.19	49.65	56.47	12.99	9.59	57.31	12.69	10.23
Movement LOS	E	D	E	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	55.00			51.35			17.48			17.26		
Approach LOS	E			D			B			B		
d_I, Intersection Delay [s/veh]	25.39											
Intersection LOS	C											
Intersection V/C	0.576											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.754	2.776	3.270	3.276
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	730	765	661	608
d_b, Bicycle Delay [s]	23.19	21.93	25.80	27.84
l_b,int, Bicycle LOS Score for Intersection	1.982	2.054	2.720	2.507
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	204.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.955

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	238	468	113	843	407	18	64	1587	263	147	1217	711
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	238	468	113	843	407	18	64	1587	263	147	1217	711
Peak Hour Factor	0.9240	0.9240	0.9240	0.9400	0.9400	0.9400	0.9140	0.9140	0.9140	0.9380	0.9380	0.9380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	64	127	31	224	108	5	18	434	72	39	324	189
Total Analysis Volume [veh/h]	258	506	122	897	433	19	70	1736	288	157	1297	758
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	19	19	8	16	16	6	71	71	6	71	71
g / C, Green / Cycle	0.09	0.16	0.16	0.07	0.14	0.14	0.05	0.59	0.59	0.05	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.07	0.13	0.06	0.26	0.11	0.01	0.04	0.36	0.35	0.04	0.23	0.40
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	315	604	302	236	518	259	91	2241	1120	178	3363	1121
d1, Uniform Delay [s]	53.68	48.99	45.38	55.99	50.53	45.22	56.31	15.70	15.61	56.63	13.07	16.79
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.30	3.19	0.87	1264.67	3.63	0.12	12.75	1.22	2.36	13.28	0.34	3.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.84	0.40	3.81	0.84	0.07	0.77	0.60	0.60	0.88	0.39	0.68
d, Delay for Lane Group [s/veh]	58.98	52.18	46.25	1320.66	54.16	45.34	69.06	16.92	17.97	69.91	13.40	20.07
Lane Group LOS	E	D	D	F	D	D	E	B	B	E	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.06	7.61	3.35	44.97	6.59	0.51	2.42	11.71	11.88	2.69	6.13	14.59
50th-Percentile Queue Length [ft/ln]	101.43	190.29	83.84	1124.25	164.84	12.65	60.46	292.65	296.95	67.32	153.18	364.80
95th-Percentile Queue Length [veh/ln]	7.30	12.14	6.04	68.37	10.80	0.91	4.35	17.32	17.53	4.85	10.19	20.86
95th-Percentile Queue Length [ft/ln]	182.57	303.40	150.91	1709.37	270.12	22.77	108.83	432.93	438.26	121.18	254.67	521.42

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.98	52.18	46.25	1320.66	54.16	45.34	69.06	17.15	17.97	69.91	13.40	20.07
Movement LOS	E	D	D	F	D	D	E	B	B	E	B	C
d_A, Approach Delay [s/veh]	53.34			896.18			19.00			19.70		
Approach LOS	D			F			B			B		
d_I, Intersection Delay [s/veh]	204.79											
Intersection LOS	F											
Intersection V/C	0.955											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.853	2.981	3.119	3.401
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.291	2.673	2.711	2.776
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D-II

YEAR 2035 CUMULATIVE TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	38.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.855

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	185	238	225	963	659	9	15	1511	230	517	1929	597
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	185	238	225	963	659	9	15	1511	230	517	1929	597
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	60	56	241	165	2	4	378	58	129	482	149
Total Analysis Volume [veh/h]	185	238	225	963	659	9	15	1511	230	517	1929	597
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	12	15	0	41	44	0	10	40	0	24	54	54
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	8	12	12	12	36	40	40	2	36	36	20	54	93
g / C, Green / Cycle	0.07	0.10	0.10	0.10	0.30	0.33	0.33	0.02	0.30	0.30	0.16	0.45	0.78
(v / s)_i Volume / Saturation Flow Rate	0.05	0.09	0.08	0.08	0.28	0.18	0.18	0.00	0.23	0.23	0.15	0.34	0.31
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	236	194	194	194	1042	632	632	72	1730	577	571	2543	1477
d1, Uniform Delay [s]	55.13	53.01	52.63	52.34	40.84	32.44	32.42	57.83	37.75	37.85	49.32	27.84	4.35
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.68	10.19	6.98	5.42	4.05	0.71	0.70	1.41	3.09	9.11	5.73	2.18	0.82
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.85	0.79	0.74	0.92	0.53	0.53	0.21	0.75	0.76	0.91	0.76	0.40
d, Delay for Lane Group [s/veh]	60.82	63.21	59.60	57.75	44.89	33.15	33.13	59.24	40.84	46.96	55.06	30.03	5.17
Lane Group LOS	E	E	E	E	D	C	C	E	D	D	E	C	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.94	5.47	4.89	4.49	14.22	7.98	7.96	0.24	11.94	13.03	8.04	15.64	4.28
50th-Percentile Queue Length [ft/ln]	73.56	136.8	122.2	112.3	355.62	199.57	198.91	5.96	298.48	325.83	201.11	391.04	106.98
95th-Percentile Queue Length [veh/ln]	5.30	9.31	8.51	7.97	20.41	12.62	12.58	0.43	17.61	18.95	12.70	22.13	7.67
95th-Percentile Queue Length [ft/ln]	132.4	232.7	212.8	199.2	510.25	315.41	314.56	10.73	440.15	473.84	317.39	553.20	191.80

Movement, Approach, & Intersection Results

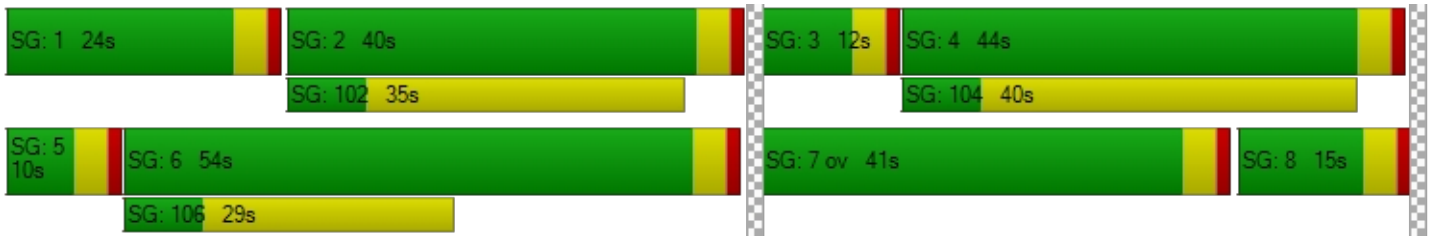
d_M, Delay for Movement [s/veh]	60.82	62.12	58.36	44.89	33.14	33.13	59.24	41.68	46.96	55.06	30.03	5.17
Movement LOS	E	E	E	D	C	C	E	D	D	E	C	A
d_A, Approach Delay [s/veh]	60.46			40.08			42.52			29.40		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	37.96											
Intersection LOS	D											
Intersection V/C	0.855											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.894	2.870	3.283	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	183	666	600	833
d_b, Bicycle Delay [s]	49.52	26.68	29.41	20.43
l_b,int, Bicycle LOS Score for Intersection	2.094	2.905	2.284	3.233
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	23.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.798

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	1045	0	695	0	1855	619	256	2169	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	1045	0	695	0	1855	619	256	2169	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	261	0	174	0	464	155	64	542	0
Total Analysis Volume [veh/h]	0	0	0	1045	0	695	0	1855	619	256	2169	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	59	0	0	0	23	0	13	36	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		95	95	95	95	95	95
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		34	34	40	40	9	53
g / C, Green / Cycle		0.36	0.36	0.42	0.42	0.09	0.55
(v / s)_i Volume / Saturation Flow Rate		0.30	0.18	0.33	0.16	0.07	0.38
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		1268	1377	2383	1588	327	3154
d1, Uniform Delay [s]		27.54	23.64	23.86	19.23	42.14	15.30
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		1.41	0.29	2.59	0.72	4.14	1.24
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.82	0.50	0.78	0.39	0.78	0.69
d, Delay for Lane Group [s/veh]		28.95	23.93	26.45	19.95	46.28	16.54
Lane Group LOS		C	C	C	B	D	B
Critical Lane Group		Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		10.64	5.99	12.00	4.77	3.10	10.75
50th-Percentile Queue Length [ft/ln]		265.91	149.64	299.97	119.21	77.38	268.81
95th-Percentile Queue Length [veh/ln]		15.98	10.00	17.68	8.35	5.57	16.13
95th-Percentile Queue Length [ft/ln]		399.62	249.95	441.99	208.75	139.29	403.25

Movement, Approach, & Intersection Results

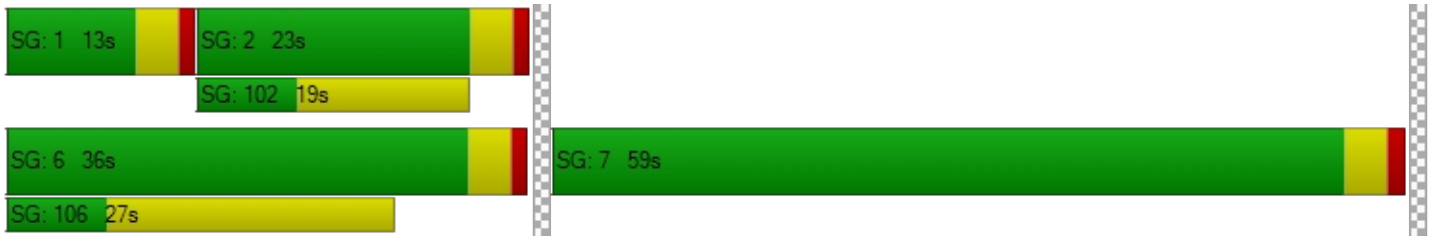
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	28.95	0.00	23.93	0.00	26.45	19.95	46.28	16.54	0.00
Movement LOS				C		C		C	B	D	B	
d_A, Approach Delay [s/veh]	0.00			26.94			24.82			19.68		
Approach LOS	A			C			C			B		
d_I, Intersection Delay [s/veh]	23.50											
Intersection LOS	C											
Intersection V/C	0.798											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.144	2.557	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1158	400	674
d_b, Bicycle Delay [s]	47.51	8.43	30.41	20.90
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.920	2.893
Bicycle LOS	D	A	C	C

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	19.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.812

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	1051	0	506	0	0	0	0	2505	404	0	1386	487
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1051	0	506	0	0	0	0	2505	404	0	1386	487
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	263	0	127	0	0	0	0	626	101	0	347	0
Total Analysis Volume [veh/h]	1051	0	506	0	0	0	0	2505	404	0	1386	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32		50	50	50	50
g / C, Green / Cycle	0.36	0.36		0.55	0.55	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.30	0.27		0.44	0.44	0.21	0.24
s, saturation flow rate [veh/h]	3500	1900		3800	1900	1900	5700
c, Capacity [veh/h]	1252	680		2102	1051	1051	3154
d1, Uniform Delay [s]	26.48	25.26		15.99	15.99	11.38	11.84
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.59	1.64		3.20	6.20	1.06	0.45
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.74		0.79	0.79	0.38	0.44
d, Delay for Lane Group [s/veh]	28.07	26.90		19.19	22.19	12.45	12.29
Lane Group LOS	C	C		B	C	B	B
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	10.15	9.38		13.28	14.15	4.56	5.19
50th-Percentile Queue Length [ft/ln]	253.70	234.39		331.91	353.83	114.06	129.71
95th-Percentile Queue Length [veh/ln]	15.37	14.40		19.25	20.32	8.07	8.92
95th-Percentile Queue Length [ft/ln]	384.31	359.93		481.31	508.07	201.64	223.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.07	0.00	26.90	0.00	0.00	0.00	0.00	19.87	12.45	0.00	12.29	0.00
Movement LOS	C		C					B	B		B	
d_A, Approach Delay [s/veh]	27.69			0.00			19.11			12.29		
Approach LOS	C			A			B			B		
d_I, Intersection Delay [s/veh]	19.78											
Intersection LOS	B											
Intersection V/C	0.812											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.682	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	3.160	2.322
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	13.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.636

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	66	1	130	557	2469	40	17	1907	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	66	1	130	557	2469	40	17	1907	183
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	2	17	0	33	139	617	10	4	477	46
Total Analysis Volume [veh/h]	9	8	7	66	1	130	557	2469	40	17	1907	183
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	44	0	0	44	0	35	37	0	29	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	20	89	89	2	71	71
g / C, Green / Cycle	0.06	0.06	0.06	0.19	0.81	0.81	0.02	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.03	0.16	0.43	0.45	0.01	0.37	0.37
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	150	170	222	648	3078	1539	41	2460	1230
d1, Uniform Delay [s]	49.42	50.65	50.49	43.42	3.50	3.64	53.04	10.77	10.85
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	1.48	2.45	3.48	0.67	1.49	6.71	0.94	1.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.39	0.59	0.86	0.53	0.56	0.42	0.56	0.57
d, Delay for Lane Group [s/veh]	49.91	52.12	52.94	46.90	4.17	5.13	59.75	11.71	12.78
Lane Group LOS	D	D	D	D	A	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.65	1.87	1.82	7.60	4.51	5.25	0.54	8.94	9.45
50th-Percentile Queue Length [ft/ln]	16.26	46.79	45.45	190.09	112.68	131.17	13.47	223.43	236.33
95th-Percentile Queue Length [veh/ln]	1.17	3.37	3.27	12.13	7.99	9.00	0.97	13.84	14.50
95th-Percentile Queue Length [ft/ln]	29.26	84.22	81.81	303.15	199.73	225.09	24.25	346.00	362.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.91	49.91	49.91	52.12	52.12	52.94	46.90	4.49	5.13	59.75	12.00	12.78
Movement LOS	D	D	D	D	D	D	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	49.91			52.66			12.20			12.46		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	13.95											
Intersection LOS	B											
Intersection V/C	0.636											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	0.00	44.55
l_p,int, Pedestrian LOS Score for Intersection	1.764	2.494	0.000	3.345
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	727	727	600	491
d_b, Bicycle Delay [s]	22.27	22.27	26.95	31.31
l_b,int, Bicycle LOS Score for Intersection	1.599	1.885	3.246	2.718
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	32.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.865

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	161	307	11	119	208	386	476	1962	165	22	1483	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	161	307	11	119	208	386	476	1962	165	22	1483	174
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	77	3	30	52	97	119	491	41	6	371	44
Total Analysis Volume [veh/h]	161	307	11	119	208	386	476	1962	165	22	1483	174
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	27	0	18	31	0	19	36	0	14	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	24	24	8	22	22	15	45	45	3	33	33
g / C, Green / Cycle	0.11	0.25	0.25	0.08	0.23	0.23	0.16	0.47	0.47	0.03	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.09	0.08	0.08	0.07	0.11	0.20	0.14	0.34	0.09	0.01	0.29	0.29
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	191	475	475	152	434	434	545	2670	890	52	1299	649
d1, Uniform Delay [s]	41.77	29.23	29.20	42.71	31.81	35.55	39.25	20.50	14.72	45.40	29.08	29.03
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.19	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.73	0.41	0.41	8.51	0.82	10.46	4.55	1.84	0.46	5.26	7.18	13.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.34	0.33	0.78	0.48	0.89	0.87	0.73	0.19	0.42	0.85	0.85
d, Delay for Lane Group [s/veh]	51.50	29.64	29.61	51.22	32.63	46.01	43.81	22.34	15.18	50.66	36.26	42.05
Lane Group LOS	D	C	C	D	C	D	D	C	B	D	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.18	3.01	2.98	3.07	4.19	9.73	5.70	11.56	2.13	0.58	12.59	13.59
50th-Percentile Queue Length [ft/ln]	104.55	75.13	74.38	76.87	104.63	243.37	142.39	288.97	53.14	14.59	314.86	339.66
95th-Percentile Queue Length [veh/ln]	7.53	5.41	5.36	5.53	7.53	14.85	9.61	17.13	3.83	1.05	18.41	19.63
95th-Percentile Queue Length [ft/ln]	188.20	135.23	133.89	138.36	188.33	371.30	240.24	428.37	95.65	26.27	460.36	490.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.50	29.63	29.61	51.22	32.63	46.01	43.81	22.34	15.18	50.66	37.73	42.05
Movement LOS	D	C	C	D	C	D	D	C	B	D	D	D
d_A, Approach Delay [s/veh]	36.98			42.97			25.81			38.34		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	32.87											
Intersection LOS	C											
Intersection V/C	0.865											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	37.18	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.473	2.628	3.353	3.121
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	484	568	673	568
d_b, Bicycle Delay [s]	27.32	24.37	20.92	24.37
l_b,int, Bicycle LOS Score for Intersection	1.955	2.148	2.991	2.483
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	28.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.732

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	316	124	42	21	236	355	109	765	1150	294	901	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	316	124	42	21	236	355	109	765	1150	294	901	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	79	31	11	5	59	89	27	191	288	74	225	4
Total Analysis Volume [veh/h]	316	124	42	21	236	355	109	765	1150	294	901	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	16	48	48	10	42	0	20	37	37	15	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	33	48	3	23	23	8	48	64	11	50	50
g / C, Green / Cycle	0.11	0.30	0.43	0.03	0.21	0.21	0.08	0.43	0.58	0.10	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.02	0.01	0.12	0.19	0.06	0.20	0.30	0.08	0.16	0.17
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	384	562	822	48	404	404	138	1640	2195	352	1731	866
d1, Uniform Delay [s]	47.97	29.23	18.13	52.75	38.95	41.95	49.96	22.26	14.08	48.62	19.39	19.54
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.48	0.20	0.03	6.02	1.34	6.87	9.60	0.96	0.90	5.23	0.55	1.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.22	0.05	0.43	0.58	0.88	0.79	0.47	0.52	0.84	0.35	0.36
d, Delay for Lane Group [s/veh]	52.45	29.42	18.16	58.76	40.29	48.83	59.55	23.22	14.98	53.85	19.94	20.72
Lane Group LOS	D	C	B	E	D	D	E	C	B	D	B	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.47	2.50	0.63	0.65	5.86	10.02	3.31	7.15	8.53	4.21	5.04	5.44
50th-Percentile Queue Length [ft/ln]	111.66	62.62	15.69	16.30	146.50	250.55	82.74	178.65	213.24	105.16	126.00	135.98
95th-Percentile Queue Length [veh/ln]	7.93	4.51	1.13	1.17	9.83	15.21	5.96	11.53	13.32	7.57	8.72	9.26
95th-Percentile Queue Length [ft/ln]	198.31	112.72	28.24	29.34	245.75	380.34	148.93	288.25	332.98	189.26	218.04	231.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.45	29.42	18.16	58.76	40.29	48.83	59.55	23.22	14.98	53.85	20.20	20.72
Movement LOS	D	C	B	E	D	D	E	C	B	D	C	C
d_A, Approach Delay [s/veh]	43.54			45.88			20.49			28.39		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	28.86											
Intersection LOS	C											
Intersection V/C	0.732											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.814	2.350	3.173	2.887
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	691	600	509
d_b, Bicycle Delay [s]	19.82	23.59	26.97	30.59
l_b,int, Bicycle LOS Score for Intersection	2.355	2.569	3.229	2.225
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	6.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.304

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	46	6	18	5	0	6	7	819	49	25	1181	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	6	18	5	0	6	7	819	49	25	1181	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	205	12	6	295	1
Total Analysis Volume [veh/h]	46	6	18	5	0	6	7	819	49	25	1181	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	12	30	0	10	28	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	2	2	1	93	93	3	95	95
g / C, Green / Cycle	0.05	0.05	0.02	0.02	0.01	0.78	0.78	0.03	0.80	0.80
(v / s)_i Volume / Saturation Flow Rate	0.03	0.01	0.00	0.00	0.00	0.23	0.23	0.01	0.20	0.21
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	82	87	28	30	20	1475	1475	52	3019	1509
d1, Uniform Delay [s]	56.11	55.37	58.29	58.31	58.94	3.89	3.87	57.41	3.19	3.23
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.88	1.71	2.88	3.19	10.63	0.51	0.50	6.83	0.21	0.44
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.56	0.28	0.18	0.20	0.36	0.30	0.29	0.48	0.26	0.27
d, Delay for Lane Group [s/veh]	61.99	57.08	61.18	61.51	69.58	4.41	4.37	64.25	3.39	3.67
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.50	0.74	0.17	0.21	0.27	2.80	2.73	0.85	2.01	2.23
50th-Percentile Queue Length [ft/ln]	37.51	18.62	4.32	5.17	6.73	69.97	68.19	21.15	50.26	55.74
95th-Percentile Queue Length [veh/ln]	2.70	1.34	0.31	0.37	0.48	5.04	4.91	1.52	3.62	4.01
95th-Percentile Queue Length [ft/ln]	67.51	33.51	7.78	9.31	12.12	125.94	122.74	38.08	90.47	100.34

Movement, Approach, & Intersection Results

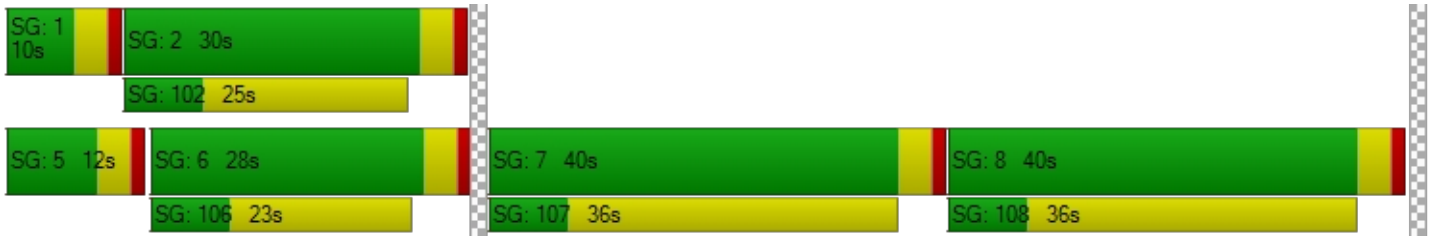
d_M, Delay for Movement [s/veh]	61.99	57.08	57.08	61.18	0.00	61.51	69.58	4.39	4.37	64.25	3.49	3.67
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	60.31			61.36			4.91			4.75		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	6.90											
Intersection LOS	A											
Intersection V/C	0.304											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.001	1.962	2.809	2.800
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	400
d_b, Bicycle Delay [s]	29.41	29.41	36.82	38.41
l_b,int, Bicycle LOS Score for Intersection	1.675	1.560	2.281	2.224
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	144.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.003

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	301	198	166	8	402	46	53	240	556	1016	867	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	301	198	166	8	402	46	53	240	556	1016	867	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	75	50	42	2	101	12	13	60	139	254	217	1
Total Analysis Volume [veh/h]	301	198	166	8	402	46	53	240	556	1016	867	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	16	49	0	10	43	0	13	36	0	25	48	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	28	1	17	17	5	54	54	21	70	70
g / C, Green / Cycle	0.10	0.23	0.01	0.14	0.14	0.04	0.45	0.45	0.18	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.17	0.05	0.00	0.12	0.12	0.03	0.06	0.29	0.29	0.15	0.16
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	181	872	23	269	269	76	1707	854	613	2212	1106
d1, Uniform Delay [s]	54.00	37.59	58.78	50.22	50.05	56.73	19.43	25.74	49.51	12.33	12.44
k, delay calibration	0.21	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.14	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	308.54	0.13	8.95	7.04	6.16	10.84	0.17	3.84	297.69	0.28	0.60
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.66	0.23	0.35	0.84	0.82	0.70	0.14	0.65	1.66	0.26	0.27
d, Delay for Lane Group [s/veh]	362.54	37.72	67.73	57.26	56.21	67.57	19.61	29.58	347.21	12.61	13.04
Lane Group LOS	F	D	E	E	E	E	B	C	F	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	20.96	2.40	0.30	7.16	6.90	1.82	2.02	13.06	34.51	3.78	4.10
50th-Percentile Queue Length [ft/ln]	524.11	59.93	7.45	178.98	172.52	45.41	50.53	326.59	862.64	94.52	102.38
95th-Percentile Queue Length [veh/ln]	33.34	4.32	0.54	11.55	11.21	3.27	3.64	18.99	53.73	6.81	7.37
95th-Percentile Queue Length [ft/ln]	833.62	107.88	13.42	288.69	280.22	81.73	90.95	474.78	1343.28	170.14	184.29

Movement, Approach, & Intersection Results

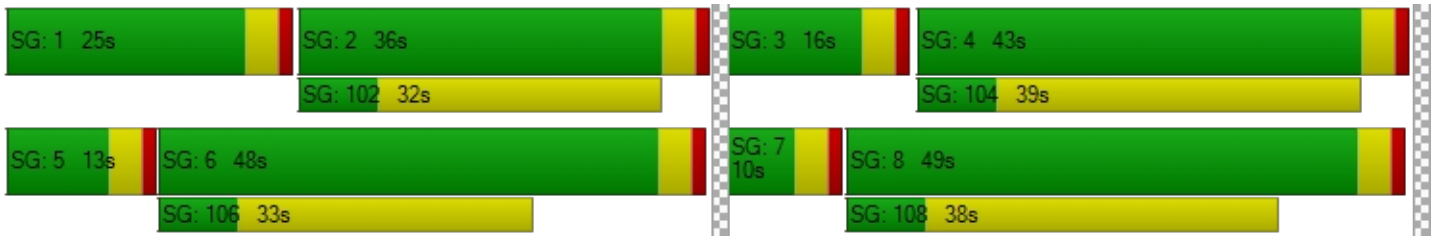
d_M, Delay for Movement [s/veh]	362.54	37.72	0.00	67.73	56.80	56.21	67.57	19.61	29.58	347.21	12.76	13.04
Movement LOS	F	D		E	E	E	E	B	C	F	B	B
d_A, Approach Delay [s/veh]	233.65			56.94			29.13			193.02		
Approach LOS	F			E			C			F		
d_I, Intersection Delay [s/veh]	143.98											
Intersection LOS	F											
Intersection V/C	1.003											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.869	2.452	2.895	2.999
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	750	650	533	733
d_b, Bicycle Delay [s]	23.45	27.35	32.28	24.08
l_b,int, Bicycle LOS Score for Intersection	1.971	1.936	2.027	2.596
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	4.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.579

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	5	1	1	0	0	25	15	412	8	7	1899	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	25	15	412	8	7	1899	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	6	4	103	2	2	475	1
Total Analysis Volume [veh/h]	5	1	1	0	0	25	15	412	8	7	1899	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	75	0	10	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	2	103	103	1	102	102
g / C, Green / Cycle	0.03	0.03	0.02	0.86	0.86	0.01	0.85	0.85
(v / s)_i Volume / Saturation Flow Rate	0.00	0.01	0.01	0.11	0.11	0.00	0.50	0.00
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	103	54	36	1635	1635	21	3235	1617
d1, Uniform Delay [s]	56.81	57.35	58.08	1.31	1.31	58.90	2.65	1.33
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.27	5.91	7.41	0.16	0.16	9.39	0.79	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.46	0.41	0.13	0.13	0.34	0.59	0.00
d, Delay for Lane Group [s/veh]	57.09	63.26	65.49	1.48	1.47	68.30	3.44	1.33
Lane Group LOS	E	E	E	A	A	E	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.22	0.84	0.52	0.49	0.49	0.27	4.26	0.01
50th-Percentile Queue Length [ft/ln]	5.38	20.92	13.12	12.22	12.15	6.63	106.62	0.30
95th-Percentile Queue Length [veh/ln]	0.39	1.51	0.94	0.88	0.87	0.48	7.65	0.02
95th-Percentile Queue Length [ft/ln]	9.68	37.65	23.62	21.99	21.87	11.93	191.29	0.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.09	57.09	57.09	0.00	0.00	63.26	65.49	1.48	1.47	68.30	3.44	1.33
Movement LOS	E	E	E			E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	57.09			63.26			3.68			3.67		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	4.46											
Intersection LOS	A											
Intersection V/C	0.579											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.739	1.751	0.000	2.844
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	1184	1184
d_b, Bicycle Delay [s]	33.00	33.00	10.00	10.00
l_b,int, Bicycle LOS Score for Intersection	1.571	1.560	1.918	3.136
Bicycle LOS	A	A	A	C

Sequence

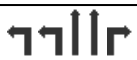
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	43.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.827

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	84	169	110	739	930	242	119	574	53	88	630	322
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	169	110	739	930	242	119	574	53	88	630	322
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	21	42	28	185	233	61	30	144	13	22	158	81
Total Analysis Volume [veh/h]	84	169	110	739	930	242	119	574	53	88	630	322
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	32	61	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	36	36	27	57	57	6	35	35	6	35	35
g / C, Green / Cycle	0.05	0.30	0.30	0.23	0.48	0.48	0.05	0.29	0.29	0.05	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	0.06	0.21	0.49	0.13	0.03	0.15	0.03	0.03	0.17	0.17
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	164	1130	565	793	907	907	172	1122	561	166	1115	557
d1, Uniform Delay [s]	55.84	31.00	31.44	45.48	31.37	18.80	56.15	35.11	30.66	55.86	35.91	36.07
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.45	0.06	0.17	5.62	21.04	0.16	4.89	1.67	0.33	2.63	2.08	4.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.15	0.19	0.93	1.03	0.27	0.69	0.51	0.09	0.53	0.57	0.58
d, Delay for Lane Group [s/veh]	58.28	31.06	31.61	51.11	52.41	18.95	61.04	36.77	30.99	58.48	37.99	40.39
Lane Group LOS	E	C	C	D	F	B	E	D	C	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.30	1.82	2.42	11.34	15.25	4.07	1.89	7.23	1.18	1.36	8.13	8.69
50th-Percentile Queue Length [ft/ln]	32.47	45.61	60.55	283.56	381.13	101.72	47.28	180.80	29.41	34.09	203.30	217.21
95th-Percentile Queue Length [veh/ln]	2.34	3.28	4.36	16.87	22.06	7.32	3.40	11.64	2.12	2.45	12.81	13.52
95th-Percentile Queue Length [ft/ln]	58.45	82.09	109.00	421.65	551.38	183.09	85.11	291.06	52.94	61.36	320.22	338.06

Movement, Approach, & Intersection Results

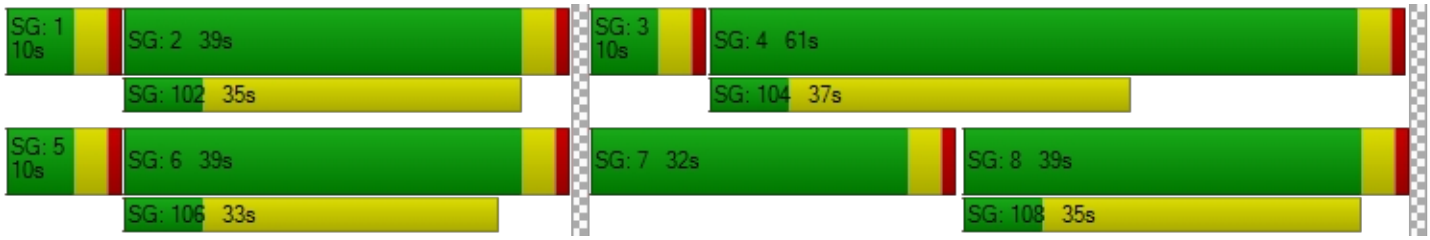
d_M, Delay for Movement [s/veh]	58.28	31.06	31.61	51.11	52.41	18.95	61.04	36.77	30.99	58.48	37.99	40.39
Movement LOS	E	C	C	D	F	B	E	D	C	E	D	D
d_A, Approach Delay [s/veh]	37.52			47.67			40.23			40.47		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	43.55											
Intersection LOS	D											
Intersection V/C	0.827											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.807	2.959	2.845	2.951
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	950	583	583
d_b, Bicycle Delay [s]	30.10	16.54	30.10	30.10
l_b,int, Bicycle LOS Score for Intersection	1.859	3.136	2.175	2.418
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	272	7	344	60	32	10	5	1049	356	380	850	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	272	7	344	60	32	10	5	1049	356	380	850	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	2	86	15	8	3	1	262	89	95	213	3
Total Analysis Volume [veh/h]	272	7	344	60	32	10	5	1049	356	380	850	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	24	61	61	0	37	0	10	38	0	21	49	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	22	43	6	6	1	69	69	17	85	85
g / C, Green / Cycle	0.10	0.18	0.35	0.05	0.05	0.01	0.58	0.58	0.14	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.18	0.03	0.02	0.00	0.38	0.36	0.11	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	340	342	675	116	94	15	1099	1099	496	1352	1352
d1, Uniform Delay [s]	53.03	40.50	30.48	56.09	55.45	59.20	17.30	16.59	49.59	6.45	6.44
k, delay calibration	0.11	0.11	0.25	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.34	0.02	1.37	3.51	3.30	13.08	3.15	2.60	2.50	0.62	0.62
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.02	0.51	0.52	0.45	0.34	0.66	0.62	0.77	0.32	0.32
d, Delay for Lane Group [s/veh]	57.37	40.52	31.85	59.61	58.75	72.29	20.45	19.19	52.09	7.07	7.06
Lane Group LOS	E	D	C	E	E	E	C	B	D	A	A
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.22	0.17	8.08	1.90	1.32	0.20	14.13	12.55	5.66	3.98	3.95
50th-Percentile Queue Length [ft/ln]	105.46	4.35	202.02	47.54	33.09	5.12	353.15	313.68	141.41	99.40	98.86
95th-Percentile Queue Length [veh/ln]	7.59	0.31	12.74	3.42	2.38	0.37	20.29	18.36	9.56	7.16	7.12
95th-Percentile Queue Length [ft/ln]	189.67	7.84	318.56	85.58	59.56	9.21	507.24	458.91	238.92	178.92	177.95

Movement, Approach, & Intersection Results

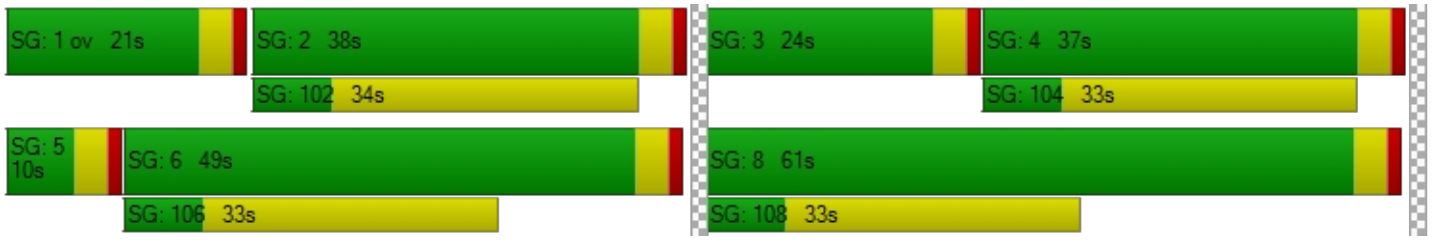
d_M, Delay for Movement [s/veh]	57.37	40.52	31.85	59.61	58.75	58.75	72.29	20.06	19.19	52.09	7.06	7.06
Movement LOS	E	D	C	E	E	E	E	C	B	D	A	A
d_A, Approach Delay [s/veh]	43.09			59.25			20.03			20.85		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	25.77											
Intersection LOS	C											
Intersection V/C	0.743											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.693	1.995	2.809	2.990
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	950	550	567	750
d_b, Bicycle Delay [s]	16.54	31.54	30.82	23.44
l_b,int, Bicycle LOS Score for Intersection	2.588	1.728	2.723	2.583
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.709

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	178	2	499	353	969	18	9	820	94
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	178	2	499	353	969	18	9	820	94
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	45	1	125	88	242	5	2	205	24
Total Analysis Volume [veh/h]	3	3	6	178	2	499	353	969	18	9	820	94
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	38	0	38	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	2	2	24	24	61	27	76	76	2	51	51
g / C, Green / Cycle	0.02	0.02	0.02	0.20	0.20	0.51	0.22	0.63	0.63	0.01	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.26	0.20	0.26	0.26	0.01	0.22	0.05
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	67	33	33	362	362	969	405	1205	1205	25	1608	804
d1, Uniform Delay [s]	58.05	58.05	58.14	40.32	40.32	19.53	44.86	10.86	10.84	58.67	25.47	21.02
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.49	0.16	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	1.17	2.58	0.35	0.35	1.91	8.24	1.04	1.03	8.46	1.16	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.09	0.18	0.25	0.25	0.51	0.87	0.41	0.41	0.36	0.51	0.12
d, Delay for Lane Group [s/veh]	58.33	59.21	60.72	40.67	40.67	21.44	53.10	11.90	11.87	67.12	26.63	21.31
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	0.10	0.20	2.28	2.29	9.62	11.01	6.57	6.52	0.33	8.80	1.68
50th-Percentile Queue Length [ft/ln]	2.37	2.51	5.09	57.08	57.13	240.46	275.26	164.19	162.96	8.26	220.07	42.06
95th-Percentile Queue Length [veh/ln]	0.17	0.18	0.37	4.11	4.11	14.70	16.45	10.77	10.71	0.59	13.67	3.03
95th-Percentile Queue Length [ft/ln]	4.27	4.52	9.16	102.75	102.84	367.61	411.30	269.26	267.63	14.86	341.71	75.70

Movement, Approach, & Intersection Results

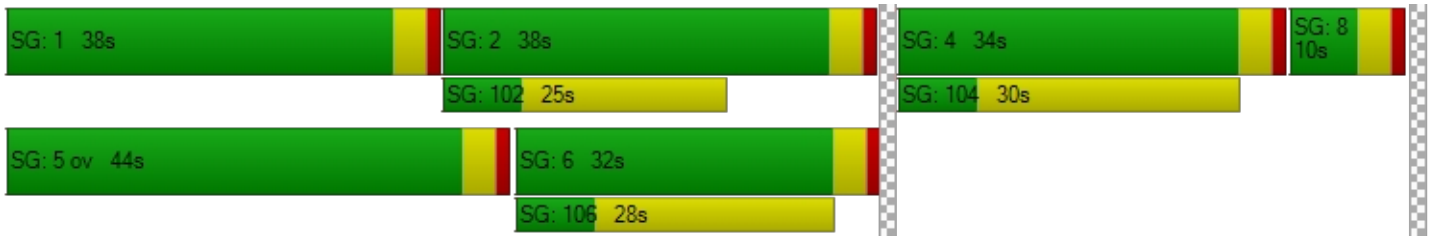
d_M, Delay for Movement [s/veh]	58.33	59.21	60.72	40.67	40.67	21.44	53.10	11.89	11.87	67.12	26.63	21.31
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	59.74			26.54			22.74			26.48		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	24.93											
Intersection LOS	C											
Intersection V/C	0.709											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.420	2.837	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	567	467
d_b, Bicycle Delay [s]	54.17	33.76	30.83	35.28
l_b,int, Bicycle LOS Score for Intersection	1.579	2.680	2.665	2.321
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	35.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.590

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	148	239	101	487	1095	202	50	649	382	69	493	238
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	148	239	101	487	1095	202	50	649	382	69	493	238
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	60	25	122	274	51	13	162	96	17	123	60
Total Analysis Volume [veh/h]	148	239	101	487	1095	202	50	649	382	69	493	238
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	37	0	34	60	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	20	20	19	32	32	5	59	59	6	60	60
g / C, Green / Cycle	0.06	0.16	0.16	0.16	0.27	0.27	0.04	0.49	0.49	0.05	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.06	0.14	0.23	0.22	0.03	0.17	0.20	0.04	0.13	0.13
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	205	621	311	568	1016	508	75	1866	933	90	1898	949
d1, Uniform Delay [s]	55.56	44.71	44.61	48.92	41.83	41.49	56.74	18.75	19.46	56.36	17.28	17.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.77	0.37	0.69	3.86	2.25	3.71	9.96	0.51	1.33	12.85	0.33	0.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.72	0.37	0.36	0.86	0.86	0.84	0.67	0.35	0.41	0.77	0.26	0.25
d, Delay for Lane Group [s/veh]	60.33	45.08	45.30	52.78	44.08	45.20	66.70	19.27	20.79	69.21	17.61	17.83
Lane Group LOS	E	D	D	D	D	D	E	B	C	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.34	3.09	3.00	7.39	12.52	12.30	1.70	5.63	7.07	2.39	3.99	3.92
50th-Percentile Queue Length [ft/ln]	58.48	77.15	74.92	184.75	313.04	307.46	42.56	140.87	176.67	59.68	99.74	97.88
95th-Percentile Queue Length [veh/ln]	4.21	5.55	5.39	11.85	18.32	18.05	3.06	9.53	11.43	4.30	7.18	7.05
95th-Percentile Queue Length [ft/ln]	105.26	138.87	134.86	296.21	458.12	451.25	76.61	238.19	285.66	107.43	179.53	176.19

Movement, Approach, & Intersection Results

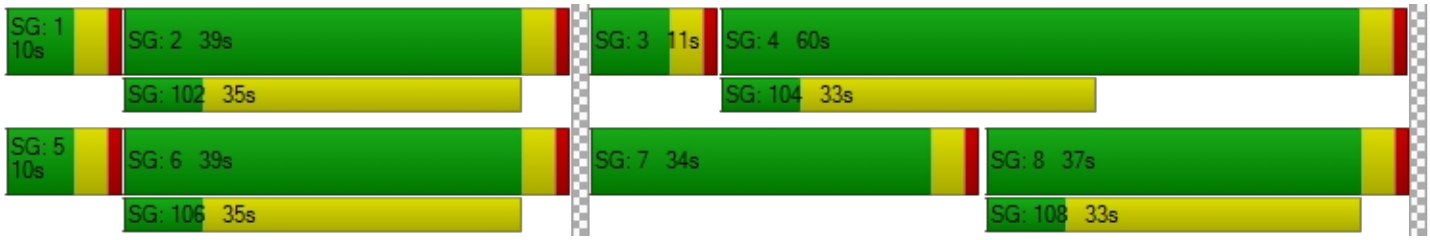
d_M, Delay for Movement [s/veh]	60.33	45.09	45.30	52.78	44.31	45.20	66.70	19.27	20.79	69.21	17.61	17.83
Movement LOS	E	D	D	D	D	D	E	B	C	E	B	B
d_A, Approach Delay [s/veh]	49.75			46.72			22.00			22.13		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	35.91											
Intersection LOS	D											
Intersection V/C	0.590											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.987	3.021	2.779	2.798
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	550	933	583	583
d_b, Bicycle Delay [s]	31.55	17.08	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.828	2.541	2.451	2.220
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	109.5
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.837

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	148	239	15	819	894	278	69	509	148	14	403	348
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	148	239	15	819	894	278	69	509	148	14	403	348
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	60	4	205	224	70	17	127	37	4	101	87
Total Analysis Volume [veh/h]	148	239	15	819	894	278	69	509	148	14	403	348
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	38	0	36	59	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	20	20	32	41	41	5	50	50	2	47	47
g / C, Green / Cycle	0.09	0.16	0.16	0.27	0.34	0.34	0.05	0.42	0.42	0.02	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.08	0.07	0.07	0.46	0.31	0.31	0.02	0.18	0.17	0.01	0.11	0.18
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	166	311	311	480	642	642	160	792	792	35	1484	742
d1, Uniform Delay [s]	53.90	45.00	44.96	44.04	38.03	38.03	55.76	24.88	24.49	58.15	24.94	27.29
k, delay calibration	0.11	0.11	0.11	0.50	0.23	0.23	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.77	0.87	0.85	327.21	10.45	10.45	1.82	1.70	1.50	7.08	0.45	2.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.41	0.41	1.71	0.91	0.91	0.43	0.43	0.40	0.40	0.27	0.47
d, Delay for Lane Group [s/veh]	68.67	45.87	45.80	371.25	48.48	48.48	57.58	26.58	26.00	65.23	25.39	29.41
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.10	3.50	3.45	57.70	18.12	18.12	1.06	7.24	6.60	0.49	4.02	7.85
50th-Percentile Queue Length [ft/ln]	127.46	87.59	86.30	1442.47	453.06	453.06	26.48	180.99	165.11	12.25	100.44	196.37
95th-Percentile Queue Length [veh/ln]	8.80	6.31	6.21	89.24	25.10	25.10	1.91	11.65	10.82	0.88	7.23	12.45
95th-Percentile Queue Length [ft/ln]	220.03	157.66	155.34	2230.88	627.60	627.60	47.66	291.30	270.48	22.05	180.78	311.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	68.67	45.84	45.80	371.25	48.48	48.48	57.58	26.39	26.00	65.23	25.39	29.41
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	54.24			181.25			29.27			27.95		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	109.50											
Intersection LOS	F											
Intersection V/C	0.837											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.598	2.830	2.719	2.809
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	916	533	533
d_b, Bicycle Delay [s]	30.83	17.62	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	1.891	3.202	2.159	2.191
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	6.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.819

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	11	773	1402	11	9	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	773	1402	11	9	38
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	193	351	3	2	10
Total Analysis Volume [veh/h]	11	773	1402	11	9	38
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	6	6	0	6	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	94	94	0	26	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C
C, Cycle Length [s]	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	107	107	107	107	5
g / C, Green / Cycle	0.89	0.89	0.89	0.89	0.04
(v / s)_i Volume / Saturation Flow Rate	0.01	0.41	0.74	0.01	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1900	1800
c, Capacity [veh/h]	1074	1697	1697	1697	72
d1, Uniform Delay [s]	0.69	1.15	2.60	0.69	56.74
k, delay calibration	0.50	0.50	0.50	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.88	4.74	0.01	9.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.46	0.83	0.01	0.65
d, Delay for Lane Group [s/veh]	0.70	2.03	7.34	0.69	66.40
Lane Group LOS	A	A	A	A	E
Critical Lane Group	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	1.28	5.78	0.01	1.60
50th-Percentile Queue Length [ft/ln]	0.31	31.97	144.39	0.26	39.94
95th-Percentile Queue Length [veh/ln]	0.02	2.30	9.72	0.02	2.88
95th-Percentile Queue Length [ft/ln]	0.56	57.54	242.92	0.48	71.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.70	2.03	7.34	0.69	66.40	66.40
Movement LOS	A	A	A	A	E	E
d_A, Approach Delay [s/veh]	2.01		7.29		66.40	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	6.69					
Intersection LOS	A					
Intersection V/C	0.819					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	0.00	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.677	0.000	1.778
Crosswalk LOS	B	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1501	1501	367
d_b, Bicycle Delay [s]	3.74	3.74	39.99
l_b,int, Bicycle LOS Score for Intersection	2.853	3.891	1.637
Bicycle LOS	C	D	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	15.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.654

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	651	0	551	0	1671	792	0	2127	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	651	0	551	0	1671	792	0	2127	221
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	163	0	138	0	418	198	0	532	55
Total Analysis Volume [veh/h]	0	0	0	651	0	551	0	1671	792	0	2127	221
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		24	24	24	58	58
g / C, Green / Cycle		0.27	0.27	0.27	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate		0.22	0.22	0.21	0.29	0.37
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		484	484	511	3658	3658
d1, Uniform Delay [s]		30.86	30.86	30.40	8.15	9.19
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.66	3.66	2.68	0.41	0.68
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.78	0.46	0.58
d, Delay for Lane Group [s/veh]		34.52	34.52	33.08	8.57	9.88
Lane Group LOS		C	C	C	A	A
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		8.41	8.41	8.18	4.93	7.10
50th-Percentile Queue Length [ft/ln]		210.18	210.18	204.42	123.17	177.54
95th-Percentile Queue Length [veh/ln]		13.16	13.16	12.87	8.57	11.47
95th-Percentile Queue Length [ft/ln]		329.06	329.06	321.66	214.18	286.80

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	34.52	0.00	33.47	0.00	8.57	0.00	0.00	9.88	0.00
Movement LOS				C		C		A			A	
d_A, Approach Delay [s/veh]	0.00			34.04			8.57			9.88		
Approach LOS	A			C			A			A		
d_I, Intersection Delay [s/veh]	15.25											
Intersection LOS	B											
Intersection V/C	0.654											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.424	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.543	2.479	2.729
Bicycle LOS	D	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	29.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1099	36	904	0	0	92	113	1545	606	0	1674	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1099	36	904	0	0	92	113	1545	606	0	1674	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	275	9	226	0	0	23	28	386	152	0	419	4
Total Analysis Volume [veh/h]	1099	36	904	0	0	92	113	1545	606	0	1674	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	53	0	0	0	10	12	42	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	6	8	51	39	39
g / C, Green / Cycle	0.35	0.35	0.35	0.05	0.08	0.48	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.29	0.29	0.27	0.02	0.06	0.27	0.22	0.22
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	1224	630	665	206	138	2747	2091	697
d1, Uniform Delay [s]	31.17	31.18	30.53	48.19	47.79	19.36	27.09	27.09
k, delay calibration	0.11	0.18	0.15	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.43	4.45	2.85	1.52	11.00	0.84	1.31	3.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.82	0.78	0.45	0.82	0.56	0.61	0.61
d, Delay for Lane Group [s/veh]	32.59	35.63	33.38	49.71	58.79	20.19	28.40	30.98
Lane Group LOS	C	D	C	D	E	C	C	C
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.58	12.46	11.96	1.21	3.32	8.85	8.71	9.21
50th-Percentile Queue Length [ft/ln]	289.47	311.48	299.11	30.23	83.12	221.22	217.82	230.27
95th-Percentile Queue Length [veh/ln]	17.16	18.25	17.64	2.18	5.98	13.73	13.55	14.19
95th-Percentile Queue Length [ft/ln]	428.99	456.21	440.92	54.42	149.61	343.18	338.84	354.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	32.82	35.63	34.36	0.00	0.00	49.71	58.79	20.19	0.00	0.00	29.03	30.98
Movement LOS	C	D	C			D	E	C			C	C
d_A, Approach Delay [s/veh]	33.56			49.71			22.82			29.05		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	29.19											
Intersection LOS	C											
Intersection V/C	0.674											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.11	42.11	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.705	2.031	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	114	723	495
d_b, Bicycle Delay [s]	14.96	46.70	21.40	29.75
l_b,int, Bicycle LOS Score for Intersection	4.924	1.560	2.472	2.257
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	31.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.806

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	164	227	79	181	360	177	227	2100	112	100	1818	108
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	227	79	181	360	177	227	2100	112	100	1818	108
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	57	20	45	90	44	57	525	28	25	455	27
Total Analysis Volume [veh/h]	164	227	79	181	360	177	227	2100	112	100	1818	108
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	15	44	0	20	45	0	11	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	22	22	8	24	24	16	57	57	7	49	49
g / C, Green / Cycle	0.05	0.20	0.20	0.07	0.21	0.21	0.14	0.52	0.52	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.05	0.08	0.08	0.05	0.19	0.09	0.13	0.38	0.40	0.06	0.25	0.26
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	194	377	377	248	406	406	257	1980	990	116	2524	841
d1, Uniform Delay [s]	51.54	38.57	38.35	50.13	41.97	37.52	46.30	20.48	20.95	51.02	22.78	23.25
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.71	0.74	0.66	4.14	6.59	0.74	9.71	2.48	5.54	16.62	0.92	3.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.42	0.39	0.73	0.89	0.44	0.88	0.74	0.76	0.86	0.56	0.60
d, Delay for Lane Group [s/veh]	61.25	39.32	39.01	54.27	48.56	38.25	56.01	22.97	26.49	67.64	23.70	26.38
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.50	3.81	3.54	2.58	10.14	4.21	6.75	14.55	16.20	3.26	9.14	10.40
50th-Percentile Queue Length [ft/ln]	62.47	95.18	88.44	64.48	253.49	105.30	168.85	363.64	405.07	81.48	228.50	260.02
95th-Percentile Queue Length [veh/ln]	4.50	6.85	6.37	4.64	15.36	7.58	11.02	20.80	22.80	5.87	14.10	15.69
95th-Percentile Queue Length [ft/ln]	112.44	171.32	159.19	116.06	384.05	189.45	275.40	520.01	570.11	146.67	352.46	392.24

Movement, Approach, & Intersection Results

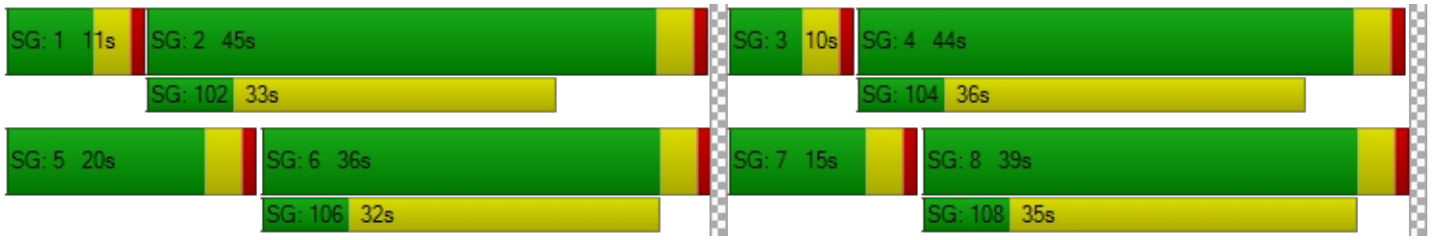
d_M, Delay for Movement [s/veh]	61.25	39.22	39.01	54.27	48.56	38.25	56.01	24.04	26.49	67.64	24.28	26.38
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	46.88			47.46			27.13			26.53		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	31.14											
Intersection LOS	C											
Intersection V/C	0.806											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.513	2.670	3.295	3.270
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	727	745	582
d_b, Bicycle Delay [s]	25.59	22.29	21.66	27.68
l_b,int, Bicycle LOS Score for Intersection	1.947	2.744	2.901	2.395
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	17.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.701

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	199	13	159	27	31	15	14	2066	398	191	1675	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	13	159	27	31	15	14	2066	398	191	1675	35
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	3	40	7	8	4	4	517	100	48	419	9
Total Analysis Volume [veh/h]	199	13	159	27	31	15	14	2066	398	191	1675	35
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	22	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	5	5	2	47	47	12	57	57
g / C, Green / Cycle	0.11	0.11	0.11	0.06	0.06	0.02	0.53	0.53	0.13	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.08	0.02	0.02	0.01	0.36	0.21	0.11	0.30	0.31
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	203	203	214	103	109	38	2988	996	231	2400	1200
d1, Uniform Delay [s]	37.71	37.72	38.74	40.69	41.08	43.55	16.01	12.91	38.31	8.69	8.84
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.06	2.09	5.01	1.34	2.61	5.86	1.34	1.20	7.30	0.66	1.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.52	0.74	0.26	0.42	0.37	0.69	0.40	0.83	0.47	0.49
d, Delay for Lane Group [s/veh]	39.78	39.81	43.75	42.03	43.68	49.41	17.35	14.11	45.61	9.35	10.26
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.29	2.30	3.65	0.61	1.06	0.37	10.08	4.86	4.52	5.25	5.80
50th-Percentile Queue Length [ft/ln]	57.17	57.53	91.31	15.16	26.39	9.18	251.97	121.41	112.90	131.30	144.97
95th-Percentile Queue Length [veh/ln]	4.12	4.14	6.57	1.09	1.90	0.66	15.29	8.47	8.00	9.01	9.75
95th-Percentile Queue Length [ft/ln]	102.91	103.55	164.35	27.29	47.50	16.52	382.13	211.76	200.02	225.26	243.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.79	39.81	43.75	42.03	43.68	43.68	49.41	17.35	14.11	45.61	9.65	10.26
Movement LOS	D	D	D	D	D	D	D	B	B	D	A	B
d_A, Approach Delay [s/veh]	41.49			43.07			17.01			13.28		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.81											
Intersection LOS	B											
Intersection V/C	0.701											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	0.00	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.372	1.984	0.000	3.172
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	488	133	622	888
d_b, Bicycle Delay [s]	25.73	39.24	21.40	13.92
l_b,int, Bicycle LOS Score for Intersection	2.172	1.680	2.923	2.605
Bicycle LOS	B	A	C	B

Sequence

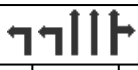
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	27.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	192	263	94	352	693	122	148	1441	263	77	1216	96
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	192	263	94	352	693	122	148	1441	263	77	1216	96
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	66	24	88	173	31	37	360	66	19	304	24
Total Analysis Volume [veh/h]	192	263	94	352	693	122	148	1441	263	77	1216	96
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	0	16	35	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	16	16	11	21	21	6	46	46	5	46	46
g / C, Green / Cycle	0.07	0.17	0.17	0.12	0.22	0.22	0.06	0.49	0.49	0.06	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.05	0.10	0.09	0.10	0.18	0.06	0.04	0.30	0.29	0.02	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	261	322	322	425	821	410	220	1844	922	196	1818	909
d1, Uniform Delay [s]	43.12	36.39	36.10	40.85	35.77	31.25	43.63	18.04	17.85	43.35	16.79	16.85
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.03	1.63	1.38	4.21	2.48	0.40	3.55	1.58	2.95	1.28	0.91	1.85
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.58	0.53	0.83	0.84	0.30	0.67	0.62	0.61	0.39	0.48	0.48
d, Delay for Lane Group [s/veh]	47.15	38.02	37.48	45.06	38.25	31.65	47.18	19.62	20.80	44.63	17.70	18.70
Lane Group LOS	D	D	D	D	D	C	D	B	C	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.34	4.06	3.72	4.23	7.84	2.37	1.80	9.16	9.20	0.90	6.37	6.70
50th-Percentile Queue Length [ft/ln]	58.42	101.45	93.09	105.70	195.98	59.26	44.98	229.02	230.08	22.58	159.21	167.47
95th-Percentile Queue Length [veh/ln]	4.21	7.30	6.70	7.60	12.43	4.27	3.24	14.12	14.18	1.63	10.51	10.94
95th-Percentile Queue Length [ft/ln]	105.15	182.61	167.56	190.00	310.77	106.66	80.96	353.11	354.46	40.65	262.68	273.59

Movement, Approach, & Intersection Results

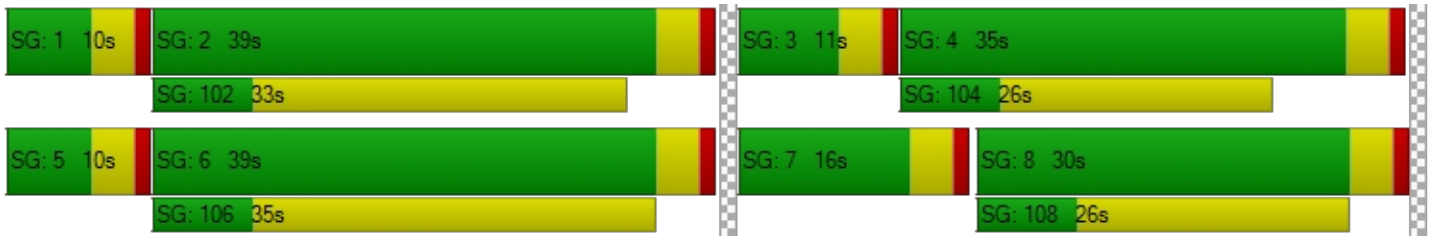
d_M, Delay for Movement [s/veh]	47.15	37.86	37.48	45.06	38.25	31.65	47.18	19.87	20.80	44.63	17.98	18.70
Movement LOS	D	D	D	D	D	C	D	B	C	D	B	B
d_A, Approach Delay [s/veh]	41.04			39.61			22.18			19.51		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	27.62											
Intersection LOS	C											
Intersection V/C	0.674											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	37.18	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.712	2.829	3.140	3.127
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	652	736	736
d_b, Bicycle Delay [s]	25.09	21.59	18.98	18.98
l_b,int, Bicycle LOS Score for Intersection	2.013	2.522	2.578	2.324
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.590

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	144	201	129	299	314	214	205	1100	99	127	1706	158
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	201	129	299	314	214	205	1100	99	127	1706	158
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	50	32	75	79	54	51	275	25	32	427	40
Total Analysis Volume [veh/h]	144	201	129	299	314	214	205	1100	99	127	1706	158
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	46	0	22	58	0	13	41	0	11	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	11	11	13	17	17	9	75	75	6	72	72
g / C, Green / Cycle	0.05	0.09	0.09	0.10	0.14	0.14	0.07	0.62	0.62	0.05	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.07	0.09	0.08	0.11	0.06	0.19	0.05	0.04	0.30	0.08
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	178	341	170	366	545	273	262	3534	1178	184	3407	1136
d1, Uniform Delay [s]	56.41	52.53	53.37	52.63	48.01	49.63	54.58	10.74	9.14	55.93	13.87	10.60
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.52	1.63	6.70	4.50	0.96	4.95	5.09	0.23	0.14	4.60	0.53	0.26
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.59	0.76	0.82	0.58	0.78	0.78	0.31	0.08	0.69	0.50	0.14
d, Delay for Lane Group [s/veh]	64.93	54.15	60.07	57.13	48.97	54.58	59.67	10.97	9.28	60.52	14.40	10.85
Lane Group LOS	E	D	E	E	D	D	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.37	2.99	4.12	4.64	4.47	6.57	3.23	4.51	1.07	2.01	8.69	1.89
50th-Percentile Queue Length [ft/ln]	59.28	74.81	103.00	115.97	111.69	164.19	80.77	112.72	26.63	50.24	217.31	47.28
95th-Percentile Queue Length [veh/ln]	4.27	5.39	7.42	8.17	7.93	10.77	5.82	7.99	1.92	3.62	13.53	3.40
95th-Percentile Queue Length [ft/ln]	106.70	134.66	185.39	204.28	198.34	269.26	145.38	199.78	47.93	90.43	338.19	85.10

Movement, Approach, & Intersection Results

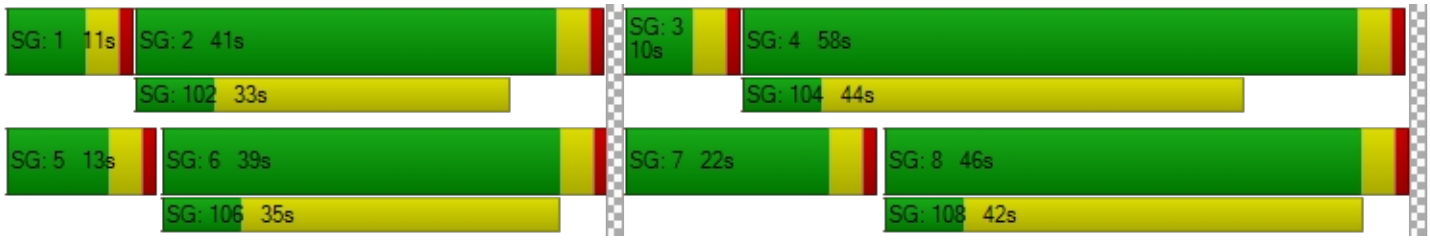
d_M, Delay for Movement [s/veh]	64.93	54.15	60.07	57.13	48.97	54.58	59.67	10.97	9.28	60.52	14.40	10.85
Movement LOS	E	D	E	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	59.04			53.37			17.96			17.06		
Approach LOS	E			D			B			B		
d_I, Intersection Delay [s/veh]	27.96											
Intersection LOS	C											
Intersection V/C	0.590											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.749	2.801	3.239	3.244
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	900	617	583
d_b, Bicycle Delay [s]	25.36	18.16	28.72	30.12
l_b,int, Bicycle LOS Score for Intersection	1.951	2.242	2.332	2.655
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	237.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	267	206	152	916	506	23	38	1333	249	280	1564	586
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	267	206	152	916	506	23	38	1333	249	280	1564	586
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	52	38	229	127	6	10	333	62	70	391	147
Total Analysis Volume [veh/h]	267	206	152	916	506	23	38	1333	249	280	1564	586
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	22	22	8	19	19	4	68	68	6	70	70
g / C, Green / Cycle	0.09	0.18	0.18	0.07	0.16	0.16	0.04	0.57	0.57	0.05	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.08	0.05	0.08	0.26	0.13	0.01	0.02	0.28	0.27	0.08	0.27	0.31
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	323	689	345	236	595	298	66	2155	1078	178	3313	1104
d1, Uniform Delay [s]	53.56	42.53	43.72	55.99	49.26	43.23	56.90	15.63	15.44	56.98	14.51	15.23
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.40	0.24	0.89	1300.92	3.53	0.11	7.60	0.81	1.53	265.15	0.49	1.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.30	0.44	3.89	0.85	0.08	0.57	0.49	0.48	1.58	0.47	0.53
d, Delay for Lane Group [s/veh]	58.96	42.77	44.61	1356.91	52.79	43.34	64.50	16.44	16.97	322.13	15.00	17.06
Lane Group LOS	E	D	D	F	D	D	E	B	B	F	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.20	2.68	4.12	46.16	7.66	0.60	1.28	8.77	8.62	9.23	8.09	9.93
50th-Percentile Queue Length [ft/ln]	105.03	67.04	102.95	1153.92	191.47	14.92	31.88	219.37	215.61	230.87	202.25	248.16
95th-Percentile Queue Length [veh/ln]	7.56	4.83	7.41	70.04	12.20	1.07	2.30	13.63	13.44	15.81	12.75	15.09
95th-Percentile Queue Length [ft/ln]	189.05	120.67	185.31	1751.01	304.94	26.85	57.38	340.83	336.02	395.27	318.87	377.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.96	42.77	44.61	1356.91	52.79	43.34	64.50	16.55	16.97	322.13	15.00	17.06
Movement LOS	E	D	D	F	D	D	E	B	B	F	B	B
d_A, Approach Delay [s/veh]	50.13			879.34			17.74			50.88		
Approach LOS	D			F			B			D		
d_I, Intersection Delay [s/veh]	237.64											
Intersection LOS	F											
Intersection V/C	0.810											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.839	2.925	3.092	3.386
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.075	2.752	2.451	2.896
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	40.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.842

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	350	655	337	607	439	16	42	1599	288	436	1286	763
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	350	655	337	607	439	16	42	1599	288	436	1286	763
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	164	84	152	110	4	11	400	72	109	322	191
Total Analysis Volume [veh/h]	350	655	337	607	439	16	42	1599	288	436	1286	763
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	17	34	0	27	44	0	10	39	0	20	49	49
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	13	25	25	25	23	35	35	5	40	40	16	51	78
g / C, Green / Cycle	0.11	0.21	0.21	0.21	0.19	0.29	0.29	0.04	0.33	0.33	0.13	0.43	0.65
(v / s)_i Volume / Saturation Flow Rate	0.10	0.18	0.18	0.16	0.17	0.12	0.12	0.01	0.25	0.25	0.12	0.23	0.40
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	381	396	396	396	671	553	553	135	1897	632	468	2440	1241
d1, Uniform Delay [s]	52.97	46.05	45.89	44.73	47.44	34.28	34.22	56.17	35.56	35.49	51.46	25.36	12.07
k, delay calibration	0.11	0.25	0.25	0.18	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.23	13.39	11.96	5.13	4.91	0.49	0.48	1.30	2.74	7.69	8.80	0.82	2.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.88	0.86	0.76	0.90	0.41	0.41	0.31	0.75	0.74	0.93	0.53	0.61
d, Delay for Lane Group [s/veh]	62.20	59.44	57.85	49.86	52.35	34.77	34.71	57.47	38.30	43.18	60.26	26.18	14.35
Lane Group LOS	E	E	E	D	D	C	C	E	D	D	E	C	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.71	11.48	11.13	9.01	9.29	5.47	5.40	0.64	12.65	13.42	7.05	9.13	11.83
50th-Percentile Queue Length [ft/ln]	142.6	286.9	278.3	225.1	232.35	136.85	134.94	16.12	316.22	335.47	176.20	228.37	295.86
95th-Percentile Queue Length [veh/ln]	9.62	17.03	16.61	13.93	14.29	9.31	9.21	1.16	18.48	19.43	11.40	14.09	17.48
95th-Percentile Queue Length [ft/ln]	240.6	425.8	415.1	348.2	357.35	232.78	230.19	29.01	462.04	485.65	285.05	352.29	436.90

Movement, Approach, & Intersection Results

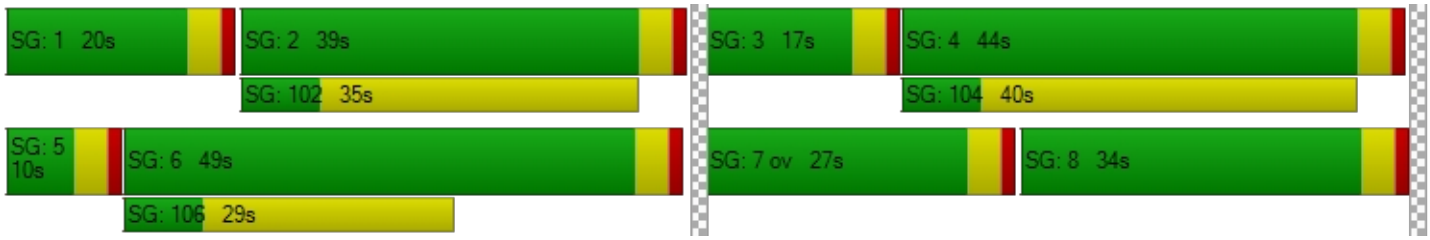
d_M, Delay for Movement [s/veh]	62.20	58.70	50.03	52.35	34.74	34.71	57.47	38.85	43.18	60.26	26.18	14.35
Movement LOS	E	E	D	D	C	C	E	D	D	E	C	B
d_A, Approach Delay [s/veh]	57.60			44.81			39.90			28.53		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	40.00											
Intersection LOS	D											
Intersection V/C	0.842											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.957	2.876	3.251	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	500	666	583	750
d_b, Bicycle Delay [s]	33.76	26.68	30.12	23.45
l_b,int, Bicycle LOS Score for Intersection	2.667	2.436	2.355	2.926
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	18.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.632

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	454	0	855	0	1430	835	251	1740	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	454	0	855	0	1430	835	251	1740	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	114	0	214	0	358	209	63	435	0
Total Analysis Volume [veh/h]	0	0	0	454	0	855	0	1430	835	251	1740	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	54	0	0	0	23	0	13	36	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		90	90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		26	26	44	44	8	56
g / C, Green / Cycle		0.28	0.28	0.49	0.49	0.09	0.63
(v / s)_i Volume / Saturation Flow Rate		0.13	0.23	0.25	0.22	0.07	0.31
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		995	1080	2787	1858	327	3573
d1, Uniform Delay [s]		26.50	29.76	15.69	15.07	39.86	9.02
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.33	1.35	0.68	0.79	3.78	0.48
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.46	0.79	0.51	0.45	0.77	0.49
d, Delay for Lane Group [s/veh]		26.83	31.11	16.37	15.86	43.64	9.50
Lane Group LOS		C	C	B	B	D	A
Critical Lane Group		No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		3.96	8.49	6.46	5.49	2.85	5.54
50th-Percentile Queue Length [ft/ln]		99.06	212.14	161.58	137.28	71.20	138.43
95th-Percentile Queue Length [veh/ln]		7.13	13.26	10.63	9.33	5.13	9.40
95th-Percentile Queue Length [ft/ln]		178.30	331.58	265.81	233.36	128.16	234.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	26.83	0.00	31.11	0.00	16.37	15.86	43.64	9.50	0.00
Movement LOS				C		C		B	B	D	A	
d_A, Approach Delay [s/veh]	0.00			29.62			16.18			13.80		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	18.49											
Intersection LOS	B											
Intersection V/C	0.632											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.244	2.450	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1111	422	711
d_b, Bicycle Delay [s]	45.01	8.90	28.02	18.70
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.805	2.655
Bicycle LOS	D	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	13.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.516

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	676	0	301	0	0	0	0	1528	576	0	1137	523
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	676	0	301	0	0	0	0	1528	576	0	1137	523
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	169	0	75	0	0	0	0	382	144	0	284	0
Total Analysis Volume [veh/h]	676	0	301	0	0	0	0	1528	576	0	1137	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21		60	60	60	60
g / C, Green / Cycle	0.24	0.24		0.67	0.67	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.19	0.16		0.28	0.28	0.28	0.20
s, saturation flow rate [veh/h]	3500	1900		3800	1900	1900	5700
c, Capacity [veh/h]	833	452		2558	1279	1279	3836
d1, Uniform Delay [s]	32.33	31.00		6.64	6.64	6.64	6.00
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.97	1.70		0.49	0.98	0.98	0.20
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.67		0.41	0.41	0.41	0.30
d, Delay for Lane Group [s/veh]	34.30	32.69		7.13	7.62	7.62	6.19
Lane Group LOS	C	C		A	A	A	A
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	6.99	5.99		4.02	4.20	4.20	2.58
50th-Percentile Queue Length [ft/ln]	174.71	149.63		100.58	104.92	104.92	64.38
95th-Percentile Queue Length [veh/ln]	11.32	10.00		7.24	7.55	7.55	4.64
95th-Percentile Queue Length [ft/ln]	283.10	249.93		181.04	188.85	188.85	115.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	34.30	0.00	32.69	0.00	0.00	0.00	0.00	7.17	7.62	0.00	6.19	0.00
Movement LOS	C		C					A	A		A	
d_A, Approach Delay [s/veh]	33.81			0.00			7.37			6.19		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	13.18											
Intersection LOS	B											
Intersection V/C	0.516											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.602	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	2.717	2.185
Bicycle LOS	A	D	B	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	14.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	124	0	30	120	0	447	204	2085	42	16	1629	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	124	0	30	120	0	447	204	2085	42	16	1629	60
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	0	8	30	0	112	51	521	11	4	407	15
Total Analysis Volume [veh/h]	124	0	30	120	0	447	204	2085	42	16	1629	60
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	44	0	0	44	0	11	36	0	10	35	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	7	62	62	2	57	57
g / C, Green / Cycle	0.15	0.15	0.15	0.08	0.69	0.69	0.02	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.12	0.06	0.37	0.38	0.01	0.29	0.30
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	345	353	576	275	2629	1315	42	2419	1209
d1, Uniform Delay [s]	35.44	34.73	36.73	40.58	6.76	6.93	43.34	8.42	8.53
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.91	0.57	2.29	3.90	0.77	1.69	5.64	0.63	1.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.45	0.34	0.78	0.74	0.53	0.55	0.38	0.46	0.48
d, Delay for Lane Group [s/veh]	36.35	35.29	39.02	44.48	7.53	8.63	48.98	9.05	9.87
Lane Group LOS	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.18	2.41	4.83	2.33	5.59	6.30	0.41	5.09	5.55
50th-Percentile Queue Length [ft/ln]	79.38	60.34	120.71	58.34	139.68	157.43	10.34	127.28	138.80
95th-Percentile Queue Length [veh/ln]	5.72	4.34	8.43	4.20	9.46	10.41	0.74	8.79	9.42
95th-Percentile Queue Length [ft/ln]	142.88	108.60	210.80	105.00	236.59	260.32	18.61	219.79	235.41

Movement, Approach, & Intersection Results

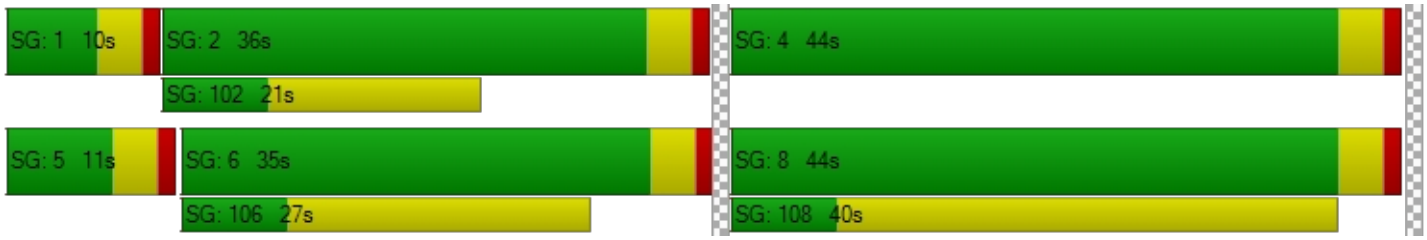
d_M, Delay for Movement [s/veh]	36.35	36.35	36.35	35.29	35.29	39.02	44.48	7.89	8.63	48.98	9.31	9.87
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	36.35			38.23			11.11			9.70		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	14.65											
Intersection LOS	B											
Intersection V/C	0.589											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.818	2.461	0.000	3.313
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	711	689
d_b, Bicycle Delay [s]	13.90	13.90	18.70	19.35
l_b,int, Bicycle LOS Score for Intersection	1.814	2.495	2.842	2.497
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.634

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	147	59	22	88	112	144	47	1992	216	26	1439	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	59	22	88	112	144	47	1992	216	26	1439	46
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	15	6	22	28	36	12	498	54	7	360	12
Total Analysis Volume [veh/h]	147	59	22	88	112	144	47	1992	216	26	1439	46
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	27	0	22	30	0	10	31	0	10	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	13	13	6	9	9	4	53	53	3	51	51
g / C, Green / Cycle	0.10	0.14	0.14	0.06	0.10	0.10	0.05	0.59	0.59	0.03	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.08	0.02	0.02	0.05	0.06	0.08	0.01	0.35	0.11	0.01	0.26	0.27
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	184	267	267	117	196	196	166	3326	1109	60	2164	1082
d1, Uniform Delay [s]	39.56	34.03	34.00	41.45	38.52	39.22	41.47	12.02	8.82	42.76	11.26	11.39
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.68	0.27	0.25	9.31	2.60	5.22	0.92	0.80	0.39	4.88	0.69	1.45
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.15	0.15	0.75	0.57	0.73	0.28	0.60	0.19	0.43	0.45	0.47
d, Delay for Lane Group [s/veh]	47.25	34.30	34.26	50.76	41.12	44.45	42.39	12.82	9.21	47.64	11.94	12.85
Lane Group LOS	D	C	C	D	D	D	D	B	A	D	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.53	0.81	0.77	2.20	2.47	3.33	0.52	7.90	1.95	0.64	5.38	5.85
50th-Percentile Queue Length [ft/ln]	88.24	20.16	19.36	55.06	61.76	83.34	13.02	197.44	48.68	16.10	134.54	146.28
95th-Percentile Queue Length [veh/ln]	6.35	1.45	1.39	3.96	4.45	6.00	0.94	12.51	3.51	1.16	9.19	9.82
95th-Percentile Queue Length [ft/ln]	158.84	36.29	34.84	99.10	111.17	150.01	23.43	312.67	87.63	28.97	229.65	245.45

Movement, Approach, & Intersection Results

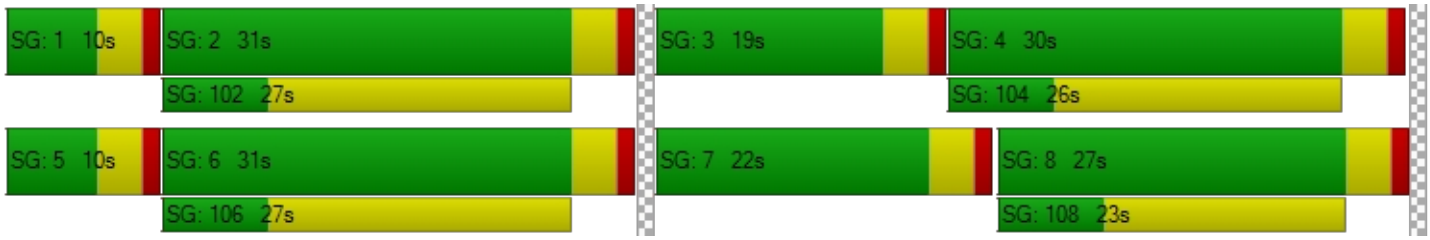
d_M, Delay for Movement [s/veh]	47.25	34.29	34.26	50.76	41.12	44.45	42.39	12.82	9.21	47.64	12.23	12.85
Movement LOS	D	C	C	D	D	D	D	B	A	D	B	B
d_A, Approach Delay [s/veh]	42.64			44.98			13.09			12.86		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.09											
Intersection LOS	B											
Intersection V/C	0.634											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	34.72	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.413	2.396	3.280	3.097
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	577	599	599
d_b, Bicycle Delay [s]	24.98	22.80	22.09	22.09
l_b,int, Bicycle LOS Score for Intersection	1.748	1.843	2.800	2.391
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	30.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.595

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	542	327	238	5	116	126	199	1022	510	90	440	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	542	327	238	5	116	126	199	1022	510	90	440	30
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	136	82	60	1	29	32	50	256	128	23	110	8
Total Analysis Volume [veh/h]	542	327	238	5	116	126	199	1022	510	90	440	30
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	27	59	59	10	42	0	19	41	41	10	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	31	41	1	10	10	15	66	92	6	57	57
g / C, Green / Cycle	0.18	0.26	0.34	0.01	0.09	0.09	0.13	0.55	0.76	0.05	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.15	0.17	0.13	0.00	0.06	0.07	0.11	0.27	0.13	0.03	0.08	0.08
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	620	485	645	16	165	165	226	2097	2898	178	1814	907
d1, Uniform Delay [s]	48.08	40.20	29.94	59.16	53.32	53.62	51.62	16.49	3.91	55.52	17.86	17.91
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.04	1.64	0.35	11.41	5.38	7.16	10.67	0.81	0.13	2.23	0.20	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.67	0.37	0.32	0.70	0.76	0.88	0.49	0.18	0.51	0.17	0.18
d, Delay for Lane Group [s/veh]	52.12	41.84	30.29	70.57	58.70	60.78	62.30	17.30	4.04	57.75	18.07	18.33
Lane Group LOS	D	D	C	E	E	E	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.22	8.89	5.27	0.20	3.65	4.05	6.55	8.65	1.53	1.38	2.51	2.64
50th-Percentile Queue Length [ft/ln]	205.53	222.16	131.83	5.02	91.32	101.22	163.75	216.15	38.25	34.60	62.64	65.98
95th-Percentile Queue Length [veh/ln]	12.92	13.78	9.04	0.36	6.57	7.29	10.75	13.47	2.75	2.49	4.51	4.75
95th-Percentile Queue Length [ft/ln]	323.09	344.38	225.98	9.03	164.37	182.19	268.67	336.70	68.86	62.29	112.75	118.77

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.12	41.84	30.29	70.57	58.70	60.78	62.30	17.30	4.04	57.75	18.15	18.33
Movement LOS	D	D	C	E	E	E	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	44.39			60.00			18.57			24.52		
Approach LOS	D			E			B			C		
d_I, Intersection Delay [s/veh]	30.13											
Intersection LOS	C											
Intersection V/C	0.595											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.763	2.341	3.085	2.862
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	916	633	617	467
d_b, Bicycle Delay [s]	17.62	28.03	28.72	35.28
l_b,int, Bicycle LOS Score for Intersection	3.386	1.967	2.988	1.868
Bicycle LOS	C	A	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.453

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	27	2	13	2	0	6	6	1444	22	6	732	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	2	13	2	0	6	6	1444	22	6	732	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	1	3	1	0	2	2	361	6	2	183	1
Total Analysis Volume [veh/h]	27	2	13	2	0	6	6	1444	22	6	732	3
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	1	1	1	97	97	1	97	97
g / C, Green / Cycle	0.04	0.04	0.01	0.01	0.01	0.81	0.81	0.01	0.81	0.81
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.00	0.00	0.00	0.39	0.39	0.00	0.13	0.13
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	69	72	22	23	17	1533	1533	17	3066	1533
d1, Uniform Delay [s]	56.37	55.97	58.63	58.75	59.07	3.65	3.64	59.07	2.56	2.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.63	1.40	1.77	5.77	11.67	1.07	1.07	11.67	0.11	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.39	0.21	0.09	0.26	0.35	0.48	0.48	0.35	0.16	0.16
d, Delay for Lane Group [s/veh]	60.01	57.37	60.40	64.52	70.74	4.72	4.71	70.74	2.67	2.81
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.87	0.47	0.07	0.22	0.24	4.69	4.66	0.24	1.02	1.13
50th-Percentile Queue Length [ft/ln]	21.73	11.74	1.77	5.45	5.93	117.16	116.40	5.93	25.55	28.22
95th-Percentile Queue Length [veh/ln]	1.56	0.85	0.13	0.39	0.43	8.24	8.19	0.43	1.84	2.03
95th-Percentile Queue Length [ft/ln]	39.12	21.13	3.19	9.81	10.67	205.91	204.87	10.67	45.99	50.80

Movement, Approach, & Intersection Results

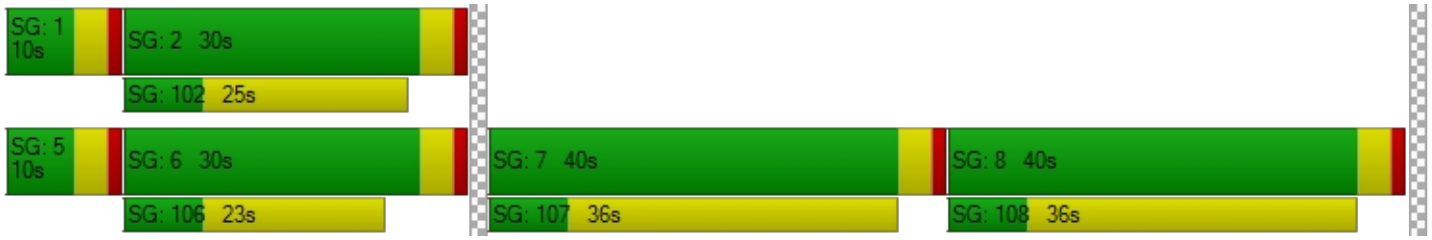
d_M, Delay for Movement [s/veh]	60.01	57.37	57.37	60.40	0.00	64.52	70.74	4.72	4.71	70.74	2.72	2.81
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	59.06			63.49			4.99			3.27		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.63											
Intersection LOS	A											
Intersection V/C	0.453											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	1.977	1.960	2.830	2.824
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.629	1.560	2.774	1.967
Bicycle LOS	A	A	C	A

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	31.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.637

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	351	154	828	26	118	36	31	909	507	171	349	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	351	154	828	26	118	36	31	909	507	171	349	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	39	207	7	30	9	8	227	127	43	87	2
Total Analysis Volume [veh/h]	351	154	828	26	118	36	31	909	507	171	349	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	29	60	0	12	43	0	11	37	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	29	4	7	7	4	65	65	7	68	68
g / C, Green / Cycle	0.21	0.24	0.03	0.06	0.06	0.03	0.54	0.54	0.06	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.20	0.04	0.01	0.04	0.04	0.02	0.24	0.27	0.05	0.06	0.06
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	375	906	54	114	114	60	2049	1025	207	2148	1074
d1, Uniform Delay [s]	46.73	36.28	57.32	55.32	55.25	57.11	16.75	17.38	55.88	12.09	12.13
k, delay calibration	0.29	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	22.69	0.09	6.57	7.07	6.53	6.86	0.70	1.71	8.16	0.10	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.94	0.17	0.48	0.69	0.67	0.52	0.44	0.49	0.83	0.11	0.11
d, Delay for Lane Group [s/veh]	69.42	36.37	63.89	62.39	61.79	63.96	17.44	19.08	64.04	12.20	12.34
Lane Group LOS	E	D	E	E	E	E	B	B	E	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	12.61	1.82	0.88	2.54	2.46	1.04	7.64	9.10	2.80	1.48	1.58
50th-Percentile Queue Length [ft/ln]	315.37	45.42	21.90	63.54	61.46	26.00	190.96	227.45	69.91	37.10	39.59
95th-Percentile Queue Length [veh/ln]	18.44	3.27	1.58	4.57	4.43	1.87	12.17	14.04	5.03	2.67	2.85
95th-Percentile Queue Length [ft/ln]	460.99	81.76	39.41	114.37	110.63	46.80	304.28	351.12	125.83	66.78	71.26

Movement, Approach, & Intersection Results

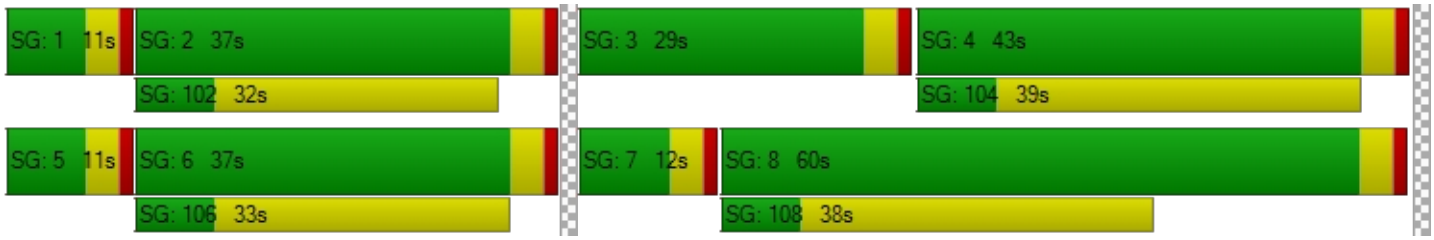
d_M, Delay for Movement [s/veh]	69.42	36.37	0.00	63.89	62.19	61.79	63.96	17.44	19.08	64.04	12.25	12.34
Movement LOS	E	D		E	E	E	E	B	B	E	B	B
d_A, Approach Delay [s/veh]	59.34			62.35			19.02			28.99		
Approach LOS	E			E			B			C		
d_I, Intersection Delay [s/veh]	31.58											
Intersection LOS	C											
Intersection V/C	0.637											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.678	2.387	2.912	2.918
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	650	550	550
d_b, Bicycle Delay [s]	17.08	27.35	31.55	31.55
l_b,int, Bicycle LOS Score for Intersection	1.976	1.708	2.355	1.851
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	3.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.531

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	11	0	2	0	0	16	1	1780	2	1	430	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	2	0	0	16	1	1780	2	1	430	8
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	0	0	4	0	445	1	0	108	2
Total Analysis Volume [veh/h]	11	0	2	0	0	16	1	1780	2	1	430	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	75	0	10	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	0	105	105	0	105	105
g / C, Green / Cycle	0.02	0.02	0.00	0.88	0.88	0.00	0.88	0.88
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.00	0.47	0.47	0.00	0.11	0.00
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	93	40	4	1666	1666	4	3332	1666
d1, Uniform Delay [s]	57.90	57.97	59.76	1.72	1.72	59.76	1.03	0.91
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.67	6.31	32.89	1.24	1.24	29.31	0.08	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.40	0.26	0.53	0.53	0.25	0.13	0.00
d, Delay for Lane Group [s/veh]	58.57	64.28	92.65	2.95	2.95	89.07	1.11	0.92
Lane Group LOS	E	E	F	A	A	F	A	A
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.41	0.55	0.07	2.60	2.60	0.06	0.33	0.01
50th-Percentile Queue Length [ft/ln]	10.17	13.76	1.63	64.95	64.93	1.58	8.24	0.30
95th-Percentile Queue Length [veh/ln]	0.73	0.99	0.12	4.68	4.67	0.11	0.59	0.02
95th-Percentile Queue Length [ft/ln]	18.31	24.76	2.94	116.90	116.87	2.84	14.84	0.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.57	58.57	58.57	0.00	0.00	64.28	92.65	2.95	2.95	89.07	1.11	0.92
Movement LOS	E	E	E			E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	58.57			64.28			3.00			1.30		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	3.43											
Intersection LOS	A											
Intersection V/C	0.531											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.736	1.741	0.000	2.828
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	1184	1184
d_b, Bicycle Delay [s]	33.00	33.00	10.00	10.00
l_b,int, Bicycle LOS Score for Intersection	1.581	1.560	3.031	1.922
Bicycle LOS	A	A	C	A

Sequence

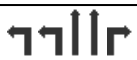
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	35.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.849

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	456	174	374	415	346	305	848	173	161	1083	713
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	456	174	374	415	346	305	848	173	161	1083	713
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	114	44	94	104	87	76	212	43	40	271	178
Total Analysis Volume [veh/h]	157	456	174	374	415	346	305	848	173	161	1083	713
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	19	48	0	15	41	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	19	19	14	27	27	11	54	54	7	50	50
g / C, Green / Cycle	0.05	0.18	0.18	0.13	0.25	0.25	0.10	0.49	0.49	0.06	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.04	0.12	0.09	0.11	0.22	0.18	0.09	0.22	0.09	0.05	0.29	0.38
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	194	670	335	439	468	468	352	1859	930	223	1719	860
d1, Uniform Delay [s]	51.43	42.44	41.11	47.16	40.01	38.24	48.78	18.48	15.79	50.59	23.08	26.42
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.86	1.23	1.25	4.79	5.84	2.31	6.47	0.81	0.44	4.38	1.76	9.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.68	0.52	0.85	0.89	0.74	0.87	0.46	0.19	0.72	0.63	0.83
d, Delay for Lane Group [s/veh]	59.29	43.67	42.36	51.94	45.85	40.55	55.25	19.29	16.24	54.96	24.85	35.52
Lane Group LOS	E	D	D	D	D	D	E	B	B	D	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.35	5.89	4.39	5.29	5.73	8.83	4.43	7.14	2.53	2.31	10.89	17.95
50th-Percentile Queue Length [ft/ln]	58.72	147.33	109.71	132.20	143.32	220.76	110.73	178.48	63.27	57.71	272.33	448.86
95th-Percentile Queue Length [veh/ln]	4.23	9.87	7.82	9.06	9.66	13.70	7.88	11.52	4.56	4.15	16.31	24.90
95th-Percentile Queue Length [ft/ln]	105.70	246.86	195.60	226.48	241.49	342.60	197.01	288.03	113.89	103.87	407.65	622.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.29	43.67	42.36	51.94	45.85	40.55	55.25	19.29	16.24	54.96	24.85	35.52
Movement LOS	E	D	D	D	D	D	E	B	B	D	C	D
d_A, Approach Delay [s/veh]	46.50			46.24			27.16			31.21		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	35.77											
Intersection LOS	D											
Intersection V/C	0.849											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.817	2.967	3.009	3.071
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	800	672	600
d_b, Bicycle Delay [s]	25.59	19.82	24.25	26.97
l_b,int, Bicycle LOS Score for Intersection	2.209	2.496	2.654	3.174
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	27.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.720

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	532	35	379	11	22	10	16	987	332	313	1399	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	532	35	379	11	22	10	16	987	332	313	1399	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	133	9	95	3	6	3	4	247	83	78	350	5
Total Analysis Volume [veh/h]	532	35	379	11	22	10	16	987	332	313	1399	18
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	28	65	65	0	37	0	10	38	0	17	45	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	29	46	5	5	3	66	66	13	76	76
g / C, Green / Cycle	0.17	0.24	0.38	0.04	0.04	0.02	0.55	0.55	0.11	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.15	0.02	0.20	0.01	0.02	0.01	0.36	0.33	0.09	0.37	0.37
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	600	462	732	77	73	38	1041	1041	380	1208	1208
d1, Uniform Delay [s]	48.58	35.01	28.34	55.82	56.43	58.02	19.16	18.39	52.37	12.72	12.70
k, delay calibration	0.11	0.11	0.30	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.64	0.07	1.59	0.84	4.07	7.21	3.25	2.65	4.52	2.10	2.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.08	0.52	0.14	0.44	0.42	0.66	0.61	0.82	0.59	0.59
d, Delay for Lane Group [s/veh]	53.22	35.08	29.92	56.66	60.50	65.23	22.41	21.05	56.90	14.81	14.79
Lane Group LOS	D	D	C	E	E	E	C	C	E	B	B
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.15	0.81	8.67	0.34	1.03	0.56	13.96	12.35	4.85	11.17	11.13
50th-Percentile Queue Length [ft/ln]	203.68	20.15	216.69	8.52	25.81	13.92	349.10	308.75	121.28	279.13	278.32
95th-Percentile Queue Length [veh/ln]	12.83	1.45	13.50	0.61	1.86	1.00	20.09	18.11	8.46	16.65	16.60
95th-Percentile Queue Length [ft/ln]	320.71	36.26	337.39	15.34	46.45	25.05	502.31	452.83	211.59	416.13	415.12

Movement, Approach, & Intersection Results

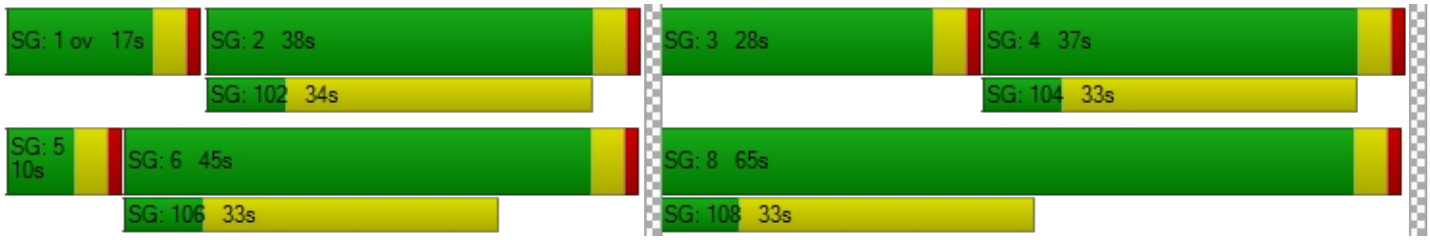
d_M, Delay for Movement [s/veh]	53.22	35.08	29.92	56.66	60.50	60.50	65.23	21.99	21.05	56.90	14.80	14.79
Movement LOS	D	D	C	E	E	E	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	43.22			59.52			22.27			22.42		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	27.62											
Intersection LOS	C											
Intersection V/C	0.720											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.729	1.990	2.952	2.987
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1017	550	567	683
d_b, Bicycle Delay [s]	14.51	31.54	30.82	26.01
l_b,int, Bicycle LOS Score for Intersection	3.121	1.631	2.661	2.987
Bicycle LOS	C	A	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	23.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.799

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	11	113	3	319	306	1023	13	6	1435	149
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	11	113	3	319	306	1023	13	6	1435	149
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	28	1	80	77	256	3	2	359	37
Total Analysis Volume [veh/h]	14	2	11	113	3	319	306	1023	13	6	1435	149
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	39	61	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	16	16	50	22	78	78	1	57	57
g / C, Green / Cycle	0.03	0.03	0.03	0.14	0.14	0.44	0.20	0.68	0.68	0.01	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.17	0.17	0.27	0.27	0.00	0.38	0.08
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	92	59	59	252	252	829	352	1292	1292	18	1879	939
d1, Uniform Delay [s]	54.44	54.07	54.33	44.00	44.00	21.99	44.85	8.11	8.10	56.57	23.63	15.96
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.19	0.13	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.75	0.23	1.50	0.46	0.46	0.51	7.81	0.93	0.93	10.15	3.01	0.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.15	0.03	0.19	0.23	0.23	0.39	0.87	0.40	0.40	0.33	0.76	0.16
d, Delay for Lane Group [s/veh]	55.19	54.30	55.83	44.46	44.46	22.51	52.66	9.04	9.02	66.72	26.65	16.32
Lane Group LOS	E	D	E	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.42	0.06	0.34	1.50	1.51	5.93	9.18	5.56	5.53	0.22	16.07	2.24
50th-Percentile Queue Length [ft/ln]	10.39	1.50	8.39	37.61	37.71	148.16	229.49	139.06	138.33	5.61	401.81	55.95
95th-Percentile Queue Length [veh/ln]	0.75	0.11	0.60	2.71	2.72	9.92	14.15	9.43	9.39	0.40	22.65	4.03
95th-Percentile Queue Length [ft/ln]	18.70	2.70	15.09	67.70	67.88	247.97	353.72	235.75	234.77	10.10	566.19	100.71

Movement, Approach, & Intersection Results

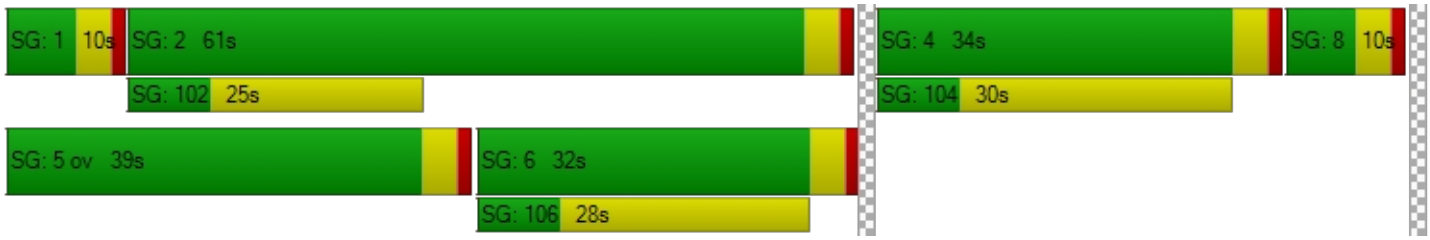
d_M, Delay for Movement [s/veh]	55.19	54.30	55.83	44.46	44.46	22.51	52.66	9.03	9.02	66.72	26.65	16.32
Movement LOS	E	D	E	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	55.38			28.36			18.98			25.83		
Approach LOS	E			C			B			C		
d_I, Intersection Delay [s/veh]	23.68											
Intersection LOS	C											
Intersection V/C	0.799											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.360	2.938	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	104	522	991	487
d_b, Bicycle Delay [s]	51.68	31.43	14.64	32.93
l_b,int, Bicycle LOS Score for Intersection	1.604	2.277	2.667	2.871
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	44.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.712

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	642	801	134	233	406	122	240	807	317	84	784	229
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	642	801	134	233	406	122	240	807	317	84	784	229
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	200	34	58	102	31	60	202	79	21	196	57
Total Analysis Volume [veh/h]	642	801	134	233	406	122	240	807	317	84	784	229
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	25	48	0	14	37	0	19	45	0	13	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	25	25	10	14	14	15	62	62	7	54	54
g / C, Green / Cycle	0.18	0.21	0.21	0.08	0.12	0.12	0.13	0.51	0.51	0.06	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.18	0.17	0.16	0.07	0.09	0.09	0.13	0.21	0.17	0.05	0.21	0.12
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	613	800	400	290	449	225	226	1952	976	108	1702	851
d1, Uniform Delay [s]	49.51	44.82	44.60	54.11	51.52	51.30	52.50	18.03	17.04	55.67	23.05	20.80
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	30.82	1.74	3.09	5.22	3.25	5.27	46.24	0.65	0.88	11.56	0.90	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.05	0.79	0.77	0.80	0.80	0.76	1.06	0.41	0.32	0.78	0.46	0.27
d, Delay for Lane Group [s/veh]	80.34	46.56	47.69	59.33	54.77	56.56	98.74	18.68	17.93	67.24	23.95	21.58
Lane Group LOS	F	D	D	E	D	E	F	B	B	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.78	9.02	8.91	3.67	5.43	5.31	9.68	7.00	5.30	2.85	7.87	4.22
50th-Percentile Queue Length [ft/ln]	294.43	225.42	222.76	91.71	135.73	132.77	242.11	174.88	132.62	71.36	196.78	105.53
95th-Percentile Queue Length [veh/ln]	17.81	13.94	13.81	6.60	9.25	9.09	15.18	11.33	9.08	5.14	12.47	7.59
95th-Percentile Queue Length [ft/ln]	445.16	348.54	345.15	165.07	231.26	227.25	379.46	283.32	227.05	128.46	311.81	189.77

Movement, Approach, & Intersection Results

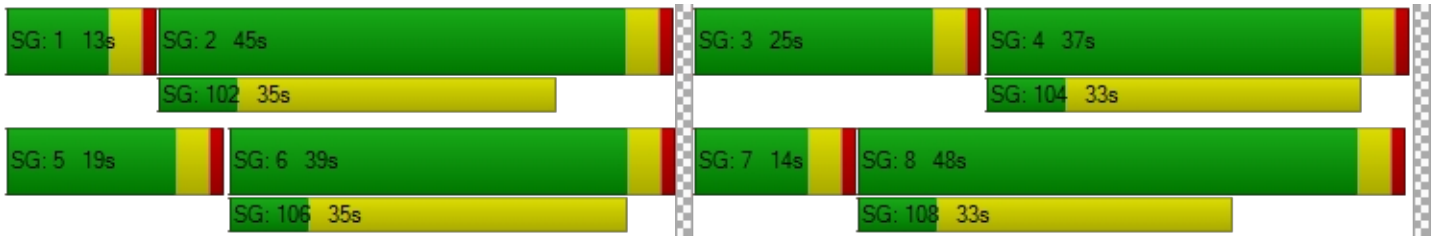
d_M, Delay for Movement [s/veh]	80.34	46.81	47.69	59.33	54.99	56.56	98.74	18.68	17.93	67.24	23.95	21.58
Movement LOS	F	D	D	E	D	E	F	B	B	E	C	C
d_A, Approach Delay [s/veh]	60.53			56.57			32.59			26.77		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	44.24											
Intersection LOS	D											
Intersection V/C	0.712											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.030	2.987	2.940	2.836
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	733	550	683	583
d_b, Bicycle Delay [s]	24.08	31.55	26.02	30.12
l_b,int, Bicycle LOS Score for Intersection	2.427	1.978	2.685	2.465
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	64.7
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.051

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	212	618	16	474	257	46	196	686	148	13	524	806
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	212	618	16	474	257	46	196	686	148	13	524	806
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	53	155	4	119	64	12	49	172	37	3	131	202
Total Analysis Volume [veh/h]	212	618	16	474	257	46	196	686	148	13	524	806
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	35	38	0	33	36	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	23	23	29	36	36	6	50	50	2	46	46
g / C, Green / Cycle	0.14	0.19	0.19	0.24	0.30	0.30	0.05	0.42	0.42	0.02	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.12	0.17	0.17	0.26	0.08	0.08	0.06	0.23	0.21	0.01	0.14	0.42
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	244	362	362	435	563	563	178	790	790	33	1458	729
d1, Uniform Delay [s]	50.83	47.24	47.16	45.53	32.36	32.21	56.98	26.46	26.00	58.25	26.44	36.99
k, delay calibration	0.11	0.15	0.15	0.49	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.06	9.48	8.79	69.29	0.26	0.24	63.60	2.68	2.36	7.25	0.69	66.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.88	0.87	1.09	0.28	0.26	1.10	0.54	0.51	0.39	0.36	1.11
d, Delay for Lane Group [s/veh]	59.89	56.73	55.95	114.82	32.62	32.46	120.58	29.15	28.36	65.50	27.13	103.02
Lane Group LOS	E	E	E	F	C	C	F	C	C	E	C	F
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	6.85	10.17	10.01	21.21	3.52	3.33	4.26	9.80	9.02	0.46	5.50	34.25
50th-Percentile Queue Length [ft/ln]	171.20	254.37	250.21	530.32	88.06	83.26	106.55	244.96	225.47	11.45	137.57	856.34
95th-Percentile Queue Length [veh/ln]	11.14	15.41	15.20	30.24	6.34	5.99	7.67	14.93	13.94	0.82	9.35	47.06
95th-Percentile Queue Length [ft/ln]	278.49	385.15	379.92	756.12	158.50	149.86	191.78	373.30	348.60	20.62	233.75	1176.49

Movement, Approach, & Intersection Results

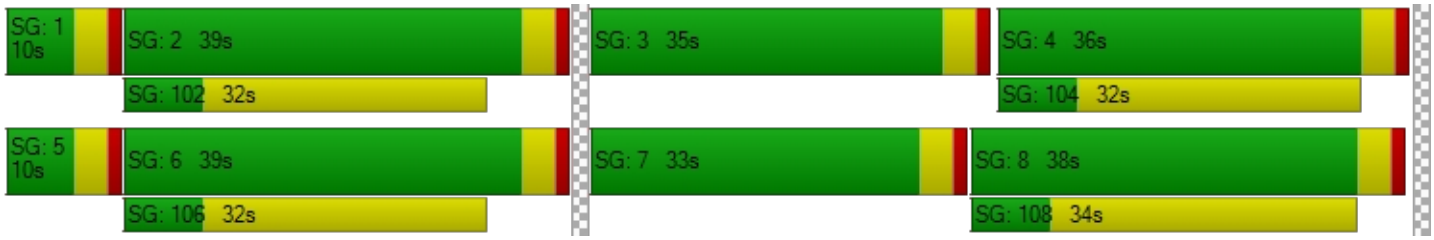
d_M, Delay for Movement [s/veh]	59.89	56.35	55.95	114.82	32.56	32.46	120.58	28.85	28.36	65.50	27.13	103.02
Movement LOS	E	E	E	F	C	C	F	C	C	E	C	F
d_A, Approach Delay [s/veh]	57.23			82.73			46.24			73.05		
Approach LOS	E			F			D			E		
d_I, Intersection Delay [s/veh]	64.67											
Intersection LOS	E											
Intersection V/C	1.051											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.560	2.781	2.761	2.876
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	533	583	583
d_b, Bicycle Delay [s]	30.83	32.28	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	2.258	2.201	2.409	2.668
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	4.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.713

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	30	1174	1233	17	8	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	1174	1233	17	8	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	294	308	4	2	5
Total Analysis Volume [veh/h]	30	1174	1233	17	8	21
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	6	6	0	6	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	94	94	0	26	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C
C, Cycle Length [s]	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	108	108	108	108	4
g / C, Green / Cycle	0.90	0.90	0.90	0.90	0.03
(v / s)_i Volume / Saturation Flow Rate	0.02	0.62	0.65	0.01	0.02
s, saturation flow rate [veh/h]	1800	1900	1900	1900	1800
c, Capacity [veh/h]	1308	1714	1714	1714	56
d1, Uniform Delay [s]	0.59	1.51	1.64	0.58	57.18
k, delay calibration	0.50	0.50	0.50	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.03	2.25	2.64	0.01	7.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.69	0.72	0.01	0.51
d, Delay for Lane Group [s/veh]	0.62	3.76	4.28	0.59	64.26
Lane Group LOS	A	A	A	A	E
Critical Lane Group	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.02	2.22	2.58	0.01	0.98
50th-Percentile Queue Length [ft/ln]	0.58	55.61	64.38	0.29	24.44
95th-Percentile Queue Length [veh/ln]	0.04	4.00	4.64	0.02	1.76
95th-Percentile Queue Length [ft/ln]	1.04	100.10	115.88	0.52	43.98

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.62	3.76	4.28	0.59	64.26	64.26
Movement LOS	A	A	A	A	E	E
d_A, Approach Delay [s/veh]	3.68		4.23		64.26	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	4.66					
Intersection LOS	A					
Intersection V/C	0.713					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	0.00	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.753	0.000	1.808
Crosswalk LOS	C	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1501	1501	367
d_b, Bicycle Delay [s]	3.74	3.74	39.99
l_b,int, Bicycle LOS Score for Intersection	3.546	3.622	1.607
Bicycle LOS	D	D	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.776

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	730	0	605	0	1898	1100	0	2623	451
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	730	0	605	0	1898	1100	0	2623	451
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	183	0	151	0	475	275	0	656	113
Total Analysis Volume [veh/h]	0	0	0	730	0	605	0	1898	1100	0	2623	451
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		27	27	27	55	55
g / C, Green / Cycle		0.30	0.30	0.30	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate		0.25	0.25	0.23	0.33	0.46
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		534	534	564	3501	3501
d1, Uniform Delay [s]		29.51	29.51	29.01	10.02	12.38
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.48	3.48	2.52	0.61	1.52
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.79	0.54	0.75
d, Delay for Lane Group [s/veh]		32.99	32.99	31.53	10.63	13.89
Lane Group LOS		C	C	C	B	B
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		9.19	9.19	8.92	6.61	11.44
50th-Percentile Queue Length [ft/ln]		229.66	229.66	222.94	165.28	286.12
95th-Percentile Queue Length [veh/ln]		14.16	14.16	13.82	10.83	16.99
95th-Percentile Queue Length [ft/ln]		353.93	353.93	345.38	270.70	424.82

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	32.99	0.00	31.92	0.00	10.63	0.00	0.00	13.89	0.00
Movement LOS				C		C		B			B	
d_A, Approach Delay [s/veh]	0.00			32.51			10.63			13.89		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	17.08											
Intersection LOS	B											
Intersection V/C	0.776											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.456	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.762	2.604	3.002
Bicycle LOS	D	D	B	C

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	37.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.850

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1110	72	482	0	0	217	205	2041	410	0	2686	43
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1110	72	482	0	0	217	205	2041	410	0	2686	43
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	278	18	121	0	0	54	51	510	103	0	672	11
Total Analysis Volume [veh/h]	1110	72	482	0	0	217	205	2041	410	0	2686	43
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	39	0	0	0	12	20	69	0	0	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32	32	8	15	68	49	49
g / C, Green / Cycle	0.27	0.27	0.27	0.07	0.13	0.57	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.23	0.23	0.22	0.06	0.11	0.36	0.36	0.36
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	929	478	504	255	232	3236	2311	770
d1, Uniform Delay [s]	42.30	42.31	41.64	55.41	51.39	17.48	33.11	33.11
k, delay calibration	0.11	0.31	0.28	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.98	14.15	9.21	7.88	10.55	0.95	5.46	14.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.88	0.84	0.85	0.88	0.63	0.89	0.89
d, Delay for Lane Group [s/veh]	45.28	56.46	50.85	63.28	61.93	18.42	38.57	47.31
Lane Group LOS	D	E	D	E	E	B	D	D
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.94	13.78	13.01	3.53	6.73	12.51	19.21	21.08
50th-Percentile Queue Length [ft/ln]	298.53	344.60	325.19	88.16	168.29	312.82	480.19	526.94
95th-Percentile Queue Length [veh/ln]	17.61	19.87	18.92	6.35	10.99	18.31	26.40	28.61
95th-Percentile Queue Length [ft/ln]	440.21	496.82	473.06	158.69	274.66	457.85	659.88	715.18

Movement, Approach, & Intersection Results

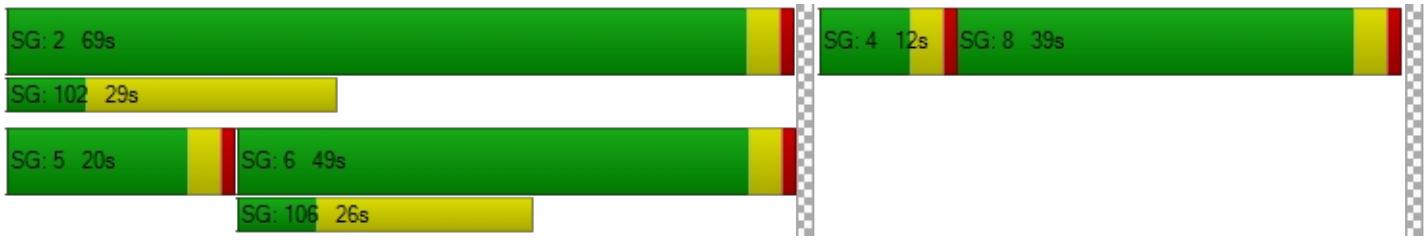
d_M, Delay for Movement [s/veh]	48.14	56.46	51.62	0.00	0.00	63.28	61.93	18.42	0.00	0.00	40.65	47.31
Movement LOS	D	E	D			E	E	B			D	D
d_A, Approach Delay [s/veh]	49.53			63.28			22.39			40.76		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	37.58											
Intersection LOS	D											
Intersection V/C	0.850											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.638	2.129	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	133	1083	750
d_b, Bicycle Delay [s]	30.11	52.27	12.61	23.44
l_b,int, Bicycle LOS Score for Intersection	4.305	1.560	2.795	2.685
Bicycle LOS	E	A	C	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	43.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.893

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	240	282	92	320	380	280	296	2073	153	191	1967	203
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	282	92	320	380	280	296	2073	153	191	1967	203
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	71	23	80	95	70	74	518	38	48	492	51
Total Analysis Volume [veh/h]	240	282	92	320	380	280	296	2073	153	191	1967	203
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	39	0	15	41	0	25	49	0	17	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	25	25	11	27	27	21	55	55	13	47	47
g / C, Green / Cycle	0.08	0.21	0.21	0.09	0.22	0.22	0.18	0.46	0.46	0.11	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.07	0.10	0.09	0.09	0.20	0.15	0.16	0.39	0.40	0.11	0.28	0.29
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	267	392	392	325	424	424	316	1741	871	197	2235	745
d1, Uniform Delay [s]	55.02	42.12	41.78	54.41	45.33	42.53	48.88	28.73	29.34	53.30	30.95	31.41
k, delay calibration	0.11	0.11	0.11	0.11	0.20	0.11	0.20	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.51	0.97	0.84	19.94	11.94	1.77	20.00	5.17	11.62	23.50	2.05	6.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.49	0.46	0.99	0.90	0.66	0.94	0.84	0.87	0.97	0.72	0.75
d, Delay for Lane Group [s/veh]	65.54	43.09	42.62	74.34	57.27	44.30	68.87	33.90	40.96	76.80	33.00	38.20
Lane Group LOS	E	D	D	E	E	D	E	C	D	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.99	5.20	4.78	5.72	12.34	7.77	10.48	19.37	21.93	7.02	13.44	15.11
50th-Percentile Queue Length [ft/ln]	99.75	130.02	119.50	143.07	308.61	194.27	261.92	484.16	548.13	175.47	335.92	377.77
95th-Percentile Queue Length [veh/ln]	7.18	8.94	8.37	9.65	18.11	12.34	15.79	26.58	29.60	11.36	19.45	21.49
95th-Percentile Queue Length [ft/ln]	179.55	223.53	209.14	241.16	452.66	308.57	394.63	664.58	740.11	284.09	486.21	537.15

Movement, Approach, & Intersection Results

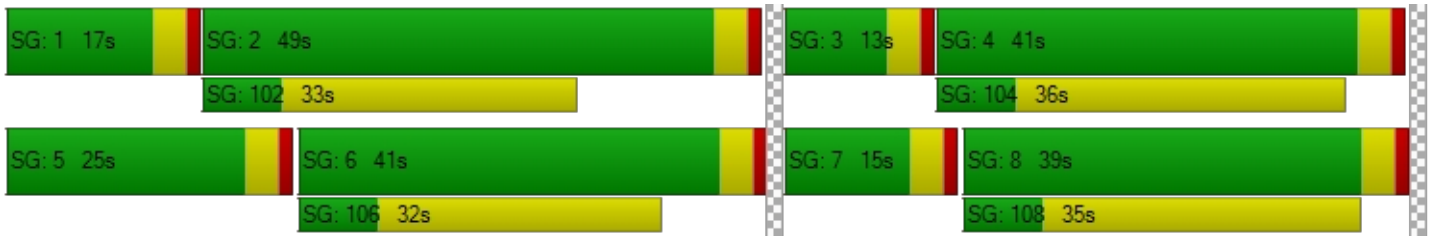
d_M, Delay for Movement [s/veh]	65.54	42.94	42.62	74.34	57.27	44.30	68.87	35.96	40.96	76.80	33.94	38.20
Movement LOS	E	D	D	E	E	D	E	D	D	E	C	D
d_A, Approach Delay [s/veh]	51.72			59.14			40.13			37.77		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	43.24											
Intersection LOS	D											
Intersection V/C	0.893											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.54	49.54	49.54	49.54
l_p,int, Pedestrian LOS Score for Intersection	2.575	2.753	3.350	3.330
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	616	750	616
d_b, Bicycle Delay [s]	30.13	28.73	23.46	28.73
l_b,int, Bicycle LOS Score for Intersection	2.066	3.177	2.947	2.534
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	25.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.820

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	276	51	292	28	25	15	21	2088	308	254	2154	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	276	51	292	28	25	15	21	2088	308	254	2154	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	69	13	73	7	6	4	5	522	77	64	539	16
Total Analysis Volume [veh/h]	276	51	292	28	25	15	21	2088	308	254	2154	63
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	27	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	17	5	5	3	41	41	15	54	54
g / C, Green / Cycle	0.18	0.18	0.18	0.05	0.05	0.03	0.43	0.43	0.16	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.15	0.02	0.02	0.01	0.37	0.16	0.14	0.38	0.40
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	325	325	343	97	102	51	2474	825	294	2164	1082
d1, Uniform Delay [s]	35.12	35.17	37.76	43.27	43.51	45.47	24.04	18.18	38.77	14.31	14.70
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.19	1.22	5.96	1.62	2.42	5.31	3.73	1.29	7.45	1.70	3.82
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.51	0.85	0.29	0.39	0.41	0.84	0.37	0.86	0.67	0.70
d, Delay for Lane Group [s/veh]	36.31	36.39	43.72	44.90	45.94	50.77	27.78	19.48	46.22	16.01	18.52
Lane Group LOS	D	D	D	D	D	D	C	B	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.45	3.51	7.04	0.67	0.97	0.56	14.08	4.72	6.29	10.52	11.87
50th-Percentile Queue Length [ft/ln]	86.35	87.70	175.95	16.82	24.32	13.98	352.11	118.10	157.36	263.01	296.64
95th-Percentile Queue Length [veh/ln]	6.22	6.31	11.39	1.21	1.75	1.01	20.24	8.29	10.41	15.84	17.51
95th-Percentile Queue Length [ft/ln]	155.43	157.87	284.72	30.28	43.77	25.17	505.97	207.22	260.22	396.00	437.87

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.34	36.39	43.72	44.90	45.94	45.94	50.77	27.78	19.48	46.22	16.82	18.52
Movement LOS	D	D	D	D	D	D	D	C	B	D	B	B
d_A, Approach Delay [s/veh]	39.83			45.51			26.92			19.89		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	25.46											
Intersection LOS	C											
Intersection V/C	0.820											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	0.00	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.427	2.008	0.000	3.276
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	463	126	589	947
d_b, Bicycle Delay [s]	28.09	41.73	23.66	13.19
l_b,int, Bicycle LOS Score for Intersection	2.581	1.672	2.889	2.919
Bicycle LOS	B	A	C	C

Sequence

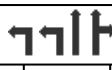
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	36.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.858

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	398	661	112	286	507	127	235	1557	239	201	1718	347
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	398	661	112	286	507	127	235	1557	239	201	1718	347
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	100	165	28	72	127	32	59	389	60	50	430	87
Total Analysis Volume [veh/h]	398	661	112	286	507	127	235	1557	239	201	1718	347
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	35	0	14	30	0	12	40	0	11	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	24	24	10	20	20	8	43	43	7	42	42
g / C, Green / Cycle	0.13	0.24	0.24	0.10	0.20	0.20	0.08	0.43	0.43	0.07	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.11	0.21	0.20	0.08	0.13	0.07	0.07	0.32	0.31	0.06	0.36	0.36
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	474	450	450	354	769	385	285	1638	819	251	1600	800
d1, Uniform Delay [s]	42.29	36.91	36.45	44.10	36.80	34.18	45.35	23.74	23.64	45.85	26.41	26.24
k, delay calibration	0.11	0.22	0.19	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.06	10.71	7.31	4.36	0.97	0.50	5.94	2.95	5.59	5.90	6.45	11.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.88	0.84	0.81	0.66	0.33	0.82	0.73	0.73	0.80	0.86	0.85
d, Delay for Lane Group [s/veh]	46.35	47.63	43.76	48.47	37.78	34.68	51.28	26.69	29.23	51.75	32.85	37.48
Lane Group LOS	D	D	D	D	D	C	D	C	C	D	C	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.02	10.52	9.55	3.66	5.75	2.68	3.09	12.00	12.45	2.65	15.74	16.56
50th-Percentile Queue Length [ft/ln]	125.62	263.03	238.70	91.54	143.77	67.01	77.32	299.98	311.27	66.34	393.54	413.93
95th-Percentile Queue Length [veh/ln]	8.70	15.84	14.62	6.59	9.68	4.82	5.57	17.68	18.24	4.78	22.25	23.23
95th-Percentile Queue Length [ft/ln]	217.53	396.02	365.39	164.77	242.10	120.62	139.17	442.00	455.94	119.42	556.21	580.77

Movement, Approach, & Intersection Results

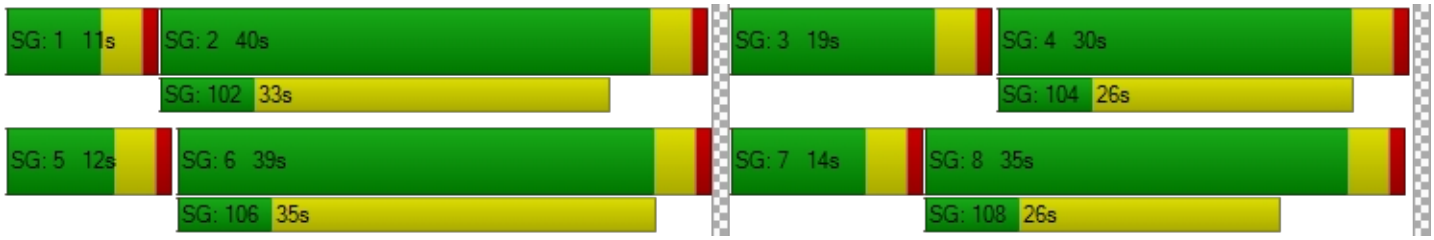
d_M, Delay for Movement [s/veh]	46.35	46.08	43.76	48.47	37.78	34.68	51.28	27.27	29.23	51.75	33.76	37.48
Movement LOS	D	D	D	D	D	C	D	C	C	D	C	D
d_A, Approach Delay [s/veh]	45.95			40.67			30.28			35.93		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	36.65											
Intersection LOS	D											
Intersection V/C	0.858											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.67	39.67	39.67	39.67
l_p,int, Pedestrian LOS Score for Intersection	2.802	2.900	3.251	3.245
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	619	519	719	699
d_b, Bicycle Delay [s]	23.87	27.45	20.54	21.19
l_b,int, Bicycle LOS Score for Intersection	2.526	2.319	2.677	2.806
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.617

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	125	284	138	229	233	141	252	1957	163	180	1457	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	284	138	229	233	141	252	1957	163	180	1457	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	71	35	57	58	35	63	489	41	45	364	36
Total Analysis Volume [veh/h]	125	284	138	229	233	141	252	1957	163	180	1457	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	46	0	15	48	0	20	47	0	12	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	12	12	10	15	15	11	74	74	8	72	72
g / C, Green / Cycle	0.05	0.10	0.10	0.08	0.13	0.13	0.09	0.62	0.62	0.07	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.04	0.07	0.07	0.07	0.06	0.07	0.07	0.34	0.09	0.05	0.26	0.08
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	183	372	186	288	486	243	317	3530	1177	236	3397	1132
d1, Uniform Delay [s]	55.92	52.79	52.67	54.11	48.64	49.32	53.50	13.25	9.52	55.05	13.16	10.59
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.45	3.27	5.72	5.00	0.74	2.19	4.53	0.63	0.25	5.09	0.40	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.76	0.74	0.80	0.48	0.58	0.79	0.55	0.14	0.76	0.43	0.13
d, Delay for Lane Group [s/veh]	60.37	56.06	58.39	59.11	49.38	51.51	58.03	13.88	9.76	60.14	13.56	10.82
Lane Group LOS	E	E	E	E	D	D	E	B	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.97	4.34	4.34	3.60	3.30	4.14	3.93	9.93	1.82	2.84	7.02	1.71
50th-Percentile Queue Length [ft/ln]	49.37	108.58	108.58	89.92	82.53	103.45	98.15	248.13	45.62	71.11	175.38	42.63
95th-Percentile Queue Length [veh/ln]	3.55	7.76	7.76	6.47	5.94	7.45	7.07	15.09	3.28	5.12	11.36	3.07
95th-Percentile Queue Length [ft/ln]	88.87	194.03	194.02	161.86	148.56	186.21	176.67	377.30	82.11	128.00	283.97	76.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.37	56.06	58.39	59.11	49.38	51.51	58.03	13.88	9.76	60.14	13.56	10.82
Movement LOS	E	E	E	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	57.63			53.57			18.29			18.05		
Approach LOS	E			D			B			B		
d_I, Intersection Delay [s/veh]	26.28											
Intersection LOS	C											
Intersection V/C	0.617											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.764	2.786	3.307	3.308
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	733	716	583
d_b, Bicycle Delay [s]	25.36	24.08	24.72	30.12
l_b,int, Bicycle LOS Score for Intersection	2.011	2.057	2.864	2.539
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	228.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.046

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	271	534	129	984	464	21	73	1905	300	168	1479	845
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	271	534	129	984	464	21	73	1905	300	168	1479	845
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	134	32	246	116	5	18	476	75	42	370	211
Total Analysis Volume [veh/h]	271	534	129	984	464	21	73	1905	300	168	1479	845
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	20	20	8	17	17	6	70	70	6	70	70
g / C, Green / Cycle	0.09	0.17	0.17	0.07	0.14	0.14	0.05	0.58	0.58	0.05	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.08	0.14	0.07	0.28	0.12	0.01	0.04	0.39	0.39	0.05	0.26	0.44
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	323	645	323	236	551	275	91	2199	1100	178	3299	1100
d1, Uniform Delay [s]	53.62	48.13	44.38	55.99	49.99	44.38	56.38	17.37	17.38	56.82	14.38	19.18
k, delay calibration	0.11	0.11	0.11	0.13	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.83	2.79	0.80	1431.12	3.59	0.12	14.58	1.63	3.24	20.66	0.44	5.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.83	0.40	4.17	0.84	0.08	0.80	0.67	0.67	0.95	0.45	0.77
d, Delay for Lane Group [s/veh]	59.45	50.92	45.18	1487.11	53.58	44.50	70.96	19.00	20.61	77.48	14.83	24.36
Lane Group LOS	E	D	D	F	D	D	E	B	C	E	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.28	7.95	3.50	50.42	7.05	0.55	2.56	13.84	14.35	3.05	7.55	18.52
50th-Percentile Queue Length [ft/ln]	107.11	198.84	87.59	1260.48	176.20	13.83	63.99	345.90	358.72	76.23	188.68	463.08
95th-Percentile Queue Length [veh/ln]	7.68	12.58	6.31	76.00	11.40	1.00	4.61	19.94	20.56	5.49	12.05	25.58
95th-Percentile Queue Length [ft/ln]	191.98	314.47	157.67	1900.04	285.05	24.89	115.18	498.41	514.03	137.21	301.31	639.54

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.45	50.92	45.18	1487.11	53.58	44.50	70.96	19.37	20.61	77.48	14.83	24.36
Movement LOS	E	D	D	F	D	D	E	B	C	E	B	C
d_A, Approach Delay [s/veh]	52.60			1013.69			21.18			22.28		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	228.92											
Intersection LOS	F											
Intersection V/C	1.046											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.868	3.015	3.172	3.460
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.330	2.772	2.813	2.930
Bicycle LOS	B	C	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



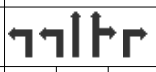
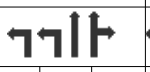
APPENDIX D-III

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	38.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.858

Intersection Setup

Name	St Co			St Co			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	St Co			St Co			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	185	238	225	963	659	9	15	152	230	517	196	597
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	185	238	225	963	659	9	15	152	230	517	196	597
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	46	60	56	241	165	2	4	382	58	129	492	149
Total Analysis Volume [veh/h]	185	238	225	963	659	9	15	152	230	517	196	597
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Ove
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	12	15	0	41	44	0	10	40	0	24	54	54
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	12	12	12	12	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.0	4.0	4.0	4.0	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	8	12	12	12	36	40	40	2	36	36	20	54	93
g / C, Green / Cycle	0.0	0.1	0.1	0.1	0.30	0.33	0.33	0.02	0.30	0.30	0.16	0.45	0.78
(v / s)_i Volume / Saturation Flow Rate	0.0	0.0	0.0	0.0	0.28	0.18	0.18	0.00	0.23	0.23	0.15	0.35	0.31
s, saturation flow rate [veh/h]	35	19	19	19	350	190	190	350	570	190	350	570	190
c, Capacity [veh/h]	23	19	19	19	104	632	632	72	173	577	571	254	147
d1, Uniform Delay [s]	55.	53.	52.	52.	40.8	32.4	32.4	57.8	37.8	37.9	49.3	28.1	4.35
k, delay calibration	0.1	0.1	0.1	0.1	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.6	10.	6.9	5.4	4.05	0.71	0.70	1.41	3.21	9.46	5.73	2.38	0.82
d3, Initial Queue Delay [s]	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.7	0.8	0.7	0.7	0.92	0.53	0.53	0.21	0.76	0.77	0.91	0.77	0.40
d, Delay for Lane Group [s/veh]	60.	63.	59.	57.	44.8	33.1	33.1	59.2	41.0	47.4	55.0	30.5	5.17
Lane Group LOS	E	E	E	E	D	C	C	E	D	D	E	C	A
Critical Lane Group	No	Ye	No	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.9	5.4	4.8	4.4	14.2	7.98	7.96	0.24	12.1	13.2	8.04	16.1	4.28
50th-Percentile Queue Length [ft/ln]	73.	13	12	11	355.	199.	198.	5.96	302.	331.	201.	404.	106.
95th-Percentile Queue Length [veh/ln]	5.3	9.3	8.5	7.9	20.4	12.6	12.5	0.43	17.8	19.2	12.7	22.7	7.67
95th-Percentile Queue Length [ft/ln]	13	23	21	19	510.	315.	314.	10.7	445.	480.	317.	569.	191.

Movement, Approach, & Intersection Results

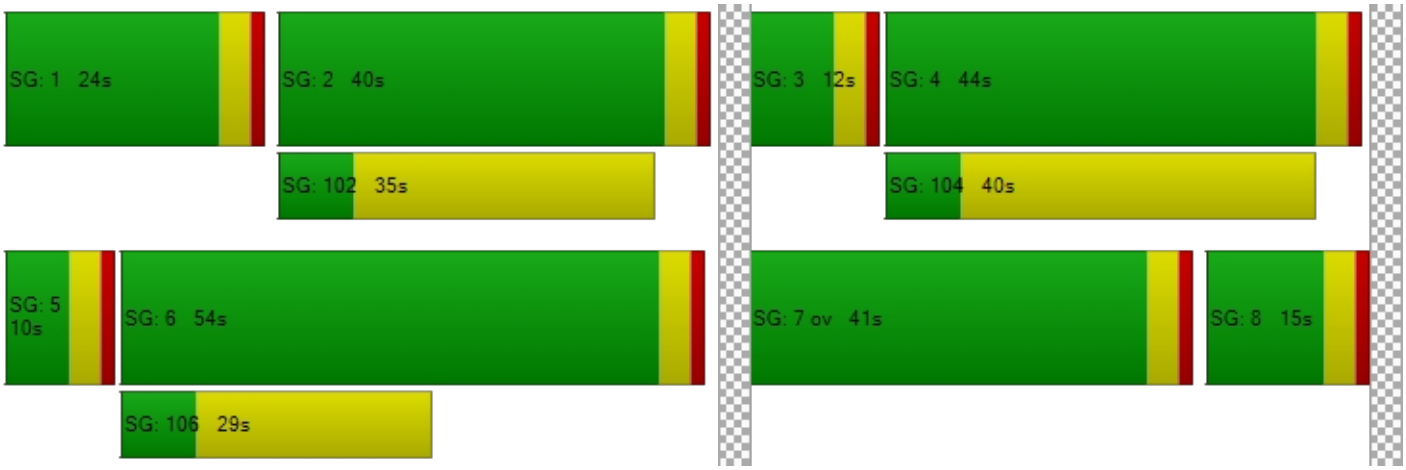
d_M, Delay for Movement [s/veh]	60.8	62.1	58.3	44.8	33.1	33.1	59.2	41.9	47.4	55.0	30.5	5.17
Movement LOS	E	E	E	D	C	C	E	D	D	E	C	A
d_A, Approach Delay [s/veh]	60.46			40.08			42.81			29.72		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	38.13											
Intersection LOS	D											
Intersection V/C	0.858											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.894	2.870	3.289	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	183	666	600	833
d_b, Bicycle Delay [s]	49.52	26.68	29.41	20.43
l_b,int, Bicycle LOS Score for Intersection	2.094	2.905	2.291	3.255
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	106	0	695	0	187	619	276	220	0
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	106	0	695	0	187	619	276	220	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	267	0	174	0	468	155	69	552	0
Total Analysis Volume [veh/h]	0	0	0	106	0	695	0	187	619	276	220	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Per	Prot	Per	Per
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	Lea	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	63	0	0	0	23	0	14	37	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		37	37	42	42	10	55
g / C, Green / Cycle		0.37	0.37	0.42	0.42	0.10	0.55
(v / s)_i Volume / Saturation Flow Rate		0.31	0.18	0.33	0.16	0.08	0.39
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		1284	1394	2367	1578	343	3153
d1, Uniform Delay [s]		28.86	24.53	25.46	20.43	44.17	16.30
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		1.48	0.28	2.80	0.73	4.46	1.32
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.50	0.79	0.39	0.81	0.70
d, Delay for Lane Group [s/veh]		30.33	24.81	28.26	21.16	48.63	17.63
Lane Group LOS		C	C	C	C	D	B
Critical Lane Group		Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		11.58	6.31	13.02	5.10	3.54	11.84
50th-Percentile Queue Length [ft/ln]		289.46	157.67	325.52	127.46	88.38	296.07
95th-Percentile Queue Length [veh/ln]		17.16	10.43	18.94	8.80	6.36	17.49
95th-Percentile Queue Length [ft/ln]		428.97	260.63	473.46	220.03	159.09	437.17

Movement, Approach, & Intersection Results

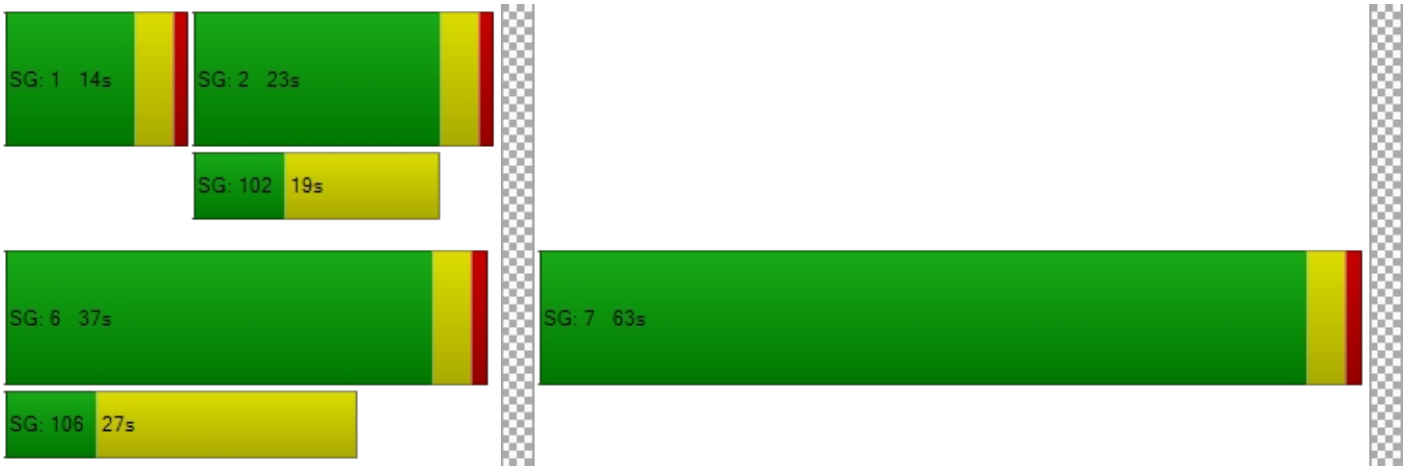
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	30.3	0.00	24.8	0.00	28.2	21.1	48.6	17.6	0.00	
Movement LOS				C		C		C	C	D	B		
d_A, Approach Delay [s/veh]	0.00			28.16			26.50			21.07			
Approach LOS	A			C			C			C			
d_I, Intersection Delay [s/veh]	24.93												
Intersection LOS	C												
Intersection V/C	0.810												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.156	2.566	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1180	380	660
d_b, Bicycle Delay [s]	50.00	8.41	32.81	22.45
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.930	2.926
Bicycle LOS	D	A	C	C

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	20.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.820

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	105	0	513	0	0	0	0	254	404	0	144	549
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	105	0	513	0	0	0	0	254	404	0	144	549
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Total 15-Minute Volume [veh/h]	263	0	128	0	0	0	0	637	101	0	362	0
Total Analysis Volume [veh/h]	105	0	513	0	0	0	0	254	404	0	144	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Per	Split	Per	Per	Per	Per	Per	Per	Per	Per	Unsi
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32		50	50	50	50
g / C, Green / Cycle	0.36	0.36		0.55	0.55	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.30	0.27		0.45	0.45	0.21	0.25
s, saturation flow rate [veh/h]	3500	1900		380	190	190	5700
c, Capacity [veh/h]	1253	680		210	105	105	3152
d1, Uniform Delay [s]	26.46	25.36		16.2	16.2	11.4	12.02
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.58	1.73		3.47	6.69	1.07	0.48
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.75		0.81	0.81	0.38	0.46
d, Delay for Lane Group [s/veh]	28.04	27.09		19.6	22.9	12.4	12.51
Lane Group LOS	C	C		B	C	B	B
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	10.14	9.56		13.7	14.6	4.57	5.50
50th-Percentile Queue Length [ft/ln]	253.54	238.97		343.	367.	114.	137.42
95th-Percentile Queue Length [veh/ln]	15.36	14.63		19.8	20.9	8.07	9.34
95th-Percentile Queue Length [ft/ln]	384.11	365.73		495.	524.	201.	233.54

Movement, Approach, & Intersection Results

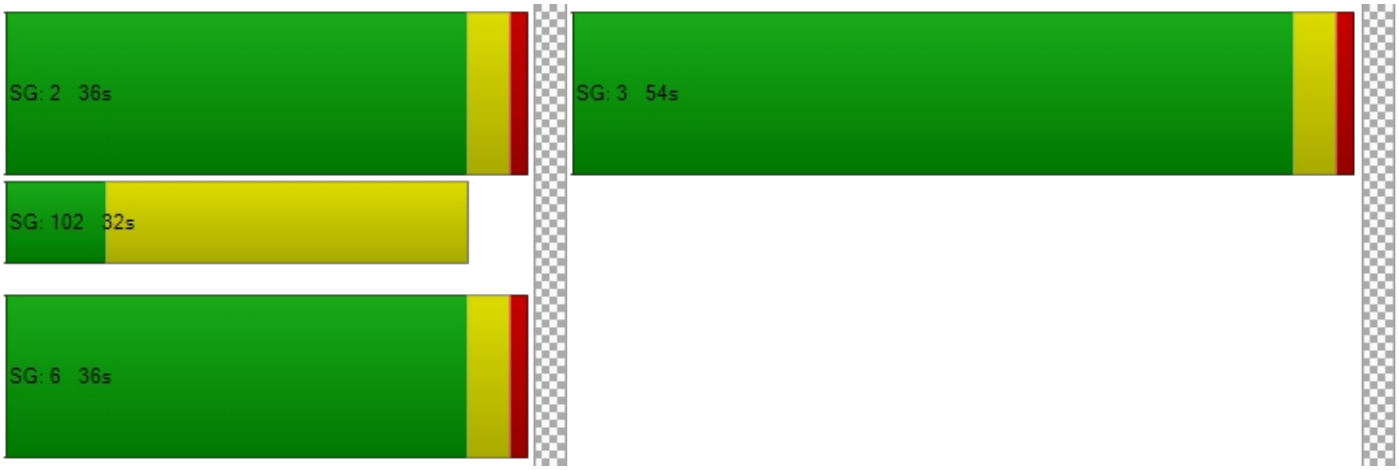
d_M, Delay for Movement [s/veh]	28.0	0.00	27.0	0.00	0.00	0.00	0.00	20.4	12.4	0.00	12.5	0.00
Movement LOS	C		C					C	B		B	
d_A, Approach Delay [s/veh]	27.73			0.00			19.63			12.51		
Approach LOS	C			A			B			B		
d_I, Intersection Delay [s/veh]	20.03											
Intersection LOS	C											
Intersection V/C	0.820											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.683	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	3.183	2.355
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	14.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.662

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	66	1	130	557	251	40	17	203	183
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	66	1	130	557	251	40	17	203	183
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	2	2	2	17	0	33	139	630	10	4	508	46
Total Analysis Volume [veh/h]	9	8	7	66	1	130	557	251	40	17	203	183
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	44	0	0	44	0	35	36	0	30	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	20	89	89	2	71	71
g / C, Green / Cycle	0.06	0.06	0.06	0.19	0.81	0.81	0.02	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.03	0.16	0.44	0.46	0.01	0.39	0.39
s, saturation flow rate [veh/h]	1800	1800	3800	350	380	190	180	380	190
c, Capacity [veh/h]	150	170	222	648	307	153	41	246	123
d1, Uniform Delay [s]	49.42	50.65	50.49	43.4	3.56	3.70	53.0	11.1	11.2
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	1.48	2.45	3.48	0.70	1.55	6.71	1.07	2.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.39	0.59	0.86	0.54	0.57	0.42	0.60	0.61
d, Delay for Lane Group [s/veh]	49.91	52.12	52.94	46.9	4.25	5.26	59.7	12.2	13.5
Lane Group LOS	D	D	D	D	A	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.65	1.87	1.82	7.60	4.67	5.44	0.54	9.79	10.4
50th-Percentile Queue Length [ft/ln]	16.26	46.79	45.45	190.	116.	136.	13.4	244.	261.
95th-Percentile Queue Length [veh/ln]	1.17	3.37	3.27	12.1	8.21	9.27	0.97	14.9	15.7
95th-Percentile Queue Length [ft/ln]	29.26	84.22	81.81	303.	205.	231.	24.2	372.	394.

Movement, Approach, & Intersection Results

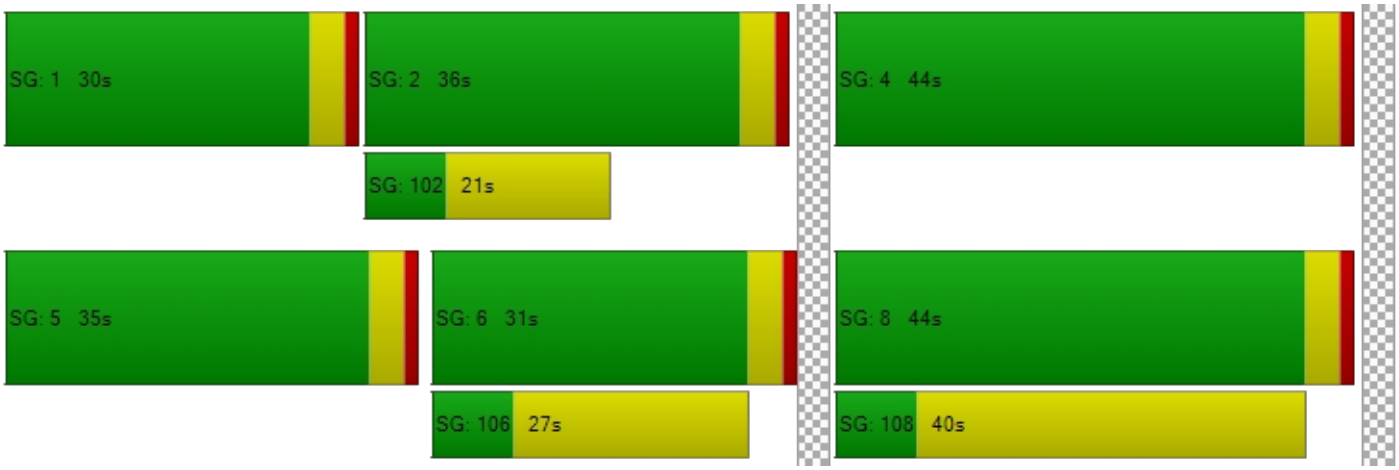
d_M, Delay for Movement [s/veh]	49.9	49.9	49.9	52.1	52.1	52.9	46.9	4.59	5.26	59.7	12.5	13.5
Movement LOS	D	D	D	D	D	D	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	49.91			52.66			12.16			13.01		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	14.10											
Intersection LOS	B											
Intersection V/C	0.662											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	0.00	44.55
l_p,int, Pedestrian LOS Score for Intersection	1.764	2.494	0.000	3.369
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	727	727	582	491
d_b, Bicycle Delay [s]	22.27	22.27	27.65	31.31
l_b,int, Bicycle LOS Score for Intersection	1.599	1.885	3.273	2.787
Bicycle LOS	A	A	C	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	34.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.882

Intersection Setup

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	161	307	11	119	208	386	476	201	165	22	160	174
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	161	307	11	119	208	386	476	201	165	22	160	174
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	40	77	3	30	52	97	119	503	41	6	402	44
Total Analysis Volume [veh/h]	161	307	11	119	208	386	476	201	165	22	160	174
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	28	0	16	30	0	19	42	0	14	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	24	24	8	23	23	15	49	49	3	36	36
g / C, Green / Cycle	0.10	0.24	0.24	0.08	0.22	0.22	0.15	0.49	0.49	0.03	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.09	0.08	0.08	0.07	0.11	0.20	0.14	0.35	0.09	0.01	0.31	0.31
s, saturation flow rate [veh/h]	180	190	190	180	190	190	350	570	190	180	380	190
c, Capacity [veh/h]	181	459	459	150	426	426	526	277	924	52	138	693
d1, Uniform Delay [s]	44.4	31.4	31.4	45.0	33.8	37.8	41.8	20.3	14.4	47.8	29.3	29.3
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.21	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.5	0.45	0.45	8.98	0.87	13.2	6.12	1.69	0.42	5.49	6.97	12.9
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.35	0.34	0.79	0.49	0.91	0.90	0.73	0.18	0.43	0.86	0.86
d, Delay for Lane Group [s/veh]	57.9	31.9	31.8	54.0	34.6	51.0	47.9	22.0	14.8	53.3	36.3	42.3
Lane Group LOS	E	C	C	D	C	D	D	C	B	D	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.59	3.23	3.20	3.26	4.46	10.6	6.16	12.2	2.17	0.62	14.0	15.2
50th-Percentile Queue Length [ft/ln]	114.	80.6	79.8	81.3	111.	265.	154.	305.	54.1	15.4	352.	381.
95th-Percentile Queue Length [veh/ln]	8.11	5.81	5.75	5.86	7.92	15.9	10.2	17.9	3.90	1.11	20.2	21.6
95th-Percentile Queue Length [ft/ln]	202.	145.	143.	146.	198.	398.	255.	448.	97.4	27.7	506.	542.

Movement, Approach, & Intersection Results

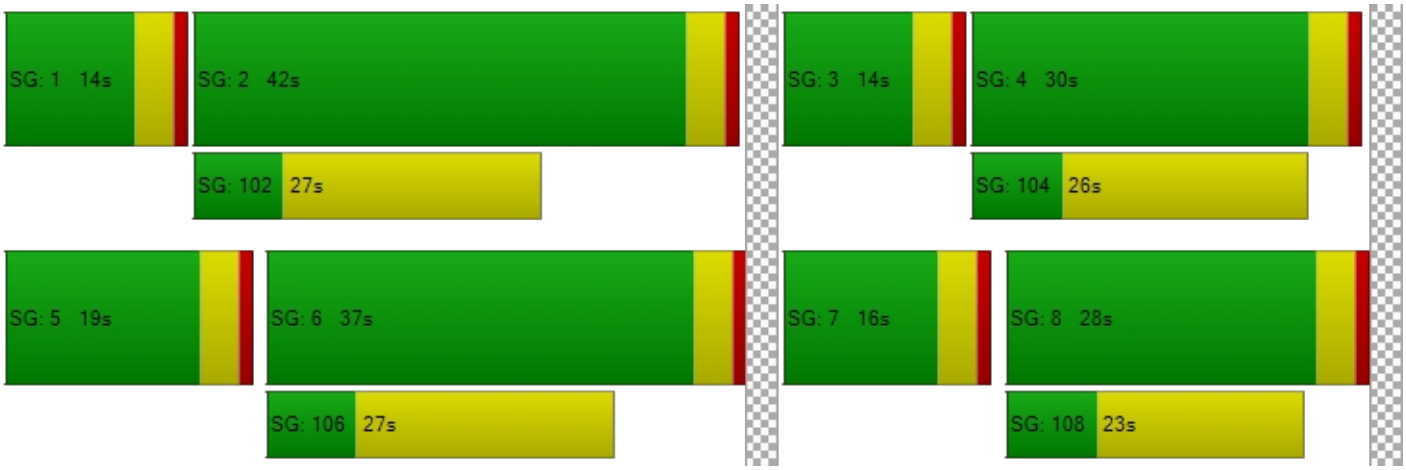
d_M, Delay for Movement [s/veh]	57.9	31.8	31.8	54.0	34.6	51.0	47.9	22.0	14.8	53.3	37.9	42.3
Movement LOS	E	C	C	D	C	D	D	C	B	D	D	D
d_A, Approach Delay [s/veh]	40.66			46.76			26.28			38.53		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	34.00											
Intersection LOS	C											
Intersection V/C	0.882											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.475	2.630	3.375	3.148
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	480	520	759	660
d_b, Bicycle Delay [s]	28.91	27.41	19.25	22.48
l_b,int, Bicycle LOS Score for Intersection	1.955	2.148	3.018	2.551
Bicycle LOS	A	B	C	B

Sequence

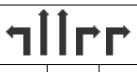
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	30.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.749

Intersection Setup

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	323	124	65	21	236	355	109	811	115	347	101	14
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	323	124	65	21	236	355	109	811	115	347	101	14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	81	31	16	5	59	89	27	203	288	87	255	4
Total Analysis Volume [veh/h]	323	124	65	21	236	355	109	811	115	347	101	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Ove	Prot	Per	Per	Prot	Per	Ove	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	16	51	51	10	45	0	16	37	37	17	38	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	33	50	3	24	24	9	50	66	13	54	54
g / C, Green / Cycle	0.10	0.29	0.44	0.03	0.21	0.21	0.08	0.43	0.57	0.11	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.03	0.01	0.12	0.19	0.06	0.21	0.30	0.10	0.18	0.19
s, saturation flow rate [veh/h]	350	190	190	180	190	190	180	380	380	350	380	190
c, Capacity [veh/h]	367	551	833	48	402	402	136	163	216	397	178	890
d1, Uniform Delay [s]	50.7	31.0	18.7	55.1	40.8	43.9	52.3	23.7	15.2	50.1	19.7	19.9
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.88	0.20	0.04	6.27	1.36	6.51	10.1	1.08	0.94	6.09	0.62	1.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.22	0.08	0.44	0.59	0.88	0.80	0.50	0.53	0.87	0.38	0.40
d, Delay for Lane Group [s/veh]	57.6	31.2	18.8	61.4	42.1	50.4	62.5	24.7	16.1	56.2	20.4	21.3
Lane Group LOS	E	C	B	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.93	2.66	1.02	0.68	6.16	10.4	3.48	8.13	9.25	5.24	5.96	6.45
50th-Percentile Queue Length [ft/ln]	123.	66.4	25.5	17.0	154.	261.	86.9	203.	231.	130.	149.	161.
95th-Percentile Queue Length [veh/ln]	8.57	4.78	1.84	1.23	10.2	15.7	6.26	12.8	14.2	8.99	9.97	10.6
95th-Percentile Queue Length [ft/ln]	214.	119.	46.0	30.7	255.	394.	156.	320.	355.	224.	249.	265.

Movement, Approach, & Intersection Results

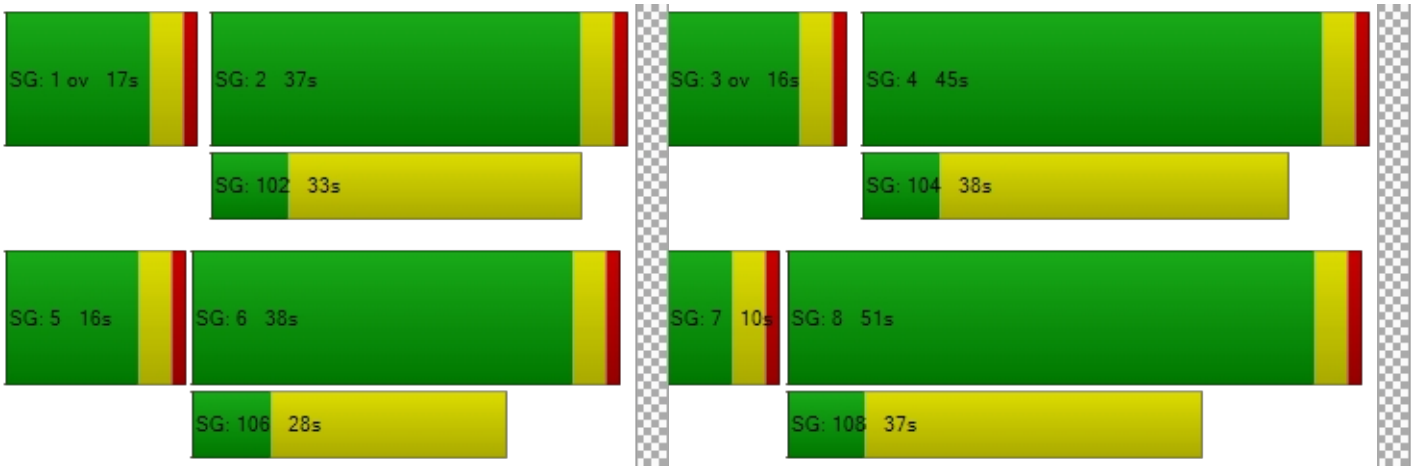
d_M, Delay for Movement [s/veh]	57.6	31.2	18.8	61.4	42.1	50.4	62.5	24.7	16.1	56.2	20.7	21.3
Movement LOS	E	C	B	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	46.33			47.65			21.99			29.67		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	30.46											
Intersection LOS	C											
Intersection V/C	0.749											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.830	2.352	3.197	2.923
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	817	713	574	591
d_b, Bicycle Delay [s]	20.12	23.83	29.25	28.54
l_b,int, Bicycle LOS Score for Intersection	2.404	2.569	3.270	2.318
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	6.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.324

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	46	6	18	5	0	6	7	887	49	25	135	2
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	6	18	5	0	6	7	887	49	25	135	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	222	12	6	338	1
Total Analysis Volume [veh/h]	46	6	18	5	0	6	7	887	49	25	135	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	2	2	1	93	93	3	95	95
g / C, Green / Cycle	0.05	0.05	0.02	0.02	0.01	0.78	0.78	0.03	0.80	0.80
(v / s)_i Volume / Saturation Flow Rate	0.03	0.01	0.00	0.00	0.00	0.25	0.24	0.01	0.23	0.25
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	190	190	180	380	190
c, Capacity [veh/h]	82	87	28	30	20	147	147	52	301	150
d1, Uniform Delay [s]	56.11	55.37	58.29	58.31	58.9	3.99	3.96	57.4	3.31	3.36
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.88	1.71	2.88	3.19	10.6	0.57	0.56	6.83	0.25	0.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.56	0.28	0.18	0.20	0.36	0.32	0.31	0.48	0.29	0.31
d, Delay for Lane Group [s/veh]	61.99	57.08	61.18	61.51	69.5	4.56	4.52	64.2	3.56	3.89
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.50	0.74	0.17	0.21	0.27	3.09	3.01	0.85	2.39	2.66
50th-Percentile Queue Length [ft/ln]	37.51	18.62	4.32	5.17	6.73	77.2	75.3	21.1	59.7	66.4
95th-Percentile Queue Length [veh/ln]	2.70	1.34	0.31	0.37	0.48	5.56	5.43	1.52	4.30	4.78
95th-Percentile Queue Length [ft/ln]	67.51	33.51	7.78	9.31	12.1	139.	135.	38.0	107.	119.

Movement, Approach, & Intersection Results

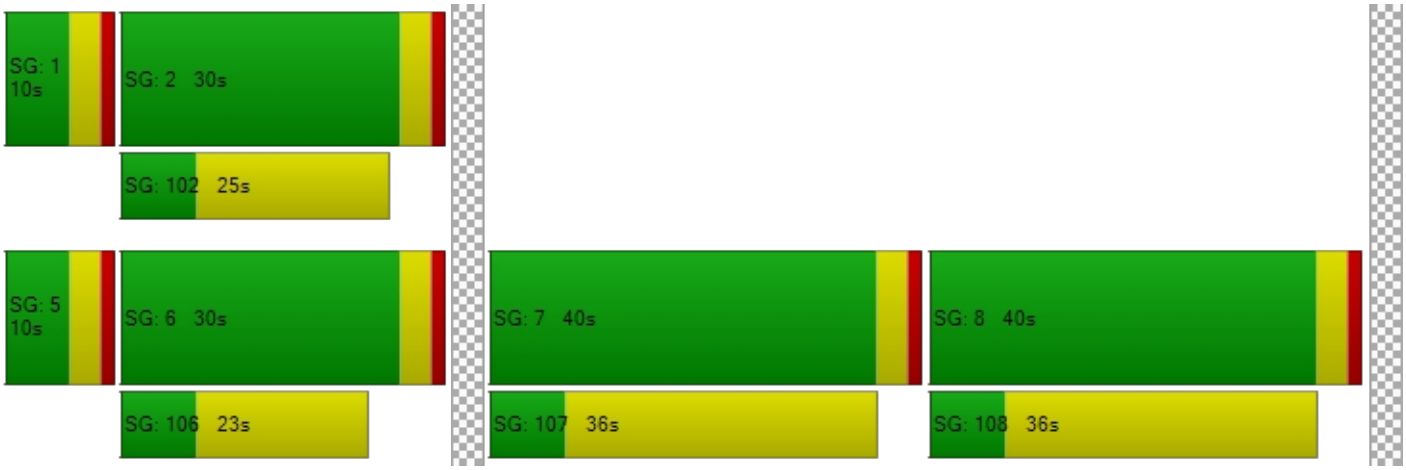
d_M, Delay for Movement [s/veh]	61.9	57.0	57.0	61.1	0.00	61.5	69.5	4.54	4.52	64.2	3.67	3.89
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	60.31			61.36			5.02			4.77		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	6.75											
Intersection LOS	A											
Intersection V/C	0.324											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.001	1.962	2.848	2.838
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.675	1.560	2.338	2.318
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	164.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.061

Intersection Setup

Name	Va Av			Va Av			Lambert Road			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Lambert Road			Ca Ca		
Base Volume Input [veh/h]	355	198	180	8	402	46	53	248	591	102	870	2
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	355	198	180	8	402	46	53	248	591	102	870	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	89	50	45	2	101	12	13	62	148	256	218	1
Total Analysis Volume [veh/h]	355	198	180	8	402	46	53	248	591	102	870	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Unsi	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	17	50	0	10	43	0	13	36	0	24	47	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	29	1	17	17	5	54	54	20	69	69
g / C, Green / Cycle	0.11	0.24	0.01	0.14	0.14	0.04	0.45	0.45	0.17	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.20	0.05	0.00	0.12	0.12	0.03	0.07	0.31	0.29	0.15	0.16
s, saturation flow rate [veh/h]	1800	3800	180	190	190	180	380	190	350	380	190
c, Capacity [veh/h]	196	904	23	269	269	76	170	854	584	218	109
d1, Uniform Delay [s]	53.50	36.79	58.7	50.2	50.0	56.7	19.4	26.4	50.0	12.8	12.9
k, delay calibration	0.30	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.15	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	377.26	0.12	8.95	7.04	6.16	10.8	0.18	4.59	339.	0.29	0.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.81	0.22	0.35	0.84	0.82	0.70	0.15	0.69	1.75	0.26	0.28
d, Delay for Lane Group [s/veh]	430.75	36.91	67.7	57.2	56.2	67.5	19.6	31.0	389.	13.1	13.5
Lane Group LOS	F	D	E	E	E	E	B	C	F	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	26.43	2.37	0.30	7.16	6.90	1.82	2.09	14.3	36.2	3.89	4.21
50th-Percentile Queue Length [ft/ln]	660.69	59.19	7.45	178.	172.	45.4	52.3	358.	906.	97.2	105.
95th-Percentile Queue Length [veh/ln]	41.75	4.26	0.54	11.5	11.2	3.27	3.77	20.5	56.6	7.00	7.58
95th-Percentile Queue Length [ft/ln]	1043.7	106.55	13.4	288.	280.	81.7	94.2	514.	141	175.	189.

Movement, Approach, & Intersection Results

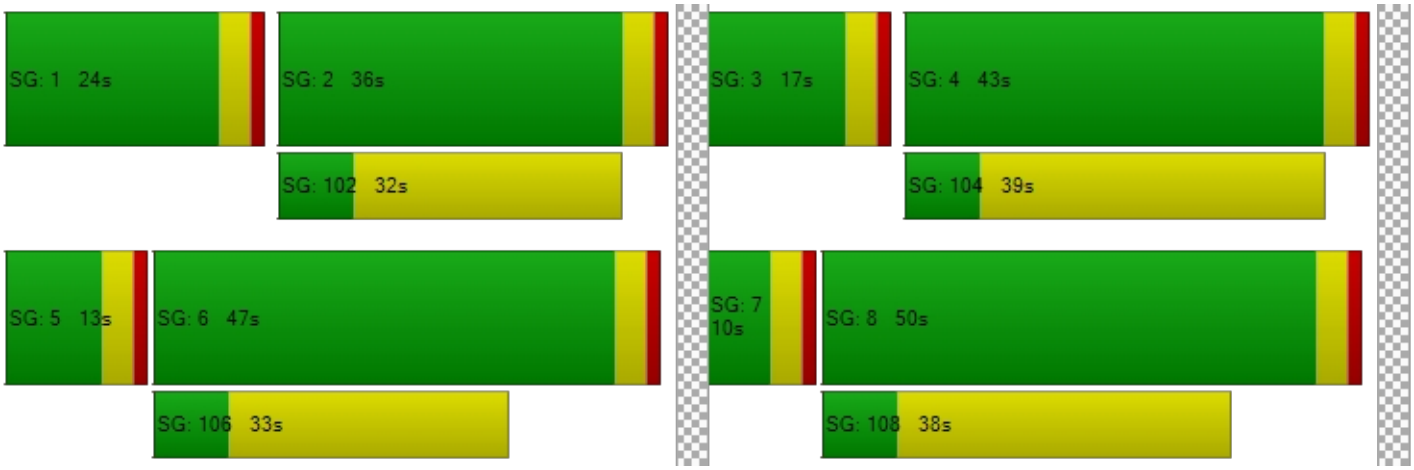
d_M, Delay for Movement [s/veh]	430.	36.9	0.00	67.7	56.8	56.2	67.5	19.6	31.0	389.	13.2	13.5
Movement LOS	F	D		E	E	E	E	B	C	F	B	B
d_A, Approach Delay [s/veh]	289.74			56.93			30.03			216.21		
Approach LOS	F			E			C			F		
d_I, Intersection Delay [s/veh]	164.03											
Intersection LOS	F											
Intersection V/C	1.061											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.884	2.452	2.909	3.001
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	766	650	533	716
d_b, Bicycle Delay [s]	22.83	27.35	32.28	24.72
l_b,int, Bicycle LOS Score for Intersection	2.016	1.936	2.050	2.601
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	4.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.582

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Base Volume Input [veh/h]	5	1	1	0	0	25	15	434	8	7	190	5
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	25	15	434	8	7	190	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	1	0	0	0	0	6	4	109	2	2	477	1
Total Analysis Volume [veh/h]	5	1	1	0	0	25	15	434	8	7	190	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	75	0	10	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	2	103	103	1	102	102
g / C, Green / Cycle	0.03	0.03	0.02	0.86	0.86	0.01	0.85	0.85
(v / s)_i Volume / Saturation Flow Rate	0.00	0.01	0.01	0.12	0.12	0.00	0.50	0.00
s, saturation flow rate [veh/h]	1800	1900	180	190	190	190	380	190
c, Capacity [veh/h]	103	54	36	163	163	21	323	161
d1, Uniform Delay [s]	56.81	57.35	58.0	1.32	1.32	58.9	2.67	1.33
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.27	5.91	7.41	0.17	0.17	9.39	0.80	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.46	0.41	0.14	0.13	0.34	0.59	0.00
d, Delay for Lane Group [s/veh]	57.09	63.26	65.4	1.49	1.49	68.3	3.46	1.33
Lane Group LOS	E	E	E	A	A	E	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.22	0.84	0.52	0.52	0.51	0.27	4.31	0.01
50th-Percentile Queue Length [ft/ln]	5.38	20.92	13.1	12.9	12.8	6.63	107.	0.30
95th-Percentile Queue Length [veh/ln]	0.39	1.51	0.94	0.93	0.93	0.48	7.71	0.02
95th-Percentile Queue Length [ft/ln]	9.68	37.65	23.6	23.2	23.1	11.9	192.	0.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.0	57.0	57.0	0.00	0.00	63.2	65.4	1.49	1.49	68.3	3.46	1.33
Movement LOS	E	E	E			E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	57.09			63.26			3.59			3.69		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	4.45											
Intersection LOS	A											
Intersection V/C	0.582											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.739	1.751	0.000	2.849
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	1184	1184
d_b, Bicycle Delay [s]	33.00	33.00	10.00	10.00
l_b,int, Bicycle LOS Score for Intersection	1.571	1.560	1.937	3.144
Bicycle LOS	A	A	A	C

Sequence

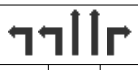
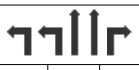
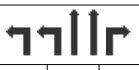
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	43.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.827

Intersection Setup

Name	St Co			St Co			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	St Co			St Co			Birch Street			Birch Street		
Base Volume Input [veh/h]	84	169	116	739	930	242	119	580	53	101	643	322
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	169	116	739	930	242	119	580	53	101	643	322
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	21	42	29	185	233	61	30	145	13	25	161	81
Total Analysis Volume [veh/h]	84	169	116	739	930	242	119	580	53	101	643	322
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	32	61	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	36	36	27	57	57	6	35	35	6	35	35
g / C, Green / Cycle	0.05	0.30	0.30	0.23	0.48	0.48	0.05	0.29	0.29	0.05	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	0.06	0.21	0.49	0.13	0.03	0.15	0.03	0.03	0.17	0.17
s, saturation flow rate [veh/h]	350	380	190	350	190	190	350	380	190	350	380	190
c, Capacity [veh/h]	164	113	565	793	907	907	172	111	559	169	111	557
d1, Uniform Delay [s]	55.8	31.0	31.5	45.4	31.3	18.8	56.1	35.2	30.7	55.9	36.0	36.0
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.45	0.06	0.18	5.62	21.0	0.16	4.89	1.72	0.34	3.36	2.18	4.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.15	0.21	0.93	1.03	0.27	0.69	0.52	0.09	0.60	0.58	0.58
d, Delay for Lane Group [s/veh]	58.2	31.0	31.7	51.1	52.4	18.9	61.0	36.9	31.0	59.3	38.2	40.3
Lane Group LOS	E	C	C	D	F	B	E	D	C	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.30	1.82	2.56	11.3	15.2	4.07	1.89	7.34	1.18	1.58	8.34	8.69
50th-Percentile Queue Length [ft/ln]	32.4	45.6	64.0	283.	381.	101.	47.2	183.	29.4	39.4	208.	217.
95th-Percentile Queue Length [veh/ln]	2.34	3.28	4.61	16.8	22.0	7.32	3.40	11.7	2.12	2.84	13.0	13.5
95th-Percentile Queue Length [ft/ln]	58.4	82.0	115.	421.	551.	183.	85.1	294.	53.0	71.0	326.	338.

Movement, Approach, & Intersection Results

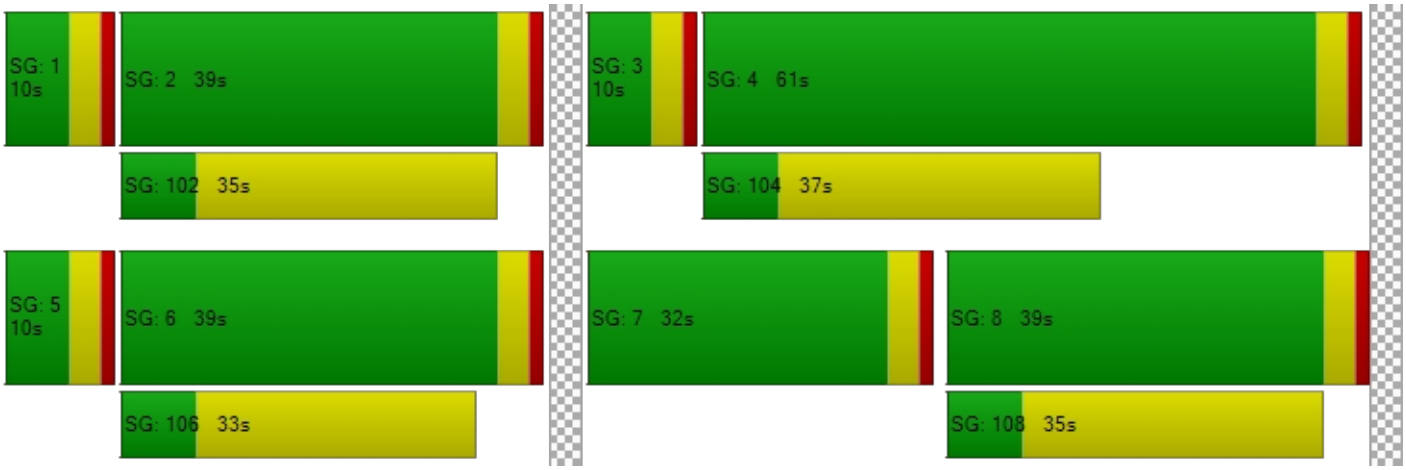
d_M, Delay for Movement [s/veh]	58.2	31.0	31.7	51.1	52.4	18.9	61.0	36.9	31.0	59.3	38.2	40.3
Movement LOS	E	C	C	D	F	B	E	D	C	E	D	D
d_A, Approach Delay [s/veh]	37.46			47.67			40.38			40.89		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	43.65											
Intersection LOS	D											
Intersection V/C	0.827											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.810	2.959	2.847	2.956
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	950	583	583
d_b, Bicycle Delay [s]	30.10	16.54	30.10	30.10
l_b,int, Bicycle LOS Score for Intersection	1.864	3.136	2.180	2.439
Bicycle LOS	A	C	B	B

Sequence

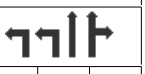
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	S As			S As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S As			S As			Birch Street			Birch Street		
Base Volume Input [veh/h]	272	7	351	60	32	10	5	106	356	396	877	11
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	272	7	351	60	32	10	5	106	356	396	877	11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	68	2	88	15	8	3	1	265	89	99	219	3
Total Analysis Volume [veh/h]	272	7	351	60	32	10	5	106	356	396	877	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Ove	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	24	61	61	0	37	0	10	38	0	21	49	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	22	43	6	6	1	69	69	17	85	85
g / C, Green / Cycle	0.10	0.18	0.35	0.05	0.05	0.01	0.58	0.58	0.14	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.18	0.03	0.02	0.00	0.39	0.36	0.11	0.23	0.23
s, saturation flow rate [veh/h]	350	190	190	1800	1900	180	190	190	350	190	190
c, Capacity [veh/h]	340	342	675	116	94	15	109	109	496	135	135
d1, Uniform Delay [s]	53.0	40.5	30.6	56.09	55.45	59.2	17.3	16.6	49.8	6.51	6.50
k, delay calibration	0.11	0.11	0.26	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.34	0.02	1.49	3.51	3.30	13.0	3.21	2.65	3.00	0.65	0.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.02	0.52	0.52	0.45	0.34	0.67	0.62	0.80	0.33	0.33
d, Delay for Lane Group [s/veh]	57.3	40.5	32.1	59.61	58.75	72.2	20.5	19.3	52.8	7.16	7.15
Lane Group LOS	E	D	C	E	E	E	C	B	D	A	A
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.22	0.17	8.30	1.90	1.32	0.20	14.3	12.7	5.95	4.14	4.12
50th-Percentile Queue Length [ft/ln]	105.	4.35	207.	47.54	33.09	5.12	357.	318.	148.	103.	102.
95th-Percentile Queue Length [veh/ln]	7.59	0.31	13.0	3.42	2.38	0.37	20.5	18.5	9.95	7.45	7.41
95th-Percentile Queue Length [ft/ln]	189.	7.84	325.	85.58	59.56	9.21	512.	464.	248.	186.	185.

Movement, Approach, & Intersection Results

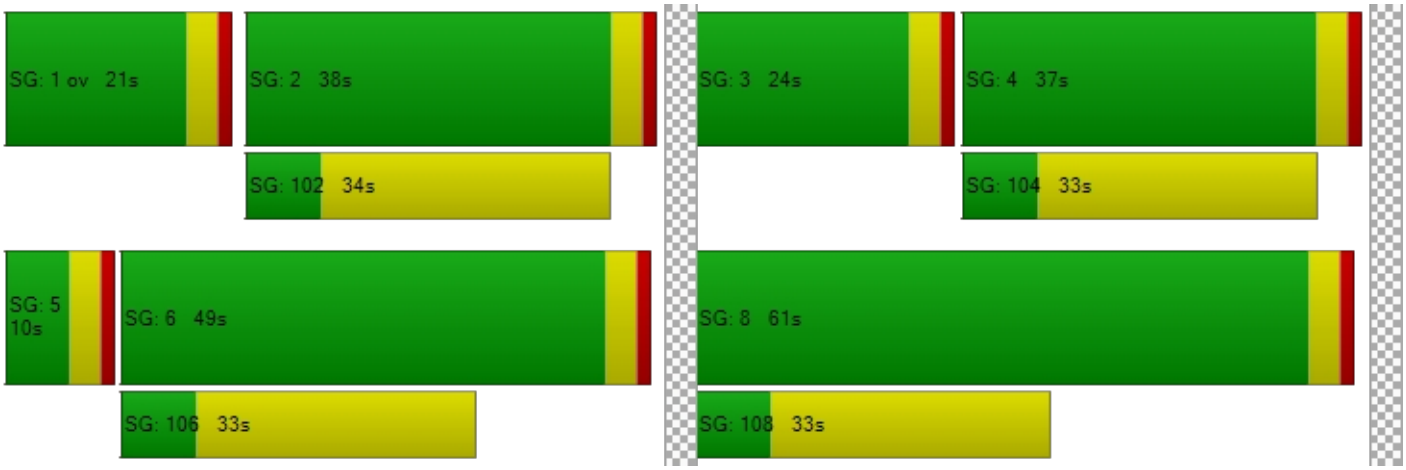
d_M, Delay for Movement [s/veh]	57.3	40.5	32.1	59.6	58.7	58.7	72.2	20.2	19.3	52.8	7.15	7.15
Movement LOS	E	D	C	E	E	E	E	C	B	D	A	A
d_A, Approach Delay [s/veh]	43.11			59.25			20.17			21.24		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	25.93											
Intersection LOS	C											
Intersection V/C	0.755											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.696	1.995	2.817	3.000
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	950	550	567	750
d_b, Bicycle Delay [s]	16.54	31.54	30.82	23.44
l_b,int, Bicycle LOS Score for Intersection	2.599	1.728	2.732	2.619
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.722

Intersection Setup

Name	N As			N As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N As			N As			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	178	2	499	353	986	18	9	864	94
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	178	2	499	353	986	18	9	864	94
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	1	1	2	45	1	125	88	247	5	2	216	24
Total Analysis Volume [veh/h]	3	3	6	178	2	499	353	986	18	9	864	94
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Ove	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	37	0	39	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	2	2	24	24	61	27	76	76	2	51	51
g / C, Green / Cycle	0.02	0.02	0.02	0.20	0.20	0.51	0.22	0.63	0.63	0.01	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.26	0.20	0.26	0.26	0.01	0.23	0.05
s, saturation flow rate [veh/h]	180	190	190	180	180	190	180	190	190	180	380	190
c, Capacity [veh/h]	67	33	33	362	362	969	405	120	120	25	160	804
d1, Uniform Delay [s]	58.0	58.0	58.1	40.3	40.3	19.5	44.8	10.9	10.9	58.6	25.8	21.0
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.49	0.16	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	1.17	2.58	0.35	0.35	1.91	8.24	1.07	1.06	8.46	1.29	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.09	0.18	0.25	0.25	0.51	0.87	0.42	0.42	0.36	0.54	0.12
d, Delay for Lane Group [s/veh]	58.3	59.2	60.7	40.6	40.6	21.4	53.1	12.0	11.9	67.1	27.1	21.3
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	0.10	0.20	2.28	2.29	9.62	11.0	6.72	6.67	0.33	9.43	1.68
50th-Percentile Queue Length [ft/ln]	2.37	2.51	5.09	57.0	57.1	240.	275.	168.	166.	8.26	235.	42.0
95th-Percentile Queue Length [veh/ln]	0.17	0.18	0.37	4.11	4.11	14.7	16.4	10.9	10.9	0.59	14.4	3.03
95th-Percentile Queue Length [ft/ln]	4.27	4.52	9.16	102.	102.	367.	411.	274.	272.	14.8	361.	75.7

Movement, Approach, & Intersection Results

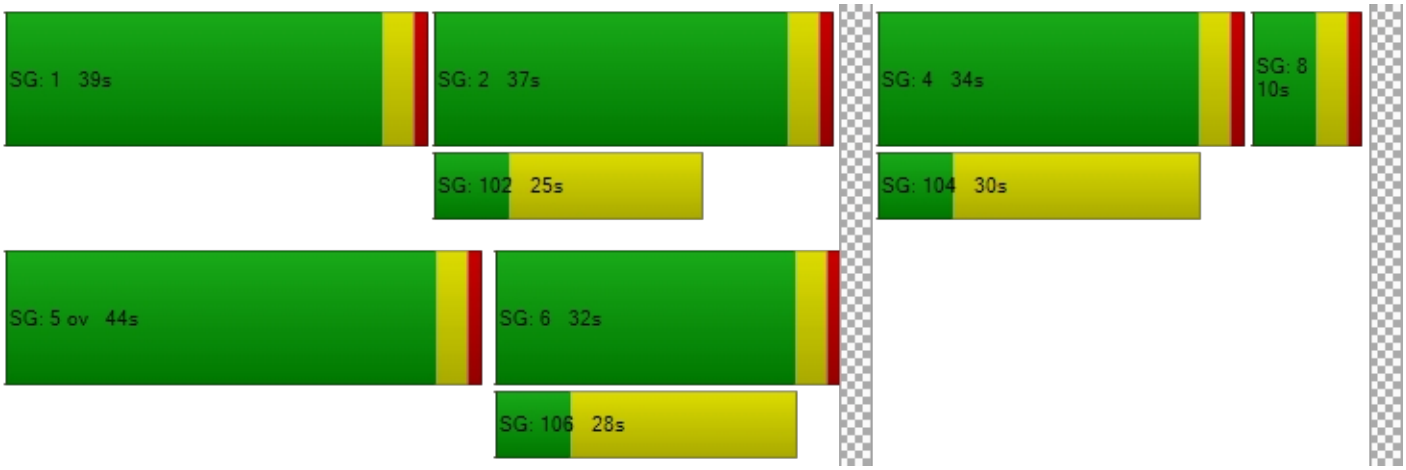
d_M, Delay for Movement [s/veh]	58.3	59.2	60.7	40.6	40.6	21.4	53.1	11.9	11.9	67.1	27.1	21.3
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	59.74			26.54			22.68			26.95		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	25.07											
Intersection LOS	C											
Intersection V/C	0.722											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.420	2.849	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	550	467
d_b, Bicycle Delay [s]	54.17	33.76	31.55	35.28
l_b,int, Bicycle LOS Score for Intersection	1.579	2.680	2.679	2.357
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	36.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.601

Intersection Setup

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Base Volume Input [veh/h]	148	256	101	490	113	216	56	660	382	69	522	245
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	148	256	101	490	113	216	56	660	382	69	522	245
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	37	64	25	123	284	54	14	165	96	17	131	61
Total Analysis Volume [veh/h]	148	256	101	490	113	216	56	660	382	69	522	245
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	38	0	33	61	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	20	20	20	33	33	5	59	59	6	60	60
g / C, Green / Cycle	0.05	0.17	0.17	0.16	0.28	0.28	0.04	0.49	0.49	0.05	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.06	0.14	0.24	0.23	0.03	0.17	0.20	0.04	0.14	0.13
s, saturation flow rate [veh/h]	350	380	190	350	380	190	180	380	190	180	380	190
c, Capacity [veh/h]	178	630	315	570	105	528	78	185	927	90	188	940
d1, Uniform Delay [s]	56.4	44.6	44.5	48.9	41.1	40.7	56.7	19.0	19.6	56.3	17.7	17.5
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.68	0.38	0.72	3.92	2.18	3.58	11.8	0.53	1.35	12.8	0.37	0.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.38	0.37	0.86	0.86	0.84	0.72	0.36	0.41	0.77	0.28	0.26
d, Delay for Lane Group [s/veh]	66.1	44.9	45.2	52.8	43.3	44.3	68.6	19.5	21.0	69.2	18.1	18.2
Lane Group LOS	E	D	D	D	D	D	E	B	C	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.46	3.24	3.15	7.44	12.9	12.7	1.93	5.79	7.12	2.39	4.31	4.09
50th-Percentile Queue Length [ft/ln]	61.5	80.9	78.7	186.	324.	317.	48.3	144.	177.	59.6	107.	102.
95th-Percentile Queue Length [veh/ln]	4.43	5.83	5.67	11.9	18.8	18.5	3.48	9.74	11.4	4.30	7.72	7.37
95th-Percentile Queue Length [ft/ln]	110.	145.	141.	297.	471.	464.	87.0	243.	287.	107.	192.	184.

Movement, Approach, & Intersection Results

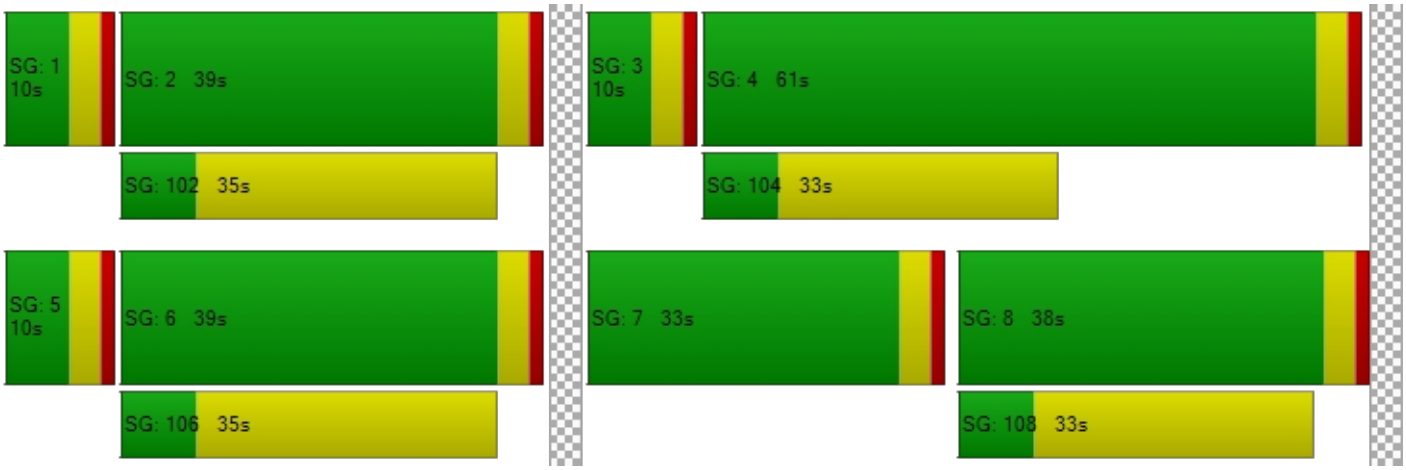
d_M, Delay for Movement [s/veh]	66.1	45.0	45.2	52.8	43.5	44.3	68.6	19.5	21.0	69.2	18.1	18.2
Movement LOS	E	D	D	D	D	D	E	B	C	E	B	B
d_A, Approach Delay [s/veh]	51.24			46.09			22.58			22.38		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	36.03											
Intersection LOS	D											
Intersection V/C	0.601											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.994	3.031	2.789	2.806
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	950	583	583
d_b, Bicycle Delay [s]	30.83	16.55	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.837	2.572	2.465	2.249
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	122.5
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.914

Intersection Setup

Name	Va Av			Va Av			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Birch Street			Rose Drive		
Base Volume Input [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	37	65	7	220	237	75	20	130	37	11	108	98
Total Analysis Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	17	38	0	36	57	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	23	23	32	43	43	6	45	45	5	44	44
g / C, Green / Cycle	0.10	0.19	0.19	0.27	0.36	0.36	0.05	0.37	0.37	0.04	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.08	0.08	0.07	0.49	0.33	0.33	0.02	0.18	0.17	0.02	0.11	0.21
s, saturation flow rate [veh/h]	180	190	190	180	190	190	350	190	190	180	380	190
c, Capacity [veh/h]	177	359	359	480	679	679	165	706	706	71	138	692
d1, Uniform Delay [s]	53.2	42.7	42.6	44.0	36.8	36.8	55.7	28.9	28.5	56.7	27.3	30.5
k, delay calibration	0.11	0.11	0.11	0.50	0.27	0.27	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.2	0.72	0.70	382.	11.8	11.8	2.14	2.43	2.12	8.59	0.59	3.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.40	0.39	1.83	0.92	0.92	0.48	0.49	0.46	0.62	0.31	0.57
d, Delay for Lane Group [s/veh]	63.5	43.4	43.3	426.	48.7	48.7	57.8	31.4	30.6	65.3	27.9	33.9
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.92	3.84	3.75	65.1	19.4	19.4	1.22	8.13	7.41	1.48	4.55	9.65
50th-Percentile Queue Length [ft/ln]	123.	96.0	93.6	162	485.	485.	30.4	203.	185.	37.1	113.	241.
95th-Percentile Queue Length [veh/ln]	8.56	6.91	6.75	101.	26.6	26.6	2.19	12.8	11.8	2.67	8.05	14.7
95th-Percentile Queue Length [ft/ln]	214.	172.	168.	253	666.	666.	54.7	320.	296.	66.7	201.	368.

Movement, Approach, & Intersection Results

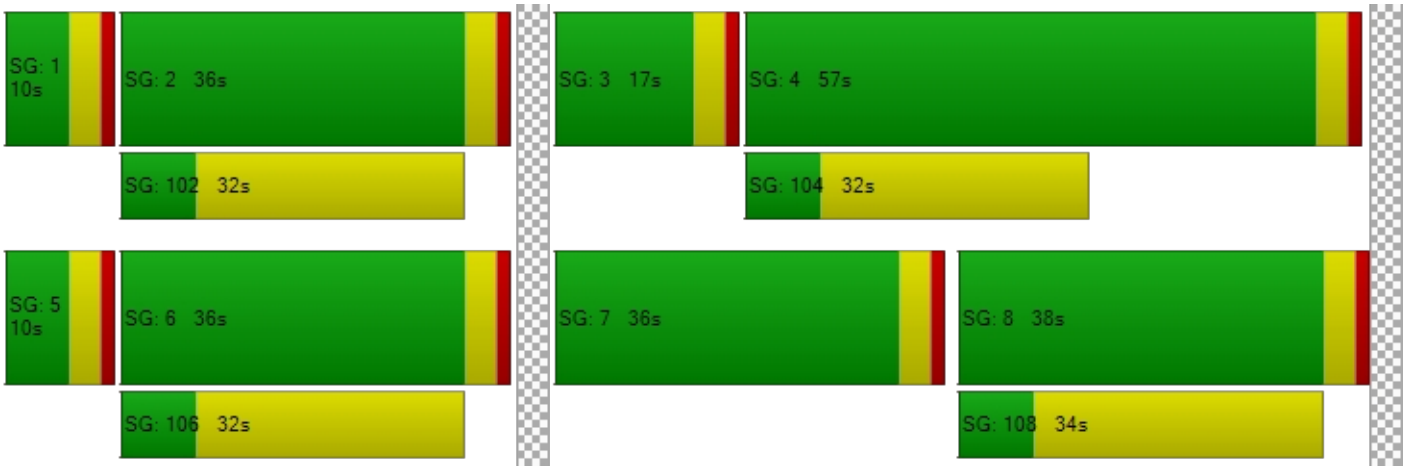
d_M, Delay for Movement [s/veh]	63.5	43.3	43.3	426.	48.7	48.7	57.8	31.1	30.6	65.3	27.9	33.9
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	50.29			205.15			33.88			32.56		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	122.55											
Intersection LOS	F											
Intersection V/C	0.914											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.620	2.870	2.731	2.839
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	883	533	533
d_b, Bicycle Delay [s]	30.83	18.72	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	1.918	3.313	2.177	2.273
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.871

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	202	4	2	374	3	2	0	10	9	0	3
Total Analysis Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	107	107	107	107	107	107	5	5	5
g / C, Green / Cycle	0.89	0.89	0.89	0.89	0.89	0.89	0.04	0.04	0.04
(v / s)_i Volume / Saturation Flow Rate	0.01	0.22	0.22	0.00	0.79	0.01	0.03	0.02	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	180	1800	1800	1900
c, Capacity [veh/h]	901	169	169	157	169	160	108	62	76
d1, Uniform Delay [s]	0.69	0.88	0.87	0.69	3.22	0.69	56.70	56.32	55.60
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.34	0.34	0.00	6.96	0.01	2.73	7.70	1.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.24	0.24	0.00	0.88	0.01	0.43	0.56	0.17
d, Delay for Lane Group [s/veh]	0.71	1.22	1.21	0.69	10.1	0.70	59.43	64.01	56.64
Lane Group LOS	A	A	A	A	B	A	E	E	E
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.01	0.52	0.51	0.01	8.00	0.01	1.49	1.17	0.40
50th-Percentile Queue Length [ft/ln]	0.34	12.9	12.8	0.15	199.	0.27	37.16	29.30	10.07
95th-Percentile Queue Length [veh/ln]	0.02	0.93	0.92	0.01	12.6	0.02	2.68	2.11	0.73
95th-Percentile Queue Length [ft/ln]	0.61	23.2	23.0	0.27	315.	0.49	66.89	52.74	18.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.71	1.22	1.21	0.69	10.1	0.70	59.4	59.4	59.4	64.0	56.6	56.6
Movement LOS	A	A	A	A	B	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	1.21			10.07			59.43			62.02		
Approach LOS	A			B			E			E		
d_I, Intersection Delay [s/veh]	9.01											
Intersection LOS	A											
Intersection V/C	0.871											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	49.48	49.48	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.780	2.783	1.778	1.985
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.53	4.53	37.58	37.58
l_b,int, Bicycle LOS Score for Intersection	2.248	4.054	1.637	1.639
Bicycle LOS	B	D	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	15.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.656

Intersection Setup

Name				SR-57			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57			Im Hi			Im Hi		
Base Volume Input [veh/h]	0	0	0	653	0	551	0	167	792	0	213	233
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	653	0	551	0	167	792	0	213	233
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	163	0	138	0	419	198	0	534	58
Total Analysis Volume [veh/h]	0	0	0	653	0	551	0	167	792	0	213	233
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Unsi	Per	Per	Unsi
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		24	24	24	58	58
g / C, Green / Cycle		0.27	0.27	0.27	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate		0.22	0.22	0.21	0.29	0.37
s, saturation flow rate [veh/h]		180	180	190	5700	5700
c, Capacity [veh/h]		485	485	512	3656	3656
d1, Uniform Delay [s]		30.8	30.8	30.3	8.18	9.24
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.66	3.66	2.68	0.42	0.69
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.78	0.46	0.58
d, Delay for Lane Group [s/veh]		34.5	34.5	33.0	8.59	9.93
Lane Group LOS		C	C	C	A	A
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		8.42	8.42	8.19	4.95	7.16
50th-Percentile Queue Length [ft/ln]		210.	210.	204.	123.69	179.06
95th-Percentile Queue Length [veh/ln]		13.1	13.1	12.8	8.60	11.55
95th-Percentile Queue Length [ft/ln]		329.	329.	322.	214.89	288.79

Movement, Approach, & Intersection Results

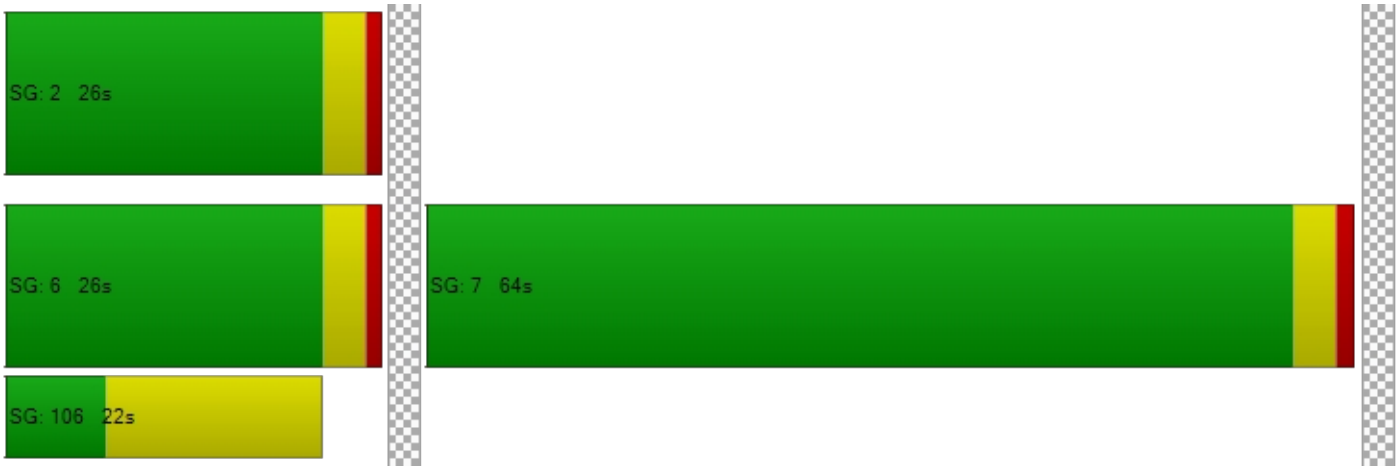
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	34.5	0.00	33.4	0.00	8.59	0.00	0.00	9.93	0.00
Movement LOS				C		C		A			A	
d_A, Approach Delay [s/veh]	0.00			34.02			8.59			9.93		
Approach LOS	A			C			A			A		
d_I, Intersection Delay [s/veh]	15.27											
Intersection LOS	B											
Intersection V/C	0.656											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.424	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.546	2.480	2.734
Bicycle LOS	D	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	29.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.678

Intersection Setup

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Base Volume Input [veh/h]	109	36	908	0	0	92	113	155	606	0	170	16
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	109	36	908	0	0	92	113	155	606	0	170	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	275	9	227	0	0	23	28	388	152	0	425	4
Total Analysis Volume [veh/h]	109	36	908	0	0	92	113	155	606	0	170	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Per	Split	Prot	Per	Unsi	Per	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	53	0	0	0	10	12	42	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	6	8	51	39	39
g / C, Green / Cycle	0.35	0.35	0.35	0.05	0.08	0.48	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.29	0.29	0.27	0.02	0.06	0.27	0.23	0.23
s, saturation flow rate [veh/h]	350	180	190	3800	1800	5700	5700	1900
c, Capacity [veh/h]	122	631	666	206	138	2743	2088	696
d1, Uniform Delay [s]	31.1	31.1	30.5	48.19	47.79	19.43	27.26	27.26
k, delay calibration	0.11	0.18	0.16	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.43	4.47	2.86	1.52	11.00	0.85	1.37	4.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.82	0.78	0.45	0.82	0.57	0.62	0.62
d, Delay for Lane Group [s/veh]	32.5	35.6	33.3	49.71	58.79	20.28	28.64	31.32
Lane Group LOS	C	D	C	D	E	C	C	C
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.6	12.4	11.9	1.21	3.32	8.91	8.90	9.42
50th-Percentile Queue Length [ft/ln]	289.	312.	299.	30.23	83.12	222.75	222.55	235.53
95th-Percentile Queue Length [veh/ln]	17.1	18.2	17.6	2.18	5.98	13.81	13.80	14.45
95th-Percentile Queue Length [ft/ln]	429.	456.	441.	54.42	149.61	345.13	344.88	361.37

Movement, Approach, & Intersection Results

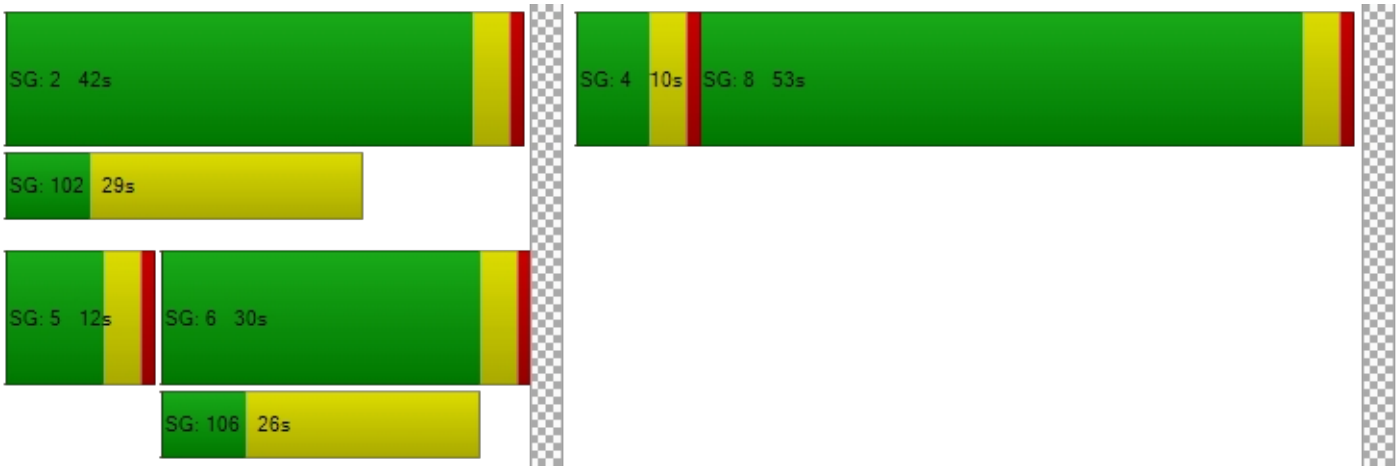
d_M, Delay for Movement [s/veh]	32.7	35.6	34.3	0.00	0.00	49.7	58.7	20.2	0.00	0.00	29.2	31.3
Movement LOS	C	D	C			D	E	C			C	C
d_A, Approach Delay [s/veh]	33.54			49.71			22.89			29.31		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	29.28											
Intersection LOS	C											
Intersection V/C	0.678											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.11	42.11	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.706	2.031	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	114	723	495
d_b, Bicycle Delay [s]	14.96	46.70	21.40	29.75
l_b,int, Bicycle LOS Score for Intersection	4.931	1.560	2.475	2.267
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	31.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.816

Intersection Setup

Name	As Ro			As Ro			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	As Ro			As Ro			Im Hi			Im Hi		
Base Volume Input [veh/h]	164	232	80	181	372	177	227	211	112	101	184	108
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	232	80	181	372	177	227	211	112	101	184	108
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	41	58	20	45	93	44	57	528	28	25	461	27
Total Analysis Volume [veh/h]	164	232	80	181	372	177	227	211	112	101	184	108
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	12	41	0	19	48	0	11	40	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	23	23	8	24	24	15	57	57	7	49	49
g / C, Green / Cycle	0.05	0.21	0.21	0.07	0.22	0.22	0.14	0.52	0.52	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.05	0.08	0.08	0.05	0.20	0.09	0.13	0.39	0.40	0.06	0.25	0.27
s, saturation flow rate [veh/h]	350	190	190	350	190	190	180	380	190	180	570	190
c, Capacity [veh/h]	194	390	390	244	417	417	246	195	979	116	252	842
d1, Uniform Delay [s]	51.5	37.9	37.7	50.2	41.6	36.9	46.9	21.0	21.5	51.0	22.8	23.3
k, delay calibration	0.11	0.11	0.11	0.11	0.15	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.71	0.70	0.63	4.43	9.05	0.68	13.5	2.66	5.96	17.4	0.94	3.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.41	0.39	0.74	0.89	0.42	0.92	0.75	0.77	0.87	0.57	0.61
d, Delay for Lane Group [s/veh]	61.2	38.6	38.3	54.6	50.7	37.6	60.4	23.7	27.4	68.5	23.8	26.5
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.50	3.85	3.58	2.59	10.7	4.17	7.03	14.9	16.6	3.32	9.31	10.6
50th-Percentile Queue Length [ft/ln]	62.4	96.2	89.3	64.7	268.	104.	175.	372.	416.	82.8	232.	265.
95th-Percentile Queue Length [veh/ln]	4.50	6.93	6.44	4.66	16.1	7.51	11.3	21.2	23.3	5.97	14.3	15.9
95th-Percentile Queue Length [ft/ln]	112.	173.	160.	116.	403.	187.	284.	530.	583.	149.	357.	398.

Movement, Approach, & Intersection Results

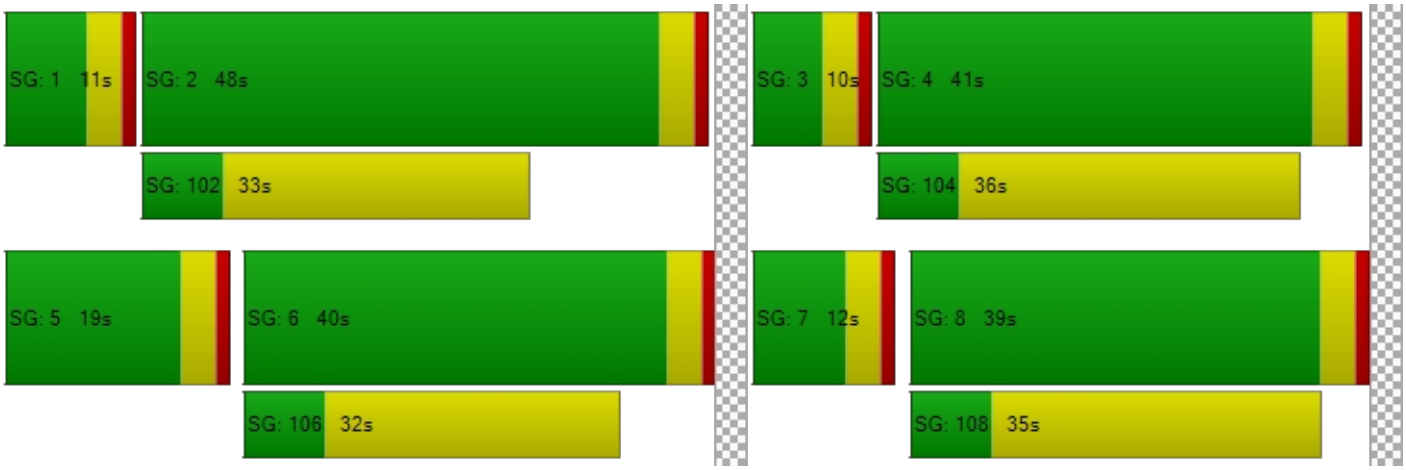
d_M, Delay for Movement [s/veh]	61.2	38.6	38.3	54.6	50.7	37.6	60.4	24.8	27.4	68.5	24.4	26.5
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	46.37			48.54			28.27			26.70		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	31.81											
Intersection LOS	C											
Intersection V/C	0.816											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.516	2.673	3.300	3.274
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	672	800	654
d_b, Bicycle Delay [s]	25.59	24.25	19.82	24.91
l_b,int, Bicycle LOS Score for Intersection	1.952	2.764	2.907	2.406
Bicycle LOS	A	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	17.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.703

Intersection Setup

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Base Volume Input [veh/h]	199	13	159	27	31	15	14	207	398	191	170	35
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	13	159	27	31	15	14	207	398	191	170	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	50	3	40	7	8	4	4	519	100	48	426	9
Total Analysis Volume [veh/h]	199	13	159	27	31	15	14	207	398	191	170	35
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	22	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	5	5	2	47	47	12	57	57
g / C, Green / Cycle	0.11	0.11	0.11	0.06	0.06	0.02	0.53	0.53	0.13	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.08	0.02	0.02	0.01	0.36	0.21	0.11	0.30	0.31
s, saturation flow rate [veh/h]	180	180	190	1800	1900	180	570	190	180	380	190
c, Capacity [veh/h]	203	203	214	103	109	38	298	996	231	240	120
d1, Uniform Delay [s]	37.7	37.7	38.7	40.69	41.08	43.5	16.0	12.9	38.3	8.75	8.91
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.06	2.09	5.01	1.34	2.61	5.86	1.36	1.20	7.30	0.68	1.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.52	0.74	0.26	0.42	0.37	0.70	0.40	0.83	0.48	0.50
d, Delay for Lane Group [s/veh]	39.7	39.8	43.7	42.03	43.68	49.4	17.4	14.1	45.6	9.43	10.3
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.29	2.30	3.65	0.61	1.06	0.37	10.1	4.86	4.52	5.38	5.94
50th-Percentile Queue Length [ft/ln]	57.1	57.5	91.3	15.16	26.39	9.18	254.	121.	112.	134.	148.
95th-Percentile Queue Length [veh/ln]	4.12	4.14	6.57	1.09	1.90	0.66	15.4	8.47	8.00	9.18	9.94
95th-Percentile Queue Length [ft/ln]	102.	103.	164.	27.29	47.50	16.5	384.	211.	200.	229.	248.

Movement, Approach, & Intersection Results

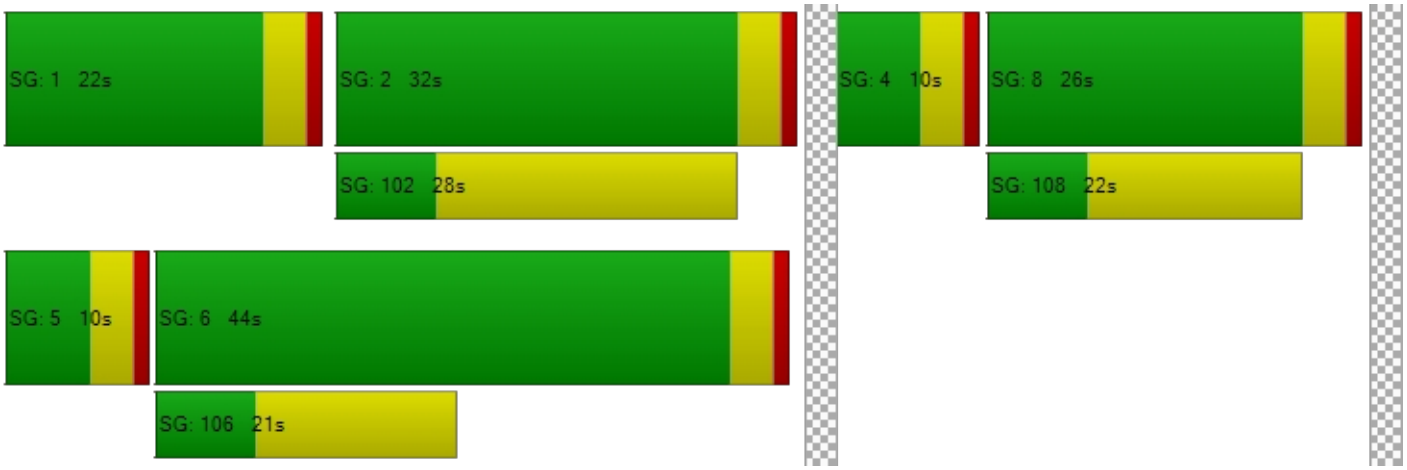
d_M, Delay for Movement [s/veh]	39.7	39.8	43.7	42.0	43.6	43.6	49.4	17.4	14.1	45.6	9.74	10.3
Movement LOS	D	D	D	D	D	D	D	B	B	D	A	B
d_A, Approach Delay [s/veh]	41.49			43.07			17.07			13.30		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.83											
Intersection LOS	B											
Intersection V/C	0.703											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	0.00	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.372	1.984	0.000	3.177
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	488	133	622	888
d_b, Bicycle Delay [s]	25.73	39.24	21.40	13.92
l_b,int, Bicycle LOS Score for Intersection	2.172	1.680	2.929	2.621
Bicycle LOS	B	A	C	B

Sequence

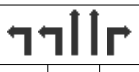
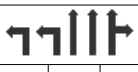
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.687

Intersection Setup

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Base Volume Input [veh/h]	192	277	94	352	726	123	148	145	263	77	124	96
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	192	277	94	352	726	123	148	145	263	77	124	96
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	48	69	24	88	182	31	37	364	66	19	312	24
Total Analysis Volume [veh/h]	192	277	94	352	726	123	148	145	263	77	124	96
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	0	16	35	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	17	17	11	21	21	6	45	45	5	45	45
g / C, Green / Cycle	0.07	0.18	0.18	0.12	0.22	0.22	0.06	0.48	0.48	0.06	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.05	0.10	0.09	0.10	0.19	0.06	0.04	0.30	0.30	0.02	0.23	0.24
s, saturation flow rate [veh/h]	350	190	190	350	380	190	350	380	190	350	380	190
c, Capacity [veh/h]	261	338	338	425	854	427	220	181	905	196	178	892
d1, Uniform Delay [s]	43.1	35.7	35.4	40.8	35.3	30.5	43.6	18.7	18.5	43.3	17.4	17.5
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.03	1.50	1.28	4.21	2.48	0.37	3.55	1.73	3.21	1.28	1.01	2.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.57	0.53	0.83	0.85	0.29	0.67	0.64	0.62	0.39	0.50	0.51
d, Delay for Lane Group [s/veh]	47.1	37.2	36.7	45.0	37.8	30.9	47.1	20.4	21.7	44.6	18.5	19.6
Lane Group LOS	D	D	D	D	D	C	D	C	C	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.34	4.17	3.83	4.23	8.19	2.36	1.80	9.48	9.54	0.90	6.72	7.09
50th-Percentile Queue Length [ft/ln]	58.4	104.	95.8	105.	204.	58.9	44.9	236.	238.	22.5	168.	177.
95th-Percentile Queue Length [veh/ln]	4.21	7.51	6.90	7.60	12.8	4.24	3.24	14.5	14.6	1.63	10.9	11.4
95th-Percentile Queue Length [ft/ln]	105.	187.	172.	190.	322.	106.	80.9	363.	365.	40.6	274.	286.

Movement, Approach, & Intersection Results

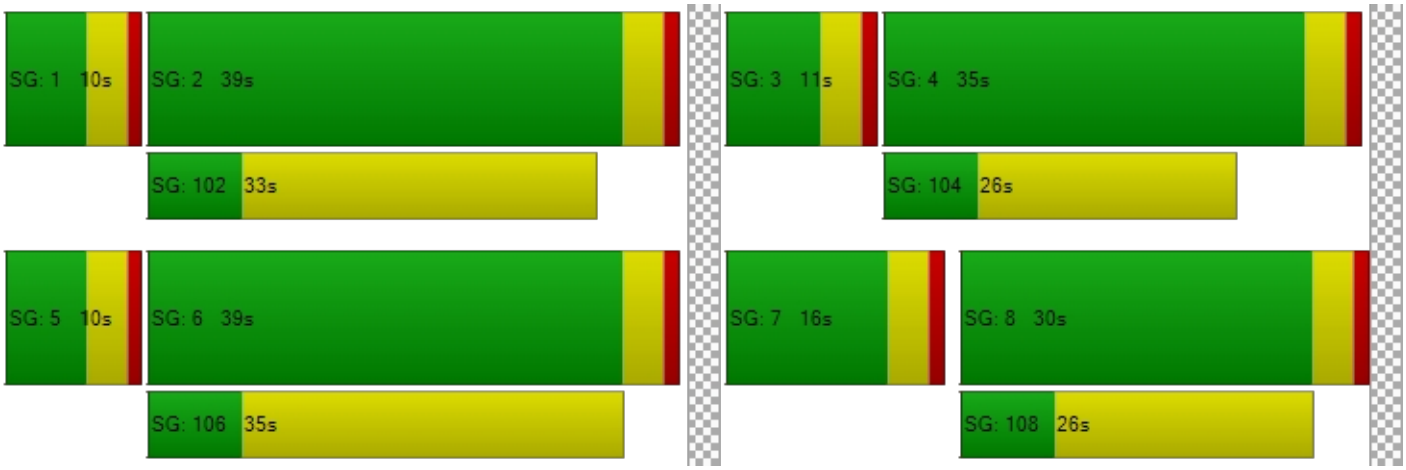
d_M, Delay for Movement [s/veh]	47.1	37.1	36.7	45.0	37.8	30.9	47.1	20.7	21.7	44.6	18.8	19.6
Movement LOS	D	D	D	D	D	C	D	C	C	D	B	B
d_A, Approach Delay [s/veh]	40.47			39.24			22.96			20.27		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	28.03											
Intersection LOS	C											
Intersection V/C	0.687											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	37.18	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.720	2.836	3.146	3.133
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	652	736	736
d_b, Bicycle Delay [s]	25.09	21.59	18.98	18.98
l_b,int, Bicycle LOS Score for Intersection	2.024	2.550	2.585	2.342
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name	Va Av			Va Av			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Im Hi			Im Hi		
Base Volume Input [veh/h]	144	214	129	311	347	247	218	110	99	127	172	163
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	214	129	311	347	247	218	110	99	127	172	163
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	36	54	32	78	87	62	55	277	25	32	430	41
Total Analysis Volume [veh/h]	144	214	129	311	347	247	218	110	99	127	172	163
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	46	0	17	52	0	13	42	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	12	12	12	18	18	9	68	68	6	65	65
g / C, Green / Cycle	0.06	0.11	0.11	0.11	0.16	0.16	0.08	0.59	0.59	0.05	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.07	0.09	0.09	0.13	0.06	0.19	0.05	0.04	0.30	0.09
s, saturation flow rate [veh/h]	350	380	190	350	380	190	350	570	190	350	570	190
c, Capacity [veh/h]	203	412	206	371	594	297	276	338	112	185	323	107
d1, Uniform Delay [s]	53.2	48.4	49.0	50.4	45.0	47.0	52.0	11.7	10.0	53.5	15.4	11.7
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.49	1.02	3.11	5.05	0.91	5.98	5.01	0.26	0.15	4.44	0.63	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.52	0.63	0.84	0.58	0.83	0.79	0.33	0.09	0.69	0.53	0.15
d, Delay for Lane Group [s/veh]	57.7	49.4	52.1	55.5	45.9	53.0	57.0	12.0	10.1	57.9	16.0	12.0
Lane Group LOS	E	D	D	E	D	D	E	B	B	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.17	2.96	3.72	4.65	4.67	7.33	3.28	4.69	1.10	1.92	9.14	2.03
50th-Percentile Queue Length [ft/ln]	54.2	74.0	93.0	116.	116.	183.	81.9	117.	27.5	47.9	228.	50.8
95th-Percentile Queue Length [veh/ln]	3.91	5.33	6.70	8.18	8.22	11.7	5.90	8.24	1.98	3.45	14.1	3.66
95th-Percentile Queue Length [ft/ln]	97.7	133.	167.	204.	205.	294.	147.	206.	49.5	86.3	352.	91.5

Movement, Approach, & Intersection Results

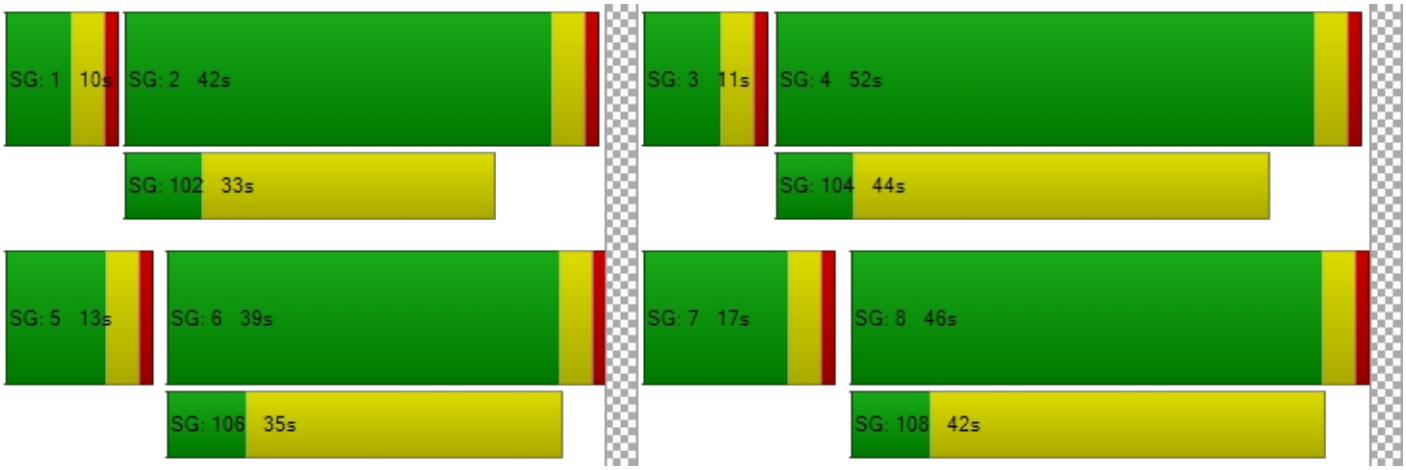
d_M, Delay for Movement [s/veh]	57.7	49.4	52.1	55.5	45.9	53.0	57.0	12.0	10.1	57.9	16.0	12.0
Movement LOS	E	D	D	E	D	D	E	B	B	E	B	B
d_A, Approach Delay [s/veh]	52.64			51.19			18.82			18.37		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	28.12											
Intersection LOS	C											
Intersection V/C	0.622											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.753	2.815	3.244	3.246
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	730	834	661	608
d_b, Bicycle Delay [s]	23.19	19.53	25.80	27.84
l_b,int, Bicycle LOS Score for Intersection	1.961	2.306	2.342	2.665
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	246.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.822

Intersection Setup

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Base Volume Input [veh/h]	267	240	152	944	590	37	44	134	249	280	156	598
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	267	240	152	944	590	37	44	134	249	280	156	598
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	67	60	38	236	148	9	11	336	62	70	392	150
Total Analysis Volume [veh/h]	267	240	152	944	590	37	44	134	249	280	156	598
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	25	25	8	22	22	5	65	65	6	67	67
g / C, Green / Cycle	0.09	0.20	0.20	0.07	0.18	0.18	0.04	0.54	0.54	0.05	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.08	0.06	0.08	0.27	0.16	0.02	0.02	0.28	0.27	0.08	0.28	0.31
s, saturation flow rate [veh/h]	350	380	190	350	380	190	180	380	190	350	570	190
c, Capacity [veh/h]	323	779	389	236	684	342	71	206	103	178	316	105
d1, Uniform Delay [s]	53.5	40.5	41.2	55.9	47.7	41.1	56.7	17.4	17.2	56.9	16.3	17.3
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.40	0.22	0.64	135	3.37	0.14	8.59	0.94	1.76	265.	0.56	2.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.31	0.39	4.00	0.86	0.11	0.62	0.52	0.50	1.58	0.50	0.57
d, Delay for Lane Group [s/veh]	58.9	40.7	41.8	141	51.1	41.3	65.3	18.3	18.9	322.	16.9	19.5
Lane Group LOS	E	D	D	F	D	D	E	B	B	F	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.20	3.05	3.97	47.9	8.86	0.94	1.48	9.47	9.33	9.23	8.77	11.0
50th-Percentile Queue Length [ft/ln]	105.	76.2	99.3	119	221.	23.4	37.1	236.	233.	230.	219.	276.
95th-Percentile Queue Length [veh/ln]	7.56	5.49	7.15	72.4	13.7	1.68	2.67	14.5	14.3	15.8	13.6	16.5
95th-Percentile Queue Length [ft/ln]	189.	137.	178.	181	343.	42.1	66.7	363.	358.	395.	340.	412.

Movement, Approach, & Intersection Results

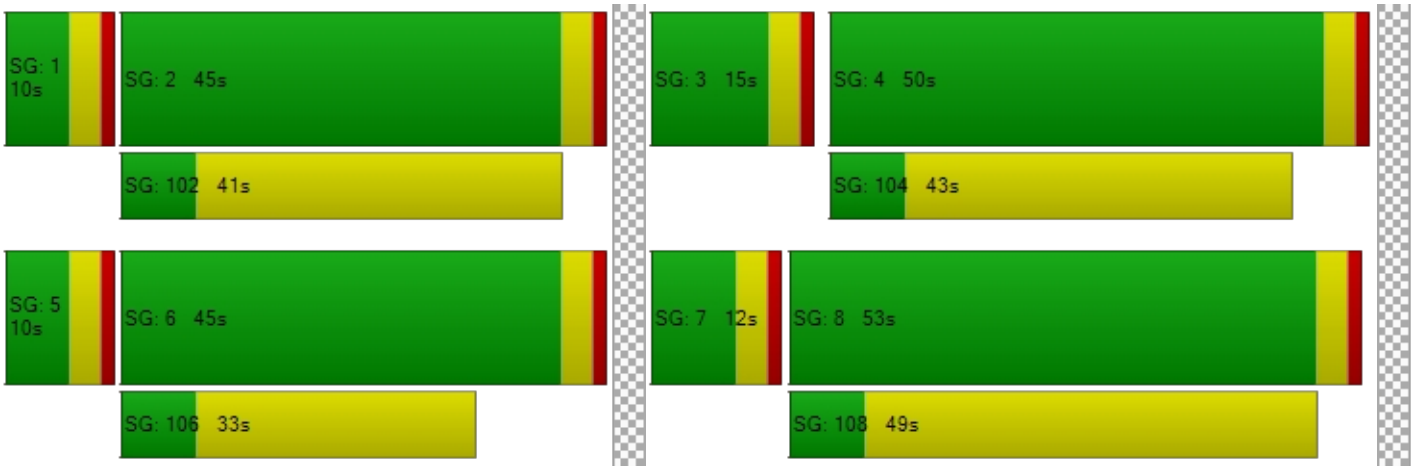
d_M, Delay for Movement [s/veh]	58.9	40.7	41.8	141	51.1	41.3	65.3	18.4	18.9	322.	16.9	19.5
Movement LOS	E	D	D	F	D	D	E	B	B	F	B	B
d_A, Approach Delay [s/veh]	48.38			867.70			19.82			52.51		
Approach LOS	D			F			B			D		
d_I, Intersection Delay [s/veh]	246.40											
Intersection LOS	F											
Intersection V/C	0.822											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.855	2.949	3.097	3.393
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.103	2.856	2.461	2.905
Bicycle LOS	B	C	B	C

Sequence

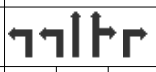
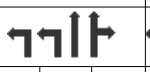
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.849

Intersection Setup

Name	St Co			St Co			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	St Co			St Co			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	350	655	337	607	439	16	42	164	288	436	131	763
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	350	655	337	607	439	16	42	164	288	436	131	763
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	88	164	84	152	110	4	11	412	72	109	329	191
Total Analysis Volume [veh/h]	350	655	337	607	439	16	42	164	288	436	131	763
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Ove
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	17	34	0	27	44	0	10	39	0	20	49	49
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	12	12	12	12	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.0	4.0	4.0	4.0	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	13	25	25	25	23	35	35	5	40	40	16	51	78
g / C, Green / Cycle	0.1	0.2	0.2	0.2	0.19	0.29	0.29	0.04	0.33	0.33	0.13	0.43	0.65
(v / s)_i Volume / Saturation Flow Rate	0.1	0.1	0.1	0.1	0.17	0.12	0.12	0.01	0.26	0.25	0.12	0.23	0.40
s, saturation flow rate [veh/h]	35	19	19	19	350	190	190	350	570	190	350	570	190
c, Capacity [veh/h]	38	39	39	39	671	553	553	135	189	632	468	244	124
d1, Uniform Delay [s]	52.	46.	45.	44.	47.4	34.2	34.2	56.1	35.8	35.8	51.4	25.5	12.0
k, delay calibration	0.1	0.2	0.2	0.1	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.2	13.	11.	5.1	4.91	0.49	0.48	1.30	3.02	8.51	8.80	0.86	2.29
d3, Initial Queue Delay [s]	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.9	0.8	0.8	0.7	0.90	0.41	0.41	0.31	0.77	0.76	0.93	0.54	0.61
d, Delay for Lane Group [s/veh]	62.	59.	57.	49.	52.3	34.7	34.7	57.4	38.8	44.3	60.2	26.4	14.3
Lane Group LOS	E	E	E	D	D	C	C	E	D	D	E	C	B
Critical Lane Group	No	Ye	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.7	11.	11.	9.0	9.29	5.47	5.40	0.64	13.1	14.0	7.05	9.42	11.8
50th-Percentile Queue Length [ft/ln]	14	28	27	22	232.	136.	134.	16.1	328.	350.	176.	235.	295.
95th-Percentile Queue Length [veh/ln]	9.6	17.	16.	13.	14.2	9.31	9.21	1.16	19.0	20.1	11.4	14.4	17.4
95th-Percentile Queue Length [ft/ln]	24	42	41	34	357.	232.	230.	29.0	476.	504.	285.	361.	436.

Movement, Approach, & Intersection Results

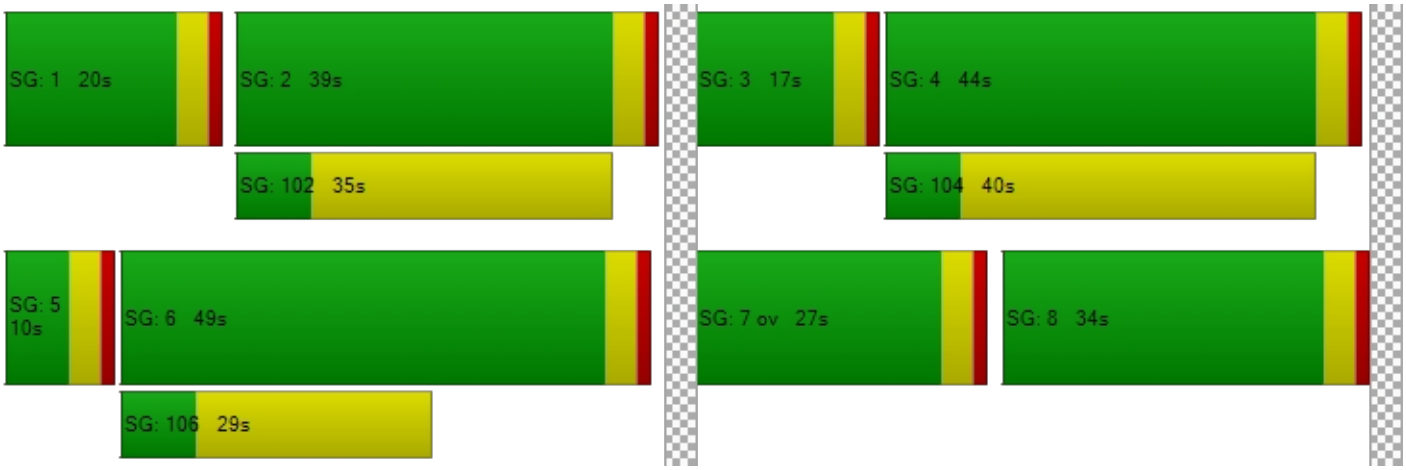
d_M, Delay for Movement [s/veh]	62.2	58.7	50.0	52.3	34.7	34.7	57.4	39.5	44.3	60.2	26.4	14.3
Movement LOS	E	E	D	D	C	C	E	D	D	E	C	B
d_A, Approach Delay [s/veh]	57.60			44.81			40.61			28.61		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	40.19											
Intersection LOS	D											
Intersection V/C	0.849											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.957	2.876	3.260	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	500	666	583	750
d_b, Bicycle Delay [s]	33.76	26.68	30.12	23.45
I_b,int, Bicycle LOS Score for Intersection	2.667	2.436	2.376	2.943
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.647

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	524	0	855	0	148	835	265	177	0
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	524	0	855	0	148	835	265	177	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	131	0	214	0	370	209	66	443	0
Total Analysis Volume [veh/h]	0	0	0	524	0	855	0	148	835	265	177	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Per	Prot	Per	Per
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	Lea	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	45	0	0	0	32	0	13	45	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		90	90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		26	26	44	44	9	56
g / C, Green / Cycle		0.28	0.28	0.49	0.49	0.10	0.63
(v / s)_i Volume / Saturation Flow Rate		0.15	0.23	0.26	0.22	0.08	0.31
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		995	1080	2767	1845	340	3574
d1, Uniform Delay [s]		27.13	29.77	16.10	15.28	39.71	9.09
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.43	1.35	0.75	0.80	3.89	0.49
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.53	0.79	0.53	0.45	0.78	0.50
d, Delay for Lane Group [s/veh]		27.57	31.12	16.85	16.08	43.60	9.58
Lane Group LOS		C	C	B	B	D	A
Critical Lane Group		No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		4.69	8.49	6.84	5.54	3.01	5.68
50th-Percentile Queue Length [ft/ln]		117.20	212.19	170.90	138.55	75.20	141.98
95th-Percentile Queue Length [veh/ln]		8.24	13.27	11.12	9.40	5.41	9.59
95th-Percentile Queue Length [ft/ln]		205.97	331.63	278.09	235.07	135.36	239.69

Movement, Approach, & Intersection Results

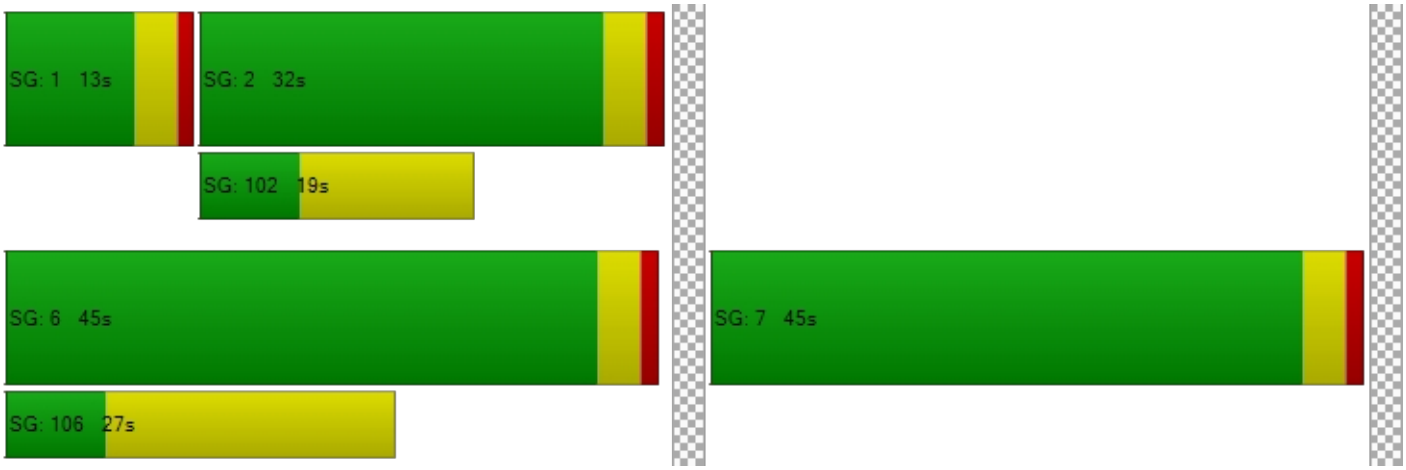
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	27.5	0.00	31.1	0.00	16.8	16.0	43.6	9.58	0.00
Movement LOS				C		C		B	B	D	A	
d_A, Approach Delay [s/veh]	0.00			29.77			16.57			14.01		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	18.84											
Intersection LOS	B											
Intersection V/C	0.647											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.251	2.467	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	911	622	911
d_b, Bicycle Delay [s]	45.01	13.35	21.37	13.35
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.833	2.679
Bicycle LOS	D	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	13.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.533

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	676	0	329	0	0	0	0	164	576	0	118	570
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	676	0	329	0	0	0	0	164	576	0	118	570
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Total 15-Minute Volume [veh/h]	169	0	82	0	0	0	0	412	144	0	297	0
Total Analysis Volume [veh/h]	676	0	329	0	0	0	0	164	576	0	118	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Per	Split	Per	Per	Per	Per	Per	Per	Per	Per	Unsi
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22		60	60	60	60
g / C, Green / Cycle	0.24	0.24		0.67	0.67	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.19	0.17		0.29	0.29	0.29	0.21
s, saturation flow rate [veh/h]	3500	1900		380	190	190	5700
c, Capacity [veh/h]	836	454		255	127	127	3831
d1, Uniform Delay [s]	32.25	31.47		6.83	6.83	6.83	6.10
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.92	2.22		0.54	1.08	1.08	0.21
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.73		0.44	0.44	0.44	0.31
d, Delay for Lane Group [s/veh]	34.18	33.69		7.37	7.91	7.91	6.31
Lane Group LOS	C	C		A	A	A	A
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	6.97	6.69		4.37	4.56	4.56	2.73
50th-Percentile Queue Length [ft/ln]	174.35	167.30		109.	114.	114.	68.20
95th-Percentile Queue Length [veh/ln]	11.31	10.93		7.80	8.06	8.06	4.91
95th-Percentile Queue Length [ft/ln]	282.63	273.36		194.	201.	201.	122.75

Movement, Approach, & Intersection Results

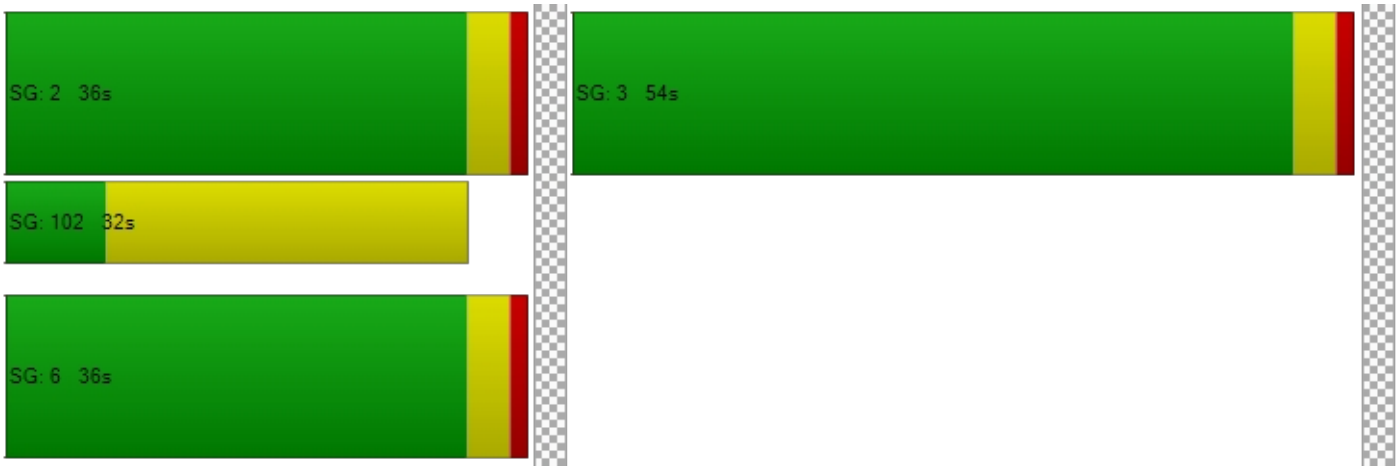
d_M, Delay for Movement [s/veh]	34.1	0.00	33.6	0.00	0.00	0.00	0.00	7.42	7.91	0.00	6.31	0.00
Movement LOS	C		C					A	A		A	
d_A, Approach Delay [s/veh]	34.02			0.00			7.64			6.31		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	13.29											
Intersection LOS	B											
Intersection V/C	0.533											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.608	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	2.783	2.212
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	14.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.620

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	124	0	30	120	0	447	204	223	42	16	172	60
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	124	0	30	120	0	447	204	223	42	16	172	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	31	0	8	30	0	112	51	558	11	4	431	15
Total Analysis Volume [veh/h]	124	0	30	120	0	447	204	223	42	16	172	60
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	48	0	0	48	0	11	32	0	10	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	7	62	62	2	57	57
g / C, Green / Cycle	0.15	0.15	0.15	0.08	0.69	0.69	0.02	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.12	0.06	0.39	0.41	0.01	0.31	0.32
s, saturation flow rate [veh/h]	1800	1800	3800	350	380	190	180	380	190
c, Capacity [veh/h]	345	353	576	275	262	131	42	241	120
d1, Uniform Delay [s]	35.44	34.72	36.73	40.5	7.04	7.26	43.3	8.62	8.75
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.91	0.57	2.28	3.90	0.90	1.98	5.64	0.70	1.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.45	0.34	0.78	0.74	0.57	0.59	0.38	0.49	0.50
d, Delay for Lane Group [s/veh]	36.34	35.29	39.01	44.4	7.94	9.24	48.9	9.32	10.2
Lane Group LOS	D	D	D	D	A	A	D	A	B
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.17	2.41	4.83	2.33	6.23	7.08	0.41	5.51	6.03
50th-Percentile Queue Length [ft/ln]	79.37	60.33	120.68	58.3	155.	177.	10.3	137.	150.
95th-Percentile Queue Length [veh/ln]	5.71	4.34	8.43	4.20	10.3	11.4	0.74	9.35	10.0
95th-Percentile Queue Length [ft/ln]	142.86	108.59	210.77	105.	258.	286.	18.6	233.	251.

Movement, Approach, & Intersection Results

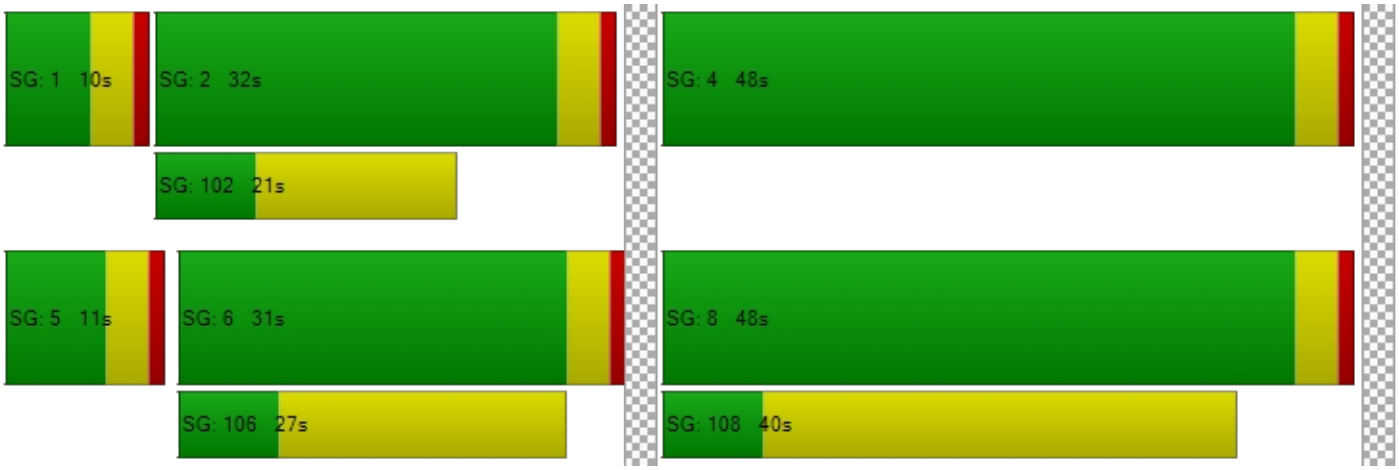
d_M, Delay for Movement [s/veh]	36.3	36.3	36.3	35.2	35.2	39.0	44.4	8.37	9.24	48.9	9.61	10.2
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	B
d_A, Approach Delay [s/veh]	36.34			38.22			11.36			9.98		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	14.68											
Intersection LOS	B											
Intersection V/C	0.620											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.818	2.461	0.000	3.346
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	978	978	622	600
d_b, Bicycle Delay [s]	11.76	11.76	21.37	22.06
l_b,int, Bicycle LOS Score for Intersection	1.814	2.495	2.923	2.549
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	17.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.666

Intersection Setup

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	147	59	23	88	112	144	47	213	216	27	153	46
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	59	23	88	112	144	47	213	216	27	153	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	37	15	6	22	28	36	12	535	54	7	383	12
Total Analysis Volume [veh/h]	147	59	23	88	112	144	47	213	216	27	153	46
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	27	0	22	30	0	10	31	0	10	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	13	13	6	9	9	4	53	53	3	51	51
g / C, Green / Cycle	0.10	0.14	0.14	0.06	0.10	0.10	0.05	0.58	0.58	0.03	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.08	0.02	0.02	0.05	0.06	0.08	0.01	0.38	0.11	0.02	0.27	0.28
s, saturation flow rate [veh/h]	180	190	190	180	190	190	350	570	190	180	380	190
c, Capacity [veh/h]	184	267	267	117	196	196	166	332	110	61	216	108
d1, Uniform Delay [s]	39.5	34.0	34.0	41.4	38.5	39.2	41.4	12.5	8.86	42.7	11.5	11.6
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.68	0.27	0.26	9.31	2.60	5.22	0.92	0.97	0.39	4.87	0.77	1.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.16	0.15	0.75	0.57	0.73	0.28	0.64	0.20	0.44	0.48	0.50
d, Delay for Lane Group [s/veh]	47.2	34.3	34.2	50.7	41.1	44.4	42.3	13.5	9.25	47.5	12.2	13.3
Lane Group LOS	D	C	C	D	D	D	D	B	A	D	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.53	0.82	0.78	2.20	2.47	3.33	0.52	8.88	1.95	0.67	5.85	6.39
50th-Percentile Queue Length [ft/ln]	88.2	20.4	19.5	55.0	61.7	83.3	13.0	221.	48.8	16.6	146.	159.
95th-Percentile Queue Length [veh/ln]	6.35	1.47	1.41	3.96	4.45	6.00	0.94	13.7	3.52	1.20	9.82	10.5
95th-Percentile Queue Length [ft/ln]	158.	36.7	35.2	99.1	111.	150.	23.4	344.	87.8	30.0	245.	263.

Movement, Approach, & Intersection Results

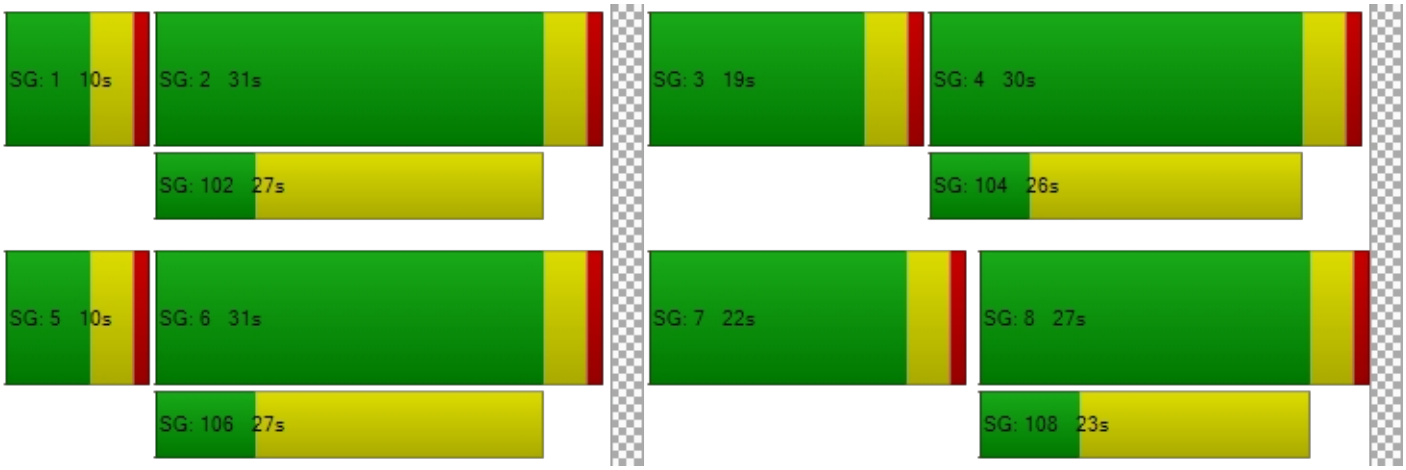
d_M, Delay for Movement [s/veh]	47.2	34.3	34.2	50.7	41.1	44.4	42.3	13.5	9.25	47.5	12.6	13.3
Movement LOS	D	C	C	D	D	D	D	B	A	D	B	B
d_A, Approach Delay [s/veh]	42.61			44.98			13.72			13.21		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.33											
Intersection LOS	B											
Intersection V/C	0.666											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	34.72	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.413	2.396	3.307	3.131
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	577	599	599
d_b, Bicycle Delay [s]	24.98	22.80	22.09	22.09
l_b,int, Bicycle LOS Score for Intersection	1.749	1.843	2.881	2.443
Bicycle LOS	A	A	C	B

Sequence

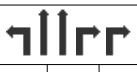
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	30.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.653

Intersection Setup

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	547	327	292	6	116	126	199	116	516	128	530	31
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	547	327	292	6	116	126	199	116	516	128	530	31
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	137	82	73	2	29	32	50	291	129	32	133	8
Total Analysis Volume [veh/h]	547	327	292	6	116	126	199	116	516	128	530	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Ove	Prot	Per	Per	Prot	Per	Ove	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	26	58	58	10	42	0	20	42	42	10	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	30	40	1	10	10	15	67	92	6	57	57
g / C, Green / Cycle	0.18	0.25	0.34	0.01	0.09	0.09	0.13	0.55	0.76	0.05	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.16	0.17	0.15	0.00	0.06	0.07	0.11	0.31	0.14	0.04	0.10	0.10
s, saturation flow rate [veh/h]	350	190	190	180	190	190	180	380	380	350	380	190
c, Capacity [veh/h]	615	480	639	18	165	165	227	210	289	178	181	909
d1, Uniform Delay [s]	48.3	40.5	31.2	59.0	53.3	53.6	51.5	17.2	3.92	56.1	18.1	18.1
k, delay calibration	0.11	0.11	0.17	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.65	1.72	0.79	10.3	5.38	7.16	10.3	1.06	0.13	5.41	0.25	0.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.68	0.46	0.33	0.70	0.76	0.88	0.55	0.18	0.72	0.20	0.21
d, Delay for Lane Group [s/veh]	52.9	42.2	32.0	69.4	58.7	60.7	61.8	18.3	4.05	61.5	18.3	18.6
Lane Group LOS	D	D	C	E	E	E	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.37	8.93	6.78	0.23	3.65	4.05	6.53	10.3	1.55	2.05	3.04	3.20
50th-Percentile Queue Length [ft/ln]	209.	223.	169.	5.84	91.3	101.	163.	259.	38.7	51.1	75.9	80.0
95th-Percentile Queue Length [veh/ln]	13.1	13.8	11.0	0.42	6.58	7.29	10.7	15.6	2.79	3.68	5.47	5.76
95th-Percentile Queue Length [ft/ln]	327.	345.	276.	10.5	164.	182.	267.	391.	69.7	92.0	136.	144.

Movement, Approach, & Intersection Results

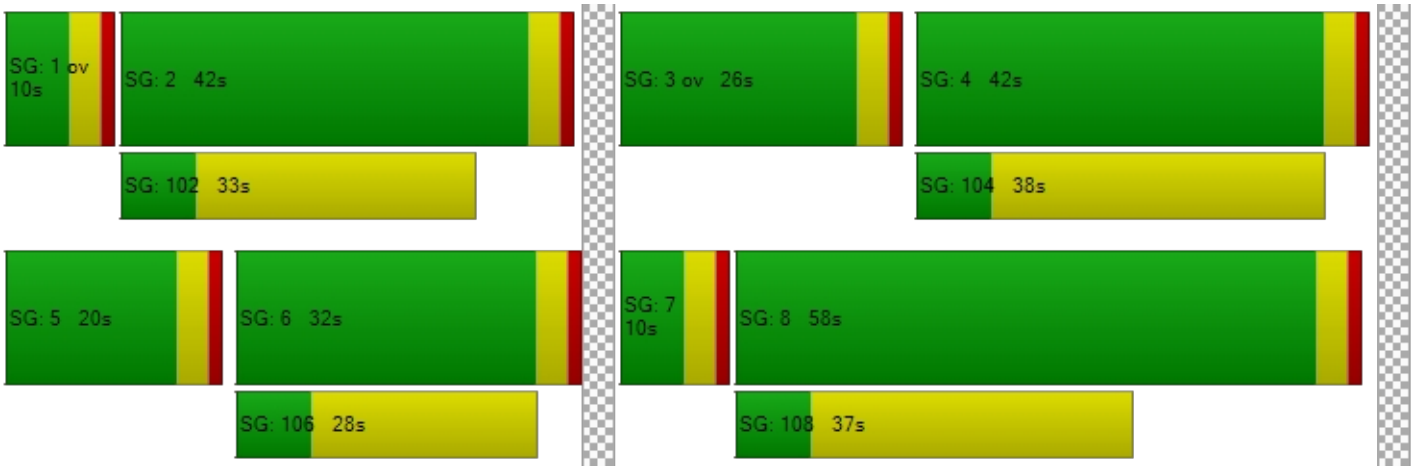
d_M, Delay for Movement [s/veh]	52.9	42.2	32.0	69.4	58.7	60.7	61.8	18.3	4.05	61.5	18.4	18.6
Movement LOS	D	D	C	E	E	E	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	44.72			60.02			19.01			26.48		
Approach LOS	D			E			B			C		
d_I, Intersection Delay [s/veh]	30.38											
Intersection LOS	C											
Intersection V/C	0.653											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.780	2.341	3.115	2.907
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	900	633	633	467
d_b, Bicycle Delay [s]	18.16	28.03	28.03	35.28
l_b,int, Bicycle LOS Score for Intersection	3.484	1.969	3.111	1.939
Bicycle LOS	C	A	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.511

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	27	2	14	2	0	6	6	164	22	6	862	3
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	2	14	2	0	6	6	164	22	6	862	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	7	1	4	1	0	2	2	411	6	2	216	1
Total Analysis Volume [veh/h]	27	2	14	2	0	6	6	164	22	6	862	3
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	1	1	1	97	97	1	97	97
g / C, Green / Cycle	0.04	0.04	0.01	0.01	0.01	0.81	0.81	0.01	0.81	0.81
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.00	0.00	0.00	0.44	0.44	0.00	0.15	0.16
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	190	190	180	380	190
c, Capacity [veh/h]	69	73	22	23	17	153	153	17	306	153
d1, Uniform Delay [s]	56.33	55.95	58.63	58.75	59.0	4.00	4.00	59.0	2.64	2.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.53	1.48	1.77	5.77	11.6	1.39	1.38	11.6	0.13	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.39	0.22	0.09	0.26	0.35	0.54	0.54	0.35	0.19	0.19
d, Delay for Lane Group [s/veh]	59.86	57.43	60.40	64.52	70.7	5.39	5.38	70.7	2.78	2.95
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.87	0.50	0.07	0.22	0.24	5.85	5.83	0.24	1.24	1.37
50th-Percentile Queue Length [ft/ln]	21.70	12.52	1.77	5.45	5.93	146.	145.	5.93	30.9	34.2
95th-Percentile Queue Length [veh/ln]	1.56	0.90	0.13	0.39	0.43	9.82	9.78	0.43	2.23	2.47
95th-Percentile Queue Length [ft/ln]	39.05	22.54	3.19	9.81	10.6	245.	244.	10.6	55.7	61.7

Movement, Approach, & Intersection Results

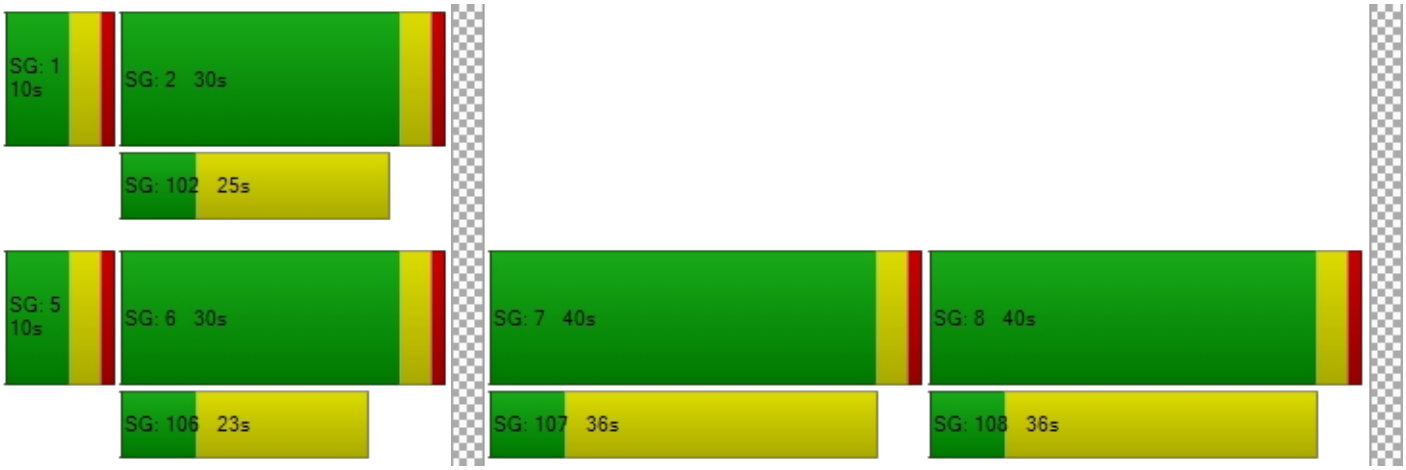
d_M, Delay for Movement [s/veh]	59.8	57.4	57.4	60.4	0.00	64.5	70.7	5.39	5.38	70.7	2.84	2.95
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	58.96			63.49			5.62			3.30		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.91											
Intersection LOS	A											
Intersection V/C	0.511											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	1.977	1.960	2.883	2.878
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.631	1.560	2.937	2.039
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	37.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.717

Intersection Setup

Name	Va Av			Va Av			Lambert Road			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Lambert Road			Ca Ca		
Base Volume Input [veh/h]	404	154	840	26	118	36	31	915	573	189	357	9
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	404	154	840	26	118	36	31	915	573	189	357	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	101	39	210	7	30	9	8	229	143	47	89	2
Total Analysis Volume [veh/h]	404	154	840	26	118	36	31	915	573	189	357	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Unsi	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	30	61	0	12	43	0	10	36	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	26	30	4	7	7	4	64	64	7	67	67
g / C, Green / Cycle	0.22	0.25	0.03	0.06	0.06	0.03	0.53	0.53	0.06	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.22	0.04	0.01	0.04	0.04	0.02	0.24	0.30	0.05	0.06	0.07
s, saturation flow rate [veh/h]	1800	3800	180	190	190	180	380	190	350	380	190
c, Capacity [veh/h]	390	938	54	114	114	60	201	100	207	211	105
d1, Uniform Delay [s]	47.02	35.50	57.3	55.3	55.2	57.1	17.3	18.9	56.1	12.5	12.6
k, delay calibration	0.38	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	49.09	0.08	6.57	7.07	6.53	6.86	0.74	2.32	14.5	0.11	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.04	0.16	0.48	0.69	0.67	0.52	0.45	0.57	0.91	0.11	0.12
d, Delay for Lane Group [s/veh]	96.11	35.58	63.8	62.3	61.7	63.9	18.1	21.2	70.7	12.6	12.8
Lane Group LOS	F	D	E	E	E	E	B	C	E	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	16.89	1.79	0.88	2.54	2.46	1.04	7.88	11.0	3.27	1.56	1.66
50th-Percentile Queue Length [ft/ln]	422.17	44.86	21.9	63.5	61.4	26.0	196.	277.	81.6	38.8	41.4
95th-Percentile Queue Length [veh/ln]	24.10	3.23	1.58	4.57	4.43	1.87	12.4	16.5	5.88	2.80	2.99
95th-Percentile Queue Length [ft/ln]	602.56	80.74	39.4	114.	110.	46.8	312.	413.	146.	70.0	74.6

Movement, Approach, & Intersection Results

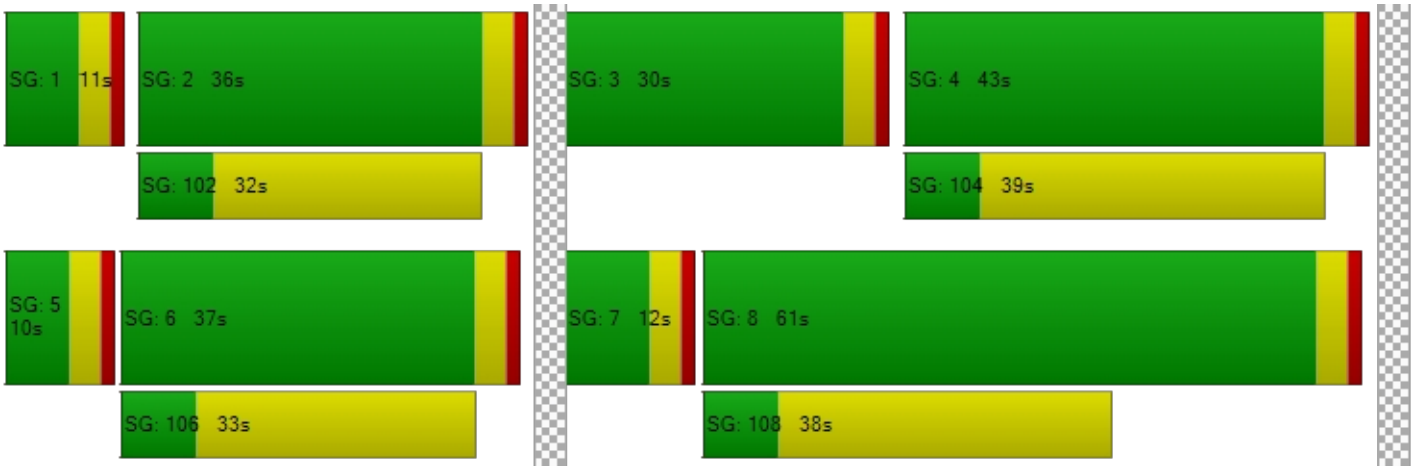
d_M, Delay for Movement [s/veh]	96.1	35.5	0.00	63.8	62.1	61.7	63.9	18.1	21.2	70.7	12.7	12.8
Movement LOS	F	D		E	E	E	E	B	C	E	B	B
d_A, Approach Delay [s/veh]	79.41			62.35			20.23			32.50		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	37.09											
Intersection LOS	D											
Intersection V/C	0.717											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.700	2.387	2.930	2.922
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	950	650	533	550
d_b, Bicycle Delay [s]	16.55	27.35	32.28	31.55
l_b,int, Bicycle LOS Score for Intersection	2.020	1.708	2.395	1.865
Bicycle LOS	B	A	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	3.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.536

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Base Volume Input [veh/h]	11	0	2	0	0	16	1	179	2	1	456	8
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	2	0	0	16	1	179	2	1	456	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	0	1	0	0	4	0	450	1	0	114	2
Total Analysis Volume [veh/h]	11	0	2	0	0	16	1	179	2	1	456	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	75	0	10	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	0	105	105	0	105	105
g / C, Green / Cycle	0.02	0.02	0.00	0.88	0.88	0.00	0.88	0.88
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.00	0.47	0.47	0.00	0.12	0.00
s, saturation flow rate [veh/h]	1800	1900	180	190	190	190	380	190
c, Capacity [veh/h]	93	40	4	166	166	4	333	166
d1, Uniform Delay [s]	57.90	57.97	59.7	1.73	1.73	59.7	1.04	0.91
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.67	6.31	32.8	1.26	1.26	29.3	0.09	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.40	0.26	0.54	0.54	0.25	0.14	0.00
d, Delay for Lane Group [s/veh]	58.57	64.28	92.6	2.99	2.99	89.0	1.12	0.92
Lane Group LOS	E	E	F	A	A	F	A	A
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.41	0.55	0.07	2.65	2.65	0.06	0.35	0.01
50th-Percentile Queue Length [ft/ln]	10.17	13.76	1.63	66.2	66.2	1.58	8.81	0.30
95th-Percentile Queue Length [veh/ln]	0.73	0.99	0.12	4.77	4.77	0.11	0.63	0.02
95th-Percentile Queue Length [ft/ln]	18.31	24.76	2.94	119.	119.	2.84	15.8	0.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.5	58.5	58.5	0.00	0.00	64.2	92.6	2.99	2.99	89.0	1.12	0.92
Movement LOS	E	E	E			E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	58.57			64.28			3.04			1.31		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	3.43											
Intersection LOS	A											
Intersection V/C	0.536											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.736	1.741	0.000	2.835
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	1184	1184
d_b, Bicycle Delay [s]	33.00	33.00	10.00	10.00
l_b,int, Bicycle LOS Score for Intersection	1.581	1.560	3.045	1.943
Bicycle LOS	A	A	C	A

Sequence

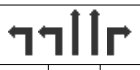
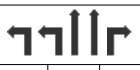
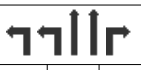
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	35.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.849

Intersection Setup

Name	St Co			St Co			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	St Co			St Co			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	456	188	374	415	346	305	863	173	171	109	713
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	456	188	374	415	346	305	863	173	171	109	713
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	39	114	47	94	104	87	76	216	43	43	273	178
Total Analysis Volume [veh/h]	157	456	188	374	415	346	305	863	173	171	109	713
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	19	48	0	15	41	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	19	19	14	27	27	11	54	54	7	50	50
g / C, Green / Cycle	0.05	0.18	0.18	0.13	0.25	0.25	0.10	0.49	0.49	0.06	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.04	0.12	0.10	0.11	0.22	0.18	0.09	0.23	0.09	0.05	0.29	0.38
s, saturation flow rate [veh/h]	350	380	190	350	190	190	350	380	190	350	380	190
c, Capacity [veh/h]	194	670	335	439	468	468	352	185	928	225	171	860
d1, Uniform Delay [s]	51.4	42.4	41.4	47.1	40.0	38.2	48.7	18.6	15.8	50.6	23.1	26.4
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.86	1.23	1.47	4.79	5.84	2.31	6.47	0.84	0.44	5.18	1.81	9.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.68	0.56	0.85	0.89	0.74	0.87	0.46	0.19	0.76	0.64	0.83
d, Delay for Lane Group [s/veh]	59.2	43.6	42.9	51.9	45.8	40.5	55.2	19.4	16.2	55.8	24.9	35.5
Lane Group LOS	E	D	D	D	D	D	E	B	B	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.35	5.89	4.79	5.29	5.73	8.83	4.43	7.32	2.54	2.47	11.0	17.9
50th-Percentile Queue Length [ft/ln]	58.7	147.	119.	132.	143.	220.	110.	182.	63.3	61.8	275.	448.
95th-Percentile Queue Length [veh/ln]	4.23	9.87	8.38	9.06	9.66	13.7	7.88	11.7	4.56	4.45	16.4	24.9
95th-Percentile Queue Length [ft/ln]	105.	246.	209.	226.	241.	342.	197.	293.	114.	111.	412.	622.

Movement, Approach, & Intersection Results

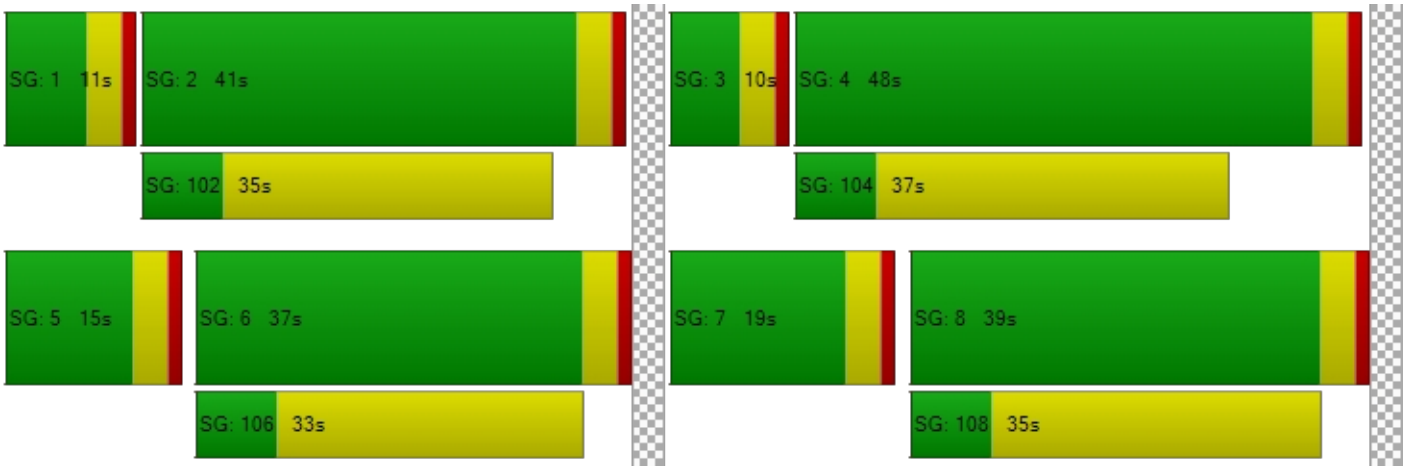
d_M, Delay for Movement [s/veh]	59.2	43.6	42.9	51.9	45.8	40.5	55.2	19.4	16.2	55.8	24.9	35.5
Movement LOS	E	D	D	D	D	D	E	B	B	E	C	D
d_A, Approach Delay [s/veh]	46.56			46.24			27.19			31.45		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	35.86											
Intersection LOS	D											
Intersection V/C	0.849											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.821	2.967	3.013	3.077
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	800	672	600
d_b, Bicycle Delay [s]	25.59	19.82	24.25	26.97
l_b,int, Bicycle LOS Score for Intersection	2.220	2.496	2.666	3.191
Bicycle LOS	B	B	B	C

Sequence

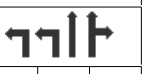
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	27.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.742

Intersection Setup

Name	S As			S As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S As			S As			Birch Street			Birch Street		
Base Volume Input [veh/h]	532	35	396	11	22	10	16	101	332	324	141	18
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	532	35	396	11	22	10	16	101	332	324	141	18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	133	9	99	3	6	3	4	254	83	81	354	5
Total Analysis Volume [veh/h]	532	35	396	11	22	10	16	101	332	324	141	18
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Ove	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	28	65	65	0	37	0	10	38	0	17	45	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	29	46	5	5	3	66	66	13	76	76
g / C, Green / Cycle	0.17	0.24	0.38	0.04	0.04	0.02	0.55	0.55	0.11	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.15	0.02	0.21	0.01	0.02	0.01	0.37	0.34	0.09	0.38	0.38
s, saturation flow rate [veh/h]	350	190	190	1800	1900	180	190	190	350	190	190
c, Capacity [veh/h]	600	462	732	77	73	38	104	104	380	120	120
d1, Uniform Delay [s]	48.5	35.0	28.6	55.82	56.43	58.0	19.3	18.6	52.5	12.8	12.8
k, delay calibration	0.11	0.11	0.33	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.64	0.07	1.89	0.84	4.07	7.21	3.45	2.82	5.47	2.16	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.08	0.54	0.14	0.44	0.42	0.67	0.62	0.85	0.59	0.59
d, Delay for Lane Group [s/veh]	53.2	35.0	30.5	56.66	60.50	65.2	22.8	21.4	58.0	14.9	14.9
Lane Group LOS	D	D	C	E	E	E	C	C	E	B	B
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.15	0.81	9.20	0.34	1.03	0.56	14.4	12.8	5.08	11.4	11.3
50th-Percentile Queue Length [ft/ln]	203.	20.1	230.	8.52	25.81	13.9	361.	320.	126.	284.	284.
95th-Percentile Queue Length [veh/ln]	12.8	1.45	14.1	0.61	1.86	1.00	20.6	18.7	8.78	16.9	16.9
95th-Percentile Queue Length [ft/ln]	320.	36.2	354.	15.34	46.45	25.0	517.	467.	219.	423.	422.

Movement, Approach, & Intersection Results

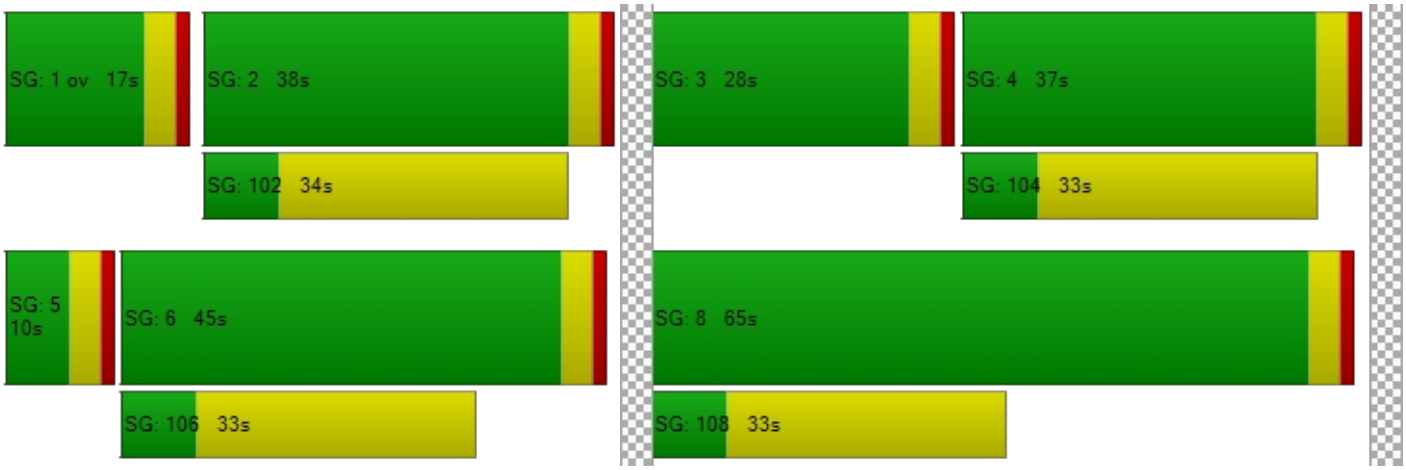
d_M, Delay for Movement [s/veh]	53.2	35.0	30.5	56.6	60.5	60.5	65.2	22.4	21.4	58.0	14.9	14.9
Movement LOS	D	D	C	E	E	E	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	43.24			59.52			22.67			22.89		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	27.95											
Intersection LOS	C											
Intersection V/C	0.742											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.733	1.990	2.962	3.000
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1017	550	567	683
d_b, Bicycle Delay [s]	14.51	31.54	30.82	26.01
l_b,int, Bicycle LOS Score for Intersection	3.149	1.631	2.686	3.011
Bicycle LOS	C	A	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	23.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.808

Intersection Setup

Name	N As			N As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N As			N As			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	11	113	3	319	306	107	13	6	146	149
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	11	113	3	319	306	107	13	6	146	149
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	4	1	3	28	1	80	77	268	3	2	366	37
Total Analysis Volume [veh/h]	14	2	11	113	3	319	306	107	13	6	146	149
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Ove	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	39	61	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	16	16	50	22	78	78	1	57	57
g / C, Green / Cycle	0.03	0.03	0.03	0.14	0.14	0.44	0.20	0.68	0.68	0.01	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.17	0.17	0.29	0.28	0.00	0.39	0.08
s, saturation flow rate [veh/h]	180	190	190	180	180	190	180	190	190	180	380	190
c, Capacity [veh/h]	92	59	59	252	252	829	352	129	129	18	187	939
d1, Uniform Delay [s]	54.4	54.0	54.3	44.0	44.0	21.9	44.8	8.25	8.24	56.5	23.9	15.9
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.19	0.13	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.75	0.23	1.50	0.46	0.46	0.51	7.81	1.00	1.00	10.1	3.28	0.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.15	0.03	0.19	0.23	0.23	0.39	0.87	0.42	0.42	0.33	0.78	0.16
d, Delay for Lane Group [s/veh]	55.1	54.3	55.8	44.4	44.4	22.5	52.6	9.25	9.24	66.7	27.2	16.3
Lane Group LOS	E	D	E	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.42	0.06	0.34	1.50	1.51	5.93	9.18	5.92	5.89	0.22	16.6	2.24
50th-Percentile Queue Length [ft/ln]	10.3	1.50	8.39	37.6	37.7	148.	229.	147.	147.	5.61	416.	55.9
95th-Percentile Queue Length [veh/ln]	0.75	0.11	0.60	2.71	2.72	9.92	14.1	9.91	9.87	0.40	23.3	4.03
95th-Percentile Queue Length [ft/ln]	18.7	2.70	15.0	67.7	67.8	247.	353.	247.	246.	10.1	583.	100.

Movement, Approach, & Intersection Results

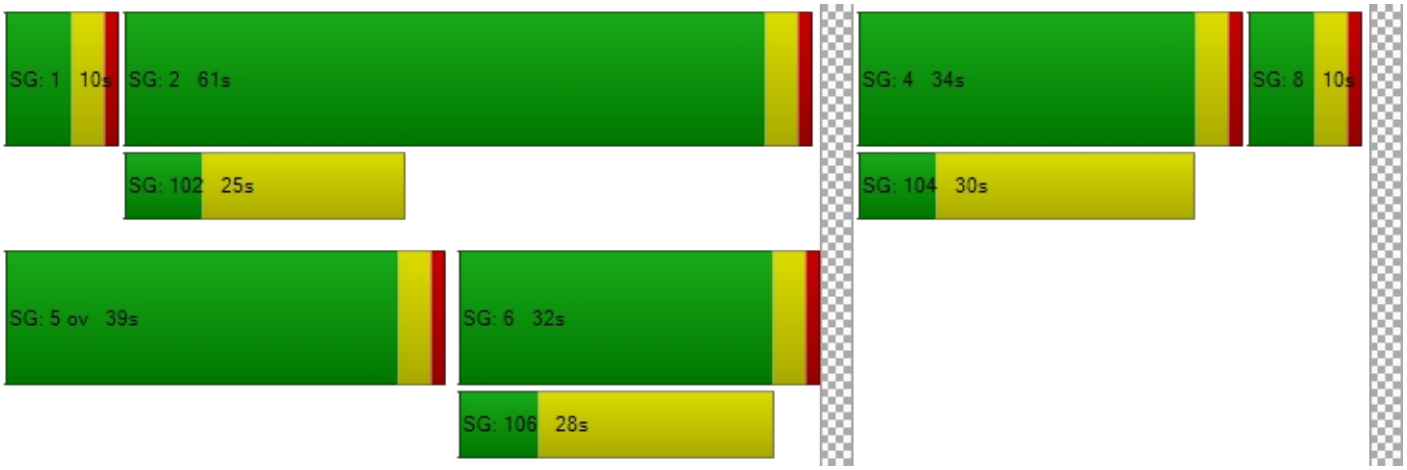
d_M, Delay for Movement [s/veh]	55.1	54.3	55.8	44.4	44.4	22.5	52.6	9.25	9.24	66.7	27.2	16.3
Movement LOS	E	D	E	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	55.38			28.36			18.81			26.36		
Approach LOS	E			C			B			C		
d_I, Intersection Delay [s/veh]	23.82											
Intersection LOS	C											
Intersection V/C	0.808											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.360	2.953	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	104	522	991	487
d_b, Bicycle Delay [s]	51.68	31.43	14.64	32.93
l_b,int, Bicycle LOS Score for Intersection	1.604	2.277	2.706	2.896
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	47.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Base Volume Input [veh/h]	642	841	141	239	434	132	254	839	317	87	804	234
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	642	841	141	239	434	132	254	839	317	87	804	234
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	161	210	35	60	109	33	64	210	79	22	201	59
Total Analysis Volume [veh/h]	642	841	141	239	434	132	254	839	317	87	804	234
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	24	47	0	14	37	0	20	45	0	14	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	25	25	10	15	15	16	62	62	7	53	53
g / C, Green / Cycle	0.17	0.21	0.21	0.08	0.13	0.13	0.13	0.51	0.51	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.18	0.17	0.17	0.07	0.10	0.10	0.14	0.22	0.17	0.05	0.21	0.12
s, saturation flow rate [veh/h]	350	380	190	350	380	190	180	380	190	180	380	190
c, Capacity [veh/h]	584	792	396	294	477	239	241	194	974	111	167	837
d1, Uniform Delay [s]	50.0	45.5	45.2	54.0	51.0	50.7	52.0	18.3	17.1	55.5	23.8	21.4
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.13	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	51.0	2.37	4.07	5.43	3.21	5.09	45.3	0.70	0.89	11.3	0.99	0.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.10	0.83	0.81	0.81	0.80	0.77	1.06	0.43	0.33	0.78	0.48	0.28
d, Delay for Lane Group [s/veh]	101.	47.8	49.3	59.5	54.2	55.8	97.3	19.0	18.0	66.8	24.8	22.2
Lane Group LOS	F	D	D	E	D	E	F	B	B	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	12.8	9.65	9.56	3.77	5.81	5.65	10.2	7.37	5.32	2.95	8.26	4.40
50th-Percentile Queue Length [ft/ln]	321.	241.	239.	94.2	145.	141.	256.	184.	132.	73.6	206.	109.
95th-Percentile Queue Length [veh/ln]	19.6	14.7	14.6	6.79	9.77	9.55	15.8	11.8	9.10	5.31	12.9	7.84
95th-Percentile Queue Length [ft/ln]	490.	368.	365.	169.	244.	238.	397.	295.	227.	132.	324.	195.

Movement, Approach, & Intersection Results

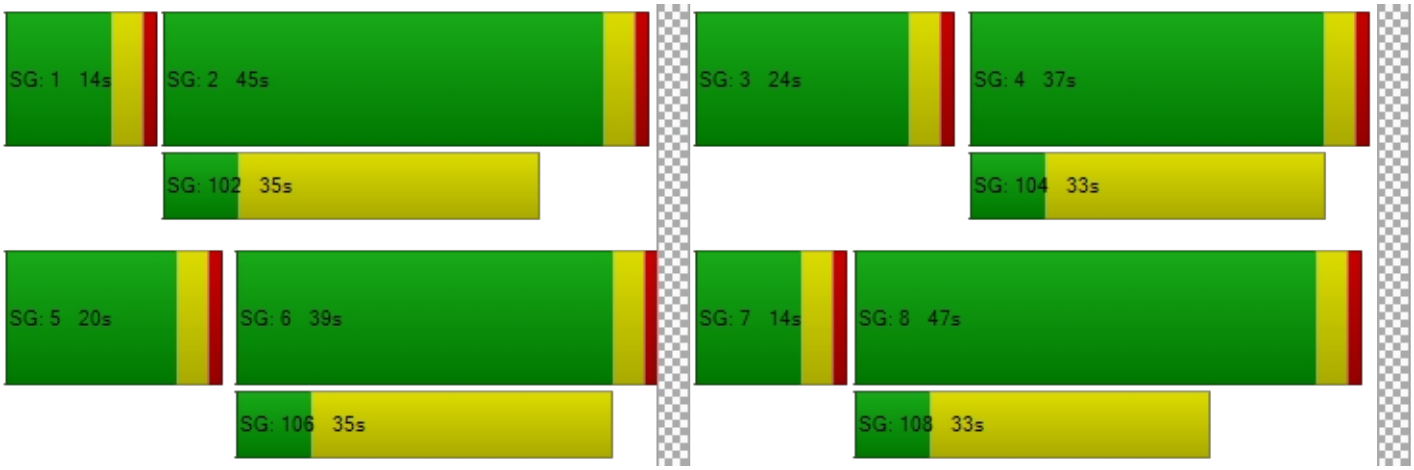
d_M, Delay for Movement [s/veh]	101.	48.1	49.3	59.5	54.4	55.8	97.3	19.0	18.0	66.8	24.8	22.2
Movement LOS	F	D	D	E	D	E	F	B	B	E	C	C
d_A, Approach Delay [s/veh]	69.18			56.18			32.90			27.54		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	47.33											
Intersection LOS	D											
Intersection V/C	0.735											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.039	2.999	2.952	2.848
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	716	550	683	583
d_b, Bicycle Delay [s]	24.72	31.55	26.02	30.12
l_b,int, Bicycle LOS Score for Intersection	2.453	2.002	2.723	2.488
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	91.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.174

Intersection Setup

Name	Va Av			Va Av			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Birch Street			Rose Drive		
Base Volume Input [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	58	170	13	135	74	16	55	180	40	8	138	219
Total Analysis Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	33	41	0	32	40	0	10	37	0	10	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	26	26	28	37	37	6	46	46	4	44	44
g / C, Green / Cycle	0.15	0.22	0.22	0.23	0.31	0.31	0.05	0.38	0.38	0.03	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.13	0.19	0.19	0.30	0.10	0.09	0.06	0.24	0.22	0.02	0.14	0.46
s, saturation flow rate [veh/h]	180	190	190	180	190	190	350	190	190	180	380	190
c, Capacity [veh/h]	263	415	415	420	581	581	178	723	723	62	138	692
d1, Uniform Delay [s]	50.2	45.5	45.2	46.0	32.0	31.8	56.9	30.2	29.6	57.0	28.3	38.1
k, delay calibration	0.11	0.19	0.17	0.50	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.14	10.7	8.71	143.	0.31	0.28	115.	4.04	3.46	7.03	0.85	131.
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.89	0.87	1.28	0.32	0.30	1.23	0.62	0.59	0.54	0.40	1.27
d, Delay for Lane Group [s/veh]	59.3	56.2	53.9	189.	32.3	32.1	172.	34.2	33.1	64.0	29.2	169.
Lane Group LOS	E	E	D	F	C	C	F	C	C	E	C	F
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.45	11.8	11.3	29.1	4.18	3.90	5.54	11.3	10.3	1.11	6.05	45.2
50th-Percentile Queue Length [ft/ln]	186.	296.	282.	729.	104.	97.6	138.	283.	259.	27.6	151.	112
95th-Percentile Queue Length [veh/ln]	11.9	17.5	16.8	43.3	7.52	7.03	9.92	16.8	15.6	1.99	10.0	65.2
95th-Percentile Queue Length [ft/ln]	298.	438.	420.	108	187.	175.	247.	421.	391.	49.7	252.	163

Movement, Approach, & Intersection Results

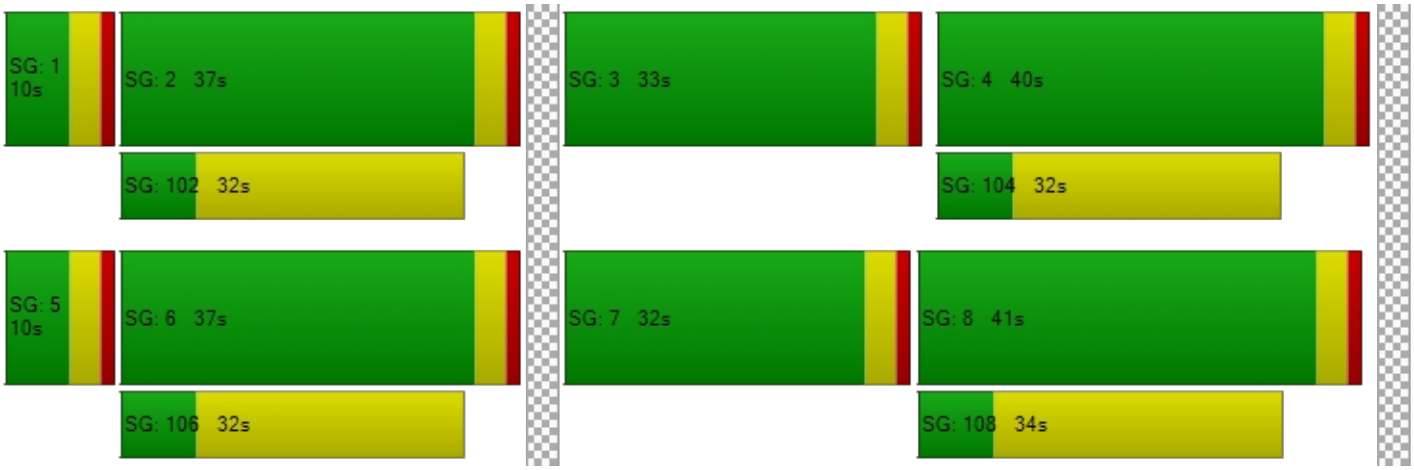
d_M, Delay for Movement [s/veh]	59.3	55.2	53.9	189.	32.2	32.1	172.	33.8	33.1	64.0	29.2	169.
Movement LOS	E	E	D	F	C	C	F	C	C	E	C	F
d_A, Approach Delay [s/veh]	56.14			126.95			61.41			114.37		
Approach LOS	E			F			E			F		
d_I, Intersection Delay [s/veh]	91.09											
Intersection LOS	F											
Intersection V/C	1.174											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.596	2.834	2.782	2.916
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	617	600	550	550
d_b, Bicycle Delay [s]	28.72	29.41	31.55	31.55
l_b,int, Bicycle LOS Score for Intersection	2.352	2.298	2.463	2.764
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	4.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.753

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	321	8	3	326	4	2	0	5	7	0	3
Total Analysis Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	108	108	108	108	108	108	4	4	4
g / C, Green / Cycle	0.90	0.90	0.90	0.90	0.90	0.90	0.04	0.04	0.04
(v / s)_i Volume / Saturation Flow Rate	0.02	0.35	0.35	0.01	0.69	0.01	0.02	0.01	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	180	1800	1800	1900
c, Capacity [veh/h]	122	170	170	153	170	161	102	68	67
d1, Uniform Delay [s]	0.63	0.96	0.95	0.63	1.99	0.63	56.71	56.61	56.09
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	0.66	0.66	0.01	3.32	0.01	1.52	3.49	1.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.39	0.38	0.01	0.76	0.01	0.28	0.38	0.15
d, Delay for Lane Group [s/veh]	0.67	1.62	1.61	0.64	5.30	0.64	58.22	60.10	57.11
Lane Group LOS	A	A	A	A	A	A	E	E	E
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.03	0.83	0.82	0.01	3.68	0.01	0.91	0.84	0.31
50th-Percentile Queue Length [ft/ln]	0.70	20.7	20.4	0.27	92.0	0.35	22.64	20.95	7.83
95th-Percentile Queue Length [veh/ln]	0.05	1.49	1.47	0.02	6.63	0.03	1.63	1.51	0.56
95th-Percentile Queue Length [ft/ln]	1.26	37.2	36.8	0.49	165.	0.63	40.75	37.71	14.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.67	1.61	1.61	0.64	5.30	0.64	58.2	58.2	58.2	60.1	57.1	57.1
Movement LOS	A	A	A	A	A	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	1.59			5.20			58.22			59.27		
Approach LOS	A			A			E			E		
d_I, Intersection Delay [s/veh]	4.70											
Intersection LOS	A											
Intersection V/C	0.753											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	49.48	49.48	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.839	2.839	1.808	1.999
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.53	4.53	37.58	37.58
l_b,int, Bicycle LOS Score for Intersection	2.670	3.761	1.607	1.619
Bicycle LOS	B	D	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	17.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.779

Intersection Setup

Name				SR-57			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57			Im Hi			Im Hi		
Base Volume Input [veh/h]	0	0	0	735	0	605	0	191	110	0	263	460
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	735	0	605	0	191	110	0	263	460
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	184	0	151	0	478	275	0	658	115
Total Analysis Volume [veh/h]	0	0	0	735	0	605	0	191	110	0	263	460
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Unsi	Per	Per	Unsi
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		27	27	27	55	55
g / C, Green / Cycle		0.30	0.30	0.30	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate		0.25	0.25	0.24	0.34	0.46
s, saturation flow rate [veh/h]		180	180	190	5700	5700
c, Capacity [veh/h]		536	536	566	3495	3495
d1, Uniform Delay [s]		29.4	29.4	28.9	10.11	12.48
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.47	3.47	2.51	0.62	1.55
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.79	0.55	0.75
d, Delay for Lane Group [s/veh]		32.9	32.9	31.4	10.73	14.03
Lane Group LOS		C	C	C	B	B
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		9.22	9.22	8.94	6.71	11.57
50th-Percentile Queue Length [ft/ln]		230.	230.	223.	167.77	289.16
95th-Percentile Queue Length [veh/ln]		14.1	14.1	13.8	10.96	17.14
95th-Percentile Queue Length [ft/ln]		354.	354.	346.	273.99	428.59

Movement, Approach, & Intersection Results

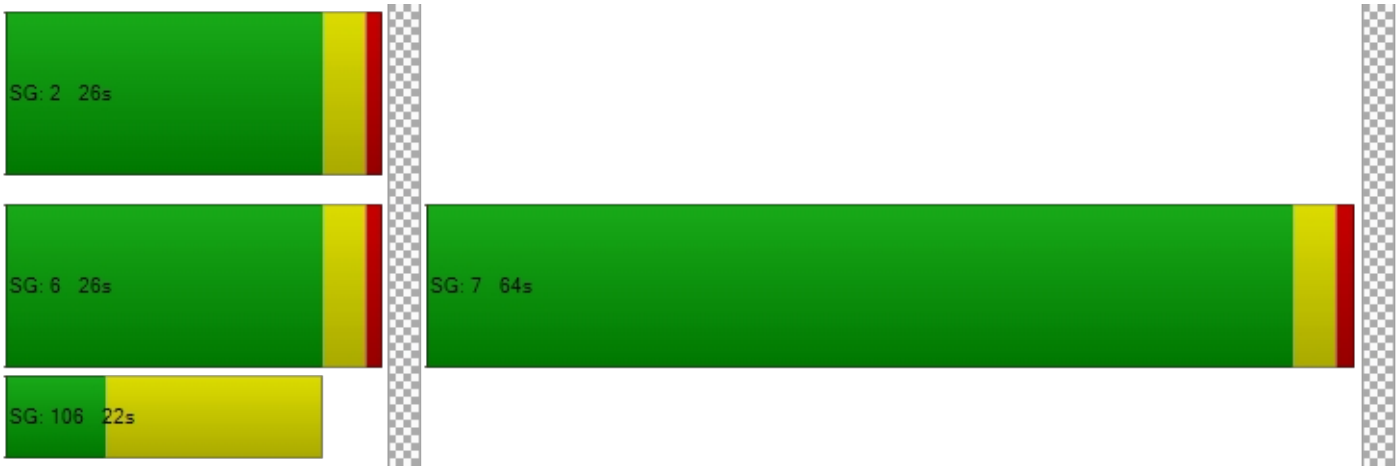
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	32.9	0.00	31.8	0.00	10.7	0.00	0.00	14.0	0.00
Movement LOS				C		C		B			B	
d_A, Approach Delay [s/veh]	0.00			32.45			10.73			14.03		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	17.15											
Intersection LOS	B											
Intersection V/C	0.779											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.457	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.771	2.611	3.007
Bicycle LOS	D	D	B	C

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	38.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.855

Intersection Setup

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Base Volume Input [veh/h]	111	72	495	0	0	217	205	206	410	0	270	43
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	72	495	0	0	217	205	206	410	0	270	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	278	18	124	0	0	54	51	515	103	0	677	11
Total Analysis Volume [veh/h]	111	72	495	0	0	217	205	206	410	0	270	43
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Per	Split	Prot	Per	Unsi	Per	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	39	0	0	0	12	20	69	0	0	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32	32	8	15	68	48	48
g / C, Green / Cycle	0.27	0.27	0.27	0.07	0.13	0.57	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.24	0.24	0.22	0.06	0.11	0.36	0.36	0.36
s, saturation flow rate [veh/h]	350	180	190	3800	1800	5700	5700	1900
c, Capacity [veh/h]	934	480	507	255	232	3228	2303	768
d1, Uniform Delay [s]	42.2	42.2	41.5	55.41	51.39	17.68	33.41	33.41
k, delay calibration	0.11	0.32	0.29	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.03	14.4	9.42	7.88	10.55	0.98	5.95	15.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.89	0.84	0.85	0.88	0.64	0.90	0.90
d, Delay for Lane Group [s/veh]	45.2	56.7	51.0	63.28	61.93	18.66	39.36	48.61
Lane Group LOS	D	E	D	E	E	B	D	D
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	12.0	13.9	13.1	3.53	6.73	12.75	19.58	21.55
50th-Percentile Queue Length [ft/ln]	301.	348.	328.	88.16	168.29	318.75	489.39	538.69
95th-Percentile Queue Length [veh/ln]	17.7	20.0	19.0	6.35	10.99	18.61	26.83	29.16
95th-Percentile Queue Length [ft/ln]	443.	501.	477.	158.69	274.66	465.14	670.79	729.01

Movement, Approach, & Intersection Results

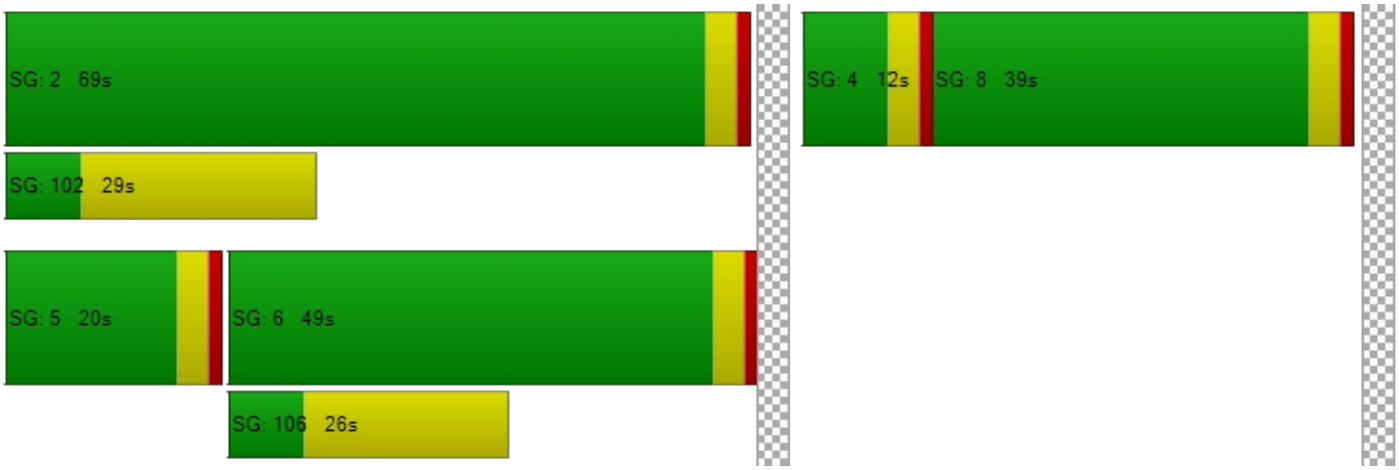
d_M, Delay for Movement [s/veh]	48.1	56.7	51.8	0.00	0.00	63.2	61.9	18.6	0.00	0.00	41.5	48.6
Movement LOS	D	E	D			E	E	B			D	D
d_A, Approach Delay [s/veh]	49.63			63.28			22.57			41.67		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	38.02											
Intersection LOS	D											
Intersection V/C	0.855											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.641	2.129	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	133	1083	750
d_b, Bicycle Delay [s]	30.11	52.27	12.61	23.44
l_b,int, Bicycle LOS Score for Intersection	4.327	1.560	2.805	2.694
Bicycle LOS	E	A	C	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	43.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.906

Intersection Setup

Name	As Ro			As Ro			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	As Ro			As Ro			Im Hi			Im Hi		
Base Volume Input [veh/h]	240	295	93	320	389	280	296	210	153	192	198	203
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	295	93	320	389	280	296	210	153	192	198	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	60	74	23	80	97	70	74	526	38	48	497	51
Total Analysis Volume [veh/h]	240	295	93	320	389	280	296	210	153	192	198	203
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	39	0	20	46	0	25	44	0	17	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	23	23	13	27	27	21	55	55	13	47	47
g / C, Green / Cycle	0.08	0.19	0.19	0.11	0.23	0.23	0.18	0.45	0.45	0.11	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.10	0.09	0.20	0.15	0.16	0.39	0.41	0.11	0.29	0.30
s, saturation flow rate [veh/h]	350	190	190	350	190	190	180	380	190	180	570	190
c, Capacity [veh/h]	265	371	371	383	435	435	315	172	862	196	220	735
d1, Uniform Delay [s]	55.0	43.5	43.1	52.4	44.8	41.8	48.8	29.4	30.1	53.3	31.5	32.0
k, delay calibration	0.11	0.11	0.11	0.11	0.16	0.11	0.20	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.2	1.24	1.06	4.85	9.18	1.60	20.1	6.03	13.6	25.4	2.25	7.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.54	0.50	0.84	0.89	0.64	0.94	0.86	0.89	0.98	0.74	0.77
d, Delay for Lane Group [s/veh]	66.3	44.7	44.2	57.2	54.0	43.4	69.0	35.5	43.7	78.8	33.8	39.5
Lane Group LOS	E	D	D	E	D	D	E	D	D	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.01	5.52	5.07	4.98	12.2	7.69	10.4	20.1	23.0	7.15	13.7	15.5
50th-Percentile Queue Length [ft/ln]	100.	137.	126.	124.	306.	192.	262.	504.	577.	178.	344.	389.
95th-Percentile Queue Length [veh/ln]	7.22	9.37	8.77	8.64	18.0	12.2	15.8	27.5	30.9	11.5	19.8	22.0
95th-Percentile Queue Length [ft/ln]	180.	234.	219.	216.	450.	306.	394.	688.	774.	288.	496.	551.

Movement, Approach, & Intersection Results

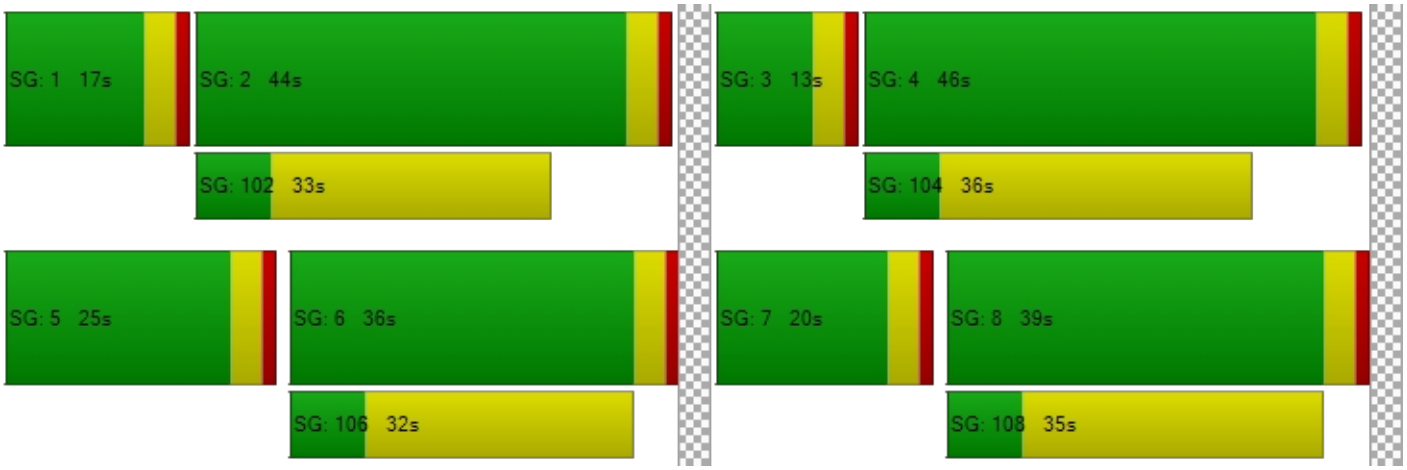
d_M, Delay for Movement [s/veh]	66.3	44.5	44.2	57.2	54.0	43.4	69.0	37.9	43.7	78.8	34.8	39.5
Movement LOS	E	D	D	E	D	D	E	D	D	E	C	D
d_A, Approach Delay [s/veh]	52.82			52.11			41.89			38.80		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	43.35											
Intersection LOS	D											
Intersection V/C	0.906											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.579	2.756	3.356	3.337
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	700	666	533
d_b, Bicycle Delay [s]	30.12	25.36	26.68	32.28
l_b,int, Bicycle LOS Score for Intersection	2.078	3.191	2.964	2.543
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	25.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.830

Intersection Setup

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Base Volume Input [veh/h]	276	51	295	28	25	15	21	212	308	255	217	63
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	276	51	295	28	25	15	21	212	308	255	217	63
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	69	13	74	7	6	4	5	531	77	64	544	16
Total Analysis Volume [veh/h]	276	51	295	28	25	15	21	212	308	255	217	63
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	27	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	17	5	5	3	41	41	16	54	54
g / C, Green / Cycle	0.18	0.18	0.18	0.05	0.05	0.03	0.43	0.43	0.16	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.16	0.02	0.02	0.01	0.37	0.16	0.14	0.39	0.40
s, saturation flow rate [veh/h]	180	180	190	1800	1900	180	570	190	180	380	190
c, Capacity [veh/h]	327	327	346	97	102	51	246	821	295	215	107
d1, Uniform Delay [s]	35.0	35.0	37.6	43.27	43.51	45.4	24.4	18.3	38.7	14.5	14.9
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.16	1.19	6.00	1.62	2.42	5.31	4.26	1.31	7.46	1.77	3.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.50	0.85	0.29	0.39	0.41	0.86	0.38	0.86	0.68	0.71
d, Delay for Lane Group [s/veh]	36.1	36.2	43.7	44.90	45.94	50.7	28.7	19.6	46.2	16.2	18.8
Lane Group LOS	D	D	D	D	D	D	C	B	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.45	3.50	7.11	0.67	0.97	0.56	14.6	4.75	6.32	10.7	12.1
50th-Percentile Queue Length [ft/ln]	86.1	87.4	177.	16.82	24.32	13.9	365.	118.	157.	268.	303.
95th-Percentile Queue Length [veh/ln]	6.20	6.30	11.4	1.21	1.75	1.01	20.8	8.32	10.4	16.1	17.8
95th-Percentile Queue Length [ft/ln]	155.	157.	287.	30.28	43.77	25.1	521.	207.	261.	403.	446.

Movement, Approach, & Intersection Results

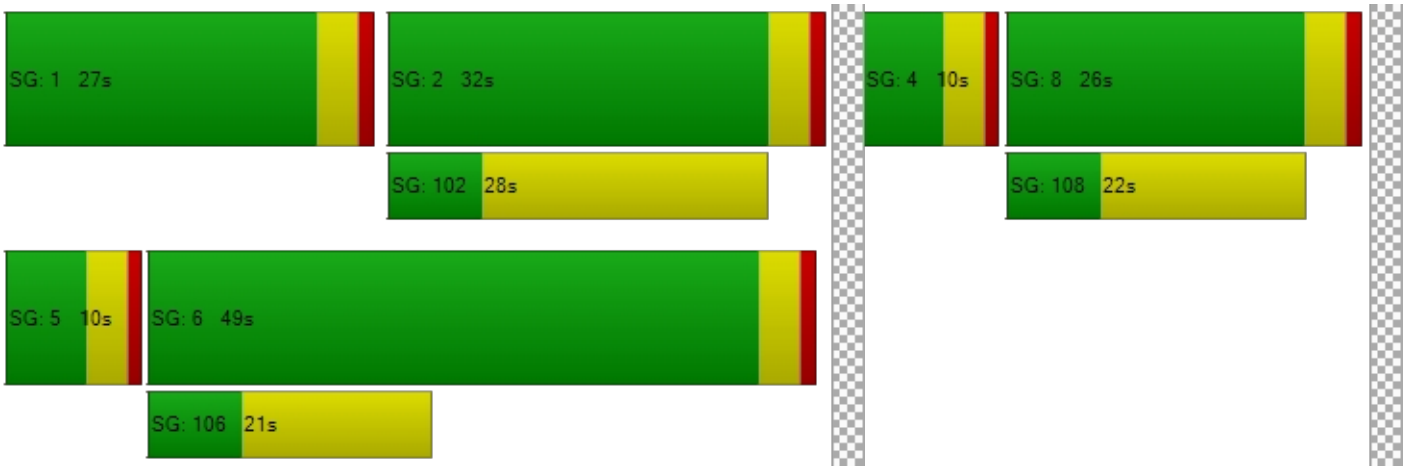
d_M, Delay for Movement [s/veh]	36.1	36.2	43.7	44.9	45.9	45.9	50.7	28.7	19.6	46.2	17.1	18.8
Movement LOS	D	D	D	D	D	D	D	C	B	D	B	B
d_A, Approach Delay [s/veh]	39.76			45.51			27.75			20.13		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	25.92											
Intersection LOS	C											
Intersection V/C	0.830											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	0.00	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.428	2.008	0.000	3.284
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	463	126	589	947
d_b, Bicycle Delay [s]	28.09	41.73	23.66	13.19
l_b,int, Bicycle LOS Score for Intersection	2.586	1.672	2.908	2.931
Bicycle LOS	B	A	C	C

Sequence

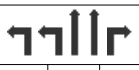
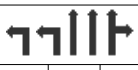
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	37.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.876

Intersection Setup

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Base Volume Input [veh/h]	398	702	112	286	535	128	236	160	239	201	174	347
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	398	702	112	286	535	128	236	160	239	201	174	347
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	100	176	28	72	134	32	59	400	60	50	436	87
Total Analysis Volume [veh/h]	398	702	112	286	535	128	236	160	239	201	174	347
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	17	34	0	13	30	0	12	42	0	11	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	25	25	9	21	21	8	43	43	7	42	42
g / C, Green / Cycle	0.13	0.25	0.25	0.09	0.21	0.21	0.08	0.43	0.43	0.07	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.11	0.22	0.21	0.08	0.14	0.07	0.07	0.32	0.32	0.06	0.37	0.36
s, saturation flow rate [veh/h]	350	190	190	350	380	190	350	380	190	350	380	190
c, Capacity [veh/h]	458	467	467	320	783	391	285	164	821	251	160	802
d1, Uniform Delay [s]	42.7	36.5	36.0	45.0	36.7	33.8	45.3	23.9	23.8	45.8	26.5	26.3
k, delay calibration	0.11	0.25	0.23	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.15	12.8	9.03	8.69	1.06	0.48	6.07	3.18	6.06	5.90	6.85	11.9
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.89	0.85	0.89	0.68	0.33	0.83	0.75	0.74	0.80	0.87	0.86
d, Delay for Lane Group [s/veh]	47.8	49.3	45.1	53.7	37.8	34.3	51.4	27.0	29.9	51.7	33.3	38.3
Lane Group LOS	D	D	D	D	D	C	D	C	C	D	C	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.11	11.3	10.2	3.88	6.10	2.69	3.11	12.4	12.9	2.65	16.0	17.0
50th-Percentile Queue Length [ft/ln]	127.	282.	256.	96.8	152.	67.2	77.7	310.	324.	66.3	402.	425.
95th-Percentile Queue Length [veh/ln]	8.82	16.8	15.5	6.98	10.1	4.84	5.60	18.2	18.8	4.78	22.6	23.8
95th-Percentile Queue Length [ft/ln]	220.	420.	388.	174.	253.	120.	139.	454.	471.	119.	566.	595.

Movement, Approach, & Intersection Results

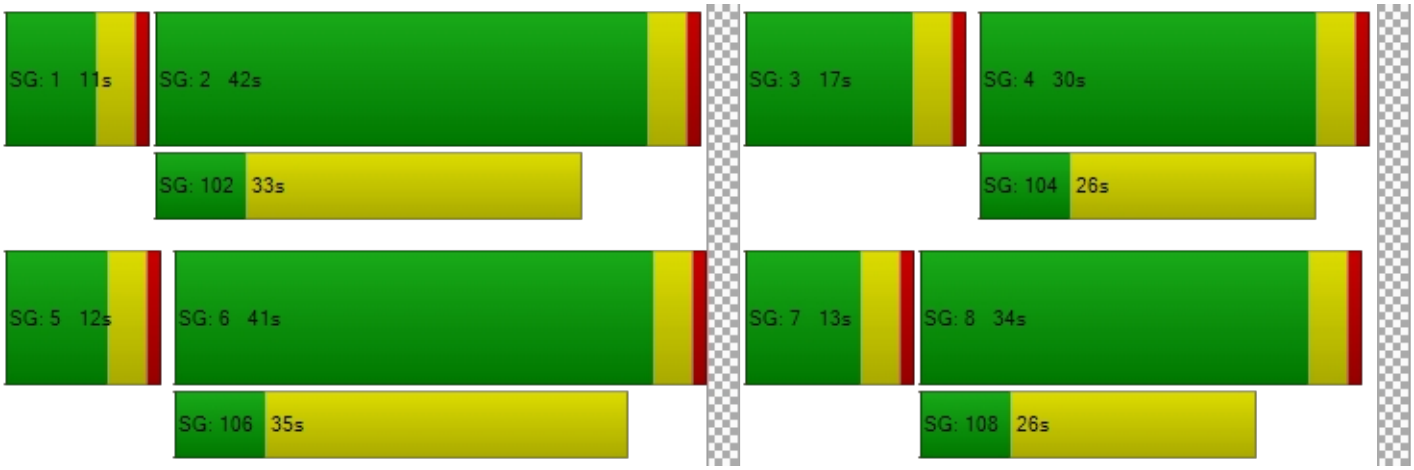
d_M, Delay for Movement [s/veh]	47.8	47.6	45.1	53.7	37.8	34.3	51.4	27.7	29.9	51.7	34.3	38.3
Movement LOS	D	D	D	D	D	C	D	C	C	D	C	D
d_A, Approach Delay [s/veh]	47.49			42.18			30.68			36.48		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	37.51											
Intersection LOS	D											
Intersection V/C	0.876											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.67	39.67	39.67	39.67
l_p,int, Pedestrian LOS Score for Intersection	2.813	2.910	3.260	3.253
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	599	519	759	739
d_b, Bicycle Delay [s]	24.56	27.45	19.28	19.91
l_b,int, Bicycle LOS Score for Intersection	2.560	2.343	2.701	2.821
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.642

Intersection Setup

Name	Va Av			Va Av			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Im Hi			Im Hi		
Base Volume Input [veh/h]	125	331	138	240	260	168	297	197	163	180	146	160
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	331	138	240	260	168	297	197	163	180	146	160
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	31	83	35	60	65	42	74	493	41	45	367	40
Total Analysis Volume [veh/h]	125	331	138	240	260	168	297	197	163	180	146	160
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	46	0	13	49	0	17	45	0	11	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	13	13	9	16	16	12	70	70	7	65	65
g / C, Green / Cycle	0.05	0.11	0.11	0.08	0.14	0.14	0.10	0.61	0.61	0.06	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.04	0.09	0.07	0.07	0.07	0.09	0.08	0.35	0.09	0.05	0.26	0.08
s, saturation flow rate [veh/h]	350	380	190	350	380	190	350	570	190	350	570	190
c, Capacity [veh/h]	183	425	213	276	526	263	359	346	115	216	323	107
d1, Uniform Delay [s]	53.5	49.7	48.9	52.4	45.8	46.8	50.6	13.4	9.64	53.4	14.4	11.7
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.43	3.12	3.31	8.19	0.72	2.57	4.92	0.68	0.26	8.21	0.46	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.78	0.65	0.87	0.49	0.64	0.83	0.57	0.14	0.83	0.45	0.15
d, Delay for Lane Group [s/veh]	58.0	52.8	52.2	60.6	46.5	49.4	55.5	14.1	9.90	61.6	14.9	12.0
Lane Group LOS	E	D	D	E	D	D	E	B	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.89	4.81	3.99	3.74	3.49	4.73	4.43	9.85	1.79	2.82	7.32	1.99
50th-Percentile Queue Length [ft/ln]	47.2	120.	99.7	93.4	87.3	118.	110.	246.	44.8	70.4	182.	49.8
95th-Percentile Queue Length [veh/ln]	3.40	8.40	7.18	6.73	6.29	8.30	7.89	14.9	3.23	5.07	11.7	3.59
95th-Percentile Queue Length [ft/ln]	85.0	210.	179.	168.	157.	207.	197.	374.	80.6	126.	293.	89.6

Movement, Approach, & Intersection Results

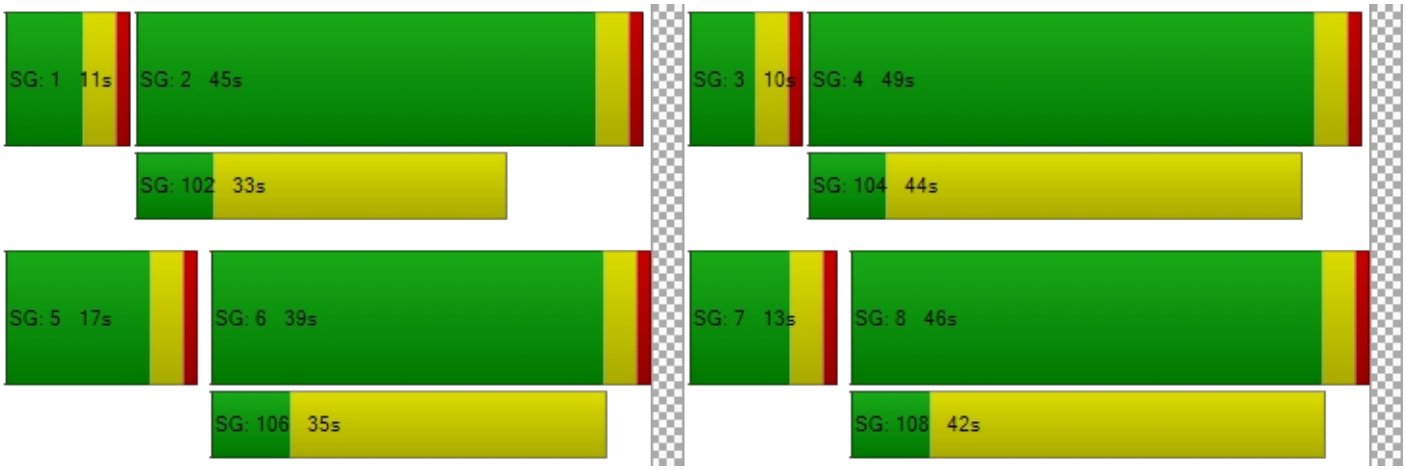
d_M, Delay for Movement [s/veh]	58.0	52.8	52.2	60.6	46.5	49.4	55.5	14.1	9.90	61.6	14.9	12.0
Movement LOS	E	D	D	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	53.79			52.33			18.93			19.33		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	26.89											
Intersection LOS	C											
Intersection V/C	0.642											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.772	2.808	3.315	3.311
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	730	782	713	608
d_b, Bicycle Delay [s]	23.19	21.32	23.83	27.84
l_b,int, Bicycle LOS Score for Intersection	2.050	2.111	2.896	2.553
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	233.5
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.112

Intersection Setup

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Base Volume Input [veh/h]	271	630	129	100	526	32	87	191	300	168	149	879
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	271	630	129	100	526	32	87	191	300	168	149	879
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	68	158	32	251	132	8	22	479	75	42	374	220
Total Analysis Volume [veh/h]	271	630	129	100	526	32	87	191	300	168	149	879
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	16	53	0	12	49	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	23	23	8	20	20	6	67	67	6	67	67
g / C, Green / Cycle	0.09	0.19	0.19	0.07	0.17	0.17	0.05	0.56	0.56	0.05	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.08	0.17	0.07	0.29	0.14	0.02	0.05	0.39	0.39	0.05	0.26	0.46
s, saturation flow rate [veh/h]	350	380	190	350	380	190	180	380	190	350	570	190
c, Capacity [veh/h]	329	734	367	236	633	316	91	211	105	178	316	105
d1, Uniform Delay [s]	53.4	46.8	41.9	55.9	48.4	42.4	56.8	19.3	19.4	56.8	16.0	22.0
k, delay calibration	0.11	0.11	0.11	0.14	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.22	3.07	0.57	147	2.91	0.14	33.3	1.95	3.89	20.6	0.51	7.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.86	0.35	4.26	0.83	0.10	0.95	0.70	0.70	0.95	0.47	0.83
d, Delay for Lane Group [s/veh]	58.6	49.9	42.5	152	51.3	42.5	90.1	21.3	23.3	77.4	16.5	29.7
Lane Group LOS	E	D	D	F	D	D	F	C	C	E	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.25	9.38	3.38	51.7	7.86	0.82	3.48	14.9	15.5	3.05	8.20	21.7
50th-Percentile Queue Length [ft/ln]	106.	234.	84.5	129	196.	20.5	86.9	373.	389.	76.2	205.	543.
95th-Percentile Queue Length [veh/ln]	7.64	14.4	6.09	77.8	12.4	1.48	6.26	21.2	22.0	5.49	12.9	29.3
95th-Percentile Queue Length [ft/ln]	190.	360.	152.	194	311.	37.0	156.	532.	551.	137.	322.	734.

Movement, Approach, & Intersection Results

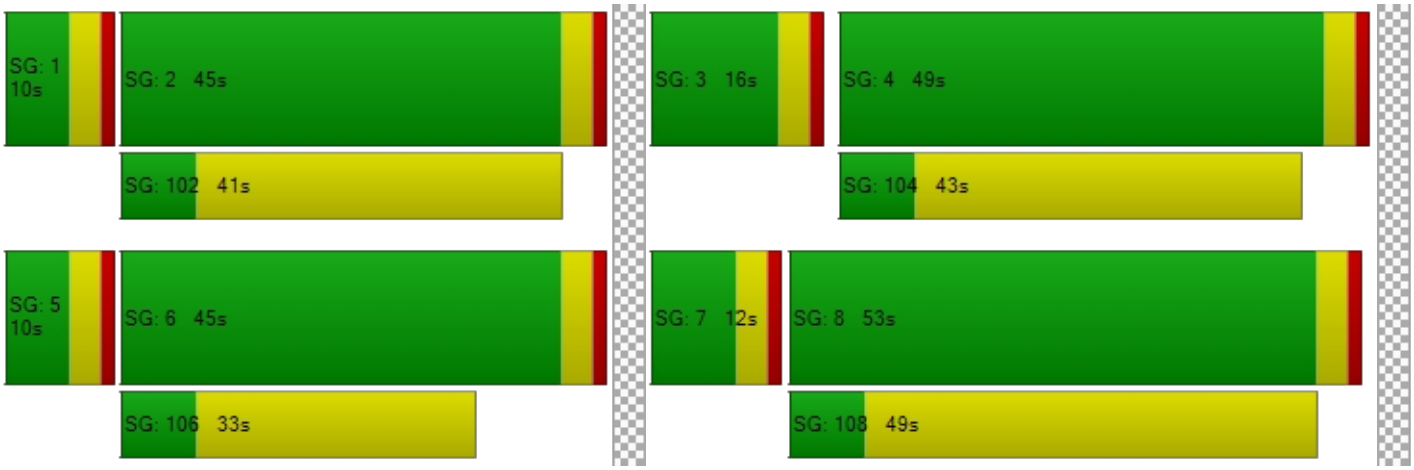
d_M, Delay for Movement [s/veh]	58.6	49.9	42.5	152	51.3	42.5	90.1	21.8	23.3	77.4	16.5	29.7
Movement LOS	E	D	D	F	D	D	F	C	C	E	B	C
d_A, Approach Delay [s/veh]	51.28			1000.22			24.58			25.17		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	233.47											
Intersection LOS	F											
Intersection V/C	1.112											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.890	3.048	3.179	3.469
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	750	683	683
d_b, Bicycle Delay [s]	21.02	23.45	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.409	2.849	2.826	2.958
Bicycle LOS	B	C	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



APPENDIX D-IV

YEAR 2035 CUMULATIVE PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	112.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.899

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	355	198	180	8	402	46	53	248	591	1022	870	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	355	198	180	8	402	46	53	248	591	1022	870	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	89	50	0	2	101	12	13	62	148	256	218	1
Total Analysis Volume [veh/h]	355	198	0	8	402	46	53	248	591	1022	870	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups									2,8			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	6	6	6	0
Maximum Green [s]	6	30	0	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	10	42	0	10	14	0	11	36	36	28	53	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	31	0	0	0	0	0	25	25	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No	No	No	No	
Maximum Recall		No			No		No	No	No	No	No	
Pedestrian Recall		No			No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	18	18	18	10	10	10	5	52	88	24	71	71
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.08	0.08	0.08	0.04	0.44	0.73	0.20	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.11	0.11	0.09	0.00	0.00	0.12	0.12	0.03	0.04	0.31	0.29	0.15	0.16
s, saturation flow rate [veh/h]	1750	1750	1900	1900	1800	1900	1900	1800	5700	1900	3500	3800	1900
c, Capacity [veh/h]	257	257	279	279	151	159	159	76	2483	1393	700	2255	1128
d1, Uniform Delay [s]	48.91	48.94	48.17	0.00	50.60	54.99	54.99	56.73	19.99	6.20	48.02	11.68	11.78
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.15	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.92	3.98	2.39	0.00	0.14	198.12	182.16	10.84	0.08	0.95	209.05	0.27	0.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.73	0.64	0.00	0.05	1.42	1.39	0.70	0.10	0.42	1.46	0.25	0.27
d, Delay for Lane Group [s/veh]	52.83	52.92	50.56	0.00	50.74	253.12	237.15	67.57	20.07	7.15	257.07	11.95	12.36
Lane Group LOS	D	D	D	A	D	F	F	E	C	A	F	B	B
Critical Lane Group	No	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.64	5.67	5.19	0.00	0.23	13.59	12.89	1.82	1.39	5.52	30.75	3.67	3.97
50th-Percentile Queue Length [ft/ln]	141.1	141.8	129.7	0.00	5.71	339.86	322.18	45.41	34.85	138.02	768.67	91.70	99.34
95th-Percentile Queue Length [veh/ln]	9.54	9.58	8.92	0.00	0.41	21.95	20.84	3.27	2.51	9.37	47.18	6.60	7.15
95th-Percentile Queue Length [ft/ln]	238.5	239.5	223.0	0.00	10.28	548.82	521.02	81.73	62.74	234.36	1179.52	165.05	178.82

Movement, Approach, & Intersection Results

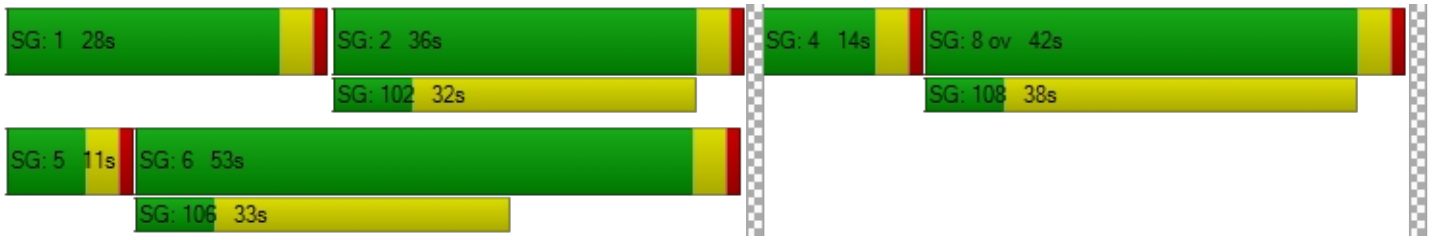
d_M, Delay for Movement [s/veh]	52.88	50.81	0.00	50.74	246.16	237.15	67.57	20.07	7.15	257.07	12.09	12.36
Movement LOS	D	D	A	D	F	F	E	C	A	F	B	B
d_A, Approach Delay [s/veh]	52.13			241.82			14.33			144.28		
Approach LOS	D			F			B			F		
d_I, Intersection Delay [s/veh]	112.03											
Intersection LOS	F											
Intersection V/C	0.899											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	0.00	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.965	2.452	0.000	3.001
Crosswalk LOS	C	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	633	167	533	816
d_b, Bicycle Delay [s]	28.03	50.43	32.28	21.02
l_b,int, Bicycle LOS Score for Intersection	2.016	1.936	2.050	2.601
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	45.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.713

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	65	7	220	237	75	20	130	37	11	108	98
Total Analysis Volume [veh/h]	149	259	26	879	946	300	79	520	149	44	430	391
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	29	38	0	33	42	0	10	39	0	10	39	39
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	28	28
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	12	26	26	29	43	43	6	45	45	5	44	77
g / C, Green / Cycle	0.10	0.21	0.21	0.24	0.36	0.36	0.05	0.37	0.37	0.04	0.36	0.64
(v / s)_i Volume / Saturation Flow Rate	0.08	0.08	0.07	0.25	0.33	0.33	0.02	0.18	0.17	0.02	0.11	0.21
s, saturation flow rate [veh/h]	1800	1900	1900	3500	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	180	406	406	846	676	676	165	707	707	71	1384	1214
d1, Uniform Delay [s]	53.04	40.16	40.08	45.53	37.09	37.09	55.76	28.96	28.50	56.79	27.36	9.85
k, delay calibration	0.11	0.11	0.11	0.11	0.30	0.30	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.41	0.53	0.51	26.08	13.59	13.59	2.14	2.43	2.11	8.59	0.59	0.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.35	0.35	1.04	0.92	0.92	0.48	0.49	0.46	0.62	0.31	0.32
d, Delay for Lane Group [s/veh]	62.45	40.68	40.59	71.61	50.68	50.68	57.89	31.39	30.61	65.38	27.95	10.55
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.88	3.70	3.61	15.55	19.79	19.79	1.22	8.13	7.41	1.48	4.55	4.73
50th-Percentile Queue Length [ft/ln]	121.95	92.44	90.22	388.73	494.71	494.71	30.42	203.31	185.22	37.10	113.72	118.33
95th-Percentile Queue Length [veh/ln]	8.50	6.66	6.50	22.52	27.08	27.08	2.19	12.81	11.87	2.67	8.05	8.30
95th-Percentile Queue Length [ft/ln]	212.50	166.39	162.40	562.92	677.09	677.09	54.76	320.23	296.82	66.78	201.17	207.52

Movement, Approach, & Intersection Results

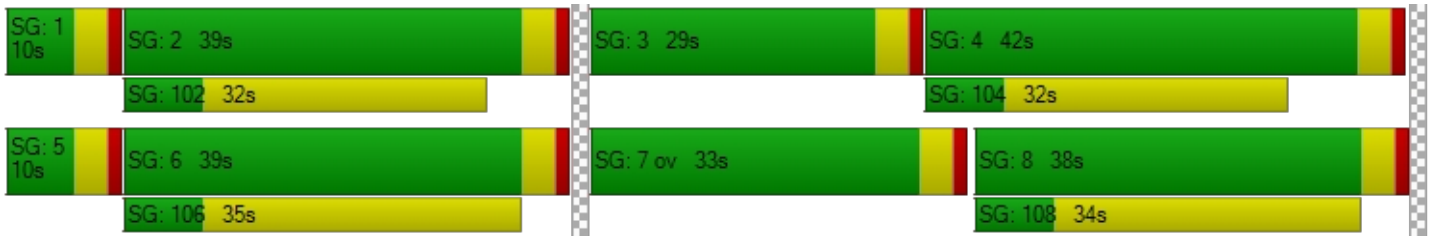
d_M, Delay for Movement [s/veh]	62.45	40.64	40.59	71.61	50.68	50.68	57.89	31.13	30.61	65.38	27.95	10.55
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	B
d_A, Approach Delay [s/veh]	48.13			59.34			33.85			21.99		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	45.86											
Intersection LOS	D											
Intersection V/C	0.713											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.620	2.930	2.731	2.839
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	633	583	583
d_b, Bicycle Delay [s]	30.83	28.03	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.918	3.313	2.177	2.273
Bicycle LOS	A	C	B	B

Sequence

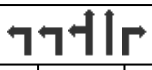
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	31.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.740

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	267	240	152	944	590	37	44	1345	249	280	1569	598
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	267	240	152	944	590	37	44	1345	249	280	1569	598
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	60	38	236	148	9	11	336	62	70	392	150
Total Analysis Volume [veh/h]	267	240	152	944	590	37	44	1345	249	280	1569	598
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	6	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	10	49	0	10	49	0	10	45	0	11	46	46
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	36	0	0	34	0	0	26	26
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall		No			No		No	No		No	No	No
Maximum Recall		No			No		No	No		No	No	No
Pedestrian Recall		No			No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	33	33	33	33	33	33	33	4	53	53	7	56	93
g / C, Green / Cycle	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.04	0.51	0.51	0.07	0.53	0.88
(v / s)_i Volume / Saturation Flow Rate	0.08	0.06	0.08	0.19	0.22	0.26	0.02	0.02	0.28	0.27	0.08	0.28	0.31
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1750	1900	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	224	1183	592	932	606	592	592	75	1928	964	234	3037	1676
d1, Uniform Delay [s]	26.59	26.57	27.06	30.58	31.79	33.86	25.39	49.44	17.75	17.54	48.99	15.81	1.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.18	0.11	0.11	0.50	0.50	0.11	0.50	0.27
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	96.77	0.08	0.23	0.96	1.07	5.75	0.04	7.16	1.17	2.17	97.44	0.63	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.19	0.20	0.26	0.70	0.63	0.85	0.06	0.59	0.56	0.54	1.20	0.52	0.36
d, Delay for Lane Group [s/veh]	123.37	26.66	27.29	31.54	32.86	39.61	25.43	56.59	18.92	19.71	146.42	16.45	1.38
Lane Group LOS	F	C	C	C	C	D	C	E	B	B	F	B	A
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.06	2.22	2.88	7.01	8.53	12.73	0.66	1.28	8.89	8.80	6.22	7.92	0.62
50th-Percentile Queue Length [ft/ln]	126.57	55.45	72.02	175.1	213.1	318.1	16.42	31.99	222.29	220.07	155.51	198.01	15.62
95th-Percentile Queue Length [veh/ln]	9.11	3.99	5.19	11.35	13.32	18.58	1.18	2.30	13.78	13.67	10.87	12.54	1.12
95th-Percentile Queue Length [ft/ln]	227.83	99.82	129.63	283.6	332.8	464.4	29.55	57.58	344.54	341.72	271.72	313.40	28.11

Movement, Approach, & Intersection Results

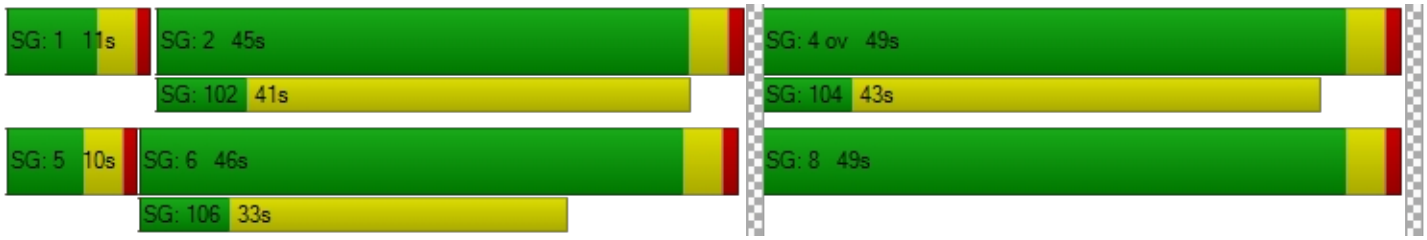
d_M, Delay for Movement [s/veh]	123.37	26.66	27.29	32.03	38.62	25.43	56.59	19.08	19.71	146.42	16.45	1.38
Movement LOS	F	C	C	C	D	C	E	B	B	F	B	A
d_A, Approach Delay [s/veh]	65.98			34.30			20.18			27.64		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	31.36											
Intersection LOS	C											
Intersection V/C	0.740											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.08	42.08	42.08	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.849	2.943	3.470	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	857	857	781	800
d_b, Bicycle Delay [s]	17.14	17.14	19.50	18.90
l_b,int, Bicycle LOS Score for Intersection	2.103	2.856	2.461	2.905
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	22.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.540

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	404	154	840	26	118	36	31	915	573	189	357	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	404	154	840	26	118	36	31	915	573	189	357	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	101	39	0	7	30	9	8	229	143	47	89	2
Total Analysis Volume [veh/h]	404	154	0	26	118	36	31	915	573	189	357	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups									2,8			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	6	6	6	0
Maximum Green [s]	6	30	0	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	10	42	0	10	10	0	10	36	36	17	43	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	31	0	0	0	0	0	25	25	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No	No	No	No	
Maximum Recall		No			No		No	No	No	No	No	
Pedestrian Recall		No			No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	17	17	6	6	6	4	58	89	8	63	63
g / C, Green / Cycle	0.16	0.16	0.16	0.16	0.06	0.06	0.06	0.03	0.56	0.85	0.07	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.08	0.00	0.01	0.04	0.04	0.02	0.16	0.30	0.05	0.06	0.07
s, saturation flow rate [veh/h]	1750	1750	1900	1900	1800	1900	1900	1800	5700	1900	3500	3800	1900
c, Capacity [veh/h]	280	280	304	304	104	110	110	63	3164	1614	261	2260	1130
d1, Uniform Delay [s]	41.92	41.92	40.35	0.00	47.33	48.64	48.59	49.79	12.39	1.71	47.58	9.22	9.25
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.49	3.49	1.30	0.00	1.23	8.09	7.44	5.78	0.23	0.61	3.79	0.09	0.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.72	0.72	0.51	0.00	0.25	0.71	0.69	0.49	0.29	0.36	0.72	0.11	0.11
d, Delay for Lane Group [s/veh]	45.41	45.41	41.66	0.00	48.56	56.74	56.03	55.57	12.62	2.32	51.37	9.31	9.44
Lane Group LOS	D	D	D	A	D	E	E	E	B	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.21	5.21	3.74	0.00	0.69	2.25	2.17	0.90	3.73	1.51	2.55	1.17	1.26
50th-Percentile Queue Length [ft/ln]	130.3	130.3	93.40	0.00	17.13	56.30	54.37	22.48	93.15	37.70	63.70	29.36	31.47
95th-Percentile Queue Length [veh/ln]	8.96	8.96	6.72	0.00	1.23	4.05	3.91	1.62	6.71	2.71	4.59	2.11	2.27
95th-Percentile Queue Length [ft/ln]	223.9	223.9	168.1	0.00	30.83	101.34	97.87	40.46	167.66	67.86	114.67	52.85	56.65

Movement, Approach, & Intersection Results

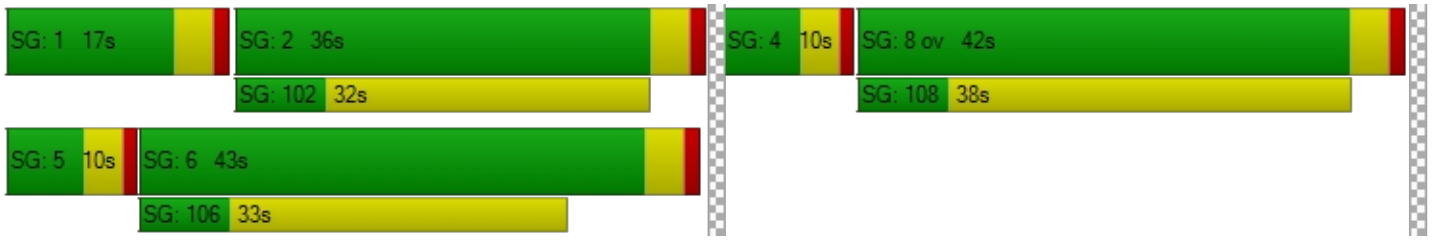
d_M, Delay for Movement [s/veh]	45.41	41.66	0.00	48.56	56.50	56.03	55.57	12.62	2.32	51.37	9.36	9.44
Movement LOS	D	D	A	D	E	E	E	B	A	D	A	A
d_A, Approach Delay [s/veh]	44.38			55.26			9.61			23.66		
Approach LOS	D			E			A			C		
d_I, Intersection Delay [s/veh]	22.21											
Intersection LOS	C											
Intersection V/C	0.540											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.11	42.11	0.00	42.11
l_p,int, Pedestrian LOS Score for Intersection	2.801	2.380	0.000	2.915
Crosswalk LOS	C	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	723	114	609	742
d_b, Bicycle Delay [s]	21.40	46.70	25.40	20.77
l_b,int, Bicycle LOS Score for Intersection	2.020	1.708	2.395	1.865
Bicycle LOS	B	A	B	A

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	37.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.911

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	58	170	13	135	74	16	55	180	40	8	138	219
Total Analysis Volume [veh/h]	231	679	51	538	295	62	219	718	158	33	550	877
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	27	39	0	24	36	0	13	36	0	16	39	39
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	28	28
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	17	25	25	20	28	28	9	50	50	4	45	69
g / C, Green / Cycle	0.15	0.22	0.22	0.17	0.25	0.25	0.08	0.43	0.43	0.03	0.39	0.60
(v / s)_i Volume / Saturation Flow Rate	0.13	0.19	0.19	0.15	0.10	0.09	0.06	0.24	0.22	0.02	0.14	0.46
s, saturation flow rate [veh/h]	1800	1900	1900	3500	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	263	417	417	609	470	470	276	822	822	63	1477	1135
d1, Uniform Delay [s]	48.13	43.55	43.29	46.38	36.10	35.87	52.08	24.30	23.85	54.59	25.14	17.31
k, delay calibration	0.11	0.19	0.18	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.16	10.72	8.73	4.43	0.53	0.48	5.11	2.64	2.31	6.62	0.72	5.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.89	0.87	0.88	0.39	0.37	0.79	0.55	0.52	0.52	0.37	0.77
d, Delay for Lane Group [s/veh]	57.29	54.27	52.02	50.81	36.63	36.35	57.19	26.93	26.16	61.21	25.86	22.43
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.14	11.36	10.83	7.85	4.38	4.09	3.30	9.62	8.84	1.06	5.50	17.84
50th-Percentile Queue Length [ft/ln]	178.45	284.12	270.76	196.21	109.52	102.35	82.46	240.58	221.08	26.40	137.40	446.00
95th-Percentile Queue Length [veh/ln]	11.52	16.89	16.23	12.44	7.81	7.37	5.94	14.71	13.72	1.90	9.34	24.77
95th-Percentile Queue Length [ft/ln]	287.99	422.34	405.69	311.07	195.34	184.23	148.43	367.77	343.01	47.51	233.52	619.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.29	53.24	52.02	50.81	36.52	36.35	57.19	26.65	26.16	61.21	25.86	22.43
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	54.15			45.10			32.68			24.60		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	37.20											
Intersection LOS	D											
Intersection V/C	0.911											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.594	2.898	2.780	2.914
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	608	556	556	608
d_b, Bicycle Delay [s]	27.84	29.97	29.97	27.84
l_b,int, Bicycle LOS Score for Intersection	2.352	2.298	2.463	2.764
Bicycle LOS	B	B	B	C

Sequence

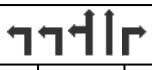
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.843

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	271	630	129	1005	526	32	87	1916	300	168	1496	879
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	271	630	129	1005	526	32	87	1916	300	168	1496	879
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	158	32	251	132	8	22	479	75	42	374	220
Total Analysis Volume [veh/h]	271	630	129	1005	526	32	87	1916	300	168	1496	879
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	6	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	10	50	0	10	50	0	10	45	0	10	45	45
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	36	0	0	34	0	0	26	26
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall		No			No		No	No		No	No	No
Maximum Recall		No			No		No	No		No	No	No
Pedestrian Recall		No			No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	35	35	35	35	35	35	35	6	52	52	6	52	91
g / C, Green / Cycle	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.06	0.50	0.50	0.06	0.50	0.87
(v / s)_i Volume / Saturation Flow Rate	0.08	0.17	0.07	0.19	0.19	0.28	0.02	0.05	0.39	0.39	0.05	0.26	0.46
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1750	1900	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	268	1260	630	696	649	630	630	106	1882	941	206	2823	1643
d1, Uniform Delay [s]	25.40	28.12	25.17	29.01	29.01	32.44	23.86	48.85	21.86	21.90	48.83	18.13	1.78
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.19	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	28.62	0.31	0.16	9.21	0.64	5.16	0.03	14.24	3.36	6.59	7.58	0.72	1.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.01	0.50	0.20	0.96	0.52	0.84	0.05	0.82	0.78	0.79	0.81	0.53	0.53
d, Delay for Lane Group [s/veh]	54.03	28.43	25.33	38.22	29.65	37.60	23.89	63.09	25.22	28.49	56.41	18.84	3.04
Lane Group LOS	F	C	C	D	C	D	C	E	C	C	E	B	A
Critical Lane Group	No	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.47	6.33	2.33	7.77	7.00	12.98	0.55	2.67	15.13	16.04	2.39	8.17	2.26
50th-Percentile Queue Length [ft/ln]	86.80	158.14	58.16	194.3	174.9	324.6	13.66	66.68	378.30	400.94	59.67	204.32	56.43
95th-Percentile Queue Length [veh/ln]	6.25	10.45	4.19	12.34	11.33	18.89	0.98	4.80	21.51	22.61	4.30	12.86	4.06
95th-Percentile Queue Length [ft/ln]	156.24	261.26	104.69	308.6	283.3	472.3	24.59	120.02	537.79	565.14	107.40	321.54	101.57

Movement, Approach, & Intersection Results

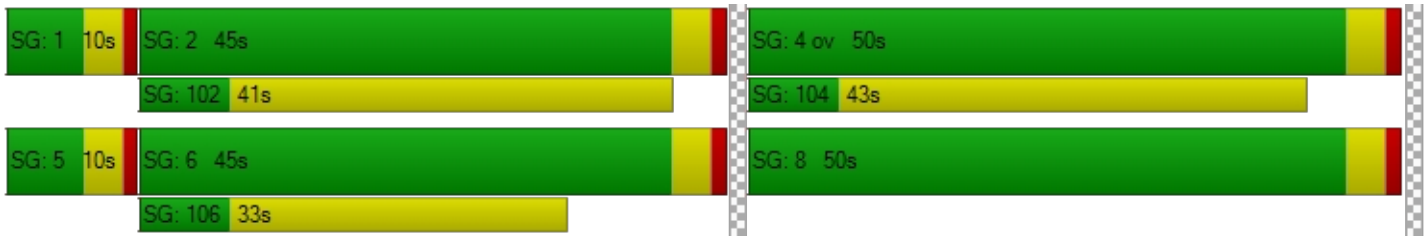
d_M, Delay for Movement [s/veh]	54.03	28.43	25.33	35.36	37.60	23.89	63.09	25.97	28.49	56.41	18.84	3.04
Movement LOS	F	C	C	D	D	C	E	C	C	E	B	A
d_A, Approach Delay [s/veh]	34.78			35.88			27.70			15.86		
Approach LOS	C			D			C			B		
d_I, Intersection Delay [s/veh]	26.35											
Intersection LOS	C											
Intersection V/C	0.843											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.07	42.07	42.07	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.883	3.041	3.558	0.000
Crosswalk LOS	C	C	D	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	876	876	781	781
d_b, Bicycle Delay [s]	16.57	16.57	19.50	19.50
l_b,int, Bicycle LOS Score for Intersection	2.409	2.849	2.826	2.958
Bicycle LOS	B	C	C	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D-V

YEAR 2045 TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	39.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.895

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	194	250	236	1011	692	9	16	1577	238	542	1995	627
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	194	250	236	1011	692	9	16	1577	238	542	1995	627
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	63	59	253	173	2	4	394	60	136	499	157
Total Analysis Volume [veh/h]	194	250	236	1011	692	9	16	1577	238	542	1995	627
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	13	15	0	42	44	0	10	39	0	24	53	53
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	9	12	12	12	37	40	40	3	35	35	20	52	94
g / C, Green / Cycle	0.07	0.10	0.10	0.10	0.31	0.34	0.34	0.02	0.29	0.29	0.17	0.44	0.78
(v / s)_i Volume / Saturation Flow Rate	0.06	0.09	0.08	0.08	0.29	0.18	0.18	0.00	0.24	0.24	0.15	0.35	0.33
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	252	189	189	189	1083	641	641	76	1657	552	584	2486	1480
d1, Uniform Delay [s]	54.75	53.58	53.16	52.84	40.26	32.35	32.33	57.73	39.64	39.75	49.30	29.37	4.39
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.13	0.13	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.97	16.51	10.09	7.35	4.41	0.86	0.85	1.37	4.66	13.28	7.03	2.85	0.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.92	0.85	0.79	0.93	0.55	0.55	0.21	0.82	0.83	0.93	0.80	0.42
d, Delay for Lane Group [s/veh]	59.72	70.09	63.25	60.20	44.67	33.21	33.18	59.10	44.30	53.03	56.33	32.22	5.28
Lane Group LOS	E	E	E	E	D	C	C	E	D	D	E	C	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.06	6.09	5.30	4.82	14.98	8.42	8.40	0.25	13.05	14.51	8.55	16.91	4.54
50th-Percentile Queue Length [ft/ln]	76.41	152.2	132.5	120.5	374.55	210.59	210.07	6.34	326.13	362.81	213.85	422.78	113.58
95th-Percentile Queue Length [veh/ln]	5.50	10.14	9.08	8.43	21.33	13.18	13.16	0.46	18.97	20.76	13.35	23.66	8.04
95th-Percentile Queue Length [ft/ln]	137.5	253.4	227.0	210.6	533.25	329.59	328.92	11.41	474.21	519.00	333.76	591.38	200.97

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.72	68.03	61.20	44.67	33.20	33.18	59.10	45.51	53.03	56.33	32.22	5.28
Movement LOS	E	E	E	D	C	C	E	D	D	E	C	A
d_A, Approach Delay [s/veh]	63.32			39.97			46.61			31.01		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	39.93											
Intersection LOS	D											
Intersection V/C	0.895											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.907	2.890	3.299	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	183	666	583	816
d_b, Bicycle Delay [s]	49.52	26.68	30.12	21.02
l_b,int, Bicycle LOS Score for Intersection	2.121	2.972	2.315	3.300
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	23.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.830

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	1060	0	730	0	1937	650	269	2247	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	1060	0	730	0	1937	650	269	2247	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	265	0	183	0	484	163	67	562	0
Total Analysis Volume [veh/h]	0	0	0	1060	0	730	0	1937	650	269	2247	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	45	0	0	0	32	0	13	45	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		90	90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		33	33	37	37	9	49
g / C, Green / Cycle		0.36	0.36	0.41	0.41	0.10	0.55
(v / s)_i Volume / Saturation Flow Rate		0.30	0.19	0.34	0.17	0.08	0.39
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		1267	1376	2317	1545	344	3130
d1, Uniform Delay [s]		26.29	22.68	24.02	19.13	39.67	15.11
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		1.54	0.32	3.76	0.84	3.92	1.45
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.84	0.53	0.84	0.42	0.78	0.72
d, Delay for Lane Group [s/veh]		27.83	23.00	27.78	19.97	43.59	16.55
Lane Group LOS		C	C	C	B	D	B
Critical Lane Group		Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		10.21	5.97	12.49	4.86	3.05	10.79
50th-Percentile Queue Length [ft/ln]		255.24	149.18	312.24	121.60	76.35	269.73
95th-Percentile Queue Length [veh/ln]		15.45	9.97	18.29	8.48	5.50	16.18
95th-Percentile Queue Length [ft/ln]		386.25	249.34	457.14	212.02	137.43	404.40

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	27.83	0.00	23.00	0.00	27.78	19.97	43.59	16.55	0.00
Movement LOS				C		C		C	B	D	B	
d_A, Approach Delay [s/veh]	0.00			25.86			25.82			19.44		
Approach LOS	A			C			C			B		
d_I, Intersection Delay [s/veh]	23.50											
Intersection LOS	C											
Intersection V/C	0.830											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.162	2.567	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	911	622	911
d_b, Bicycle Delay [s]	45.01	13.35	21.37	13.35
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.982	2.943
Bicycle LOS	D	A	C	C

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	21.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.840

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	1104	0	527	0	0	0	0	2563	424	0	1412	511
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1104	0	527	0	0	0	0	2563	424	0	1412	511
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	276	0	132	0	0	0	0	641	106	0	353	0
Total Analysis Volume [veh/h]	1104	0	527	0	0	0	0	2563	424	0	1412	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	34	34		48	48	48	48
g / C, Green / Cycle	0.37	0.37		0.54	0.54	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.32	0.28		0.45	0.45	0.22	0.25
s, saturation flow rate [veh/h]	3500	1900		3800	1900	1900	5700
c, Capacity [veh/h]	1309	710		2041	1020	1020	3061
d1, Uniform Delay [s]	25.72	24.36		17.49	17.49	12.39	12.80
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.57	1.55		4.29	8.17	1.25	0.50
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.74		0.84	0.84	0.42	0.46
d, Delay for Lane Group [s/veh]	27.29	25.92		21.78	25.66	13.64	13.30
Lane Group LOS	C	C		C	C	B	B
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	10.56	9.60		14.71	15.81	5.10	5.58
50th-Percentile Queue Length [ft/ln]	263.93	239.92		367.66	395.14	127.43	139.50
95th-Percentile Queue Length [veh/ln]	15.89	14.68		21.00	22.33	8.80	9.45
95th-Percentile Queue Length [ft/ln]	397.15	366.93		524.89	558.14	220.00	236.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.29	0.00	25.92	0.00	0.00	0.00	0.00	22.64	13.64	0.00	13.30	0.00
Movement LOS	C		C					C	B		B	
d_A, Approach Delay [s/veh]	26.84			0.00			21.73			13.30		
Approach LOS	C			A			C			B		
d_I, Intersection Delay [s/veh]	21.14											
Intersection LOS	C											
Intersection V/C	0.840											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.700	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	3.202	2.336
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	14.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.646

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	69	1	137	585	2563	42	18	1915	192
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	69	1	137	585	2563	42	18	1915	192
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	2	17	0	34	146	641	11	5	479	48
Total Analysis Volume [veh/h]	9	8	7	69	1	137	585	2563	42	18	1915	192
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	44	0	0	44	0	40	38	0	33	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	7	7	22	94	94	3	74	74
g / C, Green / Cycle	0.06	0.06	0.06	0.19	0.81	0.81	0.02	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.04	0.17	0.45	0.47	0.01	0.37	0.37
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	150	169	225	676	3090	1545	42	2444	1222
d1, Uniform Delay [s]	51.56	52.93	52.78	44.93	3.65	3.80	55.40	11.59	11.67
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	1.62	2.64	3.49	0.72	1.60	6.83	0.98	2.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.41	0.61	0.87	0.55	0.58	0.43	0.57	0.58
d, Delay for Lane Group [s/veh]	52.06	54.55	55.42	48.41	4.37	5.40	62.23	12.57	13.68
Lane Group LOS	D	D	E	D	A	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.68	2.05	2.01	8.36	5.08	5.91	0.59	9.76	10.29
50th-Percentile Queue Length [ft/ln]	17.04	51.37	50.33	209.10	126.93	147.78	14.86	243.93	257.17
95th-Percentile Queue Length [veh/ln]	1.23	3.70	3.62	13.11	8.77	9.90	1.07	14.88	15.55
95th-Percentile Queue Length [ft/ln]	30.66	92.46	90.59	327.67	219.31	247.46	26.74	372.00	388.67

Movement, Approach, & Intersection Results

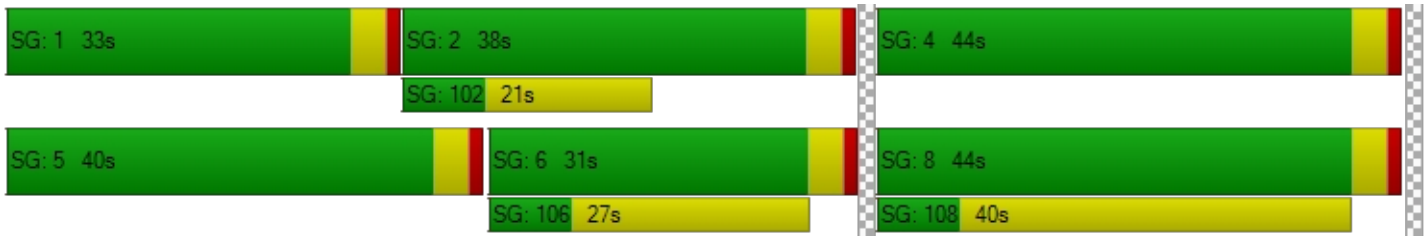
d_M, Delay for Movement [s/veh]	52.06	52.06	52.06	54.55	54.55	55.42	48.41	4.71	5.40	62.23	12.87	13.68
Movement LOS	D	D	D	D	D	E	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	52.06			55.12			12.74			13.36		
Approach LOS	D			E			B			B		
d_I, Intersection Delay [s/veh]	14.73											
Intersection LOS	B											
Intersection V/C	0.646											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.02	47.02	0.00	47.02
l_p,int, Pedestrian LOS Score for Intersection	1.768	2.505	0.000	3.367
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	696	696	591	470
d_b, Bicycle Delay [s]	24.45	24.45	28.52	33.66
l_b,int, Bicycle LOS Score for Intersection	1.599	1.901	3.314	2.728
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	34.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.890

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	169	322	11	125	218	405	500	2031	173	23	1470	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	322	11	125	218	405	500	2031	173	23	1470	183
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	81	3	31	55	101	125	508	43	6	368	46
Total Analysis Volume [veh/h]	169	322	11	125	218	405	500	2031	173	23	1470	183
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	27	0	17	30	0	19	41	0	10	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	24	24	8	22	22	15	44	44	3	32	32
g / C, Green / Cycle	0.11	0.25	0.25	0.09	0.24	0.24	0.16	0.46	0.46	0.03	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.09	0.07	0.11	0.21	0.14	0.36	0.09	0.01	0.29	0.29
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	191	482	482	158	448	448	554	2622	874	54	1261	630
d1, Uniform Delay [s]	41.98	29.05	29.02	42.53	31.38	35.31	39.33	21.55	15.26	45.34	29.95	29.86
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.21	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.75	0.43	0.42	8.46	0.82	12.47	5.76	2.31	0.51	5.21	8.71	15.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.35	0.34	0.79	0.49	0.90	0.90	0.77	0.20	0.43	0.88	0.87
d, Delay for Lane Group [s/veh]	54.73	29.48	29.45	50.99	32.20	47.78	45.09	23.86	15.77	50.56	38.66	45.03
Lane Group LOS	D	C	C	D	C	D	D	C	B	D	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.54	3.14	3.11	3.22	4.36	10.45	6.09	12.52	2.29	0.61	13.02	14.04
50th-Percentile Queue Length [ft/ln]	113.58	78.47	77.70	80.56	108.95	261.21	152.19	312.93	57.18	15.21	325.57	351.09
95th-Percentile Queue Length [veh/ln]	8.04	5.65	5.59	5.80	7.78	15.75	10.13	18.32	4.12	1.10	18.94	20.19
95th-Percentile Queue Length [ft/ln]	200.97	141.24	139.86	145.00	194.54	393.73	253.35	457.99	102.92	27.38	473.53	504.74

Movement, Approach, & Intersection Results

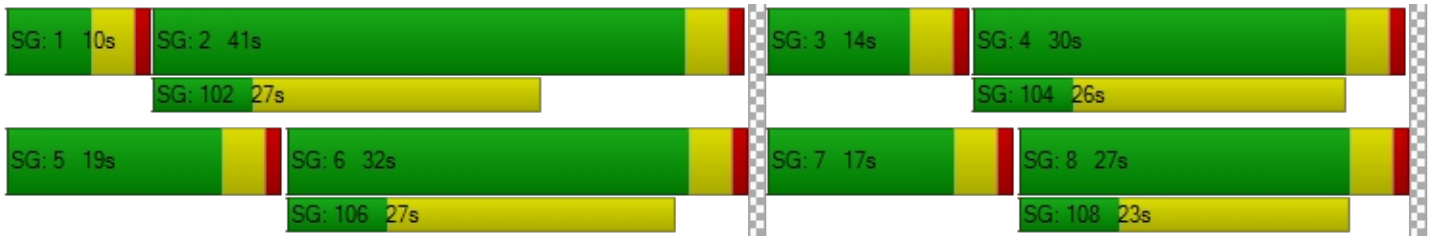
d_M, Delay for Movement [s/veh]	54.73	29.46	29.45	50.99	32.20	47.78	45.09	23.86	15.77	50.56	40.24	45.03
Movement LOS	D	C	C	D	C	D	D	C	B	D	D	D
d_A, Approach Delay [s/veh]	37.97			43.77			27.27			40.91		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	34.47											
Intersection LOS	C											
Intersection V/C	0.890											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.18	37.18	37.18	37.18
l_p,int, Pedestrian LOS Score for Intersection	2.481	2.644	3.366	3.131
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	484	547	778	589
d_b, Bicycle Delay [s]	27.32	25.09	17.74	23.66
l_b,int, Bicycle LOS Score for Intersection	1.974	2.177	3.047	2.481
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	29.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.763

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	322	130	34	22	236	373	111	777	1240	277	869	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	322	130	34	22	236	373	111	777	1240	277	869	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	81	33	9	6	59	93	28	194	310	69	217	4
Total Analysis Volume [veh/h]	322	130	34	22	236	373	111	777	1240	277	869	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	16	49	49	10	43	0	19	37	37	14	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	33	48	3	24	24	9	48	64	10	49	49
g / C, Green / Cycle	0.11	0.30	0.43	0.03	0.22	0.22	0.08	0.43	0.58	0.09	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.02	0.01	0.12	0.20	0.06	0.20	0.33	0.08	0.15	0.16
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	384	578	821	50	423	423	140	1638	2193	320	1690	845
d1, Uniform Delay [s]	48.06	28.60	18.08	52.68	38.01	41.42	49.89	22.39	14.62	49.34	20.03	20.18
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.13	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.95	0.20	0.02	5.99	1.16	7.36	9.61	0.99	1.06	6.96	0.56	1.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.22	0.04	0.44	0.56	0.88	0.79	0.47	0.57	0.86	0.34	0.36
d, Delay for Lane Group [s/veh]	53.01	28.80	18.10	58.67	39.17	48.78	59.50	23.38	15.68	56.30	20.58	21.36
Lane Group LOS	D	C	B	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.58	2.60	0.51	0.68	5.77	10.56	3.37	7.30	9.55	4.05	4.95	5.34
50th-Percentile Queue Length [ft/ln]	114.50	64.92	12.65	17.03	144.16	264.03	84.22	182.44	238.83	101.35	123.69	133.42
95th-Percentile Queue Length [veh/ln]	8.09	4.67	0.91	1.23	9.70	15.89	6.06	11.73	14.62	7.30	8.60	9.13
95th-Percentile Queue Length [ft/ln]	202.25	116.85	22.77	30.65	242.61	397.27	151.60	293.19	365.55	182.44	214.89	228.14

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.01	28.80	18.10	58.67	39.17	48.78	59.50	23.38	15.68	56.30	20.84	21.36
Movement LOS	D	C	B	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	44.09			45.53			20.78			29.31		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	29.14											
Intersection LOS	C											
Intersection V/C	0.763											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.826	2.357	3.185	2.881
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	818	709	600	509
d_b, Bicycle Delay [s]	19.23	22.94	26.97	30.59
l_b,int, Bicycle LOS Score for Intersection	2.362	2.601	3.315	2.198
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	7.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.309

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	48	6	19	5	0	6	7	828	51	26	1143	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	6	19	5	0	6	7	828	51	26	1143	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	207	13	7	286	1
Total Analysis Volume [veh/h]	48	6	19	5	0	6	7	828	51	26	1143	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	2	2	1	93	93	4	95	95
g / C, Green / Cycle	0.05	0.05	0.02	0.02	0.01	0.78	0.78	0.03	0.79	0.79
(v / s)_i Volume / Saturation Flow Rate	0.03	0.01	0.00	0.00	0.00	0.23	0.23	0.01	0.20	0.21
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	83	87	28	30	20	1473	1473	53	3017	1509
d1, Uniform Delay [s]	56.12	55.35	58.29	58.31	58.94	3.95	3.93	57.36	3.18	3.21
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.26	1.77	2.88	3.19	10.63	0.53	0.51	6.86	0.20	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.29	0.18	0.20	0.36	0.30	0.30	0.49	0.25	0.26
d, Delay for Lane Group [s/veh]	62.38	57.12	61.18	61.51	69.58	4.48	4.44	64.22	3.37	3.64
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.57	0.78	0.17	0.21	0.27	2.87	2.79	0.88	1.94	2.15
50th-Percentile Queue Length [ft/ln]	39.26	19.40	4.32	5.17	6.73	71.74	69.85	21.97	48.43	53.67
95th-Percentile Queue Length [veh/ln]	2.83	1.40	0.31	0.37	0.48	5.17	5.03	1.58	3.49	3.86
95th-Percentile Queue Length [ft/ln]	70.68	34.91	7.78	9.31	12.12	129.13	125.74	39.54	87.17	96.60

Movement, Approach, & Intersection Results

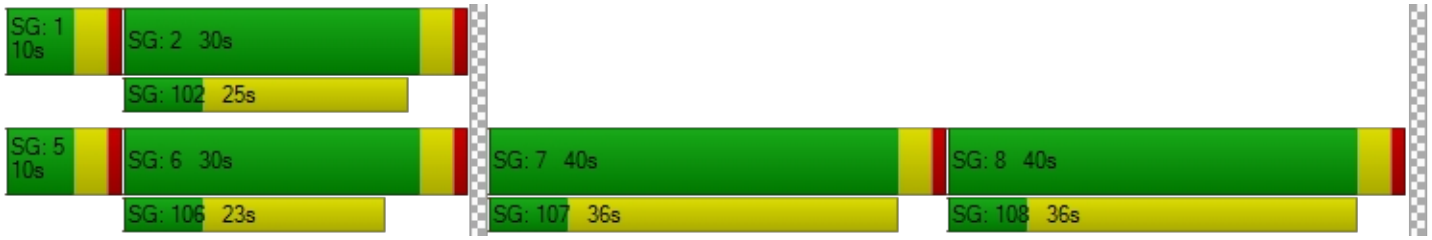
d_M, Delay for Movement [s/veh]	62.38	57.12	57.12	61.18	0.00	61.51	69.58	4.46	4.44	64.22	3.46	3.64
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	60.58			61.36			4.97			4.81		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	7.07											
Intersection LOS	A											
Intersection V/C	0.309											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.003	1.962	2.805	2.795
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.680	1.560	2.291	2.204
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	157.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.045

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	316	208	174	8	422	48	56	248	572	1063	909	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	316	208	174	8	422	48	56	248	572	1063	909	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	79	52	44	2	106	12	14	62	143	266	227	1
Total Analysis Volume [veh/h]	316	208	174	8	422	48	56	248	572	1063	909	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	16	49	0	10	43	0	12	36	0	25	49	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	28	1	18	18	5	53	53	21	69	69
g / C, Green / Cycle	0.10	0.24	0.01	0.15	0.15	0.04	0.44	0.44	0.18	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.18	0.05	0.00	0.13	0.12	0.03	0.07	0.30	0.30	0.16	0.17
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	181	896	23	281	281	78	1684	842	613	2186	1093
d1, Uniform Delay [s]	54.00	37.10	58.78	49.84	49.65	56.73	19.91	26.63	49.51	12.85	12.97
k, delay calibration	0.23	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.16	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	346.30	0.13	8.95	7.00	6.08	11.87	0.18	4.39	332.32	0.31	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.75	0.23	0.35	0.85	0.83	0.72	0.15	0.68	1.73	0.27	0.29
d, Delay for Lane Group [s/veh]	400.30	37.23	67.73	56.84	55.73	68.60	20.10	31.02	381.84	13.16	13.63
Lane Group LOS	F	D	E	E	E	E	C	C	F	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	22.86	2.50	0.30	7.50	7.22	1.93	2.12	13.85	37.45	4.08	4.42
50th-Percentile Queue Length [ft/ln]	571.56	62.57	7.45	187.46	180.44	48.35	53.03	346.19	936.37	102.05	110.61
95th-Percentile Queue Length [veh/ln]	36.31	4.50	0.54	11.99	11.62	3.48	3.82	19.95	58.45	7.35	7.87
95th-Percentile Queue Length [ft/ln]	907.74	112.62	13.42	299.73	290.59	87.03	95.45	498.76	1461.20	183.69	196.85

Movement, Approach, & Intersection Results

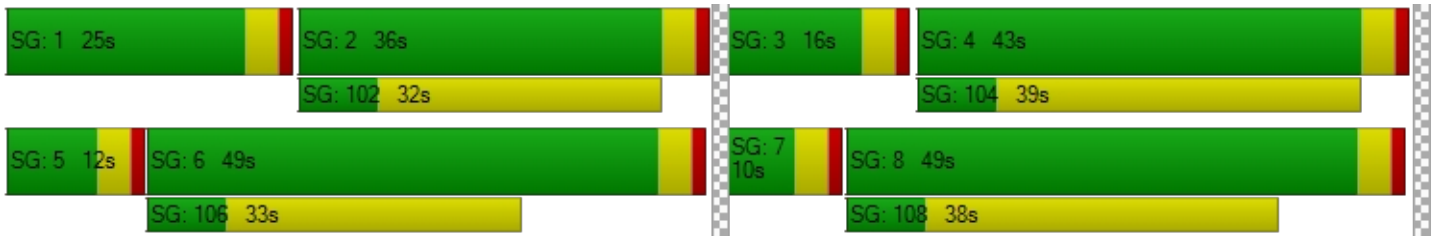
d_M, Delay for Movement [s/veh]	400.30	37.23	0.00	67.73	56.36	55.73	68.60	20.10	31.02	381.84	13.32	13.63
Movement LOS	F	D		E	E	E	E	C	C	F	B	B
d_A, Approach Delay [s/veh]	256.18			56.49			30.33			211.77		
Approach LOS	F			E			C			F		
d_I, Intersection Delay [s/veh]	157.28											
Intersection LOS	F											
Intersection V/C	1.045											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.886	2.459	2.907	3.011
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	750	650	533	750
d_b, Bicycle Delay [s]	23.45	27.35	32.28	23.45
l_b,int, Bicycle LOS Score for Intersection	1.992	1.954	2.041	2.645
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	5.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.612

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	5	1	1	0	0	29	22	415	8	7	1989	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	29	22	415	8	7	1989	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	7	6	104	2	2	497	2
Total Analysis Volume [veh/h]	5	1	1	0	0	29	22	415	8	7	1989	6
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	60	0	25	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	3	103	103	1	101	101
g / C, Green / Cycle	0.03	0.03	0.03	0.86	0.86	0.01	0.84	0.84
(v / s)_i Volume / Saturation Flow Rate	0.00	0.02	0.01	0.11	0.11	0.00	0.52	0.00
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	108	60	47	1630	1630	21	3200	1600
d1, Uniform Delay [s]	56.50	57.15	57.56	1.37	1.37	58.90	3.13	1.50
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.25	6.02	6.87	0.17	0.16	9.39	0.92	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.49	0.46	0.13	0.13	0.34	0.62	0.00
d, Delay for Lane Group [s/veh]	56.75	63.17	64.43	1.53	1.53	68.30	4.05	1.50
Lane Group LOS	E	E	E	A	A	E	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.21	0.97	0.75	0.51	0.51	0.27	5.33	0.02
50th-Percentile Queue Length [ft/ln]	5.35	24.14	18.73	12.86	12.79	6.63	133.37	0.40
95th-Percentile Queue Length [veh/ln]	0.39	1.74	1.35	0.93	0.92	0.48	9.12	0.03
95th-Percentile Queue Length [ft/ln]	9.64	43.46	33.72	23.15	23.02	11.93	228.07	0.72

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.75	56.75	56.75	0.00	0.00	63.17	64.43	1.53	1.53	68.30	4.05	1.50
Movement LOS	E	E	E			E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	56.75			63.17			4.64			4.27		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.17											
Intersection LOS	A											
Intersection V/C	0.612											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.739	1.757	0.000	2.860
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	933	1184
d_b, Bicycle Delay [s]	33.00	33.00	17.06	10.00
l_b,int, Bicycle LOS Score for Intersection	1.571	1.560	1.927	3.211
Bicycle LOS	A	A	A	C

Sequence

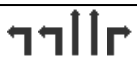
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	48.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.868

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	88	177	112	776	976	254	125	576	68	92	651	338
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	177	112	776	976	254	125	576	68	92	651	338
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	44	28	194	244	64	31	144	17	23	163	85
Total Analysis Volume [veh/h]	88	177	112	776	976	254	125	576	68	92	651	338
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	32	61	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	35	35	28	57	57	6	35	35	6	35	35
g / C, Green / Cycle	0.05	0.29	0.29	0.23	0.48	0.48	0.05	0.29	0.29	0.05	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.03	0.05	0.06	0.22	0.51	0.13	0.04	0.15	0.04	0.03	0.17	0.18
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	166	1103	552	817	905	905	175	1122	561	167	1113	557
d1, Uniform Delay [s]	55.86	31.69	32.11	45.31	31.42	18.99	56.16	35.12	30.90	55.88	36.19	36.48
k, delay calibration	0.11	0.11	0.11	0.11	0.12	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.63	0.07	0.18	6.94	41.10	0.17	5.33	1.68	0.44	2.82	2.25	4.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	0.16	0.20	0.95	1.08	0.28	0.71	0.51	0.12	0.55	0.58	0.61
d, Delay for Lane Group [s/veh]	58.48	31.76	32.29	52.25	72.52	19.16	61.49	36.80	31.34	58.71	38.44	41.34
Lane Group LOS	E	C	C	D	F	B	E	D	C	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.36	1.94	2.50	12.09	17.74	4.31	2.00	7.26	1.52	1.43	8.48	9.26
50th-Percentile Queue Length [ft/ln]	34.09	48.41	62.43	302.24	443.45	107.70	49.88	181.59	38.09	35.72	212.01	231.61
95th-Percentile Queue Length [veh/ln]	2.45	3.49	4.49	17.79	26.01	7.71	3.59	11.68	2.74	2.57	13.26	14.26
95th-Percentile Queue Length [ft/ln]	61.36	87.14	112.37	444.79	650.20	192.80	89.78	292.09	68.56	64.30	331.41	356.41

Movement, Approach, & Intersection Results

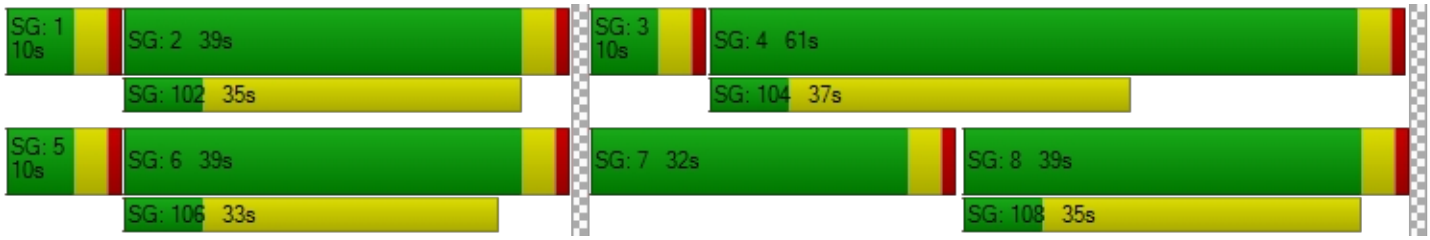
d_M, Delay for Movement [s/veh]	58.48	31.76	32.29	52.25	72.52	19.16	61.49	36.80	31.34	58.71	38.44	41.34
Movement LOS	E	C	C	D	F	B	E	D	C	E	D	D
d_A, Approach Delay [s/veh]	38.16			57.92			40.33			41.07		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	48.66											
Intersection LOS	D											
Intersection V/C	0.868											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.818	2.976	2.853	2.962
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	950	583	583
d_b, Bicycle Delay [s]	30.10	16.54	30.10	30.10
l_b,int, Bicycle LOS Score for Intersection	1.871	3.215	2.194	2.451
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	26.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	286	7	357	63	34	11	5	1094	374	389	872	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	7	357	63	34	11	5	1094	374	389	872	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	2	89	16	9	3	1	274	94	97	218	3
Total Analysis Volume [veh/h]	286	7	357	63	34	11	5	1094	374	389	872	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	24	61	61	0	37	0	10	38	0	21	49	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	22	43	6	6	1	69	69	17	85	85
g / C, Green / Cycle	0.10	0.19	0.36	0.05	0.05	0.01	0.57	0.57	0.14	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.19	0.04	0.02	0.00	0.40	0.37	0.11	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	354	353	686	120	98	15	1087	1087	496	1341	1341
d1, Uniform Delay [s]	52.79	39.91	30.16	55.96	55.31	59.20	18.28	17.53	49.73	6.77	6.76
k, delay calibration	0.11	0.11	0.27	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.36	0.02	1.52	3.55	3.35	13.08	3.72	3.05	2.76	0.66	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.02	0.52	0.53	0.46	0.34	0.70	0.65	0.78	0.33	0.33
d, Delay for Lane Group [s/veh]	57.15	39.93	31.68	59.50	58.66	72.29	22.00	20.59	52.49	7.43	7.42
Lane Group LOS	E	D	C	E	E	E	C	C	D	A	A
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.43	0.17	8.39	1.99	1.42	0.20	15.47	13.80	5.82	4.23	4.21
50th-Percentile Queue Length [ft/ln]	110.80	4.32	209.72	49.86	35.39	5.12	386.65	344.98	145.51	105.70	105.14
95th-Percentile Queue Length [veh/ln]	7.88	0.31	13.14	3.59	2.55	0.37	21.92	19.89	9.78	7.60	7.57
95th-Percentile Queue Length [ft/ln]	197.11	7.77	328.47	89.75	63.71	9.21	547.89	497.29	244.43	190.00	189.23

Movement, Approach, & Intersection Results

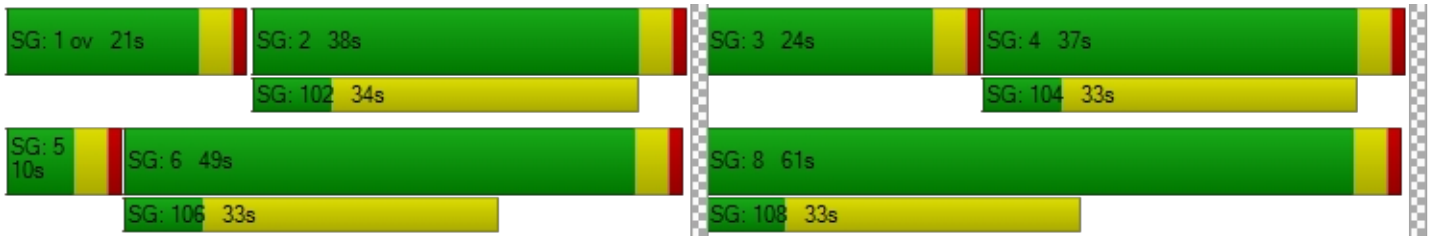
d_M, Delay for Movement [s/veh]	57.15	39.93	31.68	59.50	58.66	58.66	72.29	21.56	20.59	52.49	7.42	7.42
Movement LOS	E	D	C	E	E	E	E	C	C	D	A	A
d_A, Approach Delay [s/veh]	42.97			59.15			21.49			21.21		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	26.53											
Intersection LOS	C											
Intersection V/C	0.771											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.702	1.997	2.829	3.009
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	950	550	567	750
d_b, Bicycle Delay [s]	16.54	31.54	30.82	23.44
l_b,int, Bicycle LOS Score for Intersection	2.632	1.738	2.775	2.609
Bicycle LOS	B	A	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	187	2	524	371	1006	19	9	829	99
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	187	2	524	371	1006	19	9	829	99
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	47	1	131	93	252	5	2	207	25
Total Analysis Volume [veh/h]	3	3	6	187	2	524	371	1006	19	9	829	99
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	39	0	37	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	2	2	25	25	63	28	75	75	2	49	49
g / C, Green / Cycle	0.02	0.02	0.02	0.21	0.21	0.53	0.24	0.63	0.63	0.01	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.28	0.21	0.27	0.27	0.01	0.22	0.05
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	67	33	33	373	373	1000	423	1194	1194	25	1547	773
d1, Uniform Delay [s]	58.05	58.05	58.14	39.83	39.83	18.60	44.23	11.37	11.35	58.67	27.00	22.27
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.18	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	1.17	2.58	0.35	0.35	1.96	9.21	1.13	1.12	8.46	1.34	0.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.09	0.18	0.25	0.25	0.52	0.88	0.43	0.43	0.36	0.54	0.13
d, Delay for Lane Group [s/veh]	58.33	59.21	60.72	40.18	40.18	20.56	53.44	12.51	12.47	67.12	28.33	22.61
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	0.10	0.20	2.38	2.39	9.89	11.65	7.06	7.01	0.33	9.24	1.84
50th-Percentile Queue Length [ft/ln]	2.37	2.51	5.09	59.58	59.63	247.25	291.37	176.57	175.27	8.26	230.91	45.91
95th-Percentile Queue Length [veh/ln]	0.17	0.18	0.37	4.29	4.29	15.05	17.25	11.42	11.35	0.59	14.22	3.31
95th-Percentile Queue Length [ft/ln]	4.27	4.52	9.16	107.25	107.34	376.19	431.34	285.53	283.83	14.86	355.51	82.64

Movement, Approach, & Intersection Results

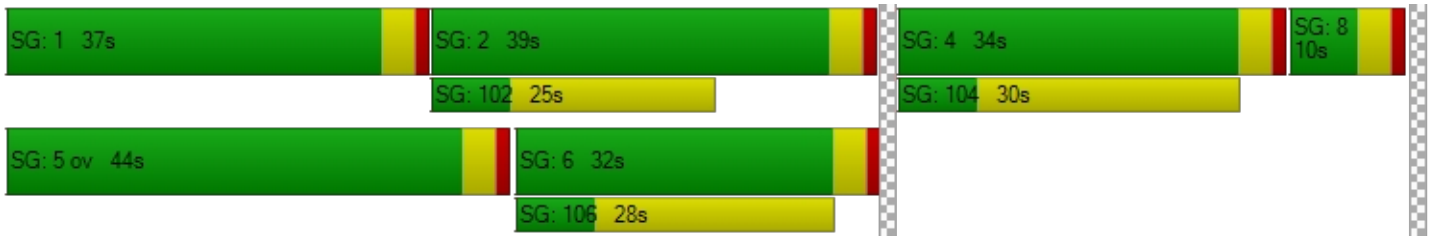
d_M, Delay for Movement [s/veh]	58.33	59.21	60.72	40.18	40.18	20.56	53.44	12.49	12.47	67.12	28.33	22.61
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	59.74			25.76			23.37			28.10		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	25.52											
Intersection LOS	C											
Intersection V/C	0.731											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.434	2.855	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	583	467
d_b, Bicycle Delay [s]	54.17	33.76	30.12	35.28
l_b,int, Bicycle LOS Score for Intersection	1.579	2.736	2.711	2.333
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	36.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	155	243	106	504	1161	210	50	673	388	72	493	240
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	243	106	504	1161	210	50	673	388	72	493	240
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	61	27	126	290	53	13	168	97	18	123	60
Total Analysis Volume [veh/h]	155	243	106	504	1161	210	50	673	388	72	493	240
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	37	0	34	60	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	21	21	20	34	34	5	57	57	6	58	58
g / C, Green / Cycle	0.06	0.17	0.17	0.17	0.28	0.28	0.04	0.48	0.48	0.05	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.06	0.14	0.24	0.24	0.03	0.18	0.20	0.04	0.13	0.13
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	207	659	330	586	1070	535	75	1806	903	91	1841	921
d1, Uniform Delay [s]	55.61	43.73	43.61	48.63	40.89	40.58	56.74	20.09	20.77	56.35	18.33	18.25
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.39	0.33	0.62	3.86	2.17	3.64	9.96	0.59	1.49	13.83	0.36	0.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.75	0.36	0.34	0.86	0.86	0.84	0.67	0.37	0.43	0.79	0.27	0.26
d, Delay for Lane Group [s/veh]	61.00	44.06	44.23	52.49	43.05	44.22	66.70	20.68	22.27	70.17	18.68	18.94
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.47	3.13	3.03	7.64	13.13	12.96	1.70	6.11	7.49	2.51	4.13	4.10
50th-Percentile Queue Length [ft/ln]	61.64	78.33	75.67	191.01	328.31	323.92	42.56	152.81	187.15	62.73	103.35	102.41
95th-Percentile Queue Length [veh/ln]	4.44	5.64	5.45	12.17	19.08	18.86	3.06	10.17	11.97	4.52	7.44	7.37
95th-Percentile Queue Length [ft/ln]	110.96	141.00	136.21	304.34	476.89	471.50	76.61	254.18	299.33	112.92	186.03	184.35

Movement, Approach, & Intersection Results

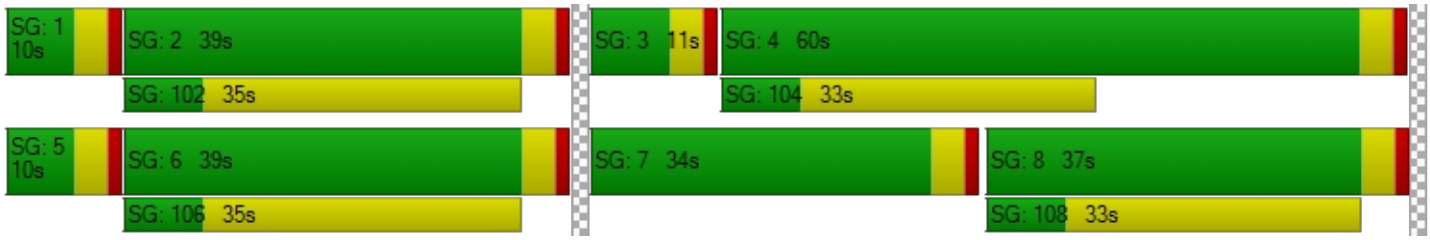
d_M, Delay for Movement [s/veh]	61.00	44.06	44.23	52.49	43.29	44.22	66.70	20.68	22.27	70.17	18.68	18.94
Movement LOS	E	D	D	D	D	D	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	49.31			45.87			23.31			23.36		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	36.22											
Intersection LOS	D											
Intersection V/C	0.613											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.998	3.033	2.787	2.806
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	550	933	583	583
d_b, Bicycle Delay [s]	31.55	17.08	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.837	2.591	2.476	2.224
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	118.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.878

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	155	251	16	860	939	292	72	529	149	15	407	365
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	251	16	860	939	292	72	529	149	15	407	365
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	63	4	215	235	73	18	132	37	4	102	91
Total Analysis Volume [veh/h]	155	251	16	860	939	292	72	529	149	15	407	365
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	38	0	36	56	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	23	23	32	42	42	6	47	47	2	44	44
g / C, Green / Cycle	0.10	0.19	0.19	0.27	0.35	0.35	0.05	0.39	0.39	0.02	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.07	0.48	0.32	0.32	0.02	0.18	0.17	0.01	0.11	0.19
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	183	358	358	480	671	671	162	743	743	37	1389	694
d1, Uniform Delay [s]	53.00	42.54	42.49	44.04	37.14	37.14	55.75	27.31	26.88	58.07	27.07	29.92
k, delay calibration	0.11	0.11	0.11	0.50	0.26	0.26	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.20	0.65	0.64	365.16	11.85	11.85	1.91	2.15	1.88	6.93	0.54	2.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.38	0.37	1.79	0.92	0.92	0.44	0.47	0.44	0.40	0.29	0.53
d, Delay for Lane Group [s/veh]	63.20	43.19	43.13	409.19	48.99	48.99	57.66	29.46	28.76	65.00	27.61	32.76
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.11	3.56	3.51	62.75	19.21	19.21	1.11	7.95	7.25	0.52	4.26	8.79
50th-Percentile Queue Length [ft/ln]	127.76	89.10	87.72	1568.86	480.37	480.37	27.65	198.64	181.19	13.05	106.58	219.82
95th-Percentile Queue Length [veh/ln]	8.82	6.42	6.32	97.54	26.40	26.40	1.99	12.57	11.66	0.94	7.65	13.66
95th-Percentile Queue Length [ft/ln]	220.45	160.38	157.90	2438.57	660.10	660.10	49.78	314.20	291.57	23.49	191.24	341.40

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.20	43.16	43.13	409.19	48.99	48.99	57.66	29.23	28.76	65.00	27.61	32.76
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	50.52			197.13			31.86			30.71		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	118.91											
Intersection LOS	F											
Intersection V/C	0.878											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.611	2.856	2.727	2.823
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	866	533	533
d_b, Bicycle Delay [s]	30.83	19.28	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	1.908	3.285	2.178	2.209
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	24.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.955

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	54	792	1410	67	61	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	792	1410	67	61	207
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	198	353	17	15	52
Total Analysis Volume [veh/h]	54	792	1410	67	61	207
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	6	6	0	6	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	94	94	0	26	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C
C, Cycle Length [s]	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	92	92	92	92	20
g / C, Green / Cycle	0.77	0.77	0.77	0.77	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.42	0.74	0.04	0.15
s, saturation flow rate [veh/h]	1800	1900	1900	1900	1800
c, Capacity [veh/h]	230	1462	1462	1462	294
d1, Uniform Delay [s]	3.27	5.45	12.32	3.29	49.24
k, delay calibration	0.50	0.50	0.50	0.50	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.38	1.44	16.41	0.06	14.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.54	0.96	0.05	0.91
d, Delay for Lane Group [s/veh]	5.66	6.89	28.72	3.35	63.36
Lane Group LOS	A	A	C	A	E
Critical Lane Group	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.42	7.10	32.89	0.36	9.01
50th-Percentile Queue Length [ft/ln]	10.48	177.51	822.19	8.93	225.35
95th-Percentile Queue Length [veh/ln]	0.75	11.47	42.29	0.64	13.94
95th-Percentile Queue Length [ft/ln]	18.87	286.76	1057.31	16.07	348.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.66	6.89	28.72	3.35	63.36	63.36
Movement LOS	A	A	C	A	E	E
d_A, Approach Delay [s/veh]	6.81		27.57		63.36	
Approach LOS	A		C		E	
d_I, Intersection Delay [s/veh]	24.50					
Intersection LOS	C					
Intersection V/C	0.955					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.45	0.00	49.45
l_p,int, Pedestrian LOS Score for Intersection	2.754	0.000	1.995
Crosswalk LOS	C	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1501	1501	367
d_b, Bicycle Delay [s]	3.73	3.73	39.97
l_b,int, Bicycle LOS Score for Intersection	2.956	3.997	2.002
Bicycle LOS	C	D	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	15.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.683

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	682	0	572	0	1739	830	0	2223	220
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	682	0	572	0	1739	830	0	2223	220
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	171	0	143	0	435	208	0	556	55
Total Analysis Volume [veh/h]	0	0	0	682	0	572	0	1739	830	0	2223	220
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		25	25	25	57	57
g / C, Green / Cycle		0.28	0.28	0.28	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate		0.23	0.23	0.22	0.31	0.39
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		504	504	532	3597	3597
d1, Uniform Delay [s]		30.33	30.33	29.86	8.80	10.02
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.59	3.59	2.61	0.47	0.81
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.79	0.48	0.62
d, Delay for Lane Group [s/veh]		33.92	33.92	32.47	9.27	10.83
Lane Group LOS		C	C	C	A	B
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		8.72	8.72	8.47	5.45	7.97
50th-Percentile Queue Length [ft/ln]		217.90	217.90	211.78	136.18	199.36
95th-Percentile Queue Length [veh/ln]		13.56	13.56	13.24	9.27	12.61
95th-Percentile Queue Length [ft/ln]		338.95	338.95	331.11	231.87	315.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	33.92	0.00	32.86	0.00	9.27	0.00	0.00	10.83	0.00
Movement LOS				C		C		A			B	
d_A, Approach Delay [s/veh]	0.00			33.44			9.27			10.83		
Approach LOS	A			C			A			B		
d_I, Intersection Delay [s/veh]	15.74											
Intersection LOS	B											
Intersection V/C	0.683											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.436	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.629	2.516	2.782
Bicycle LOS	D	D	B	C

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.694

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1153	43	945	0	0	51	118	1549	636	0	1730	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1153	43	945	0	0	51	118	1549	636	0	1730	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	288	11	236	0	0	13	30	387	159	0	433	5
Total Analysis Volume [veh/h]	1153	43	945	0	0	51	118	1549	636	0	1730	18
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	48	0	0	0	10	12	42	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	36	36	36	5	8	47	35	35
g / C, Green / Cycle	0.36	0.36	0.36	0.05	0.08	0.47	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.30	0.30	0.29	0.01	0.07	0.27	0.23	0.23
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	1275	656	692	177	145	2675	1987	662
d1, Uniform Delay [s]	28.95	28.97	28.33	46.13	45.28	19.37	27.60	27.60
k, delay calibration	0.11	0.22	0.19	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.43	5.38	3.49	0.89	10.30	0.92	1.74	5.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.83	0.78	0.29	0.81	0.58	0.66	0.66
d, Delay for Lane Group [s/veh]	30.39	34.35	31.82	47.02	55.57	20.29	29.34	32.70
Lane Group LOS	C	C	C	D	E	C	C	C
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.41	12.48	11.91	0.63	3.28	8.64	8.95	9.57
50th-Percentile Queue Length [ft/ln]	285.27	311.93	297.83	15.82	81.99	215.94	223.75	239.22
95th-Percentile Queue Length [veh/ln]	16.95	18.27	17.57	1.14	5.90	13.46	13.86	14.64
95th-Percentile Queue Length [ft/ln]	423.77	456.75	439.34	28.47	147.58	336.44	346.40	366.05

Movement, Approach, & Intersection Results

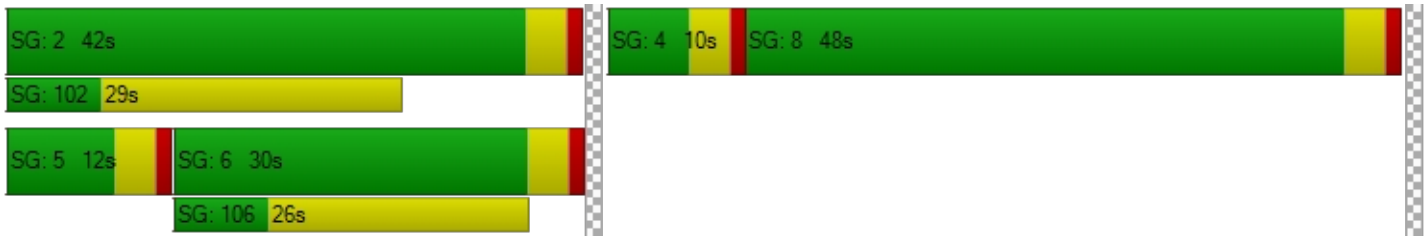
d_M, Delay for Movement [s/veh]	30.68	34.35	32.92	0.00	0.00	47.02	55.57	20.29	0.00	0.00	30.15	32.70
Movement LOS	C	C	C			D	E	C			C	C
d_A, Approach Delay [s/veh]	31.76			47.02			22.79			30.18		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	28.74											
Intersection LOS	C											
Intersection V/C	0.694											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.722	2.020	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	879	120	759	520
d_b, Bicycle Delay [s]	15.71	44.22	19.25	27.41
l_b,int, Bicycle LOS Score for Intersection	5.092	1.560	2.476	2.281
Bicycle LOS	F	A	B	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	32.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.837

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	172	236	93	190	370	186	238	2185	117	103	1795	112
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	172	236	93	190	370	186	238	2185	117	103	1795	112
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	59	23	48	93	47	60	546	29	26	449	28
Total Analysis Volume [veh/h]	172	236	93	190	370	186	238	2185	117	103	1795	112
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	13	42	0	20	47	0	11	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	22	22	8	24	24	16	57	57	7	48	48
g / C, Green / Cycle	0.05	0.20	0.20	0.07	0.22	0.22	0.15	0.52	0.52	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.05	0.09	0.08	0.05	0.19	0.10	0.13	0.40	0.41	0.06	0.25	0.26
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	194	383	383	254	416	416	262	1961	980	116	2477	826
d1, Uniform Delay [s]	51.66	38.54	38.26	50.07	41.70	37.22	46.29	21.45	22.01	51.11	23.38	23.85
k, delay calibration	0.11	0.11	0.11	0.11	0.14	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.70	0.81	0.71	4.39	8.24	0.75	11.34	3.03	6.92	19.32	0.95	3.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.45	0.41	0.75	0.89	0.45	0.91	0.77	0.80	0.89	0.57	0.60
d, Delay for Lane Group [s/veh]	64.37	39.35	38.97	54.46	49.95	37.98	57.63	24.49	28.93	70.44	24.34	27.10
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.69	4.13	3.79	2.71	10.60	4.42	7.20	15.81	17.84	3.43	9.19	10.44
50th-Percentile Queue Length [ft/ln]	67.35	103.13	94.77	67.85	265.02	110.41	179.98	395.13	445.90	85.83	229.84	261.02
95th-Percentile Queue Length [veh/ln]	4.85	7.43	6.82	4.89	15.94	7.86	11.60	22.32	24.76	6.18	14.17	15.74
95th-Percentile Queue Length [ft/ln]	121.22	185.63	170.58	122.14	398.51	196.57	289.99	558.12	619.06	154.49	354.15	393.49

Movement, Approach, & Intersection Results

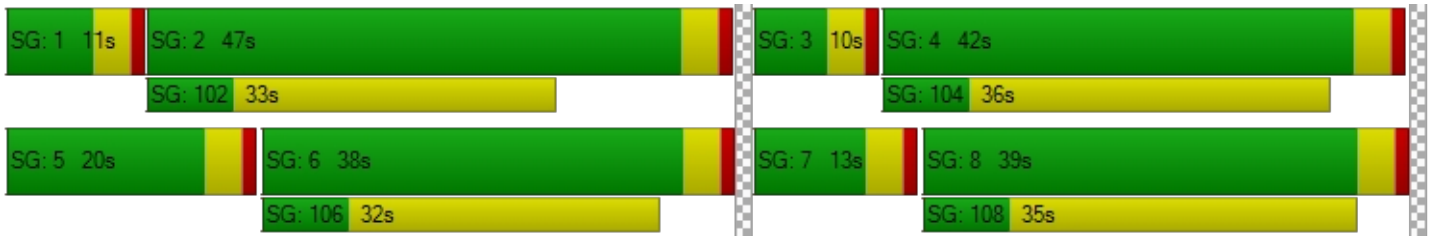
d_M, Delay for Movement [s/veh]	64.37	39.25	38.97	54.46	49.95	37.98	57.63	25.85	28.93	70.44	24.93	27.10
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	47.82			48.11			28.97			27.38		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.51											
Intersection LOS	C											
Intersection V/C	0.837											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.522	2.679	3.307	3.281
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	691	781	618
d_b, Bicycle Delay [s]	25.59	23.59	20.43	26.28
l_b,int, Bicycle LOS Score for Intersection	1.973	2.791	2.957	2.389
Bicycle LOS	A	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	203	14	167	28	33	16	14	2159	488	201	1729	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	14	167	28	33	16	14	2159	488	201	1729	37
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	4	42	7	8	4	4	540	122	50	432	9
Total Analysis Volume [veh/h]	203	14	167	28	33	16	14	2159	488	201	1729	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	22	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	11	11	5	5	2	46	46	12	57	57
g / C, Green / Cycle	0.12	0.12	0.12	0.06	0.06	0.02	0.51	0.51	0.13	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.09	0.02	0.03	0.01	0.38	0.26	0.11	0.31	0.32
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	211	211	222	105	110	38	2926	975	241	2380	1190
d1, Uniform Delay [s]	37.40	37.42	38.54	40.63	41.06	43.55	17.19	14.37	38.05	9.07	9.23
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.93	1.96	5.05	1.35	2.77	5.86	1.71	1.83	7.30	0.72	1.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.52	0.75	0.27	0.44	0.37	0.74	0.50	0.83	0.49	0.51
d, Delay for Lane Group [s/veh]	39.33	39.37	43.59	41.98	43.83	49.41	18.90	16.21	45.36	9.79	10.78
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.33	2.34	3.83	0.63	1.13	0.37	11.19	6.58	4.74	5.62	6.21
50th-Percentile Queue Length [ft/ln]	58.13	58.51	95.78	15.70	28.16	9.18	279.82	164.48	118.58	140.45	155.32
95th-Percentile Queue Length [veh/ln]	4.19	4.21	6.90	1.13	2.03	0.66	16.68	10.79	8.32	9.51	10.30
95th-Percentile Queue Length [ft/ln]	104.64	105.33	172.40	28.26	50.68	16.52	416.99	269.64	207.88	237.63	257.51

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.35	39.37	43.59	41.98	43.83	43.83	49.41	18.90	16.21	45.36	10.11	10.78
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	41.20			43.16			18.57			13.73		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.78											
Intersection LOS	B											
Intersection V/C	0.735											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	0.00	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.400	1.986	0.000	3.195
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	488	133	622	888
d_b, Bicycle Delay [s]	25.73	39.24	21.40	13.92
l_b,int, Bicycle LOS Score for Intersection	2.193	1.687	3.023	2.641
Bicycle LOS	B	A	C	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	29.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.697

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	202	269	99	413	724	148	155	1500	276	81	1241	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	269	99	413	724	148	155	1500	276	81	1241	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	67	25	103	181	37	39	375	69	20	310	25
Total Analysis Volume [veh/h]	202	269	99	413	724	148	155	1500	276	81	1241	101
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	0	21	40	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	15	15	14	22	22	6	49	49	5	49	49
g / C, Green / Cycle	0.07	0.15	0.15	0.14	0.22	0.22	0.06	0.49	0.49	0.05	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.06	0.10	0.09	0.12	0.19	0.08	0.04	0.31	0.31	0.02	0.23	0.24
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	248	294	294	492	854	427	213	1862	931	191	1839	919
d1, Uniform Delay [s]	45.88	39.76	39.43	41.93	37.18	32.64	46.21	18.98	18.78	45.80	17.43	17.48
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.43	2.42	1.97	3.92	2.45	0.48	4.70	1.71	3.18	1.48	0.92	1.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.65	0.60	0.84	0.85	0.35	0.73	0.64	0.63	0.42	0.48	0.49
d, Delay for Lane Group [s/veh]	52.31	42.18	41.40	45.85	39.64	33.12	50.91	20.68	21.96	47.28	18.34	19.35
Lane Group LOS	D	D	D	D	D	C	D	C	C	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.68	4.58	4.18	5.19	8.64	3.05	2.02	10.23	10.29	1.01	6.89	7.23
50th-Percentile Queue Length [ft/ln]	67.04	114.53	104.47	129.71	216.08	76.37	50.58	255.78	257.28	25.25	172.33	180.66
95th-Percentile Queue Length [veh/ln]	4.83	8.09	7.52	8.92	13.46	5.50	3.64	15.48	15.55	1.82	11.20	11.64
95th-Percentile Queue Length [ft/ln]	120.68	202.29	188.04	223.10	336.62	137.47	91.04	386.93	388.81	45.44	279.98	290.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.31	41.95	41.40	45.85	39.64	33.12	50.91	20.95	21.96	47.28	18.63	19.35
Movement LOS	D	D	D	D	D	C	D	C	C	D	B	B
d_A, Approach Delay [s/veh]	45.52			40.88			23.50			20.31		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	29.32											
Intersection LOS	C											
Intersection V/C	0.697											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.726	2.851	3.160	3.149
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	520	719	700	700
d_b, Bicycle Delay [s]	27.41	20.51	21.16	21.16
l_b,int, Bicycle LOS Score for Intersection	2.030	2.620	2.622	2.342
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	27.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.607

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	151	203	135	306	305	200	199	1142	99	133	1771	164
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	203	135	306	305	200	199	1142	99	133	1771	164
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	51	34	77	76	50	50	286	25	33	443	41
Total Analysis Volume [veh/h]	151	203	135	306	305	200	199	1142	99	133	1771	164
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	46	0	22	57	0	13	41	0	11	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	11	11	13	17	17	9	74	74	6	71	71
g / C, Green / Cycle	0.06	0.09	0.09	0.11	0.14	0.14	0.07	0.61	0.61	0.05	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.07	0.09	0.08	0.11	0.06	0.20	0.05	0.04	0.31	0.09
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	207	353	177	373	534	267	256	3494	1165	190	3386	1129
d1, Uniform Delay [s]	55.55	52.18	53.17	52.51	48.23	49.58	54.67	11.24	9.48	55.82	14.35	10.83
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.91	1.48	6.73	4.52	0.97	4.21	5.02	0.25	0.14	4.64	0.58	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.57	0.76	0.82	0.57	0.75	0.78	0.33	0.08	0.70	0.52	0.15
d, Delay for Lane Group [s/veh]	60.46	53.66	59.90	57.03	49.20	53.79	59.70	11.49	9.63	60.46	14.93	11.10
Lane Group LOS	E	D	E	E	D	D	E	B	A	E	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.39	3.01	4.31	4.75	4.35	6.07	3.14	4.84	1.09	2.10	9.28	1.99
50th-Percentile Queue Length [ft/ln]	59.74	75.18	107.68	118.66	108.66	151.87	78.39	120.92	27.25	52.59	232.05	49.80
95th-Percentile Queue Length [veh/ln]	4.30	5.41	7.71	8.32	7.77	10.12	5.64	8.44	1.96	3.79	14.28	3.59
95th-Percentile Queue Length [ft/ln]	107.54	135.32	192.78	207.99	194.14	252.92	141.10	211.09	49.04	94.66	356.96	89.64

Movement, Approach, & Intersection Results

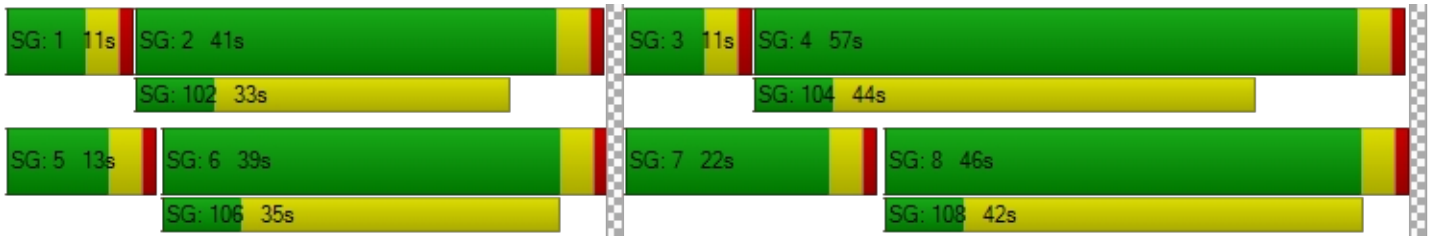
d_M, Delay for Movement [s/veh]	60.46	53.66	59.90	57.03	49.20	53.79	59.70	11.49	9.63	60.46	14.93	11.10
Movement LOS	E	D	E	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	57.48			53.29			18.02			17.56		
Approach LOS	E			D			B			B		
d_I, Intersection Delay [s/veh]	27.78											
Intersection LOS	C											
Intersection V/C	0.607											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.751	2.799	3.249	3.259
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	883	617	583
d_b, Bicycle Delay [s]	25.36	18.72	28.72	30.12
l_b,int, Bicycle LOS Score for Intersection	1.963	2.229	2.352	2.697
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	242.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.845

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	280	216	160	940	531	24	40	1391	277	294	1639	607
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	280	216	160	940	531	24	40	1391	277	294	1639	607
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	54	40	235	133	6	10	348	69	74	410	152
Total Analysis Volume [veh/h]	280	216	160	940	531	24	40	1391	277	294	1639	607
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	23	23	8	20	20	4	67	67	6	69	69
g / C, Green / Cycle	0.09	0.19	0.19	0.07	0.16	0.16	0.04	0.56	0.56	0.05	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.08	0.06	0.08	0.27	0.14	0.01	0.02	0.30	0.29	0.08	0.29	0.32
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	323	716	358	236	621	311	68	2129	1064	178	3268	1089
d1, Uniform Delay [s]	53.77	41.93	43.18	55.99	48.83	42.54	56.85	16.49	16.26	56.98	15.34	16.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.04	0.23	0.88	1346.78	3.49	0.10	7.89	0.94	1.75	300.19	0.55	2.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.30	0.45	3.99	0.85	0.08	0.59	0.53	0.51	1.66	0.50	0.56
d, Delay for Lane Group [s/veh]	60.81	42.16	44.05	1402.77	52.32	42.65	64.75	17.43	18.01	357.17	15.90	18.12
Lane Group LOS	E	D	D	F	D	D	E	B	B	F	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.48	2.79	4.31	47.66	8.02	0.62	1.34	9.67	9.46	10.10	8.84	10.72
50th-Percentile Queue Length [ft/ln]	112.10	69.80	107.79	1191.46	200.51	15.42	33.60	241.67	236.45	252.48	221.10	267.89
95th-Percentile Queue Length [veh/ln]	7.96	5.03	7.72	72.14	12.67	1.11	2.42	14.77	14.50	17.17	13.72	16.08
95th-Percentile Queue Length [ft/ln]	198.93	125.64	192.92	1803.58	316.63	27.76	60.48	369.14	362.55	429.24	343.03	402.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.81	42.16	44.05	1402.77	52.32	42.65	64.75	17.54	18.01	357.17	15.90	18.12
Movement LOS	E	D	D	F	D	D	E	B	B	F	B	B
d_A, Approach Delay [s/veh]	50.58			901.28			18.72			55.93		
Approach LOS	D			F			B			E		
d_I, Intersection Delay [s/veh]	242.95											
Intersection LOS	F											
Intersection V/C	0.845											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.853	2.936	3.116	3.408
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.101	2.793	2.499	2.957
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	42.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.877

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	368	688	353	637	461	17	44	1644	302	457	1330	801
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	368	688	353	637	461	17	44	1644	302	457	1330	801
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	172	88	159	115	4	11	411	76	114	333	200
Total Analysis Volume [veh/h]	368	688	353	637	461	17	44	1644	302	457	1330	801
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	17	34	0	27	44	0	10	39	0	20	49	49
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	13	26	26	26	23	36	36	5	39	39	16	50	77
g / C, Green / Cycle	0.11	0.22	0.22	0.22	0.19	0.30	0.30	0.04	0.33	0.33	0.13	0.42	0.65
(v / s)_i Volume / Saturation Flow Rate	0.11	0.19	0.19	0.17	0.18	0.13	0.13	0.01	0.26	0.25	0.13	0.23	0.42
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	381	410	410	410	671	568	568	138	1854	618	468	2392	1225
d1, Uniform Delay [s]	53.28	45.63	45.49	44.33	47.94	33.78	33.72	56.11	36.77	36.67	51.82	26.38	13.10
k, delay calibration	0.11	0.28	0.27	0.21	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.78	14.76	13.38	6.02	7.99	0.50	0.49	1.32	3.50	9.55	14.53	0.94	2.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.89	0.87	0.78	0.95	0.42	0.42	0.32	0.79	0.78	0.98	0.56	0.65
d, Delay for Lane Group [s/veh]	68.06	60.39	58.87	50.35	55.93	34.28	34.21	57.43	40.27	46.22	66.35	27.31	15.83
Lane Group LOS	E	E	E	D	E	C	C	E	D	D	E	C	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.30	12.14	11.81	9.59	10.11	5.72	5.64	0.67	13.46	14.36	7.78	9.72	13.32
50th-Percentile Queue Length [ft/ln]	157.5	303.5	295.2	239.7	252.87	142.98	140.97	16.87	336.39	358.94	194.48	243.00	332.93
95th-Percentile Queue Length [veh/ln]	10.42	17.85	17.45	14.67	15.33	9.64	9.53	1.21	19.47	20.57	12.35	14.83	19.30
95th-Percentile Queue Length [ft/ln]	260.4	446.3	436.1	366.7	383.27	241.03	238.33	30.37	486.78	514.29	308.84	370.83	482.55

Movement, Approach, & Intersection Results

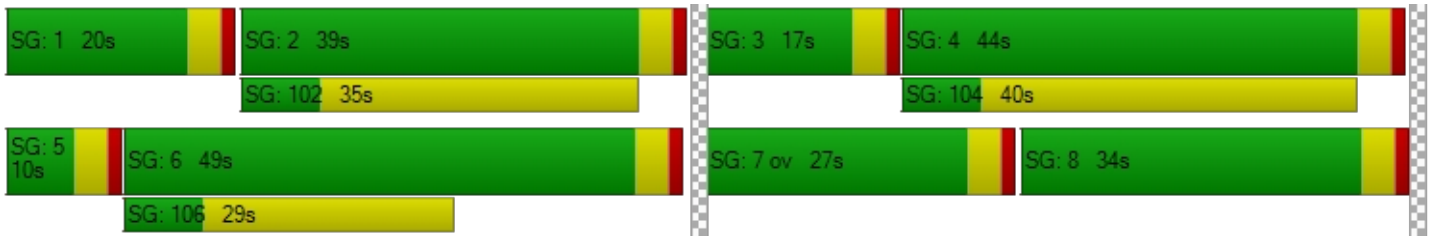
d_M, Delay for Movement [s/veh]	68.06	59.67	50.52	55.93	34.25	34.21	57.43	40.92	46.22	66.35	27.31	15.83
Movement LOS	E	E	D	E	C	C	E	D	D	E	C	B
d_A, Approach Delay [s/veh]	59.74			46.63			42.09			30.65		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	42.14											
Intersection LOS	D											
Intersection V/C	0.877											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.974	2.897	3.264	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	500	666	583	750
d_b, Bicycle Delay [s]	33.76	26.68	30.12	23.45
l_b,int, Bicycle LOS Score for Intersection	2.722	2.479	2.380	2.983
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	19.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.653

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	477	0	897	0	1466	877	256	1807	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	477	0	897	0	1466	877	256	1807	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	119	0	224	0	367	219	64	452	0
Total Analysis Volume [veh/h]	0	0	0	477	0	897	0	1466	877	256	1807	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	44	0	0	0	33	0	13	46	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		90	90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		26	26	43	43	8	56
g / C, Green / Cycle		0.29	0.29	0.48	0.48	0.09	0.62
(v / s)_i Volume / Saturation Flow Rate		0.14	0.24	0.26	0.23	0.07	0.32
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		1029	1117	2724	1816	332	3518
d1, Uniform Delay [s]		25.98	29.37	16.52	15.95	39.80	9.66
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.33	1.40	0.77	0.92	3.82	0.54
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.46	0.80	0.54	0.48	0.77	0.51
d, Delay for Lane Group [s/veh]		26.31	30.77	17.29	16.88	43.62	10.20
Lane Group LOS		C	C	B	B	D	B
Critical Lane Group		No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		4.13	8.89	6.88	6.02	2.91	6.07
50th-Percentile Queue Length [ft/ln]		103.15	222.24	171.92	150.60	72.63	151.83
95th-Percentile Queue Length [veh/ln]		7.43	13.78	11.18	10.05	5.23	10.11
95th-Percentile Queue Length [ft/ln]		185.67	344.48	279.44	251.23	130.73	252.87

Movement, Approach, & Intersection Results

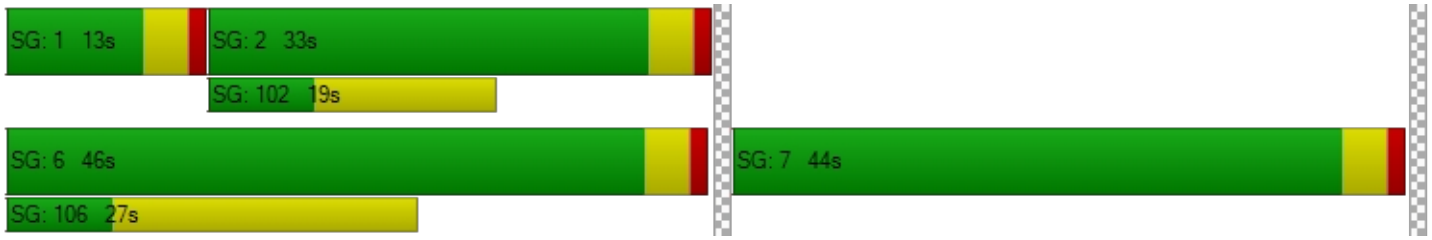
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	26.31	0.00	30.77	0.00	17.29	16.88	43.62	10.20	0.00
Movement LOS				C		C		B	B	D	B	
d_A, Approach Delay [s/veh]	0.00			29.22			17.13			14.35		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	19.01											
Intersection LOS	B											
Intersection V/C	0.653											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.267	2.466	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	889	644	933
d_b, Bicycle Delay [s]	45.01	13.90	20.68	12.81
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.848	2.694
Bicycle LOS	D	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	13.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.542

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	710	0	302	0	0	0	0	1604	605	0	1166	526
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	710	0	302	0	0	0	0	1604	605	0	1166	526
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	178	0	76	0	0	0	0	401	151	0	292	0
Total Analysis Volume [veh/h]	710	0	302	0	0	0	0	1604	605	0	1166	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22		60	60	60	60
g / C, Green / Cycle	0.25	0.25		0.66	0.66	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.20	0.16		0.29	0.29	0.29	0.20
s, saturation flow rate [veh/h]	3500	1900		3800	1900	1900	5700
c, Capacity [veh/h]	869	472		2518	1259	1259	3778
d1, Uniform Delay [s]	31.84	30.18		7.20	7.20	7.20	6.42
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.96	1.46		0.56	1.11	1.11	0.21
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.64		0.44	0.44	0.44	0.31
d, Delay for Lane Group [s/veh]	33.80	31.64		7.76	8.31	8.31	6.64
Lane Group LOS	C	C		A	A	A	A
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	7.31	5.89		4.52	4.71	4.71	2.79
50th-Percentile Queue Length [ft/ln]	182.70	147.32		112.89	117.74	117.74	69.65
95th-Percentile Queue Length [veh/ln]	11.74	9.87		8.00	8.27	8.27	5.02
95th-Percentile Queue Length [ft/ln]	293.54	246.85		200.02	206.72	206.72	125.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.80	0.00	31.64	0.00	0.00	0.00	0.00	7.80	8.31	0.00	6.64	0.00
Movement LOS	C		C					A	A		A	
d_A, Approach Delay [s/veh]	33.16			0.00			8.04			6.64		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	13.46											
Intersection LOS	B											
Intersection V/C	0.542											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.615	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	2.775	2.201
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	15.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.598

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	130	0	32	126	0	469	214	2091	44	17	1653	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	0	32	126	0	469	214	2091	44	17	1653	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	0	8	32	0	117	54	523	11	4	413	16
Total Analysis Volume [veh/h]	130	0	32	126	0	469	214	2091	44	17	1653	63
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	45	0	0	45	0	11	35	0	10	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	7	62	62	2	57	57
g / C, Green / Cycle	0.16	0.16	0.16	0.08	0.69	0.69	0.02	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.12	0.06	0.37	0.39	0.01	0.30	0.31
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	356	364	600	276	2601	1300	44	2394	1197
d1, Uniform Delay [s]	35.08	34.33	36.42	40.70	7.11	7.29	43.27	8.78	8.90
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.91	0.56	2.26	4.69	0.81	1.77	5.51	0.67	1.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.45	0.35	0.78	0.78	0.54	0.56	0.39	0.47	0.49
d, Delay for Lane Group [s/veh]	35.99	34.89	38.68	45.39	7.91	9.06	48.78	9.45	10.32
Lane Group LOS	D	C	D	D	A	A	D	A	B
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.33	2.52	5.05	2.48	5.84	6.58	0.44	5.34	5.83
50th-Percentile Queue Length [ft/ln]	83.15	63.00	126.29	61.94	145.93	164.39	10.91	133.59	145.64
95th-Percentile Queue Length [veh/ln]	5.99	4.54	8.74	4.46	9.80	10.78	0.79	9.13	9.78
95th-Percentile Queue Length [ft/ln]	149.66	113.39	218.44	111.49	244.99	269.53	19.65	228.37	244.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	35.99	35.99	35.99	34.89	34.89	38.68	45.39	8.29	9.06	48.78	9.72	10.32
Movement LOS	D	D	D	C	C	D	D	A	A	D	A	B
d_A, Approach Delay [s/veh]	35.99			37.88			11.69			10.13		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.16											
Intersection LOS	B											
Intersection V/C	0.598											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.823	2.469	0.000	3.327
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	911	911	689	666
d_b, Bicycle Delay [s]	13.35	13.35	19.35	20.01
l_b,int, Bicycle LOS Score for Intersection	1.827	2.541	2.852	2.513
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	17.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	154	62	23	92	118	151	49	1994	227	26	1454	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	154	62	23	92	118	151	49	1994	227	26	1454	48
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	16	6	23	30	38	12	499	57	7	364	12
Total Analysis Volume [veh/h]	154	62	23	92	118	151	49	1994	227	26	1454	48
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	27	0	22	30	0	10	31	0	10	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	13	13	6	10	10	4	52	52	3	51	51
g / C, Green / Cycle	0.11	0.15	0.15	0.07	0.11	0.11	0.05	0.58	0.58	0.03	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.09	0.02	0.02	0.05	0.06	0.08	0.01	0.35	0.12	0.01	0.26	0.27
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	192	277	277	122	204	204	169	3280	1093	60	2129	1065
d1, Uniform Delay [s]	39.36	33.65	33.62	41.30	38.31	39.04	41.41	12.50	9.23	42.76	11.79	11.93
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.63	0.26	0.25	9.06	2.59	5.22	0.93	0.85	0.43	4.88	0.73	1.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.16	0.15	0.75	0.58	0.74	0.29	0.61	0.21	0.43	0.47	0.48
d, Delay for Lane Group [s/veh]	46.99	33.91	33.87	50.36	40.90	44.26	42.34	13.34	9.66	47.64	12.52	13.48
Lane Group LOS	D	C	C	D	D	D	D	B	A	D	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.69	0.84	0.81	2.29	2.60	3.49	0.54	8.13	2.12	0.64	5.63	6.12
50th-Percentile Queue Length [ft/ln]	92.22	21.03	20.16	57.27	64.90	87.24	13.56	203.14	52.88	16.10	140.64	152.88
95th-Percentile Queue Length [veh/ln]	6.64	1.51	1.45	4.12	4.67	6.28	0.98	12.80	3.81	1.16	9.52	10.17
95th-Percentile Queue Length [ft/ln]	165.99	37.85	36.28	103.09	116.83	157.02	24.41	320.01	95.18	28.97	237.89	254.28

Movement, Approach, & Intersection Results

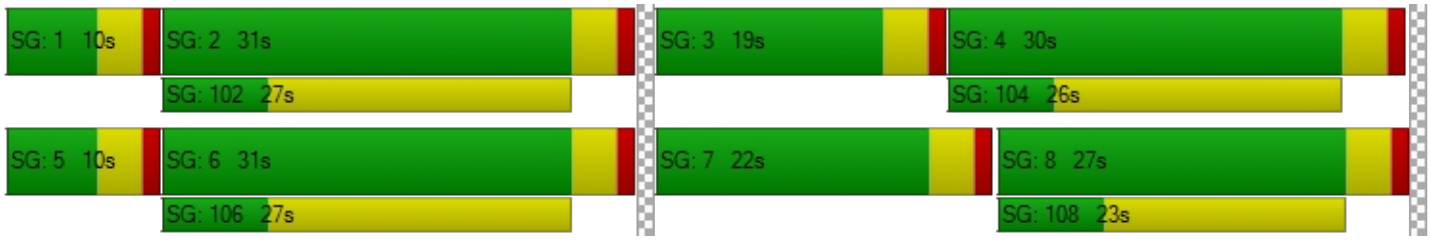
d_M, Delay for Movement [s/veh]	46.99	33.90	33.87	50.36	40.90	44.26	42.34	13.34	9.66	47.64	12.82	13.48
Movement LOS	D	C	C	D	D	D	D	B	A	D	B	B
d_A, Approach Delay [s/veh]	42.33			44.72			13.60			13.44		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.66											
Intersection LOS	B											
Intersection V/C	0.644											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	34.72	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.418	2.401	3.285	3.100
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	577	599	599
d_b, Bicycle Delay [s]	24.98	22.80	22.09	22.09
l_b,int, Bicycle LOS Score for Intersection	1.757	1.857	2.808	2.400
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	31.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	605	343	216	5	122	126	209	986	525	74	411	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	605	343	216	5	122	126	209	986	525	74	411	32
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	151	86	54	1	31	32	52	247	131	19	103	8
Total Analysis Volume [veh/h]	605	343	216	5	122	126	209	986	525	74	411	32
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	27	59	59	10	42	0	19	41	41	10	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	32	42	1	10	10	15	65	92	6	56	56
g / C, Green / Cycle	0.19	0.27	0.35	0.01	0.09	0.09	0.13	0.54	0.76	0.05	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.17	0.18	0.11	0.00	0.06	0.07	0.12	0.26	0.14	0.02	0.08	0.08
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	662	508	668	16	165	165	226	2052	2897	178	1768	884
d1, Uniform Delay [s]	47.72	39.32	28.49	59.16	53.49	53.61	51.95	17.16	3.93	55.26	18.60	18.64
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.46	1.57	0.28	11.41	6.33	7.12	14.87	0.81	0.14	1.55	0.20	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.68	0.32	0.32	0.74	0.76	0.93	0.48	0.18	0.42	0.17	0.17
d, Delay for Lane Group [s/veh]	53.18	40.89	28.77	70.57	59.82	60.73	66.81	17.97	4.07	56.81	18.80	19.06
Lane Group LOS	D	D	C	E	E	E	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	9.34	9.24	4.62	0.20	3.88	4.05	7.15	8.51	1.58	1.13	2.42	2.54
50th-Percentile Queue Length [ft/ln]	233.41	230.95	115.52	5.02	97.12	101.18	178.67	212.64	39.58	28.15	60.38	63.50
95th-Percentile Queue Length [veh/ln]	14.35	14.22	8.15	0.36	6.99	7.28	11.53	13.29	2.85	2.03	4.35	4.57
95th-Percentile Queue Length [ft/ln]	358.69	355.56	203.66	9.03	174.81	182.12	288.28	332.22	71.25	50.68	108.69	114.30

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.18	40.89	28.77	70.57	59.82	60.73	66.81	17.97	4.07	56.81	18.87	19.06
Movement LOS	D	D	C	E	E	E	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	45.03			60.49			19.66			24.31		
Approach LOS	D			E			B			C		
d_I, Intersection Delay [s/veh]	31.23											
Intersection LOS	C											
Intersection V/C	0.600											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.773	2.349	3.088	2.848
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	916	633	617	467
d_b, Bicycle Delay [s]	17.62	28.03	28.72	35.28
l_b,int, Bicycle LOS Score for Intersection	3.480	1.977	2.979	1.844
Bicycle LOS	C	A	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.444

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	28	2	14	2	0	6	6	1407	23	6	705	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	2	14	2	0	6	6	1407	23	6	705	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	1	4	1	0	2	2	352	6	2	176	1
Total Analysis Volume [veh/h]	28	2	14	2	0	6	6	1407	23	6	705	3
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	1	1	1	97	97	1	97	97
g / C, Green / Cycle	0.04	0.04	0.01	0.01	0.01	0.81	0.81	0.01	0.81	0.81
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.00	0.00	0.00	0.38	0.38	0.00	0.12	0.13
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	70	74	22	23	17	1532	1532	17	3063	1532
d1, Uniform Delay [s]	56.31	55.91	58.63	58.75	59.07	3.62	3.61	59.07	2.57	2.59
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.65	1.45	1.77	5.77	11.67	1.03	1.02	11.67	0.11	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.40	0.22	0.09	0.26	0.35	0.47	0.47	0.35	0.15	0.16
d, Delay for Lane Group [s/veh]	59.96	57.36	60.40	64.52	70.74	4.65	4.64	70.74	2.68	2.81
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.90	0.50	0.07	0.22	0.24	4.53	4.50	0.24	0.99	1.09
50th-Percentile Queue Length [ft/ln]	22.51	12.51	1.77	5.45	5.93	113.29	112.48	5.93	24.65	27.21
95th-Percentile Queue Length [veh/ln]	1.62	0.90	0.13	0.39	0.43	8.02	7.98	0.43	1.78	1.96
95th-Percentile Queue Length [ft/ln]	40.52	22.51	3.19	9.81	10.67	200.57	199.45	10.67	44.38	48.99

Movement, Approach, & Intersection Results

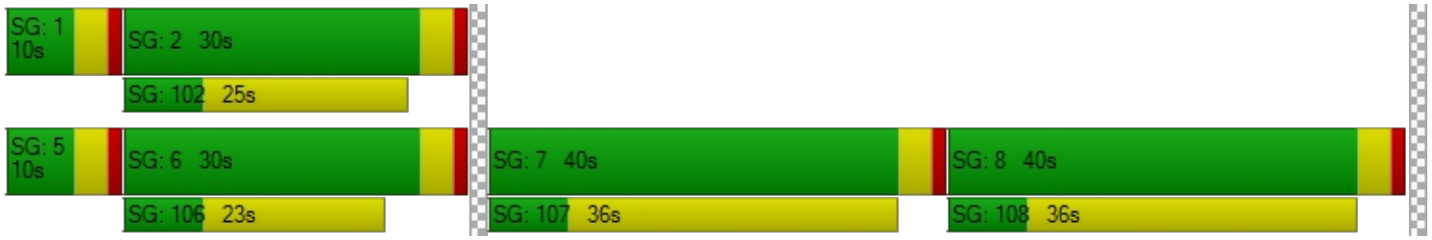
d_M, Delay for Movement [s/veh]	59.96	57.36	57.36	60.40	0.00	64.52	70.74	4.64	4.64	70.74	2.72	2.81
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	59.02			63.49			4.92			3.29		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.69											
Intersection LOS	A											
Intersection V/C	0.444											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	1.978	1.960	2.820	2.814
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.632	1.560	2.744	1.952
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	33.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.669

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	369	162	861	27	124	38	33	951	532	180	361	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	369	162	861	27	124	38	33	951	532	180	361	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	41	215	7	31	10	8	238	133	45	90	2
Total Analysis Volume [veh/h]	369	162	861	27	124	38	33	951	532	180	361	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	29	60	0	12	43	0	11	37	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	29	4	7	7	4	65	65	7	68	68
g / C, Green / Cycle	0.21	0.24	0.03	0.06	0.06	0.03	0.54	0.54	0.06	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.21	0.04	0.02	0.04	0.04	0.02	0.25	0.28	0.05	0.06	0.07
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	375	912	55	118	118	62	2041	1020	207	2135	1067
d1, Uniform Delay [s]	47.32	36.21	57.27	55.17	55.10	57.04	17.16	17.87	56.03	12.32	12.35
k, delay calibration	0.32	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	33.34	0.09	6.61	7.09	6.51	7.03	0.77	1.91	10.72	0.11	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.98	0.18	0.49	0.69	0.67	0.54	0.47	0.52	0.87	0.11	0.12
d, Delay for Lane Group [s/veh]	80.66	36.30	63.88	62.27	61.61	64.06	17.93	19.78	66.75	12.42	12.58
Lane Group LOS	F	D	E	E	E	E	B	B	E	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	14.39	1.91	0.91	2.67	2.58	1.11	8.17	9.80	3.01	1.55	1.66
50th-Percentile Queue Length [ft/ln]	359.66	47.77	22.71	66.79	64.50	27.66	204.13	244.98	75.30	38.81	41.42
95th-Percentile Queue Length [veh/ln]	20.61	3.44	1.64	4.81	4.64	1.99	12.85	14.93	5.42	2.79	2.98
95th-Percentile Queue Length [ft/ln]	515.17	85.99	40.88	120.23	116.09	49.79	321.28	373.32	135.53	69.86	74.56

Movement, Approach, & Intersection Results

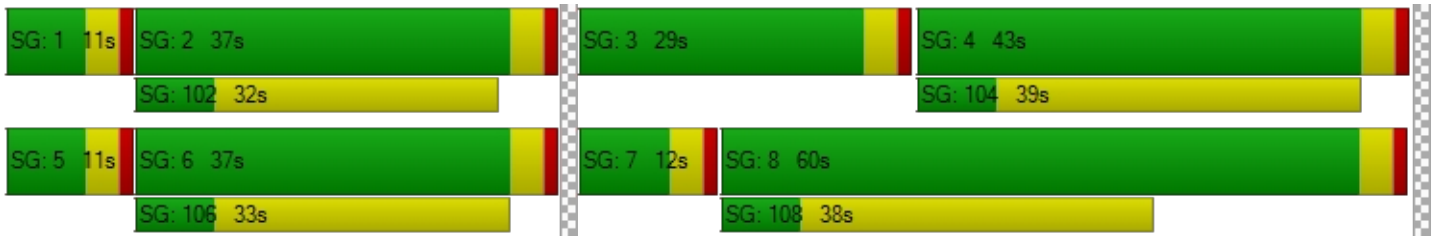
d_M, Delay for Movement [s/veh]	80.66	36.30	0.00	63.88	62.05	61.61	64.06	17.93	19.78	66.75	12.47	12.58
Movement LOS	F	D		E	E	E	E	B	B	E	B	B
d_A, Approach Delay [s/veh]	67.13			62.22			19.58			30.24		
Approach LOS	E			E			B			C		
d_I, Intersection Delay [s/veh]	33.64											
Intersection LOS	C											
Intersection V/C	0.669											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.689	2.390	2.926	2.925
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	650	550	550
d_b, Bicycle Delay [s]	17.08	27.35	31.55	31.55
l_b,int, Bicycle LOS Score for Intersection	1.998	1.716	2.393	1.862
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	4.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.558

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	12	0	2	0	0	23	2	1859	2	1	431	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	0	2	0	0	23	2	1859	2	1	431	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	0	0	6	1	465	1	0	108	3
Total Analysis Volume [veh/h]	12	0	2	0	0	23	2	1859	2	1	431	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	75	0	10	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	0	105	105	0	104	104
g / C, Green / Cycle	0.03	0.03	0.00	0.87	0.87	0.00	0.87	0.87
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.00	0.49	0.49	0.00	0.11	0.01
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	105	52	7	1654	1654	4	3303	1651
d1, Uniform Delay [s]	57.21	57.46	59.61	1.97	1.97	59.76	1.16	1.03
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.57	5.91	23.33	1.39	1.39	29.31	0.08	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.13	0.45	0.30	0.56	0.56	0.25	0.13	0.01
d, Delay for Lane Group [s/veh]	57.78	63.37	82.93	3.36	3.35	89.07	1.24	1.04
Lane Group LOS	E	E	F	A	A	F	A	A
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.43	0.77	0.10	3.21	3.21	0.06	0.39	0.02
50th-Percentile Queue Length [ft/ln]	10.84	19.32	2.60	80.27	80.26	1.58	9.83	0.58
95th-Percentile Queue Length [veh/ln]	0.78	1.39	0.19	5.78	5.78	0.11	0.71	0.04
95th-Percentile Queue Length [ft/ln]	19.51	34.77	4.67	144.49	144.48	2.84	17.70	1.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.78	57.78	57.78	0.00	0.00	63.37	82.93	3.36	3.35	89.07	1.24	1.04
Movement LOS	E	E	E			E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	57.78			63.37			3.44			1.43		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	3.97											
Intersection LOS	A											
Intersection V/C	0.558											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.737	1.747	0.000	2.841
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	1184	1184
d_b, Bicycle Delay [s]	33.00	33.00	10.00	10.00
l_b,int, Bicycle LOS Score for Intersection	1.583	1.560	3.097	1.927
Bicycle LOS	A	A	C	A

Sequence

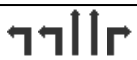
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	39.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.876

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	478	171	393	435	363	320	878	182	162	1130	749
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	478	171	393	435	363	320	878	182	162	1130	749
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	120	43	98	109	91	80	220	46	41	283	187
Total Analysis Volume [veh/h]	157	478	171	393	435	363	320	878	182	162	1130	749
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	27	56	0	17	42	0	12	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	21	21	16	31	31	13	60	60	7	55	55
g / C, Green / Cycle	0.05	0.17	0.17	0.13	0.25	0.25	0.11	0.50	0.50	0.06	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.04	0.13	0.09	0.11	0.23	0.19	0.09	0.23	0.10	0.05	0.30	0.39
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	178	656	328	466	485	485	375	1893	947	220	1724	862
d1, Uniform Delay [s]	56.63	47.00	45.15	50.82	43.21	41.19	52.66	19.66	16.72	55.30	25.50	29.57
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.28	1.57	1.28	4.25	6.21	2.35	5.53	0.82	0.45	4.79	1.96	11.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.73	0.52	0.84	0.90	0.75	0.85	0.46	0.19	0.74	0.66	0.87
d, Delay for Lane Group [s/veh]	69.91	48.57	46.43	55.07	49.42	43.53	58.19	20.48	17.17	60.09	27.46	41.14
Lane Group LOS	E	D	D	E	D	D	E	C	B	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.69	6.90	4.76	6.04	6.61	10.17	5.02	8.11	2.90	2.56	12.78	21.69
50th-Percentile Queue Length [ft/ln]	67.32	172.46	119.00	150.91	165.30	254.24	125.59	202.63	72.51	63.90	319.44	542.35
95th-Percentile Queue Length [veh/ln]	4.85	11.21	8.34	10.07	10.83	15.40	8.70	12.77	5.22	4.60	18.64	29.33
95th-Percentile Queue Length [ft/ln]	121.18	280.15	208.46	251.64	270.73	384.99	217.49	319.35	130.52	115.03	466.00	733.32

Movement, Approach, & Intersection Results

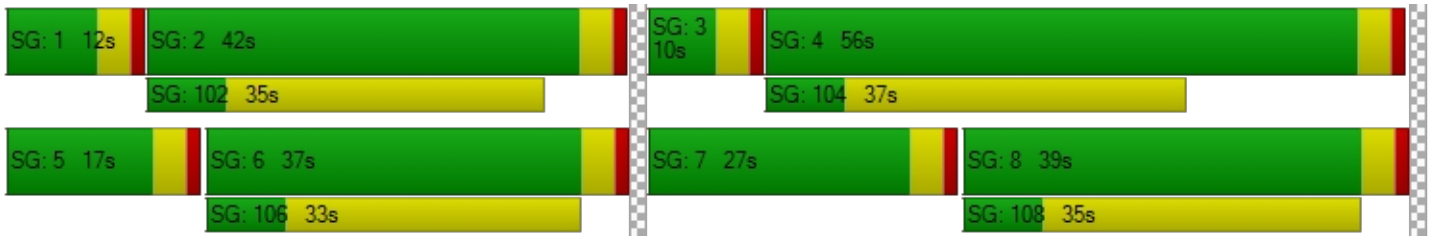
d_M, Delay for Movement [s/veh]	69.91	48.57	46.43	55.07	49.42	43.53	58.19	20.48	17.17	60.09	27.46	41.14
Movement LOS	E	D	D	E	D	D	E	C	B	E	C	D
d_A, Approach Delay [s/veh]	52.27			49.49			28.79			35.07		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	39.20											
Intersection LOS	D											
Intersection V/C	0.876											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.828	2.989	3.030	3.093
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	866	633	550
d_b, Bicycle Delay [s]	30.12	19.28	28.03	31.55
l_b,int, Bicycle LOS Score for Intersection	2.225	2.542	2.698	3.243
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	28.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.740

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	559	37	386	11	23	11	17	1013	349	321	1456	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	559	37	386	11	23	11	17	1013	349	321	1456	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	140	9	97	3	6	3	4	253	87	80	364	5
Total Analysis Volume [veh/h]	559	37	386	11	23	11	17	1013	349	321	1456	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	28	65	65	0	37	0	10	38	0	17	45	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	30	47	5	5	3	65	65	13	75	75
g / C, Green / Cycle	0.18	0.25	0.39	0.04	0.04	0.02	0.54	0.54	0.11	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.16	0.02	0.20	0.01	0.02	0.01	0.37	0.35	0.09	0.39	0.39
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	624	477	746	77	75	40	1027	1027	380	1191	1191
d1, Uniform Delay [s]	48.21	34.34	27.76	55.73	56.40	57.94	20.18	19.35	52.51	13.66	13.65
k, delay calibration	0.11	0.11	0.31	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.83	0.07	1.61	0.84	4.29	7.10	3.76	3.04	5.18	2.43	2.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.08	0.52	0.14	0.46	0.43	0.69	0.64	0.84	0.62	0.62
d, Delay for Lane Group [s/veh]	53.05	34.41	29.37	56.57	60.69	65.04	23.94	22.39	57.69	16.08	16.06
Lane Group LOS	D	C	C	E	E	E	C	C	E	B	B
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.57	0.84	8.75	0.34	1.10	0.59	15.04	13.30	5.02	12.31	12.28
50th-Percentile Queue Length [ft/ln]	214.29	21.07	218.68	8.51	27.45	14.71	376.07	332.51	125.40	307.72	307.05
95th-Percentile Queue Length [veh/ln]	13.37	1.52	13.60	0.61	1.98	1.06	21.40	19.28	8.69	18.06	18.03
95th-Percentile Queue Length [ft/ln]	334.33	37.93	339.94	15.33	49.41	26.49	535.09	482.03	217.22	451.56	450.73

Movement, Approach, & Intersection Results

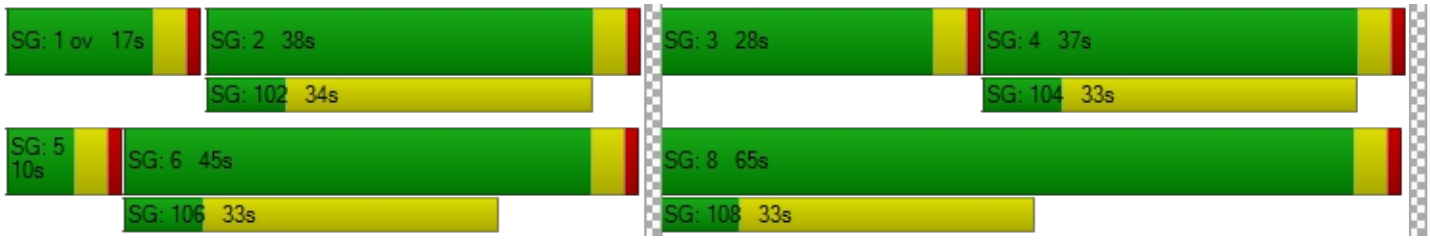
d_M, Delay for Movement [s/veh]	53.05	34.41	29.37	56.57	60.69	60.69	65.04	23.47	22.39	57.69	16.07	16.06
Movement LOS	D	C	C	E	E	E	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	43.04			59.68			23.71			23.51		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	28.53											
Intersection LOS	C											
Intersection V/C	0.740											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.739	1.992	2.978	3.003
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1017	550	567	683
d_b, Bicycle Delay [s]	14.51	31.54	30.82	26.01
l_b,int, Bicycle LOS Score for Intersection	3.180	1.634	2.697	3.041
Bicycle LOS	C	A	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.830

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	15	2	12	119	3	335	321	1039	14	6	1485	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	2	12	119	3	335	321	1039	14	6	1485	156
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	30	1	84	80	260	4	2	371	39
Total Analysis Volume [veh/h]	15	2	12	119	3	335	321	1039	14	6	1485	156
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	39	61	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	17	17	52	23	78	78	1	55	55
g / C, Green / Cycle	0.03	0.03	0.03	0.14	0.14	0.45	0.20	0.67	0.67	0.01	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.18	0.18	0.28	0.28	0.00	0.39	0.08
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	95	62	62	259	259	855	367	1281	1281	18	1825	912
d1, Uniform Delay [s]	54.32	53.92	54.21	43.63	43.63	21.11	44.36	8.45	8.44	56.57	25.52	16.94
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.21	0.15	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.77	0.21	1.51	0.46	0.46	0.58	8.84	0.98	0.97	10.15	4.11	0.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.03	0.19	0.23	0.24	0.39	0.87	0.41	0.41	0.33	0.81	0.17
d, Delay for Lane Group [s/veh]	55.08	54.13	55.72	44.09	44.09	21.69	53.20	9.43	9.41	66.72	29.62	17.34
Lane Group LOS	E	D	E	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.44	0.06	0.36	1.58	1.58	6.11	9.71	5.83	5.80	0.22	17.75	2.43
50th-Percentile Queue Length [ft/ln]	11.11	1.49	9.12	39.39	39.48	152.85	242.86	145.72	144.92	5.61	443.87	60.84
95th-Percentile Queue Length [veh/ln]	0.80	0.11	0.66	2.84	2.84	10.17	14.83	9.79	9.75	0.40	24.66	4.38
95th-Percentile Queue Length [ft/ln]	20.00	2.69	16.41	70.90	71.07	254.23	370.64	244.70	243.64	10.10	616.62	109.51

Movement, Approach, & Intersection Results

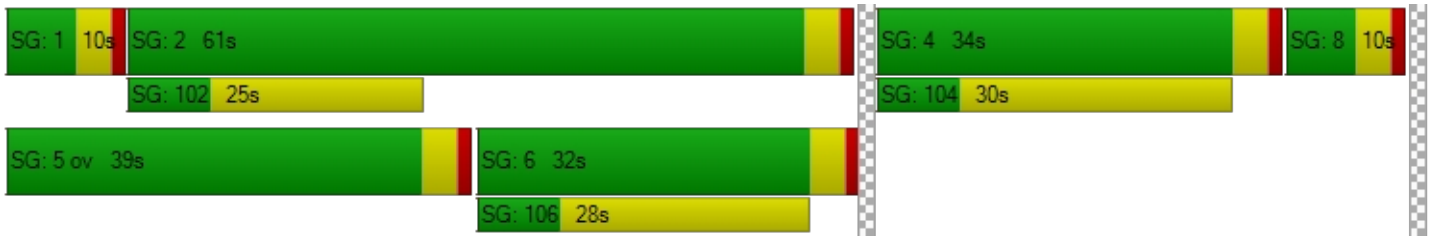
d_M, Delay for Movement [s/veh]	55.08	54.13	55.72	44.09	44.09	21.69	53.20	9.42	9.41	66.72	29.62	17.34
Movement LOS	E	D	E	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	55.28			27.67			19.65			28.60		
Approach LOS	E			C			B			C		
d_I, Intersection Delay [s/veh]	25.19											
Intersection LOS	C											
Intersection V/C	0.830											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.371	2.959	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	104	522	991	487
d_b, Bicycle Delay [s]	51.68	31.43	14.64	32.93
l_b,int, Bicycle LOS Score for Intersection	1.607	2.314	2.693	2.918
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	47.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.734

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	674	815	141	234	411	124	244	819	333	88	807	245
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	674	815	141	234	411	124	244	819	333	88	807	245
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	169	204	35	59	103	31	61	205	83	22	202	61
Total Analysis Volume [veh/h]	674	815	141	234	411	124	244	819	333	88	807	245
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	25	48	0	14	37	0	19	46	0	12	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	25	25	10	14	14	15	61	61	7	54	54
g / C, Green / Cycle	0.18	0.21	0.21	0.08	0.12	0.12	0.13	0.51	0.51	0.06	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.19	0.17	0.16	0.07	0.10	0.09	0.14	0.22	0.18	0.05	0.21	0.13
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	613	805	402	291	454	227	226	1937	969	112	1697	848
d1, Uniform Delay [s]	49.51	44.90	44.66	54.10	51.44	51.20	52.50	18.38	17.49	55.52	23.34	21.11
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	50.79	1.88	3.29	5.23	3.24	5.23	53.11	0.68	0.97	11.45	0.96	0.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.10	0.80	0.78	0.81	0.80	0.76	1.08	0.42	0.34	0.79	0.48	0.29
d, Delay for Lane Group [s/veh]	100.30	46.78	47.95	59.33	54.68	56.43	105.61	19.06	18.46	66.97	24.30	21.97
Lane Group LOS	F	D	D	E	D	E	F	B	B	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	13.48	9.26	9.14	3.68	5.50	5.37	10.12	7.20	5.69	2.98	8.19	4.58
50th-Percentile Queue Length [ft/ln]	336.94	231.59	228.48	92.10	137.51	134.32	252.89	179.93	142.17	74.58	204.82	114.42
95th-Percentile Queue Length [veh/ln]	20.42	14.25	14.10	6.63	9.35	9.17	15.85	11.60	9.60	5.37	12.89	8.09
95th-Percentile Queue Length [ft/ln]	510.50	356.37	352.43	165.79	233.67	229.35	396.13	289.93	239.94	134.25	322.18	202.13

Movement, Approach, & Intersection Results

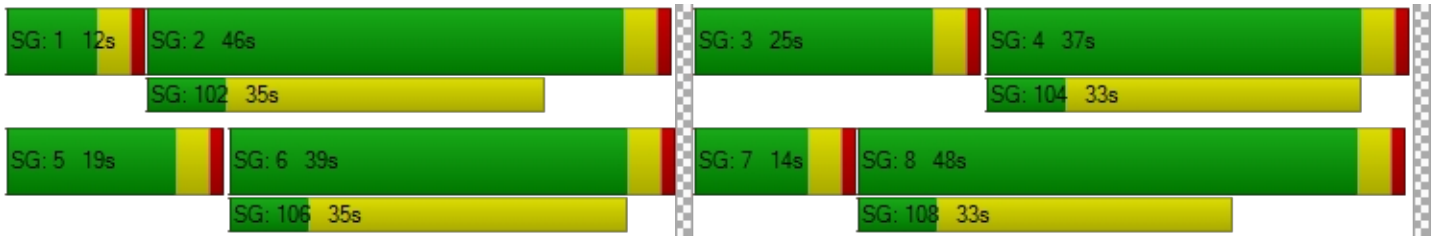
d_M, Delay for Movement [s/veh]	100.30	47.03	47.95	59.33	54.89	56.43	105.61	19.06	18.46	66.97	24.30	21.97
Movement LOS	F	D	D	E	D	E	F	B	B	E	C	C
d_A, Approach Delay [s/veh]	69.14			56.49			34.05			27.09		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	47.53											
Intersection LOS	D											
Intersection V/C	0.734											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.039	2.992	2.954	2.846
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	733	550	700	583
d_b, Bicycle Delay [s]	24.08	31.55	25.36	30.12
l_b,int, Bicycle LOS Score for Intersection	2.456	1.983	2.711	2.500
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	74.8
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.104

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	221	649	18	498	270	48	206	703	155	14	539	846
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	221	649	18	498	270	48	206	703	155	14	539	846
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	162	5	125	68	12	52	176	39	4	135	212
Total Analysis Volume [veh/h]	221	649	18	498	270	48	206	703	155	14	539	846
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	35	42	0	32	39	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	24	24	28	35	35	6	50	50	2	46	46
g / C, Green / Cycle	0.14	0.20	0.20	0.23	0.29	0.29	0.05	0.41	0.41	0.02	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.12	0.18	0.17	0.28	0.09	0.08	0.06	0.23	0.22	0.01	0.14	0.45
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	253	381	381	420	556	556	178	786	786	35	1453	727
d1, Uniform Delay [s]	50.52	46.62	46.52	46.03	32.85	32.69	56.98	26.91	26.42	58.15	26.68	37.07
k, delay calibration	0.11	0.13	0.13	0.50	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.05	7.97	7.30	105.41	0.29	0.27	85.24	2.91	2.54	7.08	0.73	88.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.88	0.87	1.19	0.29	0.28	1.16	0.56	0.53	0.40	0.37	1.16
d, Delay for Lane Group [s/veh]	59.58	54.59	53.82	151.43	33.14	32.96	142.22	29.82	28.96	65.23	27.41	125.65
Lane Group LOS	E	D	D	F	C	C	F	C	C	E	C	F
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.13	10.52	10.34	24.71	3.74	3.53	4.80	10.24	9.41	0.49	5.70	38.69
50th-Percentile Queue Length [ft/ln]	178.24	262.98	258.45	617.86	93.44	88.28	119.90	256.01	235.16	12.25	142.57	967.34
95th-Percentile Queue Length [veh/ln]	11.51	15.84	15.61	36.08	6.73	6.36	8.63	15.49	14.44	0.88	9.62	54.23
95th-Percentile Queue Length [ft/ln]	287.72	395.96	390.28	901.91	168.19	158.90	215.81	387.22	360.90	22.05	240.48	1355.70

Movement, Approach, & Intersection Results

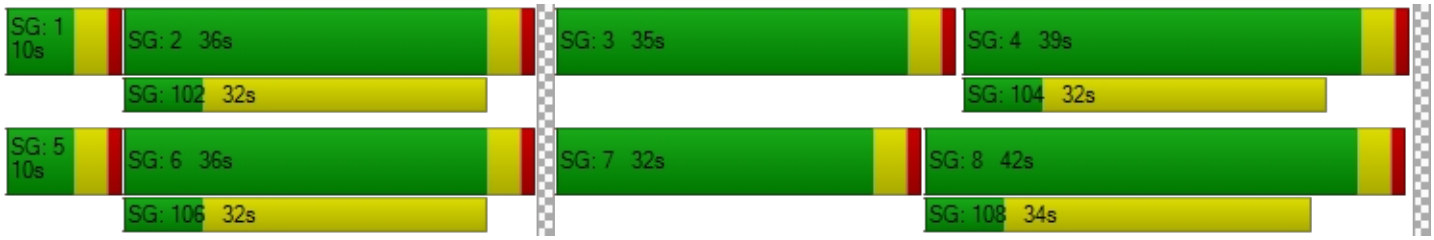
d_M, Delay for Movement [s/veh]	59.58	54.22	53.82	151.43	33.07	32.96	142.22	29.50	28.96	65.23	27.41	125.65
Movement LOS	E	D	D	F	C	C	F	C	C	E	C	F
d_A, Approach Delay [s/veh]	55.54			105.30			51.25			87.19		
Approach LOS	E			F			D			F		
d_I, Intersection Delay [s/veh]	74.82											
Intersection LOS	E											
Intersection V/C	1.104											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.572	2.804	2.771	2.892
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	633	583	533	533
d_b, Bicycle Delay [s]	28.03	30.12	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	2.292	2.233	2.437	2.714
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	11.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.827

Intersection Setup

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Rose Drive		Rose Drive		Vesuvius Drive	
Base Volume Input [veh/h]	169	1163	1255	101	49	118
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	1163	1255	101	49	118
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	291	314	25	12	30
Total Analysis Volume [veh/h]	169	1163	1255	101	49	118
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	6	6	0	6	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	64	64	0	26	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C
C, Cycle Length [s]	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	72	72	72	72	10
g / C, Green / Cycle	0.80	0.80	0.80	0.80	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.61	0.66	0.05	0.09
s, saturation flow rate [veh/h]	1800	1900	1900	1900	1800
c, Capacity [veh/h]	724	1513	1513	1513	206
d1, Uniform Delay [s]	2.05	4.79	5.48	1.96	38.83
k, delay calibration	0.50	0.50	0.50	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.76	3.81	5.40	0.09	7.45
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.77	0.83	0.07	0.81
d, Delay for Lane Group [s/veh]	2.81	8.60	10.87	2.05	46.28
Lane Group LOS	A	A	B	A	D
Critical Lane Group	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.56	8.17	10.37	0.27	3.97
50th-Percentile Queue Length [ft/ln]	14.01	204.26	259.22	6.74	99.20
95th-Percentile Queue Length [veh/ln]	1.01	12.86	15.65	0.49	7.14
95th-Percentile Queue Length [ft/ln]	25.23	321.45	391.25	12.13	178.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	2.81	8.60	10.87	2.05	46.28	46.28
Movement LOS	A	A	B	A	D	D
d_A, Approach Delay [s/veh]	7.87		10.22		46.28	
Approach LOS	A		B		D	
d_I, Intersection Delay [s/veh]	11.23					
Intersection LOS	B					
Intersection V/C	0.827					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	34.63
l_p,int, Pedestrian LOS Score for Intersection	2.819	0.000	2.168
Crosswalk LOS	C	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1335	1335	489
d_b, Bicycle Delay [s]	4.98	4.98	25.65
l_b,int, Bicycle LOS Score for Intersection	3.757	3.797	1.835
Bicycle LOS	D	D	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.809

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	759	0	619	0	1919	1154	0	2744	467
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	759	0	619	0	1919	1154	0	2744	467
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	190	0	155	0	480	289	0	686	117
Total Analysis Volume [veh/h]	0	0	0	759	0	619	0	1919	1154	0	2744	467
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		28	28	28	54	54
g / C, Green / Cycle		0.31	0.31	0.31	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate		0.26	0.26	0.24	0.34	0.48
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		550	550	581	3451	3451
d1, Uniform Delay [s]		29.08	29.08	28.56	10.55	13.49
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.42	3.42	2.47	0.65	1.98
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.84	0.84	0.79	0.56	0.80
d, Delay for Lane Group [s/veh]		32.50	32.50	31.04	11.20	15.47
Lane Group LOS		C	C	C	B	B
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		9.43	9.43	9.15	6.94	12.95
50th-Percentile Queue Length [ft/ln]		235.78	235.78	228.73	173.61	323.85
95th-Percentile Queue Length [veh/ln]		14.47	14.47	14.11	11.27	18.86
95th-Percentile Queue Length [ft/ln]		361.69	361.69	352.74	281.65	471.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	32.50	0.00	31.41	0.00	11.20	0.00	0.00	15.47	0.00
Movement LOS				C		C		B			B	
d_A, Approach Delay [s/veh]	0.00			32.01			11.20			15.47		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	17.89											
Intersection LOS	B											
Intersection V/C	0.809											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.466	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.833	2.615	3.069
Bicycle LOS	D	D	B	C

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	39.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.882

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1163	72	493	0	0	232	207	2126	430	0	2800	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1163	72	493	0	0	232	207	2126	430	0	2800	46
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	291	18	123	0	0	58	52	532	108	0	700	12
Total Analysis Volume [veh/h]	1163	72	493	0	0	232	207	2126	430	0	2800	46
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	37	0	0	0	12	19	71	0	0	52	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32	32	8	15	68	49	49
g / C, Green / Cycle	0.27	0.27	0.27	0.07	0.13	0.57	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.24	0.24	0.23	0.06	0.12	0.37	0.37	0.37
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	929	478	504	254	225	3236	2333	778
d1, Uniform Delay [s]	42.79	42.81	42.10	55.65	51.90	17.88	33.47	33.47
k, delay calibration	0.11	0.37	0.34	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.14	20.19	13.09	12.29	14.15	1.06	7.00	17.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.92	0.87	0.91	0.92	0.66	0.91	0.91
d, Delay for Lane Group [s/veh]	46.93	63.00	55.19	67.94	66.05	18.94	40.47	50.63
Lane Group LOS	D	E	E	E	E	B	D	D
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	12.68	15.19	14.14	3.92	7.03	13.36	20.64	22.84
50th-Percentile Queue Length [ft/ln]	316.90	379.73	353.38	98.01	175.81	333.92	516.04	570.92
95th-Percentile Queue Length [veh/ln]	18.52	21.58	20.30	7.06	11.38	19.35	28.09	30.67
95th-Percentile Queue Length [ft/ln]	462.88	539.52	507.53	176.42	284.54	483.76	702.32	766.85

Movement, Approach, & Intersection Results

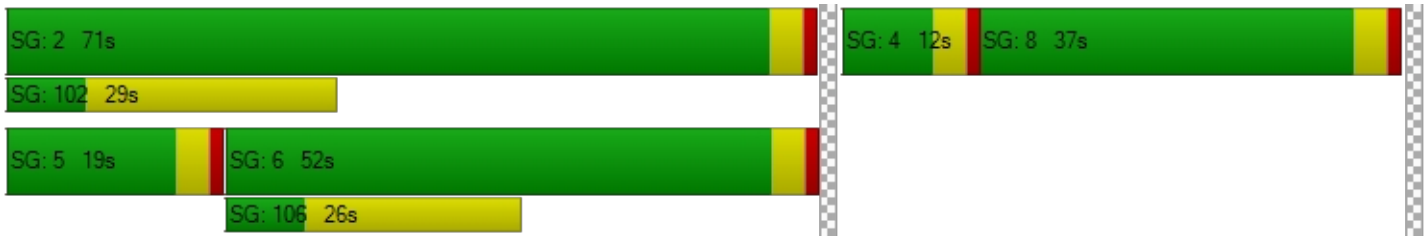
d_M, Delay for Movement [s/veh]	51.15	63.00	56.16	0.00	0.00	67.94	66.05	18.94	0.00	0.00	42.89	50.63
Movement LOS	D	E	E			E	E	B			D	D
d_A, Approach Delay [s/veh]	53.10			67.94			23.12			43.01		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	39.76											
Intersection LOS	D											
Intersection V/C	0.882											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.651	2.135	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	550	133	1117	800
d_b, Bicycle Delay [s]	31.54	52.27	11.71	21.60
l_b,int, Bicycle LOS Score for Intersection	4.411	1.560	2.843	2.734
Bicycle LOS	E	A	C	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	47.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.940

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	252	286	101	335	393	294	311	2147	161	209	1983	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	252	286	101	335	393	294	311	2147	161	209	1983	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	72	25	84	98	74	78	537	40	52	496	53
Total Analysis Volume [veh/h]	252	286	101	335	393	294	311	2147	161	209	1983	213
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	39	0	15	41	0	25	43	0	18	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	25	25	11	27	27	21	49	49	14	42	42
g / C, Green / Cycle	0.08	0.21	0.21	0.10	0.23	0.23	0.18	0.43	0.43	0.12	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.10	0.10	0.21	0.15	0.17	0.40	0.41	0.12	0.29	0.30
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	279	407	407	339	440	440	329	1624	812	221	2093	698
d1, Uniform Delay [s]	52.57	39.77	39.41	51.95	42.89	40.24	46.47	31.46	32.25	50.15	32.32	32.79
k, delay calibration	0.11	0.11	0.11	0.11	0.20	0.11	0.20	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.63	0.93	0.80	20.21	11.13	1.76	20.68	11.55	25.10	17.91	2.96	9.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.49	0.46	0.99	0.89	0.67	0.94	0.94	0.97	0.95	0.78	0.81
d, Delay for Lane Group [s/veh]	63.20	40.71	40.21	72.15	54.02	42.01	67.15	43.01	57.35	68.05	35.28	42.56
Lane Group LOS	E	D	D	E	D	D	E	D	E	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.02	5.11	4.67	5.77	12.11	7.76	10.63	22.09	26.37	7.05	13.78	15.78
50th-Percentile Queue Length [ft/ln]	100.44	127.87	116.66	144.20	302.64	193.98	265.72	552.34	659.29	176.29	344.48	394.38
95th-Percentile Queue Length [veh/ln]	7.23	8.82	8.21	9.71	17.81	12.33	15.98	29.80	34.79	11.41	19.87	22.29
95th-Percentile Queue Length [ft/ln]	180.79	220.60	205.23	242.67	445.29	308.19	399.39	745.05	869.84	285.16	496.68	557.22

Movement, Approach, & Intersection Results

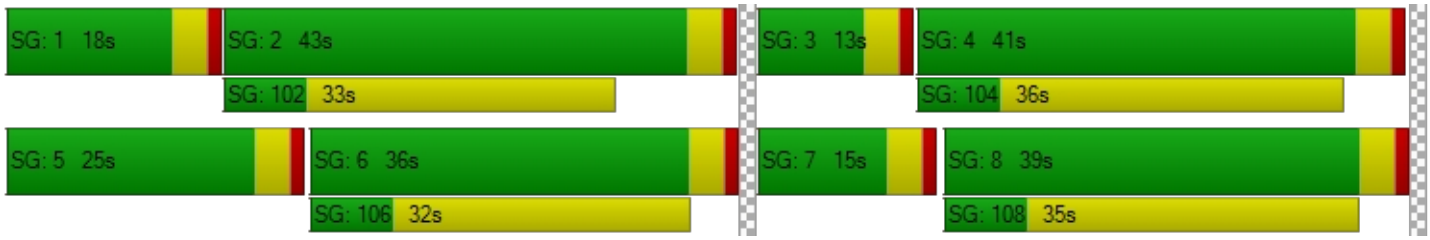
d_M, Delay for Movement [s/veh]	63.20	40.56	40.21	72.15	54.02	42.01	67.15	47.20	57.35	68.05	36.57	42.56
Movement LOS	E	D	D	E	D	D	E	D	E	E	D	D
d_A, Approach Delay [s/veh]	49.43			56.51			50.19			39.83		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	47.36											
Intersection LOS	D											
Intersection V/C	0.940											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.07	47.07	47.07	47.07
l_p,int, Pedestrian LOS Score for Intersection	2.585	2.762	3.365	3.345
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	608	643	678	556
d_b, Bicycle Delay [s]	27.86	26.49	25.15	29.99
l_b,int, Bicycle LOS Score for Intersection	2.087	3.246	3.000	2.552
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	27.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.839

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	295	54	307	29	26	16	22	2161	323	267	2241	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	54	307	29	26	16	22	2161	323	267	2241	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	74	14	77	7	7	4	6	540	81	67	560	17
Total Analysis Volume [veh/h]	295	54	307	29	26	16	22	2161	323	267	2241	66
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	10	0	10	32	0	35	57	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	20	5	5	3	46	46	18	61	61
g / C, Green / Cycle	0.19	0.19	0.19	0.05	0.05	0.03	0.44	0.44	0.17	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.10	0.10	0.16	0.02	0.02	0.01	0.38	0.17	0.15	0.40	0.42
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	333	333	352	92	97	51	2522	841	305	2218	1109
d1, Uniform Delay [s]	38.63	38.69	41.64	48.12	48.41	50.25	26.32	19.69	42.57	15.16	15.61
k, delay calibration	0.11	0.11	0.13	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.26	1.30	8.16	1.95	3.05	5.74	4.02	1.33	7.86	1.73	3.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.53	0.87	0.32	0.43	0.43	0.86	0.38	0.88	0.68	0.71
d, Delay for Lane Group [s/veh]	39.89	39.98	49.80	50.07	51.46	55.99	30.34	21.02	50.43	16.89	19.53
Lane Group LOS	D	D	D	D	D	E	C	C	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.12	4.18	8.44	0.78	1.15	0.65	16.47	5.52	7.36	12.21	13.76
50th-Percentile Queue Length [ft/ln]	103.06	104.59	211.07	19.54	28.71	16.22	411.74	137.99	184.09	305.13	344.02
95th-Percentile Queue Length [veh/ln]	7.42	7.53	13.21	1.41	2.07	1.17	23.13	9.37	11.81	17.93	19.84
95th-Percentile Queue Length [ft/ln]	185.50	188.27	330.20	35.17	51.67	29.19	578.13	234.32	295.34	448.37	496.11

Movement, Approach, & Intersection Results

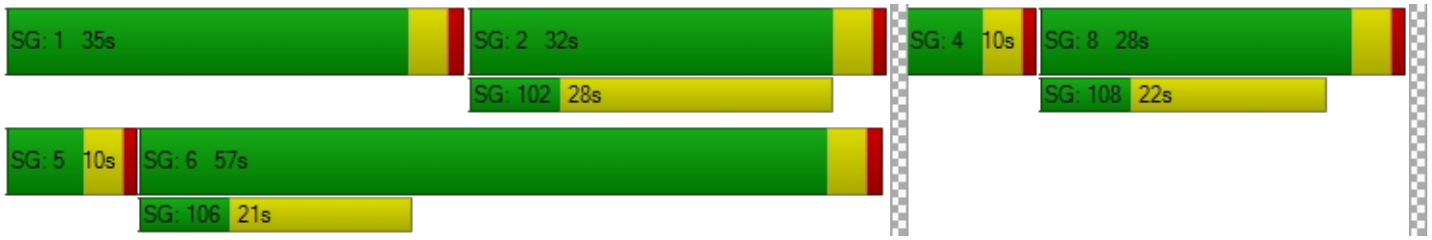
d_M, Delay for Movement [s/veh]	39.93	39.98	49.80	50.07	51.46	51.46	55.99	30.34	21.02	50.43	17.74	19.53
Movement LOS	D	D	D	D	D	D	E	C	C	D	B	B
d_A, Approach Delay [s/veh]	44.55			50.89			29.37			21.18		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	27.72											
Intersection LOS	C											
Intersection V/C	0.839											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.11	42.11	0.00	42.11
l_p,int, Pedestrian LOS Score for Intersection	2.448	2.017	0.000	3.308
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	457	114	533	1009
d_b, Bicycle Delay [s]	31.27	46.70	28.26	12.90
l_b,int, Bicycle LOS Score for Intersection	2.642	1.677	2.938	2.975
Bicycle LOS	B	A	C	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	39.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.880

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	418	671	118	300	519	133	247	1596	251	211	1780	364
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	418	671	118	300	519	133	247	1596	251	211	1780	364
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	105	168	30	75	130	33	62	399	63	53	445	91
Total Analysis Volume [veh/h]	418	671	118	300	519	133	247	1596	251	211	1780	364
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	34	0	14	30	0	13	42	0	15	44	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	25	25	10	21	21	9	46	46	8	45	45
g / C, Green / Cycle	0.13	0.24	0.24	0.10	0.20	0.20	0.09	0.43	0.43	0.08	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.12	0.21	0.20	0.09	0.14	0.07	0.07	0.32	0.32	0.06	0.38	0.37
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	470	451	451	338	759	379	305	1646	823	284	1623	811
d1, Uniform Delay [s]	44.79	38.88	38.38	46.98	39.04	36.25	47.19	25.05	24.96	47.29	27.72	27.63
k, delay calibration	0.11	0.26	0.24	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.97	14.07	9.64	7.91	1.10	0.55	5.15	3.19	6.05	3.85	7.31	12.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.90	0.85	0.89	0.68	0.35	0.81	0.75	0.74	0.74	0.88	0.88
d, Delay for Lane Group [s/veh]	50.76	52.95	48.01	54.89	40.14	36.80	52.33	28.24	31.00	51.14	35.03	40.51
Lane Group LOS	D	D	D	D	D	D	D	C	C	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.71	11.72	10.56	4.23	6.27	2.99	3.38	13.20	13.71	2.84	17.52	18.64
50th-Percentile Queue Length [ft/ln]	142.71	292.95	263.91	105.73	156.86	74.71	84.49	329.92	342.66	71.08	438.02	465.91
95th-Percentile Queue Length [veh/ln]	9.63	17.33	15.88	7.60	10.38	5.38	6.08	19.15	19.78	5.12	24.39	25.72
95th-Percentile Queue Length [ft/ln]	240.66	433.30	397.12	190.04	259.56	134.48	152.07	478.86	494.45	127.95	609.64	642.91

Movement, Approach, & Intersection Results

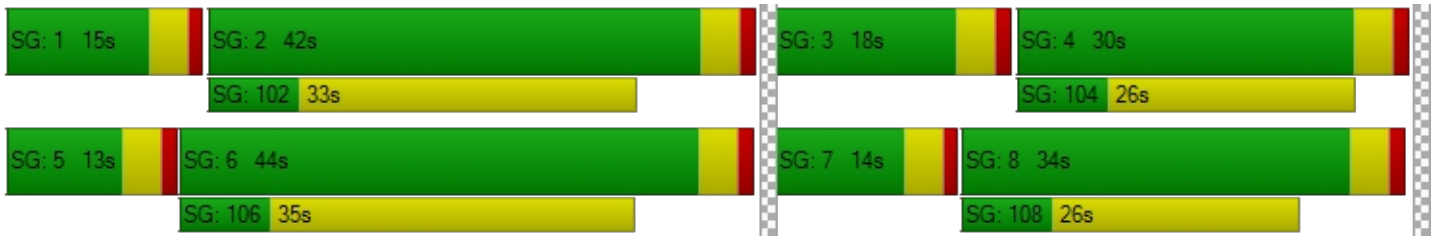
d_M, Delay for Movement [s/veh]	50.76	50.99	48.01	54.89	40.14	36.80	52.33	28.87	31.00	51.14	36.10	40.51
Movement LOS	D	D	D	D	D	D	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	50.62			44.32			31.89			38.13		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	39.33											
Intersection LOS	D											
Intersection V/C	0.880											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.14	42.14	42.14	42.14
l_p,int, Pedestrian LOS Score for Intersection	2.816	2.912	3.272	3.265
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	571	495	723	761
d_b, Bicycle Delay [s]	26.84	29.78	21.43	20.17
l_b,int, Bicycle LOS Score for Intersection	2.555	2.345	2.711	2.855
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.639

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	131	271	145	234	229	132	237	2032	171	189	1478	144
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	271	145	234	229	132	237	2032	171	189	1478	144
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	68	36	59	57	33	59	508	43	47	370	36
Total Analysis Volume [veh/h]	131	271	145	234	229	132	237	2032	171	189	1478	144
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	46	0	17	48	0	18	44	0	13	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	12	12	10	16	16	10	74	74	8	72	72
g / C, Green / Cycle	0.05	0.10	0.10	0.08	0.13	0.13	0.09	0.61	0.61	0.07	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.04	0.07	0.08	0.07	0.06	0.07	0.07	0.36	0.09	0.05	0.26	0.08
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	190	378	189	296	492	246	300	3491	1164	247	3404	1135
d1, Uniform Delay [s]	55.76	52.43	52.71	53.93	48.41	48.89	53.83	14.02	9.91	54.82	13.15	10.54
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.36	2.56	6.41	4.76	0.69	1.82	4.66	0.72	0.27	4.92	0.41	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.69	0.72	0.77	0.79	0.47	0.54	0.79	0.58	0.15	0.77	0.43	0.13
d, Delay for Lane Group [s/veh]	60.13	54.99	59.12	58.69	49.10	50.71	58.49	14.73	10.18	59.75	13.55	10.77
Lane Group LOS	E	D	E	E	D	D	E	B	B	E	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.07	4.10	4.60	3.66	3.23	3.83	3.70	10.77	1.97	2.98	7.13	1.71
50th-Percentile Queue Length [ft/ln]	51.63	102.40	114.96	91.56	80.82	95.83	92.59	269.30	49.20	74.44	178.13	42.80
95th-Percentile Queue Length [veh/ln]	3.72	7.37	8.12	6.59	5.82	6.90	6.67	16.15	3.54	5.36	11.50	3.08
95th-Percentile Queue Length [ft/ln]	92.94	184.31	202.88	164.81	145.48	172.50	166.67	403.86	88.55	133.99	287.57	77.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.13	54.99	59.12	58.69	49.10	50.71	58.49	14.73	10.18	59.75	13.55	10.77
Movement LOS	E	D	E	E	D	D	E	B	B	E	B	B
d_A, Approach Delay [s/veh]	57.32			53.23			18.66			18.15		
Approach LOS	E			D			B			B		
d_I, Intersection Delay [s/veh]	26.23											
Intersection LOS	C											
Intersection V/C	0.639											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.766	2.781	3.316	3.320
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	733	666	583
d_b, Bicycle Delay [s]	25.36	24.08	26.68	30.12
l_b,int, Bicycle LOS Score for Intersection	2.011	2.050	2.902	2.556
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	237.2
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.079

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	306	561	143	1019	487	22	77	1994	315	176	1553	862
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	306	561	143	1019	487	22	77	1994	315	176	1553	862
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	77	140	36	255	122	6	19	499	79	44	388	216
Total Analysis Volume [veh/h]	306	561	143	1019	487	22	77	1994	315	176	1553	862
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	21	21	8	18	18	6	69	69	6	69	69
g / C, Green / Cycle	0.09	0.18	0.18	0.07	0.15	0.15	0.05	0.57	0.57	0.05	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.09	0.15	0.08	0.29	0.13	0.01	0.04	0.40	0.41	0.05	0.27	0.45
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	323	670	335	236	575	288	91	2175	1088	178	3263	1088
d1, Uniform Delay [s]	54.21	47.79	44.05	55.99	49.59	43.74	56.51	18.42	18.51	56.96	15.09	20.09
k, delay calibration	0.11	0.11	0.11	0.14	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.79	2.89	0.86	1498.20	3.56	0.11	18.16	1.96	3.95	29.23	0.50	5.95
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.84	0.43	4.32	0.85	0.08	0.84	0.71	0.71	0.99	0.48	0.79
d, Delay for Lane Group [s/veh]	68.00	50.68	44.92	1554.19	53.15	43.86	74.67	20.38	22.46	86.19	15.59	26.03
Lane Group LOS	E	D	D	F	D	D	E	C	C	F	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.21	8.36	3.88	52.62	7.38	0.57	2.78	15.21	15.99	3.39	8.22	19.70
50th-Percentile Queue Length [ft/ln]	130.27	208.98	97.06	1315.39	184.58	14.37	69.40	380.28	399.78	84.69	205.60	492.45
95th-Percentile Queue Length [veh/ln]	8.95	13.10	6.99	79.06	11.84	1.03	5.00	21.61	22.55	6.10	12.93	26.98
95th-Percentile Queue Length [ft/ln]	223.87	327.52	174.70	1976.55	295.99	25.86	124.92	540.18	563.74	152.45	323.17	674.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	68.00	50.68	44.92	1554.19	53.15	43.86	74.67	20.86	22.46	86.19	15.59	26.03
Movement LOS	E	D	D	F	D	D	E	C	C	F	B	C
d_A, Approach Delay [s/veh]	55.11			1054.04			22.80			23.86		
Approach LOS	E			F			C			C		
d_I, Intersection Delay [s/veh]	237.19											
Intersection LOS	F											
Intersection V/C	1.079											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.885	3.029	3.202	3.486
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.393	2.820	2.872	2.985
Bicycle LOS	B	C	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D-VI

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.898

Intersection Setup

Name	St Co			St Co			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	St Co			St Co			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	194	250	236	101	692	9	16	159	238	542	203	627
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	194	250	236	101	692	9	16	159	238	542	203	627
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	49	63	59	253	173	2	4	399	60	136	509	157
Total Analysis Volume [veh/h]	194	250	236	101	692	9	16	159	238	542	203	627
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Ove
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	13	15	0	42	44	0	10	39	0	24	53	53
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	12	12	12	12	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.0	4.0	4.0	4.0	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	9	12	12	12	37	40	40	3	35	35	20	52	94
g / C, Green / Cycle	0.0	0.1	0.1	0.1	0.31	0.34	0.34	0.02	0.29	0.29	0.17	0.44	0.78
(v / s)_i Volume / Saturation Flow Rate	0.0	0.0	0.0	0.0	0.29	0.18	0.18	0.00	0.24	0.24	0.15	0.36	0.33
s, saturation flow rate [veh/h]	35	19	19	19	350	190	190	350	570	190	350	570	190
c, Capacity [veh/h]	25	18	18	18	108	641	641	76	165	552	584	248	148
d1, Uniform Delay [s]	54.	53.	53.	52.	40.2	32.3	32.3	57.7	39.7	39.8	49.3	29.6	4.39
k, delay calibration	0.1	0.1	0.1	0.1	0.11	0.13	0.13	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.9	16.	10.	7.3	4.41	0.86	0.85	1.37	4.88	13.8	7.03	3.15	0.89
d3, Initial Queue Delay [s]	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.0	1.0	1.0	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.7	0.9	0.8	0.7	0.93	0.55	0.55	0.21	0.83	0.83	0.93	0.82	0.42
d, Delay for Lane Group [s/veh]	59.	70.	63.	60.	44.6	33.2	33.1	59.1	44.6	53.7	56.3	32.8	5.28
Lane Group LOS	E	E	E	E	D	C	C	E	D	D	E	C	A
Critical Lane Group	No	Ye	No	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.0	6.0	5.3	4.8	14.9	8.42	8.40	0.25	13.2	14.7	8.55	17.4	4.54
50th-Percentile Queue Length [ft/ln]	76.	15	13	12	374.	210.	210.	6.34	330.	369.	213.	437.	113.
95th-Percentile Queue Length [veh/ln]	5.5	10.	9.0	8.4	21.3	13.1	13.1	0.46	19.1	21.0	13.3	24.3	8.04
95th-Percentile Queue Length [ft/ln]	13	25	22	21	533.	329.	328.	11.4	479.	526.	333.	608.	200.

Movement, Approach, & Intersection Results

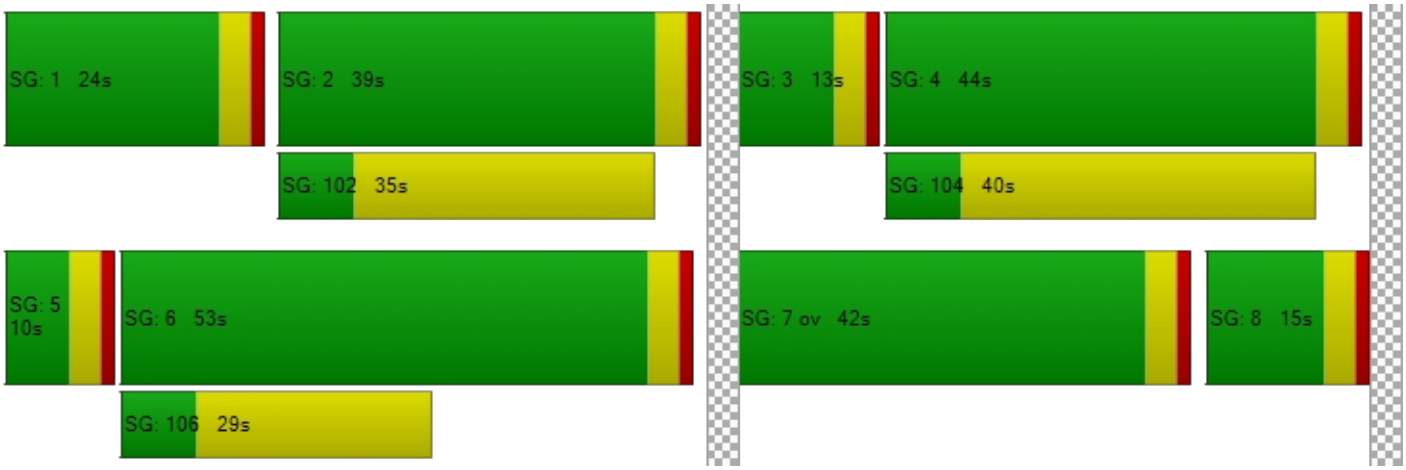
d_M, Delay for Movement [s/veh]	59.7	68.0	61.2	44.6	33.2	33.1	59.1	45.9	53.7	56.3	32.8	5.28
Movement LOS	E	E	E	D	C	C	E	D	D	E	C	A
d_A, Approach Delay [s/veh]	63.32			39.97			47.04			31.42		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	40.18											
Intersection LOS	D											
Intersection V/C	0.898											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.907	2.890	3.306	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	183	666	583	816
d_b, Bicycle Delay [s]	49.52	26.68	30.12	21.02
l_b,int, Bicycle LOS Score for Intersection	2.121	2.972	2.322	3.322
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.841

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	108	0	730	0	195	650	289	228	0
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	108	0	730	0	195	650	289	228	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	271	0	183	0	489	163	72	572	0
Total Analysis Volume [veh/h]	0	0	0	108	0	730	0	195	650	289	228	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Per	Prot	Per	Per
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	Lea	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	47	0	0	0	34	0	14	48	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		95	95	95	95	95	95
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		35	35	39	39	10	52
g / C, Green / Cycle		0.37	0.37	0.41	0.41	0.10	0.55
(v / s)_i Volume / Saturation Flow Rate		0.31	0.19	0.34	0.17	0.08	0.40
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		1280	1389	2311	1541	359	3136
d1, Uniform Delay [s]		27.70	23.67	25.56	20.26	41.70	16.05
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		1.64	0.31	4.03	0.85	4.23	1.53
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.85	0.53	0.85	0.42	0.80	0.73
d, Delay for Lane Group [s/veh]		29.35	23.98	29.59	21.11	45.93	17.58
Lane Group LOS		C	C	C	C	D	B
Critical Lane Group		Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		11.18	6.32	13.55	5.20	3.49	11.88
50th-Percentile Queue Length [ft/ln]		279.39	158.05	338.71	130.00	87.21	297.09
95th-Percentile Queue Length [veh/ln]		16.66	10.45	19.58	8.94	6.28	17.54
95th-Percentile Queue Length [ft/ln]		416.45	261.14	489.62	223.50	156.98	438.42

Movement, Approach, & Intersection Results

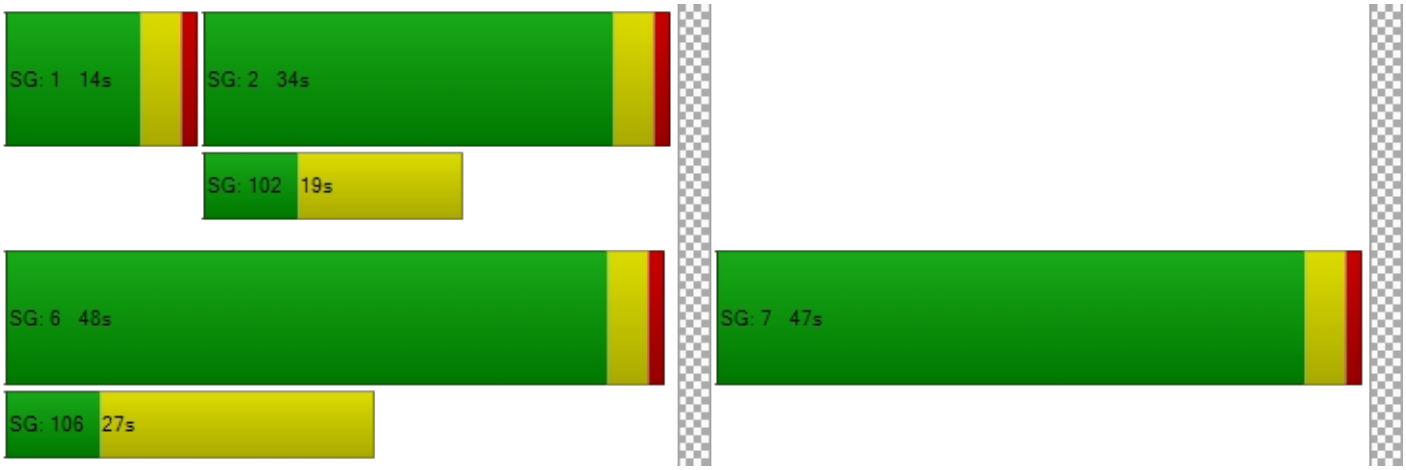
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	29.3	0.00	23.9	0.00	29.5	21.1	45.9	17.5	0.00
Movement LOS				C		C		C	C	D	B	
d_A, Approach Delay [s/veh]	0.00			27.19			27.48			20.76		
Approach LOS	A			C			C			C		
d_I, Intersection Delay [s/veh]	24.93											
Intersection LOS	C											
Intersection V/C	0.841											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.175	2.576	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	905	631	926
d_b, Bicycle Delay [s]	47.51	14.24	22.24	13.69
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.992	2.976
Bicycle LOS	D	A	C	C

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	22.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.844

Intersection Setup

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57			SR-57			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	110	0	534	0	0	0	0	260	424	0	147	573
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	110	0	534	0	0	0	0	260	424	0	147	573
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Total 15-Minute Volume [veh/h]	276	0	134	0	0	0	0	651	106	0	368	0
Total Analysis Volume [veh/h]	110	0	534	0	0	0	0	260	424	0	147	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Per	Split	Per	Per	Per	Per	Per	Per	Per	Per	Unsi
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	59	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	95	95		95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	35	35		52	52	52	52
g / C, Green / Cycle	0.37	0.37		0.54	0.54	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.32	0.28		0.46	0.46	0.22	0.26
s, saturation flow rate [veh/h]	3500	1900		380	190	190	5700
c, Capacity [veh/h]	1305	708		206	103	103	3094
d1, Uniform Delay [s]	27.26	25.96		18.2	18.2	12.7	13.37
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.60	1.66		4.38	8.32	1.21	0.53
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.75		0.84	0.84	0.41	0.48
d, Delay for Lane Group [s/veh]	28.86	27.62		22.6	26.5	13.9	13.89
Lane Group LOS	C	C		C	C	B	B
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	11.30	10.46		15.9	17.0	5.36	6.22
50th-Percentile Queue Length [ft/ln]	282.38	261.57		398.	426.	133.	155.59
95th-Percentile Queue Length [veh/ln]	16.81	15.77		22.4	23.8	9.15	10.31
95th-Percentile Queue Length [ft/ln]	420.17	394.20		562.	595.	228.	257.87

Movement, Approach, & Intersection Results

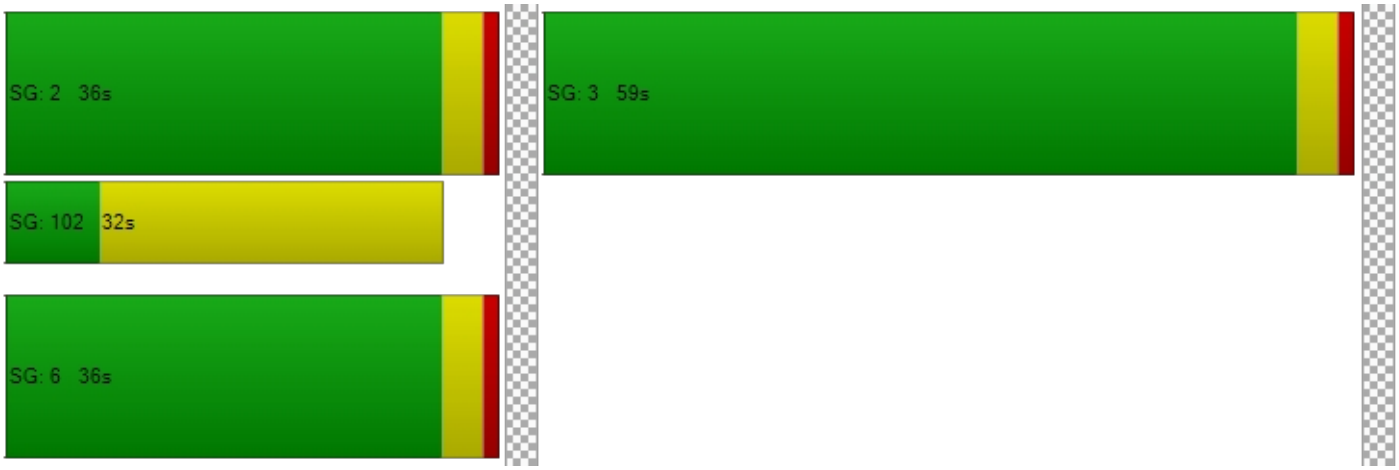
d_M, Delay for Movement [s/veh]	28.8	0.00	27.6	0.00	0.00	0.00	0.00	23.5	13.9	0.00	13.8	0.00
Movement LOS	C		C					C	B		B	
d_A, Approach Delay [s/veh]	28.46			0.00			22.55			13.89		
Approach LOS	C			A			C			B		
d_I, Intersection Delay [s/veh]	22.05											
Intersection LOS	C											
Intersection V/C	0.844											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.11	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.704	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1159	0	674	674
d_b, Bicycle Delay [s]	8.40	47.47	20.87	20.87
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	3.226	2.369
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	14.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.672

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	9	8	7	69	1	137	585	261	42	18	203	192
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	8	7	69	1	137	585	261	42	18	203	192
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	2	2	2	17	0	34	146	653	11	5	510	48
Total Analysis Volume [veh/h]	9	8	7	69	1	137	585	261	42	18	203	192
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	44	0	0	44	0	40	37	0	34	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	7	7	22	94	94	3	74	74
g / C, Green / Cycle	0.06	0.06	0.06	0.19	0.81	0.81	0.02	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.04	0.17	0.46	0.48	0.01	0.39	0.40
s, saturation flow rate [veh/h]	1800	1800	3800	350	380	190	180	380	190
c, Capacity [veh/h]	150	169	225	676	309	154	42	244	122
d1, Uniform Delay [s]	51.56	52.93	52.78	44.9	3.70	3.87	55.4	11.9	12.1
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	1.62	2.64	3.49	0.75	1.67	6.83	1.12	2.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.41	0.61	0.87	0.56	0.59	0.43	0.60	0.62
d, Delay for Lane Group [s/veh]	52.06	54.55	55.42	48.4	4.45	5.54	62.2	13.1	14.4
Lane Group LOS	D	D	E	D	A	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.68	2.05	2.01	8.36	5.26	6.13	0.59	10.6	11.4
50th-Percentile Queue Length [ft/ln]	17.04	51.37	50.33	209.	131.	153.	14.8	267.	284.
95th-Percentile Queue Length [veh/ln]	1.23	3.70	3.62	13.1	9.02	10.1	1.07	16.0	16.9
95th-Percentile Queue Length [ft/ln]	30.66	92.46	90.59	327.	225.	254.	26.7	401.	423.

Movement, Approach, & Intersection Results

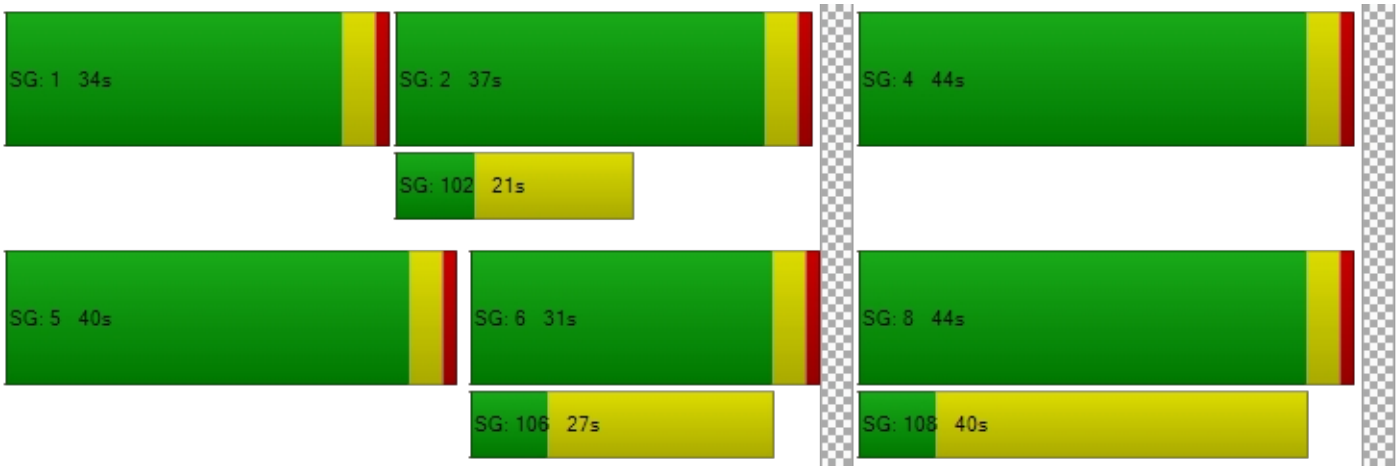
d_M, Delay for Movement [s/veh]	52.0	52.0	52.0	54.5	54.5	55.4	48.4	4.82	5.54	62.2	13.4	14.4
Movement LOS	D	D	D	D	D	E	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	52.06			55.12			12.70			13.95		
Approach LOS	D			E			B			B		
d_I, Intersection Delay [s/veh]	14.89											
Intersection LOS	B											
Intersection V/C	0.672											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.02	47.02	0.00	47.02
l_p,int, Pedestrian LOS Score for Intersection	1.768	2.505	0.000	3.391
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	696	696	574	470
d_b, Bicycle Delay [s]	24.45	24.45	29.23	33.66
l_b,int, Bicycle LOS Score for Intersection	1.599	1.901	3.341	2.797
Bicycle LOS	A	A	C	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	38.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.885

Intersection Setup

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N As			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	169	322	11	125	218	405	500	208	173	23	159	183
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	322	11	125	218	405	500	208	173	23	159	183
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	42	81	3	31	55	101	125	520	43	6	399	46
Total Analysis Volume [veh/h]	169	322	11	125	218	405	500	208	173	23	159	183
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	16	27	0	24	35	0	22	51	0	13	42	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	29	29	10	27	27	18	57	57	3	42	42
g / C, Green / Cycle	0.10	0.25	0.25	0.09	0.23	0.23	0.16	0.50	0.50	0.03	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.09	0.07	0.11	0.21	0.14	0.36	0.09	0.01	0.31	0.31
s, saturation flow rate [veh/h]	180	190	190	180	190	190	350	570	190	180	380	190
c, Capacity [veh/h]	189	478	478	155	442	442	549	282	941	51	139	696
d1, Uniform Delay [s]	50.8	35.3	35.3	51.6	38.2	43.0	47.7	23.0	16.1	55.0	33.5	33.5
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.30	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.6	0.44	0.43	9.45	0.85	18.1	6.27	1.76	0.43	6.23	6.70	12.3
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.35	0.35	0.81	0.49	0.92	0.91	0.74	0.18	0.45	0.85	0.85
d, Delay for Lane Group [s/veh]	64.5	35.7	35.7	61.0	39.1	61.1	54.0	24.8	16.5	61.2	40.2	45.9
Lane Group LOS	E	D	D	E	D	E	D	C	B	E	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.51	3.91	3.88	3.94	5.43	13.3	7.50	14.9	2.63	0.74	16.2	17.3
50th-Percentile Queue Length [ft/ln]	137.	97.8	96.8	98.5	135.	333.	187.	372.	65.7	18.6	406.	432.
95th-Percentile Queue Length [veh/ln]	9.37	7.04	6.98	7.10	9.25	19.3	11.9	21.2	4.74	1.34	22.8	24.1
95th-Percentile Queue Length [ft/ln]	234.	176.	174.	177.	231.	483.	299.	530.	118.	33.5	571.	603.

Movement, Approach, & Intersection Results

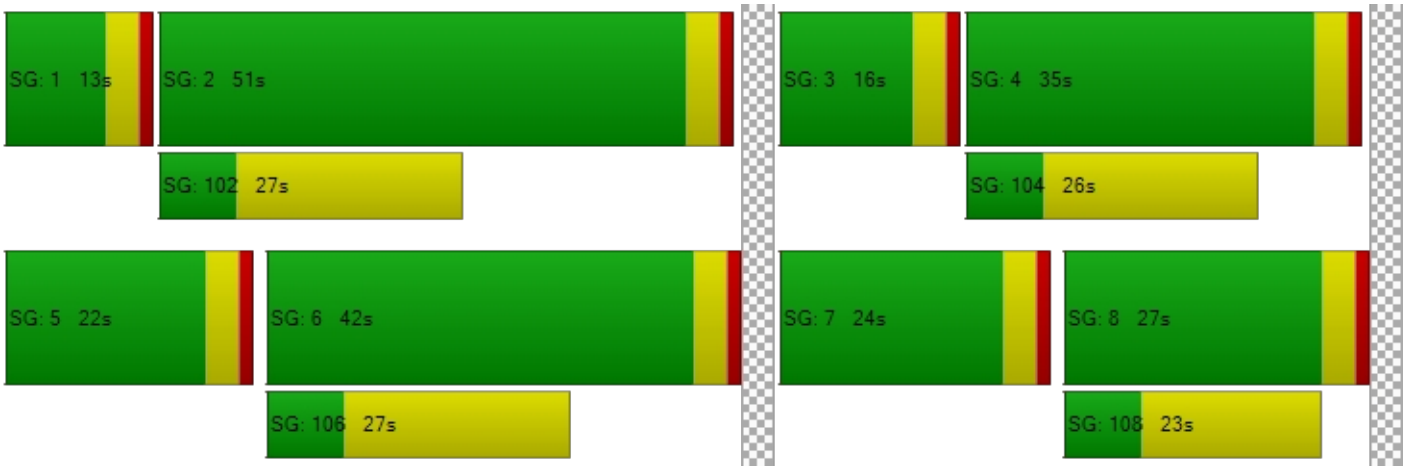
d_M, Delay for Movement [s/veh]	64.5	35.7	35.7	61.0	39.1	61.1	54.0	24.8	16.5	61.2	41.7	45.9
Movement LOS	E	D	D	E	D	E	D	C	B	E	D	D
d_A, Approach Delay [s/veh]	45.45			54.72			29.62			42.37		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	38.18											
Intersection LOS	D											
Intersection V/C	0.885											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.490	2.653	3.394	3.165
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	539	817	661
d_b, Bicycle Delay [s]	36.82	30.70	20.12	25.80
l_b,int, Bicycle LOS Score for Intersection	1.974	2.177	3.074	2.550
Bicycle LOS	A	B	C	B

Sequence

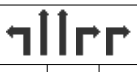
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	30.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.777

Intersection Setup

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	329	130	57	22	236	373	111	823	124	330	986	14
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	329	130	57	22	236	373	111	823	124	330	986	14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	82	33	14	6	59	93	28	206	311	83	247	4
Total Analysis Volume [veh/h]	329	130	57	22	236	373	111	823	124	330	986	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Ove	Prot	Per	Per	Prot	Per	Ove	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	17	51	51	10	44	0	22	37	37	17	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	35	52	3	25	25	9	48	65	13	52	52
g / C, Green / Cycle	0.11	0.31	0.45	0.03	0.22	0.22	0.08	0.42	0.56	0.11	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.03	0.01	0.12	0.20	0.06	0.22	0.33	0.09	0.17	0.18
s, saturation flow rate [veh/h]	350	190	190	180	190	190	180	380	380	350	380	190
c, Capacity [veh/h]	397	584	861	49	420	420	140	157	214	389	170	853
d1, Uniform Delay [s]	49.9	29.6	17.7	55.1	39.8	43.4	52.1	25.1	16.2	50.2	21.1	21.3
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.14	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.45	0.19	0.03	6.24	1.18	8.11	9.78	1.24	1.16	5.24	0.66	1.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.22	0.07	0.45	0.56	0.89	0.80	0.52	0.58	0.85	0.39	0.40
d, Delay for Lane Group [s/veh]	54.3	29.8	17.7	61.3	41.0	51.5	61.9	26.3	17.4	55.4	21.8	22.7
Lane Group LOS	D	C	B	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.87	2.72	0.87	0.71	6.07	11.1	3.53	8.56	10.5	4.93	6.00	6.49
50th-Percentile Queue Length [ft/ln]	121.	67.9	21.6	17.8	151.	279.	88.1	213.	263.	123.	150.	162.
95th-Percentile Queue Length [veh/ln]	8.48	4.89	1.56	1.28	10.1	16.6	6.35	13.3	15.8	8.58	10.0	10.6
95th-Percentile Queue Length [ft/ln]	212.	122.	38.9	32.1	252.	416.	158.	333.	396.	214.	250.	266.

Movement, Approach, & Intersection Results

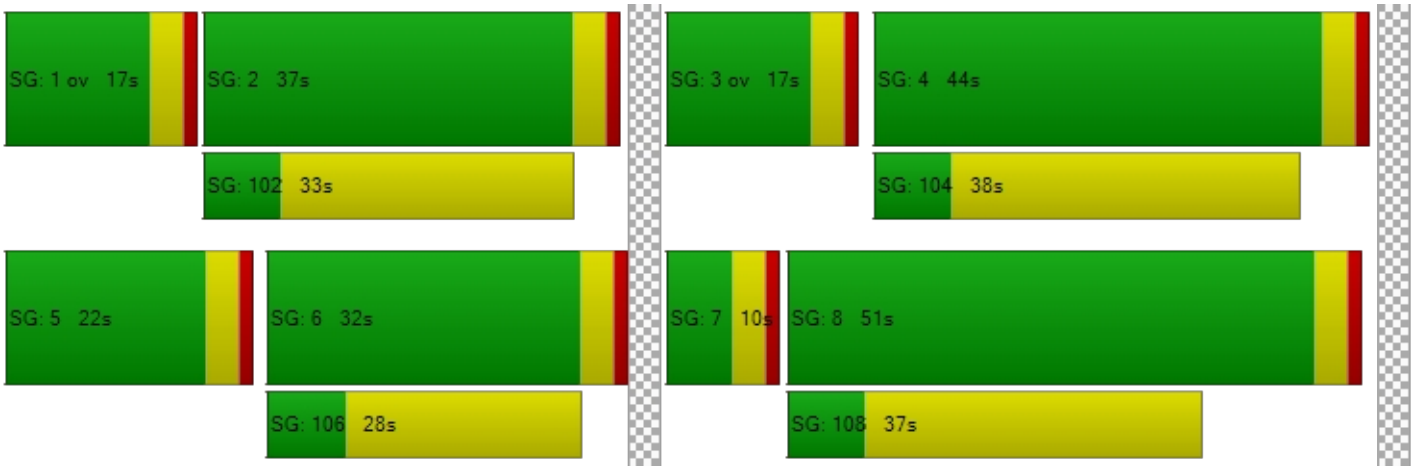
d_M, Delay for Movement [s/veh]	54.3	29.8	17.7	61.3	41.0	51.5	61.9	26.3	17.4	55.4	22.1	22.7
Movement LOS	D	C	B	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	44.14			47.96			23.08			30.40		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	30.88											
Intersection LOS	C											
Intersection V/C	0.777											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.842	2.359	3.208	2.917
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	817	695	574	487
d_b, Bicycle Delay [s]	20.12	24.47	29.25	32.93
l_b,int, Bicycle LOS Score for Intersection	2.411	2.601	3.356	2.291
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	6.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.329

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	48	6	19	5	0	6	7	896	51	26	131	2
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	6	19	5	0	6	7	896	51	26	131	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	12	2	5	1	0	2	2	224	13	7	328	1
Total Analysis Volume [veh/h]	48	6	19	5	0	6	7	896	51	26	131	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	11	30	0	10	29	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	2	2	1	93	93	4	95	95
g / C, Green / Cycle	0.05	0.05	0.02	0.02	0.01	0.78	0.78	0.03	0.79	0.79
(v / s)_i Volume / Saturation Flow Rate	0.03	0.01	0.00	0.00	0.00	0.25	0.25	0.01	0.23	0.24
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	190	190	180	380	190
c, Capacity [veh/h]	83	87	28	30	20	147	147	53	301	150
d1, Uniform Delay [s]	56.12	55.35	58.29	58.31	58.9	4.04	4.02	57.3	3.30	3.34
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.26	1.77	2.88	3.19	10.6	0.59	0.57	6.86	0.24	0.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.29	0.18	0.20	0.36	0.32	0.32	0.49	0.29	0.30
d, Delay for Lane Group [s/veh]	62.38	57.12	61.18	61.51	69.5	4.63	4.59	64.2	3.53	3.86
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.57	0.78	0.17	0.21	0.27	3.17	3.09	0.88	2.31	2.57
50th-Percentile Queue Length [ft/ln]	39.26	19.40	4.32	5.17	6.73	79.1	77.1	21.9	57.7	64.2
95th-Percentile Queue Length [veh/ln]	2.83	1.40	0.31	0.37	0.48	5.70	5.55	1.58	4.16	4.62
95th-Percentile Queue Length [ft/ln]	70.68	34.91	7.78	9.31	12.1	142.	138.	39.5	103.	115.

Movement, Approach, & Intersection Results

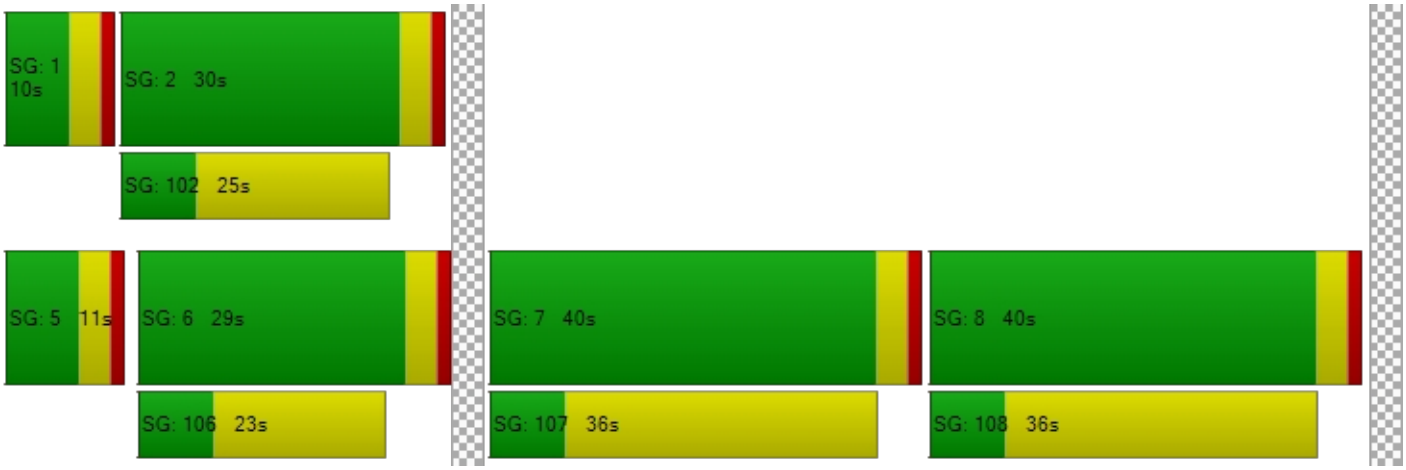
d_M, Delay for Movement [s/veh]	62.3	57.1	57.1	61.1	0.00	61.5	69.5	4.61	4.59	64.2	3.64	3.86
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	60.58			61.36			5.09			4.82		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	6.90											
Intersection LOS	A											
Intersection V/C	0.329											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.003	1.962	2.844	2.834
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	417
d_b, Bicycle Delay [s]	29.41	29.41	36.82	37.61
l_b,int, Bicycle LOS Score for Intersection	1.680	1.560	2.347	2.297
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	177.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.103

Intersection Setup

Name	Va Av			Va Av			Lambert Road			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Lambert Road			Ca Ca		
Base Volume Input [veh/h]	370	208	188	8	422	48	56	256	607	106	912	2
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	370	208	188	8	422	48	56	256	607	106	912	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	93	52	47	2	106	12	14	64	152	267	228	1
Total Analysis Volume [veh/h]	370	208	188	8	422	48	56	256	607	106	912	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Unsi	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	17	50	0	10	43	0	13	36	0	24	47	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	29	1	18	18	5	53	53	20	68	68
g / C, Green / Cycle	0.11	0.24	0.01	0.15	0.15	0.04	0.44	0.44	0.17	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.21	0.05	0.00	0.13	0.12	0.03	0.07	0.32	0.31	0.16	0.17
s, saturation flow rate [veh/h]	1800	3800	180	190	190	180	380	190	350	380	190
c, Capacity [veh/h]	196	927	23	281	281	78	168	842	584	215	107
d1, Uniform Delay [s]	53.50	36.30	58.7	49.8	49.6	56.7	19.9	27.3	50.0	13.3	13.4
k, delay calibration	0.32	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.17	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	412.10	0.12	8.95	7.00	6.08	11.8	0.19	5.30	375.	0.32	0.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.89	0.22	0.35	0.85	0.83	0.72	0.15	0.72	1.83	0.28	0.29
d, Delay for Lane Group [s/veh]	465.60	36.42	67.7	56.8	55.7	68.6	20.1	32.6	425.	13.6	14.1
Lane Group LOS	F	D	E	E	E	E	C	C	F	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	28.32	2.47	0.30	7.50	7.22	1.93	2.19	15.2	39.2	4.20	4.55
50th-Percentile Queue Length [ft/ln]	708.10	61.78	7.45	187.	180.	48.3	54.8	380.	980.	104.	113.
95th-Percentile Queue Length [veh/ln]	44.69	4.45	0.54	11.9	11.6	3.48	3.95	21.6	61.3	7.56	8.05
95th-Percentile Queue Length [ft/ln]	1117.3	111.21	13.4	299.	290.	87.0	98.7	540.	153	188.	201.

Movement, Approach, & Intersection Results

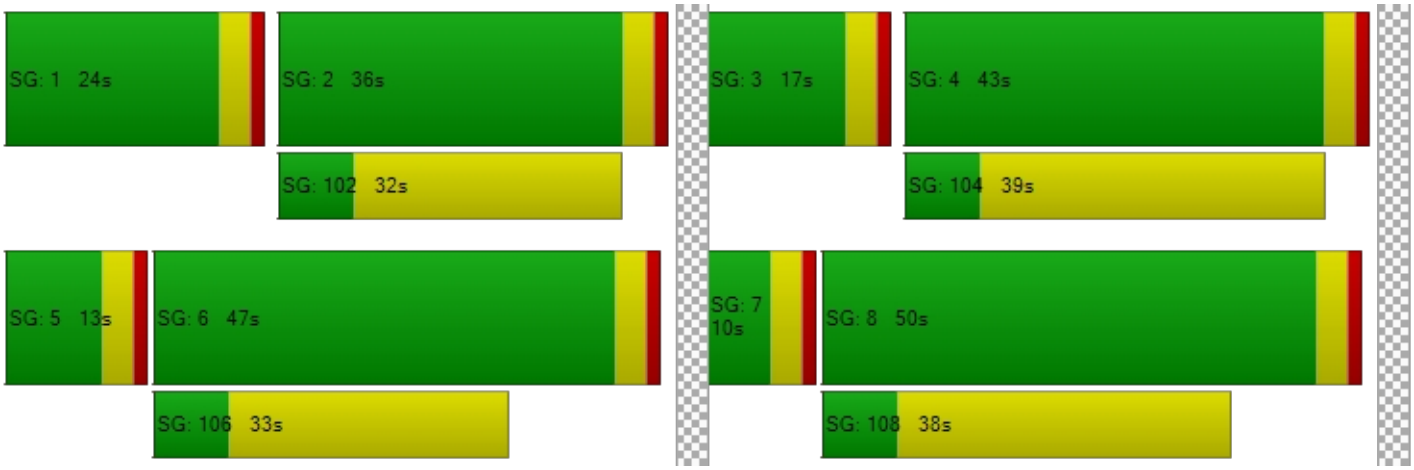
d_M, Delay for Movement [s/veh]	465.	36.4	0.00	67.7	56.3	55.7	68.6	20.1	32.6	425.	13.8	14.1
Movement LOS	F	D		E	E	E	E	C	C	F	B	B
d_A, Approach Delay [s/veh]	311.15			56.49			31.36			235.89		
Approach LOS	F			E			C			F		
d_I, Intersection Delay [s/veh]	177.72											
Intersection LOS	F											
Intersection V/C	1.103											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.902	2.459	2.921	3.013
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	766	650	533	716
d_b, Bicycle Delay [s]	22.83	27.35	32.28	24.72
l_b,int, Bicycle LOS Score for Intersection	2.036	1.954	2.065	2.650
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	5.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.615

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Ca Ca			Ca Ca		
Base Volume Input [veh/h]	5	1	1	0	0	29	22	437	8	7	199	6
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	1	1	0	0	29	22	437	8	7	199	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	1	0	0	0	0	7	6	109	2	2	500	2
Total Analysis Volume [veh/h]	5	1	1	0	0	29	22	437	8	7	199	6
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	62	0	23	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	3	103	103	1	101	101
g / C, Green / Cycle	0.03	0.03	0.03	0.86	0.86	0.01	0.84	0.84
(v / s)_i Volume / Saturation Flow Rate	0.00	0.02	0.01	0.12	0.12	0.00	0.53	0.00
s, saturation flow rate [veh/h]	1800	1900	180	190	190	190	380	190
c, Capacity [veh/h]	108	60	47	163	163	21	320	160
d1, Uniform Delay [s]	56.50	57.15	57.5	1.38	1.37	58.9	3.15	1.50
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.25	6.02	6.87	0.18	0.17	9.39	0.93	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.49	0.46	0.14	0.14	0.34	0.62	0.00
d, Delay for Lane Group [s/veh]	56.75	63.17	64.4	1.55	1.55	68.3	4.08	1.50
Lane Group LOS	E	E	E	A	A	E	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.21	0.97	0.75	0.54	0.54	0.27	5.39	0.02
50th-Percentile Queue Length [ft/ln]	5.35	24.14	18.7	13.6	13.5	6.63	134.	0.40
95th-Percentile Queue Length [veh/ln]	0.39	1.74	1.35	0.98	0.98	0.48	9.19	0.03
95th-Percentile Queue Length [ft/ln]	9.64	43.46	33.7	24.5	24.3	11.9	229.	0.72

Movement, Approach, & Intersection Results

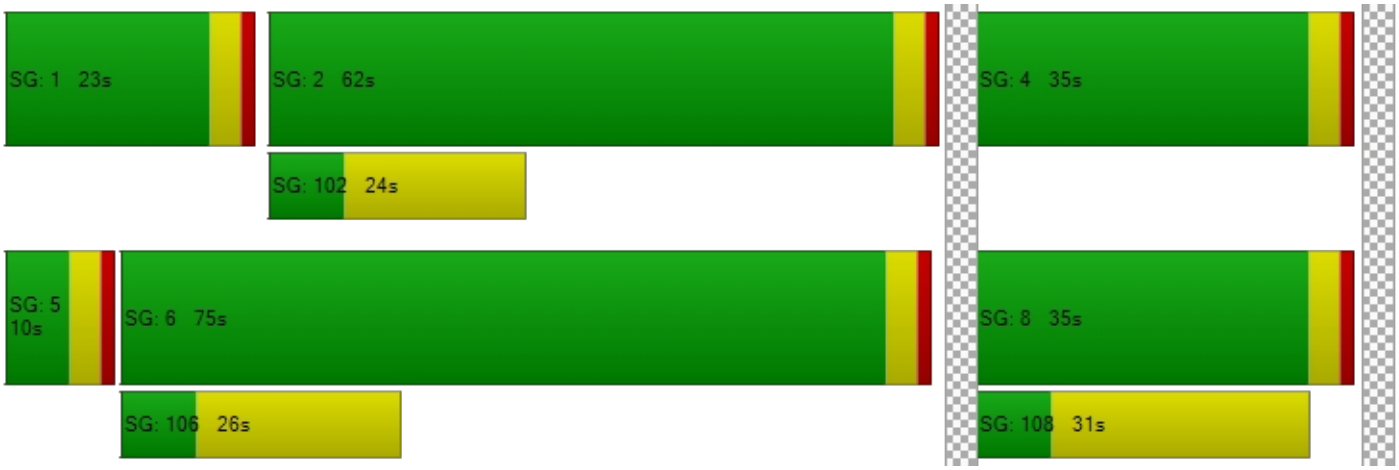
d_M, Delay for Movement [s/veh]	56.7	56.7	56.7	0.00	0.00	63.1	64.4	1.55	1.55	68.3	4.08	1.50
Movement LOS	E	E	E			E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	56.75			63.17			4.51			4.29		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.16											
Intersection LOS	A											
Intersection V/C	0.615											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.739	1.757	0.000	2.865
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	967	1184
d_b, Bicycle Delay [s]	33.00	33.00	16.01	10.00
l_b,int, Bicycle LOS Score for Intersection	1.571	1.560	1.945	3.219
Bicycle LOS	A	A	A	C

Sequence

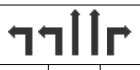
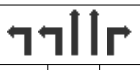
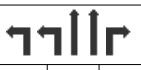
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	48.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.868

Intersection Setup

Name	St Co			St Co			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	St Co			St Co			Birch Street			Birch Street		
Base Volume Input [veh/h]	88	177	118	776	976	254	125	582	68	105	664	338
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	177	118	776	976	254	125	582	68	105	664	338
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	22	44	30	194	244	64	31	146	17	26	166	85
Total Analysis Volume [veh/h]	88	177	118	776	976	254	125	582	68	105	664	338
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	32	61	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	35	35	28	57	57	6	35	35	6	35	35
g / C, Green / Cycle	0.05	0.29	0.29	0.23	0.48	0.48	0.05	0.29	0.29	0.05	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.03	0.05	0.06	0.22	0.51	0.13	0.04	0.15	0.04	0.03	0.17	0.18
s, saturation flow rate [veh/h]	350	380	190	350	190	190	350	380	190	350	380	190
c, Capacity [veh/h]	166	110	552	817	905	905	175	111	560	170	111	557
d1, Uniform Delay [s]	55.8	31.6	32.2	45.3	31.4	18.9	56.1	35.2	30.9	56.0	36.3	36.4
k, delay calibration	0.11	0.11	0.11	0.11	0.12	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.63	0.07	0.19	6.94	41.1	0.17	5.33	1.73	0.44	3.64	2.36	4.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	0.16	0.21	0.95	1.08	0.28	0.71	0.52	0.12	0.62	0.60	0.61
d, Delay for Lane Group [s/veh]	58.4	31.7	32.4	52.2	72.5	19.1	61.4	36.9	31.4	59.6	38.7	41.3
Lane Group LOS	E	C	C	D	F	B	E	D	C	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.36	1.94	2.64	12.0	17.7	4.31	2.00	7.37	1.53	1.65	8.69	9.26
50th-Percentile Queue Length [ft/ln]	34.0	48.4	66.0	302.	443.	107.	49.8	184.	38.1	41.1	217.	231.
95th-Percentile Queue Length [veh/ln]	2.45	3.49	4.75	17.7	26.0	7.71	3.59	11.8	2.75	2.96	13.5	14.2
95th-Percentile Queue Length [ft/ln]	61.3	87.1	118.	444.	650.	192.	89.7	295.	68.6	74.0	338.	356.

Movement, Approach, & Intersection Results

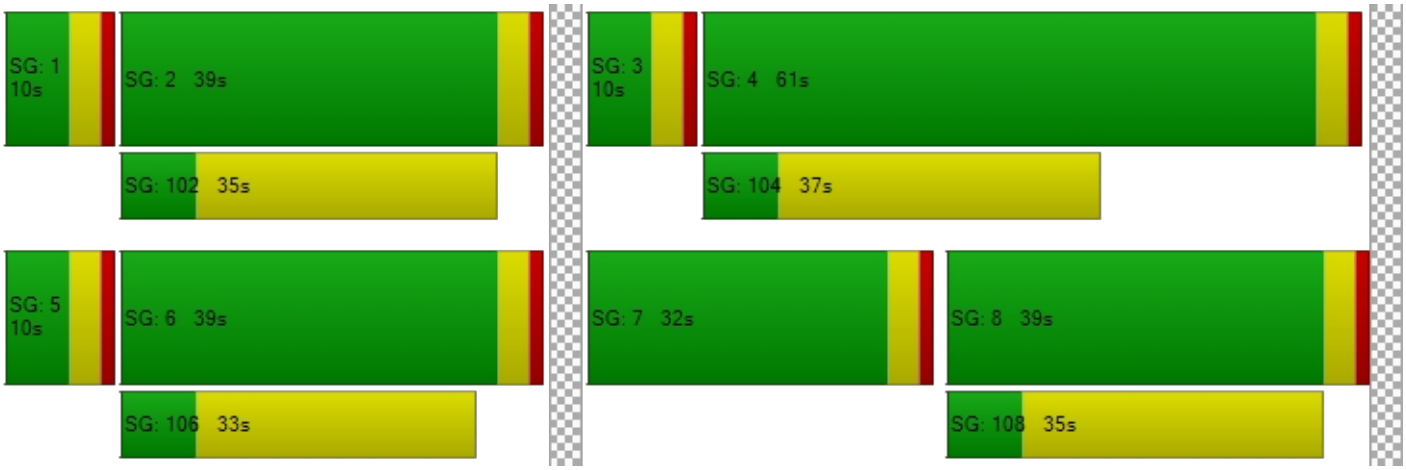
d_M, Delay for Movement [s/veh]	58.4	31.7	32.4	52.2	72.5	19.1	61.4	36.9	31.4	59.6	38.7	41.3
Movement LOS	E	C	C	D	F	B	E	D	C	E	D	D
d_A, Approach Delay [s/veh]	38.10			57.92			40.45			41.49		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	48.72											
Intersection LOS	D											
Intersection V/C	0.868											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.821	2.976	2.856	2.967
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	950	583	583
d_b, Bicycle Delay [s]	30.10	16.54	30.10	30.10
l_b,int, Bicycle LOS Score for Intersection	1.876	3.215	2.199	2.473
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	26.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.781

Intersection Setup

Name	S As			S As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S As			S As			Birch Street			Birch Street		
Base Volume Input [veh/h]	286	7	364	63	34	11	5	110	374	405	899	11
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	7	364	63	34	11	5	110	374	405	899	11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	72	2	91	16	9	3	1	276	94	101	225	3
Total Analysis Volume [veh/h]	286	7	364	63	34	11	5	110	374	405	899	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Ove	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lea	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	23	60	60	0	37	0	10	38	0	22	50	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	22	44	6	6	1	68	68	18	85	85
g / C, Green / Cycle	0.10	0.19	0.37	0.05	0.05	0.01	0.56	0.56	0.15	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.19	0.04	0.02	0.00	0.40	0.38	0.12	0.24	0.24
s, saturation flow rate [veh/h]	350	190	190	1800	1900	180	190	190	350	190	190
c, Capacity [veh/h]	353	353	701	120	98	15	107	107	525	134	134
d1, Uniform Delay [s]	52.8	39.9	29.5	55.96	55.31	59.2	19.0	18.2	49.0	6.82	6.81
k, delay calibration	0.11	0.11	0.28	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.44	0.02	1.54	3.55	3.35	13.0	4.03	3.30	2.44	0.69	0.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.02	0.52	0.53	0.46	0.34	0.71	0.67	0.77	0.34	0.34
d, Delay for Lane Group [s/veh]	57.2	39.9	31.0	59.51	58.66	72.2	23.0	21.5	51.4	7.51	7.50
Lane Group LOS	E	D	C	E	E	E	C	C	D	A	A
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.44	0.17	8.48	1.99	1.42	0.20	16.0	14.3	6.01	4.39	4.37
50th-Percentile Queue Length [ft/ln]	110.	4.32	211.	49.86	35.40	5.12	401.	358.	150.	109.	109.
95th-Percentile Queue Length [veh/ln]	7.89	0.31	13.2	3.59	2.55	0.37	22.6	20.5	10.0	7.83	7.80
95th-Percentile Queue Length [ft/ln]	197.	7.77	331.	89.76	63.71	9.21	565.	513.	250.	195.	194.

Movement, Approach, & Intersection Results

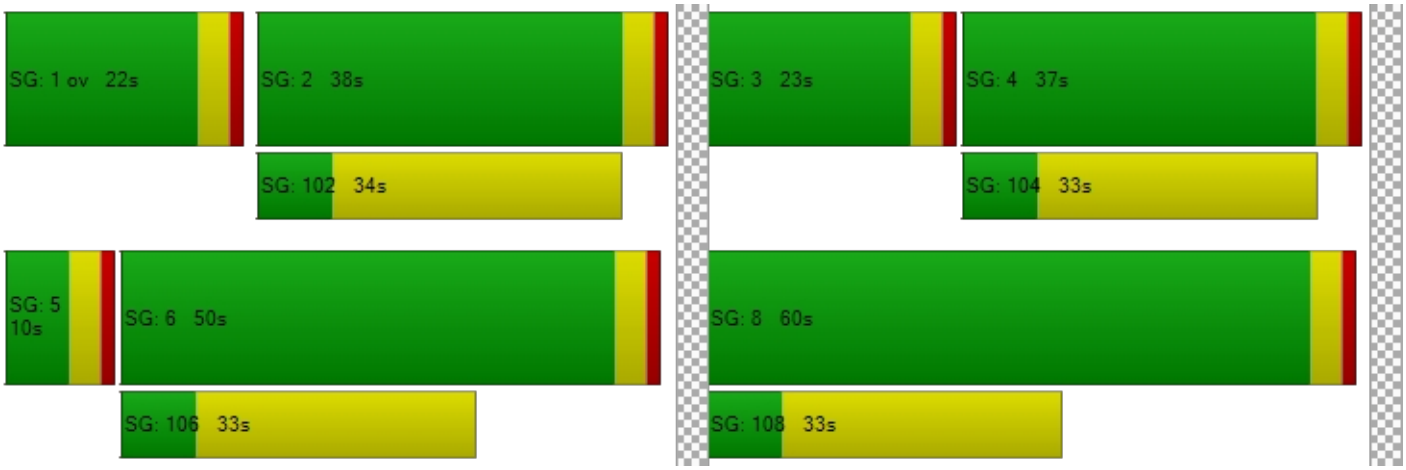
d_M, Delay for Movement [s/veh]	57.2	39.9	31.0	59.5	58.6	58.6	72.2	22.6	21.5	51.4	7.50	7.50
Movement LOS	E	D	C	E	E	E	E	C	C	D	A	A
d_A, Approach Delay [s/veh]	42.57			59.15			22.53			21.04		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	26.78											
Intersection LOS	C											
Intersection V/C	0.781											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.706	1.997	2.836	3.019
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	550	567	767
d_b, Bicycle Delay [s]	17.07	31.54	30.82	22.82
l_b,int, Bicycle LOS Score for Intersection	2.644	1.738	2.784	2.644
Bicycle LOS	B	A	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.745

Intersection Setup

Name	N As			N As			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N As			N As			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	6	187	2	524	371	102	19	9	873	99
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	6	187	2	524	371	102	19	9	873	99
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	1	1	2	47	1	131	93	256	5	2	218	25
Total Analysis Volume [veh/h]	3	3	6	187	2	524	371	102	19	9	873	99
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Ove	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	38	0	38	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	2	2	25	25	63	28	75	75	2	49	49
g / C, Green / Cycle	0.02	0.02	0.02	0.21	0.21	0.53	0.24	0.63	0.63	0.01	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.28	0.21	0.27	0.27	0.01	0.23	0.05
s, saturation flow rate [veh/h]	180	190	190	180	180	190	180	190	190	180	380	190
c, Capacity [veh/h]	67	33	33	373	373	100	423	119	119	25	154	773
d1, Uniform Delay [s]	58.0	58.0	58.1	39.8	39.8	18.6	44.2	11.4	11.4	58.6	27.4	22.2
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.18	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	1.17	2.58	0.35	0.35	1.96	9.21	1.17	1.16	8.46	1.50	0.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.09	0.18	0.25	0.25	0.52	0.88	0.44	0.44	0.36	0.56	0.13
d, Delay for Lane Group [s/veh]	58.3	59.2	60.7	40.1	40.1	20.5	53.4	12.6	12.5	67.1	28.9	22.6
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	0.10	0.20	2.38	2.39	9.89	11.6	7.23	7.17	0.33	9.89	1.84
50th-Percentile Queue Length [ft/ln]	2.37	2.51	5.09	59.5	59.6	247.	291.	180.	179.	8.26	247.	45.9
95th-Percentile Queue Length [veh/ln]	0.17	0.18	0.37	4.29	4.29	15.0	17.2	11.6	11.5	0.59	15.0	3.31
95th-Percentile Queue Length [ft/ln]	4.27	4.52	9.16	107.	107.	376.	431.	290.	289.	14.8	376.	82.6

Movement, Approach, & Intersection Results

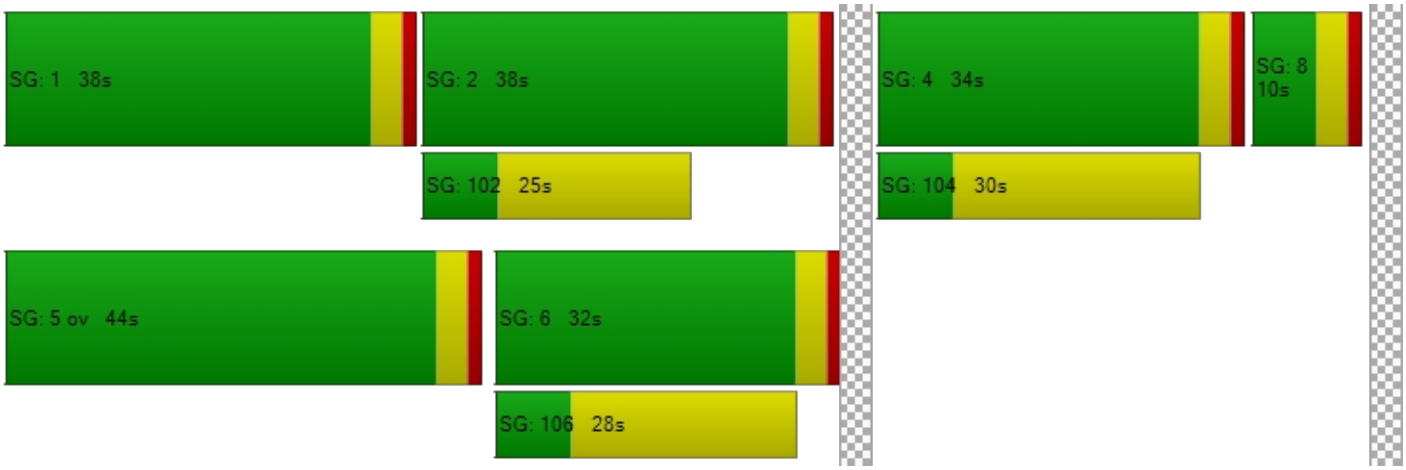
d_M, Delay for Movement [s/veh]	58.3	59.2	60.7	40.1	40.1	20.5	53.4	12.5	12.5	67.1	28.9	22.6
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	59.74			25.76			23.32			28.62		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	25.68											
Intersection LOS	C											
Intersection V/C	0.745											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.434	2.866	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	567	467
d_b, Bicycle Delay [s]	54.17	33.76	30.83	35.28
l_b,int, Bicycle LOS Score for Intersection	1.579	2.736	2.725	2.369
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	36.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.623

Intersection Setup

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Birch Street			Birch Street		
Base Volume Input [veh/h]	155	260	106	507	120	224	56	684	388	72	522	247
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	260	106	507	120	224	56	684	388	72	522	247
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	39	65	27	127	300	56	14	171	97	18	131	62
Total Analysis Volume [veh/h]	155	260	106	507	120	224	56	684	388	72	522	247
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	29	37	0	34	42	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	22	22	20	35	35	5	55	55	6	56	56
g / C, Green / Cycle	0.06	0.19	0.19	0.17	0.29	0.29	0.04	0.46	0.46	0.05	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.04	0.07	0.06	0.14	0.25	0.25	0.03	0.18	0.20	0.04	0.14	0.13
s, saturation flow rate [veh/h]	350	380	190	350	380	190	180	380	190	180	380	190
c, Capacity [veh/h]	222	712	356	589	111	555	78	175	875	91	177	889
d1, Uniform Delay [s]	55.1	42.4	42.2	48.5	40.1	39.8	56.7	21.3	21.9	56.3	19.6	19.5
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.97	0.29	0.55	3.87	2.11	3.91	11.8	0.66	1.63	13.8	0.42	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.70	0.35	0.33	0.86	0.86	0.84	0.72	0.39	0.44	0.79	0.29	0.28
d, Delay for Lane Group [s/veh]	59.0	42.6	42.8	52.4	42.3	43.7	68.6	21.9	23.5	70.1	20.1	20.3
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.42	3.23	3.12	7.68	13.5	13.4	1.93	6.45	7.75	2.51	4.59	4.40
50th-Percentile Queue Length [ft/ln]	60.5	80.7	78.1	192.	339.	335.	48.3	161.	193.	62.7	114.	110.
95th-Percentile Queue Length [veh/ln]	4.36	5.81	5.62	12.2	19.6	19.4	3.48	10.6	12.3	4.52	8.10	7.84
95th-Percentile Queue Length [ft/ln]	108.	145.	140.	305.	490.	486.	87.0	265.	307.	112.	202.	196.

Movement, Approach, & Intersection Results

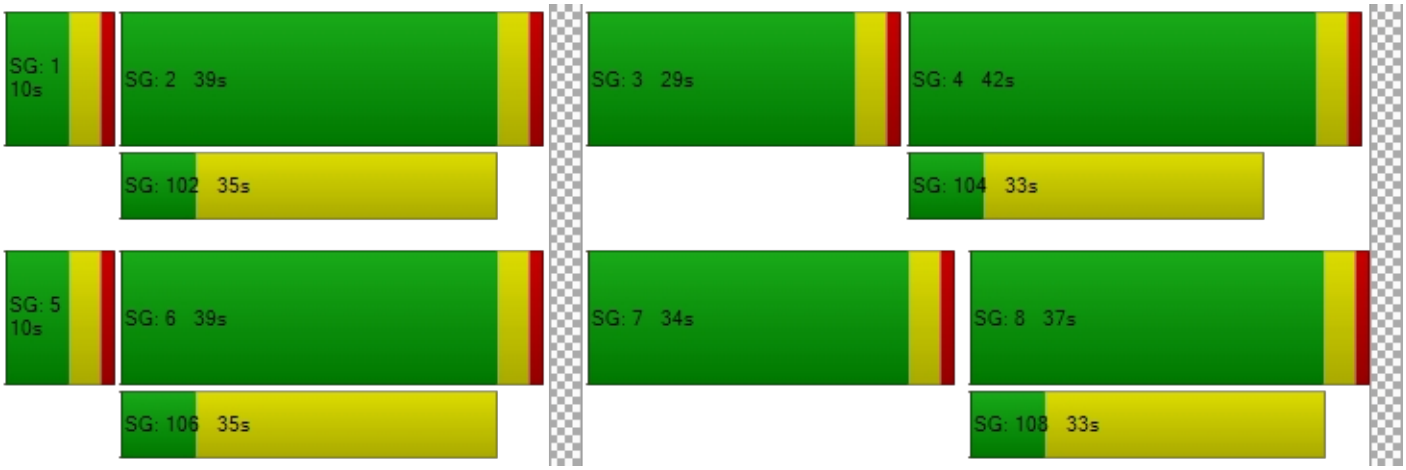
d_M, Delay for Movement [s/veh]	59.0	42.7	42.8	52.4	42.6	43.7	68.6	21.9	23.5	70.1	20.1	20.3
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	47.60			45.32			24.84			24.45		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	36.40											
Intersection LOS	D											
Intersection V/C	0.623											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.005	3.043	2.796	2.814
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	550	633	583	583
d_b, Bicycle Delay [s]	31.55	28.03	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.846	2.622	2.490	2.253
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	132.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.956

Intersection Setup

Name	Va Av			Va Av			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Birch Street			Rose Drive		
Base Volume Input [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	39	68	7	230	248	79	21	135	38	11	109	102
Total Analysis Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	17	38	0	36	57	0	10	36	0	10	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	25	25	32	45	45	6	42	42	5	41	41
g / C, Green / Cycle	0.10	0.21	0.21	0.27	0.37	0.37	0.05	0.35	0.35	0.04	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.09	0.08	0.08	0.51	0.34	0.34	0.02	0.19	0.17	0.03	0.11	0.21
s, saturation flow rate [veh/h]	180	190	190	180	190	190	350	190	190	180	380	190
c, Capacity [veh/h]	184	395	395	480	707	707	166	670	670	71	131	655
d1, Uniform Delay [s]	53.0	40.9	40.8	44.0	36.0	36.0	55.7	30.9	30.4	56.7	29.0	32.8
k, delay calibration	0.11	0.11	0.11	0.50	0.30	0.30	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.3	0.61	0.59	420.	13.1	13.1	2.25	3.03	2.61	8.79	0.68	4.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.38	0.37	1.92	0.92	0.92	0.49	0.53	0.50	0.63	0.33	0.62
d, Delay for Lane Group [s/veh]	63.3	41.5	41.4	464.	49.1	49.1	58.0	34.0	33.0	65.5	29.7	37.2
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.15	3.92	3.82	70.1	20.5	20.5	1.26	8.79	8.01	1.52	4.76	10.6
50th-Percentile Queue Length [ft/ln]	128.	97.9	95.5	175	512.	512.	31.6	219.	200.	37.9	119.	266.
95th-Percentile Queue Length [veh/ln]	8.87	7.06	6.88	109.	27.9	27.9	2.28	13.6	12.6	2.74	8.34	15.9
95th-Percentile Queue Length [ft/ln]	221.	176.	172.	274	698.	698.	56.9	341.	316.	68.3	208.	399.

Movement, Approach, & Intersection Results

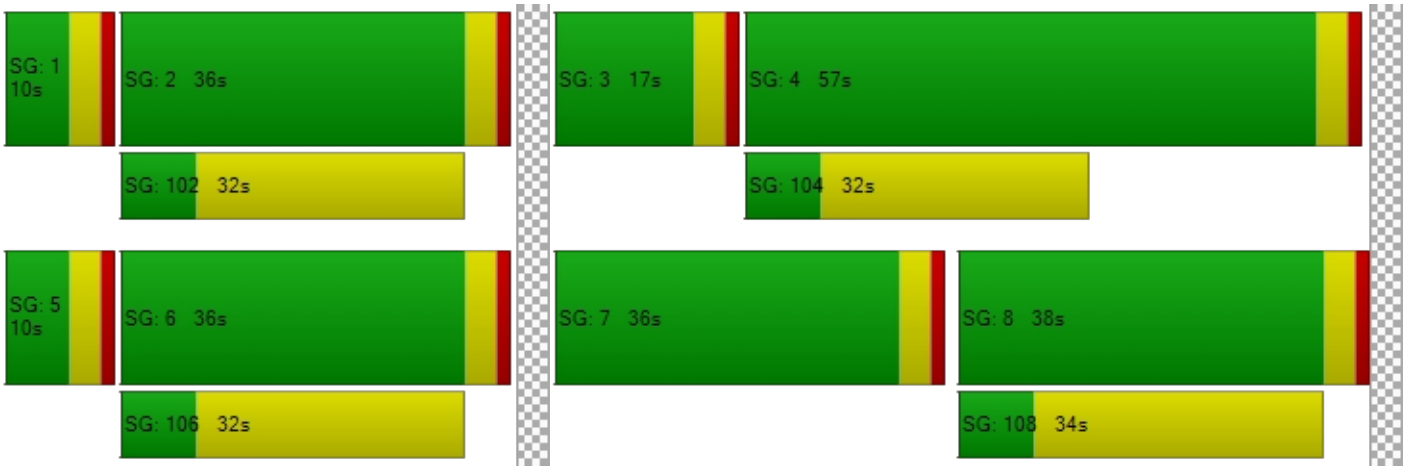
d_M, Delay for Movement [s/veh]	63.3	41.4	41.4	464.	49.1	49.1	58.0	33.6	33.0	65.5	29.7	37.2
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	D
d_A, Approach Delay [s/veh]	48.99			221.05			36.16			35.00		
Approach LOS	D			F			D			D		
d_I, Intersection Delay [s/veh]	132.10											
Intersection LOS	F											
Intersection V/C	0.956											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.633	2.896	2.739	2.852
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	883	533	533
d_b, Bicycle Delay [s]	30.83	18.72	32.28	32.28
l_b,int, Bicycle LOS Score for Intersection	1.934	3.395	2.197	2.291
Bicycle LOS	A	C	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	33.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.007

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	54	828	15	6	150	67	61	0	207	35	0	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	828	15	6	150	67	61	0	207	35	0	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	14	207	4	2	376	17	15	0	52	9	0	3
Total Analysis Volume [veh/h]	54	828	15	6	150	67	61	0	207	35	0	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	92	92	92	92	92	92	20	20	20
g / C, Green / Cycle	0.77	0.77	0.77	0.77	0.77	0.77	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.22	0.22	0.00	0.79	0.04	0.15	0.02	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	180	1800	1800	1900
c, Capacity [veh/h]	64	146	146	128	146	138	333	64	312
d1, Uniform Delay [s]	3.30	4.12	4.11	3.21	13.8	3.33	49.13	42.65	42.10
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	74.8	0.50	0.50	0.01	31.2	0.07	6.37	7.03	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.29	0.29	0.00	1.03	0.05	0.80	0.55	0.04
d, Delay for Lane Group [s/veh]	78.1	4.62	4.61	3.22	45.1	3.39	55.50	49.67	42.16
Lane Group LOS	E	A	A	A	F	A	E	D	D
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.59	2.83	2.81	0.03	43.1	0.36	8.44	1.02	0.33
50th-Percentile Queue Length [ft/ln]	39.8	70.7	70.1	0.79	107	9.04	210.98	25.38	8.28
95th-Percentile Queue Length [veh/ln]	2.87	5.09	5.05	0.06	55.4	0.65	13.20	1.83	0.60
95th-Percentile Queue Length [ft/ln]	71.7	127.	126.	1.41	138	16.2	330.08	45.68	14.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	78.1	4.62	4.61	3.22	45.1	3.39	55.5	55.5	55.5	49.6	42.1	42.1
Movement LOS	E	A	A	A	F	A	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	9.04			43.21			55.50			47.64		
Approach LOS	A			D			E			D		
d_I, Intersection Delay [s/veh]	33.48											
Intersection LOS	C											
Intersection V/C	1.007											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.45	49.45	49.45	49.45
l_p,int, Pedestrian LOS Score for Intersection	2.839	2.884	1.995	1.985
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.51	4.51	37.56	37.56
l_b,int, Bicycle LOS Score for Intersection	2.300	4.160	2.002	1.639
Bicycle LOS	B	D	B	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	15.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

Intersection Setup

Name				SR-57			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57			Im Hi			Im Hi		
Base Volume Input [veh/h]	0	0	0	684	0	572	0	174	830	0	223	232
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	684	0	572	0	174	830	0	223	232
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	0	0	0	171	0	143	0	436	208	0	558	58
Total Analysis Volume [veh/h]	0	0	0	684	0	572	0	174	830	0	223	232
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Split	Per	Split	Per	Per	Unsi	Per	Per	Unsi
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		25	25	25	57	57
g / C, Green / Cycle		0.28	0.28	0.28	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate		0.23	0.23	0.22	0.31	0.39
s, saturation flow rate [veh/h]		180	180	190	5700	5700
c, Capacity [veh/h]		505	505	533	3595	3595
d1, Uniform Delay [s]		30.3	30.3	29.8	8.82	10.07
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.59	3.59	2.61	0.47	0.82
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.83	0.83	0.79	0.48	0.62
d, Delay for Lane Group [s/veh]		33.9	33.9	32.4	9.29	10.89
Lane Group LOS		C	C	C	A	B
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		8.73	8.73	8.48	5.47	8.04
50th-Percentile Queue Length [ft/ln]		218.	218.	212.	136.74	201.03
95th-Percentile Queue Length [veh/ln]		13.5	13.5	13.2	9.31	12.69
95th-Percentile Queue Length [ft/ln]		339.	339.	331.	232.63	317.30

Movement, Approach, & Intersection Results

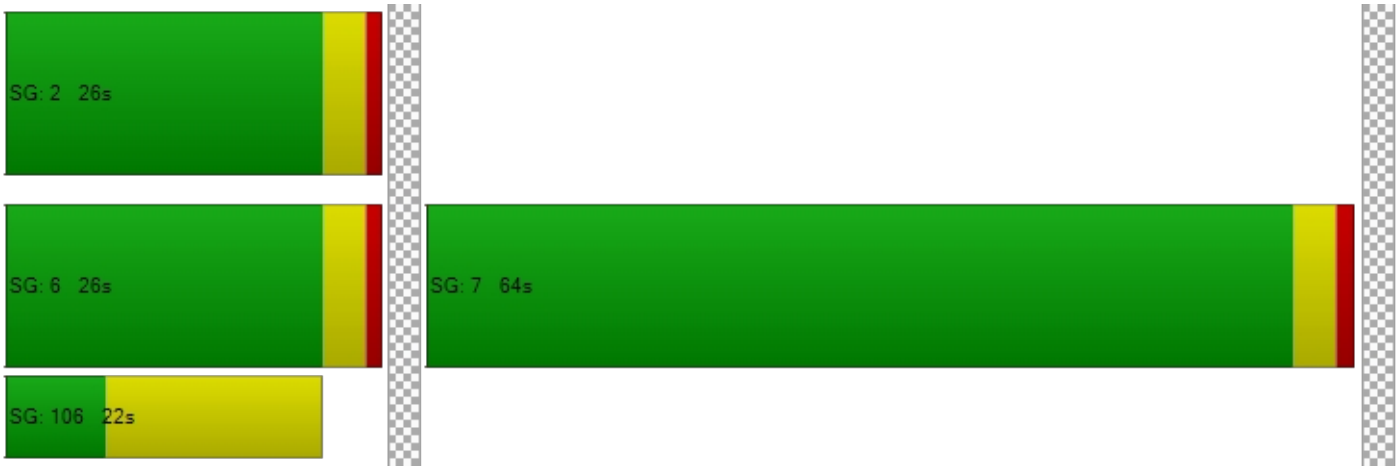
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	33.9	0.00	32.8	0.00	9.29	0.00	0.00	10.8	0.00
Movement LOS				C		C		A			B	
d_A, Approach Delay [s/veh]	0.00			33.42			9.29			10.89		
Approach LOS	A			C			A			B		
d_I, Intersection Delay [s/veh]	15.77											
Intersection LOS	B											
Intersection V/C	0.685											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.437	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.632	2.518	2.787
Bicycle LOS	D	D	B	C

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.698

Intersection Setup

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57			Sh Ce			Im Hi			Im Hi		
Base Volume Input [veh/h]	115	43	949	0	0	51	118	155	636	0	175	18
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	115	43	949	0	0	51	118	155	636	0	175	18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	288	11	237	0	0	13	30	389	159	0	439	5
Total Analysis Volume [veh/h]	115	43	949	0	0	51	118	155	636	0	175	18
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Per	Split	Prot	Per	Unsi	Per	Per	Per
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	48	0	0	0	10	12	42	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	5	8	47	35	35
g / C, Green / Cycle	0.37	0.37	0.37	0.05	0.08	0.47	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.30	0.30	0.29	0.01	0.07	0.27	0.23	0.23
s, saturation flow rate [veh/h]	350	180	190	3800	1800	5700	5700	1900
c, Capacity [veh/h]	127	657	693	177	145	2671	1983	661
d1, Uniform Delay [s]	28.9	28.9	28.3	46.13	45.28	19.44	27.77	27.77
k, delay calibration	0.11	0.22	0.19	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.43	5.40	3.51	0.89	10.30	0.93	1.83	5.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.83	0.78	0.29	0.81	0.58	0.67	0.67
d, Delay for Lane Group [s/veh]	30.3	34.3	31.8	47.02	55.57	20.37	29.60	33.12
Lane Group LOS	C	C	C	D	E	C	C	C
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.4	12.5	11.9	0.63	3.28	8.70	9.14	9.79
50th-Percentile Queue Length [ft/ln]	285.	312.	298.	15.82	81.99	217.41	228.55	244.75
95th-Percentile Queue Length [veh/ln]	16.9	18.3	17.6	1.14	5.90	13.53	14.10	14.92
95th-Percentile Queue Length [ft/ln]	424.	457.	440.	28.47	147.58	338.32	352.52	373.03

Movement, Approach, & Intersection Results

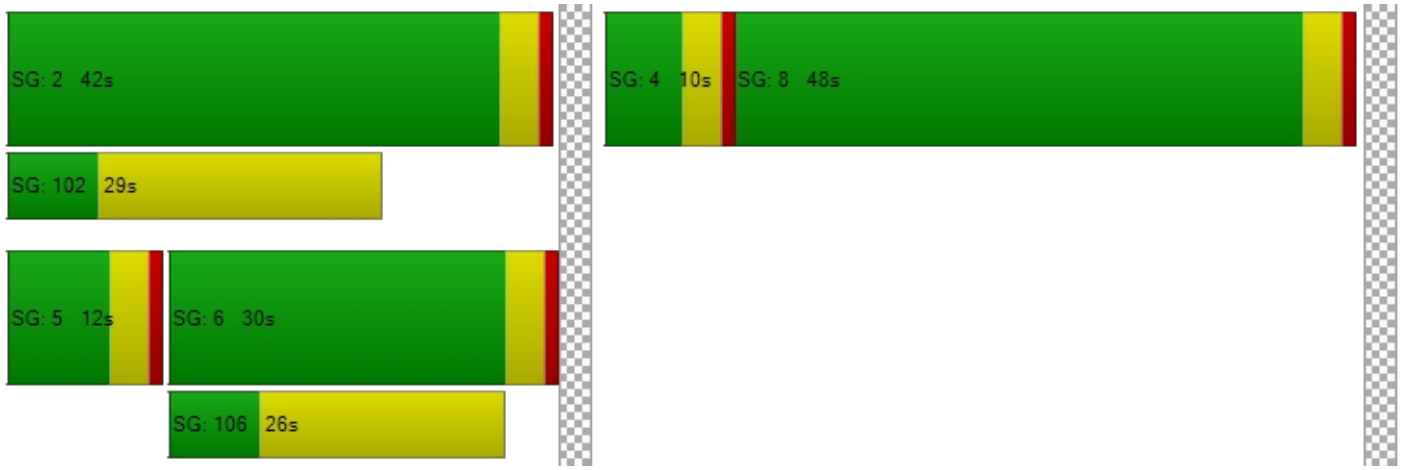
d_M, Delay for Movement [s/veh]	30.6	34.3	32.9	0.00	0.00	47.0	55.5	20.3	0.00	0.00	30.4	33.1
Movement LOS	C	C	C			D	E	C			C	C
d_A, Approach Delay [s/veh]	31.74			47.02			22.86			30.48		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	28.85											
Intersection LOS	C											
Intersection V/C	0.698											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.723	2.020	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	879	120	759	520
d_b, Bicycle Delay [s]	15.71	44.22	19.25	27.41
l_b,int, Bicycle LOS Score for Intersection	5.099	1.560	2.480	2.291
Bicycle LOS	F	A	B	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	33.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.847

Intersection Setup

Name	As Ro			As Ro			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	As Ro			As Ro			Im Hi			Im Hi		
Base Volume Input [veh/h]	172	241	94	190	382	186	238	219	117	104	182	112
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	172	241	94	190	382	186	238	219	117	104	182	112
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	43	60	24	48	96	47	60	549	29	26	455	28
Total Analysis Volume [veh/h]	172	241	94	190	382	186	238	219	117	104	182	112
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	14	43	0	21	45	0	12	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	23	23	8	25	25	16	55	55	8	47	47
g / C, Green / Cycle	0.05	0.21	0.21	0.07	0.23	0.23	0.15	0.50	0.50	0.07	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.05	0.09	0.08	0.05	0.20	0.10	0.13	0.40	0.42	0.06	0.25	0.27
s, saturation flow rate [veh/h]	350	190	190	350	190	190	180	380	190	180	570	190
c, Capacity [veh/h]	194	395	395	255	428	428	268	190	952	131	242	808
d1, Uniform Delay [s]	51.6	38.0	37.7	50.0	41.3	36.6	45.9	22.8	23.4	50.2	24.2	24.7
k, delay calibration	0.11	0.11	0.11	0.11	0.14	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.7	0.77	0.68	4.28	8.37	0.70	9.65	3.61	8.31	10.3	1.06	3.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.44	0.41	0.74	0.89	0.43	0.89	0.80	0.83	0.79	0.59	0.62
d, Delay for Lane Group [s/veh]	64.3	38.8	38.4	54.3	49.7	37.3	55.6	26.4	31.7	60.5	25.3	28.4
Lane Group LOS	E	D	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.69	4.17	3.83	2.71	10.9	4.37	7.07	16.6	18.8	3.19	9.56	10.8
50th-Percentile Queue Length [ft/ln]	67.3	104.	95.7	67.7	273.	109.	176.	415.	472.	79.6	238.	272.
95th-Percentile Queue Length [veh/ln]	4.85	7.50	6.90	4.88	16.3	7.80	11.4	23.3	26.0	5.74	14.6	16.3
95th-Percentile Queue Length [ft/ln]	121.	187.	172.	121.	409.	195.	285.	582.	650.	143.	365.	407.

Movement, Approach, & Intersection Results

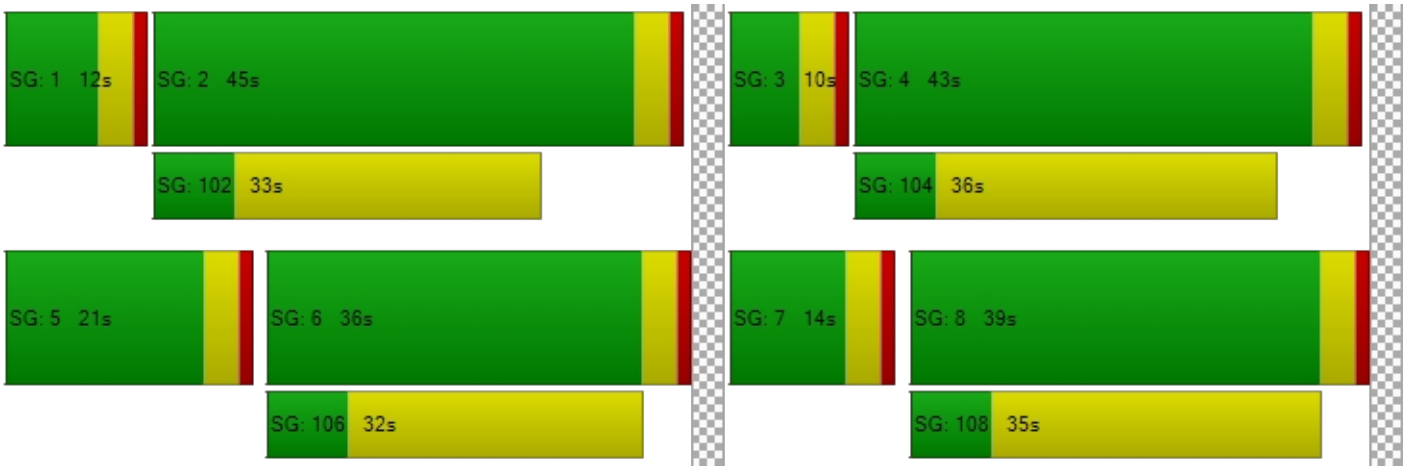
d_M, Delay for Movement [s/veh]	64.3	38.7	38.4	54.3	49.7	37.3	55.6	28.0	31.7	60.5	26.0	28.4
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	47.36			47.82			30.83			27.90		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	33.44											
Intersection LOS	C											
Intersection V/C	0.847											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.526	2.682	3.311	3.285
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	709	745	582
d_b, Bicycle Delay [s]	25.59	22.94	21.66	27.68
l_b,int, Bicycle LOS Score for Intersection	1.978	2.810	2.962	2.400
Bicycle LOS	A	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.737

Intersection Setup

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pl Av			Castlegate Lane			Im Hi			Im Hi		
Base Volume Input [veh/h]	203	14	167	28	33	16	14	217	488	201	175	37
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	14	167	28	33	16	14	217	488	201	175	37
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	51	4	42	7	8	4	4	543	122	50	439	9
Total Analysis Volume [veh/h]	203	14	167	28	33	16	14	217	488	201	175	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	10	0	10	32	0	22	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	11	11	5	5	2	46	46	12	57	57
g / C, Green / Cycle	0.12	0.12	0.12	0.06	0.06	0.02	0.51	0.51	0.13	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.09	0.02	0.03	0.01	0.38	0.26	0.11	0.31	0.32
s, saturation flow rate [veh/h]	180	180	190	1800	1900	180	570	190	180	380	190
c, Capacity [veh/h]	211	211	222	105	110	38	292	975	241	238	119
d1, Uniform Delay [s]	37.4	37.4	38.5	40.63	41.06	43.5	17.2	14.3	38.0	9.13	9.30
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.93	1.96	5.05	1.35	2.77	5.86	1.74	1.83	7.30	0.74	1.60
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.52	0.75	0.27	0.44	0.37	0.74	0.50	0.83	0.50	0.52
d, Delay for Lane Group [s/veh]	39.3	39.3	43.5	41.98	43.83	49.4	18.9	16.2	45.3	9.87	10.9
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.33	2.34	3.83	0.63	1.13	0.37	11.2	6.58	4.74	5.75	6.36
50th-Percentile Queue Length [ft/ln]	58.1	58.5	95.7	15.70	28.16	9.18	282.	164.	118.	143.	159.
95th-Percentile Queue Length [veh/ln]	4.19	4.21	6.90	1.13	2.03	0.66	16.8	10.7	8.32	9.68	10.5
95th-Percentile Queue Length [ft/ln]	104.	105.	172.	28.26	50.68	16.5	420.	269.	207.	242.	262.

Movement, Approach, & Intersection Results

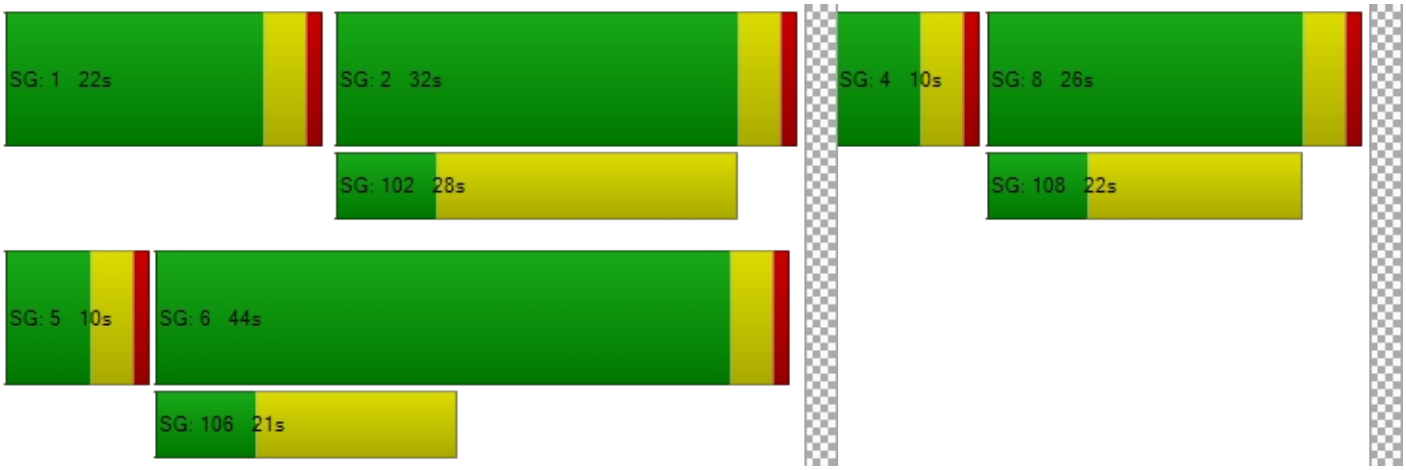
d_M, Delay for Movement [s/veh]	39.3	39.3	43.5	41.9	43.8	43.8	49.4	18.9	16.2	45.3	10.2	10.9
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	41.20			43.16			18.64			13.77		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.80											
Intersection LOS	B											
Intersection V/C	0.737											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	0.00	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.400	1.986	0.000	3.201
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	488	133	622	888
d_b, Bicycle Delay [s]	25.73	39.24	21.40	13.92
l_b,int, Bicycle LOS Score for Intersection	2.193	1.687	3.029	2.657
Bicycle LOS	B	A	C	B

Sequence

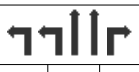
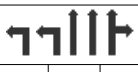
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	29.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.710

Intersection Setup

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kr Bo			Kr Bo			Im Hi			Im Hi		
Base Volume Input [veh/h]	202	283	99	413	757	149	155	151	276	81	127	101
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	283	99	413	757	149	155	151	276	81	127	101
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	51	71	25	103	189	37	39	378	69	20	319	25
Total Analysis Volume [veh/h]	202	283	99	413	757	149	155	151	276	81	127	101
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	0	21	40	0	10	39	0	10	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	16	16	14	23	23	6	48	48	5	48	48
g / C, Green / Cycle	0.07	0.16	0.16	0.14	0.23	0.23	0.06	0.48	0.48	0.05	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.06	0.10	0.10	0.12	0.20	0.08	0.04	0.32	0.31	0.02	0.24	0.24
s, saturation flow rate [veh/h]	350	190	190	350	380	190	350	380	190	350	380	190
c, Capacity [veh/h]	248	311	311	492	888	444	213	182	914	191	180	902
d1, Uniform Delay [s]	45.8	39.0	38.7	41.9	36.7	31.9	46.2	19.7	19.5	45.8	18.1	18.2
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.43	2.16	1.78	3.92	2.44	0.44	4.70	1.87	3.47	1.48	1.02	2.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.64	0.59	0.84	0.85	0.34	0.73	0.66	0.64	0.42	0.51	0.51
d, Delay for Lane Group [s/veh]	52.3	41.2	40.5	45.8	39.1	32.3	50.9	21.5	23.0	47.2	19.1	20.3
Lane Group LOS	D	D	D	D	D	C	D	C	C	D	B	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.68	4.70	4.29	5.19	9.01	3.03	2.02	10.5	10.6	1.01	7.28	7.65
50th-Percentile Queue Length [ft/ln]	67.0	117.	107.	129.	225.	75.8	50.5	264.	266.	25.2	181.	191.
95th-Percentile Queue Length [veh/ln]	4.83	8.25	7.69	8.92	13.9	5.46	3.64	15.9	16.0	1.82	11.7	12.1
95th-Percentile Queue Length [ft/ln]	120.	206.	192.	223.	348.	136.	91.0	398.	400.	45.4	292.	304.

Movement, Approach, & Intersection Results

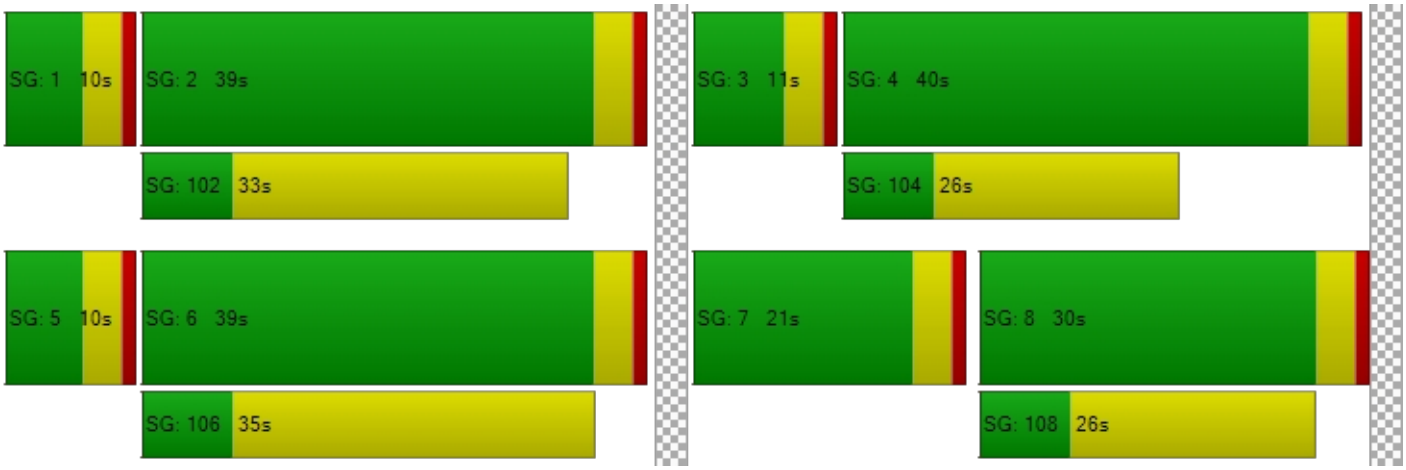
d_M, Delay for Movement [s/veh]	52.3	41.0	40.5	45.8	39.1	32.3	50.9	21.8	23.0	47.2	19.5	20.3
Movement LOS	D	D	D	D	D	C	D	C	C	D	B	C
d_A, Approach Delay [s/veh]	44.84			40.48			24.35			21.11		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	29.73											
Intersection LOS	C											
Intersection V/C	0.710											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.64	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.734	2.858	3.165	3.155
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	520	719	700	700
d_b, Bicycle Delay [s]	27.41	20.51	21.16	21.16
l_b,int, Bicycle LOS Score for Intersection	2.041	2.648	2.629	2.360
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name	Va Av			Va Av			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Im Hi			Im Hi		
Base Volume Input [veh/h]	151	216	135	318	338	233	212	114	99	133	178	169
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	216	135	318	338	233	212	114	99	133	178	169
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	38	54	34	80	85	58	53	287	25	33	446	42
Total Analysis Volume [veh/h]	151	216	135	318	338	233	212	114	99	133	178	169
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	46	0	21	56	0	13	42	0	11	40	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	12	12	13	18	18	9	73	73	6	70	70
g / C, Green / Cycle	0.06	0.10	0.10	0.11	0.15	0.15	0.08	0.61	0.61	0.05	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.07	0.09	0.09	0.12	0.06	0.20	0.05	0.04	0.31	0.09
s, saturation flow rate [veh/h]	350	380	190	350	380	190	350	570	190	350	570	190
c, Capacity [veh/h]	207	370	185	383	561	280	265	345	115	190	333	111
d1, Uniform Delay [s]	55.5	51.8	52.6	52.3	47.8	49.7	54.6	11.6	9.84	55.8	15.0	11.3
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.91	1.47	5.46	4.69	1.05	6.29	5.56	0.26	0.15	4.64	0.62	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.58	0.73	0.83	0.60	0.83	0.80	0.33	0.09	0.70	0.54	0.15
d, Delay for Lane Group [s/veh]	60.4	53.3	58.1	57.0	48.9	56.0	60.1	11.9	9.99	60.4	15.7	11.6
Lane Group LOS	E	D	E	E	D	E	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.39	3.19	4.24	4.94	4.82	7.27	3.36	4.98	1.12	2.10	9.67	2.12
50th-Percentile Queue Length [ft/ln]	59.7	79.8	105.	123.	120.	181.	83.9	124.	27.8	52.5	241.	52.9
95th-Percentile Queue Length [veh/ln]	4.30	5.75	7.61	8.58	8.42	11.7	6.04	8.65	2.01	3.79	14.7	3.82
95th-Percentile Queue Length [ft/ln]	107.	143.	190.	214.	210.	292.	151.	216.	50.1	94.6	369.	95.3

Movement, Approach, & Intersection Results

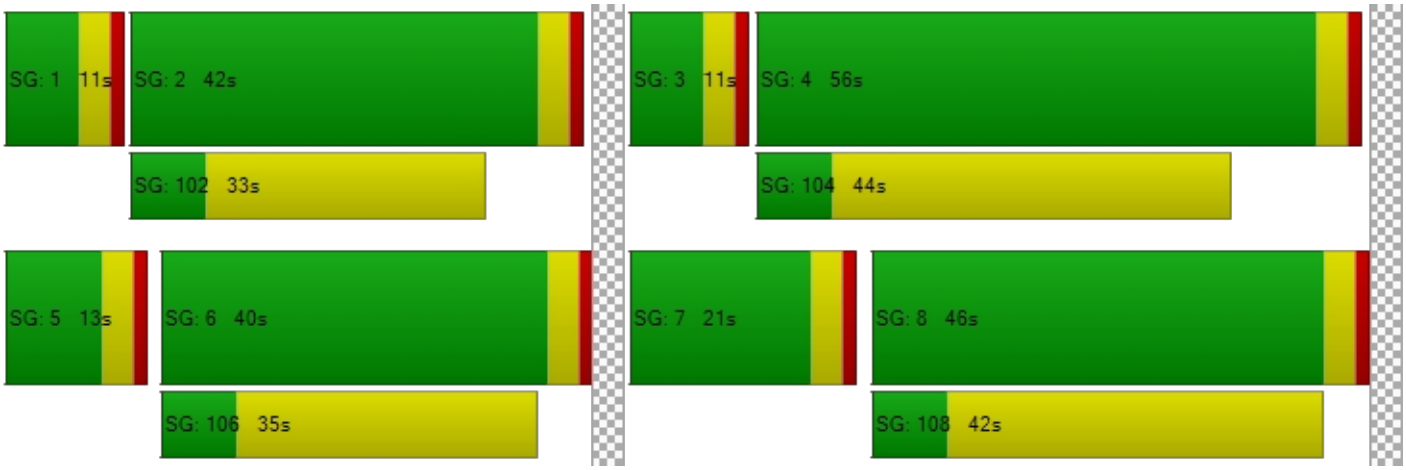
d_M, Delay for Movement [s/veh]	60.4	53.3	58.1	57.0	48.9	56.0	60.1	11.9	9.99	60.4	15.7	11.6
Movement LOS	E	D	E	E	D	E	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	56.77			53.69			18.81			18.24		
Approach LOS	E			D			B			B		
d_I, Intersection Delay [s/veh]	28.71											
Intersection LOS	C											
Intersection V/C	0.622											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.757	2.815	3.256	3.263
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	866	633	600
d_b, Bicycle Delay [s]	25.36	19.28	28.03	29.41
l_b,int, Bicycle LOS Score for Intersection	1.974	2.293	2.362	2.707
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	251.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.857

Intersection Setup

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Im Hi			Im Hi		
Base Volume Input [veh/h]	280	250	160	968	615	38	46	140	277	294	164	619
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	280	250	160	968	615	38	46	140	277	294	164	619
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	70	63	40	242	154	10	12	351	69	74	411	155
Total Analysis Volume [veh/h]	280	250	160	968	615	38	46	140	277	294	164	619
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	53	0	12	50	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	25	25	8	22	22	5	65	65	6	66	66
g / C, Green / Cycle	0.09	0.21	0.21	0.07	0.19	0.19	0.04	0.54	0.54	0.05	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.08	0.07	0.08	0.28	0.16	0.02	0.03	0.30	0.29	0.08	0.29	0.33
s, saturation flow rate [veh/h]	350	380	190	350	380	190	180	380	190	350	570	190
c, Capacity [veh/h]	323	805	403	236	711	355	72	203	102	178	312	104
d1, Uniform Delay [s]	53.7	39.9	40.7	55.9	47.3	40.4	56.7	18.3	18.1	56.9	17.2	18.2
k, delay calibration	0.11	0.11	0.11	0.12	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.04	0.22	0.64	140	3.33	0.13	9.00	1.10	2.03	300.	0.64	2.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.31	0.40	4.11	0.87	0.11	0.64	0.56	0.54	1.66	0.53	0.60
d, Delay for Lane Group [s/veh]	60.8	40.1	41.3	145	50.6	40.6	65.7	19.4	20.1	357.	17.9	20.7
Lane Group LOS	E	D	D	F	D	D	E	B	C	F	B	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.48	3.15	4.16	49.4	9.22	0.95	1.56	10.4	10.2	10.1	9.56	11.9
50th-Percentile Queue Length [ft/ln]	112.	78.8	103.	123	230.	23.8	38.8	260.	255.	252.	239.	297.
95th-Percentile Queue Length [veh/ln]	7.96	5.68	7.49	74.6	14.2	1.71	2.80	15.7	15.4	17.1	14.6	17.5
95th-Percentile Queue Length [ft/ln]	198.	141.	187.	186	354.	42.8	70.0	392.	386.	429.	365.	439.

Movement, Approach, & Intersection Results

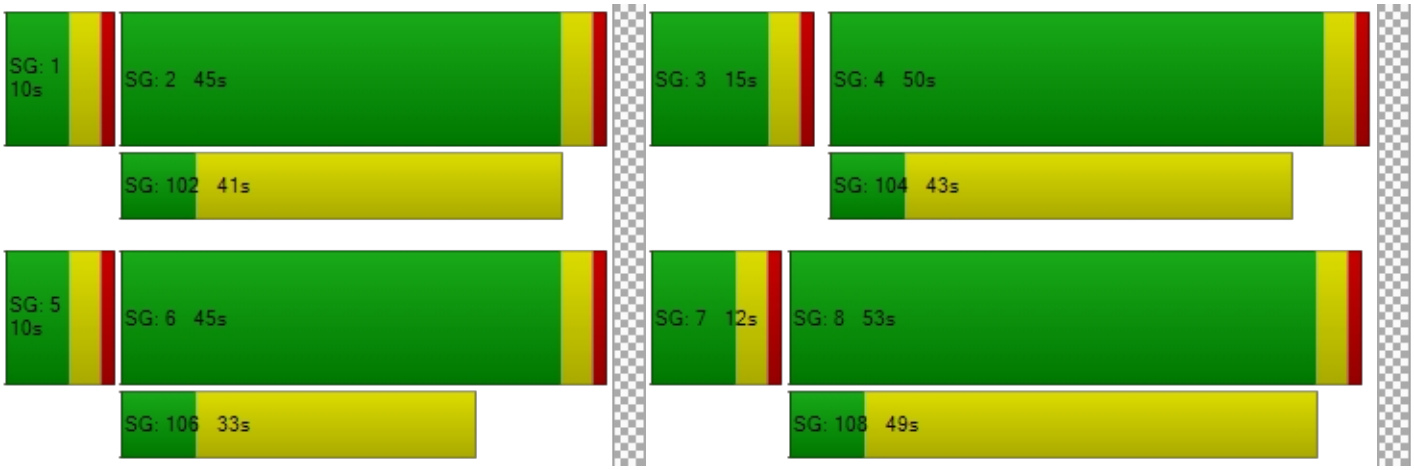
d_M, Delay for Movement [s/veh]	60.8	40.1	41.3	145	50.6	40.6	65.7	19.5	20.1	357.	17.9	20.7
Movement LOS	E	D	D	F	D	D	E	B	C	F	B	C
d_A, Approach Delay [s/veh]	48.80			889.91			20.90			57.61		
Approach LOS	D			F			C			E		
d_I, Intersection Delay [s/veh]	251.68											
Intersection LOS	F											
Intersection V/C	0.857											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.869	2.961	3.121	3.414
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	766	683	683
d_b, Bicycle Delay [s]	21.02	22.83	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.129	2.897	2.509	2.966
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.342

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	90	0	5	22	0	33	11	908	40	2	132	8
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	90	0	5	22	0	33	11	908	40	2	132	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	23	0	1	6	0	8	3	227	10	1	330	2
Total Analysis Volume [veh/h]	90	0	5	22	0	33	11	908	40	2	132	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	58	0	0	58	0	10	22	0	10	22	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	11	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	6	2	72	72	0	71	71
g / C, Green / Cycle	0.07	0.07	0.07	0.07	0.02	0.80	0.80	0.00	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.05	0.00	0.01	0.02	0.01	0.16	0.17	0.00	0.23	0.24
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	380	190	180	380	190
c, Capacity [veh/h]	137	127	162	127	31	302	151	8	297	148
d1, Uniform Delay [s]	41.26	39.30	39.68	39.89	43.7	2.26	2.27	44.6	2.77	2.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.21	0.12	0.38	1.07	6.66	0.16	0.32	14.7	0.25	0.54
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.04	0.14	0.26	0.35	0.21	0.21	0.24	0.29	0.31
d, Delay for Lane Group [s/veh]	46.46	39.42	40.06	40.95	50.4	2.42	2.60	59.3	3.02	3.34
Lane Group LOS	D	D	D	D	D	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.14	0.11	0.47	0.72	0.30	0.89	0.99	0.08	1.54	1.74
50th-Percentile Queue Length [ft/ln]	53.42	2.67	11.82	18.12	7.45	22.3	24.8	1.94	38.4	43.5
95th-Percentile Queue Length [veh/ln]	3.85	0.19	0.85	1.30	0.54	1.61	1.79	0.14	2.76	3.14
95th-Percentile Queue Length [ft/ln]	96.16	4.81	21.27	32.61	13.4	40.1	44.7	3.49	69.1	78.4

Movement, Approach, & Intersection Results

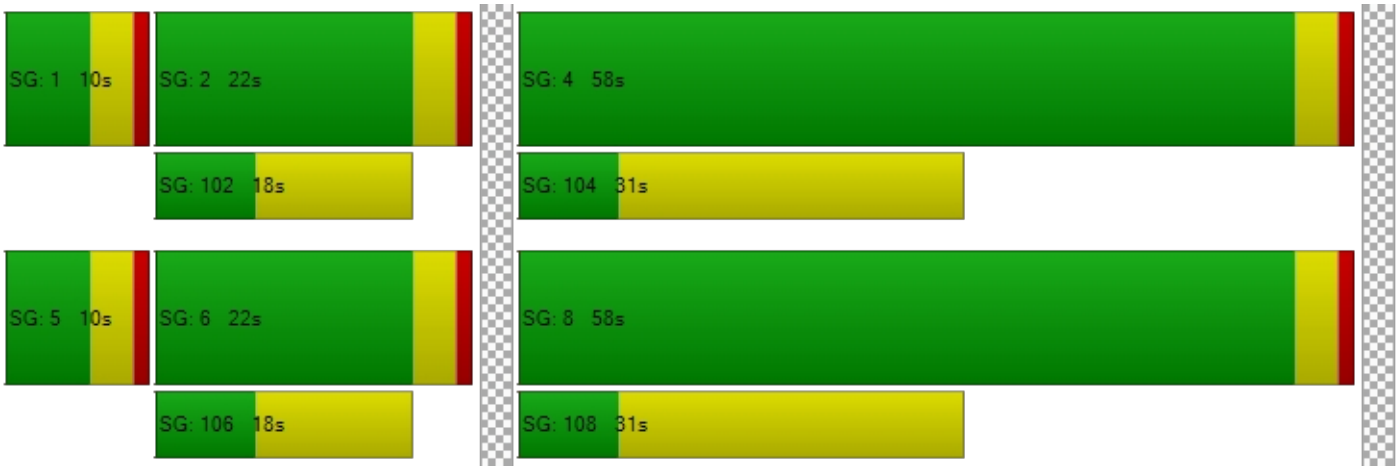
d_M, Delay for Movement [s/veh]	46.4	39.4	39.4	40.0	40.9	40.9	50.4	2.47	2.60	59.3	3.13	3.34
Movement LOS	D	D	D	D	D	D	D	A	A	E	A	A
d_A, Approach Delay [s/veh]	46.09			40.59			3.03			3.21		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.65											
Intersection LOS	A											
Intersection V/C	0.342											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.984	1.964	3.056	2.940
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1200	1200	400	400
d_b, Bicycle Delay [s]	7.21	7.21	28.81	28.81
l_b,int, Bicycle LOS Score for Intersection	1.716	1.650	2.087	2.292
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.692

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	727	13	13	209	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	727	13	13	209	2	3	0	71	36	0	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	182	3	3	525	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	727	13	13	209	2	3	0	71	36	0	36
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	6	6	0	6	6	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	60	0	10	60	0	0	30	0	0	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	18	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	81	81	2	79	79	5	5	5	5
g / C, Green / Cycle	0.04	0.81	0.81	0.02	0.79	0.79	0.05	0.05	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.02	0.20	0.19	0.01	0.55	0.55	0.00	0.04	0.02	0.02
s, saturation flow rate [veh/h]	180	190	190	180	190	190	1800	1900	1800	1900
c, Capacity [veh/h]	66	153	153	34	150	150	102	100	75	100
d1, Uniform Delay [s]	47.2	2.28	2.28	48.5	4.90	4.90	44.94	46.60	45.78	45.73
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.81	0.37	0.37	7.05	2.73	2.73	0.12	8.80	4.77	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.24	0.24	0.39	0.70	0.70	0.03	0.71	0.48	0.36
d, Delay for Lane Group [s/veh]	53.0	2.65	2.65	55.5	7.63	7.63	45.05	55.40	50.55	47.88
Lane Group LOS	D	A	A	E	A	A	D	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.89	0.96	0.95	0.38	6.39	6.39	0.07	1.99	0.97	0.93
50th-Percentile Queue Length [ft/ln]	22.1	24.0	23.8	9.41	159.	159.	1.86	49.75	24.20	23.21
95th-Percentile Queue Length [veh/ln]	1.60	1.73	1.72	0.68	10.5	10.5	0.13	3.58	1.74	1.67
95th-Percentile Queue Length [ft/ln]	39.8	43.2	42.9	16.9	263.	263.	3.35	89.56	43.56	41.77

Movement, Approach, & Intersection Results

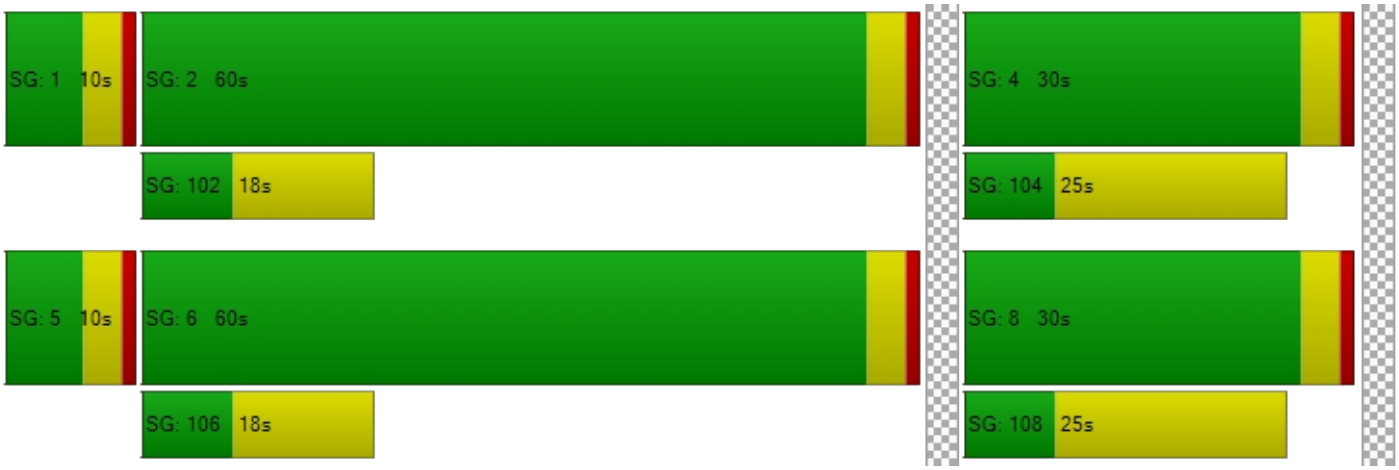
d_M, Delay for Movement [s/veh]	53.0	2.65	2.65	55.5	7.63	7.63	45.0	55.4	55.4	50.5	47.8	47.8
Movement LOS	D	A	A	E	A	A	D	E	E	D	D	D
d_A, Approach Delay [s/veh]	4.80			7.93			54.98			49.21		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	9.26											
Intersection LOS	A											
Intersection V/C	0.692											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	3.227	3.151	1.975	1.972
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1120	1120	520	520
d_b, Bicycle Delay [s]	9.68	9.68	27.38	27.38
l_b,int, Bicycle LOS Score for Intersection	2.197	3.304	1.682	1.678
Bicycle LOS	B	C	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	3.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.444

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	818	14	23	1406	41	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	818	14	23	1406	41	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	205	4	6	352	10	17
Total Analysis Volume [veh/h]	818	14	23	1406	41	66
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	6	0	0	6	6	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	61	0	0	61	29	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	11	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	76	76	76	76	6	6
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.22	0.22	0.01	0.37	0.02	0.03
s, saturation flow rate [veh/h]	1900	1900	1800	3800	1800	1900
c, Capacity [veh/h]	1611	1611	1473	3222	114	120
d1, Uniform Delay [s]	1.33	1.33	1.05	1.65	40.38	40.88
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.39	0.39	0.02	0.43	1.92	3.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.26	0.02	0.44	0.36	0.55
d, Delay for Lane Group [s/veh]	1.72	1.72	1.07	2.08	42.30	44.78
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.41	0.41	0.02	0.69	0.93	1.55
50th-Percentile Queue Length [ft/ln]	10.32	10.32	0.46	17.34	23.30	38.74
95th-Percentile Queue Length [veh/ln]	0.74	0.74	0.03	1.25	1.68	2.79
95th-Percentile Queue Length [ft/ln]	18.57	18.57	0.83	31.21	41.93	69.73

Movement, Approach, & Intersection Results

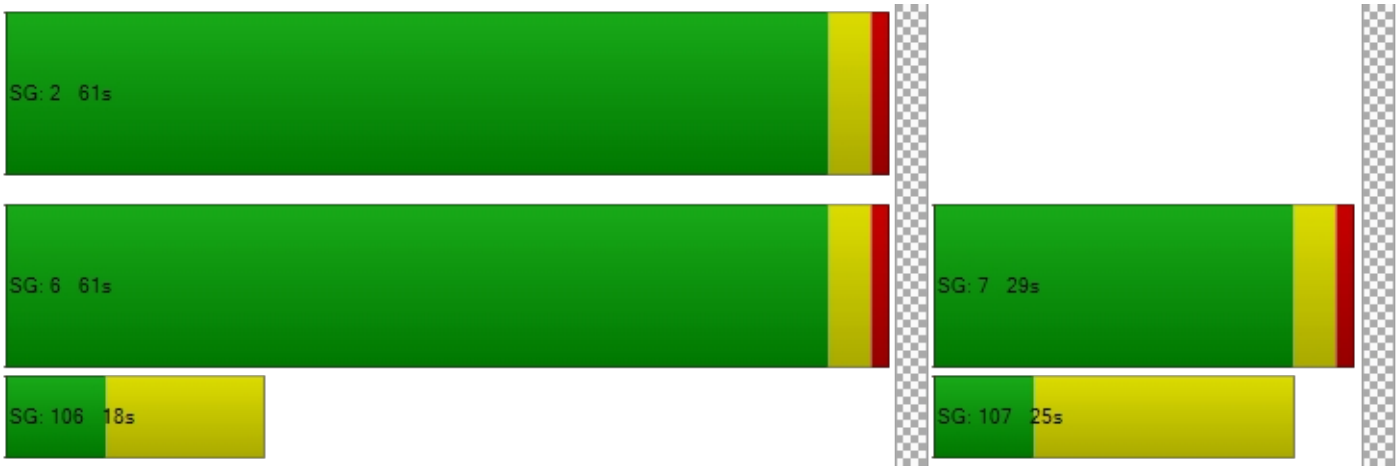
d_M, Delay for Movement [s/veh]	1.72	1.72	1.07	2.08	42.30	44.78
Movement LOS	A	A	A	A	D	D
d_A, Approach Delay [s/veh]	1.72		2.07		43.83	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.83					
Intersection LOS	A					
Intersection V/C	0.444					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.65	34.65
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.901	2.011
Crosswalk LOS	F	C	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1267	1267	556
d_b, Bicycle Delay [s]	6.04	6.04	23.45
l_b,int, Bicycle LOS Score for Intersection	2.246	2.739	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: State College Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	42.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.885

Intersection Setup

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	State College Boulevard			State College Boulevard			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	368	688	353	637	461	17	44	1694	302	457	1361	801
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	368	688	353	637	461	17	44	1694	302	457	1361	801
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	172	88	159	115	4	11	424	76	114	340	200
Total Analysis Volume [veh/h]	368	688	353	637	461	17	44	1694	302	457	1361	801
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	17	34	0	27	44	0	11	39	0	20	48	48
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	33	0	0	28	0	0	22	22
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	13	26	26	26	23	36	36	5	39	39	16	50	77
g / C, Green / Cycle	0.11	0.22	0.22	0.22	0.19	0.30	0.30	0.04	0.33	0.33	0.13	0.42	0.65
(v / s)_i Volume / Saturation Flow Rate	0.11	0.19	0.19	0.17	0.18	0.13	0.13	0.01	0.26	0.26	0.13	0.24	0.42
s, saturation flow rate [veh/h]	3500	1900	1900	1900	3500	1900	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	381	410	410	410	671	568	568	138	1854	618	468	2392	1225
d1, Uniform Delay [s]	53.28	45.63	45.49	44.33	47.94	33.78	33.72	56.11	37.09	37.02	51.82	26.56	13.10
k, delay calibration	0.11	0.28	0.27	0.21	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.78	14.76	13.38	6.02	7.99	0.50	0.49	1.32	3.92	10.69	14.53	0.99	2.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.89	0.87	0.78	0.95	0.42	0.42	0.32	0.81	0.80	0.98	0.57	0.65
d, Delay for Lane Group [s/veh]	68.06	60.39	58.87	50.35	55.93	34.28	34.21	57.43	41.01	47.70	66.35	27.55	15.83
Lane Group LOS	E	E	E	D	E	C	C	E	D	D	E	C	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.30	12.14	11.81	9.59	10.11	5.72	5.64	0.67	13.96	15.03	7.78	10.02	13.32
50th-Percentile Queue Length [ft/ln]	157.5	303.5	295.2	239.7	252.87	142.98	140.97	16.87	349.09	375.82	194.48	250.56	332.93
95th-Percentile Queue Length [veh/ln]	10.42	17.85	17.45	14.67	15.33	9.64	9.53	1.21	20.09	21.39	12.35	15.21	19.30
95th-Percentile Queue Length [ft/ln]	260.4	446.3	436.1	366.7	383.27	241.03	238.33	30.37	502.30	534.78	308.84	380.36	482.55

Movement, Approach, & Intersection Results

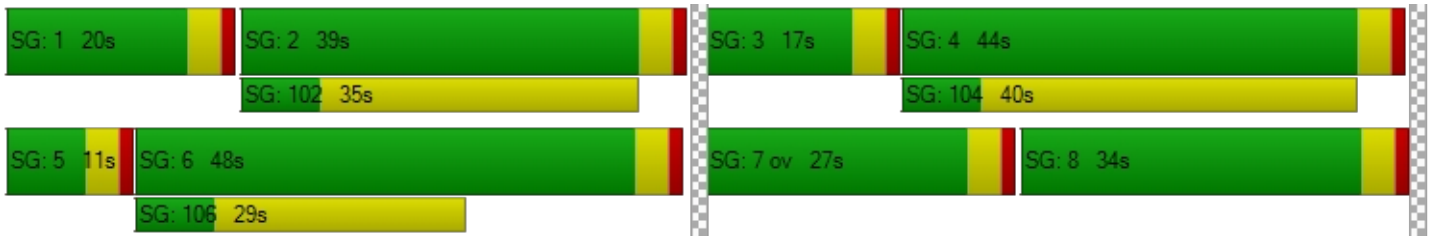
d_M, Delay for Movement [s/veh]	68.06	59.67	50.52	55.93	34.25	34.21	57.43	41.78	47.70	66.35	27.55	15.83
Movement LOS	E	E	D	E	C	C	E	D	D	E	C	B
d_A, Approach Delay [s/veh]	59.74			46.63			42.99			30.74		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	42.37											
Intersection LOS	D											
Intersection V/C	0.885											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.974	2.897	3.273	0.000
Crosswalk LOS	C	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	500	666	583	733
d_b, Bicycle Delay [s]	33.76	26.68	30.12	24.08
l_b,int, Bicycle LOS Score for Intersection	2.722	2.479	2.401	3.000
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SR-57 SB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.668

Intersection Setup

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 SB Ramps			SR-57 SB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	0	0	0	547	0	897	0	1516	877	270	1838	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	547	0	897	0	1516	877	270	1838	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	137	0	224	0	379	219	68	460	0
Total Analysis Volume [veh/h]	0	0	0	547	0	897	0	1516	877	270	1838	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	7	0	0	0	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	6	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	45	0	0	0	32	0	13	45	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	12	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall				No				No		No	No	
Maximum Recall				No				No		No	No	
Pedestrian Recall				No				No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	R	C	R	L	C
C, Cycle Length [s]		90	90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		27	27	42	42	9	55
g / C, Green / Cycle		0.30	0.30	0.47	0.47	0.10	0.61
(v / s)_i Volume / Saturation Flow Rate		0.16	0.24	0.27	0.23	0.08	0.32
s, saturation flow rate [veh/h]		3500	3800	5700	3800	3500	5700
c, Capacity [veh/h]		1039	1129	2686	1791	345	3501
d1, Uniform Delay [s]		26.37	29.13	17.14	16.36	39.65	9.89
k, delay calibration		0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.41	1.32	0.86	0.96	3.93	0.57
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.53	0.79	0.56	0.49	0.78	0.53
d, Delay for Lane Group [s/veh]		26.79	30.44	18.01	17.32	43.58	10.46
Lane Group LOS		C	C	B	B	D	B
Critical Lane Group		No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		4.82	8.84	7.32	6.12	3.07	6.30
50th-Percentile Queue Length [ft/ln]		120.62	220.90	183.07	153.12	76.64	157.44
95th-Percentile Queue Length [veh/ln]		8.43	13.71	11.76	10.18	5.52	10.41
95th-Percentile Queue Length [ft/ln]		210.68	342.77	294.02	254.59	137.94	260.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	26.79	0.00	30.44	0.00	18.01	17.32	43.58	10.46	0.00
Movement LOS				C		C		B	B	D	B	
d_A, Approach Delay [s/veh]	0.00			29.06			17.76			14.70		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	19.42											
Intersection LOS	B											
Intersection V/C	0.668											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.274	2.483	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	911	622	911
d_b, Bicycle Delay [s]	45.01	13.35	21.37	13.35
l_b,int, Bicycle LOS Score for Intersection	4.132	1.560	2.876	2.719
Bicycle LOS	D	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: SR-57 NB Ramps at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	13.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	1	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			No			No			No		

Volumes

Name	SR-57 NB Ramps			SR-57 NB Ramps			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	710	0	330	0	0	0	0	1724	605	0	1215	573
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	710	0	330	0	0	0	0	1724	605	0	1215	573
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
Total 15-Minute Volume [veh/h]	178	0	83	0	0	0	0	431	151	0	304	0
Total Analysis Volume [veh/h]	710	0	330	0	0	0	0	1724	605	0	1215	0
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Unsigna
Signal Group	3	0	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	6	0	0	0	0	0	0	6	0	0	6	0
Maximum Green [s]	30	0	0	0	0	0	0	30	0	0	30	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	54	0	0	0	0	0	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	25	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No							No			No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No							No			No	
Maximum Recall	No							No			No	
Pedestrian Recall	No							No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R		C	C	R	C
C, Cycle Length [s]	90	90		90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00		4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00		2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22		59	59	59	59
g / C, Green / Cycle	0.25	0.25		0.66	0.66	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.20	0.17		0.31	0.31	0.31	0.21
s, saturation flow rate [veh/h]	3500	1900		3800	1900	1900	5700
c, Capacity [veh/h]	872	473		2515	1257	1257	3772
d1, Uniform Delay [s]	31.76	30.64		7.41	7.41	7.41	6.53
k, delay calibration	0.11	0.11		0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.91	1.87		0.62	1.23	1.23	0.23
d3, Initial Queue Delay [s]	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.70		0.46	0.46	0.46	0.32
d, Delay for Lane Group [s/veh]	33.68	32.51		8.02	8.64	8.64	6.76
Lane Group LOS	C	C		A	A	A	A
Critical Lane Group	Yes	No		Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	7.29	6.58		4.89	5.11	5.11	2.95
50th-Percentile Queue Length [ft/ln]	182.32	164.44		122.35	127.70	127.70	73.70
95th-Percentile Queue Length [veh/ln]	11.72	10.78		8.52	8.81	8.81	5.31
95th-Percentile Queue Length [ft/ln]	293.04	269.60		213.06	220.37	220.37	132.66

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.68	0.00	32.51	0.00	0.00	0.00	0.00	8.08	8.64	0.00	6.76	0.00
Movement LOS	C		C					A	A		A	
d_A, Approach Delay [s/veh]	33.31			0.00			8.33			6.76		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	13.58											
Intersection LOS	B											
Intersection V/C	0.559											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.63	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.620	0.000	0.000	0.000
Crosswalk LOS	B	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1112	0	712	712
d_b, Bicycle Delay [s]	8.86	44.96	18.65	18.65
l_b,int, Bicycle LOS Score for Intersection	1.560	4.132	2.841	2.228
Bicycle LOS	A	D	C	B

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Pointe Drive at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	15.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.629

Intersection Setup

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Pointe Drive			Pointe Drive			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	130	0	32	126	0	469	214	2238	44	17	1747	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	0	32	126	0	469	214	2238	44	17	1747	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	0	8	32	0	117	54	560	11	4	437	16
Total Analysis Volume [veh/h]	130	0	32	126	0	469	214	2238	44	17	1747	63
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	48	0	0	48	0	11	32	0	10	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	33	0	0	0	0	0	14	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	7	62	62	2	57	57
g / C, Green / Cycle	0.16	0.16	0.16	0.08	0.69	0.69	0.02	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.09	0.07	0.12	0.06	0.39	0.41	0.01	0.31	0.32
s, saturation flow rate [veh/h]	1800	1800	3800	3500	3800	1900	1800	3800	1900
c, Capacity [veh/h]	356	364	600	276	2601	1300	44	2394	1197
d1, Uniform Delay [s]	35.08	34.32	36.41	40.70	7.41	7.63	43.27	8.99	9.12
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.91	0.56	2.26	4.69	0.94	2.07	5.51	0.75	1.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.45	0.35	0.78	0.78	0.58	0.60	0.39	0.50	0.52
d, Delay for Lane Group [s/veh]	35.98	34.89	38.67	45.39	8.34	9.70	48.78	9.73	10.71
Lane Group LOS	D	C	D	D	A	A	D	A	B
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.33	2.52	5.05	2.48	6.51	7.40	0.44	5.77	6.32
50th-Percentile Queue Length [ft/ln]	83.14	62.99	126.27	61.94	162.76	184.91	10.91	144.36	158.08
95th-Percentile Queue Length [veh/ln]	5.99	4.54	8.74	4.46	10.70	11.86	0.79	9.72	10.45
95th-Percentile Queue Length [ft/ln]	149.65	113.38	218.42	111.49	267.38	296.42	19.65	242.88	261.18

Movement, Approach, & Intersection Results

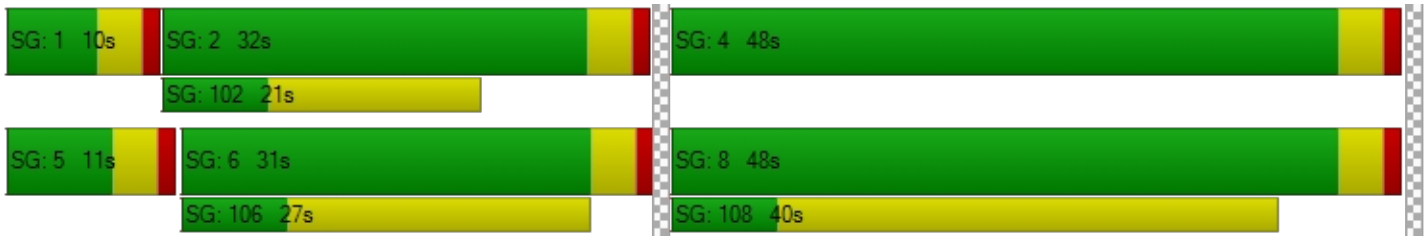
d_M, Delay for Movement [s/veh]	35.98	35.98	35.98	34.89	34.89	38.67	45.39	8.79	9.70	48.78	10.04	10.71
Movement LOS	D	D	D	C	C	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]	35.98			37.87			11.95			10.42		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.20											
Intersection LOS	B											
Intersection V/C	0.629											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.823	2.469	0.000	3.361
Crosswalk LOS	A	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	978	978	622	600
d_b, Bicycle Delay [s]	11.76	11.76	21.37	22.06
l_b,int, Bicycle LOS Score for Intersection	1.827	2.541	2.932	2.564
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Wildcat Way/N Associated Road at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.676

Intersection Setup

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Associated Road			Wildcat Way			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	154	62	24	92	118	151	49	2141	227	27	1548	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	154	62	24	92	118	151	49	2141	227	27	1548	48
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	16	6	23	30	38	12	535	57	7	387	12
Total Analysis Volume [veh/h]	154	62	24	92	118	151	49	2141	227	27	1548	48
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	27	0	22	30	0	10	31	0	10	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	16	0	0	19	0	0	20	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	13	13	6	10	10	4	52	52	3	51	51
g / C, Green / Cycle	0.11	0.15	0.15	0.07	0.11	0.11	0.05	0.58	0.58	0.03	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.09	0.02	0.02	0.05	0.06	0.08	0.01	0.38	0.12	0.02	0.28	0.29
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	5700	1900	1800	3800	1900
c, Capacity [veh/h]	192	277	277	122	204	204	169	3276	1092	61	2129	1065
d1, Uniform Delay [s]	39.36	33.66	33.63	41.30	38.31	39.04	41.41	13.06	9.26	42.70	12.05	12.21
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.63	0.26	0.25	9.06	2.59	5.22	0.93	1.03	0.43	4.87	0.82	1.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.16	0.15	0.75	0.58	0.74	0.29	0.65	0.21	0.44	0.49	0.51
d, Delay for Lane Group [s/veh]	46.99	33.92	33.88	50.36	40.90	44.26	42.34	14.09	9.70	47.57	12.87	13.96
Lane Group LOS	D	C	C	D	D	D	D	B	A	D	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.69	0.85	0.82	2.29	2.60	3.49	0.54	9.13	2.12	0.67	6.12	6.68
50th-Percentile Queue Length [ft/ln]	92.22	21.30	20.39	57.27	64.90	87.24	13.56	228.36	53.02	16.68	152.93	166.91
95th-Percentile Queue Length [veh/ln]	6.64	1.53	1.47	4.12	4.67	6.28	0.98	14.09	3.82	1.20	10.17	10.91
95th-Percentile Queue Length [ft/ln]	165.99	38.34	36.69	103.09	116.83	157.02	24.41	352.28	95.44	30.02	254.33	272.85

Movement, Approach, & Intersection Results

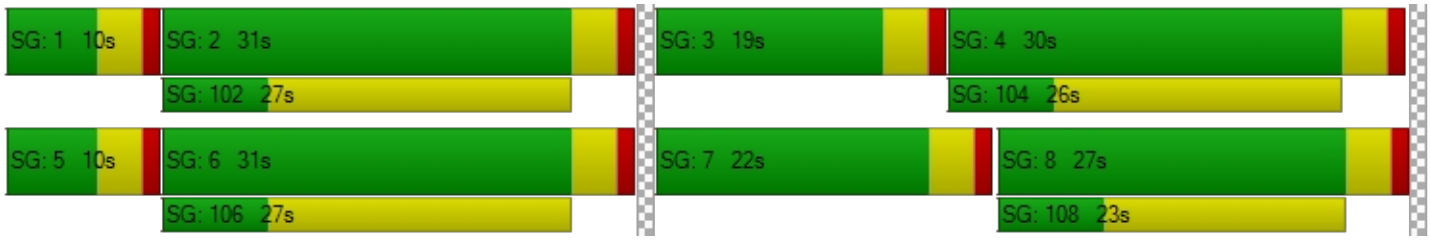
d_M, Delay for Movement [s/veh]	46.99	33.91	33.88	50.36	40.90	44.26	42.34	14.09	9.70	47.57	13.22	13.96
Movement LOS	D	C	C	D	D	D	D	B	A	D	B	B
d_A, Approach Delay [s/veh]	42.30			44.72			14.25			13.82		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.92											
Intersection LOS	B											
Intersection V/C	0.676											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.72	34.72	34.72	34.72
l_p,int, Pedestrian LOS Score for Intersection	2.419	2.401	3.311	3.134
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	577	599	599
d_b, Bicycle Delay [s]	24.98	22.80	22.09	22.09
l_b,int, Bicycle LOS Score for Intersection	1.758	1.857	2.889	2.452
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Santa Fe Road/Kraemer Boulevard at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	31.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.657

Intersection Setup

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Santa Fe Road			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	610	343	270	6	122	126	209	1129	531	112	501	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	610	343	270	6	122	126	209	1129	531	112	501	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	153	86	68	2	31	32	52	282	133	28	125	8
Total Analysis Volume [veh/h]	610	343	270	6	122	126	209	1129	531	112	501	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups			1,8						2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	6	6	0	6	6	6	6	6	0
Maximum Green [s]	30	30	30	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	27	59	59	10	42	0	19	41	41	10	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	30	30	0	31	0	0	26	26	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No	No	No	No	
Maximum Recall	No	No	No	No	No		No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	32	42	1	10	10	15	65	92	6	56	56
g / C, Green / Cycle	0.19	0.27	0.35	0.01	0.09	0.09	0.13	0.54	0.76	0.05	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.17	0.18	0.14	0.00	0.06	0.07	0.12	0.30	0.14	0.03	0.09	0.10
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1900	1800	3800	3800	3500	3800	1900
c, Capacity [veh/h]	665	507	667	18	165	165	226	2049	2897	178	1765	883
d1, Uniform Delay [s]	47.70	39.38	29.48	59.03	53.49	53.61	51.95	18.14	3.94	55.88	18.98	19.03
k, delay calibration	0.11	0.11	0.13	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.64	1.59	0.49	10.37	6.34	7.13	14.87	1.07	0.14	3.66	0.25	0.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.68	0.40	0.33	0.74	0.76	0.93	0.55	0.18	0.63	0.20	0.21
d, Delay for Lane Group [s/veh]	53.35	40.97	29.98	69.40	59.82	60.74	66.81	19.21	4.08	59.54	19.23	19.56
Lane Group LOS	D	D	C	E	E	E	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	9.43	9.25	6.00	0.23	3.88	4.05	7.15	10.31	1.60	1.76	2.97	3.13
50th-Percentile Queue Length [ft/ln]	235.84	231.18	149.95	5.84	97.12	101.18	178.67	257.75	40.11	43.88	74.24	78.13
95th-Percentile Queue Length [veh/ln]	14.47	14.23	10.01	0.42	6.99	7.29	11.53	15.58	2.89	3.16	5.35	5.63
95th-Percentile Queue Length [ft/ln]	361.77	355.86	250.36	10.50	174.81	182.13	288.28	389.39	72.20	78.98	133.63	140.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.35	40.97	29.98	69.40	59.82	60.74	66.81	19.21	4.08	59.54	19.33	19.56
Movement LOS	D	D	C	E	E	E	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	44.72			60.50			20.24			26.31		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	31.28											
Intersection LOS	C											
Intersection V/C	0.657											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.790	2.349	3.118	2.893
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	916	633	617	467
d_b, Bicycle Delay [s]	17.62	28.03	28.72	35.28
l_b,int, Bicycle LOS Score for Intersection	3.578	1.979	3.102	1.915
Bicycle LOS	D	A	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sunflower Street at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.501

Intersection Setup

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sunflower Street			Sunflower Street			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	28	2	15	2	0	6	6	1605	23	6	835	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	2	15	2	0	6	6	1605	23	6	835	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	1	4	1	0	2	2	401	6	2	209	1
Total Analysis Volume [veh/h]	28	2	15	2	0	6	6	1605	23	6	835	3
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	7	0	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	0	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	30	0	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	40	0	0	10	30	0	10	30	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	7	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	29	0	0	0	18	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No		No				No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No		No			No	No		No	No	
Maximum Recall		No		No			No	No		No	No	
Pedestrian Recall		No		No			No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	1	1	1	97	97	1	97	97
g / C, Green / Cycle	0.04	0.04	0.01	0.01	0.01	0.81	0.81	0.01	0.81	0.81
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.00	0.00	0.00	0.43	0.43	0.00	0.14	0.15
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	71	75	22	23	17	1531	1531	17	3062	1531
d1, Uniform Delay [s]	56.27	55.89	58.63	58.75	59.07	3.97	3.96	59.07	2.65	2.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.56	1.53	1.77	5.77	11.67	1.33	1.32	11.67	0.13	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.40	0.23	0.09	0.26	0.35	0.53	0.53	0.35	0.18	0.19
d, Delay for Lane Group [s/veh]	59.83	57.42	60.40	64.52	70.74	5.30	5.28	70.74	2.78	2.94
Lane Group LOS	E	E	E	E	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.90	0.53	0.07	0.22	0.24	5.66	5.64	0.24	1.20	1.33
50th-Percentile Queue Length [ft/ln]	22.48	13.29	1.77	5.45	5.93	141.59	140.91	5.93	30.06	33.24
95th-Percentile Queue Length [veh/ln]	1.62	0.96	0.13	0.39	0.43	9.57	9.53	0.43	2.16	2.39
95th-Percentile Queue Length [ft/ln]	40.46	23.93	3.19	9.81	10.67	239.16	238.25	10.67	54.10	59.83

Movement, Approach, & Intersection Results

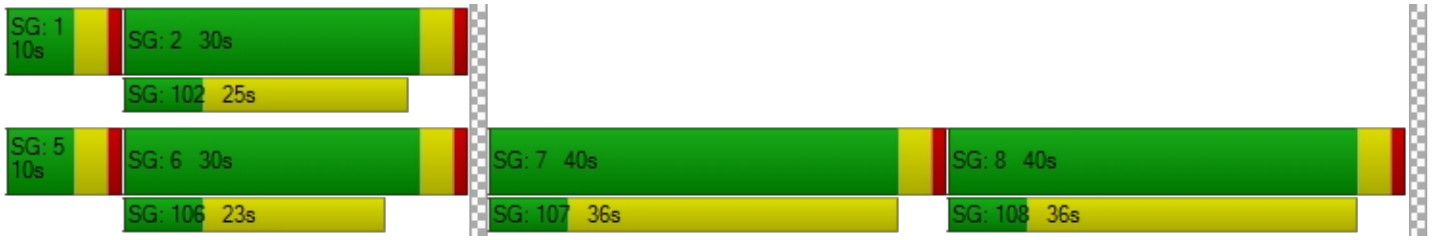
d_M, Delay for Movement [s/veh]	59.83	57.42	57.42	60.40	0.00	64.52	70.74	5.29	5.28	70.74	2.83	2.94
Movement LOS	E	E	E	E		E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	58.92			63.49			5.53			3.32		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.93											
Intersection LOS	A											
Intersection V/C	0.501											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	1.978	1.960	2.873	2.867
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	433	433
d_b, Bicycle Delay [s]	29.41	29.41	36.82	36.82
l_b,int, Bicycle LOS Score for Intersection	1.634	1.560	2.908	2.024
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.749

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	422	162	873	27	124	38	33	957	598	198	369	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	422	162	873	27	124	38	33	957	598	198	369	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	106	41	218	7	31	10	8	239	150	50	92	2
Total Analysis Volume [veh/h]	422	162	873	27	124	38	33	957	598	198	369	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	30	61	0	12	43	0	10	36	0	11	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	32	0	0	25	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	26	30	4	7	7	4	64	64	7	67	67
g / C, Green / Cycle	0.22	0.25	0.03	0.06	0.06	0.03	0.53	0.53	0.06	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.23	0.04	0.02	0.04	0.04	0.02	0.25	0.31	0.06	0.07	0.07
s, saturation flow rate [veh/h]	1800	3800	1800	1900	1900	1800	3800	1900	3500	3800	1900
c, Capacity [veh/h]	390	944	55	118	118	62	2009	1005	207	2103	1052
d1, Uniform Delay [s]	47.02	35.42	57.27	55.17	55.10	57.04	17.82	19.46	56.34	12.81	12.84
k, delay calibration	0.41	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	64.95	0.09	6.61	7.09	6.51	7.03	0.81	2.60	20.56	0.11	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.08	0.17	0.49	0.69	0.67	0.54	0.48	0.60	0.96	0.12	0.12
d, Delay for Lane Group [s/veh]	111.97	35.51	63.88	62.26	61.61	64.06	18.63	22.06	76.90	12.92	13.08
Lane Group LOS	F	D	E	E	E	E	B	C	E	B	B
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	18.61	1.89	0.91	2.67	2.58	1.11	8.42	11.90	3.58	1.63	1.73
50th-Percentile Queue Length [ft/ln]	465.13	47.18	22.71	66.79	64.50	27.66	210.46	297.56	89.52	40.65	43.37
95th-Percentile Queue Length [veh/ln]	26.83	3.40	1.64	4.81	4.64	1.99	13.18	17.56	6.45	2.93	3.12
95th-Percentile Queue Length [ft/ln]	670.67	84.92	40.88	120.23	116.09	49.79	329.42	439.01	161.14	73.17	78.07

Movement, Approach, & Intersection Results

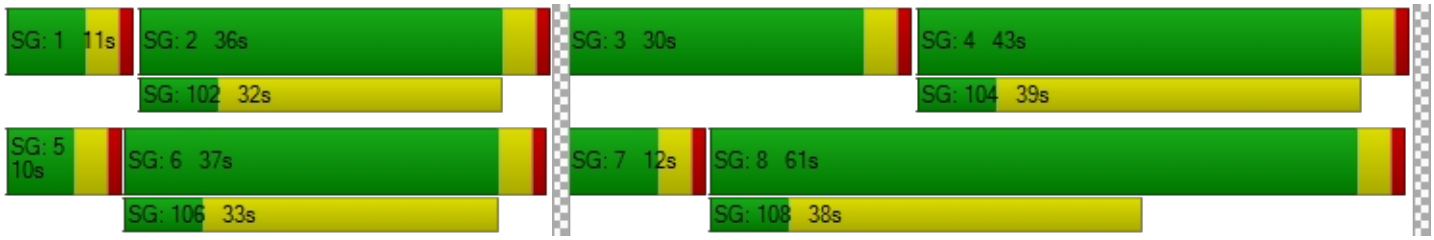
d_M, Delay for Movement [s/veh]	111.97	35.51	0.00	63.88	62.05	61.61	64.06	18.63	22.06	76.90	12.97	13.08
Movement LOS	F	D		E	E	E	E	B	C	E	B	B
d_A, Approach Delay [s/veh]	90.76			62.22			20.87			34.95		
Approach LOS	F			E			C			C		
d_I, Intersection Delay [s/veh]	40.19											
Intersection LOS	D											
Intersection V/C	0.749											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.711	2.390	2.944	2.929
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	950	650	533	550
d_b, Bicycle Delay [s]	16.55	27.35	32.28	31.55
l_b,int, Bicycle LOS Score for Intersection	2.041	1.716	2.433	1.876
Bicycle LOS	B	A	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Santa Fe Road at Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	4.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Santa Fe Road			Santa Fe Road			Carbon Canyon Road			Carbon Canyon Road		
Base Volume Input [veh/h]	12	0	2	0	0	23	2	1877	2	1	457	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	0	2	0	0	23	2	1877	2	1	457	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	0	0	6	1	469	1	0	114	3
Total Analysis Volume [veh/h]	12	0	2	0	0	23	2	1877	2	1	457	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	0	35	10	75	0	10	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	0	0	0	17	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No				No	No	No		No	No	
Maximum Recall		No				No	No	No		No	No	
Pedestrian Recall		No				No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	0	105	105	0	104	104
g / C, Green / Cycle	0.03	0.03	0.00	0.87	0.87	0.00	0.87	0.87
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.00	0.49	0.49	0.00	0.12	0.01
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1900	1900	3800	1900
c, Capacity [veh/h]	105	52	7	1654	1654	4	3303	1651
d1, Uniform Delay [s]	57.21	57.46	59.61	1.98	1.98	59.76	1.17	1.03
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.57	5.91	23.33	1.42	1.42	29.31	0.09	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.13	0.45	0.30	0.57	0.57	0.25	0.14	0.01
d, Delay for Lane Group [s/veh]	57.78	63.37	82.93	3.40	3.40	89.07	1.26	1.04
Lane Group LOS	E	E	F	A	A	F	A	A
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.43	0.77	0.10	3.27	3.27	0.06	0.42	0.02
50th-Percentile Queue Length [ft/ln]	10.84	19.32	2.60	81.86	81.85	1.58	10.51	0.58
95th-Percentile Queue Length [veh/ln]	0.78	1.39	0.19	5.89	5.89	0.11	0.76	0.04
95th-Percentile Queue Length [ft/ln]	19.51	34.77	4.67	147.34	147.33	2.84	18.91	1.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.78	57.78	57.78	0.00	0.00	63.37	82.93	3.40	3.40	89.07	1.26	1.04
Movement LOS	E	E	E			E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	57.78			63.37			3.49			1.44		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	3.98											
Intersection LOS	A											
Intersection V/C	0.563											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	0.00	49.50
l_p,int, Pedestrian LOS Score for Intersection	1.737	1.747	0.000	2.849
Crosswalk LOS	A	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	517	517	1184	1184
d_b, Bicycle Delay [s]	33.00	33.00	10.00	10.00
l_b,int, Bicycle LOS Score for Intersection	1.583	1.560	3.111	1.948
Bicycle LOS	A	A	C	A

Sequence

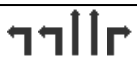
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: State College Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	39.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.876

Intersection Setup

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	157	478	185	393	435	363	320	893	182	172	1140	749
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	478	185	393	435	363	320	893	182	172	1140	749
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	120	46	98	109	91	80	223	46	43	285	187
Total Analysis Volume [veh/h]	157	478	185	393	435	363	320	893	182	172	1140	749
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	10	39	0	27	56	0	17	42	0	12	37	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	30	0	0	28	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	21	21	16	31	31	13	60	60	8	55	55
g / C, Green / Cycle	0.05	0.17	0.17	0.13	0.25	0.25	0.11	0.50	0.50	0.07	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.04	0.13	0.10	0.11	0.23	0.19	0.09	0.24	0.10	0.05	0.30	0.39
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1900	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	178	656	328	466	485	485	375	1883	941	229	1724	862
d1, Uniform Delay [s]	56.63	47.00	45.52	50.82	43.21	41.19	52.66	19.98	16.90	55.13	25.59	29.57
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.28	1.57	1.52	4.25	6.21	2.35	5.53	0.86	0.46	4.89	2.01	11.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.73	0.56	0.84	0.90	0.75	0.85	0.47	0.19	0.75	0.66	0.87
d, Delay for Lane Group [s/veh]	69.91	48.57	47.04	55.07	49.42	43.53	58.19	20.84	17.36	60.02	27.60	41.14
Lane Group LOS	E	D	D	E	D	D	E	C	B	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.69	6.90	5.20	6.04	6.61	10.17	5.02	8.34	2.92	2.71	12.95	21.69
50th-Percentile Queue Length [ft/ln]	67.32	172.46	130.07	150.91	165.30	254.24	125.59	208.61	73.00	67.84	323.63	542.35
95th-Percentile Queue Length [veh/ln]	4.85	11.21	8.94	10.07	10.83	15.40	8.70	13.08	5.26	4.88	18.85	29.33
95th-Percentile Queue Length [ft/ln]	121.18	280.15	223.60	251.64	270.73	384.99	217.49	327.05	131.39	122.12	471.14	733.32

Movement, Approach, & Intersection Results

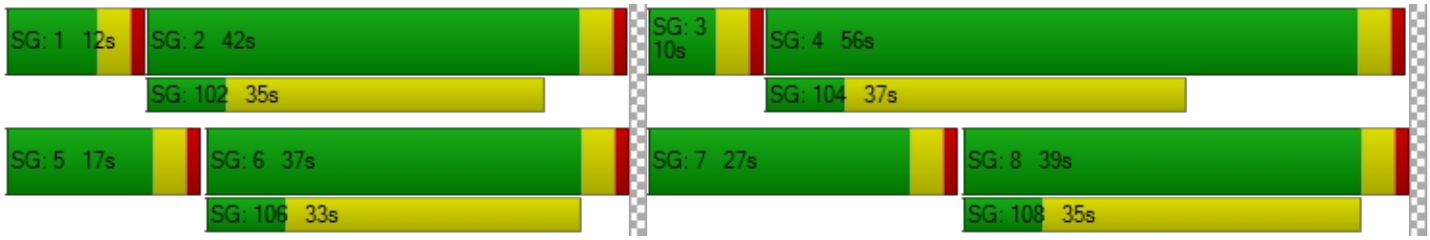
d_M, Delay for Movement [s/veh]	69.91	48.57	47.04	55.07	49.42	43.53	58.19	20.84	17.36	60.02	27.60	41.14
Movement LOS	E	D	D	E	D	D	E	C	B	E	C	D
d_A, Approach Delay [s/veh]	52.31			49.49			28.95			35.23		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	39.30											
Intersection LOS	D											
Intersection V/C	0.876											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.832	2.989	3.033	3.100
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	866	633	550
d_b, Bicycle Delay [s]	30.12	19.28	28.03	31.55
l_b,int, Bicycle LOS Score for Intersection	2.236	2.542	2.710	3.260
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: S Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	28.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.761

Intersection Setup

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	S Associated Road			S Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	559	37	403	11	23	11	17	1043	349	332	1474	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	559	37	403	11	23	11	17	1043	349	332	1474	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	140	9	101	3	6	3	4	261	87	83	369	5
Total Analysis Volume [veh/h]	559	37	403	11	23	11	17	1043	349	332	1474	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	8	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups			1,8									
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	28	65	65	0	37	0	10	38	0	17	45	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	26	0	0	27	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	30	47	5	5	3	65	65	13	75	75
g / C, Green / Cycle	0.18	0.25	0.39	0.04	0.04	0.02	0.54	0.54	0.11	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.16	0.02	0.21	0.01	0.02	0.01	0.38	0.35	0.09	0.39	0.39
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	624	477	746	77	75	40	1027	1027	380	1191	1191
d1, Uniform Delay [s]	48.21	34.34	28.08	55.73	56.40	57.94	20.42	19.60	52.69	13.76	13.75
k, delay calibration	0.11	0.11	0.34	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.83	0.07	1.90	0.84	4.29	7.10	4.00	3.24	6.36	2.50	2.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.08	0.54	0.14	0.46	0.43	0.70	0.65	0.87	0.63	0.63
d, Delay for Lane Group [s/veh]	53.05	34.41	29.98	56.57	60.69	65.04	24.42	22.84	59.05	16.27	16.25
Lane Group LOS	D	C	C	E	E	E	C	C	E	B	B
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.57	0.84	9.28	0.34	1.10	0.59	15.56	13.82	5.26	12.56	12.54
50th-Percentile Queue Length [ft/ln]	214.29	21.07	231.98	8.51	27.45	14.71	389.08	345.57	131.44	314.08	313.52
95th-Percentile Queue Length [veh/ln]	13.37	1.52	14.27	0.61	1.98	1.06	22.03	19.92	9.02	18.38	18.35
95th-Percentile Queue Length [ft/ln]	334.33	37.93	356.87	15.33	49.41	26.49	550.83	498.00	225.45	459.40	458.71

Movement, Approach, & Intersection Results

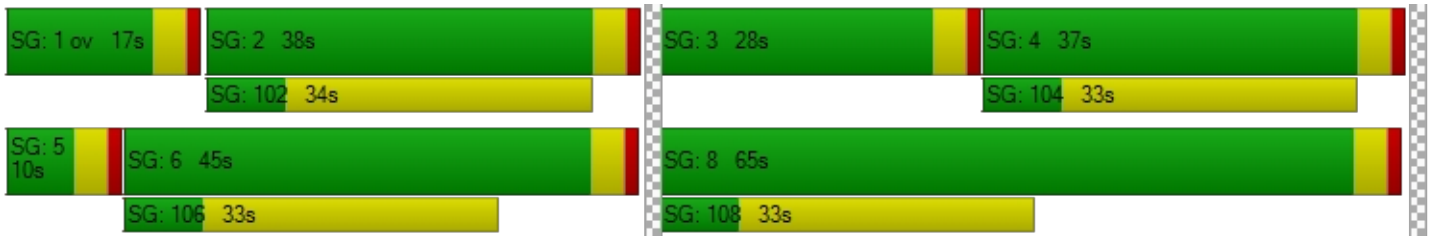
d_M, Delay for Movement [s/veh]	53.05	34.41	29.98	56.57	60.69	60.69	65.04	23.93	22.84	59.05	16.26	16.25
Movement LOS	D	C	C	E	E	E	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	43.05			59.68			24.16			24.04		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	28.90											
Intersection LOS	C											
Intersection V/C	0.761											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	2.743	1.992	2.987	3.016
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1017	550	567	683
d_b, Bicycle Delay [s]	14.51	31.54	30.82	26.01
l_b,int, Bicycle LOS Score for Intersection	3.208	1.634	2.722	3.065
Bicycle LOS	C	A	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.839

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	15	2	12	119	3	335	321	1086	14	6	1515	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	2	12	119	3	335	321	1086	14	6	1515	156
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	30	1	84	80	272	4	2	379	39
Total Analysis Volume [veh/h]	15	2	12	119	3	335	321	1086	14	6	1515	156
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	39	61	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	17	17	52	23	78	78	1	55	55
g / C, Green / Cycle	0.03	0.03	0.03	0.14	0.14	0.45	0.20	0.67	0.67	0.01	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.18	0.18	0.29	0.29	0.00	0.40	0.08
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	95	62	62	259	259	855	367	1281	1281	18	1825	912
d1, Uniform Delay [s]	54.32	53.92	54.21	43.63	43.63	21.11	44.36	8.60	8.59	56.57	25.85	16.94
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.21	0.15	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.77	0.21	1.51	0.46	0.46	0.58	8.84	1.06	1.05	10.15	4.55	0.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.03	0.19	0.23	0.24	0.39	0.87	0.43	0.43	0.33	0.83	0.17
d, Delay for Lane Group [s/veh]	55.08	54.13	55.72	44.09	44.09	21.69	53.20	9.66	9.64	66.72	30.40	17.34
Lane Group LOS	E	D	E	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.44	0.06	0.36	1.58	1.58	6.11	9.71	6.20	6.17	0.22	18.43	2.43
50th-Percentile Queue Length [ft/ln]	11.11	1.49	9.12	39.39	39.48	152.85	242.86	154.97	154.19	5.61	460.71	60.84
95th-Percentile Queue Length [veh/ln]	0.80	0.11	0.66	2.84	2.84	10.17	14.83	10.28	10.24	0.40	25.47	4.38
95th-Percentile Queue Length [ft/ln]	20.00	2.69	16.41	70.90	71.07	254.23	370.64	257.05	256.01	10.10	636.72	109.51

Movement, Approach, & Intersection Results

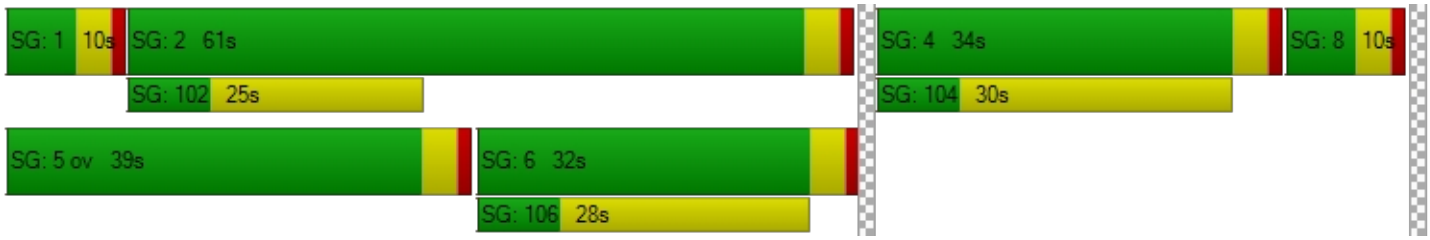
d_M, Delay for Movement [s/veh]	55.08	54.13	55.72	44.09	44.09	21.69	53.20	9.65	9.64	66.72	30.40	17.34
Movement LOS	E	D	E	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	55.28			27.67			19.48			29.32		
Approach LOS	E			C			B			C		
d_I, Intersection Delay [s/veh]	25.42											
Intersection LOS	C											
Intersection V/C	0.839											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.155	2.371	2.974	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	104	522	991	487
d_b, Bicycle Delay [s]	51.68	31.43	14.64	32.93
l_b,int, Bicycle LOS Score for Intersection	1.607	2.314	2.732	2.943
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Kraemer Boulevard at Birch Street

Control Type:	Signalized	Delay (sec / veh):	49.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.757

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Birch Street			Birch Street		
Base Volume Input [veh/h]	674	855	148	240	439	134	258	851	333	91	827	250
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	674	855	148	240	439	134	258	851	333	91	827	250
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	169	214	37	60	110	34	65	213	83	23	207	63
Total Analysis Volume [veh/h]	674	855	148	240	439	134	258	851	333	91	827	250
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	25	48	0	14	37	0	19	46	0	12	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	26	0	0	28	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	26	26	10	15	15	15	60	60	8	53	53
g / C, Green / Cycle	0.18	0.22	0.22	0.08	0.13	0.13	0.13	0.50	0.50	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.19	0.18	0.17	0.07	0.10	0.10	0.14	0.22	0.18	0.05	0.22	0.13
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	613	829	415	294	482	241	226	1902	951	115	1669	834
d1, Uniform Delay [s]	49.51	44.61	44.37	54.09	50.97	50.69	52.50	19.29	18.15	55.39	24.13	21.74
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.14	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	50.79	2.00	3.46	5.54	3.21	5.05	78.62	0.76	1.02	11.33	1.05	0.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.10	0.81	0.79	0.82	0.80	0.77	1.14	0.45	0.35	0.79	0.50	0.30
d, Delay for Lane Group [s/veh]	100.30	46.61	47.83	59.62	54.17	55.74	131.12	20.06	19.17	66.73	25.19	22.66
Lane Group LOS	F	D	D	E	D	E	F	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	13.48	9.73	9.61	3.79	5.89	5.71	11.71	7.74	5.82	3.08	8.59	4.76
50th-Percentile Queue Length [ft/ln]	336.94	243.33	240.27	94.77	147.13	142.75	292.87	193.47	145.47	76.96	214.86	119.03
95th-Percentile Queue Length [veh/ln]	20.42	14.85	14.69	6.82	9.86	9.63	18.32	12.30	9.77	5.54	13.40	8.34
95th-Percentile Queue Length [ft/ln]	510.50	371.24	367.37	170.58	246.59	240.73	457.97	307.53	244.37	138.53	335.06	208.50

Movement, Approach, & Intersection Results

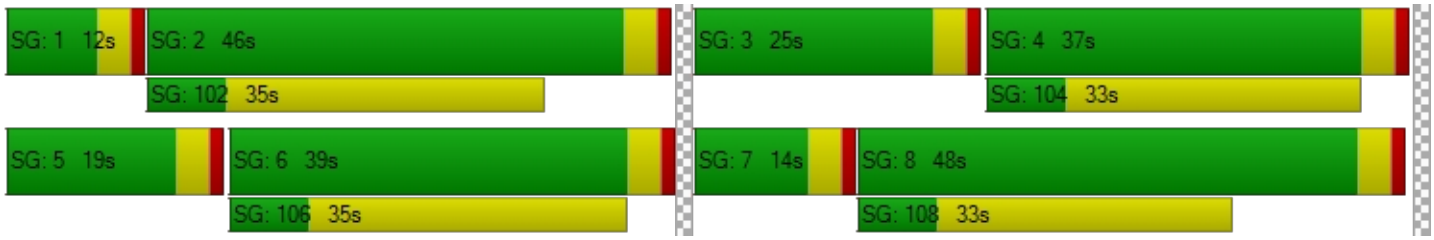
d_M, Delay for Movement [s/veh]	100.30	46.86	47.83	59.62	54.35	55.74	131.12	20.06	19.17	66.73	25.19	22.66
Movement LOS	F	D	D	E	D	E	F	C	B	E	C	C
d_A, Approach Delay [s/veh]	68.43			56.14			39.72			27.88		
Approach LOS	E			E			D			C		
d_I, Intersection Delay [s/veh]	49.07											
Intersection LOS	D											
Intersection V/C	0.757											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.049	3.004	2.967	2.858
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	733	550	700	583
d_b, Bicycle Delay [s]	24.08	31.55	25.36	30.12
l_b,int, Bicycle LOS Score for Intersection	2.482	2.007	2.749	2.523
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	103.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.227

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	178	13	141	77	16	57	184	41	9	141	229
Total Analysis Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	32	38	0	32	38	0	10	40	0	10	40	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	27	27	28	37	37	6	45	45	4	43	43
g / C, Green / Cycle	0.15	0.23	0.23	0.23	0.31	0.31	0.05	0.37	0.37	0.03	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.13	0.20	0.20	0.31	0.10	0.09	0.07	0.24	0.23	0.02	0.15	0.48
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	272	429	429	420	586	586	178	708	708	63	1356	678
d1, Uniform Delay [s]	49.93	45.14	44.86	46.03	31.95	31.74	56.98	31.26	30.65	57.00	29.18	38.62
k, delay calibration	0.11	0.25	0.23	0.50	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.22	14.15	11.66	167.69	0.32	0.30	139.22	4.69	3.98	7.13	0.95	168.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.90	0.88	1.34	0.33	0.31	1.29	0.66	0.62	0.54	0.42	1.35
d, Delay for Lane Group [s/veh]	59.15	59.29	56.52	213.71	32.27	32.03	196.21	35.95	34.63	64.13	30.12	207.02
Lane Group LOS	E	E	E	F	C	C	F	D	C	E	C	F
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.74	12.80	12.17	31.98	4.35	4.07	6.13	11.99	10.97	1.14	6.33	51.25
50th-Percentile Queue Length [ft/ln]	193.45	320.02	304.21	799.47	108.82	101.72	153.19	299.71	274.24	28.50	158.33	1281.29
95th-Percentile Queue Length [veh/ln]	12.30	18.67	17.89	47.83	7.77	7.32	10.87	17.67	16.40	2.05	10.46	75.47
95th-Percentile Queue Length [ft/ln]	307.50	466.71	447.23	1195.65	194.37	183.10	271.64	441.67	410.04	51.29	261.50	1886.85

Movement, Approach, & Intersection Results

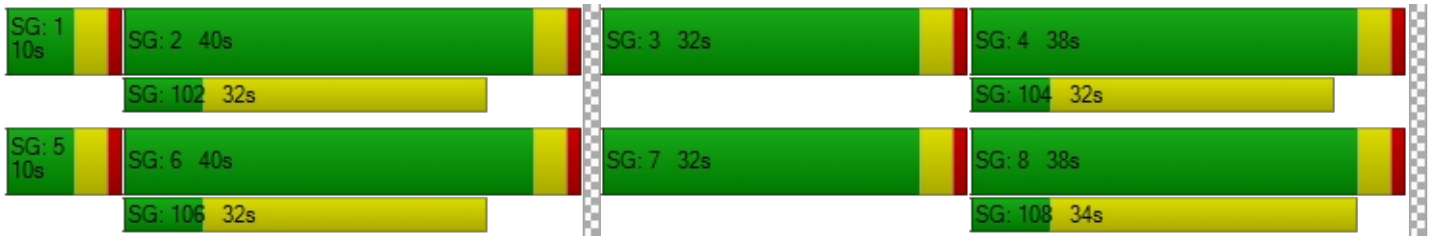
d_M, Delay for Movement [s/veh]	59.15	58.03	56.52	213.71	32.18	32.03	196.21	35.47	34.63	64.13	30.12	207.02
Movement LOS	E	E	E	F	C	C	F	D	C	E	C	F
d_A, Approach Delay [s/veh]	58.22			141.40			67.95			137.89		
Approach LOS	E			F			E			F		
d_I, Intersection Delay [s/veh]	103.93											
Intersection LOS	F											
Intersection V/C	1.227											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.608	2.858	2.791	2.932
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	567	600	600
d_b, Bicycle Delay [s]	30.83	30.83	29.41	29.41
l_b,int, Bicycle LOS Score for Intersection	2.387	2.330	2.491	2.810
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.847

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	318	8	3	332	25	12	0	30	7	0	3
Total Analysis Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	99	99	99	99	99	99	13	13	13
g / C, Green / Cycle	0.82	0.82	0.82	0.82	0.82	0.82	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.34	0.34	0.01	0.70	0.06	0.09	0.01	0.01
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	1800	1800	1900
c, Capacity [veh/h]	769	1566	1566	1336	1566	1484	235	65	207
d1, Uniform Delay [s]	2.04	2.83	2.82	1.87	6.13	1.96	52.41	48.24	47.80
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.66	0.82	0.81	0.01	5.86	0.09	3.93	3.88	0.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.42	0.42	0.01	0.85	0.07	0.71	0.40	0.05
d, Delay for Lane Group [s/veh]	2.70	3.65	3.63	1.88	11.98	2.05	56.34	52.12	47.89
Lane Group LOS	A	A	A	A	B	A	E	D	D
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.70	3.33	3.30	0.04	15.61	0.35	5.19	0.78	0.27
50th-Percentile Queue Length [ft/ln]	17.39	83.26	82.42	1.10	390.23	8.87	129.68	19.42	6.87
95th-Percentile Queue Length [veh/ln]	1.25	5.99	5.93	0.08	22.09	0.64	8.92	1.40	0.49
95th-Percentile Queue Length [ft/ln]	31.30	149.87	148.36	1.97	552.22	15.97	223.06	34.96	12.36

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	2.70	3.64	3.63	1.88	11.98	2.05	56.34	56.34	56.34	52.12	47.89	47.89
Movement LOS	A	A	A	A	B	A	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	3.53			11.20			56.34			50.95		
Approach LOS	A			B			E			D		
d_I, Intersection Delay [s/veh]	10.45											
Intersection LOS	B											
Intersection V/C	0.847											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.45	49.45	49.45	49.45
l_p,int, Pedestrian LOS Score for Intersection	2.899	2.924	2.182	1.999
Crosswalk LOS	C	C	B	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.51	4.51	37.56	37.56
l_b,int, Bicycle LOS Score for Intersection	2.776	3.936	1.835	1.619
Bicycle LOS	C	D	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: SR-57 SB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	18.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.811

Intersection Setup

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name				SR-57 SB Ramps			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	0	0	0	764	0	619	0	1933	1154	0	2753	476
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	764	0	619	0	1933	1154	0	2753	476
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	191	0	155	0	483	289	0	688	119
Total Analysis Volume [veh/h]	0	0	0	764	0	619	0	1933	1154	0	2753	476
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Split	Permiss	Split	Permiss	Permiss	Unsigna	Permiss	Permiss	Unsigna
Signal Group	0	0	0	7	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	0	0	6	0	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	30	0	0	0	30	0	0	30	0
Amber [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	64	0	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk				No				No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall				No				No			No	
Maximum Recall				No				No			No	
Pedestrian Recall				No				No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	C
C, Cycle Length [s]		90	90	90	90	90
L, Total Lost Time per Cycle [s]		4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]		28	28	28	54	54
g / C, Green / Cycle		0.31	0.31	0.31	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate		0.26	0.26	0.24	0.34	0.48
s, saturation flow rate [veh/h]		1800	1800	1900	5700	5700
c, Capacity [veh/h]		552	552	583	3445	3445
d1, Uniform Delay [s]		29.03	29.03	28.51	10.64	13.60
k, delay calibration		0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		3.42	3.42	2.47	0.67	2.03
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.84	0.84	0.79	0.56	0.80
d, Delay for Lane Group [s/veh]		32.45	32.45	30.98	11.31	15.63
Lane Group LOS		C	C	C	B	B
Critical Lane Group		Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]		9.46	9.46	9.18	7.05	13.09
50th-Percentile Queue Length [ft/ln]		236.49	236.49	229.40	176.20	327.32
95th-Percentile Queue Length [veh/ln]		14.50	14.50	14.14	11.40	19.03
95th-Percentile Queue Length [ft/ln]		362.59	362.59	353.59	285.04	475.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	32.45	0.00	31.35	0.00	11.31	0.00	0.00	15.63	0.00
Movement LOS				C		C		B			B	
d_A, Approach Delay [s/veh]	0.00			31.96			11.31			15.63		
Approach LOS	A			C			B			B		
d_I, Intersection Delay [s/veh]	17.97											
Intersection LOS	B											
Intersection V/C	0.811											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.63	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.468	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1335	489	489
d_b, Bicycle Delay [s]	44.96	4.98	25.65	25.65
l_b,int, Bicycle LOS Score for Intersection	4.132	3.842	2.623	3.074
Bicycle LOS	D	D	B	C

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: SR-57 NB Ramps at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	40.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.887

Intersection Setup

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramps			Shopping Center			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	1163	72	506	0	0	232	207	2145	430	0	2821	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1163	72	506	0	0	232	207	2145	430	0	2821	46
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	291	18	127	0	0	58	52	536	108	0	705	12
Total Analysis Volume [veh/h]	1163	72	506	0	0	232	207	2145	430	0	2821	46
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Permiss	Split	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	4	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Maximum Green [s]	0	30	0	0	0	30	30	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	37	0	0	0	12	19	71	0	0	52	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	22	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32	32	8	15	68	49	49
g / C, Green / Cycle	0.27	0.27	0.27	0.07	0.13	0.57	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.25	0.25	0.23	0.06	0.12	0.38	0.38	0.38
s, saturation flow rate [veh/h]	3500	1800	1900	3800	1800	5700	5700	1900
c, Capacity [veh/h]	932	479	506	254	225	3231	2328	776
d1, Uniform Delay [s]	42.78	42.80	42.08	55.65	51.90	18.05	33.73	33.73
k, delay calibration	0.11	0.38	0.34	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.29	20.82	13.49	12.29	14.15	1.09	7.66	18.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.92	0.87	0.91	0.92	0.66	0.92	0.92
d, Delay for Lane Group [s/veh]	47.07	63.62	55.57	67.94	66.05	19.15	41.38	52.05
Lane Group LOS	D	E	E	E	E	B	D	D
Critical Lane Group	No	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	12.80	15.39	14.30	3.92	7.03	13.59	21.04	23.34
50th-Percentile Queue Length [ft/ln]	319.98	384.68	357.47	98.01	175.81	339.80	526.11	583.56
95th-Percentile Queue Length [veh/ln]	18.67	21.82	20.50	7.06	11.38	19.64	28.57	31.27
95th-Percentile Queue Length [ft/ln]	466.66	545.51	512.50	176.42	284.54	490.95	714.19	781.64

Movement, Approach, & Intersection Results

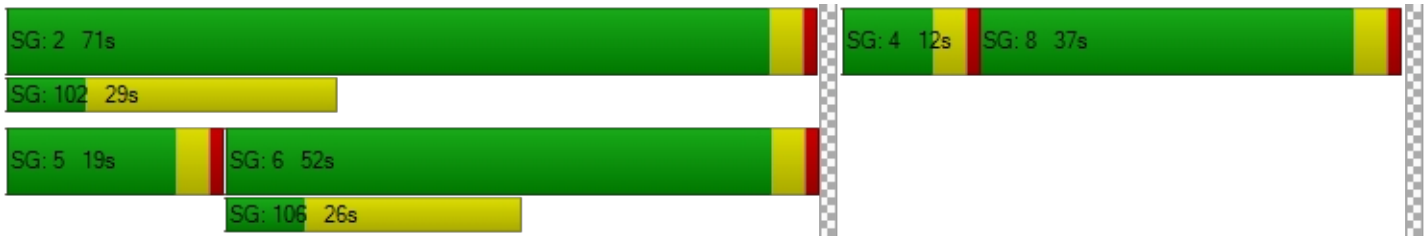
d_M, Delay for Movement [s/veh]	51.32	63.62	56.69	0.00	0.00	67.94	66.05	19.15	0.00	0.00	43.92	52.05
Movement LOS	D	E	E			E	E	B			D	D
d_A, Approach Delay [s/veh]	53.42			67.94			23.27			44.05		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	40.29											
Intersection LOS	D											
Intersection V/C	0.887											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.51	49.51	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.653	2.135	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	550	133	1117	800
d_b, Bicycle Delay [s]	31.54	52.27	11.71	21.60
l_b,int, Bicycle LOS Score for Intersection	4.432	1.560	2.853	2.742
Bicycle LOS	E	A	C	B

Sequence

Ring 1	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Associated Roadway at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	48.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.947

Intersection Setup

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Roadway			Associated Roadway			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	252	299	102	335	402	294	311	2179	161	210	2004	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	252	299	102	335	402	294	311	2179	161	210	2004	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	75	26	84	101	74	78	545	40	53	501	53
Total Analysis Volume [veh/h]	252	299	102	335	402	294	311	2179	161	210	2004	213
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	39	0	16	42	0	26	46	0	19	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	29	0	0	26	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	25	25	12	28	28	22	52	52	15	45	45
g / C, Green / Cycle	0.08	0.21	0.21	0.10	0.23	0.23	0.18	0.43	0.43	0.13	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.10	0.10	0.21	0.15	0.17	0.41	0.42	0.12	0.29	0.30
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	267	399	399	354	446	446	331	1634	817	227	2122	707
d1, Uniform Delay [s]	55.22	42.12	41.73	53.67	44.63	41.63	48.39	32.81	33.69	51.96	33.29	33.80
k, delay calibration	0.11	0.11	0.11	0.11	0.22	0.11	0.22	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	15.26	1.06	0.91	12.79	12.59	1.67	21.49	12.27	26.70	14.98	2.87	9.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.94	0.52	0.48	0.95	0.90	0.66	0.94	0.94	0.98	0.93	0.78	0.81
d, Delay for Lane Group [s/veh]	70.48	43.19	42.63	66.47	57.22	43.30	69.88	45.08	60.38	66.94	36.16	43.30
Lane Group LOS	E	D	D	E	E	D	E	D	E	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.36	5.62	5.13	5.65	13.10	8.08	11.13	23.63	28.28	7.19	14.49	16.53
50th-Percentile Queue Length [ft/ln]	109.00	140.38	128.17	141.27	327.56	202.03	278.17	590.77	706.93	179.78	362.25	413.24
95th-Percentile Queue Length [veh/ln]	7.78	9.50	8.84	9.55	19.04	12.74	16.60	31.60	37.00	11.59	20.73	23.20
95th-Percentile Queue Length [ft/ln]	194.61	237.53	221.00	238.73	475.97	318.58	414.93	790.08	924.96	289.73	518.32	579.94

Movement, Approach, & Intersection Results

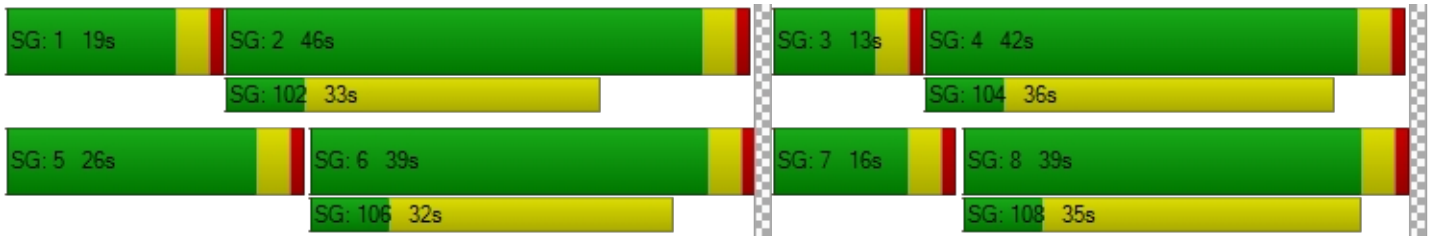
d_M, Delay for Movement [s/veh]	70.48	43.02	42.63	66.47	57.22	43.30	69.88	49.57	60.38	66.94	37.43	43.30
Movement LOS	E	D	D	E	E	D	E	D	E	E	D	D
d_A, Approach Delay [s/veh]	53.56			56.25			52.61			40.50		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	48.91											
Intersection LOS	D											
Intersection V/C	0.947											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.54	49.54	49.54	49.54
l_p,int, Pedestrian LOS Score for Intersection	2.592	2.768	3.373	3.354
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	633	700	583
d_b, Bicycle Delay [s]	30.13	28.04	25.38	30.13
l_b,int, Bicycle LOS Score for Intersection	2.098	3.261	3.018	2.561
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Castlegate Lane/Placentia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	28.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.848

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	295	54	310	29	26	16	22	2195	323	268	2263	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	54	310	29	26	16	22	2195	323	268	2263	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	74	14	78	7	7	4	6	549	81	67	566	17
Total Analysis Volume [veh/h]	295	54	310	29	26	16	22	2195	323	268	2263	66
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	10	0	10	32	0	35	57	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	0	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	20	5	5	3	46	46	18	61	61
g / C, Green / Cycle	0.19	0.19	0.19	0.05	0.05	0.03	0.44	0.44	0.17	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.10	0.10	0.16	0.02	0.02	0.01	0.39	0.17	0.15	0.40	0.42
s, saturation flow rate [veh/h]	1800	1800	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	335	335	354	92	97	51	2511	837	306	2213	1106
d1, Uniform Delay [s]	38.50	38.56	41.58	48.12	48.41	50.25	26.76	19.82	42.54	15.35	15.82
k, delay calibration	0.11	0.11	0.14	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.23	1.27	8.46	1.95	3.05	5.74	4.61	1.34	7.86	1.80	4.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.52	0.88	0.32	0.43	0.43	0.87	0.39	0.88	0.69	0.72
d, Delay for Lane Group [s/veh]	39.74	39.82	50.04	50.07	51.46	55.99	31.36	21.17	50.40	17.15	19.92
Lane Group LOS	D	D	D	D	D	E	C	C	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.11	4.17	8.55	0.78	1.15	0.65	17.07	5.54	7.39	12.46	14.08
50th-Percentile Queue Length [ft/ln]	102.82	104.34	213.80	19.54	28.71	16.22	426.67	138.61	184.75	311.53	352.00
95th-Percentile Queue Length [veh/ln]	7.40	7.51	13.35	1.41	2.07	1.17	23.84	9.41	11.85	18.25	20.23
95th-Percentile Queue Length [ft/ln]	185.08	187.82	333.70	35.17	51.67	29.19	596.04	235.14	296.21	456.27	505.85

Movement, Approach, & Intersection Results

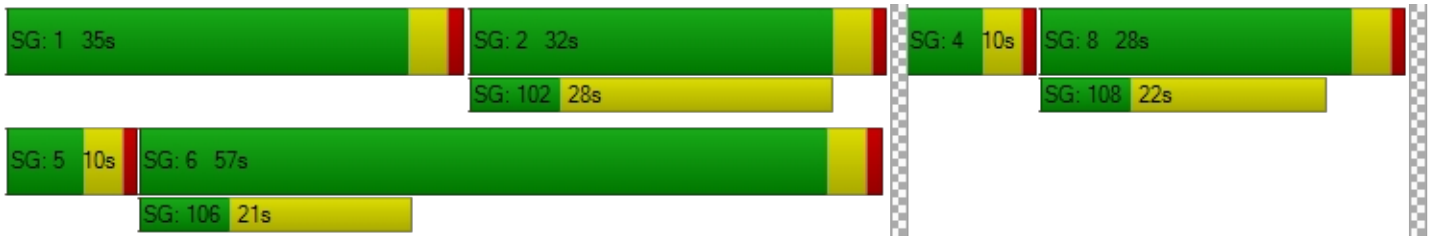
d_M, Delay for Movement [s/veh]	39.77	39.82	50.04	50.07	51.46	51.46	55.99	31.36	21.17	50.40	18.05	19.92
Movement LOS	D	D	D	D	D	D	E	C	C	D	B	B
d_A, Approach Delay [s/veh]	44.61			50.89			30.28			21.43		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	28.22											
Intersection LOS	C											
Intersection V/C	0.848											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.11	42.11	0.00	42.11
l_p,int, Pedestrian LOS Score for Intersection	2.449	2.017	0.000	3.316
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	457	114	533	1009
d_b, Bicycle Delay [s]	31.27	46.70	28.26	12.90
l_b,int, Bicycle LOS Score for Intersection	2.647	1.677	2.957	2.988
Bicycle LOS	B	A	C	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Kraemer Boulevard at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	41.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.884

Intersection Setup

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Kraemer Boulevard			Kraemer Boulevard			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	418	712	118	300	547	134	248	1639	251	211	1807	364
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	418	712	118	300	547	134	248	1639	251	211	1807	364
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	105	178	30	75	137	34	62	410	63	53	452	91
Total Analysis Volume [veh/h]	418	712	118	300	547	134	248	1639	251	211	1807	364
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	23	38	0	15	30	0	13	50	0	12	49	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	28	28	11	23	23	9	52	52	8	51	51
g / C, Green / Cycle	0.14	0.25	0.25	0.10	0.20	0.20	0.08	0.45	0.45	0.07	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.12	0.22	0.21	0.09	0.14	0.07	0.07	0.33	0.33	0.06	0.38	0.38
s, saturation flow rate [veh/h]	3500	1900	1900	3500	3800	1900	3500	3800	1900	3500	3800	1900
c, Capacity [veh/h]	488	468	468	339	775	387	279	1698	849	248	1665	833
d1, Uniform Delay [s]	48.43	42.11	41.57	51.38	42.63	39.27	52.50	26.38	26.32	52.89	29.37	29.32
k, delay calibration	0.11	0.28	0.26	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.46	15.38	10.76	7.72	1.20	0.53	9.51	2.99	5.74	7.92	6.51	11.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.91	0.87	0.89	0.71	0.35	0.89	0.74	0.74	0.85	0.87	0.87
d, Delay for Lane Group [s/veh]	52.89	57.48	52.33	59.09	43.83	39.80	62.02	29.37	32.06	60.81	35.87	41.13
Lane Group LOS	D	E	D	E	D	D	E	C	C	E	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	6.15	13.59	12.33	4.63	7.34	3.31	3.91	14.65	15.21	3.29	19.11	20.26
50th-Percentile Queue Length [ft/ln]	153.78	339.78	308.15	115.75	183.44	82.75	97.82	366.36	380.20	82.15	477.85	506.52
95th-Percentile Queue Length [veh/ln]	10.22	19.64	18.08	8.16	11.78	5.96	7.04	20.93	21.60	5.91	26.28	27.64
95th-Percentile Queue Length [ft/ln]	255.47	490.93	452.10	203.97	294.50	148.95	176.07	523.31	540.09	147.87	657.10	691.07

Movement, Approach, & Intersection Results

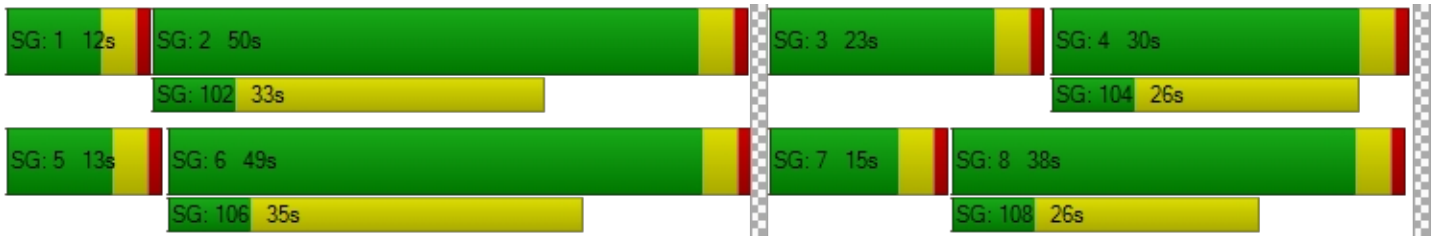
d_M, Delay for Movement [s/veh]	52.89	55.40	52.33	59.09	43.83	39.80	62.02	29.99	32.06	60.81	36.92	41.13
Movement LOS	D	E	D	E	D	D	E	C	C	E	D	D
d_A, Approach Delay [s/veh]	54.27			47.95			33.95			39.68		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	41.76											
Intersection LOS	D											
Intersection V/C	0.884											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.07	47.07	47.07	47.07
l_p,int, Pedestrian LOS Score for Intersection	2.831	2.927	3.285	3.278
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	591	452	799	782
d_b, Bicycle Delay [s]	28.56	34.48	20.73	21.34
l_b,int, Bicycle LOS Score for Intersection	2.589	2.369	2.736	2.870
Bicycle LOS	B	B	B	C

Sequence

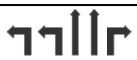
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Valencia Avenue at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	26.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.658

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	131	318	145	245	256	159	282	2045	171	189	1488	161
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	318	145	245	256	159	282	2045	171	189	1488	161
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	80	36	61	64	40	71	511	43	47	372	40
Total Analysis Volume [veh/h]	131	318	145	245	256	159	282	2045	171	189	1488	161
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	46	0	13	48	0	17	45	0	11	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	35	0	0	37	0	0	26	0	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	12	12	9	15	15	11	71	71	7	66	66
g / C, Green / Cycle	0.05	0.11	0.11	0.08	0.13	0.13	0.10	0.61	0.61	0.06	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.04	0.08	0.08	0.07	0.07	0.08	0.08	0.36	0.09	0.05	0.26	0.08
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	3500	5700	1900	3500	5700	1900
c, Capacity [veh/h]	190	412	206	276	506	253	345	3488	1163	216	3278	1093
d1, Uniform Delay [s]	53.46	49.91	49.51	52.49	46.37	47.19	50.87	13.51	9.52	53.56	14.06	11.35
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.39	3.09	4.33	9.34	0.79	2.57	4.80	0.73	0.27	10.73	0.46	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.69	0.77	0.70	0.89	0.51	0.63	0.82	0.59	0.15	0.88	0.45	0.15
d, Delay for Lane Group [s/veh]	57.85	53.00	53.85	61.83	47.15	49.76	55.66	14.24	9.79	64.29	14.51	11.64
Lane Group LOS	E	D	D	E	D	D	E	B	A	E	B	B
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.98	4.62	4.27	3.86	3.46	4.49	4.21	10.32	1.87	3.03	7.30	1.96
50th-Percentile Queue Length [ft/ln]	49.42	115.53	106.72	96.42	86.56	112.20	105.17	258.02	46.72	75.75	182.47	49.07
95th-Percentile Queue Length [veh/ln]	3.56	8.15	7.66	6.94	6.23	7.96	7.57	15.59	3.36	5.45	11.73	3.53
95th-Percentile Queue Length [ft/ln]	88.96	203.67	191.43	173.55	155.81	199.06	189.27	389.74	84.10	136.35	293.23	88.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.85	53.00	53.85	61.83	47.15	49.76	55.66	14.24	9.79	64.29	14.51	11.64
Movement LOS	E	D	D	E	D	D	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	54.28			53.23			18.61			19.38		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	26.74											
Intersection LOS	C											
Intersection V/C	0.658											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.774	2.804	3.324	3.324
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	730	765	713	608
d_b, Bicycle Delay [s]	23.19	21.93	23.83	27.84
l_b,int, Bicycle LOS Score for Intersection	2.050	2.104	2.934	2.571
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	241.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.145

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	77	164	36	260	137	8	23	501	79	44	393	224
Total Analysis Volume [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	16	53	0	12	49	0	10	45	0	10	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	42	0	0	36	0	0	34	0	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	24	24	8	20	20	6	66	66	6	66	66
g / C, Green / Cycle	0.10	0.20	0.20	0.07	0.17	0.17	0.05	0.55	0.55	0.05	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.09	0.17	0.08	0.30	0.14	0.02	0.05	0.41	0.41	0.05	0.28	0.47
s, saturation flow rate [veh/h]	3500	3800	1900	3500	3800	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	352	767	384	236	641	320	91	2078	1039	178	3117	1039
d1, Uniform Delay [s]	53.22	46.24	41.36	55.99	48.50	42.22	56.97	20.75	20.88	56.96	17.02	23.33
k, delay calibration	0.11	0.11	0.11	0.15	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.63	2.90	0.60	1538.45	3.44	0.14	42.81	2.44	4.95	29.23	0.58	9.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.86	0.37	4.41	0.86	0.10	1.00	0.74	0.75	0.99	0.50	0.86
d, Delay for Lane Group [s/veh]	59.85	49.13	41.96	1594.44	51.94	42.36	99.78	23.19	25.83	86.19	17.60	32.76
Lane Group LOS	E	D	D	F	D	D	F	C	C	F	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.87	9.73	3.73	53.93	8.28	0.85	3.84	16.54	17.50	3.39	8.98	23.41
50th-Percentile Queue Length [ft/ln]	121.74	243.35	93.35	1348.33	206.91	21.17	96.11	413.42	437.51	84.69	224.53	585.22
95th-Percentile Queue Length [veh/ln]	8.49	14.85	6.72	80.90	12.99	1.52	6.92	23.21	24.36	6.10	13.90	31.34
95th-Percentile Queue Length [ft/ln]	212.22	371.26	168.02	2022.38	324.86	38.10	173.01	580.15	609.03	152.45	347.40	783.59

Movement, Approach, & Intersection Results

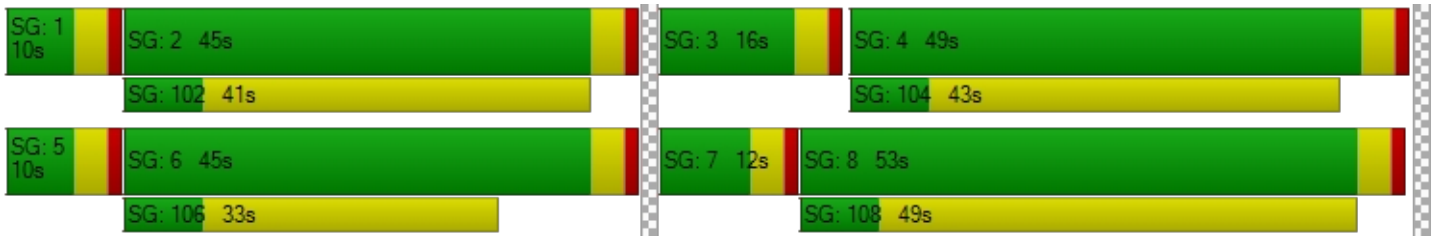
d_M, Delay for Movement [s/veh]	59.85	49.13	41.96	1594.44	51.94	42.36	99.78	23.80	25.83	86.19	17.60	32.76
Movement LOS	E	D	D	F	D	D	F	C	C	F	B	C
d_A, Approach Delay [s/veh]	51.17			1040.77			26.93			27.31		
Approach LOS	D			F			C			C		
d_I, Intersection Delay [s/veh]	241.85											
Intersection LOS	F											
Intersection V/C	1.145											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.907	3.063	3.209	3.495
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	750	683	683
d_b, Bicycle Delay [s]	21.02	23.45	26.02	26.02
l_b,int, Bicycle LOS Score for Intersection	2.472	2.898	2.886	3.013
Bicycle LOS	B	C	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.397

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	77	0	4	15	0	22	37	1572	109	5	804	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	0	4	15	0	22	37	1572	109	5	804	25
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	0	1	4	0	6	9	393	27	1	201	6
Total Analysis Volume [veh/h]	77	0	4	15	0	22	37	1572	109	5	804	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	35	0	10	45	0	10	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	11	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	5	5	4	72	72	1	69	69
g / C, Green / Cycle	0.06	0.06	0.06	0.06	0.04	0.80	0.80	0.01	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.04	0.00	0.01	0.01	0.02	0.29	0.30	0.00	0.14	0.15
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	133	112	149	112	75	3035	1517	16	2912	1456
d1, Uniform Delay [s]	41.65	39.95	40.20	40.34	42.24	2.58	2.60	44.33	2.87	2.89
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.92	0.13	0.29	0.85	5.02	0.34	0.71	10.03	0.14	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.04	0.10	0.20	0.50	0.37	0.37	0.30	0.19	0.19
d, Delay for Lane Group [s/veh]	45.57	40.08	40.50	41.18	47.26	2.93	3.31	54.36	3.01	3.19
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.81	0.09	0.32	0.49	0.90	1.82	2.01	0.16	0.99	1.10
50th-Percentile Queue Length [ft/ln]	45.18	2.17	8.12	12.16	22.53	45.45	50.27	3.89	24.80	27.40
95th-Percentile Queue Length [veh/ln]	3.25	0.16	0.58	0.88	1.62	3.27	3.62	0.28	1.79	1.97
95th-Percentile Queue Length [ft/ln]	81.32	3.91	14.61	21.88	40.55	81.81	90.49	7.00	44.64	49.31

Movement, Approach, & Intersection Results

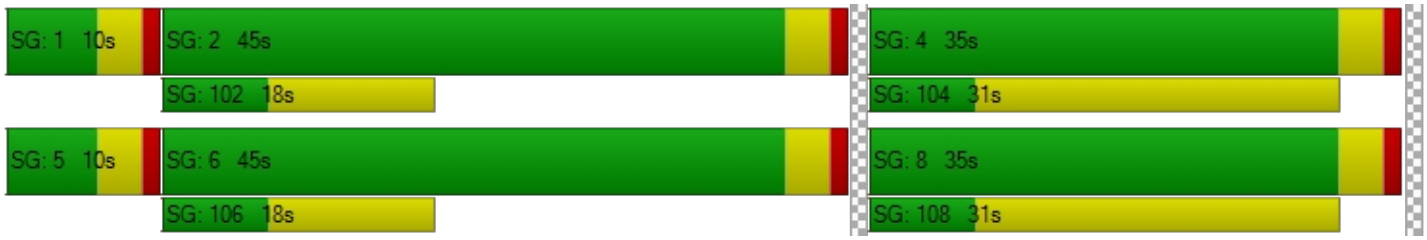
d_M, Delay for Movement [s/veh]	45.57	40.08	40.08	40.50	41.18	41.18	47.26	3.04	3.31	54.36	3.07	3.19
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	45.30			40.90			4.01			3.38		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.58											
Intersection LOS	A											
Intersection V/C	0.397											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	2.003	1.972	3.068	2.953
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	689	689	911	911
d_b, Bicycle Delay [s]	19.35	19.35	13.35	13.35
l_b,int, Bicycle LOS Score for Intersection	1.693	1.621	2.505	2.018
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.510

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	359	10	10	218	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	6	6	0	6	6	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	13	51	0	10	48	0	0	29	0	0	29	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	18	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	L	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	69	69	4	68	68	5	5	5	5
g / C, Green / Cycle	0.06	0.77	0.77	0.04	0.76	0.76	0.05	0.05	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.39	0.39	0.02	0.23	0.23	0.00	0.03	0.01	0.01
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1800	1900	1800	1900
c, Capacity [veh/h]	105	1463	1463	79	1436	1436	121	101	91	101
d1, Uniform Delay [s]	41.73	3.91	3.90	42.11	3.50	3.49	40.47	41.61	40.93	40.90
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.63	1.26	1.24	5.17	0.55	0.55	0.11	4.74	1.52	1.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.51	0.50	0.52	0.31	0.31	0.03	0.56	0.26	0.24
d, Delay for Lane Group [s/veh]	51.37	5.17	5.14	47.28	4.05	4.04	40.58	46.35	42.44	42.11
Lane Group LOS	D	A	A	D	A	A	D	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.89	3.14	3.11	0.97	1.66	1.66	0.09	1.35	0.55	0.55
50th-Percentile Queue Length [ft/ln]	47.22	78.48	77.65	24.19	41.53	41.40	2.20	33.66	13.75	13.63
95th-Percentile Queue Length [veh/ln]	3.40	5.65	5.59	1.74	2.99	2.98	0.16	2.42	0.99	0.98
95th-Percentile Queue Length [ft/ln]	85.00	141.26	139.76	43.54	74.76	74.52	3.96	60.59	24.76	24.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.37	5.15	5.14	47.28	4.05	4.04	40.58	46.35	46.35	42.44	42.11	42.11
Movement LOS	D	A	A	D	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	7.44			5.97			45.97			42.28		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.46											
Intersection LOS	A											
Intersection V/C	0.510											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	3.067	3.003	1.978	1.975
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1044	978	555	555
d_b, Bicycle Delay [s]	10.28	11.76	23.48	23.48
l_b,int, Bicycle LOS Score for Intersection	2.842	2.319	1.659	1.639
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	3.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.443

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	1412	47	75	1250	28	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1412	47	75	1250	28	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	353	12	19	313	7	11
Total Analysis Volume [veh/h]	1412	47	75	1250	28	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	6	0	0	6	6	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	71	0	0	71	29	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	11	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	R
C, Cycle Length [s]	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	87	87	87	87	5	5
g / C, Green / Cycle	0.87	0.87	0.87	0.87	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.38	0.38	0.04	0.33	0.02	0.02
s, saturation flow rate [veh/h]	1900	1900	1800	3800	1800	1900
c, Capacity [veh/h]	1649	1649	1437	3297	94	99
d1, Uniform Delay [s]	1.42	1.42	0.91	1.30	45.59	45.94
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.86	0.86	0.07	0.33	1.74	3.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.44	0.44	0.05	0.38	0.30	0.44
d, Delay for Lane Group [s/veh]	2.28	2.28	0.98	1.64	47.32	49.01
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.79	0.79	0.05	0.46	0.72	1.15
50th-Percentile Queue Length [ft/ln]	19.69	19.69	1.34	11.52	17.96	28.77
95th-Percentile Queue Length [veh/ln]	1.42	1.42	0.10	0.83	1.29	2.07
95th-Percentile Queue Length [ft/ln]	35.44	35.44	2.40	20.74	32.33	51.78

Movement, Approach, & Intersection Results

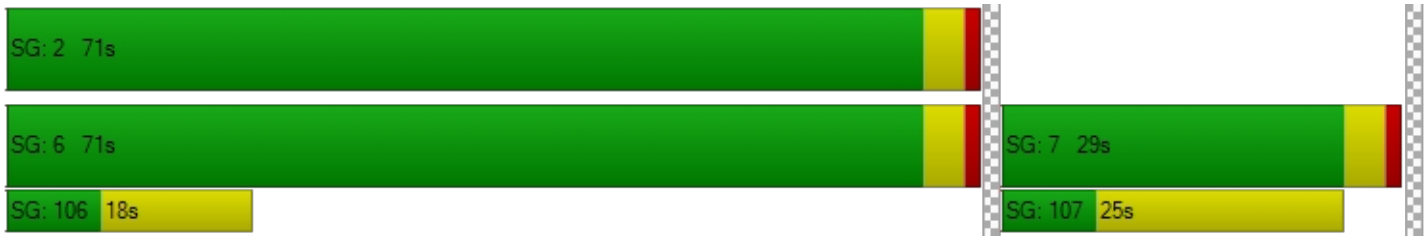
d_M, Delay for Movement [s/veh]	2.28	2.28	0.98	1.64	47.32	49.01
Movement LOS	A	A	A	A	D	D
d_A, Approach Delay [s/veh]	2.28		1.60		48.36	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.13					
Intersection LOS	A					
Intersection V/C	0.443					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.59	39.59
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.028	2.104
Crosswalk LOS	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1340	1340	500
d_b, Bicycle Delay [s]	5.44	5.44	28.11
l_b,int, Bicycle LOS Score for Intersection	2.763	2.653	1.560
Bicycle LOS	C	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D-VII

YEAR 2045 PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	124.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.933

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	370	208	188	8	422	48	56	256	607	1069	912	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	370	208	188	8	422	48	56	256	607	1069	912	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	93	52	0	2	106	12	14	64	152	267	228	1
Total Analysis Volume [veh/h]	370	208	0	8	422	48	56	256	607	1069	912	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups									2,8			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	6	6	6	0
Maximum Green [s]	6	30	0	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	10	42	0	10	14	0	11	36	36	28	53	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	31	0	0	0	0	0	25	25	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No	No	No	No	
Maximum Recall		No			No		No	No	No	No	No	
Pedestrian Recall		No			No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	18	18	18	10	10	10	5	52	88	24	71	71
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.08	0.08	0.08	0.04	0.43	0.73	0.20	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.11	0.11	0.10	0.00	0.00	0.13	0.12	0.03	0.04	0.32	0.31	0.16	0.17
s, saturation flow rate [veh/h]	1750	1750	1900	1900	1800	1900	1900	1800	5700	1900	3500	3800	1900
c, Capacity [veh/h]	267	267	290	290	151	159	159	78	2451	1393	700	2231	1115
d1, Uniform Delay [s]	48.53	48.56	47.77	0.00	50.60	54.99	54.99	56.73	20.42	6.28	48.02	12.16	12.27
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.17	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.87	3.93	2.35	0.00	0.14	229.07	211.74	11.87	0.09	0.99	239.34	0.30	0.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.74	0.64	0.00	0.05	1.49	1.45	0.72	0.10	0.44	1.53	0.27	0.28
d, Delay for Lane Group [s/veh]	52.40	52.49	50.11	0.00	50.74	284.06	266.73	68.60	20.50	7.27	287.36	12.45	12.90
Lane Group LOS	D	D	D	A	D	F	F	E	C	A	F	B	B
Critical Lane Group	No	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.88	5.91	5.41	0.00	0.23	14.97	14.20	1.93	1.46	5.74	33.69	3.96	4.29
50th-Percentile Queue Length [ft/ln]	146.9	147.8	135.1	0.00	5.71	374.14	354.94	48.35	36.46	143.58	842.32	98.90	107.22
95th-Percentile Queue Length [veh/ln]	9.86	9.90	9.22	0.00	0.41	24.11	22.90	3.48	2.62	9.67	51.93	7.12	7.69
95th-Percentile Queue Length [ft/ln]	246.4	247.5	230.5	0.00	10.28	602.64	572.51	87.03	65.62	241.84	1298.18	178.02	192.13

Movement, Approach, & Intersection Results

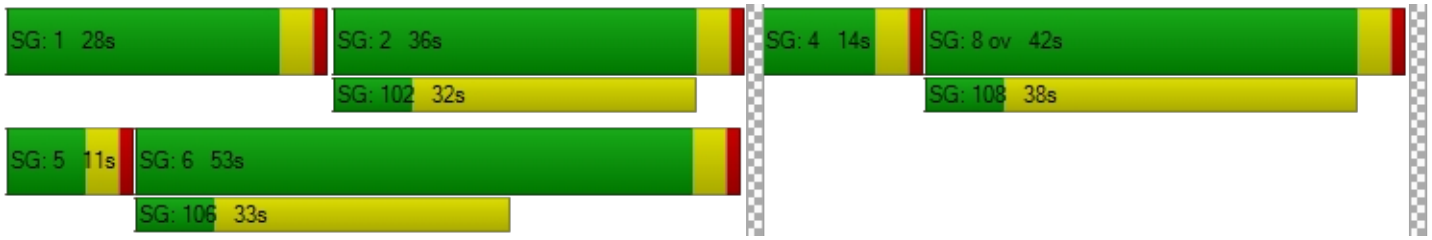
d_M, Delay for Movement [s/veh]	52.44	50.37	0.00	50.74	276.51	266.73	68.60	20.50	7.27	287.36	12.61	12.90
Movement LOS	D	D	A	D	F	F	E	C	A	F	B	B
d_A, Approach Delay [s/veh]	51.69			271.75			14.69			160.72		
Approach LOS	D			F			B			F		
d_I, Intersection Delay [s/veh]	124.30											
Intersection LOS	F											
Intersection V/C	0.933											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	0.00	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.980	2.459	0.000	3.013
Crosswalk LOS	C	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	633	167	533	816
d_b, Bicycle Delay [s]	28.03	50.43	32.28	21.02
l_b,int, Bicycle LOS Score for Intersection	2.036	1.954	2.065	2.650
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	50.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.742

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	68	7	230	248	79	21	135	38	11	109	102
Total Analysis Volume [veh/h]	156	271	27	920	991	314	82	540	150	45	434	408
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	29	38	0	33	42	0	10	39	0	10	39	39
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	28	28
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	12	28	28	29	44	44	6	43	43	5	42	75
g / C, Green / Cycle	0.10	0.23	0.23	0.24	0.37	0.37	0.05	0.35	0.35	0.04	0.35	0.62
(v / s)_i Volume / Saturation Flow Rate	0.09	0.08	0.08	0.26	0.34	0.34	0.02	0.19	0.17	0.03	0.11	0.21
s, saturation flow rate [veh/h]	1800	1900	1900	3500	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	187	440	440	846	702	702	166	672	672	71	1315	1180
d1, Uniform Delay [s]	52.80	38.50	38.42	45.53	36.36	36.36	55.76	30.88	30.38	56.78	28.99	10.99
k, delay calibration	0.11	0.11	0.11	0.11	0.33	0.33	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.38	0.46	0.44	44.69	15.20	15.20	2.25	3.00	2.59	8.79	0.67	0.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.34	0.33	1.09	0.93	0.93	0.49	0.53	0.49	0.63	0.33	0.35
d, Delay for Lane Group [s/veh]	62.17	38.96	38.87	90.22	51.55	51.55	58.01	33.88	32.96	65.56	29.66	11.79
Lane Group LOS	E	D	D	F	D	D	E	C	C	E	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.10	3.78	3.68	17.73	20.98	20.98	1.26	8.78	8.00	1.52	4.76	5.33
50th-Percentile Queue Length [ft/ln]	127.48	94.43	92.10	443.36	524.44	524.44	31.62	219.47	199.90	37.99	118.91	133.20
95th-Percentile Queue Length [veh/ln]	8.80	6.80	6.63	25.85	28.49	28.49	2.28	13.64	12.63	2.74	8.33	9.11
95th-Percentile Queue Length [ft/ln]	220.06	169.97	165.78	646.31	712.23	712.23	56.91	340.95	315.83	68.39	208.33	227.84

Movement, Approach, & Intersection Results

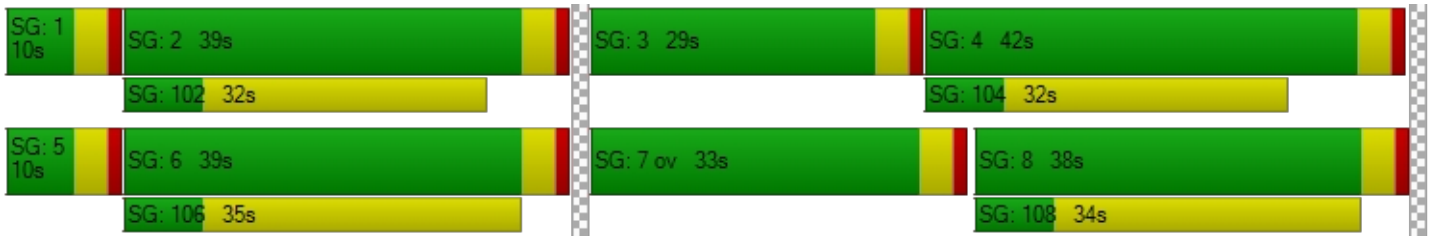
d_M, Delay for Movement [s/veh]	62.17	38.92	38.87	90.22	51.55	51.55	58.01	33.57	32.96	65.56	29.66	11.79
Movement LOS	E	D	D	F	D	D	E	C	C	E	C	B
d_A, Approach Delay [s/veh]	46.91			67.54			36.05			23.26		
Approach LOS	D			E			D			C		
d_I, Intersection Delay [s/veh]	50.72											
Intersection LOS	D											
Intersection V/C	0.742											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	2.633	2.952	2.739	2.852
Crosswalk LOS	B	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	633	583	583
d_b, Bicycle Delay [s]	30.83	28.03	30.12	30.12
l_b,int, Bicycle LOS Score for Intersection	1.934	3.395	2.197	2.291
Bicycle LOS	A	C	B	B

Sequence

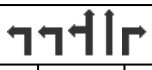
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	31.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.768

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	63	40	242	154	10	12	351	69	74	411	155
Total Analysis Volume [veh/h]	280	250	160	968	615	38	46	1403	277	294	1644	619
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	6	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	10	48	0	10	48	0	10	45	0	12	47	47
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	36	0	0	34	0	0	26	26
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall		No			No		No	No		No	No	No
Maximum Recall		No			No		No	No		No	No	No
Pedestrian Recall		No			No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	33	33	33	33	33	33	33	4	52	52	8	55	93
g / C, Green / Cycle	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.04	0.49	0.49	0.08	0.53	0.88
(v / s)_i Volume / Saturation Flow Rate	0.08	0.07	0.08	0.19	0.22	0.27	0.02	0.03	0.30	0.29	0.08	0.29	0.33
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1750	1900	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	227	1201	601	942	613	601	601	76	1874	937	267	3005	1675
d1, Uniform Delay [s]	26.25	26.28	26.81	30.47	31.63	33.60	25.05	49.40	19.21	18.94	48.49	16.49	1.10
k, delay calibration	0.11	0.11	0.11	0.11	0.12	0.20	0.11	0.11	0.50	0.50	0.11	0.50	0.30
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	114.43	0.09	0.23	1.06	1.20	6.23	0.04	7.40	1.45	2.66	57.33	0.72	0.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.24	0.21	0.27	0.72	0.64	0.85	0.06	0.60	0.60	0.58	1.10	0.55	0.37
d, Delay for Lane Group [s/veh]	140.68	26.37	27.05	31.53	32.84	39.83	25.10	56.80	20.66	21.60	105.82	17.22	1.47
Lane Group LOS	F	C	C	C	C	D	C	E	C	C	F	B	A
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.67	2.30	3.02	7.34	8.82	12.99	0.67	1.34	9.96	9.83	5.61	8.59	0.70
50th-Percentile Queue Length [ft/ln]	141.73	57.46	75.55	183.4	220.5	324.7	16.73	33.49	249.11	245.85	140.29	214.74	17.52
95th-Percentile Queue Length [veh/ln]	10.20	4.14	5.44	11.78	13.69	18.90	1.20	2.41	15.14	14.98	9.79	13.40	1.26
95th-Percentile Queue Length [ft/ln]	255.11	103.43	135.99	294.5	342.2	472.5	30.12	60.27	378.54	374.42	244.73	334.91	31.53

Movement, Approach, & Intersection Results

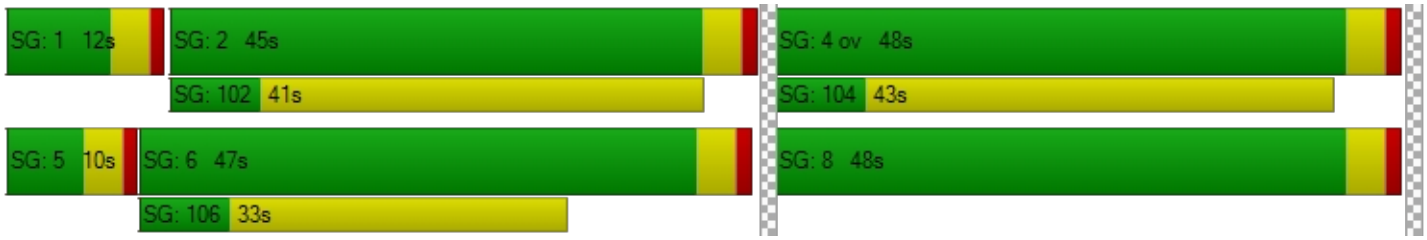
d_M, Delay for Movement [s/veh]	140.68	26.37	27.05	31.80	38.66	25.10	56.80	20.84	21.60	105.82	17.22	1.47
Movement LOS	F	C	C	C	D	C	E	C	C	F	B	A
d_A, Approach Delay [s/veh]	72.91			34.32			21.92			23.59		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	30.95											
Intersection LOS	C											
Intersection V/C	0.768											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.08	42.08	42.08	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.862	2.954	3.513	0.000
Crosswalk LOS	C	C	D	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	838	838	781	819
d_b, Bicycle Delay [s]	17.72	17.72	19.50	18.30
l_b,int, Bicycle LOS Score for Intersection	2.129	2.897	2.509	2.966
Bicycle LOS	B	C	B	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Valencia Avenue at Lambert Road/Carbon Canyon Road

Control Type:	Signalized	Delay (sec / veh):	23.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Lambert Road			Carbon Canyon Road		
Base Volume Input [veh/h]	422	162	873	27	124	38	33	957	598	198	369	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	422	162	873	27	124	38	33	957	598	198	369	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	106	41	0	7	31	10	8	239	150	50	92	2
Total Analysis Volume [veh/h]	422	162	0	27	124	38	33	957	598	198	369	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups									2,8			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	6	6	6	0
Maximum Green [s]	6	30	0	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	10	42	0	10	11	0	10	36	36	21	47	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	31	0	0	0	0	0	25	25	0	26	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No	No	No	No	
Maximum Recall		No			No		No	No	No	No	No	
Pedestrian Recall		No			No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	18	18	18	7	7	7	4	61	94	8	65	65
g / C, Green / Cycle	0.16	0.16	0.16	0.16	0.06	0.06	0.06	0.04	0.55	0.85	0.08	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.09	0.00	0.02	0.04	0.04	0.02	0.17	0.31	0.06	0.07	0.07
s, saturation flow rate [veh/h]	1750	1750	1900	1900	1800	1900	1900	1800	5700	1900	3500	3800	1900
c, Capacity [veh/h]	287	287	312	312	111	117	117	64	3146	1615	270	2255	1127
d1, Uniform Delay [s]	43.72	43.72	42.04	0.00	49.24	50.69	50.63	52.15	13.29	1.80	49.69	9.74	9.77
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.63	3.63	1.34	0.00	1.13	7.52	6.89	6.23	0.25	0.65	3.83	0.10	0.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.73	0.52	0.00	0.24	0.70	0.68	0.51	0.30	0.37	0.73	0.11	0.11
d, Delay for Lane Group [s/veh]	47.35	47.35	43.37	0.00	50.37	58.21	57.52	58.38	13.54	2.46	53.52	9.84	9.98
Lane Group LOS	D	D	D	A	D	E	E	E	B	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.73	5.73	4.13	0.00	0.74	2.46	2.37	1.01	4.21	1.76	2.80	1.30	1.39
50th-Percentile Queue Length [ft/ln]	143.2	143.2	103.2	0.00	18.56	61.54	59.37	25.14	105.21	44.12	70.06	32.40	34.68
95th-Percentile Queue Length [veh/ln]	9.65	9.65	7.44	0.00	1.34	4.43	4.27	1.81	7.57	3.18	5.04	2.33	2.50
95th-Percentile Queue Length [ft/ln]	241.3	241.3	185.8	0.00	33.42	110.77	106.87	45.25	189.32	79.42	126.11	58.31	62.42

Movement, Approach, & Intersection Results

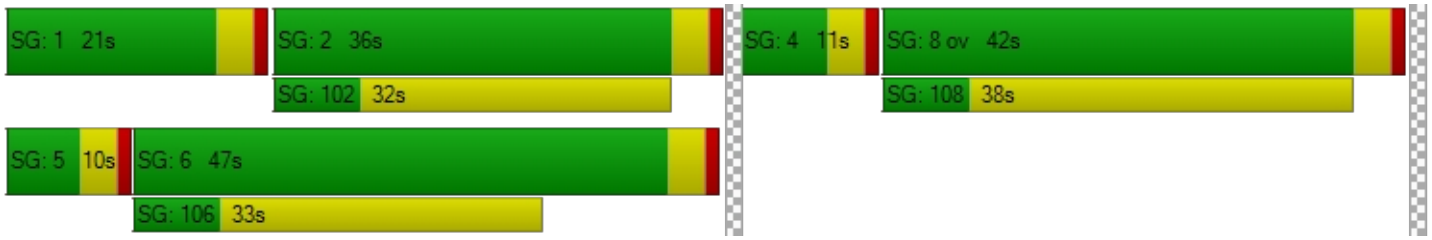
d_M, Delay for Movement [s/veh]	47.35	43.37	0.00	50.37	57.98	57.52	58.38	13.54	2.46	53.52	9.88	9.98
Movement LOS	D	D	A	D	E	E	E	B	A	D	A	A
d_A, Approach Delay [s/veh]	46.25			56.80			10.30			24.88		
Approach LOS	D			E			B			C		
d_I, Intersection Delay [s/veh]	23.30											
Intersection LOS	C											
Intersection V/C	0.559											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	0.00	44.58
l_p,int, Pedestrian LOS Score for Intersection	2.813	2.386	0.000	2.925
Crosswalk LOS	C	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	691	127	582	781
d_b, Bicycle Delay [s]	23.59	48.25	27.68	20.43
l_b,int, Bicycle LOS Score for Intersection	2.041	1.716	2.433	1.876
Bicycle LOS	B	A	B	A

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Valencia Avenue at Birch Street/Rose Drive

Control Type:	Signalized	Delay (sec / veh):	38.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.947

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Birch Street			Rose Drive		
Base Volume Input [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	178	13	141	77	16	57	184	41	9	141	229
Total Analysis Volume [veh/h]	240	710	53	562	308	64	229	735	165	34	565	917
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												6,7
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	27	38	0	25	36	0	13	36	0	16	39	39
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	27	0	0	25	0	0	25	0	0	28	28
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall	No	No		No	No		No	No		No	No	No
Maximum Recall	No	No		No	No		No	No		No	No	No
Pedestrian Recall	No	No		No	No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	17	26	26	21	30	30	9	48	48	4	43	68
g / C, Green / Cycle	0.15	0.23	0.23	0.18	0.26	0.26	0.08	0.42	0.42	0.04	0.37	0.59
(v / s)_i Volume / Saturation Flow Rate	0.13	0.20	0.20	0.16	0.10	0.09	0.07	0.24	0.23	0.02	0.15	0.48
s, saturation flow rate [veh/h]	1800	1900	1900	3500	1900	1900	3500	1900	1900	1800	3800	1900
c, Capacity [veh/h]	272	432	432	640	493	493	276	789	789	64	1413	1120
d1, Uniform Delay [s]	47.86	43.10	42.83	45.78	35.11	34.88	52.24	26.04	25.54	54.56	26.68	18.76
k, delay calibration	0.11	0.23	0.21	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.20	12.53	10.28	4.09	0.50	0.46	6.31	3.21	2.78	6.70	0.85	6.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.89	0.87	0.88	0.39	0.37	0.83	0.59	0.55	0.53	0.40	0.82
d, Delay for Lane Group [s/veh]	57.06	55.62	53.12	49.87	35.61	35.33	58.55	29.25	28.32	61.25	27.52	25.48
Lane Group LOS	E	E	D	D	D	D	E	C	C	E	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.41	12.07	11.49	8.14	4.50	4.20	3.50	10.40	9.53	1.09	5.87	20.21
50th-Percentile Queue Length [ft/ln]	185.28	301.84	287.13	203.52	112.47	105.11	87.40	259.94	238.37	27.19	146.63	505.34
95th-Percentile Queue Length [veh/ln]	11.88	17.77	17.04	12.82	7.98	7.57	6.29	15.69	14.60	1.96	9.84	27.59
95th-Percentile Queue Length [ft/ln]	296.90	444.30	426.08	320.50	199.43	189.18	157.33	392.15	364.97	48.94	245.93	689.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.06	54.48	53.12	49.87	35.51	35.33	58.55	28.91	28.32	61.25	27.52	25.48
Movement LOS	E	D	D	D	D	D	E	C	C	E	C	C
d_A, Approach Delay [s/veh]	55.02			44.14			34.83			27.04		
Approach LOS	E			D			C			C		
d_I, Intersection Delay [s/veh]	38.57											
Intersection LOS	D											
Intersection V/C	0.947											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.05	47.05	47.05	47.05
l_p,int, Pedestrian LOS Score for Intersection	2.606	2.918	2.789	2.930
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	591	556	556	608
d_b, Bicycle Delay [s]	28.54	29.97	29.97	27.84
l_b,int, Bicycle LOS Score for Intersection	2.387	2.330	2.491	2.810
Bicycle LOS	B	B	B	C

Sequence

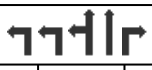
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Rose Drive at Imperial Highway

Control Type:	Signalized	Delay (sec / veh):	29.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Rose Drive			Rose Drive			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	77	164	36	260	137	8	23	501	79	44	393	224
Total Analysis Volume [veh/h]	306	657	143	1040	549	33	91	2005	315	176	1570	896
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap
Signal Group	3	8	0	7	4	0	5	2	0	1	6	6
Auxiliary Signal Groups												4,6
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	6
Maximum Green [s]	30	30	0	6	30	0	30	30	0	30	30	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
Split [s]	10	50	0	10	50	0	10	45	0	10	45	45
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	7
Pedestrian Clearance [s]	0	0	0	0	36	0	0	34	0	0	26	26
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
Minimum Recall		No			No		No	No		No	No	No
Maximum Recall		No			No		No	No		No	No	No
Pedestrian Recall		No			No		No	No		No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00
g_i, Effective Green Time [s]	36	36	36	36	36	36	36	6	51	51	6	51	91
g / C, Green / Cycle	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.06	0.48	0.48	0.06	0.48	0.87
(v / s)_i Volume / Saturation Flow Rate	0.09	0.17	0.08	0.20	0.20	0.29	0.02	0.05	0.41	0.41	0.05	0.28	0.47
s, saturation flow rate [veh/h]	3500	3800	1900	3500	1750	1900	1900	1800	3800	1900	3500	5700	1900
c, Capacity [veh/h]	270	1305	652	722	669	652	652	106	1837	918	206	2755	1643
d1, Uniform Delay [s]	24.53	27.36	24.48	28.22	28.22	31.83	23.03	48.96	23.57	23.72	48.94	19.33	1.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.21	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	70.22	0.30	0.17	8.80	0.62	5.74	0.03	17.38	4.80	9.53	9.57	0.86	1.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.13	0.50	0.22	0.96	0.52	0.84	0.05	0.86	0.84	0.85	0.85	0.57	0.55
d, Delay for Lane Group [s/veh]	94.75	27.67	24.64	37.02	28.85	37.57	23.06	66.34	28.38	33.25	58.51	20.19	3.12
Lane Group LOS	F	C	C	D	C	D	C	E	C	C	E	C	A
Critical Lane Group	No	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.01	6.51	2.55	7.91	7.15	13.60	0.55	2.87	17.00	18.45	2.55	9.00	2.34
50th-Percentile Queue Length [ft/ln]	125.37	162.85	63.63	197.8	178.6	339.9	13.80	71.72	425.04	461.17	63.81	225.02	58.59
95th-Percentile Queue Length [veh/ln]	9.03	10.70	4.58	12.53	11.53	19.64	0.99	5.16	23.76	25.49	4.59	13.92	4.22
95th-Percentile Queue Length [ft/ln]	225.67	267.49	114.54	313.1	288.2	491.0	24.84	129.09	594.09	637.26	114.85	348.03	105.46

Movement, Approach, & Intersection Results

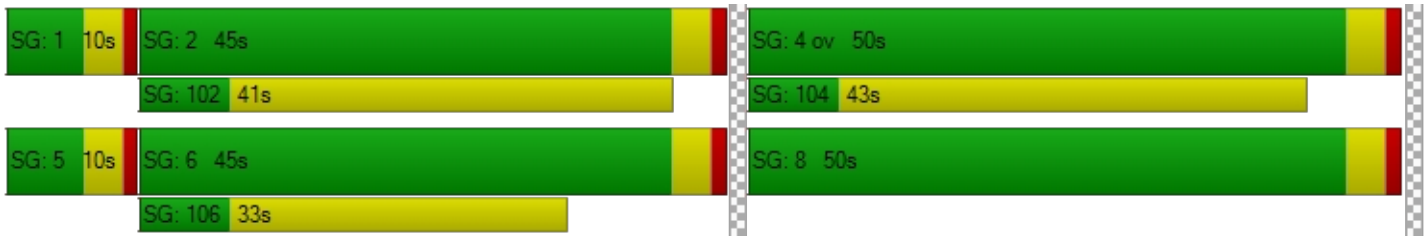
d_M, Delay for Movement [s/veh]	94.75	27.67	24.64	34.30	37.57	23.06	66.34	29.50	33.25	58.51	20.19	3.12
Movement LOS	F	C	C	C	D	C	E	C	C	E	C	A
d_A, Approach Delay [s/veh]	45.84			35.18			31.38			16.96		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	29.33											
Intersection LOS	C											
Intersection V/C	0.883											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.07	42.07	42.07	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.900	3.056	3.638	0.000
Crosswalk LOS	C	C	D	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	876	876	781	781
d_b, Bicycle Delay [s]	16.57	16.57	19.50	19.50
l_b,int, Bicycle LOS Score for Intersection	2.472	2.898	2.886	3.013
Bicycle LOS	B	C	C	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX E

YEAR 2045 MODELING WORKSHEETS

1. State College Boulevard at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	147	NORTHBOUND	
	THRU	187	IN ...	470
	RIGHT	129	OUT ...	1299
SOUTH BOUND	LEFT	840	SOUTHBOUND	
	THRU	564	IN ...	1438
	RIGHT	8	OUT ...	645
EAST BOUND	LEFT	13	EASTBOUND	
	THRU	1185	IN ...	1580
	RIGHT	191	OUT ...	1438
WEST BOUND	LEFT	417	WESTBOUND	
	THRU	1476	IN ...	2191
	RIGHT	519	OUT ...	2297

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	147	194
	THRU	187	247
	RIGHT	129	228
SOUTH BOUND	LEFT	840	1,011
	THRU	564	688
	RIGHT	8	9
EAST BOUND	LEFT	13	16
	THRU	1,185	1,587
	RIGHT	191	238
WEST BOUND	LEFT	417	534
	THRU	1,476	2,025
	RIGHT	519	627

2. SR-57 SB Ramps at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	0	NORTHBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	662
SOUTH BOUND	LEFT	997	SOUTHBOUND	
	THRU	0	IN ...	1538
	RIGHT	498	OUT ...	0
EAST BOUND	LEFT	0	EASTBOUND	
	THRU	1611	IN ...	2303
	RIGHT	549	OUT ...	2245
WEST BOUND	LEFT	211	WESTBOUND	
	THRU	1968	IN ...	1959
	RIGHT	0	OUT ...	2893

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0
SOUTH BOUND	LEFT	997	1,075
	THRU	0	0
	RIGHT	498	725
EAST BOUND	LEFT	0	0
	THRU	1,611	1,939
	RIGHT	549	650
WEST BOUND	LEFT	211	269
	THRU	1,968	2,274
	RIGHT	0	0

3. SR-57 NB Ramps at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	989	NORTHBOUND	
	THRU	0	IN ...	1,423
	RIGHT	468	OUT ...	0
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	764
EAST BOUND	LEFT	267	EASTBOUND	
	THRU	2331	IN ...	2,883
	RIGHT	0	OUT ...	1,970
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	1201	IN ...	1,516
	RIGHT	461	OUT ...	3,086

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	989	1,104
	THRU	0	0
	RIGHT	468	531
SOUTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0
EAST BOUND	LEFT	267	419
	THRU	2,331	2,586
	RIGHT	0	0
WEST BOUND	LEFT	0	0
	THRU	1,201	1,452
	RIGHT	461	511

4. Pointe Drive at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	8	NORTHBOUND	
	THRU	7	IN ...	21
	RIGHT	6	OUT ...	51
SOUTH BOUND	LEFT	42	SOUTHBOUND	
	THRU	1	IN ...	128
	RIGHT	85	OUT ...	611
EAST BOUND	LEFT	459	EASTBOUND	
	THRU	2114	IN ...	2,895
	RIGHT	35	OUT ...	1,525
WEST BOUND	LEFT	15	WESTBOUND	
	THRU	1578	IN ...	1,592
	RIGHT	145	OUT ...	2,449

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	8	9
	THRU	7	8
	RIGHT	6	7
SOUTH BOUND	LEFT	42	69
	THRU	1	1
	RIGHT	85	137
EAST BOUND	LEFT	459	585
	THRU	2,114	2,590
	RIGHT	35	42
WEST BOUND	LEFT	15	18
	THRU	1,578	1,999
	RIGHT	145	192

5. Wildcat Way/N Associated Road at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	137	NORTHBOUND	
	THRU	268	IN ...	415
	RIGHT	10	OUT ...	348
SOUTH BOUND	LEFT	104	SOUTHBOUND	
	THRU	182	IN ...	625
	RIGHT	339	OUT ...	838
EAST BOUND	LEFT	417	EASTBOUND	
	THRU	1659	IN ...	2,516
	RIGHT	140	OUT ...	1,498
WEST BOUND	LEFT	19	WESTBOUND	
	THRU	1195	IN ...	1,194
	RIGHT	153	OUT ...	2,066

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	137	169
	THRU	268	322
	RIGHT	10	11
SOUTH BOUND	LEFT	104	125
	THRU	182	218
	RIGHT	339	405
EAST BOUND	LEFT	417	499
	THRU	1,659	2,059
	RIGHT	140	173
WEST BOUND	LEFT	19	23
	THRU	1,195	1,554
	RIGHT	153	183

6. Santa Fe Road/Kraemer Boulevard at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	277	NORTHBOUND	
	THRU	107	IN ...	283
	RIGHT	30	OUT ...	1,782
SOUTH BOUND	LEFT	18	SOUTHBOUND	
	THRU	204	IN ...	530
	RIGHT	308	OUT ...	211
EAST BOUND	LEFT	92	EASTBOUND	
	THRU	614	IN ...	2,014
	RIGHT	1008	OUT ...	1,094
WEST BOUND	LEFT	253	WESTBOUND	
	THRU	691	IN ...	960
	RIGHT	12	OUT ...	700

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	277	332
	THRU	107	130
	RIGHT	30	40
SOUTH BOUND	LEFT	18	22
	THRU	204	236
	RIGHT	308	373
EAST BOUND	LEFT	92	111
	THRU	614	803
	RIGHT	1,008	1,243
WEST BOUND	LEFT	253	303
	THRU	691	946
	RIGHT	12	14

7. Sunflower Street at Lambert Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	40	NORTHBOUND	
	THRU	5	IN ...	63
	RIGHT	16	OUT ...	64
SOUTH BOUND	LEFT	4	SOUTHBOUND	
	THRU	0	IN ...	9
	RIGHT	5	OUT ...	13
EAST BOUND	LEFT	6	EASTBOUND	
	THRU	654	IN ...	741
	RIGHT	43	OUT ...	981
WEST BOUND	LEFT	22	WESTBOUND	
	THRU	932	IN ...	960
	RIGHT	2	OUT ...	715

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	40	48
	THRU	5	6
	RIGHT	16	19
SOUTH BOUND	LEFT	4	5
	THRU	0	0
	RIGHT	5	6
EAST BOUND	LEFT	6	7
	THRU	654	856
	RIGHT	43	51
WEST BOUND	LEFT	22	26
	THRU	932	1,236
	RIGHT	2	2

8. Valencia Avenue at Lambert Road/Carbon Canyon Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	264	NORTHBOUND	
	THRU	173	IN ...	586
	RIGHT	132	OUT ...	1,738
SOUTH BOUND	LEFT	7	SOUTHBOUND	
	THRU	352	IN ...	397
	RIGHT	38	OUT ...	219
EAST BOUND	LEFT	44	EASTBOUND	
	THRU	148	IN ...	721
	RIGHT	488	OUT ...	964
WEST BOUND	LEFT	862	WESTBOUND	
	THRU	658	IN ...	1,562
	RIGHT	2	OUT ...	346

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	264	316
	THRU	173	208
	RIGHT	132	174
SOUTH BOUND	LEFT	7	8
	THRU	352	422
	RIGHT	38	48
EAST BOUND	LEFT	44	56
	THRU	148	248
	RIGHT	488	584
WEST BOUND	LEFT	862	1,067
	THRU	658	906
	RIGHT	2	2

9. Santa Fe Road at Carbon Canyon Road

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	4	NORTHBOUND	
	THRU	1	IN ...	6
	RIGHT	1	OUT ...	13
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	0	IN ...	29
	RIGHT	22	OUT ...	29
EAST BOUND	LEFT	13	EASTBOUND	
	THRU	294	IN ...	373
	RIGHT	7	OUT ...	1608
WEST BOUND	LEFT	6	WESTBOUND	
	THRU	1542	IN ...	1587
	RIGHT	4	OUT ...	345

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	4	5
	THRU	1	1
	RIGHT	1	1
SOUTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	22	29
EAST BOUND	LEFT	13	22
	THRU	294	428
	RIGHT	7	8
WEST BOUND	LEFT	6	7
	THRU	1,542	1,990
	RIGHT	4	6

10. State College Boulevard at Birch Street

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	73	NORTHBOUND	
	THRU	115	IN ...	277
	RIGHT	93	OUT ...	1068
SOUTH BOUND	LEFT	610	SOUTHBOUND	
	THRU	755	IN ...	1624
	RIGHT	141	OUT ...	448
EAST BOUND	LEFT	72	EASTBOUND	
	THRU	487	IN ...	723
	RIGHT	46	OUT ...	825
WEST BOUND	LEFT	74	WESTBOUND	
	THRU	540	IN ...	966
	RIGHT	265	OUT ...	1250

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	73	88
	THRU	115	166
	RIGHT	93	111
SOUTH BOUND	LEFT	610	776
	THRU	755	964
	RIGHT	141	254
EAST BOUND	LEFT	72	125
	THRU	487	576
	RIGHT	46	68
WEST BOUND	LEFT	74	98
	THRU	540	660
	RIGHT	265	338

11. S Associated Road at Birch Street

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	228	NORTHBOUND	
	THRU	6	IN ...	527
	RIGHT	298	OUT ...	539
SOUTH BOUND	LEFT	53	SOUTHBOUND	
	THRU	28	IN ...	89
	RIGHT	8	OUT ...	18
EAST BOUND	LEFT	2	EASTBOUND	
	THRU	883	IN ...	1,178
	RIGHT	294	OUT ...	1,030
WEST BOUND	LEFT	332	WESTBOUND	
	THRU	724	IN ...	1,102
	RIGHT	10	OUT ...	1,309

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	228	286
	THRU	6	7
	RIGHT	298	361
SOUTH BOUND	LEFT	53	63
	THRU	28	34
	RIGHT	8	11
EAST BOUND	LEFT	2	5
	THRU	883	1,094
	RIGHT	294	374
WEST BOUND	LEFT	332	399
	THRU	724	887
	RIGHT	10	11

12. N Associated Road at Birch Street

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	3	NORTHBOUND	
	THRU	3	IN ...	11
	RIGHT	5	OUT ...	26
SOUTH BOUND	LEFT	152	SOUTHBOUND	
	THRU	2	IN ...	617
	RIGHT	437	OUT ...	392
EAST BOUND	LEFT	309	EASTBOUND	
	THRU	810	IN ...	1,210
	RIGHT	16	OUT ...	1,172
WEST BOUND	LEFT	8	WESTBOUND	
	THRU	696	IN ...	818
	RIGHT	78	OUT ...	1,067

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	3	3
	THRU	3	3
	RIGHT	5	6
SOUTH BOUND	LEFT	152	187
	THRU	2	2
	RIGHT	437	524
EAST BOUND	LEFT	309	371
	THRU	810	1,010
	RIGHT	16	19
WEST BOUND	LEFT	8	9
	THRU	696	856
	RIGHT	78	99

13. Kraemer Boulevard at Birch Street

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	130	NORTHBOUND	
	THRU	209	IN ...	265
	RIGHT	89	OUT ...	1,637
SOUTH BOUND	LEFT	427	SOUTHBOUND	
	THRU	958	IN ...	1,903
	RIGHT	171	OUT ...	305
EAST BOUND	LEFT	36	EASTBOUND	
	THRU	533	IN ...	1,012
	RIGHT	335	OUT ...	749
WEST BOUND	LEFT	60	WESTBOUND	
	THRU	411	IN ...	672
	RIGHT	209	OUT ...	1,162

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	130	155
	THRU	209	251
	RIGHT	89	106
SOUTH BOUND	LEFT	427	507
	THRU	958	1,184
	RIGHT	171	213
EAST BOUND	LEFT	36	48
	THRU	533	678
	RIGHT	335	388
WEST BOUND	LEFT	60	72
	THRU	411	517
	RIGHT	209	250

14. Valencia Avenue at Birch Street/Rose Drive

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	130	NORTHBOUND	
	THRU	196	IN ...	341
	RIGHT	13	OUT ...	957
SOUTH BOUND	LEFT	718	SOUTHBOUND	
	THRU	755	IN ...	1,752
	RIGHT	243	OUT ...	578
EAST BOUND	LEFT	60	EASTBOUND	
	THRU	418	IN ...	668
	RIGHT	130	OUT ...	715
WEST BOUND	LEFT	12	WESTBOUND	
	THRU	340	IN ...	677
	RIGHT	305	OUT ...	1,188

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	130	155
	THRU	196	251
	RIGHT	13	16
SOUTH BOUND	LEFT	718	860
	THRU	755	939
	RIGHT	243	292
EAST BOUND	LEFT	60	72
	THRU	418	531
	RIGHT	130	149
WEST BOUND	LEFT	12	15
	THRU	340	422
	RIGHT	305	365

15. Rose Drive at Vesuvius Drive

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	10	NORTHBOUND	
	THRU	665	IN ...	678
	RIGHT	0	OUT ...	1,383
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	1202	IN ...	1,251
	RIGHT	10	OUT ...	693
EAST BOUND	LEFT	8	EASTBOUND	
	THRU	0	IN ...	268
	RIGHT	33	OUT ...	121
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	0

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	10	54
	THRU	665	811
	RIGHT	0	0
SOUTH BOUND	LEFT	0	0
	THRU	1,202	1,469
	RIGHT	10	67
EAST BOUND	LEFT	8	61
	THRU	0	0
	RIGHT	33	207
WEST BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0

16. SR-57 SB Ramps at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	0	NORTHBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	603
SOUTH BOUND	LEFT	558	SOUTHBOUND	
	THRU	0	IN ...	1,134
	RIGHT	445	OUT ...	174
EAST BOUND	LEFT	0	EASTBOUND	
	THRU	1366	IN ...	2,318
	RIGHT	619	OUT ...	2,300
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	1589	IN ...	1,895
	RIGHT	174	OUT ...	2,269

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0
SOUTH BOUND	LEFT	558	684
	THRU	0	0
	RIGHT	445	562
EAST BOUND	LEFT	0	0
	THRU	1,366	1,696
	RIGHT	619	805
WEST BOUND	LEFT	0	0
	THRU	1,589	2,166
	RIGHT	174	232

17. SR-57 NB Ramps at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	803	NORTHBOUND	
	THRU	43	IN ...	1593
	RIGHT	761	OUT ...	515
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	0	IN ...	50
	RIGHT	50	OUT ...	177
EAST BOUND	LEFT	116	EASTBOUND	
	THRU	1241	IN ...	2150
	RIGHT	515	OUT ...	2407
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	1355	IN ...	1636
	RIGHT	18	OUT ...	2331

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	803	1,125
	THRU	43	38
	RIGHT	761	949
SOUTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	50	96
EAST BOUND	LEFT	116	118
	THRU	1,241	1,520
	RIGHT	515	627
WEST BOUND	LEFT	0	0
	THRU	1,355	1,721
	RIGHT	18	21

18. Associated Road at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	140	NORTHBOUND	
	THRU	198	IN ...	410
	RIGHT	68	OUT ...	341
SOUTH BOUND	LEFT	142	SOUTHBOUND	
	THRU	314	IN ...	429
	RIGHT	139	OUT ...	345
EAST BOUND	LEFT	142	EASTBOUND	
	THRU	1758	IN ...	2324
	RIGHT	95	OUT ...	2047
WEST BOUND	LEFT	88	WESTBOUND	
	THRU	1505	IN ...	1966
	RIGHT	80	OUT ...	2396

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	140	168
	THRU	198	238
	RIGHT	68	94
SOUTH BOUND	LEFT	142	190
	THRU	314	378
	RIGHT	139	183
EAST BOUND	LEFT	142	237
	THRU	1,758	2,165
	RIGHT	95	113
WEST BOUND	LEFT	88	105
	THRU	1,505	1,792
	RIGHT	80	113

19. Castlegate Lane/Placentia Avenue at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	163	NORTHBOUND	
	THRU	11	IN ...	335
	RIGHT	138	OUT ...	708
SOUTH BOUND	LEFT	24	SOUTHBOUND	
	THRU	27	IN ...	64
	RIGHT	13	OUT ...	54
EAST BOUND	LEFT	12	EASTBOUND	
	THRU	1721	IN ...	2,500
	RIGHT	339	OUT ...	1,846
WEST BOUND	LEFT	167	WESTBOUND	
	THRU	1377	IN ...	1,862
	RIGHT	31	OUT ...	2,154

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	163	191
	THRU	11	14
	RIGHT	138	167
SOUTH BOUND	LEFT	24	28
	THRU	27	33
	RIGHT	13	16
EAST BOUND	LEFT	12	14
	THRU	1,721	2,150
	RIGHT	339	478
WEST BOUND	LEFT	167	201
	THRU	1,377	1,741
	RIGHT	31	37

20. Kraemer Boulevard at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	163	NORTHBOUND	
	THRU	231	IN ...	392
	RIGHT	81	OUT ...	1,062
SOUTH BOUND	LEFT	308	SOUTHBOUND	
	THRU	608	IN ...	1,305
	RIGHT	105	OUT ...	280
EAST BOUND	LEFT	128	EASTBOUND	
	THRU	1187	IN ...	1,762
	RIGHT	227	OUT ...	1,500
WEST BOUND	LEFT	67	WESTBOUND	
	THRU	982	IN ...	1,301
	RIGHT	84	OUT ...	1,919

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	163	202
	THRU	231	276
	RIGHT	81	99
SOUTH BOUND	LEFT	308	413
	THRU	608	744
	RIGHT	105	148
EAST BOUND	LEFT	128	155
	THRU	1,187	1,498
	RIGHT	227	276
WEST BOUND	LEFT	67	81
	THRU	982	1,260
	RIGHT	84	101

21. Valencia Avenue at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	121	NORTHBOUND	
	THRU	167	IN ...	420
	RIGHT	113	OUT ...	492
SOUTH BOUND	LEFT	255	SOUTHBOUND	
	THRU	254	IN ...	758
	RIGHT	184	OUT ...	521
EAST BOUND	LEFT	179	EASTBOUND	
	THRU	909	IN ...	1,440
	RIGHT	84	OUT ...	1,891
WEST BOUND	LEFT	111	WESTBOUND	
	THRU	1424	IN ...	1,835
	RIGHT	134	OUT ...	1,548

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	121	151
	THRU	167	211
	RIGHT	113	135
SOUTH BOUND	LEFT	255	314
	THRU	254	330
	RIGHT	184	225
EAST BOUND	LEFT	179	207
	THRU	909	1,135
	RIGHT	84	99
WEST BOUND	LEFT	111	133
	THRU	1,424	1,775
	RIGHT	134	166

22. Rose Drive at Imperial Highway

AM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	234	NORTHBOUND	
	THRU	181	IN ...	596
	RIGHT	133	OUT ...	1,073
SOUTH BOUND	LEFT	775	SOUTHBOUND	
	THRU	444	IN ...	1,387
	RIGHT	20	OUT ...	718
EAST BOUND	LEFT	33	EASTBOUND	
	THRU	1106	IN ...	1,628
	RIGHT	218	OUT ...	1,715
WEST BOUND	LEFT	246	WESTBOUND	
	THRU	1295	IN ...	2,202
	RIGHT	501	OUT ...	2,307

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	234	280
	THRU	181	216
	RIGHT	133	160
SOUTH BOUND	LEFT	775	959
	THRU	444	518
	RIGHT	20	23
EAST BOUND	LEFT	33	40
	THRU	1,106	1,385
	RIGHT	218	277
WEST BOUND	LEFT	246	294
	THRU	1,295	1,625
	RIGHT	501	614

1. State College Boulevard at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	294	NORTHBOUND	
	THRU	558	IN ...	1159
	RIGHT	242	OUT ...	892
SOUTH BOUND	LEFT	529	SOUTHBOUND	
	THRU	359	IN ...	848
	RIGHT	14	OUT ...	1259
EAST BOUND	LEFT	37	EASTBOUND	
	THRU	1108	IN ...	1208
	RIGHT	238	OUT ...	1386
WEST BOUND	LEFT	303	WESTBOUND	
	THRU	979	IN ...	2024
	RIGHT	666	OUT ...	1703

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	294	368
	THRU	558	685
	RIGHT	242	345
SOUTH BOUND	LEFT	529	637
	THRU	359	455
	RIGHT	14	17
EAST BOUND	LEFT	37	44
	THRU	1,108	1,679
	RIGHT	238	302
WEST BOUND	LEFT	303	443
	THRU	979	1,350
	RIGHT	666	801

2. SR-57 SB Ramps at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	0	NORTHBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	920
SOUTH BOUND	LEFT	430	SOUTHBOUND	
	THRU	0	IN ...	1138
	RIGHT	675	OUT ...	0
EAST BOUND	LEFT	0	EASTBOUND	
	THRU	1079	IN ...	1627
	RIGHT	724	OUT ...	2313
WEST BOUND	LEFT	219	WESTBOUND	
	THRU	1562	IN ...	1867
	RIGHT	0	OUT ...	1399

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0
SOUTH BOUND	LEFT	430	477
	THRU	0	0
	RIGHT	675	888
EAST BOUND	LEFT	0	0
	THRU	1,079	1,493
	RIGHT	724	877
WEST BOUND	LEFT	219	264
	THRU	1,562	1,821
	RIGHT	0	0

3. SR-57 NB Ramps at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	618	NORTHBOUND	
	THRU	0	IN ...	822
	RIGHT	253	OUT ...	0
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	869
EAST BOUND	LEFT	343	EASTBOUND	
	THRU	1365	IN ...	1,598
	RIGHT	0	OUT ...	1,696
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	992	IN ...	1,670
	RIGHT	497	OUT ...	1,525

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	618	710
	THRU	0	0
	RIGHT	253	316
SOUTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0
EAST BOUND	LEFT	343	600
	THRU	1,365	1,602
	RIGHT	0	0
WEST BOUND	LEFT	0	0
	THRU	992	1,188
	RIGHT	497	554

4. Pointe Drive at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	109	NORTHBOUND	
	THRU	0	IN ...	135
	RIGHT	26	OUT ...	51
SOUTH BOUND	LEFT	95	SOUTHBOUND	
	THRU	0	IN ...	467
	RIGHT	372	OUT ...	201
EAST BOUND	LEFT	159	EASTBOUND	
	THRU	1723	IN ...	1,826
	RIGHT	37	OUT ...	2,016
WEST BOUND	LEFT	14	WESTBOUND	
	THRU	1354	IN ...	1,591
	RIGHT	42	OUT ...	1,751

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	109	130
	THRU	0	0
	RIGHT	26	32
SOUTH BOUND	LEFT	95	126
	THRU	0	0
	RIGHT	372	469
EAST BOUND	LEFT	159	214
	THRU	1,723	2,187
	RIGHT	37	44
WEST BOUND	LEFT	14	17
	THRU	1,354	1,704
	RIGHT	42	63

5. Wildcat Way/N Associated Road at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	125	NORTHBOUND	
	THRU	48	IN ...	194
	RIGHT	19	OUT ...	300
SOUTH BOUND	LEFT	77	SOUTHBOUND	
	THRU	94	IN ...	296
	RIGHT	125	OUT ...	129
EAST BOUND	LEFT	41	EASTBOUND	
	THRU	1633	IN ...	1,755
	RIGHT	186	OUT ...	1,613
WEST BOUND	LEFT	23	WESTBOUND	
	THRU	1181	IN ...	1,424
	RIGHT	40	OUT ...	1,627

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	125	154
	THRU	48	62
	RIGHT	19	23
SOUTH BOUND	LEFT	77	92
	THRU	94	118
	RIGHT	125	150
EAST BOUND	LEFT	41	49
	THRU	1,633	2,090
	RIGHT	186	227
WEST BOUND	LEFT	23	26
	THRU	1,181	1,506
	RIGHT	40	48

6. Santa Fe Road/Kraemer Boulevard at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	474	NORTHBOUND	
	THRU	279	IN ...	1,105
	RIGHT	207	OUT ...	517
SOUTH BOUND	LEFT	4	SOUTHBOUND	
	THRU	94	IN ...	206
	RIGHT	108	OUT ...	477
EAST BOUND	LEFT	172	EASTBOUND	
	THRU	787	IN ...	1,303
	RIGHT	447	OUT ...	1,093
WEST BOUND	LEFT	74	WESTBOUND	
	THRU	312	IN ...	438
	RIGHT	26	OUT ...	964

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	474	611
	THRU	279	343
	RIGHT	207	247
SOUTH BOUND	LEFT	4	5
	THRU	94	122
	RIGHT	108	126
EAST BOUND	LEFT	172	209
	THRU	787	1,073
	RIGHT	447	536
WEST BOUND	LEFT	74	87
	THRU	312	462
	RIGHT	26	32

7. Sunflower Street at Lambert Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	24	NORTHBOUND	
	THRU	2	IN ...	38
	RIGHT	11	OUT ...	26
SOUTH BOUND	LEFT	2	SOUTHBOUND	
	THRU	0	IN ...	7
	RIGHT	5	OUT ...	10
EAST BOUND	LEFT	5	EASTBOUND	
	THRU	1154	IN ...	1,144
	RIGHT	19	OUT ...	618
WEST BOUND	LEFT	5	WESTBOUND	
	THRU	563	IN ...	597
	RIGHT	3	OUT ...	1,134

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	24	28
	THRU	2	2
	RIGHT	11	14
SOUTH BOUND	LEFT	2	2
	THRU	0	0
	RIGHT	5	6
EAST BOUND	LEFT	5	6
	THRU	1,154	1,513
	RIGHT	19	23
WEST BOUND	LEFT	5	6
	THRU	563	761
	RIGHT	3	3

8. Valencia Avenue at Lambert Road/Carbon Canyon Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	308	NORTHBOUND	
	THRU	132	IN ...	1,217
	RIGHT	694	OUT ...	660
SOUTH BOUND	LEFT	23	SOUTHBOUND	
	THRU	99	IN ...	152
	RIGHT	30	OUT ...	165
EAST BOUND	LEFT	25	EASTBOUND	
	THRU	687	IN ...	1,124
	RIGHT	445	OUT ...	593
WEST BOUND	LEFT	130	WESTBOUND	
	THRU	229	IN ...	381
	RIGHT	8	OUT ...	1,454

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	308	369
	THRU	132	162
	RIGHT	694	869
SOUTH BOUND	LEFT	23	27
	THRU	99	124
	RIGHT	30	38
EAST BOUND	LEFT	25	33
	THRU	687	951
	RIGHT	445	532
WEST BOUND	LEFT	130	180
	THRU	229	359
	RIGHT	8	9

9. Santa Fe Road at Carbon Canyon Road

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	10	NORTHBOUND	
	THRU	0	IN ...	12
	RIGHT	2	OUT ...	3
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	0	IN ...	23
	RIGHT	14	OUT ...	15
EAST BOUND	LEFT	1	EASTBOUND	
	THRU	1426	IN ...	1479
	RIGHT	2	OUT ...	326
WEST BOUND	LEFT	1	WESTBOUND	
	THRU	288	IN ...	301
	RIGHT	7	OUT ...	1471

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	10	12
	THRU	0	0
	RIGHT	2	2
SOUTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	14	23
EAST BOUND	LEFT	1	2
	THRU	1,426	1,866
	RIGHT	2	2
WEST BOUND	LEFT	1	1
	THRU	288	444
	RIGHT	7	13

10. State College Boulevard at Birch Street

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	135	NORTHBOUND	
	THRU	337	IN ...	696
	RIGHT	150	OUT ...	599
SOUTH BOUND	LEFT	301	SOUTHBOUND	
	THRU	309	IN ...	834
	RIGHT	250	OUT ...	1165
EAST BOUND	LEFT	188	EASTBOUND	
	THRU	720	IN ...	1112
	RIGHT	150	OUT ...	1395
WEST BOUND	LEFT	135	WESTBOUND	
	THRU	922	IN ...	1728
	RIGHT	584	OUT ...	1212

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	135	157
	THRU	337	468
	RIGHT	150	180
SOUTH BOUND	LEFT	301	393
	THRU	309	415
	RIGHT	250	363
EAST BOUND	LEFT	188	320
	THRU	720	889
	RIGHT	150	182
WEST BOUND	LEFT	135	162
	THRU	922	1,135
	RIGHT	584	749

11. S Associated Road at Birch Street

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	447	NORTHBOUND	
	THRU	31	IN ...	807
	RIGHT	333	OUT ...	531
SOUTH BOUND	LEFT	10	SOUTHBOUND	
	THRU	19	IN ...	35
	RIGHT	6	OUT ...	59
EAST BOUND	LEFT	12	EASTBOUND	
	THRU	828	IN ...	1,145
	RIGHT	278	OUT ...	1,684
WEST BOUND	LEFT	275	WESTBOUND	
	THRU	1176	IN ...	1,518
	RIGHT	16	OUT ...	1,232

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	447	559
	THRU	31	37
	RIGHT	333	398
SOUTH BOUND	LEFT	10	11
	THRU	19	23
	RIGHT	6	11
EAST BOUND	LEFT	12	17
	THRU	828	1,032
	RIGHT	278	349
WEST BOUND	LEFT	275	329
	THRU	1,176	1,461
	RIGHT	16	19

12. N Associated Road at Birch Street

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	12	NORTHBOUND	
	THRU	2	IN ...	24
	RIGHT	10	OUT ...	19
SOUTH BOUND	LEFT	96	SOUTHBOUND	
	THRU	3	IN ...	375
	RIGHT	275	OUT ...	400
EAST BOUND	LEFT	265	EASTBOUND	
	THRU	864	IN ...	1,201
	RIGHT	11	OUT ...	1,551
WEST BOUND	LEFT	5	WESTBOUND	
	THRU	1213	IN ...	1,402
	RIGHT	127	OUT ...	1,032

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	12	15
	THRU	2	2
	RIGHT	10	12
SOUTH BOUND	LEFT	96	119
	THRU	3	3
	RIGHT	275	335
EAST BOUND	LEFT	265	321
	THRU	864	1,070
	RIGHT	11	14
WEST BOUND	LEFT	5	6
	THRU	1,213	1,498
	RIGHT	127	156

13. Kraemer Boulevard at Birch Street

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	563	NORTHBOUND	
	THRU	697	IN ...	1,479
	RIGHT	117	OUT ...	581
SOUTH BOUND	LEFT	204	SOUTHBOUND	
	THRU	353	IN ...	552
	RIGHT	97	OUT ...	1,272
EAST BOUND	LEFT	204	EASTBOUND	
	THRU	678	IN ...	1,221
	RIGHT	278	OUT ...	1,368
WEST BOUND	LEFT	73	WESTBOUND	
	THRU	647	IN ...	1,037
	RIGHT	201	OUT ...	1,067

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	563	674
	THRU	697	841
	RIGHT	117	141
SOUTH BOUND	LEFT	204	245
	THRU	353	426
	RIGHT	97	121
EAST BOUND	LEFT	204	249
	THRU	678	846
	RIGHT	278	333
WEST BOUND	LEFT	73	88
	THRU	647	821
	RIGHT	201	251

14. Valencia Avenue at Birch Street/Rose Drive

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	186	NORTHBOUND	
	THRU	510	IN ...	817
	RIGHT	14	OUT ...	344
SOUTH BOUND	LEFT	416	SOUTHBOUND	
	THRU	205	IN ...	643
	RIGHT	36	OUT ...	1,468
EAST BOUND	LEFT	168	EASTBOUND	
	THRU	582	IN ...	954
	RIGHT	130	OUT ...	718
WEST BOUND	LEFT	11	WESTBOUND	
	THRU	430	IN ...	1,198
	RIGHT	707	OUT ...	1,082

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	186	221
	THRU	510	649
	RIGHT	14	18
SOUTH BOUND	LEFT	416	498
	THRU	205	270
	RIGHT	36	48
EAST BOUND	LEFT	168	206
	THRU	582	719
	RIGHT	130	155
WEST BOUND	LEFT	11	14
	THRU	430	548
	RIGHT	707	846

15. Rose Drive at Vesuvius Drive

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	26	NORTHBOUND	
	THRU	1000	IN ...	1,173
	RIGHT	0	OUT ...	1,158
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	1061	IN ...	1,146
	RIGHT	15	OUT ...	1,057
EAST BOUND	LEFT	7	EASTBOUND	
	THRU	0	IN ...	167
	RIGHT	18	OUT ...	270
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	0

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	26	169
	THRU	1,000	1,231
	RIGHT	0	0
SOUTH BOUND	LEFT	0	0
	THRU	1,061	1,294
	RIGHT	15	101
EAST BOUND	LEFT	7	49
	THRU	0	0
	RIGHT	18	118
WEST BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0

16. SR-57 SB Ramps at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	0	NORTHBOUND	
	THRU	0	IN ...	0
	RIGHT	0	OUT ...	821
SOUTH BOUND	LEFT	632	SOUTHBOUND	
	THRU	0	IN ...	1,191
	RIGHT	502	OUT ...	375
EAST BOUND	LEFT	0	EASTBOUND	
	THRU	1567	IN ...	2,739
	RIGHT	862	OUT ...	2,943
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	2079	IN ...	2,686
	RIGHT	375	OUT ...	2,476

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	0	0
SOUTH BOUND	LEFT	632	767
	THRU	0	0
	RIGHT	502	601
EAST BOUND	LEFT	0	0
	THRU	1,567	1,886
	RIGHT	862	1,130
WEST BOUND	LEFT	0	0
	THRU	2,079	2,640
	RIGHT	375	474

17. SR-57 NB Ramps at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	848	NORTHBOUND	
	THRU	72	IN ...	1316
	RIGHT	397	OUT ...	345
SOUTH BOUND	LEFT	0	SOUTHBOUND	
	THRU	0	IN ...	231
	RIGHT	231	OUT ...	324
EAST BOUND	LEFT	206	EASTBOUND	
	THRU	1670	IN ...	2367
	RIGHT	345	OUT ...	3639
WEST BOUND	LEFT	0	WESTBOUND	
	THRU	2186	IN ...	2563
	RIGHT	46	OUT ...	2169

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	848	1,115
	THRU	72	76
	RIGHT	397	506
SOUTH BOUND	LEFT	0	0
	THRU	0	0
	RIGHT	231	232
EAST BOUND	LEFT	206	213
	THRU	1,670	2,109
	RIGHT	345	421
WEST BOUND	LEFT	0	0
	THRU	2,186	2,757
	RIGHT	46	46

18. Associated Road at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	205	NORTHBOUND	
	THRU	247	IN ...	531
	RIGHT	80	OUT ...	625
SOUTH BOUND	LEFT	278	SOUTHBOUND	
	THRU	333	IN ...	758
	RIGHT	212	OUT ...	551
EAST BOUND	LEFT	240	EASTBOUND	
	THRU	1697	IN ...	2171
	RIGHT	132	OUT ...	2345
WEST BOUND	LEFT	167	WESTBOUND	
	THRU	1597	IN ...	2330
	RIGHT	163	OUT ...	2269

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	205	245
	THRU	247	296
	RIGHT	80	103
SOUTH BOUND	LEFT	278	336
	THRU	333	399
	RIGHT	212	289
EAST BOUND	LEFT	240	309
	THRU	1,697	2,150
	RIGHT	132	158
WEST BOUND	LEFT	167	210
	THRU	1,597	1,950
	RIGHT	163	213

19. Castlegate Lane/Placentia Avenue at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	225	NORTHBOUND	
	THRU	45	IN ...	597
	RIGHT	253	OUT ...	515
SOUTH BOUND	LEFT	24	SOUTHBOUND	
	THRU	22	IN ...	59
	RIGHT	13	OUT ...	117
EAST BOUND	LEFT	18	EASTBOUND	
	THRU	1713	IN ...	2,208
	RIGHT	263	OUT ...	2,405
WEST BOUND	LEFT	219	WESTBOUND	
	THRU	1764	IN ...	2,383
	RIGHT	54	OUT ...	2,211

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	225	275
	THRU	45	54
	RIGHT	253	307
SOUTH BOUND	LEFT	24	29
	THRU	22	26
	RIGHT	13	16
EAST BOUND	LEFT	18	22
	THRU	1,713	2,176
	RIGHT	263	313
WEST BOUND	LEFT	219	267
	THRU	1,764	2,231
	RIGHT	54	66

20. Kraemer Boulevard at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	338	NORTHBOUND	
	THRU	580	IN ...	1,122
	RIGHT	97	OUT ...	819
SOUTH BOUND	LEFT	251	SOUTHBOUND	
	THRU	445	IN ...	680
	RIGHT	107	OUT ...	1,187
EAST BOUND	LEFT	202	EASTBOUND	
	THRU	1272	IN ...	1,794
	RIGHT	198	OUT ...	2,161
WEST BOUND	LEFT	174	WESTBOUND	
	THRU	1406	IN ...	2,237
	RIGHT	303	OUT ...	1,667

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	338	418
	THRU	580	694
	RIGHT	97	118
SOUTH BOUND	LEFT	251	300
	THRU	445	532
	RIGHT	107	133
EAST BOUND	LEFT	202	247
	THRU	1,272	1,620
	RIGHT	198	251
WEST BOUND	LEFT	174	211
	THRU	1,406	1,777
	RIGHT	303	364

21. Valencia Avenue at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	103	NORTHBOUND	
	THRU	227	IN ...	539
	RIGHT	121	OUT ...	478
SOUTH BOUND	LEFT	196	SOUTHBOUND	
	THRU	190	IN ...	545
	RIGHT	122	OUT ...	679
EAST BOUND	LEFT	216	EASTBOUND	
	THRU	1638	IN ...	2,034
	RIGHT	134	OUT ...	1,724
WEST BOUND	LEFT	158	WESTBOUND	
	THRU	1204	IN ...	1,786
	RIGHT	118	OUT ...	2,022

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	103	131
	THRU	227	298
	RIGHT	121	145
SOUTH BOUND	LEFT	196	240
	THRU	190	245
	RIGHT	122	148
EAST BOUND	LEFT	216	265
	THRU	1,638	2,040
	RIGHT	134	171
WEST BOUND	LEFT	158	189
	THRU	1,204	1,465
	RIGHT	118	154

22. Rose Drive at Imperial Highway

PM PEAK HOUR

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** INPUT DATA *** Modified by: COMSIS Corp. (M. Roskin) 4/9/86
Modified by: FHWA 12/21/87

APPROACH	TURN MOVEMENT	BY COUNT	APPROACH	FY TOTAL
NORTH BOUND	LEFT	238	NORTHBOUND	
	THRU	468	IN ...	1,001
	RIGHT	113	OUT ...	890
SOUTH BOUND	LEFT	843	SOUTHBOUND	
	THRU	407	IN ...	1,347
	RIGHT	18	OUT ...	1,390
EAST BOUND	LEFT	64	EASTBOUND	
	THRU	1587	IN ...	1,981
	RIGHT	263	OUT ...	1,779
WEST BOUND	LEFT	147	WESTBOUND	
	THRU	1217	IN ...	2,408
	RIGHT	711	OUT ...	2,679

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES
NCHRP 255, PAGE 105 Written by: FHWA (C. Fleet)
*** RESULTS *** Modified by: COMSIS Corp. (M. Roskin) 2/13/86

APPROACH	TURN MOVEMENT	BY COUNT	FY FORECAST
NORTH BOUND	LEFT	238	306
	THRU	468	551
	RIGHT	113	143
SOUTH BOUND	LEFT	843	1,032
	THRU	407	487
	RIGHT	18	22
EAST BOUND	LEFT	64	77
	THRU	1,587	1,986
	RIGHT	263	315
WEST BOUND	LEFT	147	176
	THRU	1,217	1,453
	RIGHT	711	885

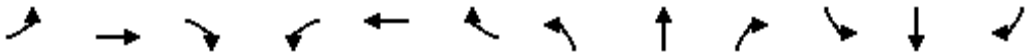
APPENDIX F

SYNCHRO QUEUEING WORKSHEETS

APPENDIX F-I

YEAR 2035 CUMULATIVE TRAFFIC CONDITIONS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1855	619	256	2169	0	0	0	0	1045	0	695
Future Volume (vph)	0	1855	619	256	2169	0	0	0	0	1045	0	695
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			528									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1855	619	256	2169	0	0	0	0	1045	0	695
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1855	619	256	2169	0	0	0	0	1045	0	695
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		56.1	56.1	15.9	72.0					48.0		48.0
Total Split (%)		46.8%	46.8%	13.3%	60.0%					40.0%		40.0%
Maximum Green (s)		51.6	51.6	11.4	67.5					43.5		43.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		52.6	52.6	11.4	68.5					42.5		42.5
Actuated g/C Ratio		0.44	0.44	0.10	0.57					0.35		0.35
v/c Ratio		0.88	0.43	0.83	0.79					0.91		0.72
Control Delay		37.9	10.6	66.3	19.3					49.1		35.4
Queue Delay		7.3	0.1	0.0	1.1					0.0		0.0
Total Delay		45.1	10.8	66.3	20.4					49.1		35.4
LOS		D	B	E	C					D		D
Approach Delay		36.5			25.2						43.6	
Approach LOS		D			C						D	
Queue Length 50th (ft)		378	64	98	302					388		239
Queue Length 95th (ft)		m400	m73	m#138	m358					#508		318
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		2111	1453	308	2750					1178		992
Starvation Cap Reductn		199	194	0	114					0		0
Spillback Cap Reductn		235	0	0	323					0		3
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.99	0.49	0.83	0.89					0.89		0.70

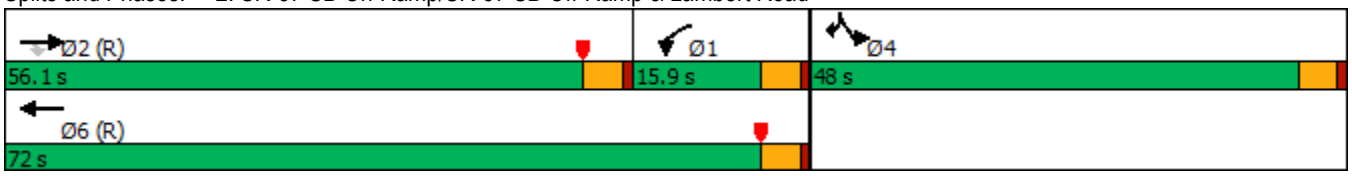
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 34.3		Intersection LOS: C	
Intersection Capacity Utilization 87.8%		ICU Level of Service E	
Analysis Period (min) 15			

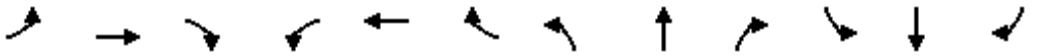
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

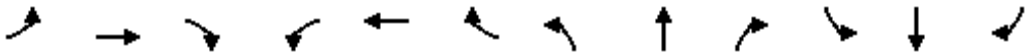
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2505	404	0	1386	487	1051	0	506	0	0	0
Future Volume (vph)	0	2505	404	0	1386	487	1051	0	506	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.998	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3	137			316			14			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2505	404	0	1386	487	1051	0	506	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	2545	364	0	1386	487	1051	0	506	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		74.0	74.0		74.0		46.0		46.0			
Total Split (%)		61.7%	61.7%		61.7%		38.3%		38.3%			
Maximum Green (s)		69.5	69.5		69.5		41.5		41.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		69.8	69.8		69.8	120.0	41.2		41.2			
Actuated g/C Ratio		0.58	0.58		0.58	1.00	0.34		0.34			
v/c Ratio		0.96	0.45		0.49	0.32	0.94		0.97			
Control Delay		17.6	4.5		0.9	0.1	54.8		70.3			
Queue Delay		17.4	0.0		0.0	0.0	0.0		0.0			
Total Delay		35.0	4.5		1.0	0.1	54.8		70.3			
LOS		D	A		A	A	D		E			
Approach Delay		31.2			0.7			59.8				
Approach LOS		C			A			E				
Queue Length 50th (ft)		360	67		12	0	403		373			
Queue Length 95th (ft)		#851	m67		m15	m0	#537		#598			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2644	807		2803	1500	1124		527			
Starvation Cap Reductn		64	0		0	0	0		0			
Spillback Cap Reductn		191	0		29	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		1.04	0.45		0.50	0.32	0.94		0.96			

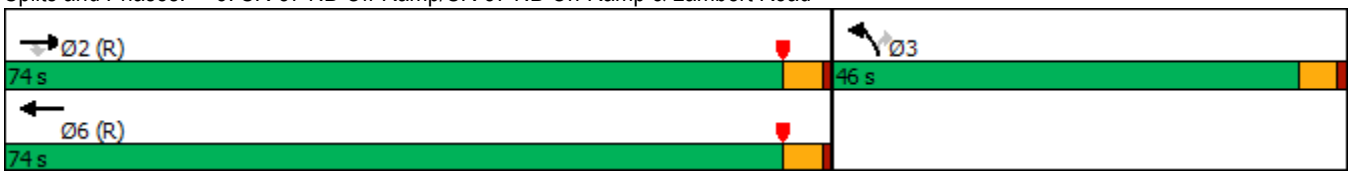
Intersection Summary

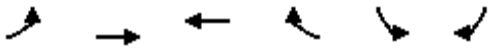
Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 9 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 29.2 Intersection LOS: C
Intersection Capacity Utilization 94.8% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

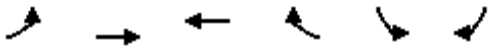
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1671	2127	0	651	551
Future Volume (vph)	0	1671	2127	0	651	551
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.968	0.850
Flt Protected					0.962	
Satd. Flow (prot)	0	4818	4818	0	3188	1365
Flt Permitted					0.962	
Satd. Flow (perm)	0	4818	4818	0	3188	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					3	3
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1671	2127	0	651	551
Shared Lane Traffic (%)						32%
Lane Group Flow (vph)	0	1671	2127	0	827	375
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		30.0	30.0		20.0	20.0
Total Split (%)		60.0%	60.0%		40.0%	40.0%
Maximum Green (s)		25.0	25.0		15.0	15.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		25.0	25.0		15.0	15.0
Actuated g/C Ratio		0.50	0.50		0.30	0.30
v/c Ratio		0.69	0.88		0.86	0.91
Control Delay		11.5	10.2		28.6	48.7
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.5	10.2		28.6	48.7
LOS		B	B		C	D
Approach Delay		11.5	10.2		34.9	
Approach LOS		B	B		C	
Queue Length 50th (ft)		123	168		115	113
Queue Length 95th (ft)		168	m284		#208	#268
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2409	2409		958	411
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.69	0.88		0.86	0.91

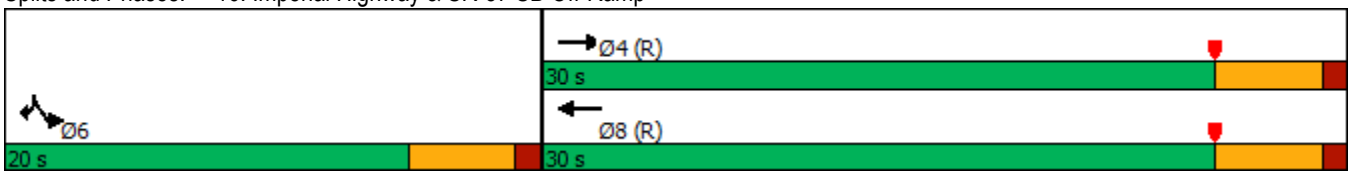
Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 43 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 120.0%	ICU Level of Service H
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.

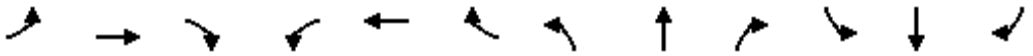
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1545	0	0	1674	16	1099	36	904	0	0	92
Future Volume (vph)	113	1545	0	0	1674	16	1099	36	904	0	0	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.999			0.891	0.850			0.850
Flt Protected	0.950						0.950	0.990				
Satd. Flow (prot)	1676	4818	0	0	6065	0	3051	1339	1425	0	0	2640
Flt Permitted	0.950						0.950	0.990				
Satd. Flow (perm)	1676	4818	0	0	6065	0	3051	1339	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2			145	148			216
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	1545	0	0	1674	16	1099	36	904	0	0	92
Shared Lane Traffic (%)							10%		43%			
Lane Group Flow (vph)	113	1545	0	0	1690	0	989	535	515	0	0	92
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	12.0	50.0			38.0		39.0	39.0	39.0			11.0
Total Split (%)	12.0%	50.0%			38.0%		39.0%	39.0%	39.0%			11.0%
Maximum Green (s)	8.0	45.0			33.0		34.0	34.0	34.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lead	Lead	Lead			Lag
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	8.2	47.2			35.0		34.0	34.0	34.0			6.0
Actuated g/C Ratio	0.08	0.47			0.35		0.34	0.34	0.34			0.06
v/c Ratio	0.82	0.68			0.79		0.95	0.97	0.88			0.25
Control Delay	81.2	23.2			33.2		51.9	57.5	41.0			1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Delay	81.2	23.2			33.2		51.9	57.5	41.0			1.7
LOS	F	C			C		D	E	D			A
Approach Delay		27.2			33.2			50.6			1.7	
Approach LOS		C			C			D			A	
Queue Length 50th (ft)	74	323			288		335	303	242			0
Queue Length 95th (ft)	m#116	388			336		#476	#565	#455			0
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	137	2274			2126		1037	550	582			361
Starvation Cap Reductn	0	0			0		0	0	0			0
Spillback Cap Reductn	0	0			0		0	0	0			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	0.82	0.68			0.79		0.95	0.97	0.88			0.25

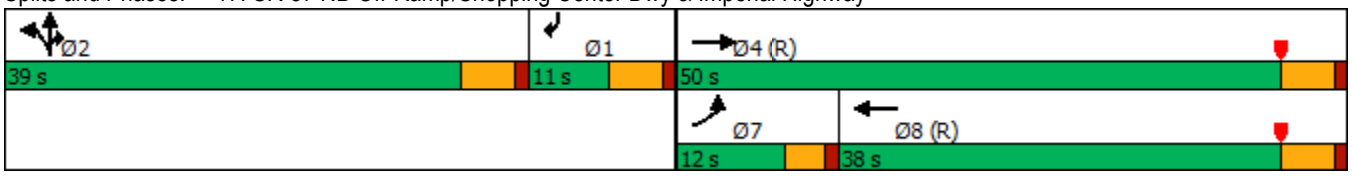
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 80 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 37.3		Intersection LOS: D	
Intersection Capacity Utilization 79.2%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

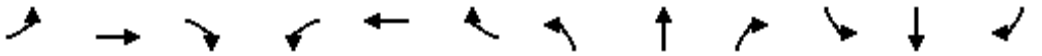
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	2100	112	100	1818	108	164	227	79	181	360	177
Future Volume (vph)	227	2100	112	100	1818	108	164	227	79	181	360	177
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.992			0.992			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4779	0	1676	4779	0	3252	3222	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4779	0	1676	4779	0	3252	3222	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			9			41				177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	227	2100	112	100	1818	108	164	227	79	181	360	177
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	2212	0	100	1926	0	164	306	0	181	360	177
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	20.0	58.0		11.0	49.0		10.0	40.0		11.0	41.0	41.0
Total Split (%)	16.7%	48.3%		9.2%	40.8%		8.3%	33.3%		9.2%	34.2%	34.2%
Maximum Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Actuated g/C Ratio	0.13	0.44		0.06	0.37		0.05	0.29		0.06	0.30	0.30
v/c Ratio	1.02	1.05		1.03	1.10		1.01	0.32		0.96	0.68	0.31
Control Delay	116.6	65.9		145.5	77.3		130.5	29.6		62.8	22.6	9.6
Queue Delay	0.0	22.6		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	116.6	88.5		145.5	77.3		130.5	29.6		62.8	22.6	9.6
LOS	F	F		F	E		F	C		E	C	A
Approach Delay		91.1			80.6			64.8			29.6	
Approach LOS		F			F			E			C	
Queue Length 50th (ft)	~182	~680		~79	~624		~67	83		77	236	56
Queue Length 95th (ft)	#347	#776		m#195	#717		#141	124		m72	m209	m46
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	223	2115		97	1758		162	968		189	529	573
Starvation Cap Reductn	0	251		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.02	1.19		1.03	1.10		1.01	0.32		0.96	0.68	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.10			
Intersection Signal Delay: 77.4		Intersection LOS: E	
Intersection Capacity Utilization 92.9%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

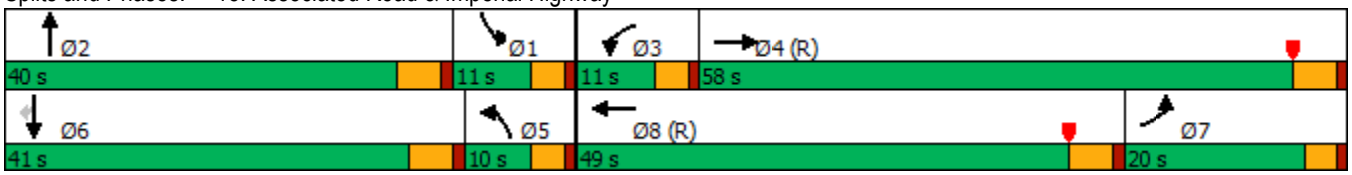
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

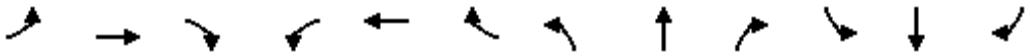
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2066	398	191	1675	35	199	13	159	27	31	15
Future Volume (vph)	14	2066	398	191	1675	35	199	13	159	27	31	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.997				0.850		0.951	
Flt Protected	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Flt Permitted	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			270		4				159		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	2066	398	191	1675	35	199	13	159	27	31	15
Shared Lane Traffic (%)							47%					
Lane Group Flow (vph)	14	2066	398	191	1710	0	105	107	159	27	46	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	62.0	62.0	20.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	51.7%	51.7%	16.7%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	57.0	57.0	16.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	57.0	57.0	16.0	73.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.48	0.48	0.13	0.61		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.17	0.90	0.47	0.86	0.59		0.36	0.36	0.39	0.33	0.47	
Control Delay	81.4	7.3	0.9	60.0	3.6		47.0	47.0	9.5	65.8	56.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	81.4	7.3	0.9	60.0	3.6		47.0	47.0	9.5	65.8	56.8	
LOS	F	A	A	E	A		D	D	A	E	E	
Approach Delay		6.7			9.3			30.9			60.2	
Approach LOS		A			A			C			E	
Queue Length 50th (ft)	11	82	1	138	52		75	76	0	21	24	
Queue Length 95th (ft)	m12	m80	m2	m#267	74		133	136	59	52	64	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2288	854	223	2923		292	294	404	83	98	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.90	0.47	0.86	0.59		0.36	0.36	0.39	0.33	0.47	

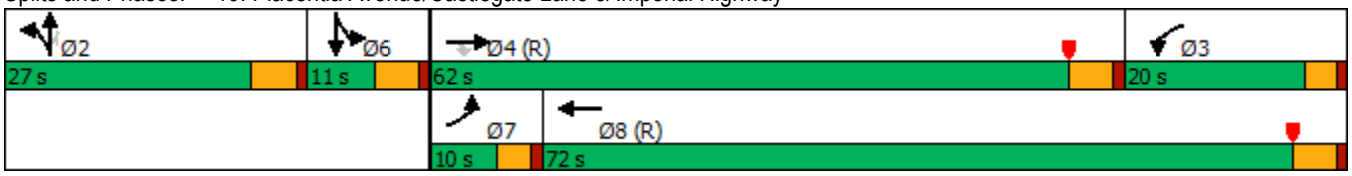
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 56 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 10.4		Intersection LOS: B	
Intersection Capacity Utilization 77.8%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

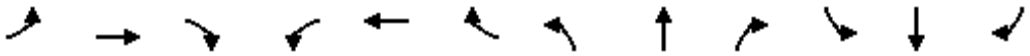
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	1441	263	77	1216	96	192	263	94	352	693	122
Future Volume (vph)	148	1441	263	77	1216	96	192	263	94	352	693	122
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.977			0.989			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4707	0	3252	4765	0	3252	3222	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4707	0	3252	4765	0	3252	3222	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			12			38				145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	148	1441	263	77	1216	96	192	263	94	352	693	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	1704	0	77	1312	0	192	357	0	352	693	122
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	14.0	57.0		10.0	53.0		14.0	31.0		22.0	39.0	39.0
Total Split (%)	11.7%	47.5%		8.3%	44.2%		11.7%	25.8%		18.3%	32.5%	32.5%
Maximum Green (s)	10.0	52.0		6.0	48.0		10.0	26.0		18.0	34.0	34.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	10.0	54.0		6.0	48.0		10.0	27.3		16.7	34.0	34.0
Actuated g/C Ratio	0.08	0.45		0.05	0.40		0.08	0.23		0.14	0.28	0.28
v/c Ratio	0.55	0.80		0.48	0.69		0.71	0.47		0.78	0.73	0.23
Control Delay	30.3	4.6		86.4	9.7		68.5	38.4		55.4	24.5	0.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	30.3	4.6		86.4	9.7		68.5	38.4		55.4	24.5	0.8
LOS	C	A		F	A		E	D		E	C	A
Approach Delay		6.7			14.0			48.9			31.3	
Approach LOS		A			B			D			C	
Queue Length 50th (ft)	53	37		30	61		75	114		97	152	0
Queue Length 95th (ft)	m60	86		m33	m60		#124	163		163	221	m1
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	271	2139		162	1913		271	761		487	950	528
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.55	0.80		0.48	0.69		0.71	0.47		0.72	0.73	0.23

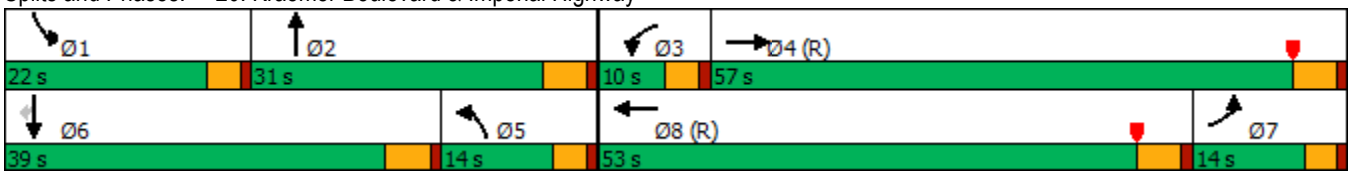
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	1100	99	127	1706	158	144	201	129	299	314	214
Future Volume (vph)	205	1100	99	127	1706	158	144	201	129	299	314	214
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			152			145			180
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	1100	99	127	1706	158	144	201	129	299	314	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	205	1100	99	127	1706	158	144	201	129	299	314	214
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	12.0	45.0	45.0	13.0	46.0	46.0	13.0	47.0	47.0	15.0	49.0	49.0
Total Split (%)	10.0%	37.5%	37.5%	10.8%	38.3%	38.3%	10.8%	39.2%	39.2%	12.5%	40.8%	40.8%
Maximum Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	9.0	42.0	42.0	11.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	8.7	42.0	42.0	11.0	44.3	44.3
Actuated g/C Ratio	0.07	0.33	0.33	0.08	0.34	0.34	0.07	0.35	0.35	0.09	0.37	0.37
v/c Ratio	0.95	0.68	0.17	0.52	1.04	0.26	0.61	0.17	0.21	1.00	0.25	0.32
Control Delay	81.2	37.8	8.5	37.9	47.7	2.7	65.5	27.5	4.1	76.0	10.2	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	37.8	8.5	37.9	47.7	2.7	65.5	27.5	4.1	76.0	10.2	1.0
LOS	F	D	A	D	D	A	E	C	A	E	B	A
Approach Delay		42.1			43.5			32.7			31.6	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	79	320	8	41	~254	3	56	56	0	~123	24	0
Queue Length 95th (ft)	m#129	367	m28	m51	#595	m12	91	85	33	m#171	m32	m0
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	216	1606	596	243	1646	612	243	1173	619	298	1237	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.68	0.17	0.52	1.04	0.26	0.59	0.17	0.21	1.00	0.25	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 39.9		Intersection LOS: D	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

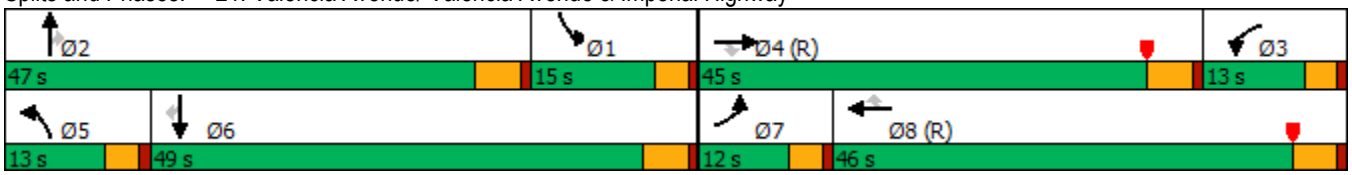
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

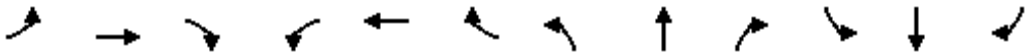
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	1333	249	280	1564	586	267	206	152	916	506	23
Future Volume (vph)	38	1333	249	280	1564	586	267	206	152	916	506	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.976				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4702	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4702	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34				550			140			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	1333	249	280	1564	586	267	206	152	916	506	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	1582	0	280	1564	586	267	206	152	916	506	23
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	45.0	45.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.38	0.38	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	0.46	0.97		1.73	0.87	0.65	0.82	0.15	0.22	5.65	0.42	0.04
Control Delay	39.5	23.1		386.0	41.6	7.3	73.7	22.8	5.3	2106.3	38.1	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	23.1		386.0	41.6	7.3	73.7	22.8	5.3	2106.3	38.1	0.0
LOS	D	C		F	D	A	E	C	A	F	D	A
Approach Delay		23.5			73.0			40.3			1348.6	
Approach LOS		C			E			D			F	
Queue Length 50th (ft)	26	43		~164	430	19	106	52	6	~716	156	0
Queue Length 95th (ft)	m38	m#498		#254	#534	127	#174	78	47	m#670	m147	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1628		162	1806	906	325	1369	695	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.97		1.73	0.87	0.65	0.82	0.15	0.22	5.65	0.42	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 5.65			
Intersection Signal Delay: 357.7		Intersection LOS: F	
Intersection Capacity Utilization 90.1%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

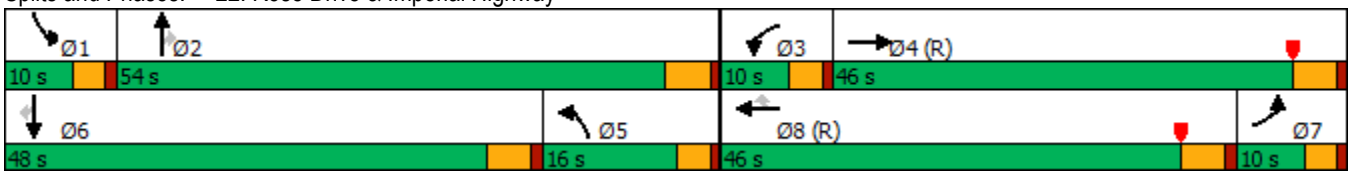
Queue shown is maximum after two cycles.

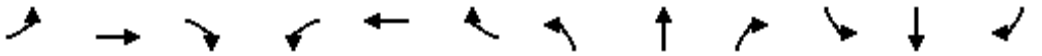
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

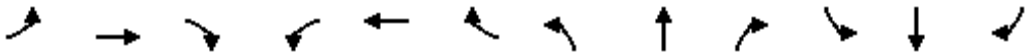
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1430	835	251	1740	0	0	0	0	454	0	855
Future Volume (vph)	0	1430	835	251	1740	0	0	0	0	454	0	855
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			835									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1430	835	251	1740	0	0	0	0	454	0	855
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1430	835	251	1740	0	0	0	0	454	0	855
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									

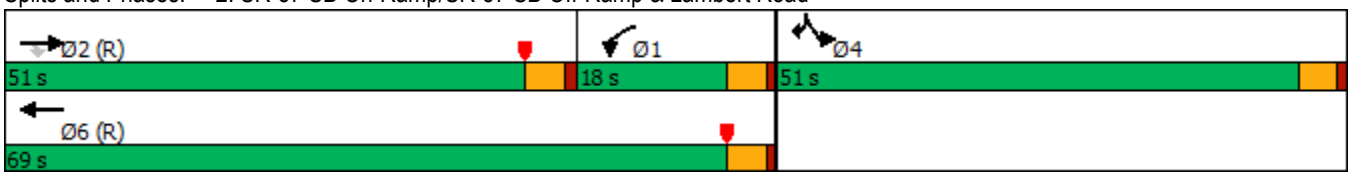


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		51.0	51.0	18.0	69.0					51.0		51.0
Total Split (%)		42.5%	42.5%	15.0%	57.5%					42.5%		42.5%
Maximum Green (s)		46.5	46.5	13.5	64.5					46.5		46.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		50.6	50.6	13.5	68.6					42.4		42.4
Actuated g/C Ratio		0.42	0.42	0.11	0.57					0.35		0.35
v/c Ratio		0.70	0.52	0.69	0.63					0.40		0.88
Control Delay		20.1	2.0	60.4	19.1					29.7		45.3
Queue Delay		0.6	0.4	0.0	0.2					0.0		0.0
Total Delay		20.8	2.4	60.4	19.3					29.7		45.3
LOS		C	A	E	B					C		D
Approach Delay		14.0			24.5						39.9	
Approach LOS		B			C						D	
Queue Length 50th (ft)		150	22	97	282					131		323
Queue Length 95th (ft)		m173	m26	143	352					170		406
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		2030	1595	365	2753					1260		1056
Starvation Cap Reductn		260	311	0	278					0		0
Spillback Cap Reductn		0	0	0	36					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.81	0.65	0.69	0.70					0.36		0.81

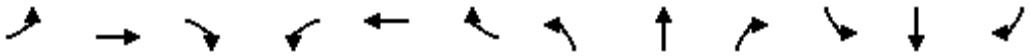
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 23.8		Intersection LOS: C	
Intersection Capacity Utilization 74.6%		ICU Level of Service D	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road



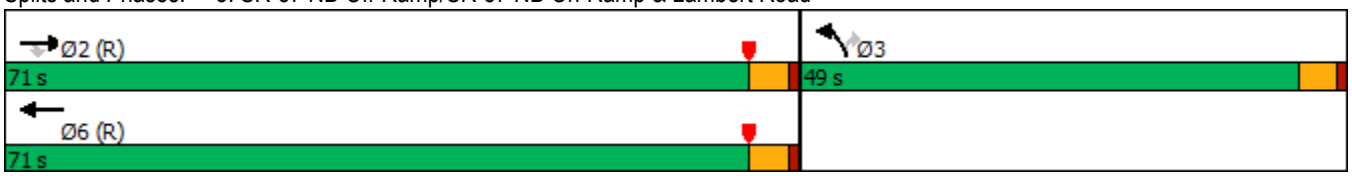
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1528	576	0	1137	523	676	0	301	0	0	0
Future Volume (vph)	0	1528	576	0	1137	523	676	0	301	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.990	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4507	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4507	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14	299			415			26			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1528	576	0	1137	523	676	0	301	0	0	0
Shared Lane Traffic (%)			19%									
Lane Group Flow (vph)	0	1637	467	0	1137	523	676	0	301	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			

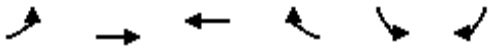


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		71.0	71.0		71.0		49.0		49.0			
Total Split (%)		59.2%	59.2%		59.2%		40.8%		40.8%			
Maximum Green (s)		66.5	66.5		66.5		44.5		44.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		79.2	79.2		79.2	120.0	31.8		31.8			
Actuated g/C Ratio		0.66	0.66		0.66	1.00	0.26		0.26			
v/c Ratio		0.55	0.49		0.36	0.35	0.78		0.72			
Control Delay		6.2	3.7		3.0	0.5	47.4		46.2			
Queue Delay		0.2	0.3		0.0	0.0	0.0		0.0			
Total Delay		6.4	4.0		3.0	0.5	47.4		46.2			
LOS		A	A		A	A	D		D			
Approach Delay		5.9			2.2			47.0				
Approach LOS		A			A			D				
Queue Length 50th (ft)		120	37		41	0	252		196			
Queue Length 95th (ft)		146	61		66	0	290		272			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2978	952		3179	1500	1205		572			
Starvation Cap Reductn		419	133		0	0	0		0			
Spillback Cap Reductn		92	0		0	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		0.64	0.57		0.36	0.35	0.56		0.53			

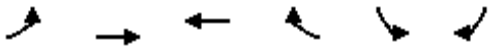
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 63.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1898	2623	0	730	605
Future Volume (vph)	0	1898	2623	0	730	605
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.969	0.850
Flt Protected					0.962	
Satd. Flow (prot)	0	4818	4818	0	3191	1365
Flt Permitted					0.962	
Satd. Flow (perm)	0	4818	4818	0	3191	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					2	2
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1898	2623	0	730	605
Shared Lane Traffic (%)						31%
Lane Group Flow (vph)	0	1898	2623	0	918	417
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		39.0	39.0		21.0	21.0
Total Split (%)		65.0%	65.0%		35.0%	35.0%
Maximum Green (s)		34.0	34.0		16.0	16.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		34.0	34.0		16.0	16.0
Actuated g/C Ratio		0.57	0.57		0.27	0.27
v/c Ratio		0.70	0.96		1.08	1.14
Control Delay		11.0	14.5		78.7	117.6
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.0	14.5		78.7	117.6
LOS		B	B		E	F
Approach Delay		11.0	14.5		90.8	
Approach LOS		B	B		F	
Queue Length 50th (ft)		159	309		~197	~201
Queue Length 95th (ft)		207	m288		#304	#371
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2730	2730		852	365
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.70	0.96		1.08	1.14

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 9 (15%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 30.8	Intersection LOS: C
Intersection Capacity Utilization 143.2%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.

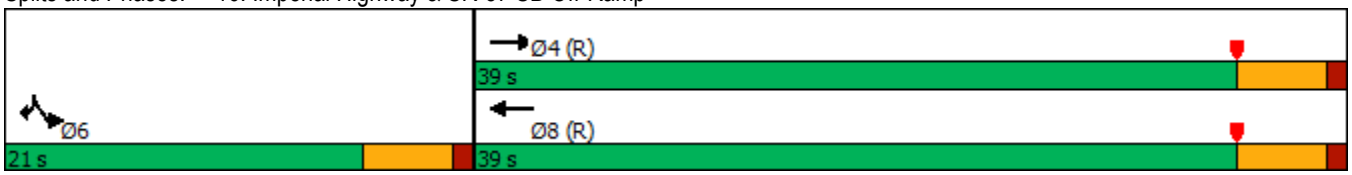
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

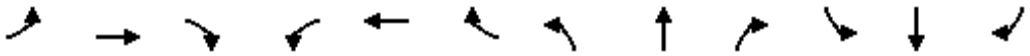
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	2041	0	0	2686	43	1110	72	482	0	0	217
Future Volume (vph)	205	2041	0	0	2686	43	1110	72	482	0	0	217
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.998			0.966	0.850			0.850
Flt Protected	0.950						0.950	0.971				
Satd. Flow (prot)	1676	4818	0	0	6058	0	3051	1424	1425	0	0	2640
Flt Permitted	0.950						0.950	0.971				
Satd. Flow (perm)	1676	4818	0	0	6058	0	3051	1424	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3			12	101			245
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	2041	0	0	2686	43	1110	72	482	0	0	217
Shared Lane Traffic (%)							23%		20%			
Lane Group Flow (vph)	205	2041	0	0	2729	0	855	423	386	0	0	217
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	16.0	72.0			56.0		37.0	37.0	37.0			11.0
Total Split (%)	13.3%	60.0%			46.7%		30.8%	30.8%	30.8%			9.2%
Maximum Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lag	Lag	Lag			Lead
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Actuated g/C Ratio	0.10	0.56			0.42		0.27	0.27	0.27			0.05
v/c Ratio	1.23	0.76			1.06		1.05	1.09	0.85			0.60
Control Delay	171.1	19.3			38.9		88.7	112.8	49.2			11.6
Queue Delay	0.0	47.7			16.1		0.0	2.2	2.4			0.0
Total Delay	171.1	67.0			55.0		88.7	115.0	51.5			11.6
LOS	F	E			D		F	F	D			B
Approach Delay		76.5			55.0			86.8			11.6	
Approach LOS		E			D			F			B	
Queue Length 50th (ft)	~196	394			~652		~396	~420	228			0
Queue Length 95th (ft)	m#293	m436			m134		#530	#658	#411			30
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	167	2690			2576		813	388	454			364
Starvation Cap Reductn	0	0			89		0	0	0			0
Spillback Cap Reductn	0	1011			0		0	2	20			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	1.23	1.22			1.10		1.05	1.10	0.89			0.60

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 12 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 68.4		Intersection LOS: E	
Intersection Capacity Utilization 91.9%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

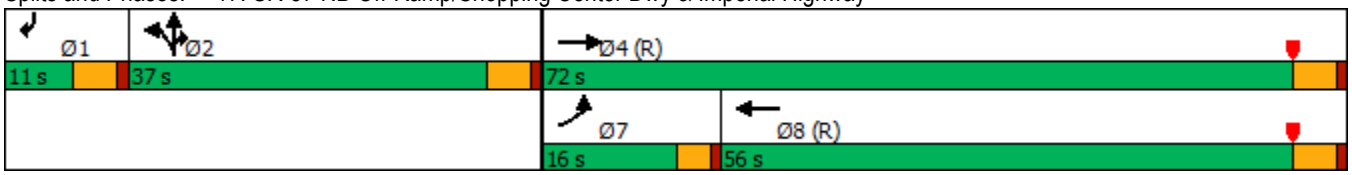
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	2073	153	191	1967	203	240	282	92	320	380	280
Future Volume (vph)	296	2073	153	191	1967	203	240	282	92	320	380	280
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.990			0.986			0.963				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4769	0	1676	4750	0	3252	3229	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4769	0	1676	4750	0	3252	3229	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			16			37				234
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	296	2073	153	191	1967	203	240	282	92	320	380	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	296	2226	0	191	2170	0	240	374	0	320	380	280
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	18.0	53.0		14.0	49.0		12.0	40.0		13.0	41.0	41.0
Total Split (%)	15.0%	44.2%		11.7%	40.8%		10.0%	33.3%		10.8%	34.2%	34.2%
Maximum Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Actuated g/C Ratio	0.12	0.40		0.08	0.37		0.07	0.29		0.08	0.30	0.30
v/c Ratio	1.52	1.16		1.37	1.24		1.11	0.39		1.32	0.72	0.46
Control Delay	279.1	101.3		233.6	137.5		145.1	31.8		196.6	23.9	3.4
Queue Delay	0.0	0.0		0.0	0.4		0.0	0.0		0.0	0.0	0.0
Total Delay	279.1	101.4		233.6	137.9		145.1	31.8		196.6	23.9	3.4
LOS	F	F		F	F		F	C		F	C	A
Approach Delay		122.2			145.6			76.1			74.4	
Approach LOS		F			F			E			E	
Queue Length 50th (ft)	~318	~739		~194	~763		~109	108		~168	176	19
Queue Length 95th (ft)	m#455	m#832		m#301	#869		#194	154		m#179	m183	m23
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	195	1914		139	1751		216	968		243	529	613
Starvation Cap Reductn	0	26		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	221		0	0		0	0	10
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.52	1.18		1.37	1.42		1.11	0.39		1.32	0.72	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 4 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay: 119.2		Intersection LOS: F	
Intersection Capacity Utilization 105.5%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

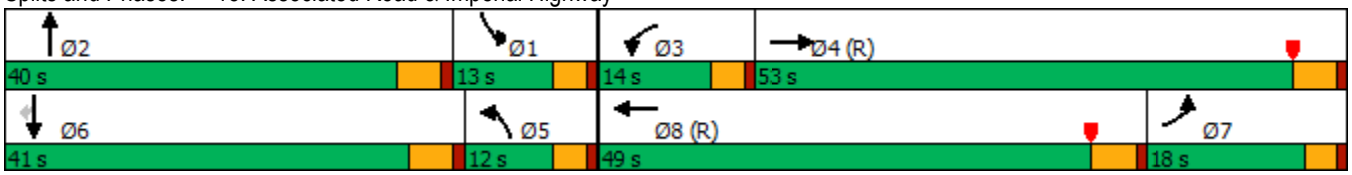
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

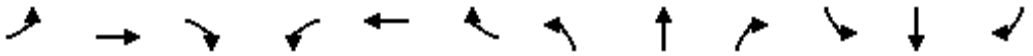
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	2088	308	254	2154	63	276	51	292	28	25	15
Future Volume (vph)	21	2088	308	254	2154	63	276	51	292	28	25	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850		0.944	
Flt Protected	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1666	0
Flt Permitted	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			198		6				292		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	2088	308	254	2154	63	276	51	292	28	25	15
Shared Lane Traffic (%)							41%					
Lane Group Flow (vph)	21	2088	308	254	2217	0	163	164	292	28	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	59.0	59.0	23.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	49.2%	49.2%	19.2%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	54.0	54.0	19.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	54.0	54.0	19.0	73.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.45	0.45	0.16	0.61		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.25	0.96	0.39	0.96	0.76		0.56	0.55	0.57	0.34	0.41	
Control Delay	81.9	9.1	1.2	61.0	3.5		52.9	52.5	9.6	66.4	51.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	81.9	9.1	1.2	61.0	3.5		52.9	52.5	9.6	66.4	51.9	
LOS	F	A	A	E	A		D	D	A	E	D	
Approach Delay		8.7			9.4			32.4			57.8	
Approach LOS		A			A			C			E	
Queue Length 50th (ft)	17	106	9	187	45		122	123	0	21	19	
Queue Length 95th (ft)	m16	m91	m7	m#206	m108		200	200	79	53	56	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2168	783	265	2920		292	297	513	83	97	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.25	0.96	0.39	0.96	0.76		0.56	0.55	0.57	0.34	0.41	

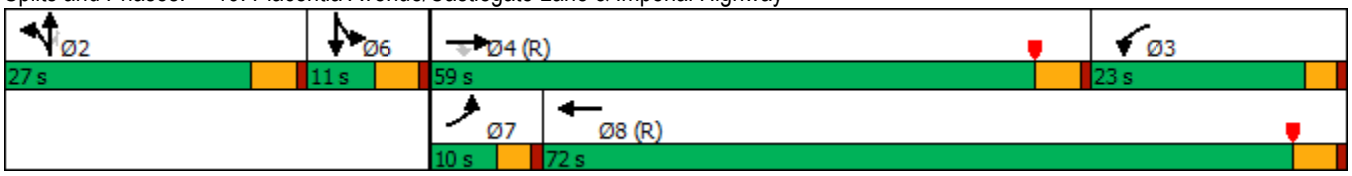
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 55 (46%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

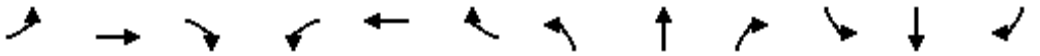
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	1557	239	201	1718	347	398	661	112	286	507	127
Future Volume (vph)	235	1557	239	201	1718	347	398	661	112	286	507	127
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.980			0.975			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4721	0	3252	4697	0	3252	3279	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4721	0	3252	4697	0	3252	3279	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			45			15				136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	235	1557	239	201	1718	347	398	661	112	286	507	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	1796	0	201	2065	0	398	773	0	286	507	127
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	13.0	56.0		14.0	57.0		19.0	35.0		15.0	31.0	31.0
Total Split (%)	10.8%	46.7%		11.7%	47.5%		15.8%	29.2%		12.5%	25.8%	25.8%
Maximum Green (s)	9.0	51.0		10.0	52.0		15.0	30.0		11.0	26.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	9.0	51.1		9.9	52.0		15.0	30.0		11.0	26.0	26.0
Actuated g/C Ratio	0.08	0.43		0.08	0.43		0.12	0.25		0.09	0.22	0.22
v/c Ratio	0.97	0.89		0.75	1.00		0.98	0.93		0.96	0.70	0.29
Control Delay	61.1	9.5		91.5	29.5		92.6	61.7		97.1	36.8	5.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	61.1	9.5		91.5	29.5		92.6	61.7		97.1	36.8	5.3
LOS	E	A		F	C		F	E		F	D	A
Approach Delay		15.4			35.0			72.2			51.2	
Approach LOS		B			C			E			D	
Queue Length 50th (ft)	89	54		84	~152		160	304		121	186	12
Queue Length 95th (ft)	m#108	m104		m105	#682		#263	#426		#208	250	m46
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	243	2028		271	2060		406	831		298	726	431
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.89		0.74	1.00		0.98	0.93		0.96	0.70	0.29

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 119 (99%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 37.9		Intersection LOS: D	
Intersection Capacity Utilization 96.9%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

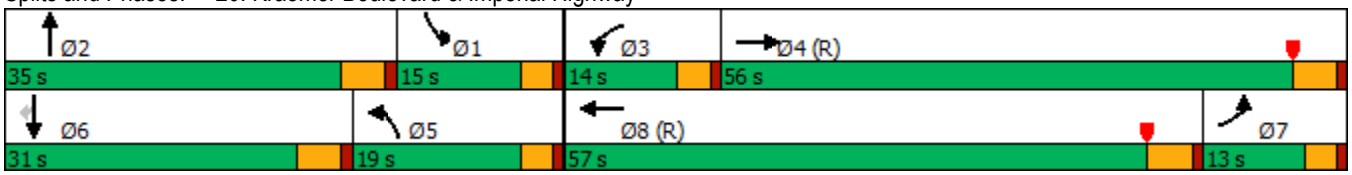
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

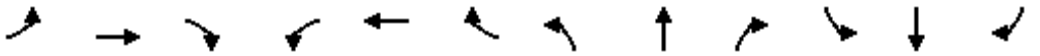
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	252	1957	163	180	1457	143	125	284	138	229	233	141
Future Volume (vph)	252	1957	163	180	1457	143	125	284	138	229	233	141
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			150			143			136			141
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	252	1957	163	180	1457	143	125	284	138	229	233	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	1957	163	180	1457	143	125	284	138	229	233	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	15.0	51.0	51.0	10.0	46.0	46.0	10.0	47.0	47.0	12.0	49.0	49.0
Total Split (%)	12.5%	42.5%	42.5%	8.3%	38.3%	38.3%	8.3%	39.2%	39.2%	10.0%	40.8%	40.8%
Maximum Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Actuated g/C Ratio	0.09	0.38	0.38	0.05	0.34	0.34	0.05	0.35	0.35	0.07	0.37	0.37
v/c Ratio	0.85	1.06	0.24	1.11	0.89	0.24	0.77	0.24	0.23	1.06	0.19	0.22
Control Delay	65.2	75.6	13.1	111.7	13.4	1.3	85.9	28.4	5.6	127.3	24.1	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.2	75.6	13.1	111.7	13.4	1.3	85.9	28.4	5.6	127.3	24.1	5.4
LOS	E	E	B	F	B	A	F	C	A	F	C	A
Approach Delay		70.2			22.3			35.8			58.9	
Approach LOS		E			C			D			E	
Queue Length 50th (ft)	105	~608	44	~78	97	3	50	81	1	~100	60	17
Queue Length 95th (ft)	m124	m#697	m64	m#97	147	m3	#101	116	45	m#176	m100	m26
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	298	1846	667	162	1646	606	162	1173	613	216	1229	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	1.06	0.24	1.11	0.89	0.24	0.77	0.24	0.23	1.06	0.19	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 49.3		Intersection LOS: D	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

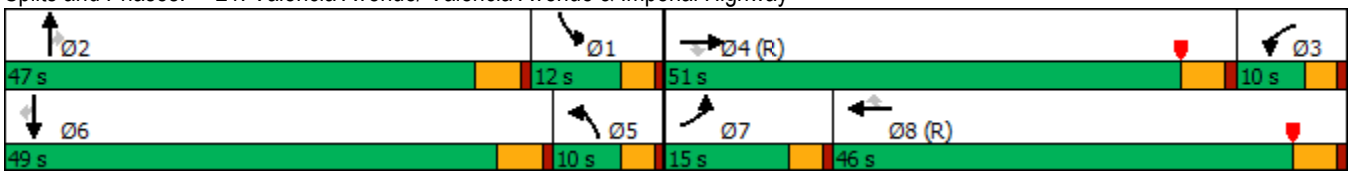
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

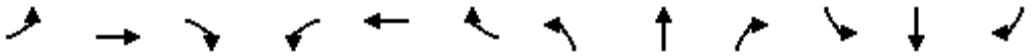
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	1905	300	168	1479	845	271	534	129	984	464	21
Future Volume (vph)	73	1905	300	168	1479	845	271	534	129	984	464	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.980				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				291			136			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	73	1905	300	168	1479	845	271	534	129	984	464	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	2205	0	168	1479	845	271	534	129	984	464	21
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.34	0.34	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	0.88	1.35		1.04	0.90	1.20	0.83	0.39	0.19	6.07	0.39	0.03
Control Delay	61.2	186.9		136.0	46.1	127.9	75.0	26.0	4.0	2302.6	30.7	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	186.9		136.0	46.1	127.9	75.0	26.0	4.0	2302.6	30.7	0.0
LOS	E	F		F	D	F	E	C	A	F	C	A
Approach Delay		182.8			79.9			37.2			1552.1	
Approach LOS		F			E			D			F	
Queue Length 50th (ft)	52	~793		~72	396	~639	108	151	0	~756	111	0
Queue Length 95th (ft)	m52	m#731		#145	463	#886	#178	197	34	#875	m138	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1630		162	1646	704	325	1369	692	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	1.35		1.04	0.90	1.20	0.83	0.39	0.19	6.07	0.39	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 80 (67%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 6.07			
Intersection Signal Delay: 408.5		Intersection LOS: F	
Intersection Capacity Utilization 111.2%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

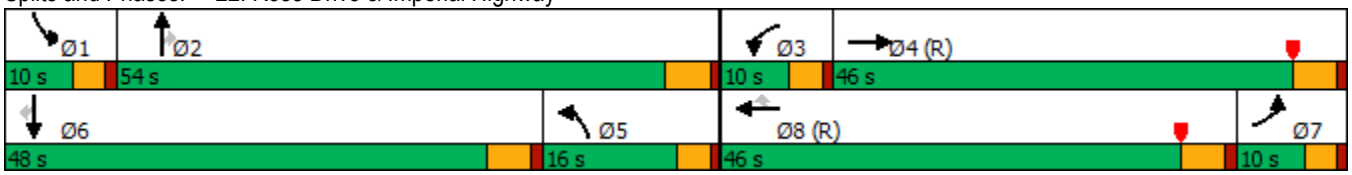
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

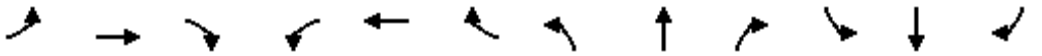
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway

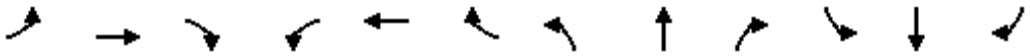


APPENDIX F-II

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1872	619	276	2209	0	0	0	0	1069	0	695
Future Volume (vph)	0	1872	619	276	2209	0	0	0	0	1069	0	695
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			473									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1872	619	276	2209	0	0	0	0	1069	0	695
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1872	619	276	2209	0	0	0	0	1069	0	695
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		49.0	49.0	23.0	72.0					48.0		48.0
Total Split (%)		40.8%	40.8%	19.2%	60.0%					40.0%		40.0%
Maximum Green (s)		44.5	44.5	18.5	67.5					43.5		43.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		45.3	45.3	18.5	68.3					42.7		42.7
Actuated g/C Ratio		0.38	0.38	0.15	0.57					0.36		0.36
v/c Ratio		1.03	0.48	0.55	0.81					0.92		0.71
Control Delay		61.2	13.9	51.2	23.7					50.8		35.2
Queue Delay		27.9	0.1	0.0	1.0					0.0		0.0
Total Delay		89.1	14.0	51.2	24.7					50.8		35.2
LOS		F	B	D	C					D		D
Approach Delay		70.4			27.7						44.7	
Approach LOS		E			C						D	
Queue Length 50th (ft)		~561	77	106	421					402		239
Queue Length 95th (ft)		m#587	m84	m138	m521					#530		318
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		1817	1290	501	2740					1178		992
Starvation Cap Reductn		125	121	0	276					0		0
Spillback Cap Reductn		69	0	0	199					0		2
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		1.11	0.53	0.55	0.90					0.91		0.70

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 47.9		Intersection LOS: D	
Intersection Capacity Utilization 89.5%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

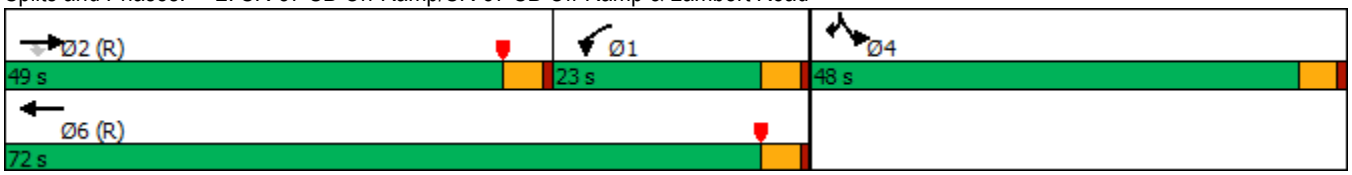
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

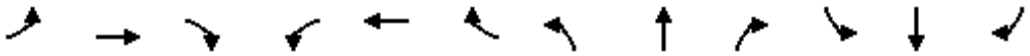
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2547	404	0	1446	549	1051	0	513	0	0	0
Future Volume (vph)	0	2547	404	0	1446	549	1051	0	513	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.998	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3	135			342			14			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2547	404	0	1446	549	1051	0	513	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	2587	364	0	1446	549	1051	0	513	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		74.0	74.0		74.0		46.0		46.0			
Total Split (%)		61.7%	61.7%		61.7%		38.3%		38.3%			
Maximum Green (s)		69.5	69.5		69.5		41.5		41.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		69.5	69.5		69.5	120.0	41.5		41.5			
Actuated g/C Ratio		0.58	0.58		0.58	1.00	0.35		0.35			
v/c Ratio		0.98	0.45		0.52	0.37	0.94		0.97			
Control Delay		13.3	2.6		0.9	0.8	53.5		71.5			
Queue Delay		26.3	0.0		0.0	0.0	0.0		0.0			
Total Delay		39.6	2.6		0.9	0.8	53.5		71.5			
LOS		D	A		A	A	D		E			
Approach Delay		35.0			0.9			59.4				
Approach LOS		D			A			E				
Queue Length 50th (ft)		300	46		12	0	403		381			
Queue Length 95th (ft)		m280	m39		m14	m0	#537		#610			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2632	803		2790	1500	1124		527			
Starvation Cap Reductn		62	0		0	0	0		0			
Spillback Cap Reductn		204	0		124	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		1.07	0.45		0.54	0.37	0.94		0.97			

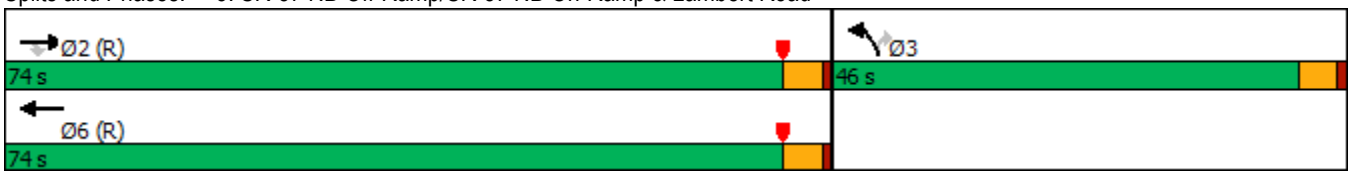
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 30.4		Intersection LOS: C	
Intersection Capacity Utilization 96.1%		ICU Level of Service F	
Analysis Period (min) 15			

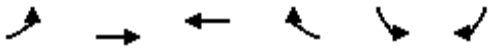
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

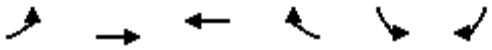
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1674	2136	0	653	551
Future Volume (vph)	0	1674	2136	0	653	551
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.969	0.850
Flt Protected					0.962	
Satd. Flow (prot)	0	4818	4818	0	3191	1365
Flt Permitted					0.962	
Satd. Flow (perm)	0	4818	4818	0	3191	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					3	3
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1674	2136	0	653	551
Shared Lane Traffic (%)						31%
Lane Group Flow (vph)	0	1674	2136	0	824	380
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		30.0	30.0		20.0	20.0
Total Split (%)		60.0%	60.0%		40.0%	40.0%
Maximum Green (s)		25.0	25.0		15.0	15.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		25.0	25.0		15.0	15.0
Actuated g/C Ratio		0.50	0.50		0.30	0.30
v/c Ratio		0.69	0.89		0.86	0.92
Control Delay		11.5	10.4		28.3	50.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.5	10.4		28.3	50.9
LOS		B	B		C	D
Approach Delay		11.5	10.4		35.4	
Approach LOS		B	B		D	
Queue Length 50th (ft)		124	177		114	115
Queue Length 95th (ft)		168	m284		#207	#272
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2409	2409		959	411
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.69	0.89		0.86	0.92

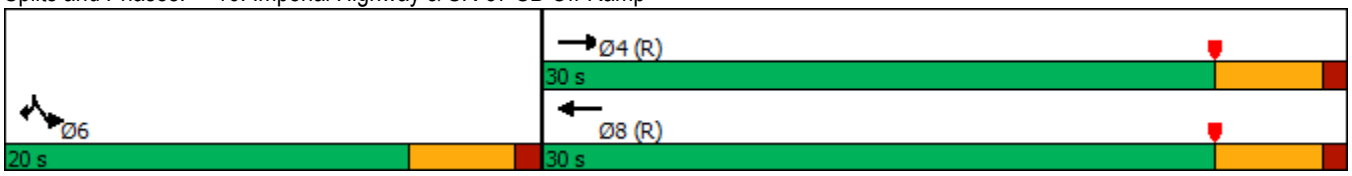
Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 43 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 120.6%		ICU Level of Service H	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

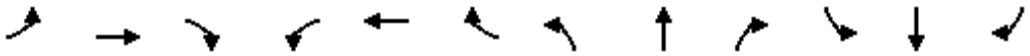
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1551	0	0	1700	16	1099	36	908	0	0	92
Future Volume (vph)	113	1551	0	0	1700	16	1099	36	908	0	0	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.999			0.891	0.850			0.850
Flt Protected	0.950						0.950	0.990				
Satd. Flow (prot)	1676	4818	0	0	6065	0	3051	1339	1425	0	0	2640
Flt Permitted	0.950						0.950	0.990				
Satd. Flow (perm)	1676	4818	0	0	6065	0	3051	1339	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2			146	148			216
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	1551	0	0	1700	16	1099	36	908	0	0	92
Shared Lane Traffic (%)							10%		43%			
Lane Group Flow (vph)	113	1551	0	0	1716	0	989	536	518	0	0	92
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	12.0	50.0			38.0		39.0	39.0	39.0			11.0
Total Split (%)	12.0%	50.0%			38.0%		39.0%	39.0%	39.0%			11.0%
Maximum Green (s)	8.0	45.0			33.0		34.0	34.0	34.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lead	Lead	Lead			Lag
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	8.2	47.2			35.0		34.0	34.0	34.0			6.0
Actuated g/C Ratio	0.08	0.47			0.35		0.34	0.34	0.34			0.06
v/c Ratio	0.82	0.68			0.81		0.95	0.97	0.89			0.25
Control Delay	81.2	23.2			33.6		51.9	57.4	41.7			1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Delay	81.2	23.2			33.6		51.9	57.4	41.7			1.7
LOS	F	C			C		D	E	D			A
Approach Delay		27.2			33.6			50.8			1.7	
Approach LOS		C			C			D			A	
Queue Length 50th (ft)	74	324			294		335	303	245			0
Queue Length 95th (ft)	m#116	389			343		#476	#567	#462			0
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	137	2274			2126		1037	551	582			361
Starvation Cap Reductn	0	0			0		0	0	0			0
Spillback Cap Reductn	0	0			0		0	0	0			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	0.82	0.68			0.81		0.95	0.97	0.89			0.25

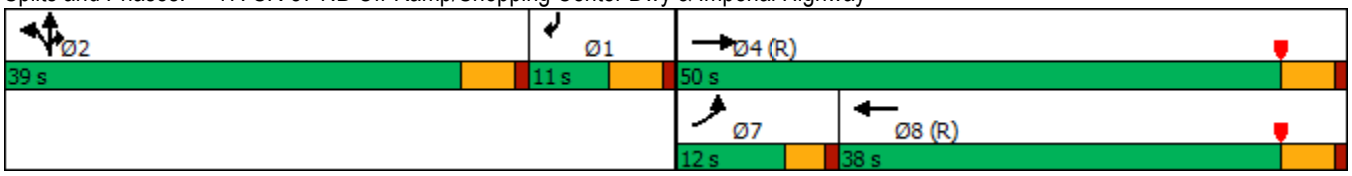
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 80 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 37.5		Intersection LOS: D	
Intersection Capacity Utilization 79.5%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

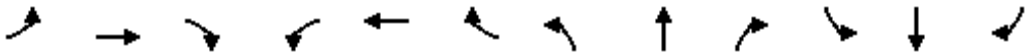
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	2110	112	101	1844	108	164	232	80	181	372	177
Future Volume (vph)	227	2110	112	101	1844	108	164	232	80	181	372	177
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.992			0.992			0.962				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4779	0	1676	4779	0	3252	3226	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4779	0	1676	4779	0	3252	3226	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			8			40				177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	227	2110	112	101	1844	108	164	232	80	181	372	177
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	2222	0	101	1952	0	164	312	0	181	372	177
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	20.0	58.0		11.0	49.0		10.0	40.0		11.0	41.0	41.0
Total Split (%)	16.7%	48.3%		9.2%	40.8%		8.3%	33.3%		9.2%	34.2%	34.2%
Maximum Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Actuated g/C Ratio	0.13	0.44		0.06	0.37		0.05	0.29		0.06	0.30	0.30
v/c Ratio	1.02	1.05		1.04	1.11		1.01	0.32		0.96	0.70	0.31
Control Delay	116.6	67.5		147.6	83.2		130.5	29.8		63.0	23.3	9.9
Queue Delay	0.0	20.8		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	116.6	88.3		147.6	83.2		130.5	29.8		63.0	23.3	9.9
LOS	F	F		F	F		F	C		E	C	A
Approach Delay		90.9			86.4			64.5			29.9	
Approach LOS		F			F			E			C	
Queue Length 50th (ft)	~182	~686		~80	~641		~67	86		77	247	58
Queue Length 95th (ft)	#347	#782		m#196	#732		#141	126		m70	m213	m46
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	223	2115		97	1757		162	969		189	529	573
Starvation Cap Reductn	0	250		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.02	1.19		1.04	1.11		1.01	0.32		0.96	0.70	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 79.3		Intersection LOS: E	
Intersection Capacity Utilization 94.1%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

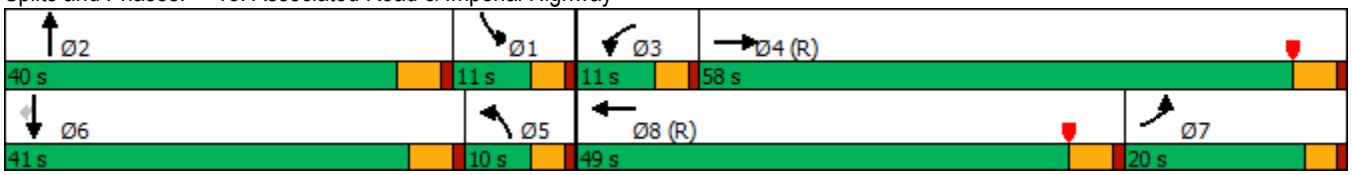
Queue shown is maximum after two cycles.

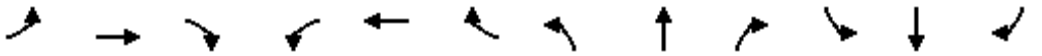
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2077	398	191	1703	35	199	13	159	27	31	15
Future Volume (vph)	14	2077	398	191	1703	35	199	13	159	27	31	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.997				0.850		0.951	
Flt Protected	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Flt Permitted	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			269		4				159		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	2077	398	191	1703	35	199	13	159	27	31	15
Shared Lane Traffic (%)							47%					
Lane Group Flow (vph)	14	2077	398	191	1738	0	105	107	159	27	46	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	62.0	62.0	20.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	51.7%	51.7%	16.7%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	57.0	57.0	16.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	57.0	57.0	16.0	73.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.48	0.48	0.13	0.61		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.17	0.91	0.47	0.86	0.59		0.36	0.36	0.39	0.33	0.47	
Control Delay	81.4	7.4	0.9	59.4	3.5		47.0	47.0	9.5	65.8	56.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	81.4	7.4	0.9	59.4	3.5		47.0	47.0	9.5	65.8	56.8	
LOS	F	A	A	E	A		D	D	A	E	E	
Approach Delay		6.8			9.1			30.9			60.2	
Approach LOS		A			A			C			E	
Queue Length 50th (ft)	11	82	2	138	51		75	76	0	21	24	
Queue Length 95th (ft)	m12	m80	m2	m#262	72		133	136	59	52	64	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2288	853	223	2923		292	294	404	83	98	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.91	0.47	0.86	0.59		0.36	0.36	0.39	0.33	0.47	

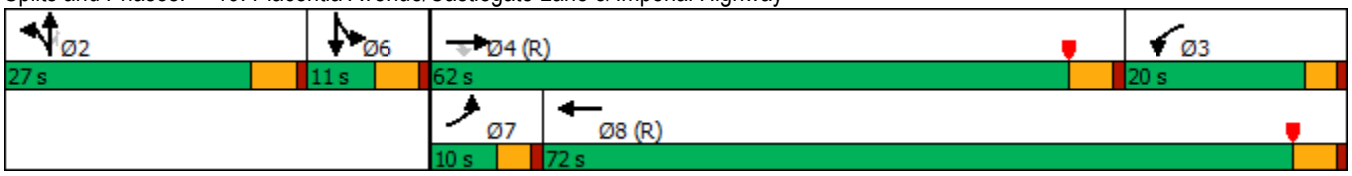
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 56 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 10.3 Intersection LOS: B
Intersection Capacity Utilization 78.0% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.

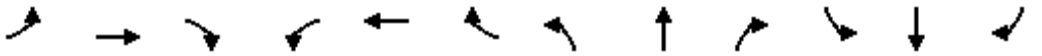
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	1454	263	77	1249	96	192	277	94	352	726	123
Future Volume (vph)	148	1454	263	77	1249	96	192	277	94	352	726	123
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.977			0.989			0.962				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4707	0	3252	4765	0	3252	3226	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4707	0	3252	4765	0	3252	3226	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			12			36				145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	148	1454	263	77	1249	96	192	277	94	352	726	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	1717	0	77	1345	0	192	371	0	352	726	123
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	14.0	57.0		10.0	53.0		14.0	31.0		22.0	39.0	39.0
Total Split (%)	11.7%	47.5%		8.3%	44.2%		11.7%	25.8%		18.3%	32.5%	32.5%
Maximum Green (s)	10.0	52.0		6.0	48.0		10.0	26.0		18.0	34.0	34.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	10.0	54.0		6.0	48.0		10.0	27.3		16.7	34.0	34.0
Actuated g/C Ratio	0.08	0.45		0.05	0.40		0.08	0.23		0.14	0.28	0.28
v/c Ratio	0.55	0.80		0.48	0.70		0.71	0.49		0.78	0.76	0.23
Control Delay	30.2	4.7		86.3	10.2		68.5	39.1		56.6	25.1	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	30.2	4.7		86.3	10.2		68.5	39.1		56.6	25.1	0.9
LOS	C	A		F	B		E	D		E	C	A
Approach Delay		6.7			14.3			49.1			31.9	
Approach LOS		A			B			D			C	
Queue Length 50th (ft)	53	39		30	65		75	121		99	158	0
Queue Length 95th (ft)	m60	88		m33	m64		#124	171		165	239	m3
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	271	2139		162	1913		271	761		487	950	528
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.55	0.80		0.48	0.70		0.71	0.49		0.72	0.76	0.23

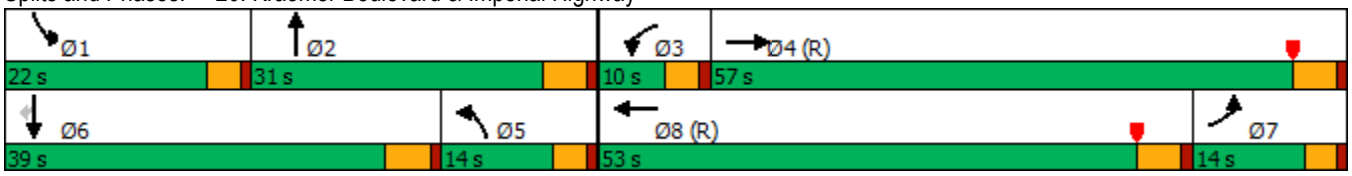
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

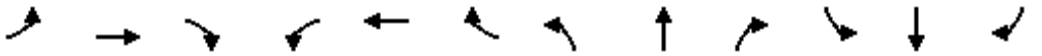
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	1106	99	127	1720	163	144	214	129	311	347	247
Future Volume (vph)	218	1106	99	127	1720	163	144	214	129	311	347	247
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			156			145			180
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	218	1106	99	127	1720	163	144	214	129	311	347	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	1106	99	127	1720	163	144	214	129	311	347	247
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	12.0	45.0	45.0	13.0	46.0	46.0	13.0	47.0	47.0	15.0	49.0	49.0
Total Split (%)	10.0%	37.5%	37.5%	10.8%	38.3%	38.3%	10.8%	39.2%	39.2%	12.5%	40.8%	40.8%
Maximum Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	9.0	42.0	42.0	11.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	8.7	42.0	42.0	11.0	44.3	44.3
Actuated g/C Ratio	0.07	0.33	0.33	0.08	0.34	0.34	0.07	0.35	0.35	0.09	0.37	0.37
v/c Ratio	1.01	0.69	0.17	0.52	1.04	0.27	0.61	0.18	0.21	1.04	0.28	0.37
Control Delay	94.5	37.9	8.4	37.4	50.3	2.7	65.5	27.6	4.1	83.3	11.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.5	37.9	8.4	37.4	50.3	2.7	65.5	27.6	4.1	83.3	11.2	1.1
LOS	F	D	A	D	D	A	E	C	A	F	B	A
Approach Delay		44.5			45.6			32.6			33.2	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	~85	322	8	41	~505	4	56	60	0	~134	32	1
Queue Length 95th (ft)	m#142	369	m27	m50	#604	m12	91	90	33	m#169	m38	m0
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	216	1606	596	243	1646	615	243	1173	619	298	1237	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.69	0.17	0.52	1.04	0.27	0.59	0.18	0.21	1.04	0.28	0.37

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 41.6		Intersection LOS: D	
Intersection Capacity Utilization 72.3%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

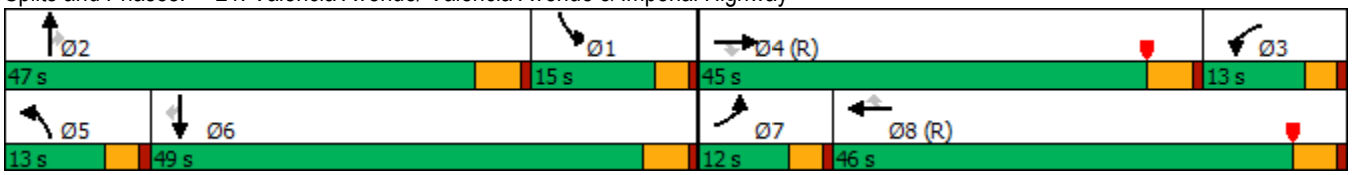
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

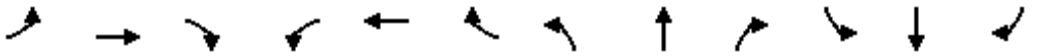
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	1345	249	280	1569	598	267	240	152	944	590	37
Future Volume (vph)	44	1345	249	280	1569	598	267	240	152	944	590	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.977				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4707	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4707	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34				559			140			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	44	1345	249	280	1569	598	267	240	152	944	590	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	1594	0	280	1569	598	267	240	152	944	590	37
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	43.0	43.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.36	0.36	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	0.53	0.98		1.73	0.91	0.67	0.82	0.18	0.22	5.83	0.49	0.06
Control Delay	43.9	24.2		386.0	46.1	7.7	73.7	23.1	5.3	2186.8	35.7	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	24.2		386.0	46.1	7.7	73.7	23.1	5.3	2186.8	35.7	0.1
LOS	D	C		F	D	A	E	C	A	F	D	A
Approach Delay		24.8			75.6			39.5			1327.4	
Approach LOS		C			E			D			F	
Queue Length 50th (ft)	29	44		~164	432	20	106	61	6	~726	173	0
Queue Length 95th (ft)	m44	m#499		#254	#537	131	#174	90	47	m#750	m188	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1630		162	1726	896	325	1369	695	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.98		1.73	0.91	0.67	0.82	0.18	0.22	5.83	0.49	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 5.83			
Intersection Signal Delay: 370.1		Intersection LOS: F	
Intersection Capacity Utilization 92.2%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

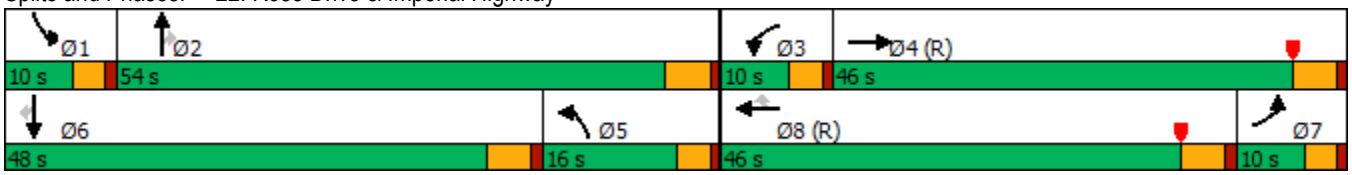
Queue shown is maximum after two cycles.

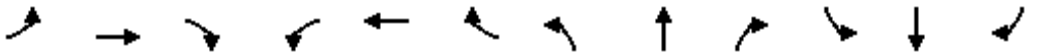
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

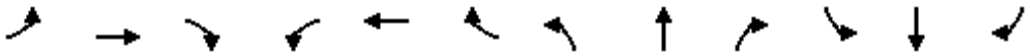
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1480	835	265	1771	4	0	0	0	524	0	855
Future Volume (vph)	0	1480	835	265	1771	4	0	0	0	524	0	855
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	0.91	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			830									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1480	835	265	1771	4	0	0	0	524	0	855
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1480	835	265	1775	0	0	0	0	524	0	855
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		51.0	51.0	18.0	69.0					51.0		51.0
Total Split (%)		42.5%	42.5%	15.0%	57.5%					42.5%		42.5%
Maximum Green (s)		46.5	46.5	13.5	64.5					46.5		46.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		50.3	50.3	13.5	68.3					42.7		42.7
Actuated g/C Ratio		0.42	0.42	0.11	0.57					0.36		0.36
v/c Ratio		0.73	0.53	0.73	0.65					0.45		0.88
Control Delay		20.0	1.8	62.9	20.1					30.6		44.7
Queue Delay		0.8	0.4	0.0	0.2					0.0		0.0
Total Delay		20.8	2.3	62.9	20.3					30.6		44.7
LOS		C	A	E	C					C		D
Approach Delay		14.1			25.8						39.3	
Approach LOS		B			C						D	
Queue Length 50th (ft)		153	21	103	292					156		323
Queue Length 95th (ft)		m173	m22	#152	368					198		406
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		2020	1589	365	2743					1260		1056
Starvation Cap Reductn		252	313	0	246					0		0
Spillback Cap Reductn		0	0	0	32					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.84	0.65	0.73	0.71					0.42		0.81

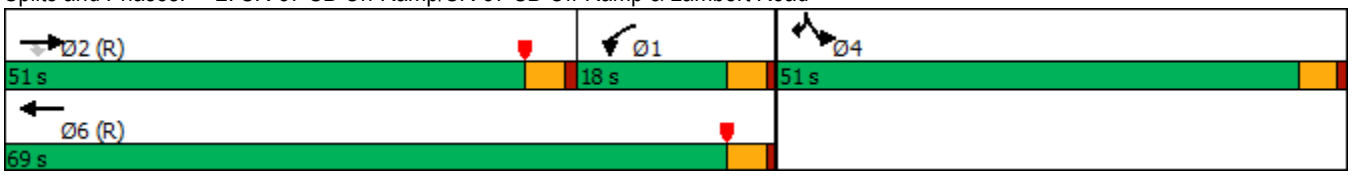
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 75.3%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

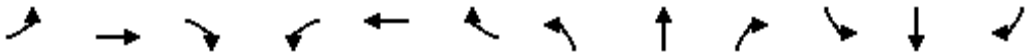
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1648	576	0	1186	570	676	0	329	0	0	0
Future Volume (vph)	0	1648	576	0	1186	570	676	0	329	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.993	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4521	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4521	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9	283			433			19			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1648	576	0	1186	570	676	0	329	0	0	0
Shared Lane Traffic (%)			14%									
Lane Group Flow (vph)	0	1729	495	0	1186	570	676	0	329	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			

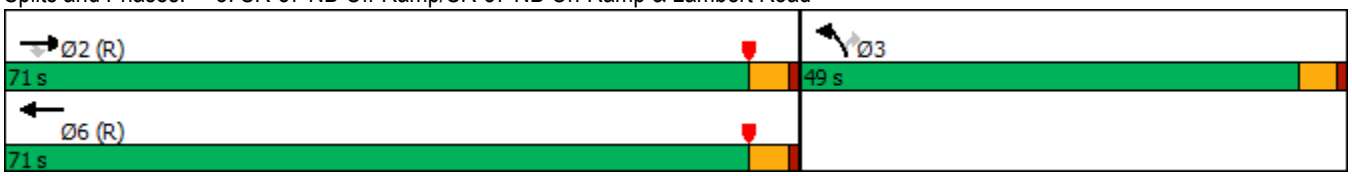


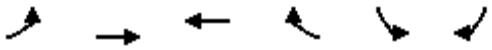
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		71.0	71.0		71.0		49.0		49.0			
Total Split (%)		59.2%	59.2%		59.2%		40.8%		40.8%			
Maximum Green (s)		66.5	66.5		66.5		44.5		44.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		78.2	78.2		78.2	120.0	32.8		32.8			
Actuated g/C Ratio		0.65	0.65		0.65	1.00	0.27		0.27			
v/c Ratio		0.59	0.53		0.38	0.38	0.76		0.78			
Control Delay		7.1	4.6		3.1	0.5	45.3		50.1			
Queue Delay		0.2	0.4		0.0	0.0	0.0		0.0			
Total Delay		7.3	5.0		3.1	0.5	45.3		50.1			
LOS		A	A		A	A	D		D			
Approach Delay		6.8			2.3			46.9				
Approach LOS		A			A			D				
Queue Length 50th (ft)		139	54		42	0	249		224			
Queue Length 95th (ft)		172	79		68	m0	279		298			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2948	938		3139	1500	1205		568			
Starvation Cap Reductn		415	130		0	0	0		0			
Spillback Cap Reductn		138	0		0	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		0.68	0.61		0.38	0.38	0.56		0.58			

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 67.1%		ICU Level of Service C	
Analysis Period (min) 15			

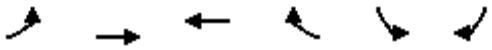
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1912	2632	0	735	605
Future Volume (vph)	0	1912	2632	0	735	605
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.969	0.850
Flt Protected					0.962	
Satd. Flow (prot)	0	4818	4818	0	3191	1365
Flt Permitted					0.962	
Satd. Flow (perm)	0	4818	4818	0	3191	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					2	2
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1912	2632	0	735	605
Shared Lane Traffic (%)						31%
Lane Group Flow (vph)	0	1912	2632	0	923	417
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		39.0	39.0		21.0	21.0
Total Split (%)		65.0%	65.0%		35.0%	35.0%
Maximum Green (s)		34.0	34.0		16.0	16.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		34.0	34.0		16.0	16.0
Actuated g/C Ratio		0.57	0.57		0.27	0.27
v/c Ratio		0.70	0.96		1.08	1.14
Control Delay		11.1	14.7		80.7	117.6
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.1	14.7		80.7	117.6
LOS		B	B		F	F
Approach Delay		11.1	14.7		92.2	
Approach LOS		B	B		F	
Queue Length 50th (ft)		161	313		~200	~201
Queue Length 95th (ft)		209	m287		#306	#371
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2730	2730		852	365
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.70	0.96		1.08	1.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 9 (15%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 31.2		Intersection LOS: C	
Intersection Capacity Utilization 144.0%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

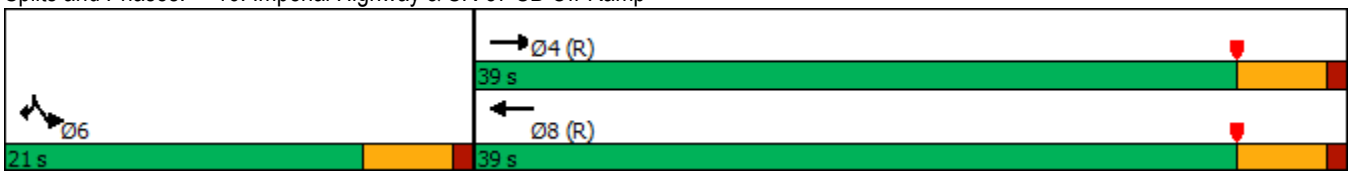
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	2060	0	0	2707	43	1110	72	495	0	0	217
Future Volume (vph)	205	2060	0	0	2707	43	1110	72	495	0	0	217
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.998			0.964	0.850			0.850
Flt Protected	0.950						0.950	0.971				
Satd. Flow (prot)	1676	4818	0	0	6058	0	3051	1421	1425	0	0	2640
Flt Permitted	0.950						0.950	0.971				
Satd. Flow (perm)	1676	4818	0	0	6058	0	3051	1421	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3			13	101			245
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	2060	0	0	2707	43	1110	72	495	0	0	217
Shared Lane Traffic (%)							23%		21%			
Lane Group Flow (vph)	205	2060	0	0	2750	0	855	431	391	0	0	217
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	16.0	72.0			56.0		37.0	37.0	37.0			11.0
Total Split (%)	13.3%	60.0%			46.7%		30.8%	30.8%	30.8%			9.2%
Maximum Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lag	Lag	Lag			Lead
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Actuated g/C Ratio	0.10	0.56			0.42		0.27	0.27	0.27			0.05
v/c Ratio	1.23	0.77			1.07		1.05	1.11	0.86			0.60
Control Delay	170.9	19.5			42.6		88.7	119.2	50.5			11.6
Queue Delay	0.0	47.7			13.9		0.0	0.1	2.9			0.0
Total Delay	170.9	67.2			56.5		88.7	119.3	53.4			11.6
LOS	F	E			E		F	F	D			B
Approach Delay		76.6			56.5			88.3			11.6	
Approach LOS		E			E			F			B	
Queue Length 50th (ft)	~196	399			~661		~396	~436	233			0
Queue Length 95th (ft)	m#290	m441			m133		#530	#674	#420			30
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	167	2690			2576		813	388	454			364
Starvation Cap Reductn	0	0			89		0	0	0			0
Spillback Cap Reductn	0	1027			0		0	2	21			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	1.23	1.24			1.11		1.05	1.12	0.90			0.60

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 12 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 69.4		Intersection LOS: E	
Intersection Capacity Utilization 92.3%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

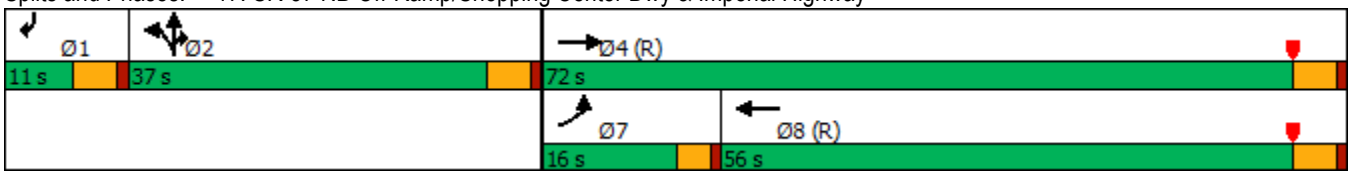
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	2105	153	192	1988	203	240	295	93	320	389	280
Future Volume (vph)	296	2105	153	192	1988	203	240	295	93	320	389	280
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.990			0.986			0.964				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4769	0	1676	4750	0	3252	3232	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4769	0	1676	4750	0	3252	3232	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			16			35				234
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	296	2105	153	192	1988	203	240	295	93	320	389	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	296	2258	0	192	2191	0	240	388	0	320	389	280
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	18.0	53.0		14.0	49.0		12.0	40.0		13.0	41.0	41.0
Total Split (%)	15.0%	44.2%		11.7%	40.8%		10.0%	33.3%		10.8%	34.2%	34.2%
Maximum Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Actuated g/C Ratio	0.12	0.40		0.08	0.37		0.07	0.29		0.08	0.30	0.30
v/c Ratio	1.52	1.18		1.38	1.25		1.11	0.40		1.32	0.74	0.46
Control Delay	278.8	108.6		236.1	142.6		145.1	32.3		195.5	23.9	3.2
Queue Delay	0.0	0.0		0.0	0.5		0.0	0.0		0.0	0.0	0.0
Total Delay	278.8	108.6		236.1	143.0		145.1	32.3		195.5	23.9	3.3
LOS	F	F		F	F		F	C		F	C	A
Approach Delay		128.3			150.5			75.4			73.6	
Approach LOS		F			F			E			E	
Queue Length 50th (ft)	~318	~757		~195	~775		~109	115		~169	179	19
Queue Length 95th (ft)	m#452	m#850		m#300	#881		#194	161		m#175	m181	m21
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	195	1914		139	1751		216	967		243	529	613
Starvation Cap Reductn	0	25		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	232		0	0		0	0	10
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.52	1.20		1.38	1.44		1.11	0.40		1.32	0.74	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 4 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay: 123.1		Intersection LOS: F	
Intersection Capacity Utilization 106.5%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

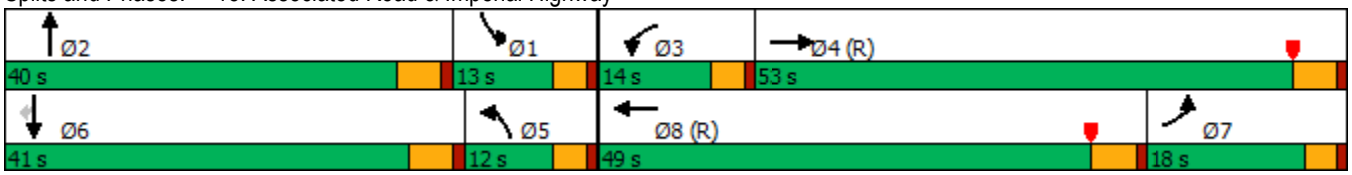
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

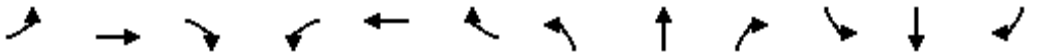
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	2122	308	255	2176	63	276	51	295	28	25	15
Future Volume (vph)	21	2122	308	255	2176	63	276	51	295	28	25	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850		0.944	
Flt Protected	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1666	0
Flt Permitted	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			195		6				295		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	2122	308	255	2176	63	276	51	295	28	25	15
Shared Lane Traffic (%)							41%					
Lane Group Flow (vph)	21	2122	308	255	2239	0	163	164	295	28	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	59.0	59.0	23.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	49.2%	49.2%	19.2%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	54.0	54.0	19.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	54.0	54.0	19.0	73.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.45	0.45	0.16	0.61		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.25	0.98	0.39	0.96	0.77		0.56	0.55	0.57	0.34	0.41	
Control Delay	81.9	10.3	1.1	60.7	3.4		52.9	52.5	9.6	66.4	51.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	81.9	10.3	1.1	60.7	3.4		52.9	52.5	9.6	66.4	51.9	
LOS	F	B	A	E	A		D	D	A	E	D	
Approach Delay		9.8			9.3			32.3			57.8	
Approach LOS		A			A			C			E	
Queue Length 50th (ft)	17	107	9	188	46		122	123	0	21	19	
Queue Length 95th (ft)	m16	m90	m6	m#205	m105		200	200	80	53	56	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2168	782	265	2920		292	297	515	83	97	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.25	0.98	0.39	0.96	0.77		0.56	0.55	0.57	0.34	0.41	

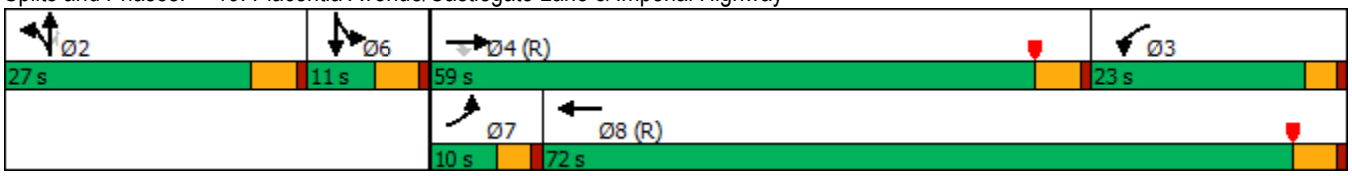
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 55 (46%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 86.0%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

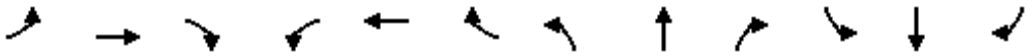
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	1600	239	201	1745	347	398	702	112	286	535	128
Future Volume (vph)	236	1600	239	201	1745	347	398	702	112	286	535	128
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.981			0.975			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4726	0	3252	4697	0	3252	3283	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4726	0	3252	4697	0	3252	3283	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			44			14				136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	236	1600	239	201	1745	347	398	702	112	286	535	128
Shared Lane Traffic (%)												
Lane Group Flow (vph)	236	1839	0	201	2092	0	398	814	0	286	535	128
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	13.0	56.0		14.0	57.0		19.0	35.0		15.0	31.0	31.0
Total Split (%)	10.8%	46.7%		11.7%	47.5%		15.8%	29.2%		12.5%	25.8%	25.8%
Maximum Green (s)	9.0	51.0		10.0	52.0		15.0	30.0		11.0	26.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	9.0	51.1		9.9	52.0		15.0	30.0		11.0	26.0	26.0
Actuated g/C Ratio	0.08	0.43		0.08	0.43		0.12	0.25		0.09	0.22	0.22
v/c Ratio	0.97	0.91		0.75	1.02		0.98	0.98		0.96	0.74	0.30
Control Delay	60.7	10.3		91.1	33.4		92.6	70.8		96.0	37.5	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	60.7	10.3		91.1	33.4		92.6	70.8		96.0	37.5	5.1
LOS	E	B		F	C		F	E		F	D	A
Approach Delay		16.0			38.4			78.0			50.8	
Approach LOS		B			D			E			D	
Queue Length 50th (ft)	89	56		84	~167		160	326		121	195	20
Queue Length 95th (ft)	m#106	m108		m105	#698		#263	#462		#208	257	m43
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	243	2030		271	2060		406	831		298	726	431
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.91		0.74	1.02		0.98	0.98		0.96	0.74	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 119 (99%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 40.5		Intersection LOS: D	
Intersection Capacity Utilization 98.7%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

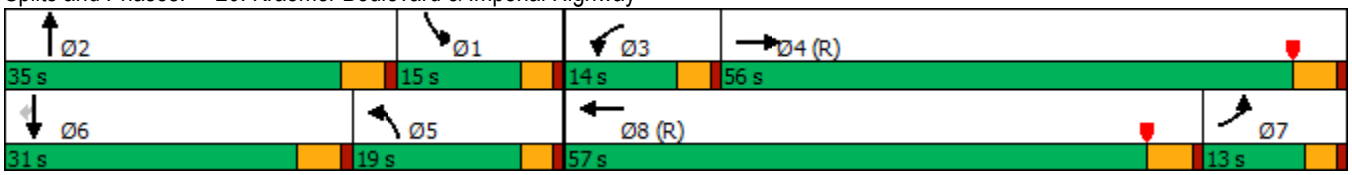
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

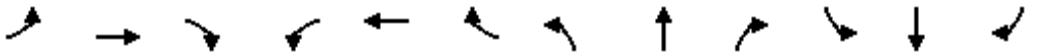
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	1970	163	180	1467	160	125	331	138	240	260	168
Future Volume (vph)	297	1970	163	180	1467	160	125	331	138	240	260	168
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			160			136			168
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	297	1970	163	180	1467	160	125	331	138	240	260	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	297	1970	163	180	1467	160	125	331	138	240	260	168
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	15.0	51.0	51.0	10.0	46.0	46.0	10.0	47.0	47.0	12.0	49.0	49.0
Total Split (%)	12.5%	42.5%	42.5%	8.3%	38.3%	38.3%	8.3%	39.2%	39.2%	10.0%	40.8%	40.8%
Maximum Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Actuated g/C Ratio	0.09	0.38	0.38	0.05	0.34	0.34	0.05	0.35	0.35	0.07	0.37	0.37
v/c Ratio	1.00	1.07	0.24	1.11	0.89	0.26	0.77	0.28	0.23	1.11	0.21	0.26
Control Delay	89.5	78.0	13.2	111.5	14.0	1.4	85.9	28.9	5.6	141.0	24.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.5	78.0	13.2	111.5	14.0	1.4	85.9	28.9	5.6	141.0	24.1	4.8
LOS	F	E	B	F	B	A	F	C	A	F	C	A
Approach Delay		75.1			22.6			35.5			61.2	
Approach LOS		E			C			D			E	
Queue Length 50th (ft)	125	~616	45	~78	102	3	50	96	1	~108	76	23
Queue Length 95th (ft)	m#160	m#701	m63	m#96	m148	m3	#101	135	45	m#182	m104	m21
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	298	1846	666	162	1646	617	162	1173	613	216	1229	656
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	1.07	0.24	1.11	0.89	0.26	0.77	0.28	0.23	1.11	0.21	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 51.9		Intersection LOS: D	
Intersection Capacity Utilization 77.5%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

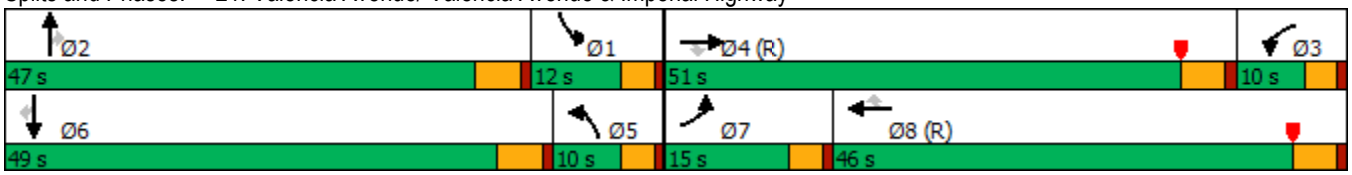
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

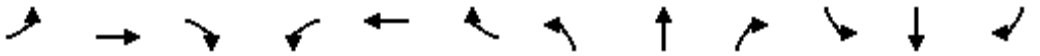
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1916	300	168	1496	879	271	630	129	1005	526	32
Future Volume (vph)	87	1916	300	168	1496	879	271	630	129	1005	526	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.980				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				243			136			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	87	1916	300	168	1496	879	271	630	129	1005	526	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	2216	0	168	1496	879	271	630	129	1005	526	32
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.34	0.34	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	1.05	1.36		1.04	0.91	1.31	0.83	0.46	0.19	6.20	0.44	0.05
Control Delay	91.0	189.9		136.0	47.0	174.7	75.0	27.2	4.0	2360.7	31.2	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.0	189.9		136.0	47.0	174.7	75.0	27.2	4.0	2360.7	31.2	0.1
LOS	F	F		F	D	F	E	C	A	F	C	A
Approach Delay		186.2			97.0			36.9			1528.4	
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	~70	~801		~72	402	~747	108	184	0	~775	155	0
Queue Length 95th (ft)	m#63	m#726		#145	#476	#996	#178	237	34	#908	m171	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1630		162	1646	672	325	1369	692	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	1.36		1.04	0.91	1.31	0.83	0.46	0.19	6.20	0.44	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 80 (67%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 6.20			
Intersection Signal Delay: 417.0		Intersection LOS: F	
Intersection Capacity Utilization 114.8%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

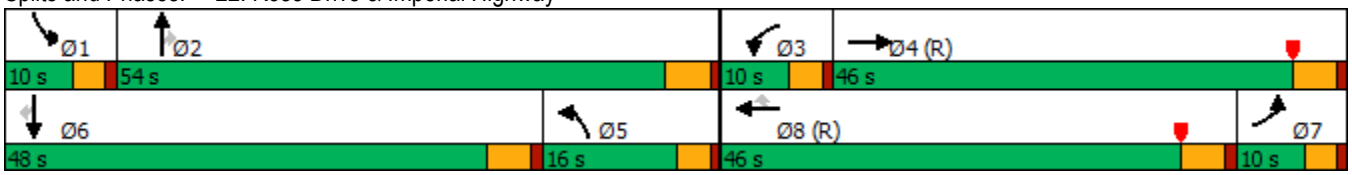
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

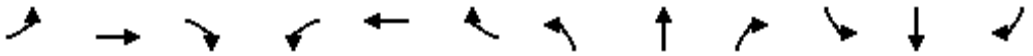
Splits and Phases: 22: Rose Drive & Imperial Highway



APPENDIX F-III

YEAR 2035 CUMULATIVE PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	1345	249	280	1569	598	267	240	152	944	590	37
Future Volume (vph)	44	1345	249	280	1569	598	267	240	152	944	590	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.86	0.86	1.00
Frt		0.977				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.988	
Satd. Flow (prot)	1676	4707	0	3252	4818	1500	3252	3353	1500	2884	2999	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.988	
Satd. Flow (perm)	1676	4707	0	3252	4818	1500	3252	3353	1500	2884	2999	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				166			152			152
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	44	1345	249	280	1569	598	267	240	152	944	590	37
Shared Lane Traffic (%)										20%		
Lane Group Flow (vph)	44	1594	0	280	1569	598	267	240	152	755	779	37
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Split	NA	Perm	Split	NA	Perm
Protected Phases	7	4		3	8	6	2	2		6	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	6	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	41.0	48.0	11.0	11.0	11.0	48.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	48.0	11.0	11.0	11.0	48.0	48.0	48.0
Total Split (%)	8.7%	40.0%		8.7%	40.0%	41.7%	9.6%	9.6%	9.6%	41.7%	41.7%	41.7%
Maximum Green (s)	6.0	41.0		6.0	41.0	43.0	6.0	6.0	6.0	43.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		34.0			29.0	36.0				36.0	36.0	36.0
Pedestrian Calls (#/hr)		2			2	2				2	2	2
Act Effct Green (s)	6.0	41.0		6.0	43.0	91.0	6.0	6.0	6.0	43.0	43.0	43.0
Actuated g/C Ratio	0.05	0.36		0.05	0.37	0.79	0.05	0.05	0.05	0.37	0.37	0.37
v/c Ratio	0.51	0.94		1.66	0.87	0.49	1.58	1.38	0.68	0.70	0.69	0.06
Control Delay	73.3	46.6		354.6	40.5	4.5	323.1	243.1	24.8	34.8	34.4	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.3	46.6		354.6	40.5	4.5	323.1	243.1	24.8	34.8	34.4	0.2
LOS	E	D		F	D	A	F	F	C	C	C	A
Approach Delay		47.3			67.6			225.1			33.8	
Approach LOS		D			E			F			C	
Queue Length 50th (ft)	32	406		~155	402	89	~144	~123	0	272	280	0
Queue Length 95th (ft)	#79	#510		#243	#481	144	#230	#208	#83	352	360	0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	87	1701		169	1801	1221	169	174	222	1078	1121	656
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.94		1.66	0.87	0.49	1.58	1.38	0.68	0.70	0.69	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 115	
Actuated Cycle Length: 115	
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.66	
Intersection Signal Delay: 70.4	Intersection LOS: E
Intersection Capacity Utilization 88.7%	ICU Level of Service E
Analysis Period (min) 15	

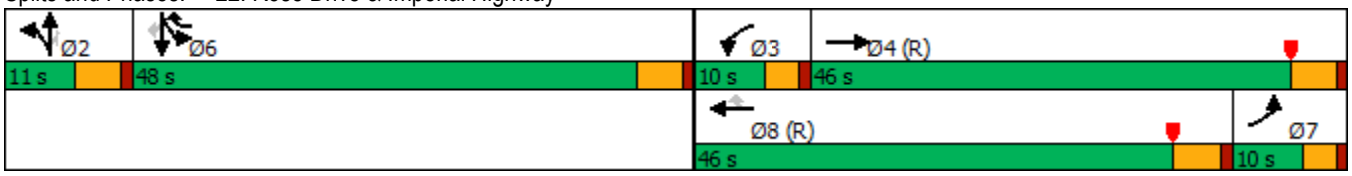
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

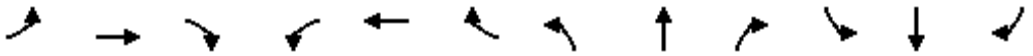
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 22: Rose Drive & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1916	300	168	1496	879	271	630	129	1005	526	32
Future Volume (vph)	87	1916	300	168	1496	879	271	630	129	1005	526	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.86	0.86	1.00
Frt		0.980				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.984	
Satd. Flow (prot)	1676	4721	0	3252	4818	1500	3252	3353	1500	2884	2987	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.984	
Satd. Flow (perm)	1676	4721	0	3252	4818	1500	3252	3353	1500	2884	2987	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				105			152			152
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	87	1916	300	168	1496	879	271	630	129	1005	526	32
Shared Lane Traffic (%)										25%		
Lane Group Flow (vph)	87	2216	0	168	1496	879	271	630	129	754	777	32
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Split	NA	Perm	Split	NA	Perm
Protected Phases	7	4		3	8	6	2	2		6	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	6	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	48.0	11.0	11.0	11.0	48.0	48.0	48.0
Total Split (s)	12.0	46.0		10.0	44.0	47.0	12.0	12.0	12.0	47.0	47.0	47.0
Total Split (%)	10.4%	40.0%		8.7%	38.3%	40.9%	10.4%	10.4%	10.4%	40.9%	40.9%	40.9%
Maximum Green (s)	8.0	41.0		6.0	39.0	42.0	7.0	7.0	7.0	42.0	42.0	42.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		34.0			26.0	36.0				36.0	36.0	36.0
Pedestrian Calls (#/hr)		2			2	2				2	2	2
Act Effct Green (s)	8.0	41.0		6.0	39.0	86.0	7.0	7.0	7.0	42.0	42.0	42.0
Actuated g/C Ratio	0.07	0.36		0.05	0.34	0.75	0.06	0.06	0.06	0.37	0.37	0.37
v/c Ratio	0.75	1.30		0.99	0.92	0.77	1.38	3.09	0.55	0.72	0.71	0.05
Control Delay	88.8	172.8		122.8	46.4	12.9	238.2	971.4	14.6	36.0	35.7	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.8	172.8		122.8	46.4	12.9	238.2	971.4	14.6	36.0	35.7	0.2
LOS	F	F		F	D	B	F	F	B	D	D	A
Approach Delay		169.6			39.9			658.6			35.1	
Approach LOS		F			D			F			D	
Queue Length 50th (ft)	64	~771		65	386	289	~136	~428	0	276	284	0
Queue Length 95th (ft)	#151	#867		#137	#480	469	#224	#546	44	357	365	0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	116	1701		169	1633	1148	197	204	234	1053	1090	644
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	1.30		0.99	0.92	0.77	1.38	3.09	0.55	0.72	0.71	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 115			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 3.09			
Intersection Signal Delay: 164.7		Intersection LOS: F	
Intersection Capacity Utilization 108.5%		ICU Level of Service G	
Analysis Period (min) 15			

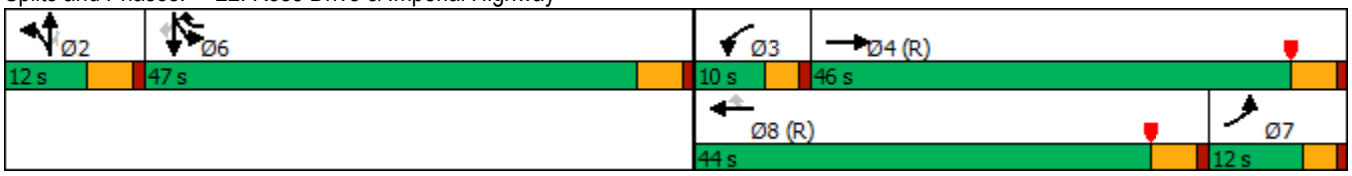
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

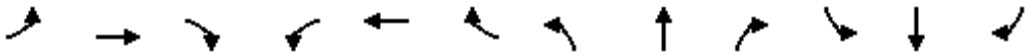
Splits and Phases: 22: Rose Drive & Imperial Highway



APPENDIX F-IV

YEAR 2045 TRAFFIC CONDITIONS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1937	650	269	2247	0	0	0	0	1060	0	730
Future Volume (vph)	0	1937	650	269	2247	0	0	0	0	1060	0	730
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			530									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1937	650	269	2247	0	0	0	0	1060	0	730
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1937	650	269	2247	0	0	0	0	1060	0	730
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		56.1	56.1	15.9	72.0					48.0		48.0
Total Split (%)		46.8%	46.8%	13.3%	60.0%					40.0%		40.0%
Maximum Green (s)		51.6	51.6	11.4	67.5					43.5		43.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		52.5	52.5	11.4	68.4					42.6		42.6
Actuated g/C Ratio		0.44	0.44	0.10	0.57					0.36		0.36
v/c Ratio		0.92	0.45	0.87	0.82					0.92		0.75
Control Delay		39.3	11.6	70.4	20.3					50.2		36.8
Queue Delay		20.5	0.2	0.0	2.5					0.0		0.0
Total Delay		59.8	11.7	70.4	22.8					50.2		36.8
LOS		E	B	E	C					D		D
Approach Delay		47.7			27.9						44.7	
Approach LOS		D			C						D	
Queue Length 50th (ft)		404	77	104	331					396		257
Queue Length 95th (ft)		m401	m73	m#144	m387					#522		339
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		2106	1452	308	2744					1178		992
Starvation Cap Reductn		200	193	0	106					0		0
Spillback Cap Reductn		241	0	0	366					0		3
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		1.04	0.52	0.87	0.94					0.90		0.74

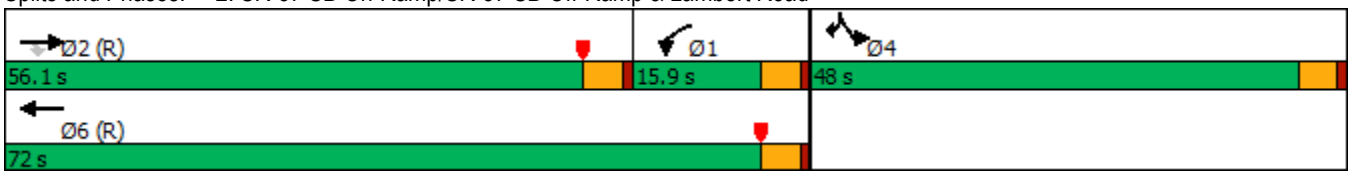
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 39.7		Intersection LOS: D	
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

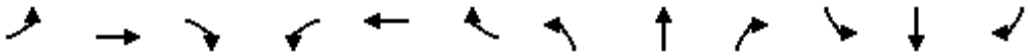
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2563	424	0	1412	511	1104	0	527	0	0	0
Future Volume (vph)	0	2563	424	0	1412	511	1104	0	527	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.998	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3	141			326			14			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2563	424	0	1412	511	1104	0	527	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	2605	382	0	1412	511	1104	0	527	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		74.0	74.0		74.0		46.0		46.0			
Total Split (%)		61.7%	61.7%		61.7%		38.3%		38.3%			
Maximum Green (s)		69.5	69.5		69.5		41.5		41.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		69.5	69.5		69.5	120.0	41.5		41.5			
Actuated g/C Ratio		0.58	0.58		0.58	1.00	0.35		0.35			
v/c Ratio		0.99	0.47		0.51	0.34	0.98		1.00			
Control Delay		20.8	4.4		1.0	0.4	62.1		78.0			
Queue Delay		31.1	0.0		0.0	0.0	0.0		0.0			
Total Delay		51.9	4.4		1.0	0.4	62.1		78.0			
LOS		D	A		A	A	E		E			
Approach Delay		45.8			0.8			67.2				
Approach LOS		D			A			E				
Queue Length 50th (ft)		363	68		13	0	434		397			
Queue Length 95th (ft)		#887	m66		m16	m0	#581		#636			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2632	806		2790	1500	1124		527			
Starvation Cap Reductn		71	0		0	0	0		0			
Spillback Cap Reductn		219	0		62	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		1.08	0.47		0.52	0.34	0.98		1.00			

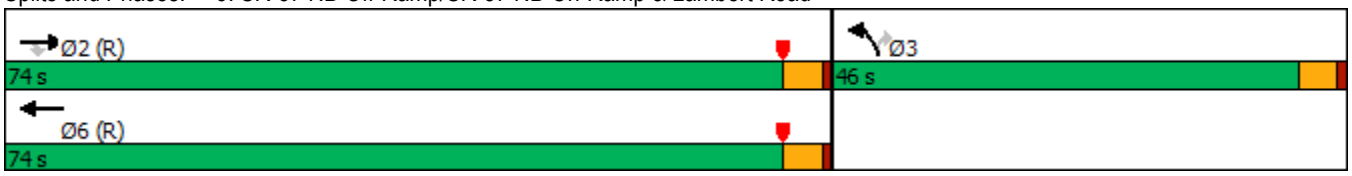
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 38.0		Intersection LOS: D	
Intersection Capacity Utilization 97.5%		ICU Level of Service F	
Analysis Period (min) 15			

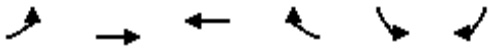
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

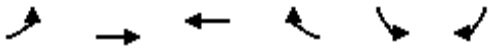
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1739	2223	0	682	572
Future Volume (vph)	0	1739	2223	0	682	572
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.969	0.850
Flt Protected					0.962	
Satd. Flow (prot)	0	4818	4818	0	3191	1365
Flt Permitted					0.962	
Satd. Flow (perm)	0	4818	4818	0	3191	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					2	2
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1739	2223	0	682	572
Shared Lane Traffic (%)						31%
Lane Group Flow (vph)	0	1739	2223	0	859	395
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		30.0	30.0		20.0	20.0
Total Split (%)		60.0%	60.0%		40.0%	40.0%
Maximum Green (s)		25.0	25.0		15.0	15.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		25.0	25.0		15.0	15.0
Actuated g/C Ratio		0.50	0.50		0.30	0.30
v/c Ratio		0.72	0.92		0.90	0.96
Control Delay		12.0	12.0		31.9	58.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.0	12.0		31.9	58.8
LOS		B	B		C	E
Approach Delay		12.0	12.0		40.4	
Approach LOS		B	B		D	
Queue Length 50th (ft)		131	195		121	121
Queue Length 95th (ft)		178	m301		#220	#285
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2409	2409		958	410
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.72	0.92		0.90	0.96

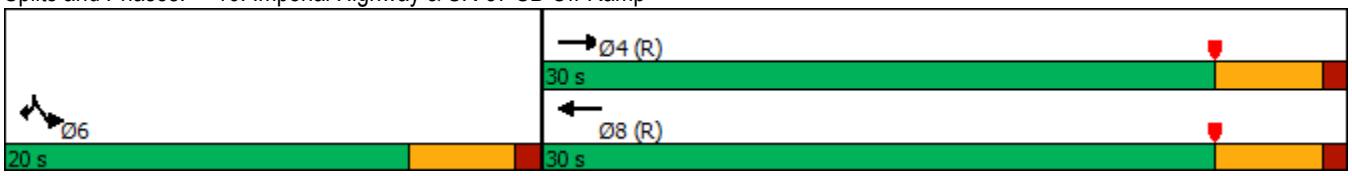
Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 43 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 124.5%	ICU Level of Service H
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.

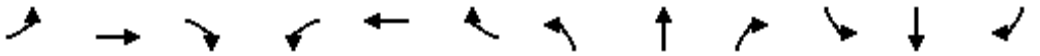
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	1549	0	0	1730	18	1153	43	945	0	0	51
Future Volume (vph)	118	1549	0	0	1730	18	1153	43	945	0	0	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.998			0.892	0.850			0.850
Flt Protected	0.950						0.950	0.990				
Satd. Flow (prot)	1676	4818	0	0	6058	0	3051	1340	1425	0	0	2640
Flt Permitted	0.950						0.950	0.990				
Satd. Flow (perm)	1676	4818	0	0	6058	0	3051	1340	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2			140	148			214
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	1549	0	0	1730	18	1153	43	945	0	0	51
Shared Lane Traffic (%)							10%		43%			
Lane Group Flow (vph)	118	1549	0	0	1748	0	1038	564	539	0	0	51
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	12.0	50.0			38.0		39.0	39.0	39.0			11.0
Total Split (%)	12.0%	50.0%			38.0%		39.0%	39.0%	39.0%			11.0%
Maximum Green (s)	8.0	45.0			33.0		34.0	34.0	34.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lead	Lead	Lead			Lag
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	8.3	47.2			34.9		34.0	34.0	34.0			6.0
Actuated g/C Ratio	0.08	0.47			0.35		0.34	0.34	0.34			0.06
v/c Ratio	0.85	0.68			0.83		1.00	1.03	0.93			0.14
Control Delay	82.2	23.1			34.4		62.1	72.3	47.3			0.8
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Delay	82.2	23.1			34.4		62.1	72.3	47.3			0.8
LOS	F	C			C		E	E	D			A
Approach Delay		27.3			34.4			61.1			0.8	
Approach LOS		C			C			E			A	
Queue Length 50th (ft)	77	326			302		~360	~375	265			0
Queue Length 95th (ft)	m#116	m384			352		#514	#619	#493			0
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	139	2274			2115		1037	548	582			359
Starvation Cap Reductn	0	0			0		0	0	0			0
Spillback Cap Reductn	0	0			0		0	0	0			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	0.85	0.68			0.83		1.00	1.03	0.93			0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 80 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 42.2		Intersection LOS: D	
Intersection Capacity Utilization 81.1%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

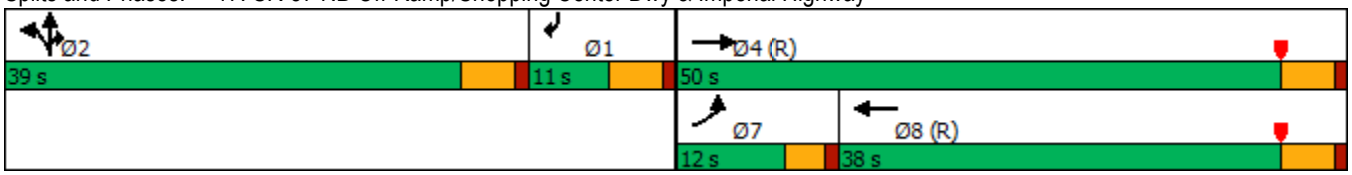
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

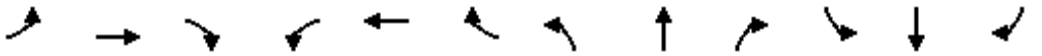
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	2185	117	103	1795	112	172	236	93	190	370	186
Future Volume (vph)	238	2185	117	103	1795	112	172	236	93	190	370	186
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.992			0.991			0.958				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4779	0	1676	4774	0	3252	3212	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4779	0	1676	4774	0	3252	3212	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			9			49				186
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	2185	117	103	1795	112	172	236	93	190	370	186
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	2302	0	103	1907	0	172	329	0	190	370	186
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	20.0	58.0		11.0	49.0		10.0	40.0		11.0	41.0	41.0
Total Split (%)	16.7%	48.3%		9.2%	40.8%		8.3%	33.3%		9.2%	34.2%	34.2%
Maximum Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Actuated g/C Ratio	0.13	0.44		0.06	0.37		0.05	0.29		0.06	0.30	0.30
v/c Ratio	1.07	1.09		1.06	1.09		1.06	0.34		1.01	0.70	0.32
Control Delay	128.7	81.1		151.9	73.0		142.0	29.3		71.5	22.9	9.5
Queue Delay	0.0	5.3		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	128.7	86.3		151.9	73.0		142.0	29.3		71.5	22.9	9.5
LOS	F	F		F	E		F	C		E	C	A
Approach Delay		90.3			77.0			68.0			31.9	
Approach LOS		F			E			E			C	
Queue Length 50th (ft)	~204	~734		~86	~613		~75	88		~81	243	60
Queue Length 95th (ft)	#366	#830		m#195	#706		#149	130		m73	m208	m45
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	223	2115		97	1756		162	971		189	529	580
Starvation Cap Reductn	0	242		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.07	1.23		1.06	1.09		1.06	0.34		1.01	0.70	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 76.3		Intersection LOS: E	
Intersection Capacity Utilization 94.1%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

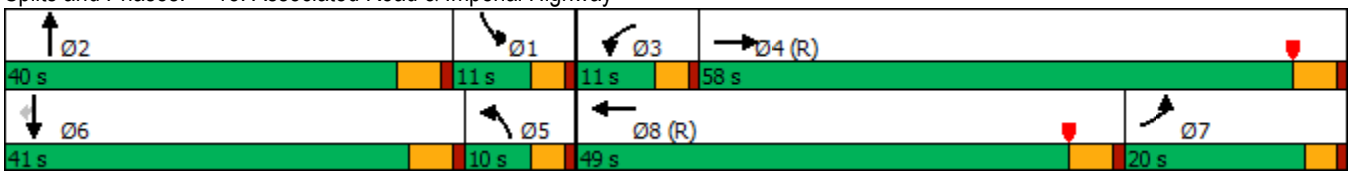
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

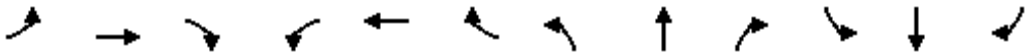
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2159	488	201	1729	37	203	14	167	28	33	16
Future Volume (vph)	14	2159	488	201	1729	37	203	14	167	28	33	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.997				0.850		0.951	
Flt Protected	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Flt Permitted	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			317		4				167		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	2159	488	201	1729	37	203	14	167	28	33	16
Shared Lane Traffic (%)							47%					
Lane Group Flow (vph)	14	2159	488	201	1766	0	108	109	167	28	49	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	62.0	62.0	20.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	51.7%	51.7%	16.7%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	57.0	57.0	16.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	57.0	57.0	16.0	73.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.48	0.48	0.13	0.61		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.17	0.94	0.56	0.90	0.60		0.37	0.37	0.41	0.34	0.50	
Control Delay	81.9	10.0	1.0	67.3	3.7		47.2	47.2	9.5	66.4	59.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	81.9	10.0	1.0	67.3	3.7		47.2	47.2	9.5	66.4	59.5	
LOS	F	B	A	E	A		D	D	A	E	E	
Approach Delay		8.8			10.2			30.8			62.0	
Approach LOS		A			B			C			E	
Queue Length 50th (ft)	11	95	3	147	56		77	78	0	21	26	
Queue Length 95th (ft)	m13	m90	m3	m#283	79		137	138	60	53	#72	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2288	878	223	2923		292	294	411	83	98	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.94	0.56	0.90	0.60		0.37	0.37	0.41	0.34	0.50	

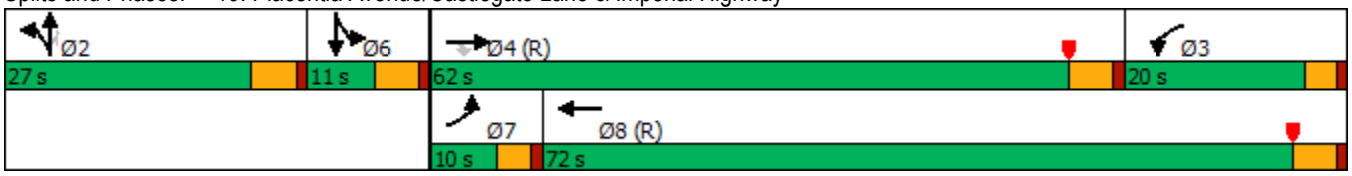
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 56 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

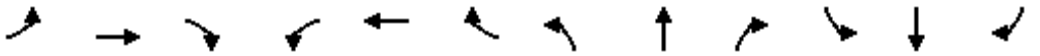
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1500	276	81	1241	101	202	269	99	413	724	148
Future Volume (vph)	155	1500	276	81	1241	101	202	269	99	413	724	148
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.977			0.989			0.960				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4707	0	3252	4765	0	3252	3219	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4707	0	3252	4765	0	3252	3219	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			13			40				148
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	1500	276	81	1241	101	202	269	99	413	724	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	1776	0	81	1342	0	202	368	0	413	724	148
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	14.0	57.0		10.0	53.0		14.0	31.0		22.0	39.0	39.0
Total Split (%)	11.7%	47.5%		8.3%	44.2%		11.7%	25.8%		18.3%	32.5%	32.5%
Maximum Green (s)	10.0	52.0		6.0	48.0		10.0	26.0		18.0	34.0	34.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	10.0	54.0		6.0	48.0		10.0	26.4		17.6	34.0	34.0
Actuated g/C Ratio	0.08	0.45		0.05	0.40		0.08	0.22		0.15	0.28	0.28
v/c Ratio	0.57	0.83		0.50	0.70		0.75	0.50		0.87	0.76	0.28
Control Delay	29.9	5.1		86.5	9.3		71.1	39.1		61.4	25.7	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	29.9	5.1		86.5	9.3		71.1	39.1		61.4	25.7	1.3
LOS	C	A		F	A		E	D		E	C	A
Approach Delay		7.1			13.7			50.5			34.3	
Approach LOS		A			B			D			C	
Queue Length 50th (ft)	56	42		31	61		80	117		127	160	1
Queue Length 95th (ft)	m61	m90		m34	m57		#134	168		#234	241	m7
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	271	2139		162	1913		271	740		487	950	531
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.57	0.83		0.50	0.70		0.75	0.50		0.85	0.76	0.28

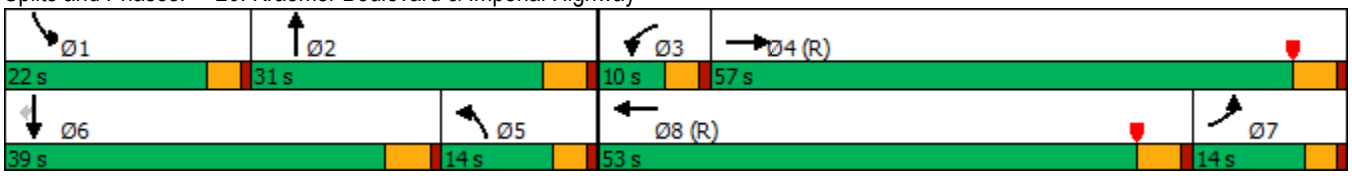
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

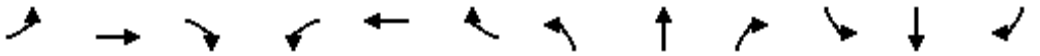
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	1142	99	133	1771	164	151	203	135	306	305	200
Future Volume (vph)	199	1142	99	133	1771	164	151	203	135	306	305	200
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			152			145			178
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	199	1142	99	133	1771	164	151	203	135	306	305	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	1142	99	133	1771	164	151	203	135	306	305	200
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	12.0	45.0	45.0	13.0	46.0	46.0	13.0	47.0	47.0	15.0	49.0	49.0
Total Split (%)	10.0%	37.5%	37.5%	10.8%	38.3%	38.3%	10.8%	39.2%	39.2%	12.5%	40.8%	40.8%
Maximum Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	9.0	42.0	42.0	11.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	8.8	42.0	42.0	11.0	44.2	44.2
Actuated g/C Ratio	0.07	0.33	0.33	0.08	0.34	0.34	0.07	0.35	0.35	0.09	0.37	0.37
v/c Ratio	0.92	0.71	0.17	0.55	1.08	0.27	0.64	0.17	0.22	1.03	0.25	0.30
Control Delay	74.6	37.0	7.6	37.9	61.7	2.9	66.8	27.5	4.5	78.5	9.8	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.6	37.0	7.6	37.9	61.7	2.9	66.8	27.5	4.5	78.5	9.8	0.8
LOS	E	D	A	D	E	A	E	C	A	E	A	A
Approach Delay		40.2			55.5			33.3			33.5	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	77	333	9	44	~536	9	59	56	0	~131	23	0
Queue Length 95th (ft)	m#109	381	m20	m49	m#599	m12	95	86	37	m#165	m28	m0
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	216	1606	596	243	1646	612	243	1173	619	298	1236	665
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.71	0.17	0.55	1.08	0.27	0.62	0.17	0.22	1.03	0.25	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 44.9		Intersection LOS: D	
Intersection Capacity Utilization 72.2%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

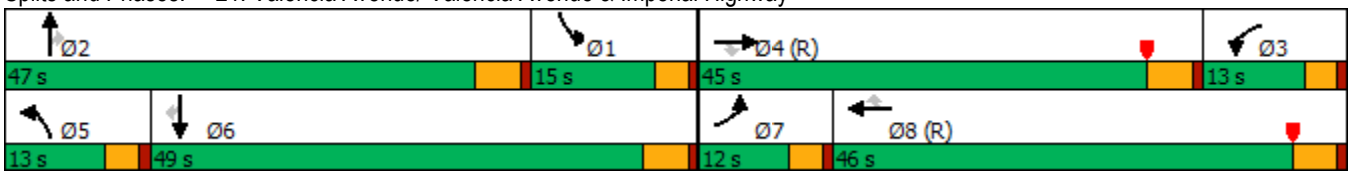
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

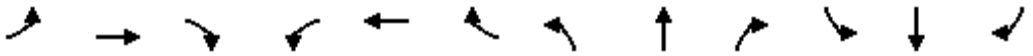
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1391	277	294	1639	607	280	216	160	940	531	24
Future Volume (vph)	40	1391	277	294	1639	607	280	216	160	940	531	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.975				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4697	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4697	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38				544			139			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	1391	277	294	1639	607	280	216	160	940	531	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1668	0	294	1639	607	280	216	160	940	531	24
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	43.0	43.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.36	0.36	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	0.48	1.02		1.81	0.95	0.69	0.86	0.16	0.23	5.80	0.44	0.04
Control Delay	42.4	37.4		422.1	50.8	8.9	78.2	22.9	6.0	2175.0	37.6	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	37.4		422.1	50.8	8.9	78.2	22.9	6.0	2175.0	37.6	0.0
LOS	D	D		F	D	A	E	C	A	F	D	A
Approach Delay		37.5			83.8			42.4			1380.9	
Approach LOS		D			F			D			F	
Queue Length 50th (ft)	26	~119		~176	461	33	111	54	10	~736	164	0
Queue Length 95th (ft)	m40	m#546		#267	#579	159	#187	82	53	m#553	m126	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1629		162	1726	886	325	1369	694	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	1.02		1.81	0.95	0.69	0.86	0.16	0.23	5.80	0.44	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 5.80			
Intersection Signal Delay: 370.2		Intersection LOS: F	
Intersection Capacity Utilization 93.3%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

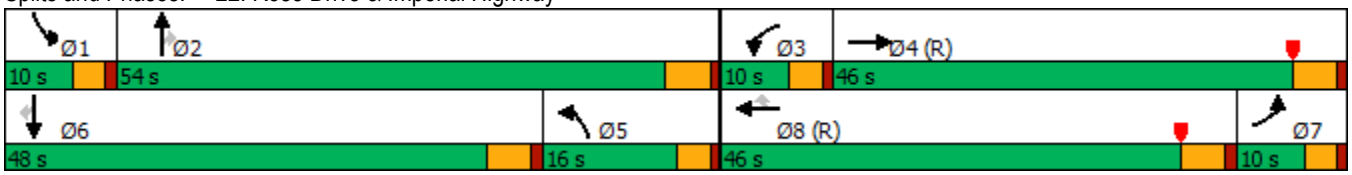
Queue shown is maximum after two cycles.

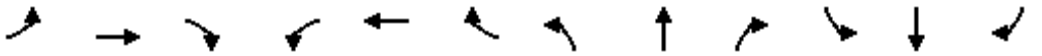
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

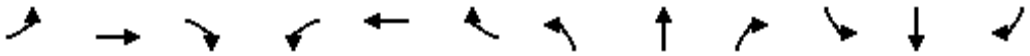
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1466	877	256	1807	0	0	0	0	477	0	897
Future Volume (vph)	0	1466	877	256	1807	0	0	0	0	477	0	897
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			877									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1466	877	256	1807	0	0	0	0	477	0	897
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1466	877	256	1807	0	0	0	0	477	0	897
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									

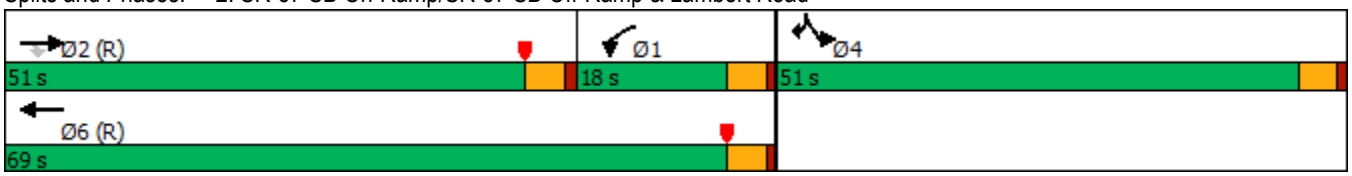


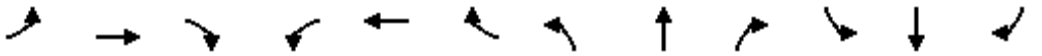
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		51.0	51.0	18.0	69.0					51.0		51.0
Total Split (%)		42.5%	42.5%	15.0%	57.5%					42.5%		42.5%
Maximum Green (s)		46.5	46.5	13.5	64.5					46.5		46.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		49.1	49.1	13.5	67.1					43.9		43.9
Actuated g/C Ratio		0.41	0.41	0.11	0.56					0.37		0.37
v/c Ratio		0.74	0.55	0.70	0.67					0.40		0.90
Control Delay		21.1	2.0	60.3	19.9					29.0		45.9
Queue Delay		0.9	0.5	0.0	0.2					0.0		0.0
Total Delay		22.0	2.5	60.3	20.1					29.0		45.9
LOS		C	A	E	C					C		D
Approach Delay		14.7			25.1						40.0	
Approach LOS		B			C						D	
Queue Length 50th (ft)		163	25	99	297					135		339
Queue Length 95th (ft)		m175	m25	145	375					180		438
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		1969	1598	365	2692					1260		1056
Starvation Cap Reductn		245	325	0	233					0		0
Spillback Cap Reductn		0	0	0	38					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.85	0.69	0.70	0.73					0.38		0.85

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 77.5%		ICU Level of Service D	
Analysis Period (min) 15			

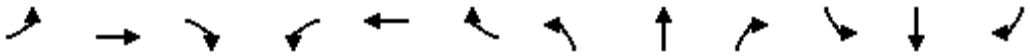
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road





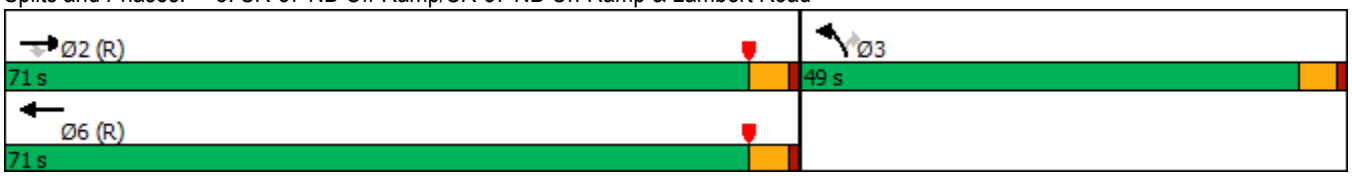
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1604	605	0	1166	526	710	0	302	0	0	0
Future Volume (vph)	0	1604	605	0	1166	526	710	0	302	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.990	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4507	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4507	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14	299			407			21			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1604	605	0	1166	526	710	0	302	0	0	0
Shared Lane Traffic (%)			19%									
Lane Group Flow (vph)	0	1719	490	0	1166	526	710	0	302	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			

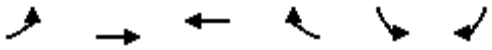


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		71.0	71.0		71.0		49.0		49.0			
Total Split (%)		59.2%	59.2%		59.2%		40.8%		40.8%			
Maximum Green (s)		66.5	66.5		66.5		44.5		44.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		78.0	78.0		78.0	120.0	33.0		33.0			
Actuated g/C Ratio		0.65	0.65		0.65	1.00	0.28		0.28			
v/c Ratio		0.59	0.52		0.37	0.35	0.79		0.71			
Control Delay		6.8	4.1		3.4	0.5	46.9		45.0			
Queue Delay		0.2	0.4		0.0	0.0	0.0		0.0			
Total Delay		7.0	4.5		3.4	0.5	46.9		45.0			
LOS		A	A		A	A	D		D			
Approach Delay		6.4			2.5			46.4				
Approach LOS		A			A			D				
Queue Length 50th (ft)		132	41		47	0	261		196			
Queue Length 95th (ft)		160	67		71	0	305		275			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2932	942		3130	1500	1205		569			
Starvation Cap Reductn		402	129		0	0	0		0			
Spillback Cap Reductn		88	0		0	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		0.68	0.60		0.37	0.35	0.59		0.53			

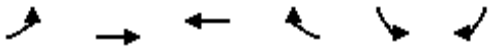
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 65.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1919	2744	0	759	619
Future Volume (vph)	0	1919	2744	0	759	619
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.970	0.850
Flt Protected					0.961	
Satd. Flow (prot)	0	4818	4818	0	3191	1365
Flt Permitted					0.961	
Satd. Flow (perm)	0	4818	4818	0	3191	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					1	1
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1919	2744	0	759	619
Shared Lane Traffic (%)						30%
Lane Group Flow (vph)	0	1919	2744	0	945	433
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		39.0	39.0		21.0	21.0
Total Split (%)		65.0%	65.0%		35.0%	35.0%
Maximum Green (s)		34.0	34.0		16.0	16.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		34.0	34.0		16.0	16.0
Actuated g/C Ratio		0.57	0.57		0.27	0.27
v/c Ratio		0.70	1.01		1.11	1.19
Control Delay		11.1	21.0		90.4	135.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.1	21.0		90.4	135.0
LOS		B	C		F	F
Approach Delay		11.1	21.0		104.4	
Approach LOS		B	C		F	
Queue Length 50th (ft)		162	~358		~209	~216
Queue Length 95th (ft)		211	m295		#316	#389
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2730	2730		851	364
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.70	1.01		1.11	1.19

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 9 (15%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 36.9	Intersection LOS: D
Intersection Capacity Utilization 147.5%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.

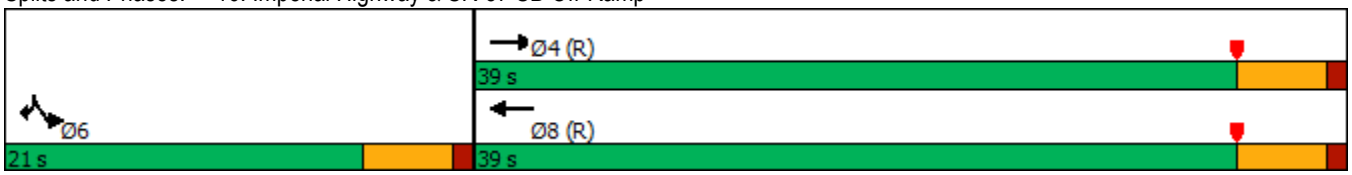
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

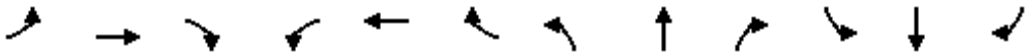
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	2126	0	0	2800	46	1163	72	493	0	0	232
Future Volume (vph)	207	2126	0	0	2800	46	1163	72	493	0	0	232
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.998			0.968	0.850			0.850
Flt Protected	0.950						0.950	0.970				
Satd. Flow (prot)	1676	4818	0	0	6058	0	3051	1425	1425	0	0	2640
Flt Permitted	0.950						0.950	0.970				
Satd. Flow (perm)	1676	4818	0	0	6058	0	3051	1425	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3			11	100			244
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	207	2126	0	0	2800	46	1163	72	493	0	0	232
Shared Lane Traffic (%)							24%		19%			
Lane Group Flow (vph)	207	2126	0	0	2846	0	884	445	399	0	0	232
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	16.0	72.0			56.0		37.0	37.0	37.0			11.0
Total Split (%)	13.3%	60.0%			46.7%		30.8%	30.8%	30.8%			9.2%
Maximum Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lag	Lag	Lag			Lead
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Actuated g/C Ratio	0.10	0.56			0.42		0.27	0.27	0.27			0.05
v/c Ratio	1.24	0.79			1.10		1.09	1.15	0.88			0.64
Control Delay	175.6	20.2			60.7		99.7	131.5	53.3			14.5
Queue Delay	0.0	47.6			0.1		0.0	0.1	3.4			0.0
Total Delay	175.6	67.7			60.8		99.7	131.5	56.7			14.5
LOS	F	E			E		F	F	E			B
Approach Delay		77.3			60.8			98.0			14.5	
Approach LOS		E			E			F			B	
Queue Length 50th (ft)	~199	412			~707		~422	~463	243			0
Queue Length 95th (ft)	m#291	m451			m149		#558	#706	#436			38
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	167	2690			2576		813	388	453			363
Starvation Cap Reductn	0	0			85		0	0	0			0
Spillback Cap Reductn	0	1019			0		0	2	20			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	1.24	1.27			1.14		1.09	1.15	0.92			0.64

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 12 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 73.7		Intersection LOS: E	
Intersection Capacity Utilization 94.9%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

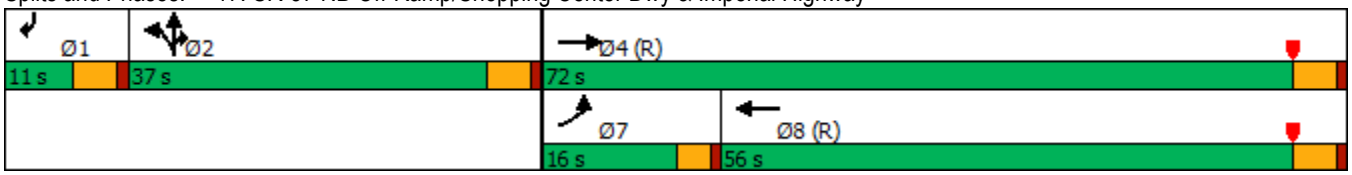
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

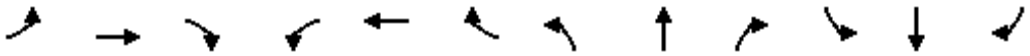
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	2147	161	209	1983	213	252	286	101	335	393	294
Future Volume (vph)	311	2147	161	209	1983	213	252	286	101	335	393	294
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.990			0.985			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4769	0	1676	4745	0	3252	3222	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4769	0	1676	4745	0	3252	3222	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			17			42				234
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	311	2147	161	209	1983	213	252	286	101	335	393	294
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	2308	0	209	2196	0	252	387	0	335	393	294
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	18.0	53.0		14.0	49.0		12.0	40.0		13.0	41.0	41.0
Total Split (%)	15.0%	44.2%		11.7%	40.8%		10.0%	33.3%		10.8%	34.2%	34.2%
Maximum Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Actuated g/C Ratio	0.12	0.40		0.08	0.37		0.07	0.29		0.08	0.30	0.30
v/c Ratio	1.59	1.21		1.50	1.25		1.17	0.40		1.38	0.74	0.48
Control Delay	310.2	119.5		282.9	143.8		162.1	31.6		220.9	24.8	3.7
Queue Delay	0.0	0.0		0.0	0.6		0.0	0.0		0.0	0.0	0.1
Total Delay	310.2	119.5		282.9	144.4		162.1	31.6		220.9	24.8	3.7
LOS	F	F		F	F		F	C		F	C	A
Approach Delay		142.1			156.5			83.1			83.0	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~343	~788		~222	~779		~119	112		~181	187	23
Queue Length 95th (ft)	m#463	m#880		m#311	#885		#205	158		m#187	m190	m25
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	195	1914		139	1750		216	969		243	529	613
Starvation Cap Reductn	0	26		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	301		0	0		0	0	14
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.59	1.22		1.50	1.52		1.17	0.40		1.38	0.74	0.49

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 4 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.59			
Intersection Signal Delay: 132.6		Intersection LOS: F	
Intersection Capacity Utilization 108.1%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

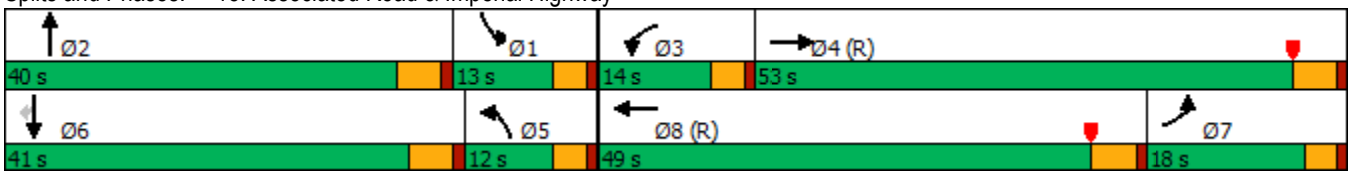
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	2161	323	267	2241	66	295	54	307	29	26	16
Future Volume (vph)	22	2161	323	267	2241	66	295	54	307	29	26	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850		0.943	
Flt Protected	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1664	0
Flt Permitted	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1664	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			200		6				307		16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	2161	323	267	2241	66	295	54	307	29	26	16
Shared Lane Traffic (%)							41%					
Lane Group Flow (vph)	22	2161	323	267	2307	0	174	175	307	29	42	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	59.0	59.0	23.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	49.2%	49.2%	19.2%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	54.0	54.0	19.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	54.0	54.0	19.0	71.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.45	0.45	0.16	0.59		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.27	1.00	0.41	1.01	0.81		0.60	0.59	0.58	0.35	0.43	
Control Delay	82.5	13.5	1.2	69.9	4.3		54.4	54.0	9.6	67.0	52.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	82.5	13.5	1.2	69.9	4.3		54.4	54.0	9.6	67.0	52.3	
LOS	F	B	A	E	A		D	D	A	E	D	
Approach Delay		12.5			11.1			33.3			58.3	
Approach LOS		B			B			C			E	
Queue Length 50th (ft)	18	112	10	~201	115		131	131	0	22	20	
Queue Length 95th (ft)	m16	m93	m7	m#223	m116		212	212	82	55	58	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2168	785	265	2841		292	297	525	83	98	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.27	1.00	0.41	1.01	0.81		0.60	0.59	0.58	0.35	0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 55 (46%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 14.8		Intersection LOS: B	
Intersection Capacity Utilization 88.1%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

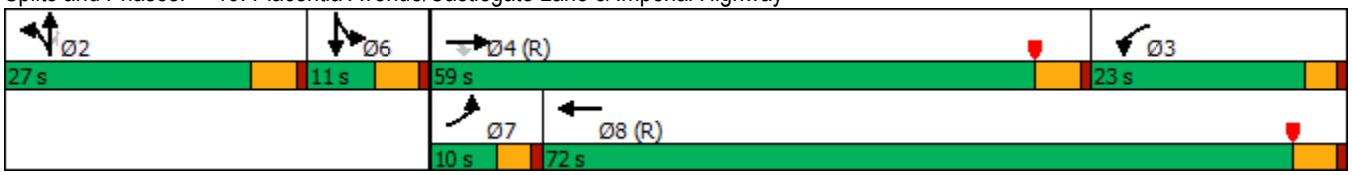
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	247	1596	251	211	1780	364	418	671	118	300	519	133
Future Volume (vph)	247	1596	251	211	1780	364	418	671	118	300	519	133
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.980			0.975			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4721	0	3252	4697	0	3252	3279	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4721	0	3252	4697	0	3252	3279	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			46			16				136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	247	1596	251	211	1780	364	418	671	118	300	519	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	247	1847	0	211	2144	0	418	789	0	300	519	133
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	13.0	56.0		14.0	57.0		19.0	35.0		15.0	31.0	31.0
Total Split (%)	10.8%	46.7%		11.7%	47.5%		15.8%	29.2%		12.5%	25.8%	25.8%
Maximum Green (s)	9.0	51.0		10.0	52.0		15.0	30.0		11.0	26.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	9.0	51.0		10.0	52.0		15.0	30.0		11.0	26.0	26.0
Actuated g/C Ratio	0.08	0.42		0.08	0.43		0.12	0.25		0.09	0.22	0.22
v/c Ratio	1.02	0.91		0.78	1.04		1.03	0.95		1.01	0.71	0.31
Control Delay	70.1	10.4		92.7	41.8		103.8	64.8		108.0	37.9	5.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	70.1	10.4		92.7	41.8		103.8	64.8		108.0	37.9	5.8
LOS	E	B		F	D		F	E		F	D	A
Approach Delay		17.4			46.3			78.3			55.5	
Approach LOS		B			D			E			E	
Queue Length 50th (ft)	~94	59		88	~636		~178	312		~129	195	13
Queue Length 95th (ft)	m#112	m99		m109	#728		#281	#439		#222	259	m52
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	243	2026		271	2061		406	831		298	726	431
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.02	0.91		0.78	1.04		1.03	0.95		1.01	0.71	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 119 (99%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 44.3		Intersection LOS: D	
Intersection Capacity Utilization 99.9%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

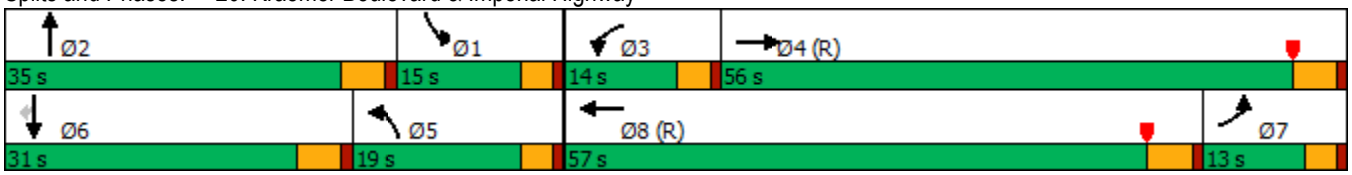
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

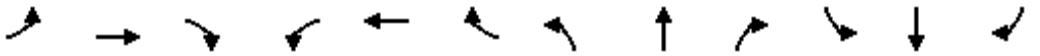
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	2032	171	189	1478	144	131	271	145	234	229	132
Future Volume (vph)	237	2032	171	189	1478	144	131	271	145	234	229	132
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152			144			136			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	237	2032	171	189	1478	144	131	271	145	234	229	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	237	2032	171	189	1478	144	131	271	145	234	229	132
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	15.0	51.0	51.0	10.0	46.0	46.0	10.0	47.0	47.0	12.0	49.0	49.0
Total Split (%)	12.5%	42.5%	42.5%	8.3%	38.3%	38.3%	8.3%	39.2%	39.2%	10.0%	40.8%	40.8%
Maximum Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	10.9	46.0	46.0	6.0	41.1	41.1	6.0	42.0	42.0	8.0	44.0	44.0
Actuated g/C Ratio	0.09	0.38	0.38	0.05	0.34	0.34	0.05	0.35	0.35	0.07	0.37	0.37
v/c Ratio	0.80	1.10	0.26	1.17	0.90	0.24	0.81	0.23	0.24	1.08	0.19	0.21
Control Delay	61.0	90.0	13.3	126.8	14.1	1.3	90.5	28.2	6.3	132.9	23.8	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	90.0	13.3	126.8	14.1	1.3	90.5	28.2	6.3	132.9	23.8	5.1
LOS	E	F	B	F	B	A	F	C	A	F	C	A
Approach Delay		81.8			24.9			37.3			62.6	
Approach LOS		F			C			D			E	
Queue Length 50th (ft)	98	~650	48	~85	119	3	52	77	5	~105	58	17
Queue Length 95th (ft)	m113	m#733	m66	m#95	m146	m3	#107	111	49	m#180	m98	m20
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	298	1846	668	162	1650	608	162	1173	613	216	1229	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	1.10	0.26	1.17	0.90	0.24	0.81	0.23	0.24	1.08	0.19	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.17			
Intersection Signal Delay: 56.1		Intersection LOS: E	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

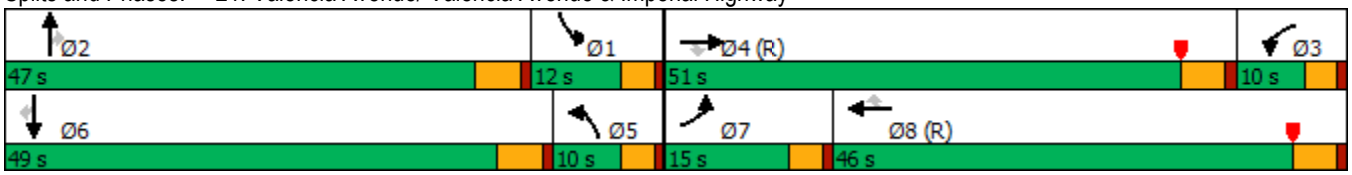
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	1994	315	176	1553	862	306	561	143	1019	487	22
Future Volume (vph)	77	1994	315	176	1553	862	306	561	143	1019	487	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.980				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				276			136			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	77	1994	315	176	1553	862	306	561	143	1019	487	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	2309	0	176	1553	862	306	561	143	1019	487	22
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.34	0.34	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	0.93	1.42		1.09	0.94	1.24	0.94	0.41	0.21	6.29	0.41	0.03
Control Delay	66.3	215.2		148.5	51.0	145.8	91.0	26.4	5.0	2397.5	31.0	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.3	215.2		148.5	51.0	145.8	91.0	26.4	5.0	2397.5	31.0	0.0
LOS	E	F		F	D	F	F	C	A	F	C	A
Approach Delay		210.4			89.1			42.9			1608.7	
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	56	~854		~78	425	~683	123	160	3	~786	120	0
Queue Length 95th (ft)	m53	m#746		#153	#527	#932	#212	209	43	m#731	m112	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1630		162	1646	694	325	1369	692	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	1.42		1.09	0.94	1.24	0.94	0.41	0.21	6.29	0.41	0.03

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 80 (67%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 6.29
Intersection Signal Delay: 430.4 Intersection LOS: F
Intersection Capacity Utilization 115.4% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

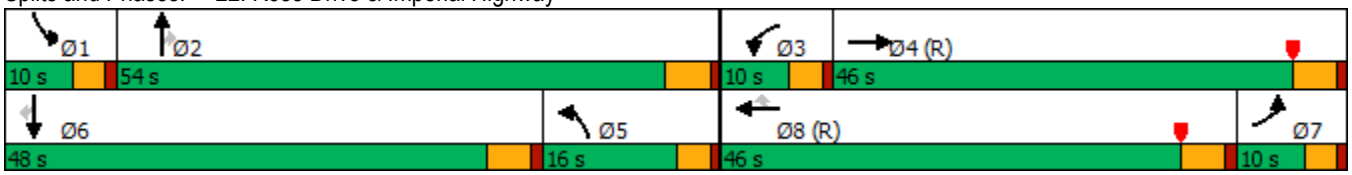
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

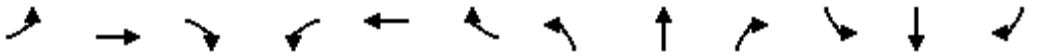
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway

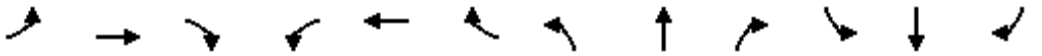


APPENDIX F-V

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1954	650	289	2287	0	0	0	0	1084	0	730
Future Volume (vph)	0	1954	650	289	2287	0	0	0	0	1084	0	730
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			526									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1954	650	289	2287	0	0	0	0	1084	0	730
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1954	650	289	2287	0	0	0	0	1084	0	730
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		56.1	56.1	15.9	72.0					48.0		48.0
Total Split (%)		46.8%	46.8%	13.3%	60.0%					40.0%		40.0%
Maximum Green (s)		51.6	51.6	11.4	67.5					43.5		43.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		52.2	52.2	11.4	68.1					42.9		42.9
Actuated g/C Ratio		0.44	0.44	0.10	0.57					0.36		0.36
v/c Ratio		0.93	0.45	0.94	0.84					0.93		0.75
Control Delay		38.6	11.6	79.0	20.2					52.0		36.5
Queue Delay		33.0	0.2	0.0	5.5					0.0		0.0
Total Delay		71.7	11.8	79.0	25.7					52.0		36.5
LOS		E	B	E	C					D		D
Approach Delay		56.7			31.6						45.8	
Approach LOS		E			C						D	
Queue Length 50th (ft)		408	78	113	323					410		257
Queue Length 95th (ft)		m402	m74	m#163	m384					#542		339
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		2095	1445	308	2734					1178		992
Starvation Cap Reductn		197	194	0	110					0		0
Spillback Cap Reductn		272	0	0	399					0		4
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		1.07	0.52	0.94	0.98					0.92		0.74

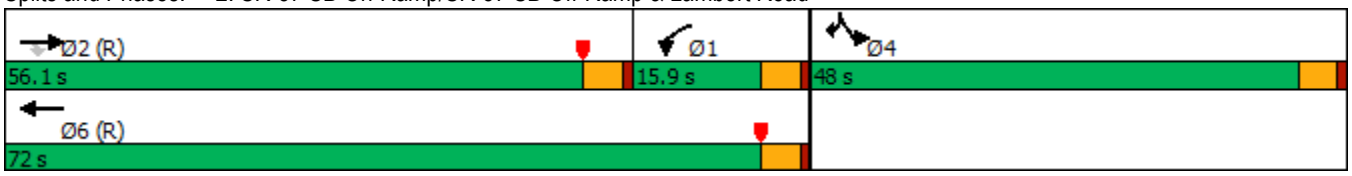
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 44.6		Intersection LOS: D	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

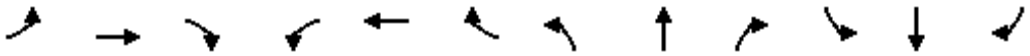
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2605	424	0	1472	573	1104	0	534	0	0	0
Future Volume (vph)	0	2605	424	0	1472	573	1104	0	534	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.998	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4544	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3	138			351			14			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2605	424	0	1472	573	1104	0	534	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	2647	382	0	1472	573	1104	0	534	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		74.0	74.0		74.0		46.0		46.0			
Total Split (%)		61.7%	61.7%		61.7%		38.3%		38.3%			
Maximum Green (s)		69.5	69.5		69.5		41.5		41.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		69.5	69.5		69.5	120.0	41.5		41.5			
Actuated g/C Ratio		0.58	0.58		0.58	1.00	0.35		0.35			
v/c Ratio		1.01	0.47		0.53	0.38	0.98		1.01			
Control Delay		24.3	4.3		0.9	1.2	62.1		81.1			
Queue Delay		36.4	0.0		0.0	0.0	0.0		0.0			
Total Delay		60.7	4.3		1.0	1.2	62.1		81.1			
LOS		E	A		A	A	E		F			
Approach Delay		53.6			1.0			68.3				
Approach LOS		D			A			E				
Queue Length 50th (ft)		~523	67		12	0	434		~414			
Queue Length 95th (ft)		#914	m66		m15	m0	#581		#648			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2632	805		2790	1500	1124		527			
Starvation Cap Reductn		69	0		0	0	0		0			
Spillback Cap Reductn		250	0		68	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		1.11	0.47		0.54	0.38	0.98		1.01			

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 41.2		Intersection LOS: D	
Intersection Capacity Utilization 98.8%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

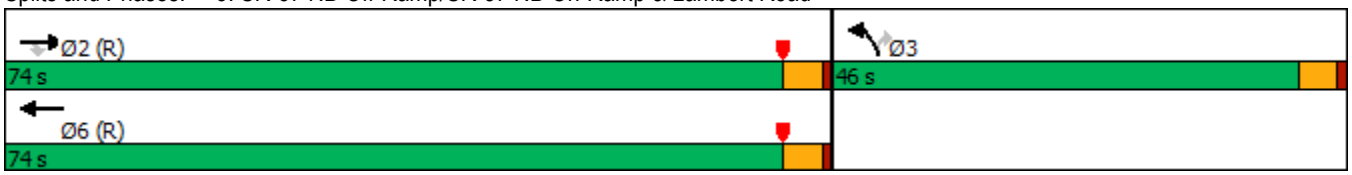
Queue shown is maximum after two cycles.

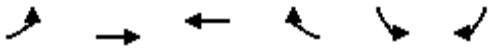
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

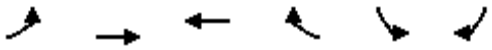
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1742	2232	0	684	572
Future Volume (vph)	0	1742	2232	0	684	572
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.969	0.850
Flt Protected					0.962	
Satd. Flow (prot)	0	4818	4818	0	3191	1365
Flt Permitted					0.962	
Satd. Flow (perm)	0	4818	4818	0	3191	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					2	2
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1742	2232	0	684	572
Shared Lane Traffic (%)						31%
Lane Group Flow (vph)	0	1742	2232	0	861	395
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		30.0	30.0		20.0	20.0
Total Split (%)		60.0%	60.0%		40.0%	40.0%
Maximum Green (s)		25.0	25.0		15.0	15.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		25.0	25.0		15.0	15.0
Actuated g/C Ratio		0.50	0.50		0.30	0.30
v/c Ratio		0.72	0.93		0.90	0.96
Control Delay		12.0	12.3		32.2	58.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.0	12.3		32.2	58.8
LOS		B	B		C	E
Approach Delay		12.0	12.3		40.6	
Approach LOS		B	B		D	
Queue Length 50th (ft)		131	204		122	121
Queue Length 95th (ft)		179	m302		#221	#285
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2409	2409		958	410
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.72	0.93		0.90	0.96

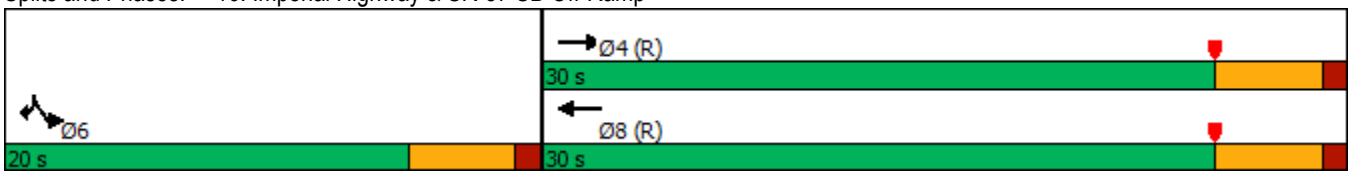
Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 43 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 125.1%	ICU Level of Service H
Analysis Period (min) 15	

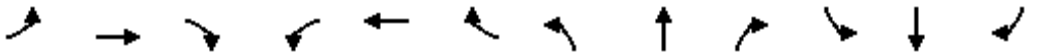
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

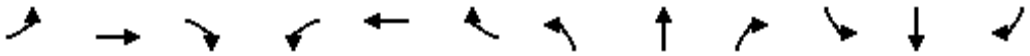
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	1555	0	0	1756	18	1153	43	949	0	0	51
Future Volume (vph)	118	1555	0	0	1756	18	1153	43	949	0	0	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.998			0.892	0.850			0.850
Flt Protected	0.950						0.950	0.990				
Satd. Flow (prot)	1676	4818	0	0	6058	0	3051	1340	1425	0	0	2640
Flt Permitted	0.950						0.950	0.990				
Satd. Flow (perm)	1676	4818	0	0	6058	0	3051	1340	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2			141	147			213
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	1555	0	0	1756	18	1153	43	949	0	0	51
Shared Lane Traffic (%)							10%		43%			
Lane Group Flow (vph)	118	1555	0	0	1774	0	1038	566	541	0	0	51
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	12.0	50.0			38.0		39.0	39.0	39.0			11.0
Total Split (%)	12.0%	50.0%			38.0%		39.0%	39.0%	39.0%			11.0%
Maximum Green (s)	8.0	45.0			33.0		34.0	34.0	34.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lead	Lead	Lead			Lag
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	8.3	47.2			34.9		34.0	34.0	34.0			6.0
Actuated g/C Ratio	0.08	0.47			0.35		0.34	0.34	0.34			0.06
v/c Ratio	0.85	0.68			0.84		1.00	1.03	0.93			0.14
Control Delay	82.3	23.2			35.0		62.1	73.3	48.2			0.8
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Delay	82.3	23.2			35.0		62.1	73.3	48.2			0.8
LOS	F	C			C		E	E	D			A
Approach Delay		27.4			35.0			61.6			0.8	
Approach LOS		C			C			E			A	
Queue Length 50th (ft)	77	328			308		~360	~377	268			0
Queue Length 95th (ft)	m#116	m386			359		#514	#623	#498			0
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	139	2274			2115		1037	548	581			358
Starvation Cap Reductn	0	0			0		0	0	0			0
Spillback Cap Reductn	0	0			0		0	0	0			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	0.85	0.68			0.84		1.00	1.03	0.93			0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 80 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 42.5		Intersection LOS: D	
Intersection Capacity Utilization 81.4%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

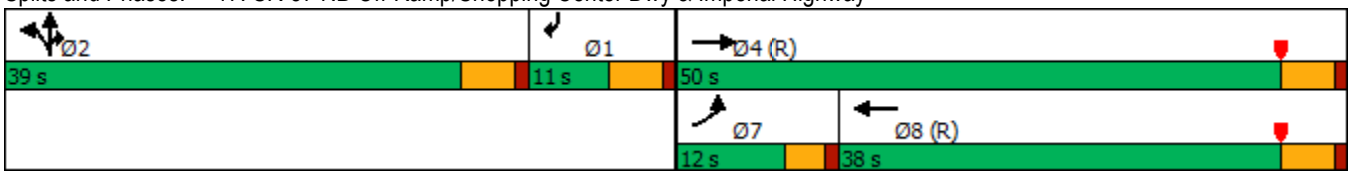
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

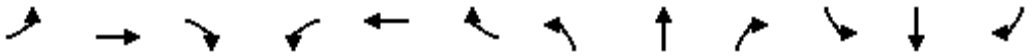
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	2195	117	104	1821	112	172	241	94	190	382	186
Future Volume (vph)	238	2195	117	104	1821	112	172	241	94	190	382	186
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.992			0.991			0.958				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4779	0	1676	4774	0	3252	3212	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4779	0	1676	4774	0	3252	3212	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			9			49				186
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	2195	117	104	1821	112	172	241	94	190	382	186
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	2312	0	104	1933	0	172	335	0	190	382	186
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	20.0	58.0		11.0	49.0		10.0	40.0		11.0	41.0	41.0
Total Split (%)	16.7%	48.3%		9.2%	40.8%		8.3%	33.3%		9.2%	34.2%	34.2%
Maximum Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	16.0	53.0		7.0	44.0		6.0	35.0		7.0	36.0	36.0
Actuated g/C Ratio	0.13	0.44		0.06	0.37		0.05	0.29		0.06	0.30	0.30
v/c Ratio	1.07	1.09		1.07	1.10		1.06	0.35		1.01	0.72	0.32
Control Delay	128.7	82.9		153.9	78.6		142.0	29.5		71.8	23.5	9.7
Queue Delay	0.0	3.2		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	128.7	86.1		153.9	78.6		142.0	29.5		71.8	23.5	9.7
LOS	F	F		F	E		F	C		E	C	A
Approach Delay		90.1			82.5			67.7			32.2	
Approach LOS		F			F			E			C	
Queue Length 50th (ft)	~204	~741		~88	~629		~75	91		~81	254	62
Queue Length 95th (ft)	#366	#836		m#193	#722		#149	133		m71	m212	m45
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	223	2115		97	1756		162	971		189	529	580
Starvation Cap Reductn	0	240		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.07	1.23		1.07	1.10		1.06	0.35		1.01	0.72	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.10			
Intersection Signal Delay: 78.0		Intersection LOS: E	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

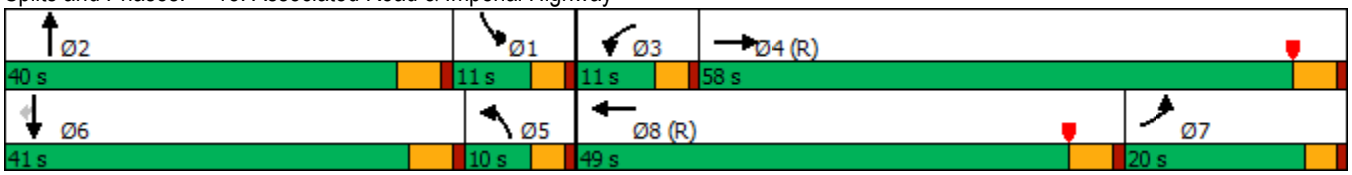
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

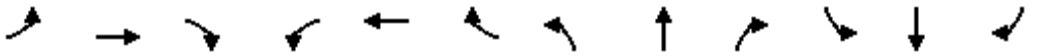
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2170	488	201	1757	37	203	14	167	28	33	16
Future Volume (vph)	14	2170	488	201	1757	37	203	14	167	28	33	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.997				0.850		0.951	
Flt Protected	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Flt Permitted	0.950			0.950			0.950	0.958		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4803	0	1593	1606	1500	1676	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316		4				167		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	2170	488	201	1757	37	203	14	167	28	33	16
Shared Lane Traffic (%)							47%					
Lane Group Flow (vph)	14	2170	488	201	1794	0	108	109	167	28	49	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	62.0	62.0	20.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	51.7%	51.7%	16.7%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	57.0	57.0	16.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	57.0	57.0	16.0	73.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.48	0.48	0.13	0.61		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.17	0.95	0.56	0.90	0.61		0.37	0.37	0.41	0.34	0.50	
Control Delay	81.9	10.3	1.0	66.7	3.7		47.2	47.2	9.5	66.4	59.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	81.9	10.3	1.0	66.7	3.7		47.2	47.2	9.5	66.4	59.5	
LOS	F	B	A	E	A		D	D	A	E	E	
Approach Delay		9.0			10.0			30.8			62.0	
Approach LOS		A			B			C			E	
Queue Length 50th (ft)	11	96	3	147	55		77	78	0	21	26	
Queue Length 95th (ft)	m13	m90	m2	m#274	78		137	138	60	53	#72	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2288	878	223	2923		292	294	411	83	98	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.95	0.56	0.90	0.61		0.37	0.37	0.41	0.34	0.50	

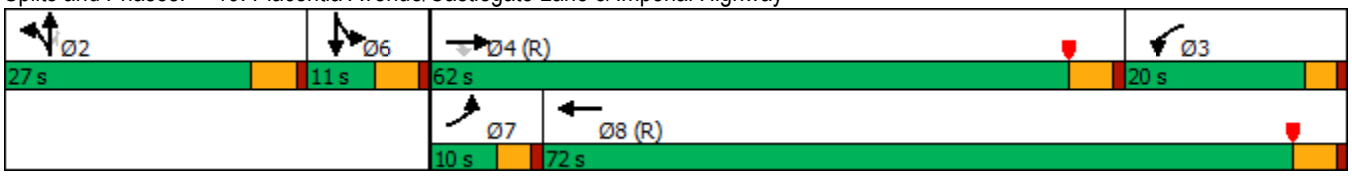
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 56 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

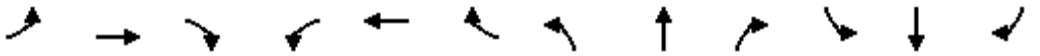
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1513	276	81	1274	101	202	283	99	413	757	149
Future Volume (vph)	155	1513	276	81	1274	101	202	283	99	413	757	149
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.977			0.989			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4707	0	3252	4765	0	3252	3222	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4707	0	3252	4765	0	3252	3222	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			13			37				149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	1513	276	81	1274	101	202	283	99	413	757	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	1789	0	81	1375	0	202	382	0	413	757	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	14.0	57.0		10.0	53.0		14.0	31.0		22.0	39.0	39.0
Total Split (%)	11.7%	47.5%		8.3%	44.2%		11.7%	25.8%		18.3%	32.5%	32.5%
Maximum Green (s)	10.0	52.0		6.0	48.0		10.0	26.0		18.0	34.0	34.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	10.0	54.0		6.0	48.0		10.0	26.4		17.6	34.0	34.0
Actuated g/C Ratio	0.08	0.45		0.05	0.40		0.08	0.22		0.15	0.28	0.28
v/c Ratio	0.57	0.84		0.50	0.72		0.75	0.52		0.87	0.80	0.28
Control Delay	29.8	5.3		86.4	9.8		71.1	40.0		62.3	26.8	1.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	29.8	5.3		86.4	9.8		71.1	40.0		62.3	26.8	1.5
LOS	C	A		F	A		E	D		E	C	A
Approach Delay		7.2			14.0			50.8			35.1	
Approach LOS		A			B			D			D	
Queue Length 50th (ft)	56	42		31	64		80	125		129	169	1
Queue Length 95th (ft)	m60	m95		m34	m61		#134	176		#234	273	m11
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	271	2139		162	1913		271	739		487	950	531
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.57	0.84		0.50	0.72		0.75	0.52		0.85	0.80	0.28

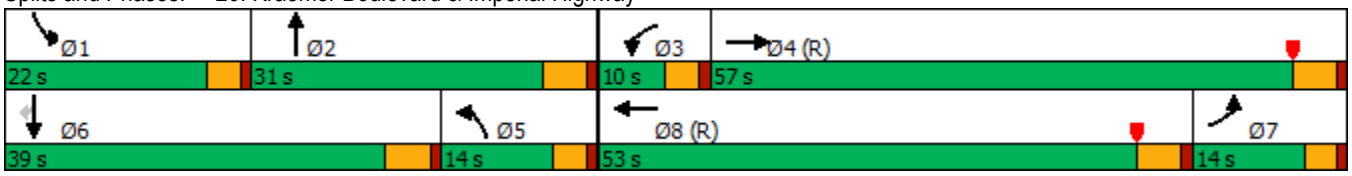
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 20.8		Intersection LOS: C	
Intersection Capacity Utilization 85.5%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

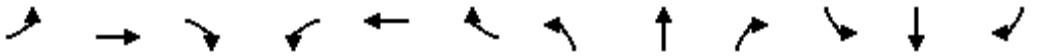
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	1148	99	133	1785	169	151	216	135	318	338	233
Future Volume (vph)	212	1148	99	133	1785	169	151	216	135	318	338	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			155			145			178
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	212	1148	99	133	1785	169	151	216	135	318	338	233
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	1148	99	133	1785	169	151	216	135	318	338	233
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	12.0	45.0	45.0	13.0	46.0	46.0	13.0	47.0	47.0	15.0	49.0	49.0
Total Split (%)	10.0%	37.5%	37.5%	10.8%	38.3%	38.3%	10.8%	39.2%	39.2%	12.5%	40.8%	40.8%
Maximum Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	9.0	42.0	42.0	11.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	8.0	40.0	40.0	9.0	41.0	41.0	8.8	42.0	42.0	11.0	44.2	44.2
Actuated g/C Ratio	0.07	0.33	0.33	0.08	0.34	0.34	0.07	0.35	0.35	0.09	0.37	0.37
v/c Ratio	0.98	0.71	0.17	0.55	1.08	0.28	0.64	0.18	0.22	1.07	0.27	0.35
Control Delay	86.2	37.1	7.5	38.1	65.3	2.9	66.8	27.6	4.5	86.9	10.7	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.2	37.1	7.5	38.1	65.3	2.9	66.8	27.6	4.5	86.9	10.7	0.8
LOS	F	D	A	D	E	A	E	C	A	F	B	A
Approach Delay		42.2			58.5			33.2			35.4	
Approach LOS		D			E			C			D	
Queue Length 50th (ft)	82	335	9	44	~545	10	59	60	0	~140	29	1
Queue Length 95th (ft)	m#121	383	m20	m50	m#606	m12	95	91	37	m#163	m33	m0
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	216	1606	596	243	1646	614	243	1173	619	298	1236	665
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.71	0.17	0.55	1.08	0.28	0.62	0.18	0.22	1.07	0.27	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 47.0		Intersection LOS: D	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

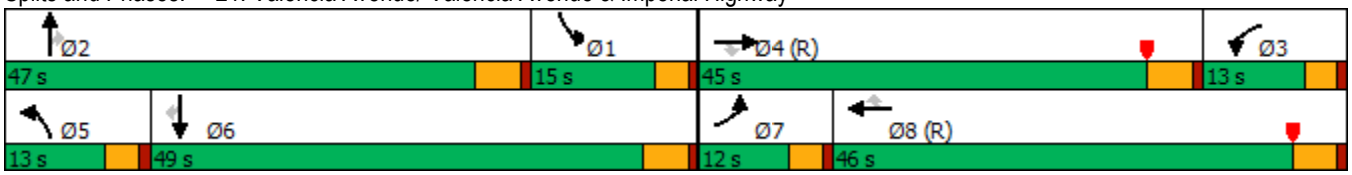
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

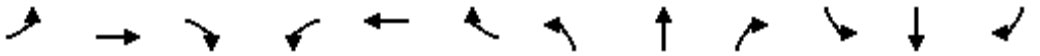
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1403	277	294	1644	619	280	250	160	968	615	38
Future Volume (vph)	46	1403	277	294	1644	619	280	250	160	968	615	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.975				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4697	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4697	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37				546			139			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	1403	277	294	1644	619	280	250	160	968	615	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	1680	0	294	1644	619	280	250	160	968	615	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	43.0	43.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.36	0.36	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	0.55	1.03		1.81	0.95	0.70	0.86	0.18	0.23	5.98	0.51	0.06
Control Delay	47.6	39.5		422.1	51.2	9.5	78.2	23.2	6.0	2250.1	35.6	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	39.5		422.1	51.2	9.5	78.2	23.2	6.0	2250.1	35.6	0.0
LOS	D	D		F	D	A	E	C	A	F	D	A
Approach Delay		39.8			83.8			41.5			1357.2	
Approach LOS		D			F			D			F	
Queue Length 50th (ft)	31	~147		~176	463	39	111	64	10	~756	195	0
Queue Length 95th (ft)	m46	m#546		#267	#581	173	#187	93	53	m#680	m178	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1629		162	1726	887	325	1369	694	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	1.03		1.81	0.95	0.70	0.86	0.18	0.23	5.98	0.51	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 5.98			
Intersection Signal Delay: 380.9		Intersection LOS: F	
Intersection Capacity Utilization 95.4%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

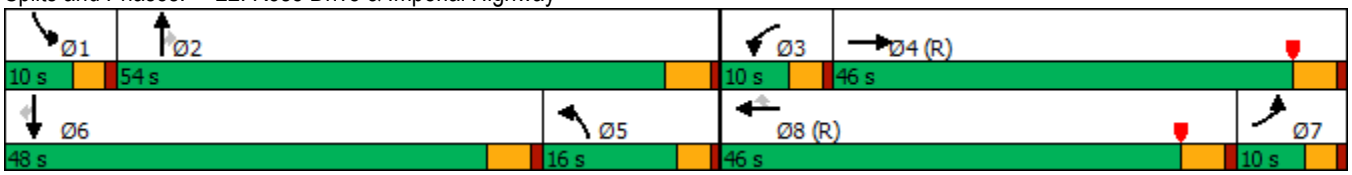
Queue shown is maximum after two cycles.

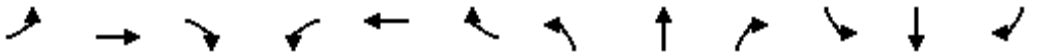
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

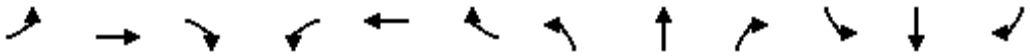
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1516	877	270	1838	4	0	0	0	547	0	897
Future Volume (vph)	0	1516	877	270	1838	4	0	0	0	547	0	897
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	70		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	2		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.88	0.97	0.91	0.91	1.00	1.00	1.00	0.97	1.00	0.88
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	4818	2640	3252	4818	0	0	0	0	3252	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			851									55
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		453			598			824			1360	
Travel Time (s)		6.9			9.1			18.7			30.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1516	877	270	1838	4	0	0	0	547	0	897
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1516	877	270	1842	0	0	0	0	547	0	897
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			2									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0		5.0
Minimum Split (s)		20.5	20.5	9.5	31.5					9.5		9.5
Total Split (s)		51.0	51.0	18.0	69.0					51.0		51.0
Total Split (%)		42.5%	42.5%	15.0%	57.5%					42.5%		42.5%
Maximum Green (s)		46.5	46.5	13.5	64.5					46.5		46.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0		1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5		4.5
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		9.0	9.0		20.0							
Pedestrian Calls (#/hr)		2	2		2							
Act Effct Green (s)		49.0	49.0	13.5	67.0					44.0		44.0
Actuated g/C Ratio		0.41	0.41	0.11	0.56					0.37		0.37
v/c Ratio		0.77	0.55	0.74	0.68					0.46		0.90
Control Delay		20.9	2.0	62.9	20.9					30.0		45.8
Queue Delay		1.2	0.5	0.0	0.2					0.0		0.0
Total Delay		22.1	2.5	62.9	21.0					30.0		45.8
LOS		C	A	E	C					C		D
Approach Delay		14.9			26.4						39.8	
Approach LOS		B			C						D	
Queue Length 50th (ft)		173	25	105	315					158		338
Queue Length 95th (ft)		m176	m23	#159	391					208		438
Internal Link Dist (ft)		373			518			744			1280	
Turn Bay Length (ft)				70								
Base Capacity (vph)		1967	1581	365	2690					1260		1056
Starvation Cap Reductn		236	317	0	205					0		0
Spillback Cap Reductn		0	0	0	32					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.88	0.69	0.74	0.74					0.43		0.85

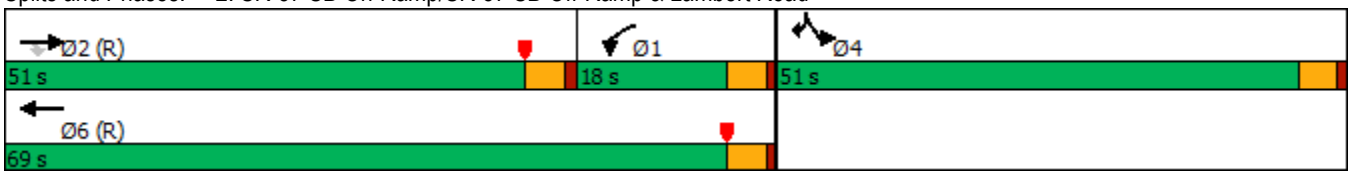
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 25.0		Intersection LOS: C	
Intersection Capacity Utilization 78.2%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

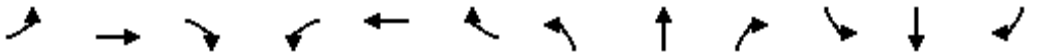
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SR-57 SB On-Ramp/SR-57 SB Off-Ramp & Lambert Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1724	605	0	1215	573	710	0	330	0	0	0
Future Volume (vph)	0	1724	605	0	1215	573	710	0	330	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		100	0		0	215		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.993	0.850			0.850			0.850			
Flt Protected							0.950					
Satd. Flow (prot)	0	4521	1290	0	4818	1500	3252	0	1500	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	4521	1290	0	4818	1500	3252	0	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9	284			425			16			
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		598			654			831			1116	
Travel Time (s)		9.1			9.9			18.9			25.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1724	605	0	1215	573	710	0	330	0	0	0
Shared Lane Traffic (%)			14%									
Lane Group Flow (vph)	0	1809	520	0	1215	573	710	0	330	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1		1			
Detector Template		Thru	Right		Thru	Right	Left		Right			
Leading Detector (ft)		100	20		100	20	20		20			
Trailing Detector (ft)		0	0		0	0	0		0			
Detector 1 Position(ft)		0	0		0	0	0		0			
Detector 1 Size(ft)		6	20		6	20	20		20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm		NA	Free	Prot		Perm			
Protected Phases		2			6		3					
Permitted Phases			2			Free			3			

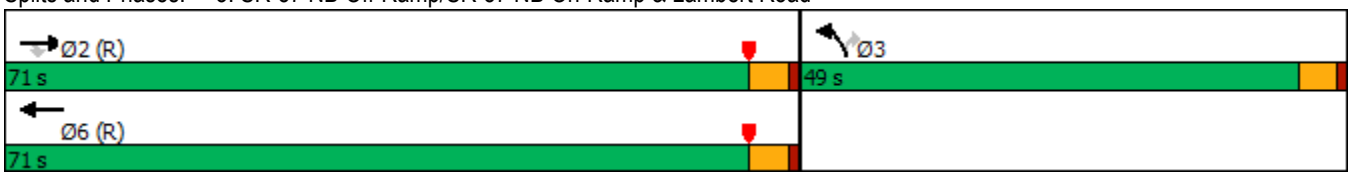


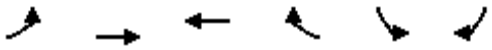
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2		6		3		3			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0		5.0		5.0			
Minimum Split (s)		36.5	36.5		20.5		23.5		23.5			
Total Split (s)		71.0	71.0		71.0		49.0		49.0			
Total Split (%)		59.2%	59.2%		59.2%		40.8%		40.8%			
Maximum Green (s)		66.5	66.5		66.5		44.5		44.5			
Yellow Time (s)		3.5	3.5		3.5		3.5		3.5			
All-Red Time (s)		1.0	1.0		1.0		1.0		1.0			
Lost Time Adjust (s)		0.0	0.0		0.0		0.0		0.0			
Total Lost Time (s)		4.5	4.5		4.5		4.5		4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Recall Mode		C-Max	C-Max		C-Max		None		None			
Walk Time (s)		7.0	7.0									
Flash Dont Walk (s)		25.0	25.0									
Pedestrian Calls (#/hr)		2	2									
Act Effct Green (s)		77.3	77.3		77.3	120.0	33.7		33.7			
Actuated g/C Ratio		0.64	0.64		0.64	1.00	0.28		0.28			
v/c Ratio		0.62	0.56		0.39	0.38	0.78		0.76			
Control Delay		7.7	4.9		3.4	0.5	45.5		48.8			
Queue Delay		0.2	0.5		0.0	0.0	0.0		0.0			
Total Delay		8.0	5.4		3.4	0.5	45.5		48.8			
LOS		A	A		A	A	D		D			
Approach Delay		7.4			2.5			46.5				
Approach LOS		A			A			D				
Queue Length 50th (ft)		150	59		47	0	261		224			
Queue Length 95th (ft)		185	86		73	m0	295		301			
Internal Link Dist (ft)		518			574			751			1036	
Turn Bay Length (ft)			100				215					
Base Capacity (vph)		2914	931		3102	1500	1205		566			
Starvation Cap Reductn		404	126		0	0	0		0			
Spillback Cap Reductn		128	0		0	0	0		0			
Storage Cap Reductn		0	0		0	0	0		0			
Reduced v/c Ratio		0.72	0.65		0.39	0.38	0.59		0.58			

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 69.0%		ICU Level of Service C	
Analysis Period (min) 15			

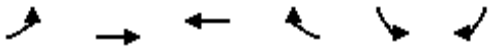
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR-57 NB Off-Ramp/SR-57 NB On-Ramp & Lambert Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1933	2753	0	764	619
Future Volume (vph)	0	1933	2753	0	764	619
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	0	260
Storage Lanes	0			0	2	1
Taper Length (ft)	90				90	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.91
Frt					0.971	0.850
Flt Protected					0.961	
Satd. Flow (prot)	0	4818	4818	0	3195	1365
Flt Permitted					0.961	
Satd. Flow (perm)	0	4818	4818	0	3195	1365
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					1	1
Link Speed (mph)		45	45		30	
Link Distance (ft)		293	273		775	
Travel Time (s)		4.4	4.1		17.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1933	2753	0	764	619
Shared Lane Traffic (%)						30%
Lane Group Flow (vph)	0	1933	2753	0	950	433
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		24	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (ft)		100	100		20	20
Trailing Detector (ft)		0	0		0	0
Detector 1 Position(ft)		0	0		0	0
Detector 1 Size(ft)		6	6		20	20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase		4	8		6	6
Switch Phase						
Minimum Initial (s)		6.0	6.0		6.0	6.0
Minimum Split (s)		11.0	25.0		11.0	11.0
Total Split (s)		39.0	39.0		21.0	21.0
Total Split (%)		65.0%	65.0%		35.0%	35.0%
Maximum Green (s)		34.0	34.0		16.0	16.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			13.0			
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)		34.0	34.0		16.0	16.0
Actuated g/C Ratio		0.57	0.57		0.27	0.27
v/c Ratio		0.71	1.01		1.12	1.19
Control Delay		11.2	22.0		92.1	135.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.2	22.0		92.1	135.0
LOS		B	C		F	F
Approach Delay		11.2	22.0		105.5	
Approach LOS		B	C		F	
Queue Length 50th (ft)		164	~368		~211	~216
Queue Length 95th (ft)		214	m294		#319	#389
Internal Link Dist (ft)		213	193		695	
Turn Bay Length (ft)						260
Base Capacity (vph)		2730	2730		852	364
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.71	1.01		1.12	1.19

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 9 (15%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 37.6	Intersection LOS: D
Intersection Capacity Utilization 148.3%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.

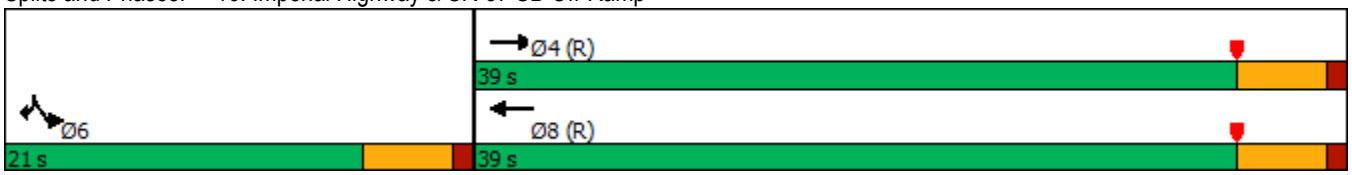
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Imperial Highway & SR-57 SB Off-Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	2145	0	0	2821	46	1163	72	506	0	0	232
Future Volume (vph)	207	2145	0	0	2821	46	1163	72	506	0	0	232
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	260		0	0		0	610		350	0		0
Storage Lanes	1		0	0		0	1		1	0		2
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	0.91	0.86	0.95	1.00	1.00	0.88
Frt					0.998			0.968	0.850			0.850
Flt Protected	0.950						0.950	0.970				
Satd. Flow (prot)	1676	4818	0	0	6058	0	3051	1425	1425	0	0	2640
Flt Permitted	0.950						0.950	0.970				
Satd. Flow (perm)	1676	4818	0	0	6058	0	3051	1425	1425	0	0	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3			11	100			244
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		271			540			932			494	
Travel Time (s)		4.1			8.2			21.2			11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	207	2145	0	0	2821	46	1163	72	506	0	0	232
Shared Lane Traffic (%)							24%		19%			
Lane Group Flow (vph)	207	2145	0	0	2867	0	884	447	410	0	0	232
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			1
Detector Template	Left	Thru			Thru		Left	Thru	Right			Right
Leading Detector (ft)	20	100			100		20	100	20			20
Trailing Detector (ft)	0	0			0		0	0	0			0
Detector 1 Position(ft)	0	0			0		0	0	0			0
Detector 1 Size(ft)	20	6			6		20	6	20			20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Prot			Prot
Protected Phases	7	4			8		2	2	2			1
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4			8		2	2	2			1
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0		6.0	6.0	6.0			6.0
Minimum Split (s)	10.0	32.0			28.0		11.0	11.0	11.0			11.0
Total Split (s)	16.0	72.0			56.0		37.0	37.0	37.0			11.0
Total Split (%)	13.3%	60.0%			46.7%		30.8%	30.8%	30.8%			9.2%
Maximum Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Yellow Time (s)	3.0	4.0			4.0		4.0	4.0	4.0			4.0
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	5.0			5.0		5.0	5.0	5.0			5.0
Lead/Lag	Lead				Lag		Lag	Lag	Lag			Lead
Lead-Lag Optimize?	Yes				Yes		Yes	Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			3.0
Recall Mode	None	C-Max			C-Max		Max	Max	Max			None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		20.0			16.0							
Pedestrian Calls (#/hr)		2			2							
Act Effct Green (s)	12.0	67.0			51.0		32.0	32.0	32.0			6.0
Actuated g/C Ratio	0.10	0.56			0.42		0.27	0.27	0.27			0.05
v/c Ratio	1.24	0.80			1.11		1.09	1.15	0.91			0.64
Control Delay	175.4	20.4			64.4		99.7	133.2	57.0			14.5
Queue Delay	0.0	47.6			0.1		0.0	0.1	5.0			0.0
Total Delay	175.4	68.0			64.5		99.7	133.3	62.0			14.5
LOS	F	E			E		F	F	E			B
Approach Delay		77.4			64.5			99.4			14.5	
Approach LOS		E			E			F			B	
Queue Length 50th (ft)	~199	417			~717		~422	~468	254			0
Queue Length 95th (ft)	m#288	m457			m147		#558	#708	#457			38
Internal Link Dist (ft)		191			460			852			414	
Turn Bay Length (ft)	260						610		350			
Base Capacity (vph)	167	2690			2576		813	388	453			363
Starvation Cap Reductn	0	0			84		0	0	0			0
Spillback Cap Reductn	0	1036			0		0	2	21			0
Storage Cap Reductn	0	0			0		0	0	0			0
Reduced v/c Ratio	1.24	1.30			1.15		1.09	1.16	0.95			0.64

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 12 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 75.6		Intersection LOS: E	
Intersection Capacity Utilization 95.3%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

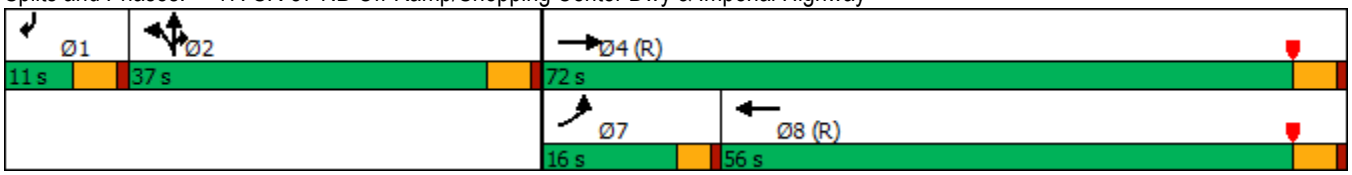
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: SR-57 NB Off-Ramp/Shopping Center Dwy & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	2179	161	210	2004	213	252	299	102	335	402	294
Future Volume (vph)	311	2179	161	210	2004	213	252	299	102	335	402	294
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	340		0	200		0	170		0	210		0
Storage Lanes	1		0	1		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	0.97	0.95	0.95	0.97	1.00	1.00
Frt		0.990			0.986			0.962				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4769	0	1676	4750	0	3252	3226	0	3252	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4769	0	1676	4750	0	3252	3226	0	3252	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			17			40				234
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		540			1433			1004			3109	
Travel Time (s)		12.3			32.6			22.8			70.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	311	2179	161	210	2004	213	252	299	102	335	402	294
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	2340	0	210	2217	0	252	401	0	335	402	294
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	37.0		10.0	40.0		10.0	41.0	41.0
Total Split (s)	18.0	53.0		14.0	49.0		12.0	40.0		13.0	41.0	41.0
Total Split (%)	15.0%	44.2%		11.7%	40.8%		10.0%	33.3%		10.8%	34.2%	34.2%
Maximum Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			25.0			28.0			29.0	29.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	14.0	48.0		10.0	44.0		8.0	35.0		9.0	36.0	36.0
Actuated g/C Ratio	0.12	0.40		0.08	0.37		0.07	0.29		0.08	0.30	0.30
v/c Ratio	1.59	1.22		1.51	1.27		1.17	0.41		1.38	0.76	0.48
Control Delay	309.9	126.8		285.5	148.3		162.1	32.2		219.8	24.9	3.5
Queue Delay	0.0	0.0		0.0	0.6		0.0	0.0		0.0	0.0	0.1
Total Delay	309.9	126.8		285.5	149.0		162.1	32.2		219.8	24.9	3.6
LOS	F	F		F	F		F	C		F	C	A
Approach Delay		148.3			160.8			82.3			82.2	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~343	~808		~225	~792		~119	117		~180	190	23
Queue Length 95th (ft)	m#457	m#898		m#310	#898		#205	165		m#182	m188	m24
Internal Link Dist (ft)		460			1353			924			3029	
Turn Bay Length (ft)	340			200			170			210		
Base Capacity (vph)	195	1914		139	1752		216	969		243	529	613
Starvation Cap Reductn	0	26		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	312		0	0		0	0	15
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.59	1.24		1.51	1.54		1.17	0.41		1.38	0.76	0.49

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 4 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.59			
Intersection Signal Delay: 136.3		Intersection LOS: F	
Intersection Capacity Utilization 109.0%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

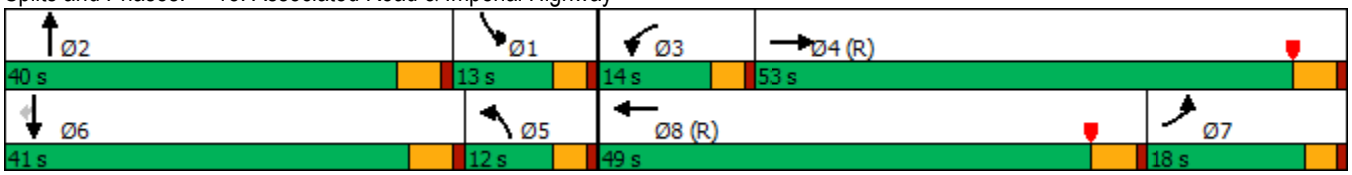
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Associated Road & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	2195	323	268	2263	66	295	54	310	29	26	16
Future Volume (vph)	22	2195	323	268	2263	66	295	54	310	29	26	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	140		200	225		0	195		0	85		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850		0.943	
Flt Protected	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (prot)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1664	0
Flt Permitted	0.950			0.950			0.950	0.967		0.950		
Satd. Flow (perm)	1676	4818	1500	1676	4798	0	1593	1621	1500	1676	1664	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			197		6				308		16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1433			3487			2609			962	
Travel Time (s)		32.6			79.3			59.3			21.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	2195	323	268	2263	66	295	54	310	29	26	16
Shared Lane Traffic (%)							41%					
Lane Group Flow (vph)	22	2195	323	268	2329	0	174	175	310	29	42	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	33.0	33.0	10.0	26.0		27.0	27.0	27.0	11.0	11.0	
Total Split (s)	10.0	59.0	59.0	23.0	72.0		27.0	27.0	27.0	11.0	11.0	
Total Split (%)	8.3%	49.2%	49.2%	19.2%	60.0%		22.5%	22.5%	22.5%	9.2%	9.2%	
Maximum Green (s)	6.0	54.0	54.0	19.0	67.0		22.0	22.0	22.0	6.0	6.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0	7.0			
Flash Dont Walk (s)		21.0	21.0		14.0		15.0	15.0	15.0			
Pedestrian Calls (#/hr)		2	2		2		2	2	2			
Act Effct Green (s)	6.0	54.0	54.0	19.0	71.0		22.0	22.0	22.0	6.0	6.0	
Actuated g/C Ratio	0.05	0.45	0.45	0.16	0.59		0.18	0.18	0.18	0.05	0.05	
v/c Ratio	0.27	1.01	0.41	1.01	0.82		0.60	0.59	0.59	0.35	0.43	
Control Delay	82.6	18.0	1.2	69.7	4.2		54.4	54.0	9.9	67.0	52.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	82.6	18.0	1.2	69.7	4.2		54.4	54.0	9.9	67.0	52.3	
LOS	F	B	A	E	A		D	D	A	E	D	
Approach Delay		16.4			11.0			33.4			58.3	
Approach LOS		B			B			C			E	
Queue Length 50th (ft)	18	~121	10	~205	115		131	131	1	22	20	
Queue Length 95th (ft)	m15	m92	m7	m#222	m109		212	212	84	55	58	
Internal Link Dist (ft)		1353			3407			2529			882	
Turn Bay Length (ft)	140		200	225			195			85		
Base Capacity (vph)	83	2168	783	265	2841		292	297	526	83	98	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.27	1.01	0.41	1.01	0.82		0.60	0.59	0.59	0.35	0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 55 (46%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 16.4		Intersection LOS: B	
Intersection Capacity Utilization 88.9%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

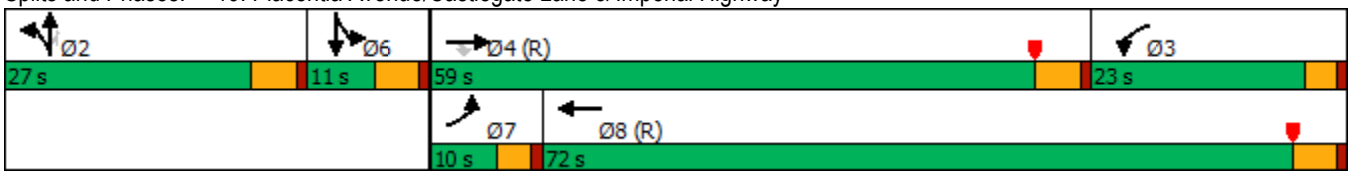
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

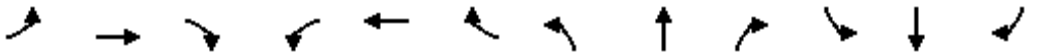
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Placentia Avenue/Castlegate Lane & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	1639	251	211	1807	364	418	712	118	300	547	134
Future Volume (vph)	248	1639	251	211	1807	364	418	712	118	300	547	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	185		0	220		0	150		0	205		0
Storage Lanes	2		0	2		0	2		0	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.95	0.95	0.97	0.95	1.00
Frt		0.980			0.975			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4721	0	3252	4697	0	3252	3283	0	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4721	0	3252	4697	0	3252	3283	0	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			45			15				136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3487			3626			1318			1319	
Travel Time (s)		79.3			82.4			30.0			30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	248	1639	251	211	1807	364	418	712	118	300	547	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	248	1890	0	211	2171	0	418	830	0	300	547	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	38.0		10.0	40.0		10.0	31.0		10.0	31.0	31.0
Total Split (s)	13.0	56.0		14.0	57.0		19.0	35.0		15.0	31.0	31.0
Total Split (%)	10.8%	46.7%		11.7%	47.5%		15.8%	29.2%		12.5%	25.8%	25.8%
Maximum Green (s)	9.0	51.0		10.0	52.0		15.0	30.0		11.0	26.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		26.0			28.0			19.0			19.0	19.0
Pedestrian Calls (#/hr)		2			2			2			2	2
Act Effct Green (s)	9.0	51.0		10.0	52.0		15.0	30.0		11.0	26.0	26.0
Actuated g/C Ratio	0.08	0.42		0.08	0.43		0.12	0.25		0.09	0.22	0.22
v/c Ratio	1.02	0.93		0.78	1.05		1.03	1.00		1.01	0.75	0.31
Control Delay	69.8	11.5		92.6	46.9		103.8	75.0		107.0	38.8	5.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	69.8	11.5		92.6	46.9		103.8	75.0		107.0	38.8	5.7
LOS	E	B		F	D		F	E		F	D	A
Approach Delay		18.2			50.9			84.7			55.1	
Approach LOS		B			D			F			E	
Queue Length 50th (ft)	~95	63		88	~653		~178	334		~128	203	20
Queue Length 95th (ft)	m#110	m108		m109	#743		#281	#476		#221	267	m49
Internal Link Dist (ft)		3407			3546			1238			1239	
Turn Bay Length (ft)	185			220			150			205		
Base Capacity (vph)	243	2025		271	2060		406	832		298	726	431
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.02	0.93		0.78	1.05		1.03	1.00		1.01	0.75	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 119 (99%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 47.4		Intersection LOS: D	
Intersection Capacity Utilization 101.7%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

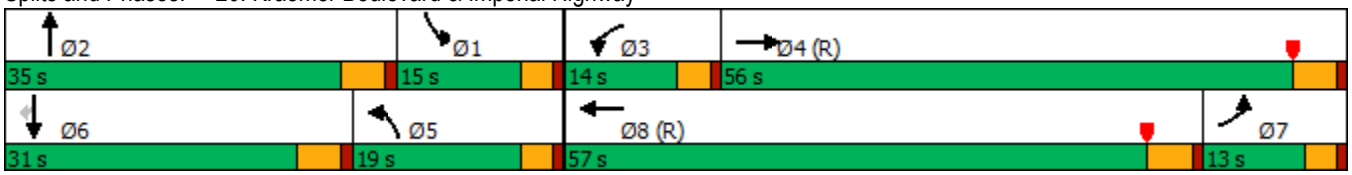
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

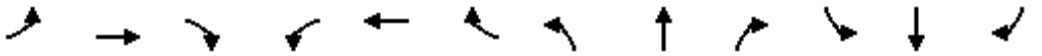
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Kraemer Boulevard & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	282	2045	171	189	1488	161	131	318	145	245	256	159
Future Volume (vph)	282	2045	171	189	1488	161	131	318	145	245	256	159
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	190		315	260		305	150		150	240		185
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3252	4818	1500	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151			161			136			159
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3626			3640			1142			3502	
Travel Time (s)		82.4			82.7			26.0			79.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	282	2045	171	189	1488	161	131	318	145	245	256	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	2045	171	189	1488	161	131	318	145	245	256	159
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	38.0	38.0	10.0	40.0	40.0	10.0	47.0	47.0	10.0	49.0	49.0
Total Split (s)	15.0	51.0	51.0	10.0	46.0	46.0	10.0	47.0	47.0	12.0	49.0	49.0
Total Split (%)	12.5%	42.5%	42.5%	8.3%	38.3%	38.3%	8.3%	39.2%	39.2%	10.0%	40.8%	40.8%
Maximum Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		26.0	26.0		28.0	28.0		35.0	35.0		37.0	37.0
Pedestrian Calls (#/hr)		2	2		2	2		2	2		2	2
Act Effct Green (s)	11.0	46.0	46.0	6.0	41.0	41.0	6.0	42.0	42.0	8.0	44.0	44.0
Actuated g/C Ratio	0.09	0.38	0.38	0.05	0.34	0.34	0.05	0.35	0.35	0.07	0.37	0.37
v/c Ratio	0.95	1.11	0.26	1.17	0.90	0.26	0.81	0.27	0.24	1.13	0.21	0.24
Control Delay	77.4	92.7	13.3	126.6	14.7	1.4	90.5	28.8	6.3	147.3	23.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.4	92.7	13.3	126.6	14.7	1.4	90.5	28.8	6.3	147.3	23.8	4.7
LOS	E	F	B	F	B	A	F	C	A	F	C	A
Approach Delay		85.5			25.1			36.9			65.1	
Approach LOS		F			C			D			E	
Queue Length 50th (ft)	118	~658	49	~86	123	3	52	92	5	~113	75	24
Queue Length 95th (ft)	m#139	m#732	m64	m#94	m146	m3	#107	130	49	m#184	m100	m20
Internal Link Dist (ft)		3546			3560			1062			3422	
Turn Bay Length (ft)	190		315	260		305	150		150	240		185
Base Capacity (vph)	298	1846	668	162	1646	618	162	1173	613	216	1229	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	1.11	0.26	1.17	0.90	0.26	0.81	0.27	0.24	1.13	0.21	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.17			
Intersection Signal Delay: 58.1		Intersection LOS: E	
Intersection Capacity Utilization 79.1%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

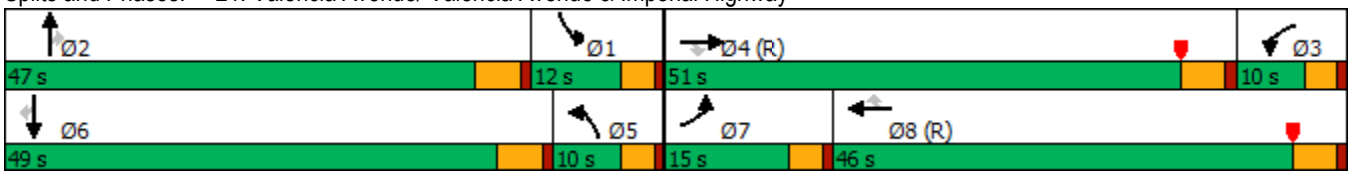
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

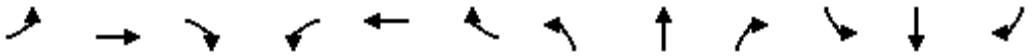
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Valencia Avenue/ Valencia Avenue & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	2005	315	176	1570	896	306	657	143	1040	549	33
Future Volume (vph)	91	2005	315	176	1570	896	306	657	143	1040	549	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.980				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	4721	0	3252	4818	1500	3252	3353	1500	3252	3353	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				232			136			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	91	2005	315	176	1570	896	306	657	143	1040	549	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	2320	0	176	1570	896	306	657	143	1040	549	33
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	38.0	38.0	10.0	54.0	54.0	10.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	46.0	16.0	54.0	54.0	10.0	48.0	48.0
Total Split (%)	8.3%	38.3%		8.3%	38.3%	38.3%	13.3%	45.0%	45.0%	8.3%	40.0%	40.0%
Maximum Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		34.0			26.0	26.0		42.0	42.0		36.0	36.0
Pedestrian Calls (#/hr)		2			2	2		2	2		2	2
Act Effct Green (s)	6.0	41.0		6.0	41.0	41.0	12.0	49.0	49.0	6.0	43.0	43.0
Actuated g/C Ratio	0.05	0.34		0.05	0.34	0.34	0.10	0.41	0.41	0.05	0.36	0.36
v/c Ratio	1.10	1.42		1.09	0.95	1.35	0.94	0.48	0.21	6.42	0.46	0.05
Control Delay	105.7	218.2		148.5	52.5	191.8	91.0	27.6	5.0	2455.9	30.9	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.7	218.2		148.5	52.5	191.8	91.0	27.6	5.0	2455.9	30.9	0.1
LOS	F	F		F	D	F	F	C	A	F	C	A
Approach Delay		214.0			106.1			42.2			1585.1	
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	~76	~861		~78	432	~787	123	194	3	~806	166	0
Queue Length 95th (ft)	m#65	m#741		#153	#537	#1038	#212	249	43	m#880	m165	m0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	83	1630		162	1646	665	325	1369	692	162	1201	630
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	1.42		1.09	0.95	1.35	0.94	0.48	0.21	6.42	0.46	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 80 (67%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 6.42			
Intersection Signal Delay: 438.8		Intersection LOS: F	
Intersection Capacity Utilization 119.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

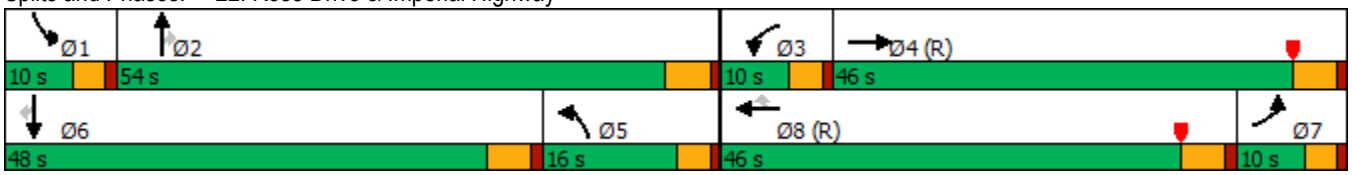
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Rose Drive & Imperial Highway



APPENDIX F-VI

YEAR 2045 PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1403	277	294	1644	619	280	250	160	968	615	38
Future Volume (vph)	46	1403	277	294	1644	619	280	250	160	968	615	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.86	0.86	1.00
Frt		0.975				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.988	
Satd. Flow (prot)	1676	4697	0	3252	4818	1500	3252	3353	1500	2884	2999	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.988	
Satd. Flow (perm)	1676	4697	0	3252	4818	1500	3252	3353	1500	2884	2999	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40				158			152			152
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	1403	277	294	1644	619	280	250	160	968	615	38
Shared Lane Traffic (%)										20%		
Lane Group Flow (vph)	46	1680	0	294	1644	619	280	250	160	774	809	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Split	NA	Perm	Split	NA	Perm
Protected Phases	7	4		3	8	6	2	2		6	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	6	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	41.0	48.0	11.0	11.0	11.0	48.0	48.0	48.0
Total Split (s)	10.0	46.0		10.0	46.0	48.0	11.0	11.0	11.0	48.0	48.0	48.0
Total Split (%)	8.7%	40.0%		8.7%	40.0%	41.7%	9.6%	9.6%	9.6%	41.7%	41.7%	41.7%
Maximum Green (s)	6.0	41.0		6.0	41.0	43.0	6.0	6.0	6.0	43.0	43.0	43.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		34.0			29.0	36.0				36.0	36.0	36.0
Pedestrian Calls (#/hr)		2			2	2				2	2	2
Act Effct Green (s)	6.0	41.0		6.0	43.0	91.0	6.0	6.0	6.0	43.0	43.0	43.0
Actuated g/C Ratio	0.05	0.36		0.05	0.37	0.79	0.05	0.05	0.05	0.37	0.37	0.37
v/c Ratio	0.53	0.99		1.74	0.91	0.51	1.66	1.44	0.72	0.72	0.72	0.06
Control Delay	75.1	55.4		388.9	43.7	4.8	354.6	265.3	28.7	35.4	35.3	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	55.4		388.9	43.7	4.8	354.6	265.3	28.7	35.4	35.3	0.2
LOS	E	E		F	D	A	F	F	C	D	D	A
Approach Delay		55.9			74.0			246.7			34.5	
Approach LOS		E			E			F			C	
Queue Length 50th (ft)	34	441		~166	431	98	~155	~132	6	281	295	0
Queue Length 95th (ft)	#82	#559		#256	#540	158	#243	#217	#97	364	379	0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	87	1700		169	1801	1219	169	174	222	1078	1121	656
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.99		1.74	0.91	0.51	1.66	1.44	0.72	0.72	0.72	0.06

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.74
Intersection Signal Delay: 77.6 Intersection LOS: E
Intersection Capacity Utilization 92.1% ICU Level of Service F
Analysis Period (min) 15

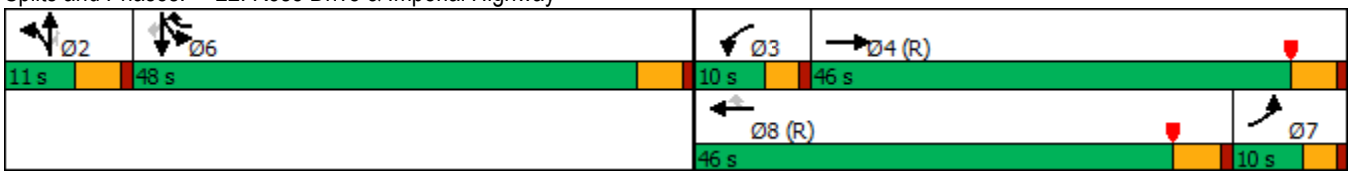
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

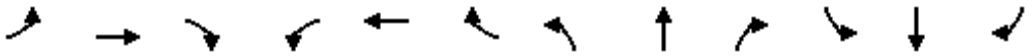
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 22: Rose Drive & Imperial Highway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	2005	315	176	1570	896	306	657	143	1040	549	33
Future Volume (vph)	91	2005	315	176	1570	896	306	657	143	1040	549	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	220		0	230		270	135		100	185		50
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.86	0.86	1.00
Frt		0.980				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.984	
Satd. Flow (prot)	1676	4721	0	3252	4818	1500	3252	3353	1500	2884	2987	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.984	
Satd. Flow (perm)	1676	4721	0	3252	4818	1500	3252	3353	1500	2884	2987	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				66			152			152
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3640			1874			918			1486	
Travel Time (s)		82.7			42.6			20.9			33.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	91	2005	315	176	1570	896	306	657	143	1040	549	33
Shared Lane Traffic (%)										25%		
Lane Group Flow (vph)	91	2320	0	176	1570	896	306	657	143	780	809	33
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Split	NA	Perm	Split	NA	Perm
Protected Phases	7	4		3	8	6	2	2		6	6	
Permitted Phases						8			2			6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	6	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	46.0		10.0	41.0	48.0	11.0	11.0	11.0	48.0	48.0	48.0
Total Split (s)	11.0	46.0		10.0	45.0	45.0	14.0	14.0	14.0	45.0	45.0	45.0
Total Split (%)	9.6%	40.0%		8.7%	39.1%	39.1%	12.2%	12.2%	12.2%	39.1%	39.1%	39.1%
Maximum Green (s)	7.0	41.0		6.0	40.0	40.0	9.0	9.0	9.0	40.0	40.0	40.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		34.0			29.0	36.0				36.0	36.0	36.0
Pedestrian Calls (#/hr)		2			2	2				2	2	2
Act Effct Green (s)	7.0	41.0		6.0	40.0	85.0	9.0	9.0	9.0	40.0	40.0	40.0
Actuated g/C Ratio	0.06	0.36		0.05	0.35	0.74	0.08	0.08	0.08	0.35	0.35	0.35
v/c Ratio	0.89	1.36		1.04	0.94	0.80	1.20	2.51	0.56	0.78	0.78	0.05
Control Delay	117.9	198.9		133.6	48.1	15.5	168.4	712.5	15.8	40.0	39.8	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	117.9	198.9		133.6	48.1	15.5	168.4	712.5	15.8	40.0	39.8	0.2
LOS	F	F		F	D	B	F	F	B	D	D	A
Approach Delay		195.8			42.7			471.9			39.1	
Approach LOS		F			D			F			D	
Queue Length 50th (ft)	68	~830		~72	408	338	~142	~426	0	298	309	0
Queue Length 95th (ft)	#170	#926		#145	#510	548	#232	#546	56	384	397	0
Internal Link Dist (ft)		3560			1794			838			1406	
Turn Bay Length (ft)	220			230		270	135		100	185		50
Base Capacity (vph)	102	1701		169	1675	1125	254	262	257	1003	1038	620
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	1.36		1.04	0.94	0.80	1.20	2.51	0.56	0.78	0.78	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 115			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 2.51			
Intersection Signal Delay: 150.4		Intersection LOS: F	
Intersection Capacity Utilization 112.6%		ICU Level of Service H	
Analysis Period (min) 15			

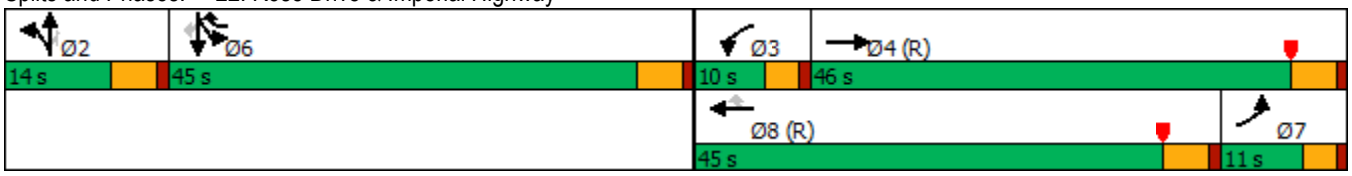
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 22: Rose Drive & Imperial Highway



APPENDIX G

PROJECT DRIVEWAY LEVEL OF SERVICE CALCULATION WORKSHEETS – ICU

APPENDIX G-I

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.984

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	202	4	2	374	3	2	0	10	9	0	3
Total Analysis Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.24	0.24	0.00	0.88	0.01	0.01	0.00	0.03	0.02	0.00	0.01
Intersection LOS	E											
Intersection V/C	0.984											

Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.377

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	90	0	5	22	0	33	11	864	40	2	126	8
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	90	0	5	22	0	33	11	864	40	2	126	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	23	0	1	6	0	8	3	216	10	1	315	2
Total Analysis Volume [veh/h]	90	0	5	22	0	33	11	864	40	2	126	8
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.01	0.00	0.02	0.01	0.18	0.18	0.00	0.25	0.25
Intersection LOS	A											
Intersection V/C	0.377											

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.721

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	695	13	13	200	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	695	13	13	200	2	3	0	71	36	0	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	174	3	3	500	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	695	13	13	200	2	3	0	71	36	0	36
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.21	0.21	0.01	0.59	0.59	0.00	0.00	0.04	0.02	0.00	0.02
Intersection LOS	C											
Intersection V/C	0.721											

Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.501

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	799	14	23	1400	41	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	799	14	23	1400	41	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	200	4	6	350	10	17
Total Analysis Volume [veh/h]	799	14	23	1400	41	66
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.24	0.24	0.01	0.41	0.02	0.04
Intersection LOS	A					
Intersection V/C	0.501					

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.867

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	321	8	3	326	4	2	0	5	7	0	3
Total Analysis Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.39	0.39	0.01	0.77	0.01	0.00	0.00	0.02	0.02	0.00	0.01
Intersection LOS	D											
Intersection V/C	0.867											

Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.427

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	77	0	4	15	0	22	37	150	109	5	767	25
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	0	4	15	0	22	37	150	109	5	767	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	19	0	1	4	0	6	9	375	27	1	192	6
Total Analysis Volume [veh/h]	77	0	4	15	0	22	37	150	109	5	767	25
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.01	0.00	0.01	0.02	0.32	0.32	0.00	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.427											

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.536

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	137	41	41	833	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	137	41	41	833	6	4	0	56	24	0	24
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	19	343	10	10	208	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	137	41	41	833	6	4	0	56	24	0	24
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.42	0.42	0.02	0.25	0.25	0.00	0.00	0.03	0.01	0.00	0.01
Intersection LOS	A											
Intersection V/C	0.536											

Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.550

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	1415	47	75	1230	28	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1415	47	75	1230	28	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	354	12	19	308	7	11
Total Analysis Volume [veh/h]	1415	47	75	1230	28	44
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.43	0.43	0.04	0.36	0.02	0.03
Intersection LOS	A					
Intersection V/C	0.550					

APPENDIX G-II

YEAR 2035 CUMULATIVE PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.548

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	11	809	15	6	1495	11	9	0	38	35	0	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	809	15	6	1495	11	9	0	38	35	0	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	202	4	2	374	3	2	0	10	9	0	3
Total Analysis Volume [veh/h]	11	809	15	6	1495	11	9	0	38	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.24	0.24	0.00	0.44	0.44	0.01	0.00	0.03	0.02	0.00	0.01
Intersection LOS	A											
Intersection V/C	0.548											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.489

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	30	1283	33	13	1304	17	8	0	21	26	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	1283	33	13	1304	17	8	0	21	26	0	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	321	8	3	326	4	2	0	5	7	0	3
Total Analysis Volume [veh/h]	30	1283	33	13	1304	17	8	0	21	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.39	0.39	0.01	0.39	0.39	0.00	0.00	0.02	0.02	0.00	0.01
Intersection LOS	A											
Intersection V/C	0.489											

APPENDIX G-III

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.144

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	207	4	2	376	17	15	0	52	9	0	3
Total Analysis Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.25	0.25	0.00	0.88	0.04	0.04	0.00	0.16	0.02	0.00	0.01
Intersection LOS	F											
Intersection V/C	1.144											

Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.389

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	90	0	5	22	0	33	11	908	40	2	1321	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	90	0	5	22	0	33	11	908	40	2	1321	8
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	0	1	6	0	8	3	227	10	1	330	2
Total Analysis Volume [veh/h]	90	0	5	22	0	33	11	908	40	2	1321	8
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.01	0.00	0.02	0.01	0.19	0.19	0.00	0.26	0.26
Intersection LOS	A											
Intersection V/C	0.389											

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.750

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	727	13	13	2099	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	727	13	13	2099	2	3	0	71	36	0	36
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	182	3	3	525	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	727	13	13	2099	2	3	0	71	36	0	36
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.22	0.22	0.01	0.62	0.62	0.00	0.00	0.04	0.02	0.00	0.02
Intersection LOS	C											
Intersection V/C	0.750											

Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.502

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	818	14	23	1406	41	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	818	14	23	1406	41	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	205	4	6	352	10	17
Total Analysis Volume [veh/h]	818	14	23	1406	41	66
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.24	0.24	0.01	0.41	0.02	0.04
Intersection LOS	A					
Intersection V/C	0.502					

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.043

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	169	127	33	13	132	101	49	0	118	26	0	10
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	127	33	13	132	101	49	0	118	26	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	42	318	8	3	332	25	12	0	30	7	0	3
Total Analysis Volume [veh/h]	169	127	33	13	132	101	49	0	118	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.38	0.38	0.01	0.78	0.06	0.03	0.00	0.10	0.02	0.00	0.01
Intersection LOS	F											
Intersection V/C	1.043											

Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.441

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	77	0	4	15	0	22	37	157	109	5	804	25
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	0	4	15	0	22	37	157	109	5	804	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	19	0	1	4	0	6	9	393	27	1	201	6
Total Analysis Volume [veh/h]	77	0	4	15	0	22	37	157	109	5	804	25
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.01	0.00	0.01	0.02	0.33	0.33	0.00	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.441											

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.556

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	143	41	41	873	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	143	41	41	873	6	4	0	56	24	0	24
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	19	359	10	10	218	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	143	41	41	873	6	4	0	56	24	0	24
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.43	0.43	0.02	0.26	0.26	0.00	0.00	0.03	0.01	0.00	0.01
Intersection LOS	A											
Intersection V/C	0.556											

Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.549

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	1412	47	75	1250	28	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1412	47	75	1250	28	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	353	12	19	313	7	11
Total Analysis Volume [veh/h]	1412	47	75	1250	28	44
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.43	0.43	0.04	0.37	0.02	0.03
Intersection LOS	A					
Intersection V/C	0.549					

APPENDIX G-IV

YEAR 2045 PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.722

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	207	4	2	376	17	15	0	52	9	0	3
Total Analysis Volume [veh/h]	54	828	15	6	1503	67	61	0	207	35	0	13
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.25	0.25	0.00	0.46	0.46	0.04	0.00	0.16	0.02	0.00	0.01
Intersection LOS	C											
Intersection V/C	0.722											

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.683

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	318	8	3	332	25	12	0	30	7	0	3
Total Analysis Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.38	0.38	0.01	0.42	0.42	0.03	0.00	0.10	0.02	0.00	0.01
Intersection LOS	B											
Intersection V/C	0.683											

APPENDIX H

PROJECT DRIVEWAY LEVEL OF SERVICE CALCULATION WORKSHEETS – HCM

APPENDIX H-I

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.871

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	3	202	4	2	374	3	2	0	10	9	0	3
Total Analysis Volume [veh/h]	11	809	15	6	149	11	9	0	38	35	0	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	107	107	107	107	107	107	5	5	5
g / C, Green / Cycle	0.89	0.89	0.89	0.89	0.89	0.89	0.04	0.04	0.04
(v / s)_i Volume / Saturation Flow Rate	0.01	0.22	0.22	0.00	0.79	0.01	0.03	0.02	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	180	1800	1800	1900
c, Capacity [veh/h]	901	169	169	157	169	160	108	62	76
d1, Uniform Delay [s]	0.69	0.88	0.87	0.69	3.22	0.69	56.70	56.32	55.60
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.34	0.34	0.00	6.96	0.01	2.73	7.70	1.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.24	0.24	0.00	0.88	0.01	0.43	0.56	0.17
d, Delay for Lane Group [s/veh]	0.71	1.22	1.21	0.69	10.1	0.70	59.43	64.01	56.64
Lane Group LOS	A	A	A	A	B	A	E	E	E
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.01	0.52	0.51	0.01	8.00	0.01	1.49	1.17	0.40
50th-Percentile Queue Length [ft/ln]	0.34	12.9	12.8	0.15	199.	0.27	37.16	29.30	10.07
95th-Percentile Queue Length [veh/ln]	0.02	0.93	0.92	0.01	12.6	0.02	2.68	2.11	0.73
95th-Percentile Queue Length [ft/ln]	0.61	23.2	23.0	0.27	315.	0.49	66.89	52.74	18.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.71	1.22	1.21	0.69	10.1	0.70	59.4	59.4	59.4	64.0	56.6	56.6
Movement LOS	A	A	A	A	B	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	1.21			10.07			59.43			62.02		
Approach LOS	A			B			E			E		
d_I, Intersection Delay [s/veh]	9.01											
Intersection LOS	A											
Intersection V/C	0.871											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	49.48	49.48	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.780	2.783	1.778	1.985
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.53	4.53	37.58	37.58
l_b,int, Bicycle LOS Score for Intersection	2.248	4.054	1.637	1.639
Bicycle LOS	B	D	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.329

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	90	0	5	22	0	33	11	864	40	2	126	8
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	90	0	5	22	0	33	11	864	40	2	126	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	23	0	1	6	0	8	3	216	10	1	315	2
Total Analysis Volume [veh/h]	90	0	5	22	0	33	11	864	40	2	126	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	58	0	0	58	0	10	22	0	10	22	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	11	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	6	2	72	72	0	71	71
g / C, Green / Cycle	0.07	0.07	0.07	0.07	0.02	0.80	0.80	0.00	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.05	0.00	0.01	0.02	0.01	0.16	0.16	0.00	0.22	0.23
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	380	190	180	380	190
c, Capacity [veh/h]	137	127	162	127	31	302	151	8	297	148
d1, Uniform Delay [s]	41.26	39.30	39.68	39.89	43.7	2.24	2.25	44.6	2.73	2.77
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.21	0.12	0.38	1.07	6.66	0.15	0.30	14.7	0.24	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.04	0.14	0.26	0.35	0.20	0.20	0.24	0.28	0.29
d, Delay for Lane Group [s/veh]	46.46	39.42	40.06	40.95	50.4	2.39	2.56	59.3	2.96	3.27
Lane Group LOS	D	D	D	D	D	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.14	0.11	0.47	0.72	0.30	0.84	0.94	0.08	1.45	1.64
50th-Percentile Queue Length [ft/ln]	53.42	2.67	11.82	18.12	7.45	21.1	23.4	1.94	36.1	40.9
95th-Percentile Queue Length [veh/ln]	3.85	0.19	0.85	1.30	0.54	1.52	1.69	0.14	2.60	2.95
95th-Percentile Queue Length [ft/ln]	96.16	4.81	21.27	32.61	13.4	37.9	42.2	3.49	65.0	73.6

Movement, Approach, & Intersection Results

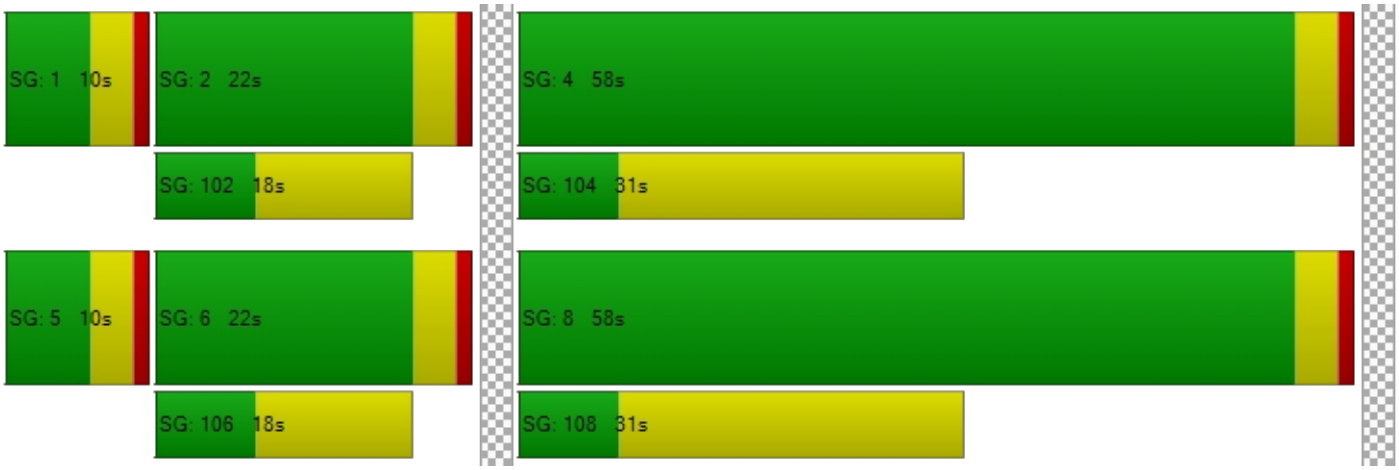
d_M, Delay for Movement [s/veh]	46.4	39.4	39.4	40.0	40.9	40.9	50.4	2.44	2.56	59.3	3.07	3.27
Movement LOS	D	D	D	D	D	D	D	A	A	E	A	A
d_A, Approach Delay [s/veh]	46.09			40.59			3.02			3.16		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.73											
Intersection LOS	A											
Intersection V/C	0.329											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.984	1.964	3.042	2.926
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1200	1200	400	400
d_b, Bicycle Delay [s]	7.21	7.21	28.81	28.81
l_b,int, Bicycle LOS Score for Intersection	1.716	1.650	2.063	2.258
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.667

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	695	13	13	200	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	695	13	13	200	2	3	0	71	36	0	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	174	3	3	500	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	695	13	13	200	2	3	0	71	36	0	36
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	6	6	0	6	6	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	56	0	10	56	0	0	29	0	0	29	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	18	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	L	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	76	76	2	74	74	5	5	5	5
g / C, Green / Cycle	0.04	0.80	0.80	0.02	0.78	0.78	0.05	0.05	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.02	0.19	0.19	0.01	0.53	0.53	0.00	0.04	0.02	0.02
s, saturation flow rate [veh/h]	180	190	190	180	190	190	1800	1900	1800	1900
c, Capacity [veh/h]	68	151	151	35	148	148	111	105	82	105
d1, Uniform Delay [s]	44.8	2.36	2.36	46.0	4.83	4.83	42.48	44.06	43.28	43.23
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.25	0.36	0.36	6.35	2.48	2.48	0.10	7.38	3.71	1.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.48	0.23	0.23	0.37	0.67	0.67	0.03	0.68	0.44	0.34
d, Delay for Lane Group [s/veh]	50.0	2.72	2.72	52.3	7.31	7.31	42.58	51.43	46.99	45.15
Lane Group LOS	D	A	A	D	A	A	D	D	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.83	0.90	0.89	0.35	5.67	5.67	0.07	1.86	0.90	0.87
50th-Percentile Queue Length [ft/ln]	20.8	22.5	22.3	8.86	141.	141.	1.75	46.48	22.57	21.85
95th-Percentile Queue Length [veh/ln]	1.50	1.62	1.61	0.64	9.57	9.57	0.13	3.35	1.63	1.57
95th-Percentile Queue Length [ft/ln]	37.5	40.5	40.2	15.9	239.	239.	3.15	83.66	40.63	39.33

Movement, Approach, & Intersection Results

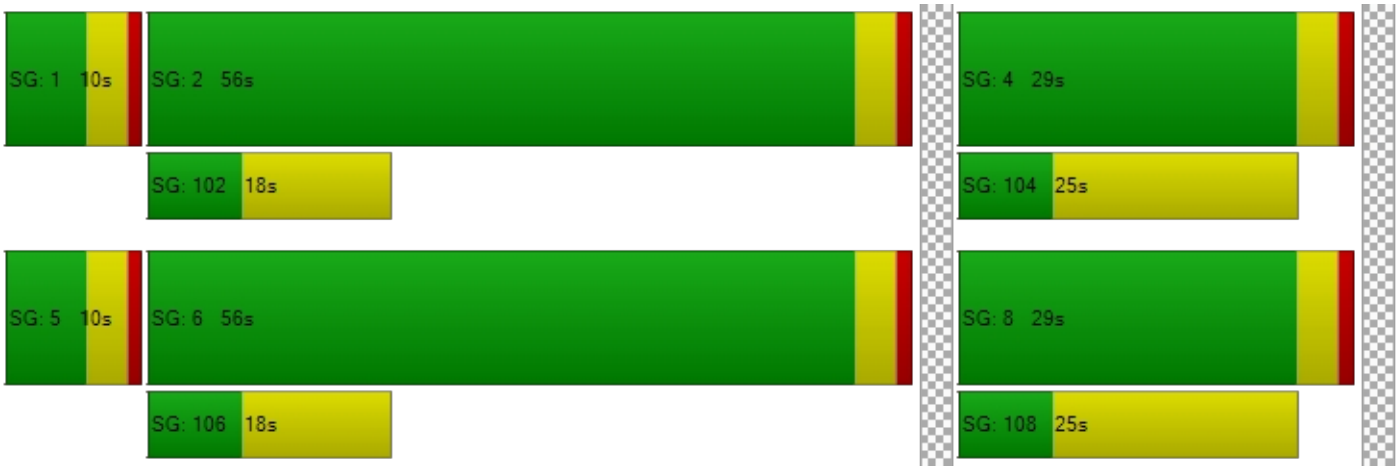
d_M, Delay for Movement [s/veh]	50.0	2.72	2.72	52.3	7.31	7.31	42.5	51.4	51.4	46.9	45.1	45.1
Movement LOS	D	A	A	D	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	4.83			7.60			51.07			46.07		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.96											
Intersection LOS	A											
Intersection V/C	0.667											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
l_p,int, Pedestrian LOS Score for Intersection	3.186	3.110	1.972	1.969
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1095	1095	526	526
d_b, Bicycle Delay [s]	9.74	9.74	25.80	25.80
l_b,int, Bicycle LOS Score for Intersection	2.171	3.222	1.682	1.678
Bicycle LOS	B	C	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	3.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.443

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	799	14	23	1400	41	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	799	14	23	1400	41	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	200	4	6	350	10	17
Total Analysis Volume [veh/h]	799	14	23	1400	41	66
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	6	0	0	6	6	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	61	0	0	61	29	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	11	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	76	76	76	76	6	6
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.21	0.21	0.01	0.37	0.02	0.03
s, saturation flow rate [veh/h]	1900	1900	1800	3800	1800	1900
c, Capacity [veh/h]	1611	1611	1476	3222	114	120
d1, Uniform Delay [s]	1.32	1.32	1.05	1.65	40.38	40.88
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	0.38	0.02	0.43	1.92	3.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.25	0.25	0.02	0.43	0.36	0.55
d, Delay for Lane Group [s/veh]	1.70	1.70	1.07	2.07	42.30	44.78
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.40	0.40	0.02	0.69	0.93	1.55
50th-Percentile Queue Length [ft/ln]	10.01	10.01	0.46	17.22	23.30	38.74
95th-Percentile Queue Length [veh/ln]	0.72	0.72	0.03	1.24	1.68	2.79
95th-Percentile Queue Length [ft/ln]	18.02	18.02	0.83	30.99	41.93	69.73

Movement, Approach, & Intersection Results

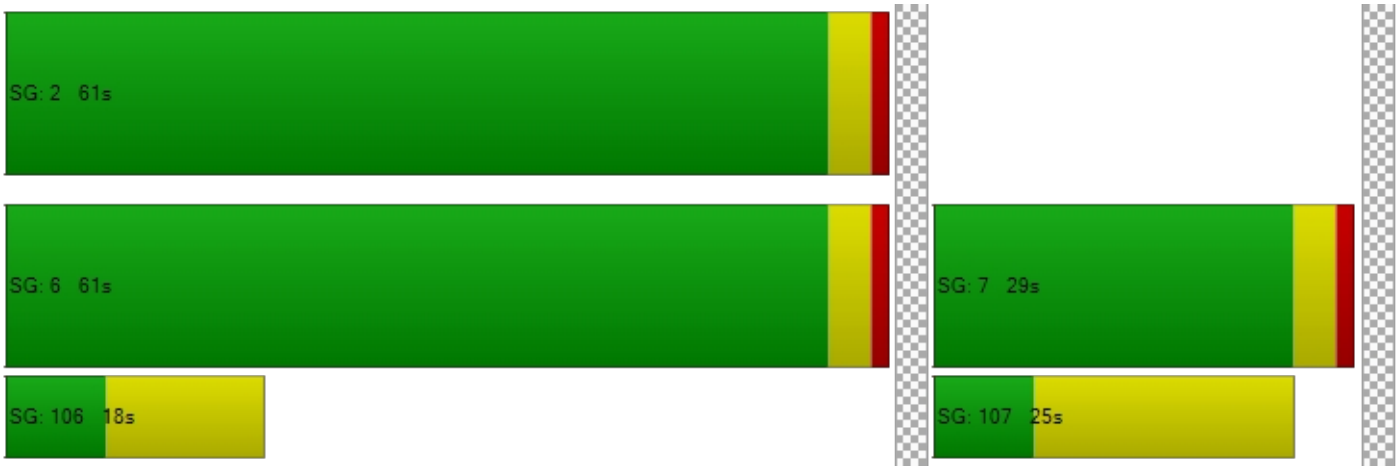
d_M, Delay for Movement [s/veh]	1.70	1.70	1.07	2.07	42.30	44.78
Movement LOS	A	A	A	A	D	D
d_A, Approach Delay [s/veh]	1.70		2.06		43.83	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.84					
Intersection LOS	A					
Intersection V/C	0.443					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.65	34.65
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.894	2.011
Crosswalk LOS	F	C	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1267	1267	556
d_b, Bicycle Delay [s]	6.04	6.04	23.45
l_b,int, Bicycle LOS Score for Intersection	2.230	2.734	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	4.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.753

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	321	8	3	326	4	2	0	5	7	0	3
Total Analysis Volume [veh/h]	30	128	33	13	130	17	8	0	21	26	0	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	108	108	108	108	108	108	4	4	4
g / C, Green / Cycle	0.90	0.90	0.90	0.90	0.90	0.90	0.04	0.04	0.04
(v / s)_i Volume / Saturation Flow Rate	0.02	0.35	0.35	0.01	0.69	0.01	0.02	0.01	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	180	1800	1800	1900
c, Capacity [veh/h]	122	170	170	153	170	161	102	68	67
d1, Uniform Delay [s]	0.63	0.96	0.95	0.63	1.99	0.63	56.71	56.61	56.09
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	0.66	0.66	0.01	3.32	0.01	1.52	3.49	1.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.39	0.38	0.01	0.76	0.01	0.28	0.38	0.15
d, Delay for Lane Group [s/veh]	0.67	1.62	1.61	0.64	5.30	0.64	58.22	60.10	57.11
Lane Group LOS	A	A	A	A	A	A	E	E	E
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.03	0.83	0.82	0.01	3.68	0.01	0.91	0.84	0.31
50th-Percentile Queue Length [ft/ln]	0.70	20.7	20.4	0.27	92.0	0.35	22.64	20.95	7.83
95th-Percentile Queue Length [veh/ln]	0.05	1.49	1.47	0.02	6.63	0.03	1.63	1.51	0.56
95th-Percentile Queue Length [ft/ln]	1.26	37.2	36.8	0.49	165.	0.63	40.75	37.71	14.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.67	1.61	1.61	0.64	5.30	0.64	58.2	58.2	58.2	60.1	57.1	57.1
Movement LOS	A	A	A	A	A	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	1.59			5.20			58.22			59.27		
Approach LOS	A			A			E			E		
d_I, Intersection Delay [s/veh]	4.70											
Intersection LOS	A											
Intersection V/C	0.753											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.48	49.48	49.48	49.48
l_p,int, Pedestrian LOS Score for Intersection	2.839	2.839	1.808	1.999
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.53	4.53	37.58	37.58
l_b,int, Bicycle LOS Score for Intersection	2.670	3.761	1.607	1.619
Bicycle LOS	B	D	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.381

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	77	0	4	15	0	22	37	150	109	5	767	25
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	0	4	15	0	22	37	150	109	5	767	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	19	0	1	4	0	6	9	375	27	1	192	6
Total Analysis Volume [veh/h]	77	0	4	15	0	22	37	150	109	5	767	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	35	0	10	45	0	10	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	11	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	5	5	4	72	72	1	69	69
g / C, Green / Cycle	0.06	0.06	0.06	0.06	0.04	0.80	0.80	0.01	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.04	0.00	0.01	0.01	0.02	0.28	0.29	0.00	0.14	0.14
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	380	190	180	380	190
c, Capacity [veh/h]	133	112	149	112	75	303	151	16	291	145
d1, Uniform Delay [s]	41.65	39.95	40.20	40.34	42.2	2.54	2.55	44.3	2.85	2.87
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.92	0.13	0.29	0.85	5.02	0.32	0.66	10.0	0.13	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.04	0.10	0.20	0.50	0.35	0.36	0.30	0.18	0.19
d, Delay for Lane Group [s/veh]	45.57	40.08	40.50	41.18	47.2	2.86	3.21	54.3	2.98	3.15
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.81	0.09	0.32	0.49	0.90	1.71	1.88	0.16	0.94	1.04
50th-Percentile Queue Length [ft/ln]	45.18	2.17	8.12	12.16	22.5	42.7	47.1	3.89	23.5	25.9
95th-Percentile Queue Length [veh/ln]	3.25	0.16	0.58	0.88	1.62	3.08	3.39	0.28	1.69	1.87
95th-Percentile Queue Length [ft/ln]	81.32	3.91	14.61	21.88	40.5	76.9	84.8	7.00	42.3	46.7

Movement, Approach, & Intersection Results

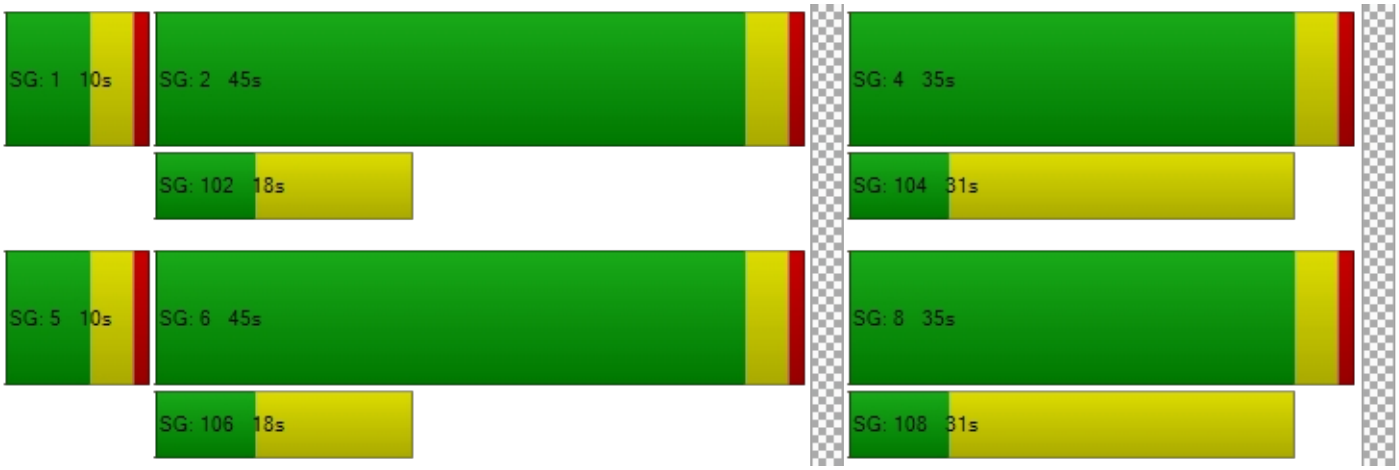
d_M, Delay for Movement [s/veh]	45.5	40.0	40.0	40.5	41.1	41.1	47.2	2.96	3.21	54.3	3.04	3.15
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	45.30			40.90			3.97			3.36		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.62											
Intersection LOS	A											
Intersection V/C	0.381											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	2.003	1.972	3.053	2.937
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	689	689	911	911
d_b, Bicycle Delay [s]	19.35	19.35	13.35	13.35
l_b,int, Bicycle LOS Score for Intersection	1.693	1.621	2.465	1.998
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.491

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	137	41	41	833	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	137	41	41	833	6	4	0	56	24	0	24
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	19	343	10	10	208	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	137	41	41	833	6	4	0	56	24	0	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	6	6	0	6	6	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	13	51	0	10	48	0	0	29	0	0	29	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	18	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	L	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	69	69	4	68	68	5	5	5	5
g / C, Green / Cycle	0.06	0.77	0.77	0.04	0.76	0.76	0.05	0.05	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.37	0.37	0.02	0.22	0.22	0.00	0.03	0.01	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	190	1800	1900	1800	1900
c, Capacity [veh/h]	105	146	146	79	143	143	121	101	91	101
d1, Uniform Delay [s]	41.7	3.80	3.79	42.1	3.45	3.45	40.47	41.61	40.93	40.90
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.63	1.15	1.13	5.17	0.52	0.52	0.11	4.74	1.52	1.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.48	0.48	0.52	0.29	0.29	0.03	0.56	0.26	0.24
d, Delay for Lane Group [s/veh]	51.3	4.95	4.92	47.2	3.97	3.96	40.58	46.35	42.44	42.11
Lane Group LOS	D	A	A	D	A	A	D	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.89	2.91	2.88	0.97	1.56	1.56	0.09	1.35	0.55	0.55
50th-Percentile Queue Length [ft/ln]	47.2	72.7	71.8	24.1	39.0	38.9	2.20	33.66	13.75	13.63
95th-Percentile Queue Length [veh/ln]	3.40	5.24	5.18	1.74	2.81	2.80	0.16	2.42	0.99	0.98
95th-Percentile Queue Length [ft/ln]	85.0	130.	129.	43.5	70.3	70.1	3.96	60.59	24.76	24.53

Movement, Approach, & Intersection Results

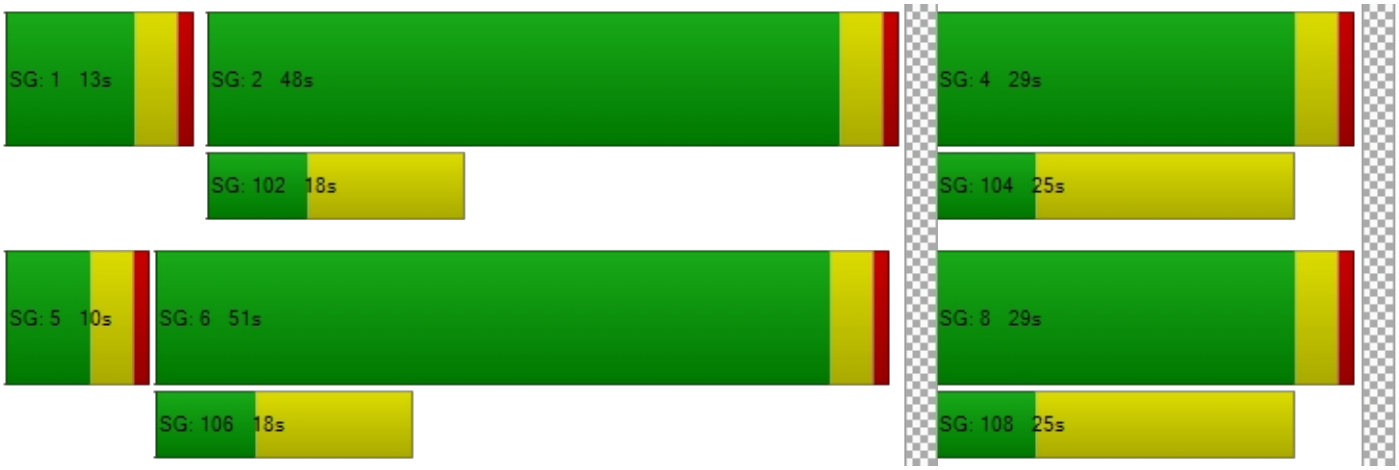
d_M, Delay for Movement [s/veh]	51.3	4.94	4.92	47.2	3.96	3.96	40.5	46.3	46.3	42.4	42.1	42.1
Movement LOS	D	A	A	D	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	7.34			5.98			45.97			42.28		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.47											
Intersection LOS	A											
Intersection V/C	0.491											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	3.036	2.972	1.978	1.975
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1044	978	555	555
d_b, Bicycle Delay [s]	10.28	11.76	23.48	23.48
l_b,int, Bicycle LOS Score for Intersection	2.788	2.286	1.659	1.639
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	3.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.443

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	1415	47	75	1230	28	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1415	47	75	1230	28	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	354	12	19	308	7	11
Total Analysis Volume [veh/h]	1415	47	75	1230	28	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	6	0	0	6	6	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	71	0	0	71	29	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	11	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	R
C, Cycle Length [s]	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	87	87	87	87	5	5
g / C, Green / Cycle	0.87	0.87	0.87	0.87	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.38	0.38	0.04	0.32	0.02	0.02
s, saturation flow rate [veh/h]	1900	1900	1800	3800	1800	1900
c, Capacity [veh/h]	1649	1649	1437	3297	94	99
d1, Uniform Delay [s]	1.42	1.42	0.91	1.29	45.59	45.94
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.87	0.87	0.07	0.32	1.74	3.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.44	0.44	0.05	0.37	0.30	0.44
d, Delay for Lane Group [s/veh]	2.29	2.29	0.98	1.62	47.32	49.01
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.79	0.79	0.05	0.45	0.72	1.15
50th-Percentile Queue Length [ft/ln]	19.76	19.76	1.34	11.24	17.96	28.77
95th-Percentile Queue Length [veh/ln]	1.42	1.42	0.10	0.81	1.29	2.07
95th-Percentile Queue Length [ft/ln]	35.56	35.56	2.40	20.23	32.33	51.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	2.29	2.29	0.98	1.62	47.32	49.01
Movement LOS	A	A	A	A	D	D
d_A, Approach Delay [s/veh]	2.29		1.58		48.36	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.13					
Intersection LOS	A					
Intersection V/C	0.443					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.59	39.59
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.023	2.104
Crosswalk LOS	F	C	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1340	1340	500
d_b, Bicycle Delay [s]	5.44	5.44	28.11
l_b,int, Bicycle LOS Score for Intersection	2.766	2.636	1.560
Bicycle LOS	C	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX H-II

YEAR 2035 CUMULATIVE PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

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APPENDIX H-III

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	33.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.007

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	54	828	15	6	150	67	61	0	207	35	0	13
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	828	15	6	150	67	61	0	207	35	0	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	14	207	4	2	376	17	15	0	52	9	0	3
Total Analysis Volume [veh/h]	54	828	15	6	150	67	61	0	207	35	0	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	92	92	92	92	92	92	20	20	20
g / C, Green / Cycle	0.77	0.77	0.77	0.77	0.77	0.77	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.22	0.22	0.00	0.79	0.04	0.15	0.02	0.01
s, saturation flow rate [veh/h]	180	190	190	180	190	180	1800	1800	1900
c, Capacity [veh/h]	64	146	146	128	146	138	333	64	312
d1, Uniform Delay [s]	3.30	4.12	4.11	3.21	13.8	3.33	49.13	42.65	42.10
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	74.8	0.50	0.50	0.01	31.2	0.07	6.37	7.03	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.29	0.29	0.00	1.03	0.05	0.80	0.55	0.04
d, Delay for Lane Group [s/veh]	78.1	4.62	4.61	3.22	45.1	3.39	55.50	49.67	42.16
Lane Group LOS	E	A	A	A	F	A	E	D	D
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.59	2.83	2.81	0.03	43.1	0.36	8.44	1.02	0.33
50th-Percentile Queue Length [ft/ln]	39.8	70.7	70.1	0.79	107	9.04	210.98	25.38	8.28
95th-Percentile Queue Length [veh/ln]	2.87	5.09	5.05	0.06	55.4	0.65	13.20	1.83	0.60
95th-Percentile Queue Length [ft/ln]	71.7	127.	126.	1.41	138	16.2	330.08	45.68	14.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	78.1	4.62	4.61	3.22	45.1	3.39	55.5	55.5	55.5	49.6	42.1	42.1
Movement LOS	E	A	A	A	F	A	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	9.04			43.21			55.50			47.64		
Approach LOS	A			D			E			D		
d_I, Intersection Delay [s/veh]	33.48											
Intersection LOS	C											
Intersection V/C	1.007											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.45	49.45	49.45	49.45
l_p,int, Pedestrian LOS Score for Intersection	2.839	2.884	1.995	1.985
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.51	4.51	37.56	37.56
l_b,int, Bicycle LOS Score for Intersection	2.300	4.160	2.002	1.639
Bicycle LOS	B	D	B	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.342

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	90	0	5	22	0	33	11	908	40	2	132	8
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	90	0	5	22	0	33	11	908	40	2	132	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	23	0	1	6	0	8	3	227	10	1	330	2
Total Analysis Volume [veh/h]	90	0	5	22	0	33	11	908	40	2	132	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Per	Per	Per	Per	Per	Per	Prot	Per	Per	Prot	Per	Per
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lea	-	-	Lea	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	58	0	0	58	0	10	22	0	10	22	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	11	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	6	2	72	72	0	71	71
g / C, Green / Cycle	0.07	0.07	0.07	0.07	0.02	0.80	0.80	0.00	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.05	0.00	0.01	0.02	0.01	0.16	0.17	0.00	0.23	0.24
s, saturation flow rate [veh/h]	1800	1900	1800	1900	180	380	190	180	380	190
c, Capacity [veh/h]	137	127	162	127	31	302	151	8	297	148
d1, Uniform Delay [s]	41.26	39.30	39.68	39.89	43.7	2.26	2.27	44.6	2.77	2.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.21	0.12	0.38	1.07	6.66	0.16	0.32	14.7	0.25	0.54
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.04	0.14	0.26	0.35	0.21	0.21	0.24	0.29	0.31
d, Delay for Lane Group [s/veh]	46.46	39.42	40.06	40.95	50.4	2.42	2.60	59.3	3.02	3.34
Lane Group LOS	D	D	D	D	D	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.14	0.11	0.47	0.72	0.30	0.89	0.99	0.08	1.54	1.74
50th-Percentile Queue Length [ft/ln]	53.42	2.67	11.82	18.12	7.45	22.3	24.8	1.94	38.4	43.5
95th-Percentile Queue Length [veh/ln]	3.85	0.19	0.85	1.30	0.54	1.61	1.79	0.14	2.76	3.14
95th-Percentile Queue Length [ft/ln]	96.16	4.81	21.27	32.61	13.4	40.1	44.7	3.49	69.1	78.4

Movement, Approach, & Intersection Results

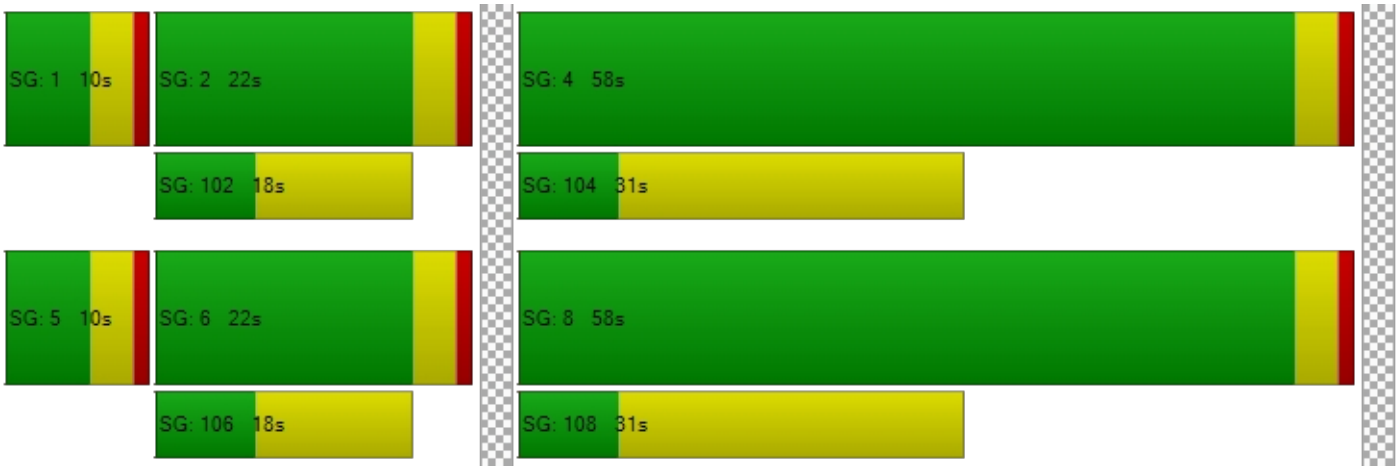
d_M, Delay for Movement [s/veh]	46.4	39.4	39.4	40.0	40.9	40.9	50.4	2.47	2.60	59.3	3.13	3.34
Movement LOS	D	D	D	D	D	D	D	A	A	E	A	A
d_A, Approach Delay [s/veh]	46.09			40.59			3.03			3.21		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.65											
Intersection LOS	A											
Intersection V/C	0.342											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.984	1.964	3.056	2.940
Crosswalk LOS	A	A	C	C
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1200	1200	400	400
d_b, Bicycle Delay [s]	7.21	7.21	28.81	28.81
l_b,int, Bicycle LOS Score for Intersection	1.716	1.650	2.087	2.292
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.692

Intersection Setup

Name	Va Av			Va Av			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ	Left	Thru	Righ
Lane Width [ft]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Va Av			Va Av			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	727	13	13	209	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	727	13	13	209	2	3	0	71	36	0	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total 15-Minute Volume [veh/h]	8	182	3	3	525	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	727	13	13	209	2	3	0	71	36	0	36
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Prot	Per	Per	Prot	Per	Per	Per	Per	Per	Per	Per	Per
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lea	-	-	Lea	-	-	-	-	-	-	-	-
Minimum Green [s]	6	6	0	6	6	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	60	0	10	60	0	0	30	0	0	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	18	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	81	81	2	79	79	5	5	5	5
g / C, Green / Cycle	0.04	0.81	0.81	0.02	0.79	0.79	0.05	0.05	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.02	0.20	0.19	0.01	0.55	0.55	0.00	0.04	0.02	0.02
s, saturation flow rate [veh/h]	180	190	190	180	190	190	1800	1900	1800	1900
c, Capacity [veh/h]	66	153	153	34	150	150	102	100	75	100
d1, Uniform Delay [s]	47.2	2.28	2.28	48.5	4.90	4.90	44.94	46.60	45.78	45.73
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.81	0.37	0.37	7.05	2.73	2.73	0.12	8.80	4.77	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.24	0.24	0.39	0.70	0.70	0.03	0.71	0.48	0.36
d, Delay for Lane Group [s/veh]	53.0	2.65	2.65	55.5	7.63	7.63	45.05	55.40	50.55	47.88
Lane Group LOS	D	A	A	E	A	A	D	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.89	0.96	0.95	0.38	6.39	6.39	0.07	1.99	0.97	0.93
50th-Percentile Queue Length [ft/ln]	22.1	24.0	23.8	9.41	159.	159.	1.86	49.75	24.20	23.21
95th-Percentile Queue Length [veh/ln]	1.60	1.73	1.72	0.68	10.5	10.5	0.13	3.58	1.74	1.67
95th-Percentile Queue Length [ft/ln]	39.8	43.2	42.9	16.9	263.	263.	3.35	89.56	43.56	41.77

Movement, Approach, & Intersection Results

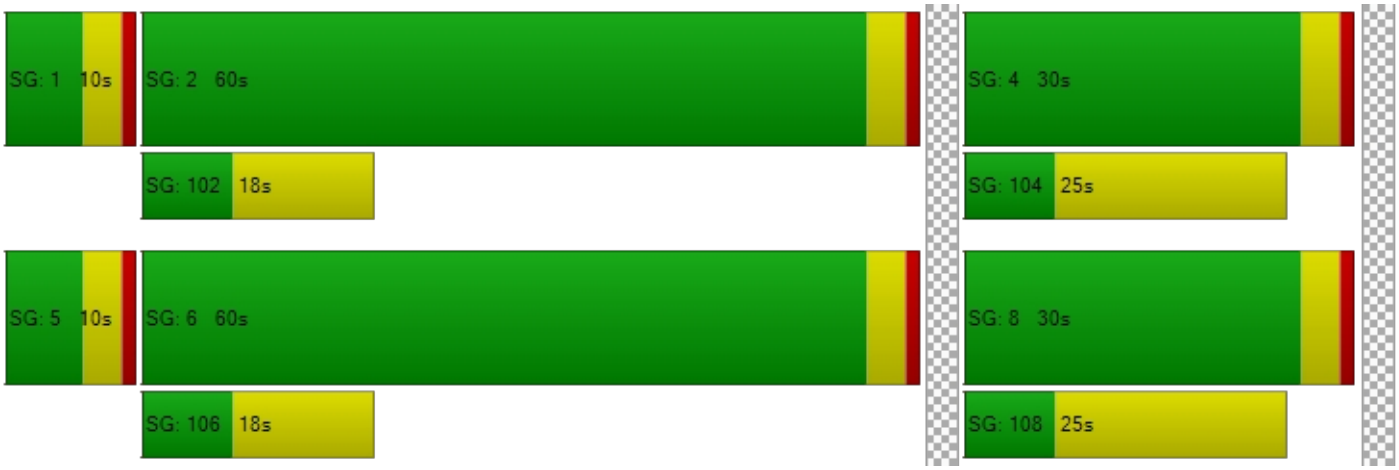
d_M, Delay for Movement [s/veh]	53.0	2.65	2.65	55.5	7.63	7.63	45.0	55.4	55.4	50.5	47.8	47.8
Movement LOS	D	A	A	E	A	A	D	E	E	D	D	D
d_A, Approach Delay [s/veh]	4.80			7.93			54.98			49.21		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	9.26											
Intersection LOS	A											
Intersection V/C	0.692											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	3.227	3.151	1.975	1.972
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1120	1120	520	520
d_b, Bicycle Delay [s]	9.68	9.68	27.38	27.38
l_b,int, Bicycle LOS Score for Intersection	2.197	3.304	1.682	1.678
Bicycle LOS	B	C	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	3.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.444

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	818	14	23	1406	41	66
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	818	14	23	1406	41	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	205	4	6	352	10	17
Total Analysis Volume [veh/h]	818	14	23	1406	41	66
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissiv	Permissiv	Permissiv	Permissiv	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	6	0	0	6	6	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	61	0	0	61	29	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	11	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	76	76	76	76	6	6
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.22	0.22	0.01	0.37	0.02	0.03
s, saturation flow rate [veh/h]	1900	1900	1800	3800	1800	1900
c, Capacity [veh/h]	1611	1611	1473	3222	114	120
d1, Uniform Delay [s]	1.33	1.33	1.05	1.65	40.38	40.88
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.39	0.39	0.02	0.43	1.92	3.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.26	0.02	0.44	0.36	0.55
d, Delay for Lane Group [s/veh]	1.72	1.72	1.07	2.08	42.30	44.78
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.41	0.41	0.02	0.69	0.93	1.55
50th-Percentile Queue Length [ft/ln]	10.32	10.32	0.46	17.34	23.30	38.74
95th-Percentile Queue Length [veh/ln]	0.74	0.74	0.03	1.25	1.68	2.79
95th-Percentile Queue Length [ft/ln]	18.57	18.57	0.83	31.21	41.93	69.73

Movement, Approach, & Intersection Results

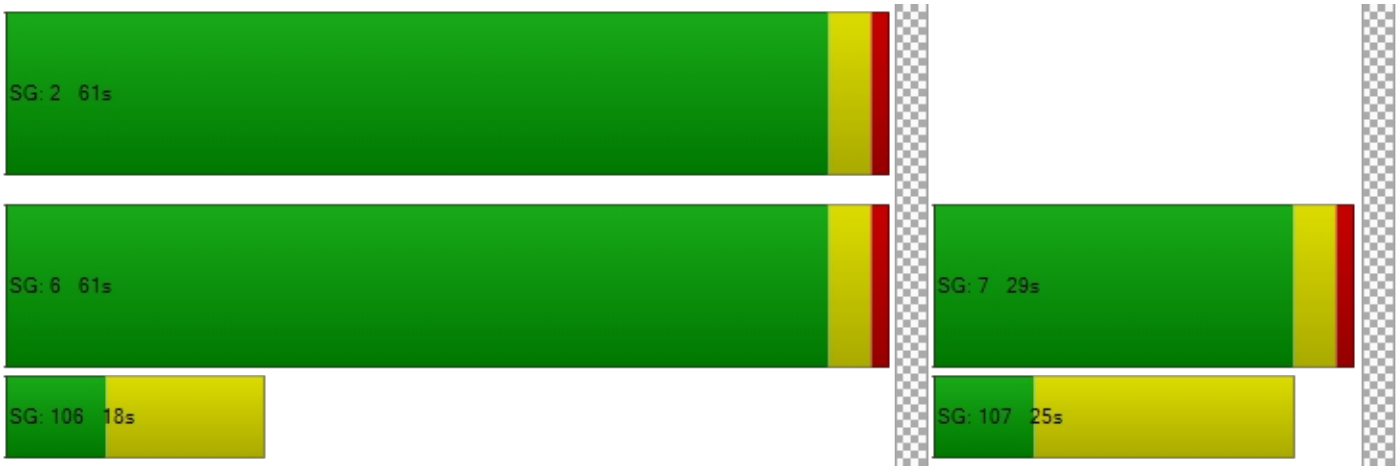
d_M, Delay for Movement [s/veh]	1.72	1.72	1.07	2.08	42.30	44.78
Movement LOS	A	A	A	A	D	D
d_A, Approach Delay [s/veh]	1.72		2.07		43.83	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.83					
Intersection LOS	A					
Intersection V/C	0.444					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	34.65	34.65
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.901	2.011
Crosswalk LOS	F	C	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1267	1267	556
d_b, Bicycle Delay [s]	6.04	6.04	23.45
l_b,int, Bicycle LOS Score for Intersection	2.246	2.739	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Rose Drive at Vesuvius Drive

Control Type:	Signalized	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.847

Intersection Setup

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Rose Drive			Rose Drive			Vesuvius Drive			Vesuvius Drive		
Base Volume Input [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	318	8	3	332	25	12	0	30	7	0	3
Total Analysis Volume [veh/h]	169	1272	33	13	1326	101	49	0	118	26	0	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	91	0	0	91	0	0	29	0	0	29	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	7	0	0	14	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	99	99	99	99	99	99	13	13	13
g / C, Green / Cycle	0.82	0.82	0.82	0.82	0.82	0.82	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.34	0.34	0.01	0.70	0.06	0.09	0.01	0.01
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	1800	1800	1900
c, Capacity [veh/h]	769	1566	1566	1336	1566	1484	235	65	207
d1, Uniform Delay [s]	2.04	2.83	2.82	1.87	6.13	1.96	52.41	48.24	47.80
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.66	0.82	0.81	0.01	5.86	0.09	3.93	3.88	0.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.42	0.42	0.01	0.85	0.07	0.71	0.40	0.05
d, Delay for Lane Group [s/veh]	2.70	3.65	3.63	1.88	11.98	2.05	56.34	52.12	47.89
Lane Group LOS	A	A	A	A	B	A	E	D	D
Critical Lane Group	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.70	3.33	3.30	0.04	15.61	0.35	5.19	0.78	0.27
50th-Percentile Queue Length [ft/ln]	17.39	83.26	82.42	1.10	390.23	8.87	129.68	19.42	6.87
95th-Percentile Queue Length [veh/ln]	1.25	5.99	5.93	0.08	22.09	0.64	8.92	1.40	0.49
95th-Percentile Queue Length [ft/ln]	31.30	149.87	148.36	1.97	552.22	15.97	223.06	34.96	12.36

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	2.70	3.64	3.63	1.88	11.98	2.05	56.34	56.34	56.34	52.12	47.89	47.89
Movement LOS	A	A	A	A	B	A	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	3.53			11.20			56.34			50.95		
Approach LOS	A			B			E			D		
d_I, Intersection Delay [s/veh]	10.45											
Intersection LOS	B											
Intersection V/C	0.847											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.45	49.45	49.45	49.45
l_p,int, Pedestrian LOS Score for Intersection	2.899	2.924	2.182	1.999
Crosswalk LOS	C	C	B	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1451	1451	417	417
d_b, Bicycle Delay [s]	4.51	4.51	37.56	37.56
l_b,int, Bicycle LOS Score for Intersection	2.776	3.936	1.835	1.619
Bicycle LOS	C	D	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Driveway A at Lambert Road

Control Type:	Signalized	Delay (sec / veh):	5.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.397

Intersection Setup

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway A			Driveway A			Lambert Road			Lambert Road		
Base Volume Input [veh/h]	77	0	4	15	0	22	37	1572	109	5	804	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	0	4	15	0	22	37	1572	109	5	804	25
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	0	1	4	0	6	9	393	27	1	201	6
Total Analysis Volume [veh/h]	77	0	4	15	0	22	37	1572	109	5	804	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	35	0	10	45	0	10	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	11	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	5	5	4	72	72	1	69	69
g / C, Green / Cycle	0.06	0.06	0.06	0.06	0.04	0.80	0.80	0.01	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.04	0.00	0.01	0.01	0.02	0.29	0.30	0.00	0.14	0.15
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	3800	1900	1800	3800	1900
c, Capacity [veh/h]	133	112	149	112	75	3035	1517	16	2912	1456
d1, Uniform Delay [s]	41.65	39.95	40.20	40.34	42.24	2.58	2.60	44.33	2.87	2.89
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.92	0.13	0.29	0.85	5.02	0.34	0.71	10.03	0.14	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.04	0.10	0.20	0.50	0.37	0.37	0.30	0.19	0.19
d, Delay for Lane Group [s/veh]	45.57	40.08	40.50	41.18	47.26	2.93	3.31	54.36	3.01	3.19
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.81	0.09	0.32	0.49	0.90	1.82	2.01	0.16	0.99	1.10
50th-Percentile Queue Length [ft/ln]	45.18	2.17	8.12	12.16	22.53	45.45	50.27	3.89	24.80	27.40
95th-Percentile Queue Length [veh/ln]	3.25	0.16	0.58	0.88	1.62	3.27	3.62	0.28	1.79	1.97
95th-Percentile Queue Length [ft/ln]	81.32	3.91	14.61	21.88	40.55	81.81	90.49	7.00	44.64	49.31

Movement, Approach, & Intersection Results

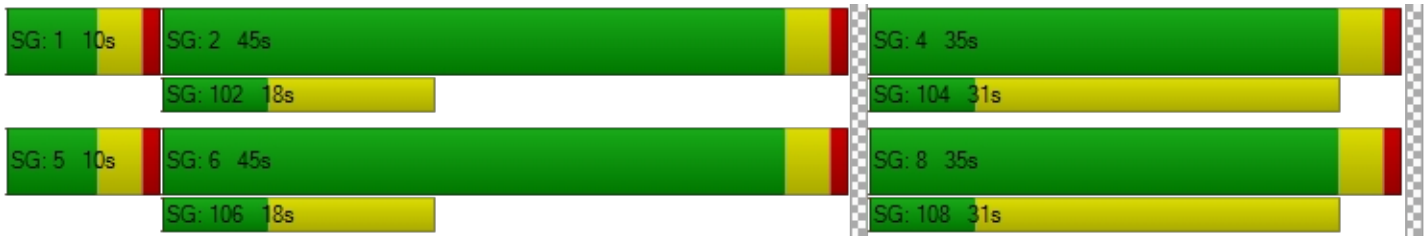
d_M, Delay for Movement [s/veh]	45.57	40.08	40.08	40.50	41.18	41.18	47.26	3.04	3.31	54.36	3.07	3.19
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	45.30			40.90			4.01			3.38		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.58											
Intersection LOS	A											
Intersection V/C	0.397											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	2.003	1.972	3.068	2.953
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	689	689	911	911
d_b, Bicycle Delay [s]	19.35	19.35	13.35	13.35
l_b,int, Bicycle LOS Score for Intersection	1.693	1.621	2.505	2.018
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.510

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	359	10	10	218	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	6	6	0	6	6	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	13	51	0	10	48	0	0	29	0	0	29	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	18	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	L	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	69	69	4	68	68	5	5	5	5
g / C, Green / Cycle	0.06	0.77	0.77	0.04	0.76	0.76	0.05	0.05	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.39	0.39	0.02	0.23	0.23	0.00	0.03	0.01	0.01
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1800	1900	1800	1900
c, Capacity [veh/h]	105	1463	1463	79	1436	1436	121	101	91	101
d1, Uniform Delay [s]	41.73	3.91	3.90	42.11	3.50	3.49	40.47	41.61	40.93	40.90
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.63	1.26	1.24	5.17	0.55	0.55	0.11	4.74	1.52	1.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.51	0.50	0.52	0.31	0.31	0.03	0.56	0.26	0.24
d, Delay for Lane Group [s/veh]	51.37	5.17	5.14	47.28	4.05	4.04	40.58	46.35	42.44	42.11
Lane Group LOS	D	A	A	D	A	A	D	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.89	3.14	3.11	0.97	1.66	1.66	0.09	1.35	0.55	0.55
50th-Percentile Queue Length [ft/ln]	47.22	78.48	77.65	24.19	41.53	41.40	2.20	33.66	13.75	13.63
95th-Percentile Queue Length [veh/ln]	3.40	5.65	5.59	1.74	2.99	2.98	0.16	2.42	0.99	0.98
95th-Percentile Queue Length [ft/ln]	85.00	141.26	139.76	43.54	74.76	74.52	3.96	60.59	24.76	24.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.37	5.15	5.14	47.28	4.05	4.04	40.58	46.35	46.35	42.44	42.11	42.11
Movement LOS	D	A	A	D	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	7.44			5.97			45.97			42.28		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.46											
Intersection LOS	A											
Intersection V/C	0.510											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	3.067	3.003	1.978	1.975
Crosswalk LOS	C	C	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1044	978	555	555
d_b, Bicycle Delay [s]	10.28	11.76	23.48	23.48
l_b,int, Bicycle LOS Score for Intersection	2.842	2.319	1.659	1.639
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: Rose Drive at Driveway C

Control Type:	Signalized	Delay (sec / veh):	3.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.443

Intersection Setup

Name	Rose Drive		Rose Drive		Driveway C	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		Yes		Yes	

Volumes

Name	Rose Drive		Rose Drive		Driveway C	
Base Volume Input [veh/h]	1412	47	75	1250	28	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1412	47	75	1250	28	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	353	12	19	313	7	11
Total Analysis Volume [veh/h]	1412	47	75	1250	28	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal Group	6	0	0	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	6	0	0	6	6	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	71	0	0	71	29	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	11	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	R
C, Cycle Length [s]	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	87	87	87	87	5	5
g / C, Green / Cycle	0.87	0.87	0.87	0.87	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.38	0.38	0.04	0.33	0.02	0.02
s, saturation flow rate [veh/h]	1900	1900	1800	3800	1800	1900
c, Capacity [veh/h]	1649	1649	1437	3297	94	99
d1, Uniform Delay [s]	1.42	1.42	0.91	1.30	45.59	45.94
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.86	0.86	0.07	0.33	1.74	3.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.44	0.44	0.05	0.38	0.30	0.44
d, Delay for Lane Group [s/veh]	2.28	2.28	0.98	1.64	47.32	49.01
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.79	0.79	0.05	0.46	0.72	1.15
50th-Percentile Queue Length [ft/ln]	19.69	19.69	1.34	11.52	17.96	28.77
95th-Percentile Queue Length [veh/ln]	1.42	1.42	0.10	0.83	1.29	2.07
95th-Percentile Queue Length [ft/ln]	35.44	35.44	2.40	20.74	32.33	51.78

Movement, Approach, & Intersection Results

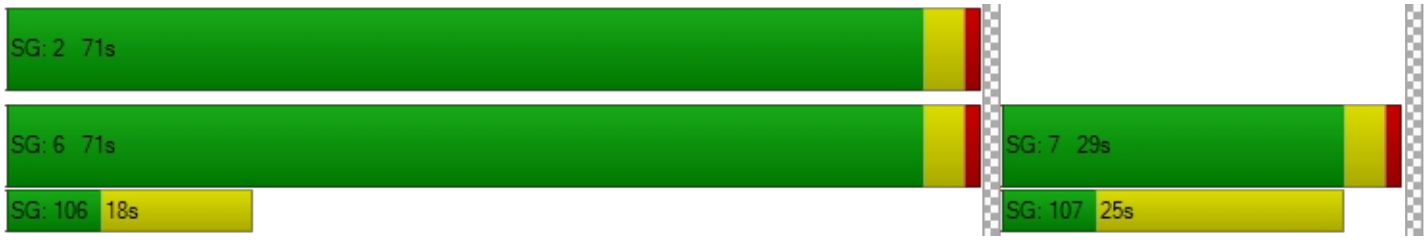
d_M, Delay for Movement [s/veh]	2.28	2.28	0.98	1.64	47.32	49.01
Movement LOS	A	A	A	A	D	D
d_A, Approach Delay [s/veh]	2.28		1.60		48.36	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.13					
Intersection LOS	A					
Intersection V/C	0.443					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.59	39.59
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.028	2.104
Crosswalk LOS	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1340	1340	500
d_b, Bicycle Delay [s]	5.44	5.44	28.11
l_b,int, Bicycle LOS Score for Intersection	2.763	2.653	1.560
Bicycle LOS	C	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX H-IV

YEAR 2045 PLUS PROJECT WITH MITIGATION TRAFFIC CONDITIONS

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APPENDIX I

PROJECT DRIVEWAY B PHASED ANALYSIS

APPENDIX I-I

ZONE 2 ONLY (TRAFFIC SIGNAL) - ICU

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.698

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	33	673	1992	2	3	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	673	1992	2	3	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	168	498	1	1	18
Total Analysis Volume [veh/h]	33	673	1992	2	3	71
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.20	0.59	0.59	0.00	0.04
Intersection LOS	B					
Intersection V/C	0.698					

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.482

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	77	1356	809	6	4	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1356	809	6	4	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	339	202	2	1	14
Total Analysis Volume [veh/h]	77	1356	809	6	4	56
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.40	0.24	0.24	0.00	0.03
Intersection LOS	A					
Intersection V/C	0.482					

APPENDIX I-II

ZONE 2 ONLY (TRAFFIC SIGNAL) - ICU

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.727

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	33	705	2091	2	3	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	705	2091	2	3	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	176	523	1	1	18
Total Analysis Volume [veh/h]	33	705	2091	2	3	71
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.21	0.62	0.62	0.00	0.04
Intersection LOS	C					
Intersection V/C	0.727					

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.501

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	77	1422	849	6	4	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1422	849	6	4	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	356	212	2	1	14
Total Analysis Volume [veh/h]	77	1422	849	6	4	56
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.42	0.25	0.25	0.00	0.03
Intersection LOS	A					
Intersection V/C	0.501					

APPENDIX I-III

ZONES 2 AND 3 (TRAFFIC SIGNAL) - ICU

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

SEE APPENDIX G

APPENDIX I-IV

ZONES 2 AND 3 (TRAFFIC SIGNAL) - ICU

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

SEE APPENDIX G

APPENDIX I-V

ZONE 2 ONLY (ONE-WAY STOP CONTROL) - HCM

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	169.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.121

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	33	673	1992	2	3	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	673	1992	2	3	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	168	498	1	1	18
Total Analysis Volume [veh/h]	33	673	1992	2	3	71
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.01	0.02	0.00	0.12	0.29
d_M, Delay for Movement [s/veh]	19.31	0.00	0.00	0.00	169.81	25.86
Movement LOS	C	A	A	A	F	D
95th-Percentile Queue Length [veh/ln]	0.39	0.00	0.00	0.00	0.37	1.18
95th-Percentile Queue Length [ft/ln]	9.72	0.00	0.00	0.00	9.13	29.42
d_A, Approach Delay [s/veh]	0.90		0.00		31.70	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	1.08					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	51.2
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.049

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	77	1356	809	6	4	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1356	809	6	4	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	339	202	2	1	14
Total Analysis Volume [veh/h]	77	1356	809	6	4	56
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.01	0.01	0.00	0.05	0.09
d_M, Delay for Movement [s/veh]	9.92	0.00	0.00	0.00	51.24	11.70
Movement LOS	A	A	A	A	F	B
95th-Percentile Queue Length [veh/ln]	0.31	0.00	0.00	0.00	0.15	0.31
95th-Percentile Queue Length [ft/ln]	7.87	0.00	0.00	0.00	3.80	7.79
d_A, Approach Delay [s/veh]	0.53		0.00		14.34	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.70					
Intersection LOS	F					

APPENDIX I-VI

ZONE 2 ONLY (ONE-WAY STOP CONTROL) - HCM

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	210.5
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.148

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	33	705	2091	2	3	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	705	2091	2	3	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	176	523	1	1	18
Total Analysis Volume [veh/h]	33	705	2091	2	3	71
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.01	0.02	0.00	0.15	0.32
d_M, Delay for Movement [s/veh]	20.84	0.00	0.00	0.00	210.54	28.23
Movement LOS	C	A	A	A	F	D
95th-Percentile Queue Length [veh/ln]	0.43	0.00	0.00	0.00	0.43	1.30
95th-Percentile Queue Length [ft/ln]	10.74	0.00	0.00	0.00	10.82	32.43
d_A, Approach Delay [s/veh]	0.93		0.00		35.62	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	1.14					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	57.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.055

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	77	1422	849	6	4	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1422	849	6	4	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	356	212	2	1	14
Total Analysis Volume [veh/h]	77	1422	849	6	4	56
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.01	0.01	0.00	0.05	0.10
d_M, Delay for Movement [s/veh]	10.12	0.00	0.00	0.00	57.26	11.93
Movement LOS	B	A	A	A	F	B
95th-Percentile Queue Length [veh/ln]	0.33	0.00	0.00	0.00	0.17	0.32
95th-Percentile Queue Length [ft/ln]	8.18	0.00	0.00	0.00	4.27	8.04
d_A, Approach Delay [s/veh]	0.52		0.00		14.95	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.69					
Intersection LOS	F					

APPENDIX I-VII

ZONE 2 ONLY (TRAFFIC SIGNAL) - HCM

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	7.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	33	673	1992	2	3	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	673	1992	2	3	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	168	498	1	1	18
Total Analysis Volume [veh/h]	33	673	1992	2	3	71
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	10	61	51	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	11	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	77	69	69	5	5
g / C, Green / Cycle	0.04	0.85	0.77	0.77	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.02	0.18	0.52	0.52	0.00	0.04
s, saturation flow rate [veh/h]	1800	3800	1900	1900	1800	1900
c, Capacity [veh/h]	70	3245	1464	1464	103	109
d1, Uniform Delay [s]	42.39	1.17	4.98	4.98	40.08	41.56
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.93	0.15	2.58	2.58	0.11	6.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.47	0.21	0.68	0.68	0.03	0.65
d, Delay for Lane Group [s/veh]	47.32	1.31	7.55	7.55	40.19	47.99
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.78	0.10	5.54	5.54	0.07	1.74
50th-Percentile Queue Length [ft/ln]	19.60	2.41	138.39	138.39	1.65	43.45
95th-Percentile Queue Length [veh/ln]	1.41	0.17	9.39	9.39	0.12	3.13
95th-Percentile Queue Length [ft/ln]	35.29	4.35	234.85	234.85	2.98	78.22

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.32	1.31	7.55	7.55	40.19	47.99
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	3.46		7.55		47.68	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	7.58					
Intersection LOS	A					
Intersection V/C	0.670					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	3.109	0.000	1.969
Crosswalk LOS	C	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1266	1044	555
d_b, Bicycle Delay [s]	6.06	10.28	23.48
l_b,int, Bicycle LOS Score for Intersection	2.142	3.205	1.560
Bicycle LOS	B	C	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	5.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.446

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	77	1356	809	6	4	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1356	809	6	4	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	339	202	2	1	14
Total Analysis Volume [veh/h]	77	1356	809	6	4	56
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	11	61	50	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	11	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	77	68	68	5	5
g / C, Green / Cycle	0.06	0.86	0.76	0.76	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.36	0.21	0.21	0.00	0.03
s, saturation flow rate [veh/h]	1800	3800	1900	1900	1800	1900
c, Capacity [veh/h]	105	3261	1436	1436	95	101
d1, Uniform Delay [s]	41.73	1.41	3.42	3.42	40.47	41.61
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.63	0.39	0.50	0.50	0.18	4.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.42	0.28	0.28	0.04	0.56
d, Delay for Lane Group [s/veh]	51.37	1.80	3.92	3.92	40.65	46.35
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.89	0.18	1.50	1.50	0.09	1.35
50th-Percentile Queue Length [ft/ln]	47.22	4.44	37.57	37.57	2.23	33.66
95th-Percentile Queue Length [veh/ln]	3.40	0.32	2.71	2.71	0.16	2.42
95th-Percentile Queue Length [ft/ln]	85.00	8.00	67.63	67.63	4.01	60.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.37	1.80	3.92	3.92	40.65	46.35
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	4.46		3.92		45.97	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	5.35					
Intersection LOS	A					
Intersection V/C	0.446					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	2.972	0.000	1.978
Crosswalk LOS	C	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1266	1022	555
d_b, Bicycle Delay [s]	6.06	10.76	23.48
l_b,int, Bicycle LOS Score for Intersection	2.742	2.232	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX I-VIII

ZONE 2 ONLY (TRAFFIC SIGNAL) - HCM

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	7.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.694

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	33	705	2091	2	3	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	705	2091	2	3	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	176	523	1	1	18
Total Analysis Volume [veh/h]	33	705	2091	2	3	71
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	10	66	56	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	11	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	82	74	74	5	5
g / C, Green / Cycle	0.04	0.86	0.78	0.78	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.02	0.19	0.55	0.55	0.00	0.04
s, saturation flow rate [veh/h]	1800	3800	1900	1900	1800	1900
c, Capacity [veh/h]	67	3272	1485	1485	98	104
d1, Uniform Delay [s]	44.85	1.13	5.04	5.04	42.52	44.10
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.47	0.15	2.83	2.83	0.12	7.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.49	0.22	0.70	0.70	0.03	0.68
d, Delay for Lane Group [s/veh]	50.33	1.28	7.87	7.87	42.64	51.74
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.84	0.11	6.25	6.25	0.07	1.87
50th-Percentile Queue Length [ft/ln]	20.91	2.74	156.28	156.28	1.76	46.63
95th-Percentile Queue Length [veh/ln]	1.51	0.20	10.35	10.35	0.13	3.36
95th-Percentile Queue Length [ft/ln]	37.64	4.93	258.79	258.79	3.17	83.94

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	50.33	1.28	7.87	7.87	42.64	51.74
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	3.47		7.87		51.38	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	7.86					
Intersection LOS	A					
Intersection V/C	0.694					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	0.00	37.14
l_p,int, Pedestrian LOS Score for Intersection	3.150	0.000	1.972
Crosswalk LOS	C	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1305	1095	526
d_b, Bicycle Delay [s]	5.73	9.73	25.79
l_b,int, Bicycle LOS Score for Intersection	2.168	3.286	1.560
Bicycle LOS	B	C	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Signalized	Delay (sec / veh):	5.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.466

Intersection Setup

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	Valencia Avenue		Valencia Avenue		Driveway B	
Base Volume Input [veh/h]	77	1422	849	6	4	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1422	849	6	4	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	356	212	2	1	14
Total Analysis Volume [veh/h]	77	1422	849	6	4	56
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	11	61	50	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	11	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	77	68	68	5	5
g / C, Green / Cycle	0.06	0.86	0.76	0.76	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.37	0.23	0.23	0.00	0.03
s, saturation flow rate [veh/h]	1800	3800	1900	1900	1800	1900
c, Capacity [veh/h]	105	3261	1436	1436	95	101
d1, Uniform Delay [s]	41.73	1.45	3.47	3.47	40.47	41.61
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.63	0.43	0.53	0.53	0.18	4.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.44	0.30	0.30	0.04	0.56
d, Delay for Lane Group [s/veh]	51.37	1.87	4.00	4.00	40.65	46.35
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.89	0.19	1.60	1.60	0.09	1.35
50th-Percentile Queue Length [ft/ln]	47.22	4.82	39.99	39.99	2.23	33.66
95th-Percentile Queue Length [veh/ln]	3.40	0.35	2.88	2.88	0.16	2.42
95th-Percentile Queue Length [ft/ln]	85.00	8.68	71.97	71.97	4.01	60.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.37	1.87	4.00	4.00	40.65	46.35
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	4.41		4.00		45.97	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	5.30					
Intersection LOS	A					
Intersection V/C	0.466					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	34.68
l_p,int, Pedestrian LOS Score for Intersection	3.003	0.000	1.978
Crosswalk LOS	C	F	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1266	1022	555
d_b, Bicycle Delay [s]	6.06	10.76	23.48
l_b,int, Bicycle LOS Score for Intersection	2.796	2.265	1.560
Bicycle LOS	C	B	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX I-IX

ZONES 2 AND 3 (TWO-WAY STOP CONTROL) - HCM

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	382.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.118

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	695	13	13	2000	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	695	13	13	2000	2	3	0	71	36	0	36
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	174	3	3	500	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	695	13	13	2000	2	3	0	71	36	0	36
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.01	0.00	0.01	0.02	0.00	0.22	0.00	0.29	1.12	0.00	0.06
d_M, Delay for Movement [s/veh]	19.43	0.00	0.00	9.12	0.00	0.00	328.42	240.13	26.04	382.01	232.46	10.94
Movement LOS	C	A	A	A	A	A	F	F	D	F	F	B
95th-Percentile Queue Length [veh/ln]	0.39	0.00	0.00	0.04	0.00	0.00	0.58	1.19	1.19	3.92	0.18	0.18
95th-Percentile Queue Length [ft/ln]	9.80	0.00	0.00	1.12	0.00	0.00	14.58	29.65	29.65	97.99	4.44	4.44
d_A, Approach Delay [s/veh]	0.87			0.06			38.30			196.47		
Approach LOS	A			A			E			F		
d_I, Intersection Delay [s/veh]	6.11											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	375.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.938

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	1371	41	41	833	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1371	41	41	833	6	4	0	56	24	0	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	343	10	10	208	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	1371	41	41	833	6	4	0	56	24	0	24
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.01	0.00	0.09	0.01	0.00	0.09	0.00	0.10	0.94	0.00	0.06
d_M, Delay for Movement [s/veh]	10.04	0.00	0.00	13.22	0.00	0.00	95.39	155.74	11.84	375.86	151.87	15.16
Movement LOS	B	A	A	B	A	A	F	F	B	F	F	C
95th-Percentile Queue Length [veh/ln]	0.32	0.00	0.00	0.28	0.00	0.00	0.29	0.32	0.32	2.90	0.20	0.20
95th-Percentile Queue Length [ft/ln]	8.05	0.00	0.00	6.99	0.00	0.00	7.14	7.94	7.94	72.56	5.06	5.06
d_A, Approach Delay [s/veh]	0.52			0.62			17.41			195.51		
Approach LOS	A			A			C			F		
d_I, Intersection Delay [s/veh]	4.74											
Intersection LOS	F											

APPENDIX I-X

ZONES 2 AND 3 (TWO-WAY STOP CONTROL) - HCM

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	513.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.346

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	33	727	13	13	2099	2	3	0	71	36	0	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	727	13	13	2099	2	3	0	71	36	0	36
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	182	3	3	525	1	1	0	18	9	0	9
Total Analysis Volume [veh/h]	33	727	13	13	2099	2	3	0	71	36	0	36
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.01	0.00	0.02	0.02	0.00	0.27	0.00	0.32	1.35	0.00	0.06
d_M, Delay for Movement [s/veh]	20.97	0.00	0.00	9.24	0.00	0.00	423.43	295.28	28.44	513.26	285.95	11.09
Movement LOS	C	A	A	A	A	A	F	F	D	F	F	B
95th-Percentile Queue Length [veh/ln]	0.43	0.00	0.00	0.05	0.00	0.00	0.67	1.31	1.31	4.30	0.18	0.18
95th-Percentile Queue Length [ft/ln]	10.82	0.00	0.00	1.15	0.00	0.00	16.74	32.69	32.69	107.44	4.56	4.56
d_A, Approach Delay [s/veh]	0.90			0.06			44.45			262.17		
Approach LOS	A			A			E			F		
d_I, Intersection Delay [s/veh]	7.58											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 25: Valencia Avenue at Driveway B

Control Type:	Two-way stop	Delay (sec / veh):	480.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.103

Intersection Setup

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Valencia Avenue			Valencia Avenue			Driveway B			Driveway B		
Base Volume Input [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	359	10	10	218	2	1	0	14	6	0	6
Total Analysis Volume [veh/h]	77	1437	41	41	873	6	4	0	56	24	0	24
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.01	0.00	0.09	0.01	0.00	0.10	0.00	0.10	1.10	0.00	0.07
d_M, Delay for Movement [s/veh]	10.24	0.00	0.00	13.77	0.00	0.00	110.19	183.19	12.07	480.93	178.62	15.72
Movement LOS	B	A	A	B	A	A	F	F	B	F	F	C
95th-Percentile Queue Length [veh/ln]	0.33	0.00	0.00	0.30	0.00	0.00	0.33	0.33	0.33	3.14	0.21	0.21
95th-Percentile Queue Length [ft/ln]	8.37	0.00	0.00	7.45	0.00	0.00	8.17	8.20	8.20	78.57	5.33	5.33
d_A, Approach Delay [s/veh]	0.51			0.61			18.61			248.33		
Approach LOS	A			A			C			F		
d_I, Intersection Delay [s/veh]	5.57											
Intersection LOS	F											

APPENDIX I-XI

ZONES 2 AND 3 (TRAFFIC SIGNAL) - HCM

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

SEE APPENDIX H

APPENDIX I-XII

ZONES 2 AND 3 (TRAFFIC SIGNAL) - HCM

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

SEE APPENDIX H

APPENDIX I-XIII

ZONE 2 ONLY (ONE-WAY STOP CONTROL) – SIGNAL WARRANT

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	706	1994	74
2	685	1934	72
3	671	1894	70
4	628	1775	66
5	558	1575	58
6	551	1555	58
7	544	1535	57
8	494	1396	52
9	487	1376	51
10	480	1356	50
11	417	1176	44
12	388	1097	41
13	381	1077	40
14	282	798	30
15	282	798	30
16	198	558	21
17	113	319	12
18	113	319	12
19	64	179	7
20	35	100	4
21	21	60	2
22	7	20	1
23	7	20	1
24	7	20	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2700	2	74	No	No	No	No	No	No	Yes	Yes	No	No
2	3	2619	2	72	No	No	No	No	No	No	Yes	Yes	No	No
3	3	2565	2	70	No	No	No	No	No	No	Yes	Yes	No	No
4	3	2403	2	66	No	No	No	No	No	No	No	Yes	No	No
5	3	2133	2	58	No	No	No	No	No	No	No	Yes	No	No
6	3	2106	2	58	No	No	No	No	No	No	No	Yes	No	No
7	3	2079	2	57	No	No	No	No	No	No	No	Yes	No	No
8	3	1890	2	52	No	No	No	No	No	No	No	No	No	No
9	3	1863	2	51	No	No	No	No	No	No	No	No	No	No
10	3	1836	2	50	No	No	No	No	No	No	No	No	No	No
11	3	1593	2	44	No	No	No	No	No	No	No	No	No	No
12	3	1485	2	41	No	No	No	No	No	No	No	No	No	No
13	3	1458	2	40	No	No	No	No	No	No	No	No	No	No
14	3	1080	2	30	No	No	No	No	No	No	No	No	No	No
15	3	1080	2	30	No	No	No	No	No	No	No	No	No	No
16	3	756	2	21	No	No	No	No	No	No	No	No	No	No
17	3	432	2	12	No	No	No	No	No	No	No	No	No	No
18	3	432	2	12	No	No	No	No	No	No	No	No	No	No
19	3	243	2	7	No	No	No	No	No	No	No	No	No	No
20	3	135	2	4	No	No	No	No	No	No	No	No	No	No
21	3	81	2	2	No	No	No	No	No	No	No	No	No	No
22	3	27	2	1	No	No	No	No	No	No	No	No	No	No
23	3	27	2	1	No	No	No	No	No	No	No	No	No	No
24	3	27	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	3	7	0	0

Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	31.7
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:39
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	74
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2774
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	1433	815	60
2	1390	791	58
3	1361	774	57
4	1275	725	53
5	1132	644	47
6	1118	636	47
7	1103	628	46
8	1003	571	42
9	989	562	41
10	974	554	41
11	845	481	35
12	788	448	33
13	774	440	32
14	573	326	24
15	573	326	24
16	401	228	17
17	229	130	10
18	229	130	10
19	129	73	5
20	72	41	3
21	43	24	2
22	14	8	1
23	14	8	1
24	14	8	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2248	2	60	No	No	No	No	No	No	No	Yes	No	No
2	3	2181	2	58	No	No	No	No	No	No	No	Yes	No	No
3	3	2135	2	57	No	No	No	No	No	No	No	Yes	No	No
4	3	2000	2	53	No	No	No	No	No	No	No	No	No	No
5	3	1776	2	47	No	No	No	No	No	No	No	No	No	No
6	3	1754	2	47	No	No	No	No	No	No	No	No	No	No
7	3	1731	2	46	No	No	No	No	No	No	No	No	No	No
8	3	1574	2	42	No	No	No	No	No	No	No	No	No	No
9	3	1551	2	41	No	No	No	No	No	No	No	No	No	No
10	3	1528	2	41	No	No	No	No	No	No	No	No	No	No
11	3	1326	2	35	No	No	No	No	No	No	No	No	No	No
12	3	1236	2	33	No	No	No	No	No	No	No	No	No	No
13	3	1214	2	32	No	No	No	No	No	No	No	No	No	No
14	3	899	2	24	No	No	No	No	No	No	No	No	No	No
15	3	899	2	24	No	No	No	No	No	No	No	No	No	No
16	3	629	2	17	No	No	No	No	No	No	No	No	No	No
17	3	359	2	10	No	No	No	No	No	No	No	No	No	No
18	3	359	2	10	No	No	No	No	No	No	No	No	No	No
19	3	202	2	5	No	No	No	No	No	No	No	No	No	No
20	3	113	2	3	No	No	No	No	No	No	No	No	No	No
21	3	67	2	2	No	No	No	No	No	No	No	No	No	No
22	3	22	2	1	No	No	No	No	No	No	No	No	No	No
23	3	22	2	1	No	No	No	No	No	No	No	No	No	No
24	3	22	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	14.3
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:14
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	60
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2308
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

APPENDIX I-XIV

ZONE 2 ONLY (ONE-WAY STOP CONTROL) – SIGNAL WARRANT

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	738	2093	74
2	716	2030	72
3	701	1988	70
4	657	1863	66
5	583	1653	58
6	576	1633	58
7	568	1612	57
8	517	1465	52
9	509	1444	51
10	502	1423	50
11	435	1235	44
12	406	1151	41
13	399	1130	40
14	295	837	30
15	295	837	30
16	207	586	21
17	118	335	12
18	118	335	12
19	66	188	7
20	37	105	4
21	22	63	2
22	7	21	1
23	7	21	1
24	7	21	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2831	2	74	No	No	No	No	No	No	Yes	Yes	No	No
2	3	2746	2	72	No	No	No	No	No	No	Yes	Yes	No	No
3	3	2689	2	70	No	No	No	No	No	No	Yes	Yes	No	No
4	3	2520	2	66	No	No	No	No	No	No	No	Yes	No	No
5	3	2236	2	58	No	No	No	No	No	No	No	Yes	No	No
6	3	2209	2	58	No	No	No	No	No	No	No	Yes	No	No
7	3	2180	2	57	No	No	No	No	No	No	No	Yes	No	No
8	3	1982	2	52	No	No	No	No	No	No	No	No	No	No
9	3	1953	2	51	No	No	No	No	No	No	No	No	No	No
10	3	1925	2	50	No	No	No	No	No	No	No	No	No	No
11	3	1670	2	44	No	No	No	No	No	No	No	No	No	No
12	3	1557	2	41	No	No	No	No	No	No	No	No	No	No
13	3	1529	2	40	No	No	No	No	No	No	No	No	No	No
14	3	1132	2	30	No	No	No	No	No	No	No	No	No	No
15	3	1132	2	30	No	No	No	No	No	No	No	No	No	No
16	3	793	2	21	No	No	No	No	No	No	No	No	No	No
17	3	453	2	12	No	No	No	No	No	No	No	No	No	No
18	3	453	2	12	No	No	No	No	No	No	No	No	No	No
19	3	254	2	7	No	No	No	No	No	No	No	No	No	No
20	3	142	2	4	No	No	No	No	No	No	No	No	No	No
21	3	85	2	2	No	No	No	No	No	No	No	No	No	No
22	3	28	2	1	No	No	No	No	No	No	No	No	No	No
23	3	28	2	1	No	No	No	No	No	No	No	No	No	No
24	3	28	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	3	7	0	0

Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	35.6
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:43
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	74
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2905
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	1499	855	60
2	1454	829	58
3	1424	812	57
4	1334	761	53
5	1184	675	47
6	1169	667	47
7	1154	658	46
8	1049	599	42
9	1034	590	41
10	1019	581	41
11	884	504	35
12	824	470	33
13	809	462	32
14	600	342	24
15	600	342	24
16	420	239	17
17	240	137	10
18	240	137	10
19	135	77	5
20	75	43	3
21	45	26	2
22	15	9	1
23	15	9	1
24	15	9	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2354	2	60	No	No	No	No	No	No	No	Yes	No	No
2	3	2283	2	58	No	No	No	No	No	No	No	Yes	No	No
3	3	2236	2	57	No	No	No	No	No	No	No	Yes	No	No
4	3	2095	2	53	No	No	No	No	No	No	No	No	No	No
5	3	1859	2	47	No	No	No	No	No	No	No	No	No	No
6	3	1836	2	47	No	No	No	No	No	No	No	No	No	No
7	3	1812	2	46	No	No	No	No	No	No	No	No	No	No
8	3	1648	2	42	No	No	No	No	No	No	No	No	No	No
9	3	1624	2	41	No	No	No	No	No	No	No	No	No	No
10	3	1600	2	41	No	No	No	No	No	No	No	No	No	No
11	3	1388	2	35	No	No	No	No	No	No	No	No	No	No
12	3	1294	2	33	No	No	No	No	No	No	No	No	No	No
13	3	1271	2	32	No	No	No	No	No	No	No	No	No	No
14	3	942	2	24	No	No	No	No	No	No	No	No	No	No
15	3	942	2	24	No	No	No	No	No	No	No	No	No	No
16	3	659	2	17	No	No	No	No	No	No	No	No	No	No
17	3	377	2	10	No	No	No	No	No	No	No	No	No	No
18	3	377	2	10	No	No	No	No	No	No	No	No	No	No
19	3	212	2	5	No	No	No	No	No	No	No	No	No	No
20	3	118	2	3	No	No	No	No	No	No	No	No	No	No
21	3	71	2	2	No	No	No	No	No	No	No	No	No	No
22	3	24	2	1	No	No	No	No	No	No	No	No	No	No
23	3	24	2	1	No	No	No	No	No	No	No	No	No	No
24	3	24	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	15
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:14
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	60
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2414
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

APPENDIX I-XV

ZONES 2 AND 3 (TWO-WAY STOP CONTROL) – SIGNAL WARRANT

YEAR 2035 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E, W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	S	N	E	W
1	741	2015	72	74
2	719	1955	70	72
3	704	1914	68	70
4	659	1793	64	66
5	585	1592	57	58
6	578	1572	56	58
7	571	1552	55	57
8	519	1411	50	52
9	511	1390	50	51
10	504	1370	49	50
11	437	1189	42	44
12	408	1108	40	41
13	400	1088	39	40
14	296	806	29	30
15	296	806	29	30
16	207	564	20	21
17	119	322	12	12
18	119	322	12	12
19	67	181	6	7
20	37	101	4	4
21	22	60	2	2
22	7	20	1	1
23	7	20	1	1
24	7	20	1	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2756	2	74	No	No	No	No	No	No	Yes	Yes	No	No
2	3	2674	2	72	No	No	No	No	No	No	Yes	Yes	No	No
3	3	2618	2	70	No	No	No	No	No	No	Yes	Yes	No	No
4	3	2452	2	66	No	No	No	No	No	No	No	Yes	No	No
5	3	2177	2	58	No	No	No	No	No	No	No	Yes	No	No
6	3	2150	2	58	No	No	No	No	No	No	No	Yes	No	No
7	3	2123	2	57	No	No	No	No	No	No	No	Yes	No	No
8	3	1930	2	52	No	No	No	No	No	No	No	No	No	No
9	3	1901	2	51	No	No	No	No	No	No	No	No	No	No
10	3	1874	2	50	No	No	No	No	No	No	No	No	No	No
11	3	1626	2	44	No	No	No	No	No	No	No	No	No	No
12	3	1516	2	41	No	No	No	No	No	No	No	No	No	No
13	3	1488	2	40	No	No	No	No	No	No	No	No	No	No
14	3	1102	2	30	No	No	No	No	No	No	No	No	No	No
15	3	1102	2	30	No	No	No	No	No	No	No	No	No	No
16	3	771	2	21	No	No	No	No	No	No	No	No	No	No
17	3	441	2	12	No	No	No	No	No	No	No	No	No	No
18	3	441	2	12	No	No	No	No	No	No	No	No	No	No
19	3	248	2	7	No	No	No	No	No	No	No	No	No	No
20	3	138	2	4	No	No	No	No	No	No	No	No	No	No
21	3	82	2	2	No	No	No	No	No	No	No	No	No	No
22	3	27	2	1	No	No	No	No	No	No	No	No	No	No
23	3	27	2	1	No	No	No	No	No	No	No	No	No	No
24	3	27	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	3	7	0	0

Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	196.5	38.3
Number of Lanes on Minor Street Approach	2	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	3:55	0:47
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	72	74
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	2902	2902
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E, W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	S	N	E	W
1	1489	880	48	60
2	1444	854	47	58
3	1415	836	46	57
4	1325	783	43	53
5	1176	695	38	47
6	1161	686	37	47
7	1147	678	37	46
8	1042	616	34	42
9	1027	607	33	41
10	1013	598	33	41
11	879	519	28	35
12	819	484	26	33
13	804	475	26	32
14	596	352	19	24
15	596	352	19	24
16	417	246	13	17
17	238	141	8	10
18	238	141	8	10
19	134	79	4	5
20	74	44	2	3
21	45	26	1	2
22	15	9	0	1
23	15	9	0	1
24	15	9	0	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2369	2	60	No	No	No	No	No	No	No	Yes	No	No
2	3	2298	2	58	No	No	No	No	No	No	No	Yes	No	No
3	3	2251	2	57	No	No	No	No	No	No	No	Yes	No	No
4	3	2108	2	53	No	No	No	No	No	No	No	No	No	No
5	3	1871	2	47	No	No	No	No	No	No	No	No	No	No
6	3	1847	2	47	No	No	No	No	No	No	No	No	No	No
7	3	1825	2	46	No	No	No	No	No	No	No	No	No	No
8	3	1658	2	42	No	No	No	No	No	No	No	No	No	No
9	3	1634	2	41	No	No	No	No	No	No	No	No	No	No
10	3	1611	2	41	No	No	No	No	No	No	No	No	No	No
11	3	1398	2	35	No	No	No	No	No	No	No	No	No	No
12	3	1303	2	33	No	No	No	No	No	No	No	No	No	No
13	3	1279	2	32	No	No	No	No	No	No	No	No	No	No
14	3	948	2	24	No	No	No	No	No	No	No	No	No	No
15	3	948	2	24	No	No	No	No	No	No	No	No	No	No
16	3	663	2	17	No	No	No	No	No	No	No	No	No	No
17	3	379	2	10	No	No	No	No	No	No	No	No	No	No
18	3	379	2	10	No	No	No	No	No	No	No	No	No	No
19	3	213	2	5	No	No	No	No	No	No	No	No	No	No
20	3	118	2	3	No	No	No	No	No	No	No	No	No	No
21	3	71	2	2	No	No	No	No	No	No	No	No	No	No
22	3	24	2	1	No	No	No	No	No	No	No	No	No	No
23	3	24	2	1	No	No	No	No	No	No	No	No	No	No
24	3	24	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	195.5	17.4
Number of Lanes on Minor Street Approach	2	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	2:36	0:17
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	48	60
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	2477	2477
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

APPENDIX I-XVI

ZONES 2 AND 3 (TWO-WAY STOP CONTROL) – SIGNAL WARRANT

YEAR 2045 PLUS PROJECT TRAFFIC CONDITIONS

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E, W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	S	N	E	W
1	773	2114	72	74
2	750	2051	70	72
3	734	2008	68	70
4	688	1881	64	66
5	611	1670	57	58
6	603	1649	56	58
7	595	1628	55	57
8	541	1480	50	52
9	533	1459	50	51
10	526	1438	49	50
11	456	1247	42	44
12	425	1163	40	41
13	417	1142	39	40
14	309	846	29	30
15	309	846	29	30
16	216	592	20	21
17	124	338	12	12
18	124	338	12	12
19	70	190	6	7
20	39	106	4	4
21	23	63	2	2
22	8	21	1	1
23	8	21	1	1
24	8	21	1	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2887	2	74	No	No	No	No	No	No	Yes	Yes	No	No
2	3	2801	2	72	No	No	No	No	No	No	Yes	Yes	No	No
3	3	2742	2	70	No	No	No	No	No	No	Yes	Yes	No	No
4	3	2569	2	66	No	No	No	No	No	No	No	Yes	No	No
5	3	2281	2	58	No	No	No	No	No	No	No	Yes	No	No
6	3	2252	2	58	No	No	No	No	No	No	No	Yes	No	No
7	3	2223	2	57	No	No	No	No	No	No	No	Yes	No	No
8	3	2021	2	52	No	No	No	No	No	No	No	No	No	No
9	3	1992	2	51	No	No	No	No	No	No	No	No	No	No
10	3	1964	2	50	No	No	No	No	No	No	No	No	No	No
11	3	1703	2	44	No	No	No	No	No	No	No	No	No	No
12	3	1588	2	41	No	No	No	No	No	No	No	No	No	No
13	3	1559	2	40	No	No	No	No	No	No	No	No	No	No
14	3	1155	2	30	No	No	No	No	No	No	No	No	No	No
15	3	1155	2	30	No	No	No	No	No	No	No	No	No	No
16	3	808	2	21	No	No	No	No	No	No	No	No	No	No
17	3	462	2	12	No	No	No	No	No	No	No	No	No	No
18	3	462	2	12	No	No	No	No	No	No	No	No	No	No
19	3	260	2	7	No	No	No	No	No	No	No	No	No	No
20	3	145	2	4	No	No	No	No	No	No	No	No	No	No
21	3	86	2	2	No	No	No	No	No	No	No	No	No	No
22	3	29	2	1	No	No	No	No	No	No	No	No	No	No
23	3	29	2	1	No	No	No	No	No	No	No	No	No	No
24	3	29	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	3	7	0	0

Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	262.2	44.5
Number of Lanes on Minor Street Approach	2	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	5:14	0:54
Delay Condition Met	Yes	No
Volume on Minor Street Approach During Same Hour	72	74
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	3033	3033
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection 25: Valencia Avenue at Driveway B

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E, W
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	S	N	E	W
1	1555	920	48	60
2	1508	892	47	58
3	1477	874	46	57
4	1384	819	43	53
5	1228	727	38	47
6	1213	718	37	47
7	1197	708	37	46
8	1089	644	34	42
9	1073	635	33	41
10	1057	626	33	41
11	917	543	28	35
12	855	506	26	33
13	840	497	26	32
14	622	368	19	24
15	622	368	19	24
16	435	258	13	17
17	249	147	8	10
18	249	147	8	10
19	140	83	4	5
20	78	46	2	3
21	47	28	1	2
22	16	9	0	1
23	16	9	0	1
24	16	9	0	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2475	2	60	No	No	No	No	No	No	No	Yes	No	No
2	3	2400	2	58	No	No	No	No	No	No	No	Yes	No	No
3	3	2351	2	57	No	No	No	No	No	No	No	Yes	No	No
4	3	2203	2	53	No	No	No	No	No	No	No	No	No	No
5	3	1955	2	47	No	No	No	No	No	No	No	No	No	No
6	3	1931	2	47	No	No	No	No	No	No	No	No	No	No
7	3	1905	2	46	No	No	No	No	No	No	No	No	No	No
8	3	1733	2	42	No	No	No	No	No	No	No	No	No	No
9	3	1708	2	41	No	No	No	No	No	No	No	No	No	No
10	3	1683	2	41	No	No	No	No	No	No	No	No	No	No
11	3	1460	2	35	No	No	No	No	No	No	No	No	No	No
12	3	1361	2	33	No	No	No	No	No	No	No	No	No	No
13	3	1337	2	32	No	No	No	No	No	No	No	No	No	No
14	3	990	2	24	No	No	No	No	No	No	No	No	No	No
15	3	990	2	24	No	No	No	No	No	No	No	No	No	No
16	3	693	2	17	No	No	No	No	No	No	No	No	No	No
17	3	396	2	10	No	No	No	No	No	No	No	No	No	No
18	3	396	2	10	No	No	No	No	No	No	No	No	No	No
19	3	223	2	5	No	No	No	No	No	No	No	No	No	No
20	3	124	2	3	No	No	No	No	No	No	No	No	No	No
21	3	75	2	2	No	No	No	No	No	No	No	No	No	No
22	3	25	2	1	No	No	No	No	No	No	No	No	No	No
23	3	25	2	1	No	No	No	No	No	No	No	No	No	No
24	3	25	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	248.3	18.6
Number of Lanes on Minor Street Approach	2	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	3:18	0:18
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	48	60
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	2583	2583
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

APPENDIX J

REDBAY AVENUE AT BIRCH STREET FOCUSED ASSESSMENT

APPENDIX J-I

EXISTING TRAFFIC CONDITIONS – SIGNAL WARRANT

Signal Warrants Report For Intersection 31: Redbay Avenue at Birch Street

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	1180	1137	65	65
2	1145	1103	63	63
3	1121	1080	62	62
4	1050	1012	58	58
5	932	898	51	51
6	920	887	51	51
7	909	875	50	50
8	826	796	46	46
9	814	785	45	45
10	802	773	44	44
11	696	671	38	38
12	649	625	36	36
13	637	614	35	35
14	472	455	26	26
15	472	455	26	26
16	330	318	18	18
17	189	182	10	10
18	189	182	10	10
19	106	102	6	6
20	59	57	3	3
21	35	34	2	2
22	12	11	1	1
23	12	11	1	1
24	12	11	1	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2317	1	65	No	No	No	No	No	Yes	Yes	Yes	Yes	No
2	3	2248	1	63	No	No	No	No	No	Yes	Yes	Yes	Yes	No
3	3	2201	1	62	No	No	No	No	No	Yes	Yes	Yes	Yes	No
4	3	2062	1	58	No	No	No	No	No	No	Yes	Yes	No	No
5	3	1830	1	51	No	No	No	No	No	No	No	Yes	No	No
6	3	1807	1	51	No	No	No	No	No	No	No	Yes	No	No
7	3	1784	1	50	No	No	No	No	No	No	No	Yes	No	No
8	3	1622	1	46	No	No	No	No	No	No	No	Yes	No	No
9	3	1599	1	45	No	No	No	No	No	No	No	Yes	No	No
10	3	1575	1	44	No	No	No	No	No	No	No	Yes	No	No
11	3	1367	1	38	No	No	No	No	No	No	No	No	No	No
12	3	1274	1	36	No	No	No	No	No	No	No	No	No	No
13	3	1251	1	35	No	No	No	No	No	No	No	No	No	No
14	3	927	1	26	No	No	No	No	No	No	No	No	No	No
15	3	927	1	26	No	No	No	No	No	No	No	No	No	No
16	3	648	1	18	No	No	No	No	No	No	No	No	No	No
17	3	371	1	10	No	No	No	No	No	No	No	No	No	No
18	3	371	1	10	No	No	No	No	No	No	No	No	No	No
19	3	208	1	6	No	No	No	No	No	No	No	No	No	No
20	3	116	1	3	No	No	No	No	No	No	No	No	No	No
21	3	69	1	2	No	No	No	No	No	No	No	No	No	No
22	3	23	1	1	No	No	No	No	No	No	No	No	No	No
23	3	23	1	1	No	No	No	No	No	No	No	No	No	No
24	3	23	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	3	4	10	3	0

Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	119.2	546.2
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	2:09	9:51
Delay Condition Met	No	Yes
Volume on Minor Street Approach During Same Hour	65	65
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	2447	2447
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection 31: Redbay Avenue at Birch Street

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	1595	1538	49	48
2	1547	1492	48	47
3	1515	1461	47	46
4	1420	1369	44	43
5	1260	1215	39	38
6	1244	1200	38	37
7	1228	1184	38	37
8	1117	1077	34	34
9	1101	1061	34	33
10	1085	1046	33	33
11	941	907	29	28
12	877	846	27	26
13	861	831	26	26
14	638	615	20	19
15	638	615	20	19
16	447	431	14	13
17	255	246	8	8
18	255	246	8	8
19	144	138	4	4
20	80	77	2	2
21	48	46	1	1
22	16	15	0	0
23	16	15	0	0
24	16	15	0	0

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	3133	1	49	No	No	No	No	No	No	No	Yes	No	No
2	3	3039	1	48	No	No	No	No	No	No	No	Yes	No	No
3	3	2976	1	47	No	No	No	No	No	No	No	Yes	No	No
4	3	2789	1	44	No	No	No	No	No	No	No	Yes	No	No
5	3	2475	1	39	No	No	No	No	No	No	No	No	No	No
6	3	2444	1	38	No	No	No	No	No	No	No	No	No	No
7	3	2412	1	38	No	No	No	No	No	No	No	No	No	No
8	3	2194	1	34	No	No	No	No	No	No	No	No	No	No
9	3	2162	1	34	No	No	No	No	No	No	No	No	No	No
10	3	2131	1	33	No	No	No	No	No	No	No	No	No	No
11	3	1848	1	29	No	No	No	No	No	No	No	No	No	No
12	3	1723	1	27	No	No	No	No	No	No	No	No	No	No
13	3	1692	1	26	No	No	No	No	No	No	No	No	No	No
14	3	1253	1	20	No	No	No	No	No	No	No	No	No	No
15	3	1253	1	20	No	No	No	No	No	No	No	No	No	No
16	3	878	1	14	No	No	No	No	No	No	No	No	No	No
17	3	501	1	8	No	No	No	No	No	No	No	No	No	No
18	3	501	1	8	No	No	No	No	No	No	No	No	No	No
19	3	282	1	4	No	No	No	No	No	No	No	No	No	No
20	3	157	1	2	No	No	No	No	No	No	No	No	No	No
21	3	94	1	1	No	No	No	No	No	No	No	No	No	No
22	3	31	1	0	No	No	No	No	No	No	No	No	No	No
23	3	31	1	0	No	No	No	No	No	No	No	No	No	No
24	3	31	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	4	0	0

Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	1035.8	644.4
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	14:05	8:35
Delay Condition Met	Yes	Yes
Volume on Minor Street Approach During Same Hour	49	48
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	3230	3230
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

APPENDIX J-II

EXISTING PLUS PROJECT TRAFFIC CONDITIONS – SIGNAL WARRANT

Signal Warrants Report For Intersection 31: Redbay Avenue at Birch Street

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	1207	1148	65	65
2	1171	1114	63	63
3	1147	1091	62	62
4	1074	1022	58	58
5	954	907	51	51
6	941	895	51	51
7	929	884	50	50
8	845	804	46	46
9	833	792	45	45
10	821	781	44	44
11	712	677	38	38
12	664	631	36	36
13	652	620	35	35
14	483	459	26	26
15	483	459	26	26
16	338	321	18	18
17	193	184	10	10
18	193	184	10	10
19	109	103	6	6
20	60	57	3	3
21	36	34	2	2
22	12	11	1	1
23	12	11	1	1
24	12	11	1	1

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	2355	1	65	No	No	No	No	No	Yes	Yes	Yes	Yes	No
2	3	2285	1	63	No	No	No	No	No	Yes	Yes	Yes	Yes	No
3	3	2238	1	62	No	No	No	No	No	Yes	Yes	Yes	Yes	No
4	3	2096	1	58	No	No	No	No	No	No	Yes	Yes	No	No
5	3	1861	1	51	No	No	No	No	No	No	No	Yes	No	No
6	3	1836	1	51	No	No	No	No	No	No	No	Yes	No	No
7	3	1813	1	50	No	No	No	No	No	No	No	Yes	No	No
8	3	1649	1	46	No	No	No	No	No	No	No	Yes	No	No
9	3	1625	1	45	No	No	No	No	No	No	No	Yes	No	No
10	3	1602	1	44	No	No	No	No	No	No	No	Yes	No	No
11	3	1389	1	38	No	No	No	No	No	No	No	No	No	No
12	3	1295	1	36	No	No	No	No	No	No	No	No	No	No
13	3	1272	1	35	No	No	No	No	No	No	No	No	No	No
14	3	942	1	26	No	No	No	No	No	No	No	No	No	No
15	3	942	1	26	No	No	No	No	No	No	No	No	No	No
16	3	659	1	18	No	No	No	No	No	No	No	No	No	No
17	3	377	1	10	No	No	No	No	No	No	No	No	No	No
18	3	377	1	10	No	No	No	No	No	No	No	No	No	No
19	3	212	1	6	No	No	No	No	No	No	No	No	No	No
20	3	117	1	3	No	No	No	No	No	No	No	No	No	No
21	3	70	1	2	No	No	No	No	No	No	No	No	No	No
22	3	23	1	1	No	No	No	No	No	No	No	No	No	No
23	3	23	1	1	No	No	No	No	No	No	No	No	No	No
24	3	23	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	3	4	10	3	0

Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	132.5	609.7
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	2:23	11:00
Delay Condition Met	No	Yes
Volume on Minor Street Approach During Same Hour	65	65
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	2485	2485
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection 31: Redbay Avenue at Birch Street

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	1613	1568	49	48
2	1565	1521	48	47
3	1532	1490	47	46
4	1436	1396	44	43
5	1274	1239	39	38
6	1258	1223	38	37
7	1242	1207	38	37
8	1129	1098	34	34
9	1113	1082	34	33
10	1097	1066	33	33
11	952	925	29	28
12	887	862	27	26
13	871	847	26	26
14	645	627	20	19
15	645	627	20	19
16	452	439	14	13
17	258	251	8	8
18	258	251	8	8
19	145	141	4	4
20	81	78	2	2
21	48	47	1	1
22	16	16	0	0
23	16	16	0	0
24	16	16	0	0

Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	3	3181	1	49	No	No	No	No	No	No	No	Yes	No	No
2	3	3086	1	48	No	No	No	No	No	No	No	Yes	No	No
3	3	3022	1	47	No	No	No	No	No	No	No	Yes	No	No
4	3	2832	1	44	No	No	No	No	No	No	No	Yes	No	No
5	3	2513	1	39	No	No	No	No	No	No	No	No	No	No
6	3	2481	1	38	No	No	No	No	No	No	No	No	No	No
7	3	2449	1	38	No	No	No	No	No	No	No	No	No	No
8	3	2227	1	34	No	No	No	No	No	No	No	No	No	No
9	3	2195	1	34	No	No	No	No	No	No	No	No	No	No
10	3	2163	1	33	No	No	No	No	No	No	No	No	No	No
11	3	1877	1	29	No	No	No	No	No	No	No	No	No	No
12	3	1749	1	27	No	No	No	No	No	No	No	No	No	No
13	3	1718	1	26	No	No	No	No	No	No	No	No	No	No
14	3	1272	1	20	No	No	No	No	No	No	No	No	No	No
15	3	1272	1	20	No	No	No	No	No	No	No	No	No	No
16	3	891	1	14	No	No	No	No	No	No	No	No	No	No
17	3	509	1	8	No	No	No	No	No	No	No	No	No	No
18	3	509	1	8	No	No	No	No	No	No	No	No	No	No
19	3	286	1	4	No	No	No	No	No	No	No	No	No	No
20	3	159	1	2	No	No	No	No	No	No	No	No	No	No
21	3	95	1	1	No	No	No	No	No	No	No	No	No	No
22	3	32	1	0	No	No	No	No	No	No	No	No	No	No
23	3	32	1	0	No	No	No	No	No	No	No	No	No	No
24	3	32	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	4	0	0

Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	1145.2	709.1
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	15:35	9:27
Delay Condition Met	Yes	Yes
Volume on Minor Street Approach During Same Hour	49	48
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	3278	3278
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

APPENDIX J-III

EXISTING TRAFFIC CONDITIONS – HCM

Intersection Level Of Service Report
Intersection 31: Redbay Avenue at Birch Street

Control Type:	Two-way stop	Delay (sec / veh):	614.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.633

Intersection Setup

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Base Volume Input [veh/h]	13	0	52	33	0	32	10	1108	19	32	1118	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	0	52	33	0	32	10	1108	19	32	1118	30
Peak Hour Factor	0.6560	0.6560	0.6560	0.8290	0.8290	0.8290	0.8990	0.8990	0.8990	0.8470	0.8470	0.8470
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	20	10	0	10	3	308	5	9	330	9
Total Analysis Volume [veh/h]	20	0	79	40	0	39	11	1232	21	38	1320	35
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.67	0.00	0.19	1.63	0.00	0.10	0.02	0.01	0.00	0.07	0.01	0.00
d_M, Delay for Movement [s/veh]	209.44	274.61	96.39	614.27	652.00	476.41	12.31	0.00	0.00	12.02	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	5.17	5.17	5.17	7.92	7.92	7.92	0.07	0.00	0.00	0.22	0.00	0.00
95th-Percentile Queue Length [ft/ln]	129.23	129.23	129.23	197.88	197.88	197.88	1.67	0.00	0.00	5.54	0.00	0.00
d_A, Approach Delay [s/veh]	119.23			546.21			0.11			0.33		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	19.59											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 31: Redbay Avenue at Birch Street

Control Type:	Two-way stop	Delay (sec / veh):	1,203.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	2.469

Intersection Setup

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Base Volume Input [veh/h]	21	0	28	15	0	33	47	1452	39	14	1542	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	0	28	15	0	33	47	1452	39	14	1542	39
Peak Hour Factor	0.7340	0.7340	0.7340	0.8390	0.8390	0.8390	0.9590	0.9590	0.9590	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	10	4	0	10	12	379	10	4	405	10
Total Analysis Volume [veh/h]	29	0	38	18	0	39	49	1514	41	15	1621	41
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	2.47	0.00	0.11	1.66	0.00	0.12	0.13	0.02	0.00	0.04	0.02	0.00
d_M, Delay for Movement [s/veh]	1203.64	1424.45	907.72	863.96	1058.84	543.01	15.76	0.00	0.00	13.85	0.00	0.00
Movement LOS	F	F	F	F	F	F	C	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	8.20	8.20	8.20	6.45	6.45	6.45	0.44	0.00	0.00	0.11	0.00	0.00
95th-Percentile Queue Length [ft/ln]	204.90	204.90	204.90	161.28	161.28	161.28	10.88	0.00	0.00	2.76	0.00	0.00
d_A, Approach Delay [s/veh]	1035.81			644.37			0.48			0.12		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	31.46											
Intersection LOS	F											

APPENDIX J-IV

EXISTING PLUS PROJECT TRAFFIC CONDITIONS – HCM

Intersection Level Of Service Report
Intersection 31: Redbay Avenue at Birch Street

Control Type:	Two-way stop	Delay (sec / veh):	683.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.753

Intersection Setup

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Base Volume Input [veh/h]	13	0	52	33	0	32	10	1119	19	32	1145	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	0	52	33	0	32	10	1119	19	32	1145	30
Peak Hour Factor	0.6560	0.6560	0.6560	0.8290	0.8290	0.8290	0.8990	0.8990	0.8990	0.8470	0.8470	0.8470
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	20	10	0	10	3	311	5	9	338	9
Total Analysis Volume [veh/h]	20	0	79	40	0	39	11	1245	21	38	1352	35
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.71	0.00	0.19	1.75	0.00	0.10	0.02	0.01	0.00	0.07	0.01	0.00
d_M, Delay for Movement [s/veh]	228.10	299.81	108.30	682.96	723.08	534.49	12.52	0.00	0.00	12.10	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	5.44	5.44	5.44	8.17	8.17	8.17	0.07	0.00	0.00	0.22	0.00	0.00
95th-Percentile Queue Length [ft/ln]	136.09	136.09	136.09	204.36	204.36	204.36	1.72	0.00	0.00	5.60	0.00	0.00
d_A, Approach Delay [s/veh]	132.50			609.66			0.11			0.32		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	21.49											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 31: Redbay Avenue at Birch Street

Control Type:	Two-way stop	Delay (sec / veh):	1,326.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	2.667

Intersection Setup

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Ave			Redbay Ave			Birch St			Birch St		
Base Volume Input [veh/h]	21	0	28	15	0	33	47	1482	39	14	1560	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	0	28	15	0	33	47	1482	39	14	1560	39
Peak Hour Factor	0.7340	0.7340	0.7340	0.8390	0.8390	0.8390	0.9590	0.9590	0.9590	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	10	4	0	10	12	386	10	4	410	10
Total Analysis Volume [veh/h]	29	0	38	18	0	39	49	1545	41	15	1640	41
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	2.67	0.00	0.11	1.78	0.00	0.13	0.13	0.02	0.00	0.04	0.02	0.00
d_M, Delay for Movement [s/veh]	1326.81	1567.46	1006.57	944.43	1160.53	600.46	15.97	0.00	0.00	14.11	0.00	0.00
Movement LOS	F	F	F	F	F	F	C	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	8.37	8.37	8.37	6.62	6.62	6.62	0.44	0.00	0.00	0.11	0.00	0.00
95th-Percentile Queue Length [ft/ln]	209.18	209.18	209.18	165.39	165.39	165.39	11.09	0.00	0.00	2.84	0.00	0.00
d_A, Approach Delay [s/veh]	1145.18			709.08			0.48			0.12		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	34.19											
Intersection LOS	F											

APPENDIX K

VOYAGER AVENUE AT BIRCH STREET AND N. ASSOCIATED ROAD AT BIRCH STREET FOCUSED ASSESSMENT

APPENDIX K-I

EXISTING TRAFFIC CONDITIONS – ICU

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.529

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	38	1	109	77	203	4	2	174	20
Total Analysis Volume [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.08	0.18	0.24	0.24	0.00	0.20	0.05
Intersection LOS	A											
Intersection V/C	0.529											

Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.330

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	27	23	16	75	2	93	95	575	74	31	459	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	23	16	75	2	93	95	575	74	31	459	127
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	6	4	19	1	23	24	144	19	8	115	32
Total Analysis Volume [veh/h]	27	23	16	75	2	93	95	575	74	31	459	127
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.02	0.02	0.04	0.05	0.05	0.06	0.19	0.19	0.02	0.14	0.07
Intersection LOS	A											
Intersection V/C	0.330											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.626

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	3	24	1	69	66	216	3	1	303	32
Total Analysis Volume [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.06	0.00	0.01	0.16	0.26	0.26	0.00	0.36	0.07
Intersection LOS	B											
Intersection V/C	0.626											

Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.334

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	47	1	39	11	0	18	26	848	10	2	641	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	47	1	39	11	0	18	26	848	10	2	641	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	0	10	3	0	5	7	212	3	1	160	3
Total Analysis Volume [veh/h]	47	1	39	11	0	18	26	848	10	2	641	11
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.02	0.02	0.01	0.00	0.01	0.02	0.25	0.25	0.00	0.19	0.01
Intersection LOS	A											
Intersection V/C	0.334											

APPENDIX K-II

EXISTING PLUS PROJECT TRAFFIC CONDITIONS – ICU

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.542

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	5	152	2	437	309	827	16	8	740	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	5	152	2	437	309	827	16	8	740	78
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	38	1	109	77	207	4	2	185	20
Total Analysis Volume [veh/h]	3	3	5	152	2	437	309	827	16	8	740	78
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.08	0.18	0.25	0.25	0.00	0.22	0.05
Intersection LOS	A											
Intersection V/C	0.542											

Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.336

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	6	4	19	1	23	24	149	19	8	127	32
Total Analysis Volume [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.02	0.02	0.04	0.05	0.05	0.06	0.20	0.20	0.02	0.15	0.07
Intersection LOS	A											
Intersection V/C	0.336											

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	12	2	10	96	3	275	265	911	11	5	1243	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	2	10	96	3	275	265	911	11	5	1243	127
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	3	24	1	69	66	228	3	1	311	32
Total Analysis Volume [veh/h]	12	2	10	96	3	275	265	911	11	5	1243	127
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.06	0.00	0.01	0.16	0.27	0.27	0.00	0.37	0.07
Intersection LOS	B											
Intersection V/C	0.635											

Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.351

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	47	1	39	11	0	18	26	908	10	2	680	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	47	1	39	11	0	18	26	908	10	2	680	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	0	10	3	0	5	7	227	3	1	170	3
Total Analysis Volume [veh/h]	47	1	39	11	0	18	26	908	10	2	680	11
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.02	0.02	0.01	0.00	0.01	0.02	0.27	0.27	0.00	0.20	0.01
Intersection LOS	A											
Intersection V/C	0.351											

APPENDIX K-III

EXISTING TRAFFIC CONDITIONS – HCM

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.707

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	5	152	2	437	309	810	16	8	696	78
Peak Hour Factor	0.5500	0.5500	0.5500	0.8490	0.8490	0.8490	0.8890	0.8890	0.8890	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	45	1	129	87	228	4	2	198	22
Total Analysis Volume [veh/h]	5	5	9	179	2	515	348	911	18	9	791	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	37	0	39	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	3	25	25	62	27	75	75	2	50	50
g / C, Green / Cycle	0.02	0.02	0.02	0.21	0.21	0.52	0.22	0.62	0.62	0.01	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.27	0.19	0.25	0.24	0.01	0.21	0.05
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	79	46	46	370	370	986	401	1184	1184	25	1574	787
d1, Uniform Delay [s]	57.30	57.29	57.41	39.90	39.90	19.04	44.97	11.31	11.28	58.67	26.01	21.61
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.15	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.33	1.01	2.01	0.34	0.34	1.98	7.82	0.98	0.97	8.46	1.15	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.11	0.19	0.24	0.24	0.52	0.87	0.39	0.39	0.36	0.50	0.11
d, Delay for Lane Group [s/veh]	57.63	58.30	59.42	40.24	40.24	21.02	52.80	12.29	12.26	67.12	27.16	21.90
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.16	0.16	0.29	2.28	2.28	9.84	10.81	6.29	6.24	0.33	8.56	1.62
50th-Percentile Queue Length [ft/ln]	3.90	4.04	7.35	57.06	57.11	245.92	270.27	157.32	156.03	8.26	214.05	40.43
95th-Percentile Queue Length [veh/ln]	0.28	0.29	0.53	4.11	4.11	14.98	16.20	10.41	10.34	0.59	13.36	2.91
95th-Percentile Queue Length [ft/ln]	7.02	7.28	13.23	102.70	102.79	374.51	405.07	260.17	258.45	14.86	334.01	72.78

Movement, Approach, & Intersection Results

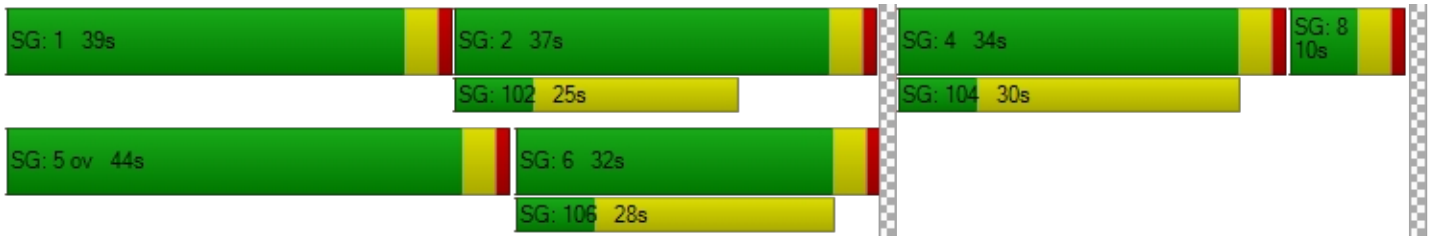
d_M, Delay for Movement [s/veh]	57.63	58.30	59.42	40.24	40.24	21.02	52.80	12.28	12.26	67.12	27.16	21.90
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	58.66			26.02			23.32			27.04		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	25.35											
Intersection LOS	C											
Intersection V/C	0.707											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.157	2.422	2.825	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	550	467
d_b, Bicycle Delay [s]	54.17	33.76	31.55	35.28
l_b,int, Bicycle LOS Score for Intersection	1.591	2.708	2.613	2.293
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	17.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.431

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Peak Hour Factor	0.5710	0.5710	0.5710	0.4170	0.4170	0.4170	0.7600	0.7600	0.7600	0.7430	0.7430	0.7430
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	10	7	45	1	56	31	196	24	10	171	43
Total Analysis Volume [veh/h]	47	40	28	180	5	223	125	783	97	42	684	171
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	51	0	0	51	0	13	34	0	10	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	25	0	0	18	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	14	8	65	65	4	61	61
g / C, Green / Cycle	0.14	0.14	0.14	0.14	0.09	0.69	0.69	0.04	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.03	0.04	0.10	0.12	0.07	0.24	0.23	0.02	0.18	0.09
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	126	274	335	274	156	1303	1303	78	2442	1221
d1, Uniform Delay [s]	35.72	36.08	38.77	39.41	42.59	6.13	6.06	44.52	7.40	6.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.83	0.47	1.43	5.77	9.09	0.72	0.68	5.63	0.29	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.25	0.55	0.81	0.80	0.34	0.33	0.54	0.28	0.14
d, Delay for Lane Group [s/veh]	37.55	36.54	40.20	45.18	51.68	6.86	6.74	50.15	7.69	6.91
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.01	1.43	4.20	5.42	3.12	2.89	2.75	1.05	2.44	1.14
50th-Percentile Queue Length [ft/ln]	25.37	35.63	104.88	135.44	78.10	72.27	68.65	26.14	61.09	28.46
95th-Percentile Queue Length [veh/ln]	1.83	2.57	7.55	9.23	5.62	5.20	4.94	1.88	4.40	2.05
95th-Percentile Queue Length [ft/ln]	45.66	64.13	188.79	230.87	140.57	130.08	123.58	47.05	109.97	51.24

Movement, Approach, & Intersection Results

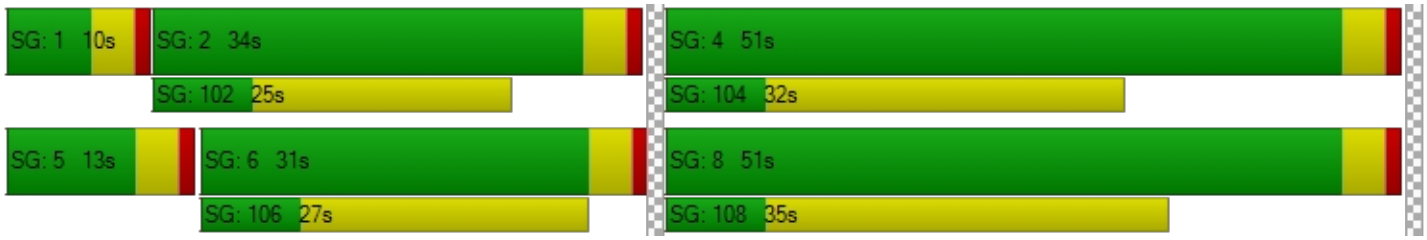
d_M, Delay for Movement [s/veh]	37.55	36.54	36.54	40.20	40.20	45.18	51.68	6.81	6.74	50.15	7.69	6.91
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	36.95			42.92			12.38			9.53		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	17.63											
Intersection LOS	B											
Intersection V/C	0.431											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
l_p,int, Pedestrian LOS Score for Intersection	2.027	2.315	3.006	3.223
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	989	989	631	568
d_b, Bicycle Delay [s]	12.13	12.13	22.24	24.34
l_b,int, Bicycle LOS Score for Intersection	1.749	2.233	2.389	2.300
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	23.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.776

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	2	10	96	3	275	265	864	11	5	1213	127
Peak Hour Factor	0.7500	0.7500	0.7500	0.8100	0.8100	0.8100	0.9290	0.9290	0.9290	0.9040	0.9040	0.9040
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	30	1	85	71	233	3	1	335	35
Total Analysis Volume [veh/h]	16	3	13	119	4	340	285	930	12	6	1342	140
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	34	56	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	16	16	49	20	73	73	1	53	53
g / C, Green / Cycle	0.03	0.03	0.03	0.15	0.15	0.44	0.18	0.66	0.66	0.01	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.18	0.16	0.25	0.25	0.00	0.35	0.07
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	101	67	67	269	269	840	333	1254	1254	18	1844	922
d1, Uniform Delay [s]	51.72	51.34	51.61	41.23	41.24	20.88	43.46	8.47	8.46	54.11	22.54	15.74
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.20	0.14	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	0.28	1.41	0.43	0.43	0.58	8.21	0.86	0.86	9.93	2.55	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.05	0.20	0.23	0.23	0.40	0.86	0.38	0.37	0.33	0.73	0.15
d, Delay for Lane Group [s/veh]	52.44	51.61	53.02	41.66	41.66	21.45	51.67	9.33	9.32	64.04	25.10	16.09
Lane Group LOS	D	D	D	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.45	0.09	0.37	1.50	1.51	6.01	8.22	5.00	4.98	0.22	13.97	2.03
50th-Percentile Queue Length [ft/ln]	11.25	2.13	9.37	37.52	37.65	150.25	205.58	125.11	124.41	5.39	349.23	50.73
95th-Percentile Queue Length [veh/ln]	0.81	0.15	0.67	2.70	2.71	10.03	12.93	8.67	8.63	0.39	20.10	3.65
95th-Percentile Queue Length [ft/ln]	20.26	3.83	16.86	67.54	67.76	250.77	323.15	216.83	215.87	9.70	502.47	91.32

Movement, Approach, & Intersection Results

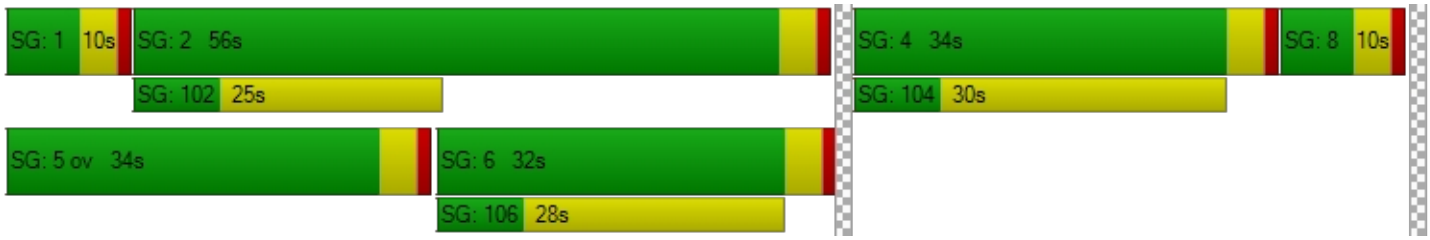
d_M, Delay for Movement [s/veh]	52.44	51.61	53.02	41.66	41.66	21.45	51.67	9.33	9.32	64.04	25.10	16.09
Movement LOS	D	D	D	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	52.60			26.82			19.16			24.41		
Approach LOS	D			C			B			C		
d_I, Intersection Delay [s/veh]	23.03											
Intersection LOS	C											
Intersection V/C	0.776											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.154	2.358	2.903	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	109	545	945	509
d_b, Bicycle Delay [s]	49.19	29.11	15.31	30.59
l_b,int, Bicycle LOS Score for Intersection	1.612	2.324	2.572	2.787
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	7.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.331

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	47	1	39	11	0	18	26	848	10	2	641	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	47	1	39	11	0	18	26	848	10	2	641	11
Peak Hour Factor	0.7330	0.7330	0.7330	0.7000	0.7000	0.7000	0.9040	0.9040	0.9040	0.8270	0.8270	0.8270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	0	13	4	0	6	7	235	3	1	194	3
Total Analysis Volume [veh/h]	64	1	53	16	0	26	29	938	11	2	775	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	39	0	0	39	0	10	41	0	10	41	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	25	0	0	18	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	6	3	72	72	0	69	69
g / C, Green / Cycle	0.06	0.06	0.06	0.06	0.04	0.80	0.80	0.00	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.04	0.03	0.01	0.01	0.02	0.25	0.25	0.00	0.20	0.01
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	147	122	196	122	64	1516	1516	8	2914	1457
d1, Uniform Delay [s]	40.88	40.58	39.78	39.97	42.56	2.45	2.45	44.66	3.07	2.46
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.02	2.50	0.18	0.86	4.91	0.54	0.54	14.71	0.22	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.44	0.44	0.08	0.21	0.45	0.31	0.31	0.24	0.27	0.01
d, Delay for Lane Group [s/veh]	42.90	43.08	39.96	40.83	47.47	2.99	2.99	59.37	3.30	2.47
Lane Group LOS	D	D	D	D	D	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.44	1.23	0.34	0.57	0.69	1.01	1.00	0.08	1.07	0.03
50th-Percentile Queue Length [ft/ln]	36.12	30.65	8.53	14.26	17.17	25.22	25.08	1.89	26.71	0.77
95th-Percentile Queue Length [veh/ln]	2.60	2.21	0.61	1.03	1.24	1.82	1.81	0.14	1.92	0.06
95th-Percentile Queue Length [ft/ln]	65.02	55.16	15.35	25.67	30.91	45.40	45.15	3.41	48.08	1.39

Movement, Approach, & Intersection Results

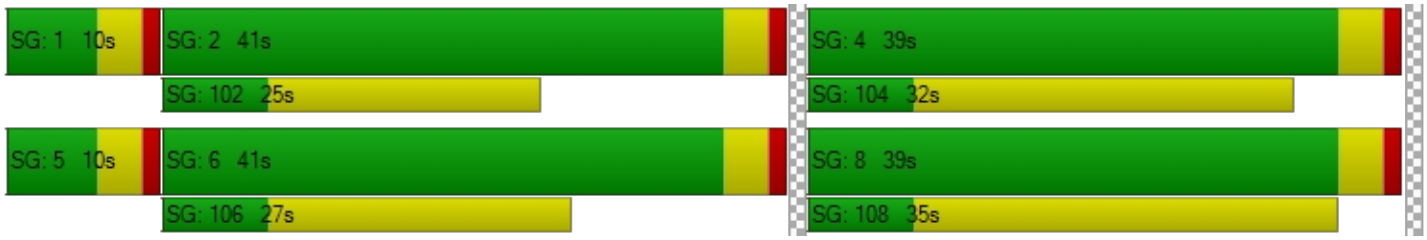
d_M, Delay for Movement [s/veh]	42.90	43.08	43.08	39.96	39.96	40.83	47.47	2.99	2.99	59.37	3.30	2.47
Movement LOS	D	D	D	D	D	D	D	A	A	E	A	A
d_A, Approach Delay [s/veh]	42.98			40.50			4.31			3.43		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	7.10											
Intersection LOS	A											
Intersection V/C	0.331											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	34.68	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	1.982	2.151	2.989	2.962
Crosswalk LOS	A	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	778	778	822	822
d_b, Bicycle Delay [s]	16.82	16.82	15.62	15.62
l_b,int, Bicycle LOS Score for Intersection	1.754	1.629	2.366	2.211
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX K-IV

EXISTING PLUS PROJECT TRAFFIC CONDITIONS – HCM

Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	25.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.722

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	3	3	5	152	2	437	309	827	16	8	740	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	3	5	152	2	437	309	827	16	8	740	78
Peak Hour Factor	0.5500	0.5500	0.5500	0.8490	0.8490	0.8490	0.8890	0.8890	0.8890	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	2	45	1	129	87	233	4	2	210	22
Total Analysis Volume [veh/h]	5	5	9	179	2	515	348	930	18	9	841	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	44	36	0	40	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	3	3	25	25	62	27	75	75	2	50	50
g / C, Green / Cycle	0.02	0.02	0.02	0.21	0.21	0.52	0.22	0.62	0.62	0.01	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.00	0.00	0.00	0.05	0.05	0.27	0.19	0.25	0.25	0.01	0.22	0.05
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	79	46	46	370	370	986	401	1184	1184	25	1574	787
d1, Uniform Delay [s]	57.30	57.29	57.41	39.90	39.90	19.04	44.97	11.38	11.36	58.67	26.45	21.61
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.15	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.33	1.01	2.01	0.34	0.34	1.98	7.82	1.02	1.01	8.46	1.30	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.11	0.19	0.24	0.24	0.52	0.87	0.40	0.40	0.36	0.53	0.11
d, Delay for Lane Group [s/veh]	57.63	58.30	59.42	40.24	40.24	21.02	52.80	12.40	12.37	67.12	27.75	21.90
Lane Group LOS	E	E	E	D	D	C	D	B	B	E	C	C
Critical Lane Group	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.16	0.16	0.29	2.28	2.28	9.84	10.81	6.47	6.41	0.33	9.27	1.62
50th-Percentile Queue Length [ft/ln]	3.90	4.04	7.35	57.06	57.11	245.92	270.27	161.64	160.35	8.26	231.76	40.43
95th-Percentile Queue Length [veh/ln]	0.28	0.29	0.53	4.11	4.11	14.98	16.20	10.64	10.57	0.59	14.26	2.91
95th-Percentile Queue Length [ft/ln]	7.02	7.28	13.23	102.70	102.79	374.51	405.07	265.90	264.18	14.86	356.59	72.78

Movement, Approach, & Intersection Results

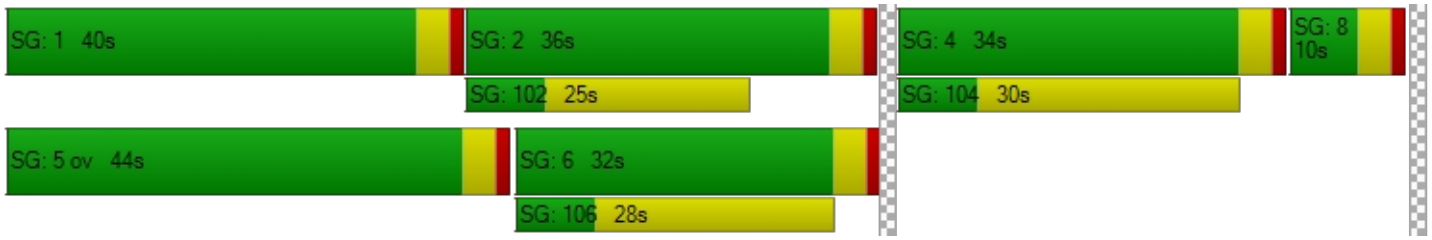
d_M, Delay for Movement [s/veh]	57.63	58.30	59.42	40.24	40.24	21.02	52.80	12.38	12.37	67.12	27.75	21.90
Movement LOS	E	E	E	D	D	C	D	B	B	E	C	C
d_A, Approach Delay [s/veh]	58.66			26.02			23.24			27.58		
Approach LOS	E			C			C			C		
d_I, Intersection Delay [s/veh]	25.50											
Intersection LOS	C											
Intersection V/C	0.722											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.157	2.422	2.839	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	100	500	533	467
d_b, Bicycle Delay [s]	54.17	33.76	32.28	35.28
l_b,int, Bicycle LOS Score for Intersection	1.591	2.708	2.629	2.334
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	17.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.431

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	23	16	75	2	93	95	595	74	31	508	127
Peak Hour Factor	0.5710	0.5710	0.5710	0.4170	0.4170	0.4170	0.7600	0.7600	0.7600	0.7430	0.7430	0.7430
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	10	7	45	1	56	31	196	24	10	171	43
Total Analysis Volume [veh/h]	47	40	28	180	5	223	125	783	97	42	684	171
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	51	0	0	51	0	13	34	0	10	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	25	0	0	18	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	14	8	65	65	4	61	61
g / C, Green / Cycle	0.14	0.14	0.14	0.14	0.09	0.69	0.69	0.04	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.03	0.04	0.10	0.12	0.07	0.24	0.23	0.02	0.18	0.09
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	126	274	335	274	156	1303	1303	78	2442	1221
d1, Uniform Delay [s]	35.72	36.08	38.77	39.41	42.59	6.13	6.06	44.52	7.40	6.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.83	0.47	1.43	5.77	9.09	0.72	0.68	5.63	0.29	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.25	0.55	0.81	0.80	0.34	0.33	0.54	0.28	0.14
d, Delay for Lane Group [s/veh]	37.55	36.54	40.20	45.18	51.68	6.86	6.74	50.15	7.69	6.91
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.01	1.43	4.20	5.42	3.12	2.89	2.75	1.05	2.44	1.14
50th-Percentile Queue Length [ft/ln]	25.37	35.63	104.88	135.44	78.10	72.27	68.65	26.14	61.09	28.46
95th-Percentile Queue Length [veh/ln]	1.83	2.57	7.55	9.23	5.62	5.20	4.94	1.88	4.40	2.05
95th-Percentile Queue Length [ft/ln]	45.66	64.13	188.79	230.87	140.57	130.08	123.58	47.05	109.97	51.24

Movement, Approach, & Intersection Results

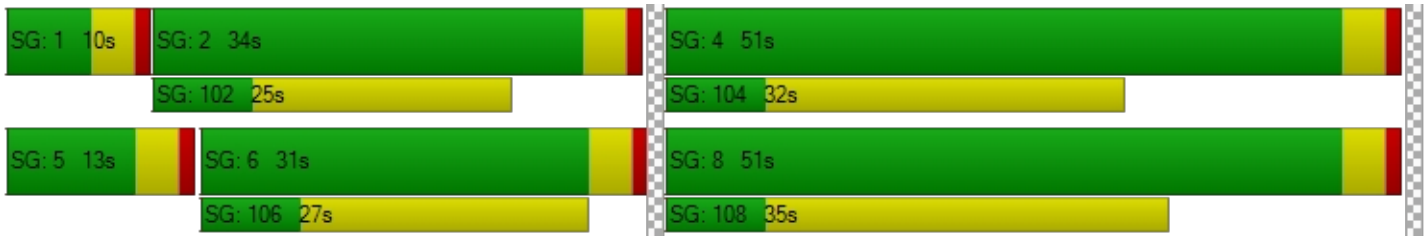
d_M, Delay for Movement [s/veh]	37.55	36.54	36.54	40.20	40.20	45.18	51.68	6.81	6.74	50.15	7.69	6.91
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	36.95			42.92			12.38			9.53		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	17.63											
Intersection LOS	B											
Intersection V/C	0.431											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
l_p,int, Pedestrian LOS Score for Intersection	2.027	2.315	3.006	3.223
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	989	989	631	568
d_b, Bicycle Delay [s]	12.13	12.13	22.24	24.34
l_b,int, Bicycle LOS Score for Intersection	1.749	2.233	2.389	2.300
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: N Associated Road at Birch Street

Control Type:	Signalized	Delay (sec / veh):	23.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.786

Intersection Setup

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	N Associated Road			N Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	12	2	10	96	3	275	265	911	11	5	1243	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	2	10	96	3	275	265	911	11	5	1243	127
Peak Hour Factor	0.7500	0.7500	0.7500	0.8100	0.8100	0.8100	0.9290	0.9290	0.9290	0.9040	0.9040	0.9040
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	30	1	85	71	245	3	1	344	35
Total Analysis Volume [veh/h]	16	3	13	119	4	340	285	981	12	6	1375	140
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	0	0	34	34	34	56	0	10	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	23	23	0	18	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	4	4	16	16	49	20	73	73	1	53	53
g / C, Green / Cycle	0.03	0.03	0.03	0.15	0.15	0.44	0.18	0.66	0.66	0.01	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.01	0.03	0.03	0.18	0.16	0.26	0.26	0.00	0.36	0.07
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	101	67	67	269	269	840	333	1254	1254	18	1844	922
d1, Uniform Delay [s]	51.72	51.34	51.61	41.23	41.24	20.88	43.46	8.62	8.61	54.11	22.85	15.74
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.20	0.14	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	0.28	1.41	0.43	0.43	0.58	8.21	0.94	0.93	9.93	2.79	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.05	0.20	0.23	0.23	0.40	0.86	0.40	0.40	0.33	0.75	0.15
d, Delay for Lane Group [s/veh]	52.44	51.61	53.02	41.66	41.66	21.45	51.67	9.56	9.55	64.04	25.64	16.09
Lane Group LOS	D	D	D	D	D	C	D	A	A	E	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.45	0.09	0.37	1.50	1.51	6.01	8.22	5.38	5.35	0.22	14.54	2.03
50th-Percentile Queue Length [ft/ln]	11.25	2.13	9.37	37.52	37.65	150.25	205.58	134.38	133.67	5.39	363.58	50.73
95th-Percentile Queue Length [veh/ln]	0.81	0.15	0.67	2.70	2.71	10.03	12.93	9.18	9.14	0.39	20.80	3.65
95th-Percentile Queue Length [ft/ln]	20.26	3.83	16.86	67.54	67.76	250.77	323.15	229.43	228.47	9.70	519.93	91.32

Movement, Approach, & Intersection Results

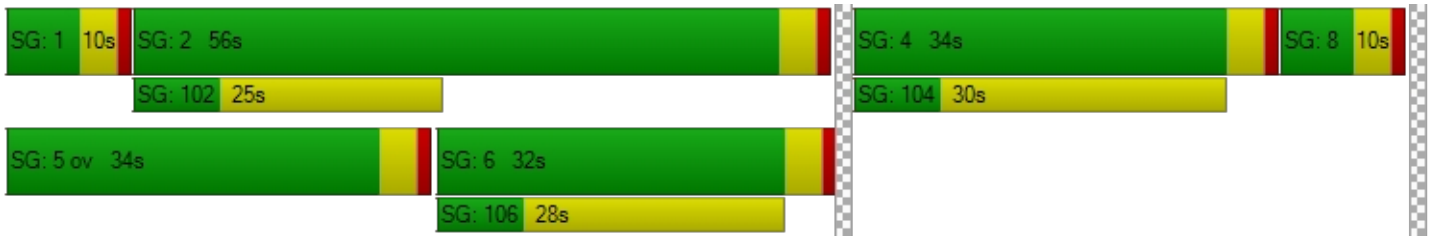
d_M, Delay for Movement [s/veh]	52.44	51.61	53.02	41.66	41.66	21.45	51.67	9.56	9.55	64.04	25.64	16.09
Movement LOS	D	D	D	D	D	C	D	A	A	E	C	B
d_A, Approach Delay [s/veh]	52.60			26.82			18.95			24.91		
Approach LOS	D			C			B			C		
d_I, Intersection Delay [s/veh]	23.14											
Intersection LOS	C											
Intersection V/C	0.786											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.58	44.58	44.58	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.154	2.358	2.919	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	109	545	945	509
d_b, Bicycle Delay [s]	49.19	29.11	15.31	30.59
l_b,int, Bicycle LOS Score for Intersection	1.612	2.324	2.614	2.814
Bicycle LOS	A	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 32: Voyager Avenue at Birch Street

Control Type:	Signalized	Delay (sec / veh):	7.1
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.348

Intersection Setup

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Voyager Ave			Voyager Ave			Birch St			Birch St		
Base Volume Input [veh/h]	47	1	39	11	0	18	26	908	10	2	680	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	47	1	39	11	0	18	26	908	10	2	680	11
Peak Hour Factor	0.7330	0.7330	0.7330	0.7000	0.7000	0.7000	0.9040	0.9040	0.9040	0.8270	0.8270	0.8270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	0	13	4	0	6	7	251	3	1	206	3
Total Analysis Volume [veh/h]	64	1	53	16	0	26	29	1004	11	2	822	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	39	0	0	39	0	10	46	0	10	46	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	25	0	0	18	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	C	L	C	R
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	6	6	6	3	77	77	0	74	74
g / C, Green / Cycle	0.06	0.06	0.06	0.06	0.03	0.81	0.81	0.00	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.04	0.03	0.01	0.01	0.02	0.27	0.27	0.00	0.22	0.01
s, saturation flow rate [veh/h]	1800	1900	1800	1900	1800	1900	1900	1800	3800	1900
c, Capacity [veh/h]	139	117	186	117	63	1535	1535	8	2954	1477
d1, Uniform Delay [s]	43.41	43.09	42.24	42.44	44.98	2.39	2.39	47.14	3.00	2.37
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.35	2.85	0.20	0.96	5.19	0.58	0.58	15.28	0.23	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.46	0.46	0.09	0.22	0.46	0.33	0.33	0.25	0.28	0.01
d, Delay for Lane Group [s/veh]	45.75	45.93	42.43	43.40	50.17	2.97	2.97	62.42	3.24	2.38
Lane Group LOS	D	D	D	D	D	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.54	1.31	0.36	0.61	0.73	1.11	1.11	0.08	1.17	0.03
50th-Percentile Queue Length [ft/ln]	38.61	32.74	9.09	15.21	18.25	27.85	27.70	1.98	29.33	0.78
95th-Percentile Queue Length [veh/ln]	2.78	2.36	0.65	1.09	1.31	2.01	1.99	0.14	2.11	0.06
95th-Percentile Queue Length [ft/ln]	69.49	58.93	16.37	27.37	32.85	50.13	49.86	3.56	52.79	1.41

Movement, Approach, & Intersection Results

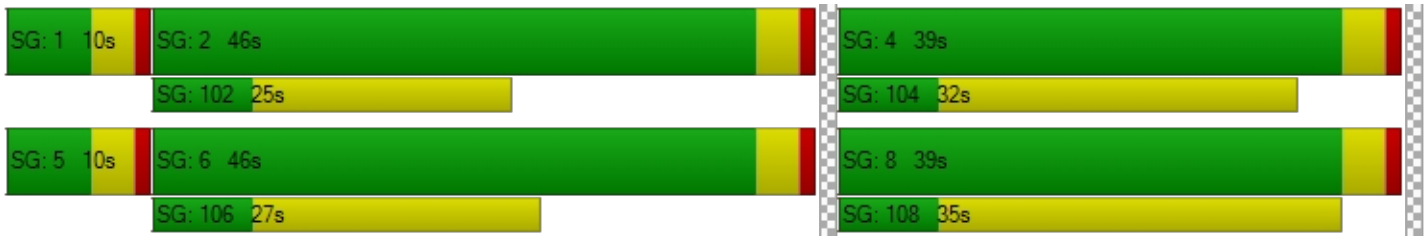
d_M, Delay for Movement [s/veh]	45.75	45.93	45.93	42.43	42.43	43.40	50.17	2.97	2.97	62.42	3.24	2.38
Movement LOS	D	D	D	D	D	D	D	A	A	E	A	A
d_A, Approach Delay [s/veh]	45.84			43.03			4.28			3.37		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	7.11											
Intersection LOS	A											
Intersection V/C	0.348											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
l_p,int, Pedestrian LOS Score for Intersection	1.985	2.154	3.029	2.995
Crosswalk LOS	A	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	737	737	884	884
d_b, Bicycle Delay [s]	18.95	18.95	14.79	14.79
l_b,int, Bicycle LOS Score for Intersection	1.754	1.629	2.421	2.250
Bicycle LOS	A	A	B	B

Sequence

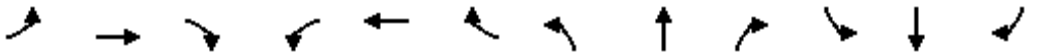
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX K-V

EXISTING TRAFFIC CONDITIONS – SYNCHRO QUEUEING

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	309	810	16	8	696	78	3	3	5	152	2	437
Future Volume (vph)	309	810	16	8	696	78	3	3	5	152	2	437
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	195		0	200		200	120		65	205		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.953	
Satd. Flow (prot)	1676	3343	0	1676	3353	1500	1676	1765	1500	1593	1598	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.953	
Satd. Flow (perm)	1676	3343	0	1676	3353	1500	1676	1765	1500	1593	1598	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				100			145			185
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1708			1966			417			1375	
Travel Time (s)		38.8			44.7			9.5			31.3	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.55	0.55	0.55	0.85	0.85	0.85
Adj. Flow (vph)	347	910	18	9	791	89	5	5	9	179	2	514
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	347	928	0	9	791	89	5	5	9	91	90	514
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Prot	Split	NA	pm+ov
Protected Phases	7	4		3	8		2	2	2	6	6	7
Permitted Phases						8						6

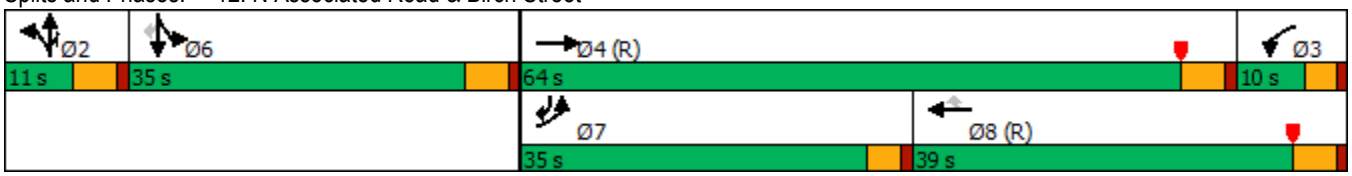


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	33.0	33.0	11.0	11.0	11.0	35.0	35.0	10.0
Total Split (s)	35.0	64.0		10.0	39.0	39.0	11.0	11.0	11.0	35.0	35.0	35.0
Total Split (%)	29.2%	53.3%		8.3%	32.5%	32.5%	9.2%	9.2%	9.2%	29.2%	29.2%	29.2%
Maximum Green (s)	31.0	59.0		6.0	34.0	34.0	6.0	6.0	6.0	30.0	30.0	31.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag						Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max	Max	Max	Max	None
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	
Flash Dont Walk (s)		18.0			21.0	21.0				23.0	23.0	
Pedestrian Calls (#/hr)		2			2	2				2	2	
Act Effct Green (s)	28.5	67.0		6.0	36.5	36.5	6.0	6.0	6.0	30.0	30.0	63.5
Actuated g/C Ratio	0.24	0.56		0.05	0.30	0.30	0.05	0.05	0.05	0.25	0.25	0.53
v/c Ratio	0.87	0.50		0.11	0.77	0.17	0.06	0.06	0.04	0.23	0.23	0.58
Control Delay	41.8	10.8		40.8	27.3	1.8	56.0	55.7	0.4	34.6	34.7	13.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	10.8		40.8	27.3	1.8	56.0	55.7	0.4	34.6	34.7	13.2
LOS	D	B		D	C	A	E	E	A	C	C	B
Approach Delay		19.2			24.9			29.6			18.8	
Approach LOS		B			C			C			B	
Queue Length 50th (ft)	231	221		0	323	0	4	4	0	53	53	125
Queue Length 95th (ft)	m244	m222		m15	387	m6	11	11	0	m86	m85	156
Internal Link Dist (ft)		1628			1886			337			1295	
Turn Bay Length (ft)	195			200		200	120		65	205		
Base Capacity (vph)	432	1867		83	1021	526	83	88	212	398	399	908
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.50		0.11	0.77	0.17	0.06	0.06	0.04	0.23	0.23	0.57

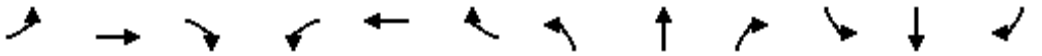
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 78 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 20.9		Intersection LOS: C	
Intersection Capacity Utilization 65.5%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: N Associated Road & Birch Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	575	74	31	459	127	27	23	16	75	2	93
Future Volume (vph)	95	575	74	31	459	127	27	23	16	75	2	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	200		0	140		225	120		0	0		0
Storage Lanes	1		0	1		1	1		0	0		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983				0.850		0.938				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1676	3296	0	1676	3353	1500	1676	1655	0	0	1684	1500
Flt Permitted	0.950			0.950			0.585				0.682	
Satd. Flow (perm)	1676	3296	0	1676	3353	1500	1032	1655	0	0	1204	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				172		28				221
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3055			1784			760			496	
Travel Time (s)		69.4			40.5			17.3			11.3	
Peak Hour Factor	0.76	0.76	0.76	0.74	0.74	0.74	0.57	0.57	0.57	0.42	0.42	0.42
Adj. Flow (vph)	125	757	97	42	620	172	47	40	28	179	5	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	854	0	42	620	172	47	68	0	0	184	221
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6

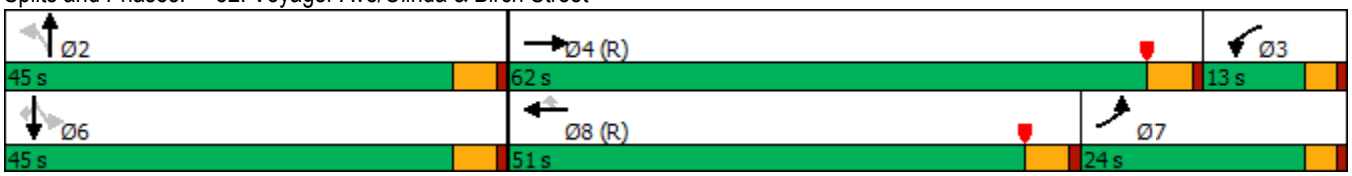


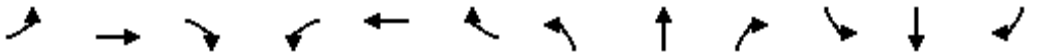
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	32.0	32.0	40.0	40.0		37.0	37.0	37.0
Total Split (s)	24.0	62.0		13.0	51.0	51.0	45.0	45.0		45.0	45.0	45.0
Total Split (%)	20.0%	51.7%		10.8%	42.5%	42.5%	37.5%	37.5%		37.5%	37.5%	37.5%
Maximum Green (s)	20.0	57.0		9.0	46.0	46.0	40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lag	Lead		Lag	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		18.0			20.0	20.0	28.0	28.0		25.0	25.0	25.0
Pedestrian Calls (#/hr)		2			2	2	2	2		2	2	2
Act Effct Green (s)	17.2	57.3		7.9	46.0	46.0	42.8	42.8			42.8	42.8
Actuated g/C Ratio	0.14	0.48		0.07	0.38	0.38	0.36	0.36			0.36	0.36
v/c Ratio	0.52	0.54		0.38	0.48	0.25	0.13	0.11			0.43	0.33
Control Delay	45.2	5.6		62.4	26.8	4.8	29.1	18.2			34.4	5.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	45.2	5.6		62.4	26.8	4.8	29.1	18.2			34.4	5.1
LOS	D	A		E	C	A	C	B			C	A
Approach Delay		10.6			24.1			22.6			18.4	
Approach LOS		B			C			C			B	
Queue Length 50th (ft)	103	49		32	198	35	25	21			111	0
Queue Length 95th (ft)	m139	20		m49	203	m50	34	28			74	0
Internal Link Dist (ft)		2975			1704			680			416	
Turn Bay Length (ft)	200			140		225	120					
Base Capacity (vph)	279	1583		125	1285	681	368	607			429	676
Starvation Cap Reductn	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn	0	0		0	0	0	0	0			0	0
Storage Cap Reductn	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio	0.45	0.54		0.34	0.48	0.25	0.13	0.11			0.43	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 101 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 47.1%		ICU Level of Service A	
Analysis Period (min) 15			

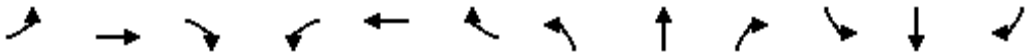
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Voyager Ave/Olinda & Birch Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	864	11	5	1213	127	12	2	10	96	3	275
Future Volume (vph)	265	864	11	5	1213	127	12	2	10	96	3	275
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	195		0	200		200	120		65	205		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.955	
Satd. Flow (prot)	1676	3346	0	1676	3353	1500	1676	1765	1500	1593	1601	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.955	
Satd. Flow (perm)	1676	3346	0	1676	3353	1500	1676	1765	1500	1593	1601	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				100			145			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1708			1966			417			1375	
Travel Time (s)		38.8			44.7			9.5			31.3	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.75	0.75	0.75	0.81	0.81	0.81
Adj. Flow (vph)	285	929	12	6	1348	141	16	3	13	119	4	340
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	285	941	0	6	1348	141	16	3	13	62	61	340
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Prot	Split	NA	pm+ov
Protected Phases	7	4		3	8		2	2	2	6	6	7
Permitted Phases						8						6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	33.0	33.0	11.0	11.0	11.0	35.0	35.0	10.0
Total Split (s)	23.0	64.0		10.0	51.0	51.0	11.0	11.0	11.0	35.0	35.0	23.0
Total Split (%)	19.2%	53.3%		8.3%	42.5%	42.5%	9.2%	9.2%	9.2%	29.2%	29.2%	19.2%
Maximum Green (s)	19.0	59.0		6.0	46.0	46.0	6.0	6.0	6.0	30.0	30.0	19.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag						Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max	Max	Max	Max	None
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	
Flash Dont Walk (s)		18.0			21.0	21.0				23.0	23.0	
Pedestrian Calls (#/hr)		2			2	2				2	2	
Act Effct Green (s)	19.0	67.0		6.0	46.0	46.0	6.0	6.0	6.0	30.0	30.0	54.0
Actuated g/C Ratio	0.16	0.56		0.05	0.38	0.38	0.05	0.05	0.05	0.25	0.25	0.45
v/c Ratio	1.08	0.50		0.07	1.05	0.22	0.19	0.03	0.06	0.16	0.15	0.46
Control Delay	99.4	15.8		34.4	47.7	2.3	60.3	55.0	0.6	32.5	32.3	18.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.4	15.8		34.4	47.7	2.3	60.3	55.0	0.6	32.5	32.3	18.8
LOS	F	B		C	D	A	E	D	A	C	C	B
Approach Delay		35.2			43.3			35.6			22.4	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)	~246	308		5	~615	17	12	2	0	37	36	132
Queue Length 95th (ft)	m#299	m330		m5	m#621	m20	30	11	0	67	65	142
Internal Link Dist (ft)		1628			1886			337			1295	
Turn Bay Length (ft)	195			200		200	120		65	205		
Base Capacity (vph)	265	1868		83	1285	636	83	88	212	398	400	734
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.50		0.07	1.05	0.22	0.19	0.03	0.06	0.16	0.15	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 79 (66%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 37.2		Intersection LOS: D	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

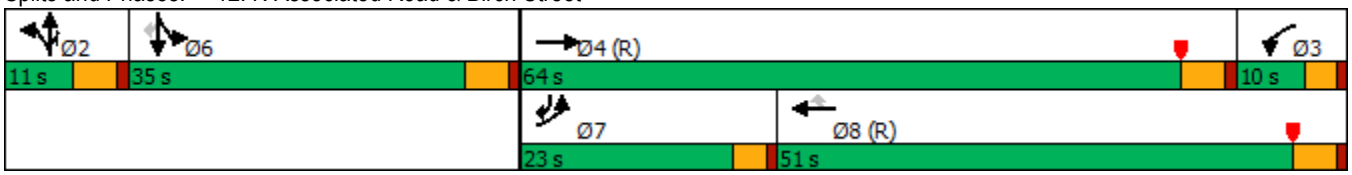
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

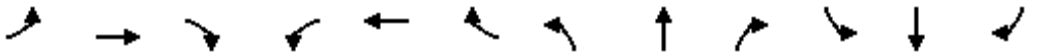
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: N Associated Road & Birch Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	848	10	2	641	11	47	1	39	11	0	18
Future Volume (vph)	26	848	10	2	641	11	47	1	39	11	0	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	200		0	140		225	120		0	0		0
Storage Lanes	1		0	1		1	1		0	0		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850		0.853				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1676	3346	0	1676	3353	1500	1676	1505	0	0	1676	1500
Flt Permitted	0.950			0.950			0.747				0.722	
Satd. Flow (perm)	1676	3346	0	1676	3353	1500	1318	1505	0	0	1274	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				64		53				100
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3055			1784			760			496	
Travel Time (s)		69.4			40.5			17.3			11.3	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.73	0.73	0.73	0.70	0.70	0.70
Adj. Flow (vph)	29	942	11	2	772	13	64	1	53	16	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	953	0	2	772	13	64	54	0	0	16	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6

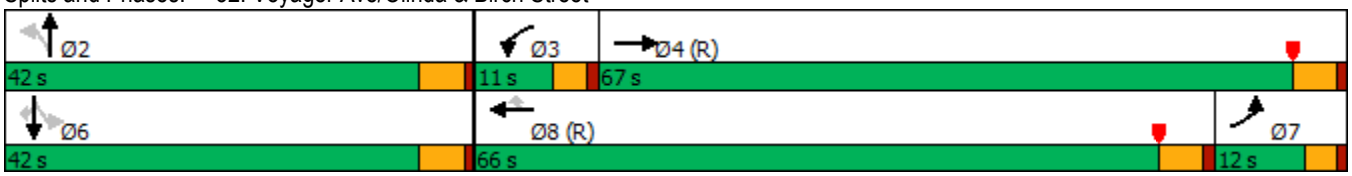


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	32.0	32.0	40.0	40.0		37.0	37.0	37.0
Total Split (s)	12.0	67.0		11.0	66.0	66.0	42.0	42.0		42.0	42.0	42.0
Total Split (%)	10.0%	55.8%		9.2%	55.0%	55.0%	35.0%	35.0%		35.0%	35.0%	35.0%
Maximum Green (s)	8.0	62.0		7.0	61.0	61.0	37.0	37.0		37.0	37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		18.0			20.0	20.0	28.0	28.0		25.0	25.0	25.0
Pedestrian Calls (#/hr)		2			2	2	2	2		2	2	2
Act Effct Green (s)	7.3	70.9		6.1	65.8	65.8	37.0	37.0			37.0	37.0
Actuated g/C Ratio	0.06	0.59		0.05	0.55	0.55	0.31	0.31			0.31	0.31
v/c Ratio	0.29	0.48		0.02	0.42	0.02	0.16	0.11			0.04	0.05
Control Delay	46.7	4.3		43.5	16.3	2.3	31.6	8.8			29.6	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	46.7	4.3		43.5	16.3	2.3	31.6	8.8			29.6	0.2
LOS	D	A		D	B	A	C	A			C	A
Approach Delay		5.5			16.1			21.1			11.4	
Approach LOS		A			B			C			B	
Queue Length 50th (ft)	24	46		1	222	0	36	1			9	0
Queue Length 95th (ft)	m35	131		m3	244	m2	57	19			20	0
Internal Link Dist (ft)		2975			1704			680			416	
Turn Bay Length (ft)	200			140		225	120					
Base Capacity (vph)	111	1978		97	1838	851	406	500			392	531
Starvation Cap Reductn	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn	0	0		0	0	0	0	0			0	0
Storage Cap Reductn	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio	0.26	0.48		0.02	0.42	0.02	0.16	0.11			0.04	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 114 (95%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 42.8%		ICU Level of Service A	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

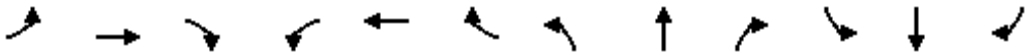
Splits and Phases: 32: Voyager Ave/Olinda & Birch Street



APPENDIX K-VI

EXISTING PLUS PROJECT TRAFFIC CONDITIONS – SYNCHRO QUEUEING

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	309	827	16	8	740	78	3	3	5	152	2	437
Future Volume (vph)	309	827	16	8	740	78	3	3	5	152	2	437
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	195		0	200		200	120		65	205		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.953	
Satd. Flow (prot)	1676	3343	0	1676	3353	1500	1676	1765	1500	1593	1598	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.953	
Satd. Flow (perm)	1676	3343	0	1676	3353	1500	1676	1765	1500	1593	1598	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				100			145			180
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1708			1966			417			1375	
Travel Time (s)		38.8			44.7			9.5			31.3	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.55	0.55	0.55	0.85	0.85	0.85
Adj. Flow (vph)	347	929	18	9	841	89	5	5	9	179	2	514
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	347	947	0	9	841	89	5	5	9	91	90	514
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Prot	Split	NA	pm+ov
Protected Phases	7	4		3	8		2	2	2	6	6	7
Permitted Phases						8						6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	33.0	33.0	11.0	11.0	11.0	35.0	35.0	10.0
Total Split (s)	35.0	64.0		10.0	39.0	39.0	11.0	11.0	11.0	35.0	35.0	35.0
Total Split (%)	29.2%	53.3%		8.3%	32.5%	32.5%	9.2%	9.2%	9.2%	29.2%	29.2%	29.2%
Maximum Green (s)	31.0	59.0		6.0	34.0	34.0	6.0	6.0	6.0	30.0	30.0	31.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag						Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max	Max	Max	Max	None
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	
Flash Dont Walk (s)		18.0			21.0	21.0				23.0	23.0	
Pedestrian Calls (#/hr)		2			2	2				2	2	
Act Effct Green (s)	28.5	67.0		6.0	36.5	36.5	6.0	6.0	6.0	30.0	30.0	63.5
Actuated g/C Ratio	0.24	0.56		0.05	0.30	0.30	0.05	0.05	0.05	0.25	0.25	0.53
v/c Ratio	0.87	0.51		0.11	0.82	0.17	0.06	0.06	0.04	0.23	0.23	0.59
Control Delay	41.6	11.0		39.8	29.4	1.7	56.0	55.7	0.4	34.6	34.7	13.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	11.0		39.8	29.4	1.7	56.0	55.7	0.4	34.6	34.7	13.4
LOS	D	B		D	C	A	E	E	A	C	C	B
Approach Delay		19.2			26.9			29.6			18.9	
Approach LOS		B			C			C			B	
Queue Length 50th (ft)	232	230		0	351	0	4	4	0	53	53	126
Queue Length 95th (ft)	m241	m230		m13	#429	m5	11	11	0	m86	m85	159
Internal Link Dist (ft)		1628			1886			337			1295	
Turn Bay Length (ft)	195			200		200	120		65	205		
Base Capacity (vph)	432	1867		83	1021	526	83	88	212	398	399	906
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.51		0.11	0.82	0.17	0.06	0.06	0.04	0.23	0.23	0.57

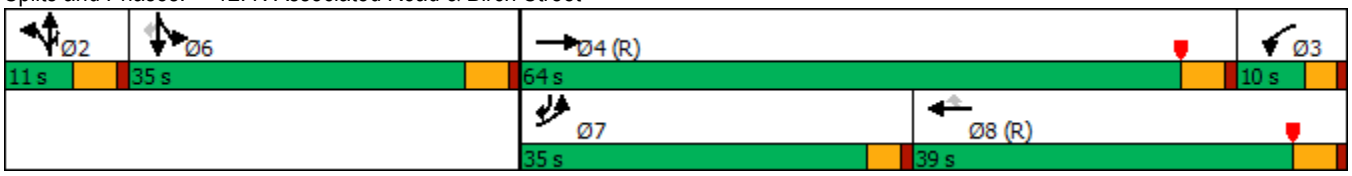
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 78 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 66.8%		ICU Level of Service C	
Analysis Period (min) 15			

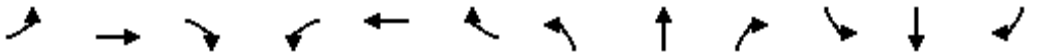
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

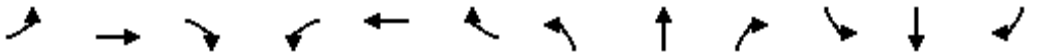
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: N Associated Road & Birch Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	595	74	31	508	127	27	23	16	75	2	93
Future Volume (vph)	95	595	74	31	508	127	27	23	16	75	2	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	200		0	140		225	120		0	0		0
Storage Lanes	1		0	1		1	1		0	0		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983				0.850		0.938				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1676	3296	0	1676	3353	1500	1676	1655	0	0	1684	1500
Flt Permitted	0.950			0.950			0.585				0.682	
Satd. Flow (perm)	1676	3296	0	1676	3353	1500	1032	1655	0	0	1204	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				172		28				221
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3055			1784			760			496	
Travel Time (s)		69.4			40.5			17.3			11.3	
Peak Hour Factor	0.76	0.76	0.76	0.74	0.74	0.74	0.57	0.57	0.57	0.42	0.42	0.42
Adj. Flow (vph)	125	783	97	42	686	172	47	40	28	179	5	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	880	0	42	686	172	47	68	0	0	184	221
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6

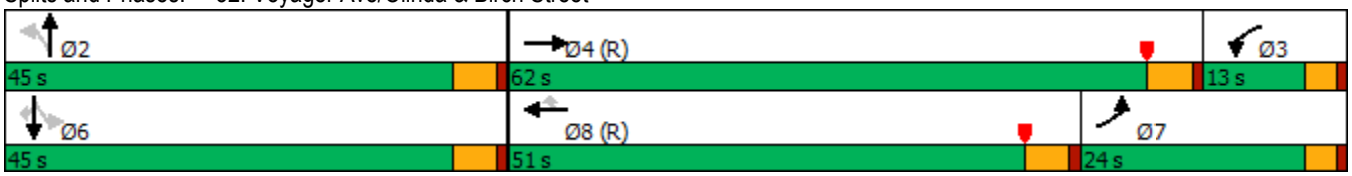


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	32.0	32.0	40.0	40.0		37.0	37.0	37.0
Total Split (s)	24.0	62.0		13.0	51.0	51.0	45.0	45.0		45.0	45.0	45.0
Total Split (%)	20.0%	51.7%		10.8%	42.5%	42.5%	37.5%	37.5%		37.5%	37.5%	37.5%
Maximum Green (s)	20.0	57.0		9.0	46.0	46.0	40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lag	Lead		Lag	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		18.0			20.0	20.0	28.0	28.0		25.0	25.0	25.0
Pedestrian Calls (#/hr)		2			2	2	2	2		2	2	2
Act Effct Green (s)	17.2	57.3		7.9	46.0	46.0	42.8	42.8			42.8	42.8
Actuated g/C Ratio	0.14	0.48		0.07	0.38	0.38	0.36	0.36			0.36	0.36
v/c Ratio	0.52	0.56		0.38	0.53	0.25	0.13	0.11			0.43	0.33
Control Delay	45.0	5.8		63.0	27.9	4.6	29.1	18.2			34.4	5.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	45.0	5.8		63.0	27.9	4.6	29.1	18.2			34.4	5.1
LOS	D	A		E	C	A	C	B			C	A
Approach Delay		10.6			25.1			22.6			18.4	
Approach LOS		B			C			C			B	
Queue Length 50th (ft)	103	56		32	226	40	25	21			111	0
Queue Length 95th (ft)	m139	19		m48	226	m41	34	28			74	0
Internal Link Dist (ft)		2975			1704			680			416	
Turn Bay Length (ft)	200			140		225	120					
Base Capacity (vph)	279	1582		125	1285	681	368	607			429	676
Starvation Cap Reductn	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn	0	0		0	0	0	0	0			0	0
Storage Cap Reductn	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio	0.45	0.56		0.34	0.53	0.25	0.13	0.11			0.43	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 101 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Voyager Ave/Olinda & Birch Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	911	11	5	1243	127	12	2	10	96	3	275
Future Volume (vph)	265	911	11	5	1243	127	12	2	10	96	3	275
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	195		0	200		200	120		65	205		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.955	
Satd. Flow (prot)	1676	3346	0	1676	3353	1500	1676	1765	1500	1593	1601	1500
Flt Permitted	0.950			0.950			0.950			0.950	0.955	
Satd. Flow (perm)	1676	3346	0	1676	3353	1500	1676	1765	1500	1593	1601	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				100			145			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1708			1966			417			1375	
Travel Time (s)		38.8			44.7			9.5			31.3	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.75	0.75	0.75	0.81	0.81	0.81
Adj. Flow (vph)	285	980	12	6	1381	141	16	3	13	119	4	340
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	285	992	0	6	1381	141	16	3	13	62	61	340
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Prot	Split	NA	pm+ov
Protected Phases	7	4		3	8		2	2	2	6	6	7
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	33.0	33.0	11.0	11.0	11.0	35.0	35.0	10.0
Total Split (s)	23.0	64.0		10.0	51.0	51.0	11.0	11.0	11.0	35.0	35.0	23.0
Total Split (%)	19.2%	53.3%		8.3%	42.5%	42.5%	9.2%	9.2%	9.2%	29.2%	29.2%	19.2%
Maximum Green (s)	19.0	59.0		6.0	46.0	46.0	6.0	6.0	6.0	30.0	30.0	19.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag						Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max	Max	Max	Max	None
Walk Time (s)		7.0			7.0	7.0				7.0	7.0	
Flash Dont Walk (s)		18.0			21.0	21.0				23.0	23.0	
Pedestrian Calls (#/hr)		2			2	2				2	2	
Act Effct Green (s)	19.0	67.0		6.0	46.0	46.0	6.0	6.0	6.0	30.0	30.0	54.0
Actuated g/C Ratio	0.16	0.56		0.05	0.38	0.38	0.05	0.05	0.05	0.25	0.25	0.45
v/c Ratio	1.08	0.53		0.07	1.07	0.22	0.19	0.03	0.06	0.16	0.15	0.46
Control Delay	98.3	16.2		35.0	57.4	2.2	60.3	55.0	0.6	32.6	32.6	18.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.3	16.2		35.0	57.4	2.2	60.3	55.0	0.6	32.6	32.6	18.1
LOS	F	B		C	E	A	E	D	A	C	C	B
Approach Delay		34.5			52.2			35.6			22.0	
Approach LOS		C			D			D			C	
Queue Length 50th (ft)	~246	324		5	~640	16	12	2	0	37	36	129
Queue Length 95th (ft)	m#290	m339		m5	m#650	m19	30	11	0	67	66	136
Internal Link Dist (ft)		1628			1886			337			1295	
Turn Bay Length (ft)	195			200		200	120		65	205		
Base Capacity (vph)	265	1868		83	1285	636	83	88	212	398	400	734
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.53		0.07	1.07	0.22	0.19	0.03	0.06	0.16	0.15	0.46

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 79 (66%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 40.9 Intersection LOS: D
Intersection Capacity Utilization 73.0% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

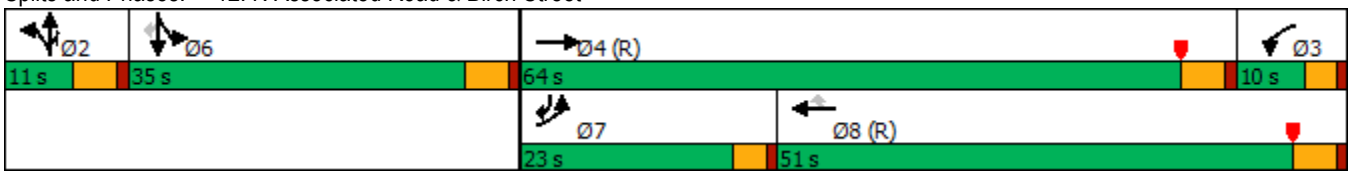
Queue shown is maximum after two cycles.

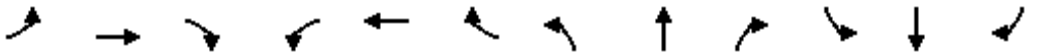
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

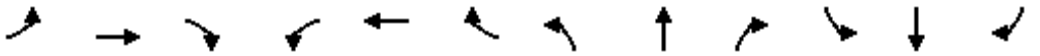
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: N Associated Road & Birch Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	908	10	2	680	11	47	1	39	11	0	18
Future Volume (vph)	26	908	10	2	680	11	47	1	39	11	0	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	200		0	140		225	120		0	0		0
Storage Lanes	1		0	1		1	1		0	0		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850		0.853				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1676	3346	0	1676	3353	1500	1676	1505	0	0	1676	1500
Flt Permitted	0.950			0.950			0.747				0.722	
Satd. Flow (perm)	1676	3346	0	1676	3353	1500	1318	1505	0	0	1274	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				64		53				100
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3055			1784			760			496	
Travel Time (s)		69.4			40.5			17.3			11.3	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.73	0.73	0.73	0.70	0.70	0.70
Adj. Flow (vph)	29	1009	11	2	819	13	64	1	53	16	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1020	0	2	819	13	64	54	0	0	16	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6

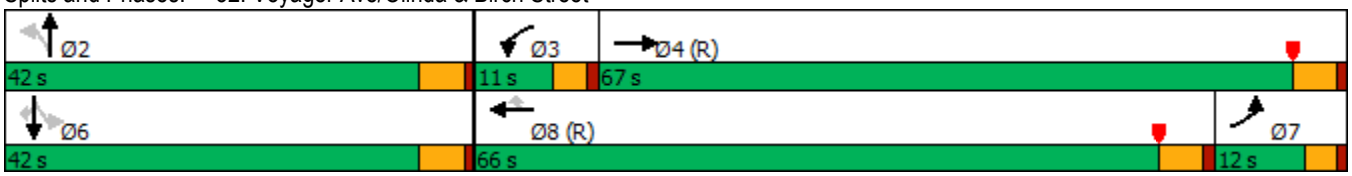


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	10.0	30.0		10.0	32.0	32.0	40.0	40.0		37.0	37.0	37.0
Total Split (s)	12.0	67.0		11.0	66.0	66.0	42.0	42.0		42.0	42.0	42.0
Total Split (%)	10.0%	55.8%		9.2%	55.0%	55.0%	35.0%	35.0%		35.0%	35.0%	35.0%
Maximum Green (s)	8.0	62.0		7.0	61.0	61.0	37.0	37.0		37.0	37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		18.0			20.0	20.0	28.0	28.0		25.0	25.0	25.0
Pedestrian Calls (#/hr)		2			2	2	2	2		2	2	2
Act Effct Green (s)	7.3	70.9		6.1	65.8	65.8	37.0	37.0			37.0	37.0
Actuated g/C Ratio	0.06	0.59		0.05	0.55	0.55	0.31	0.31			0.31	0.31
v/c Ratio	0.29	0.52		0.02	0.45	0.02	0.16	0.11			0.04	0.05
Control Delay	46.0	4.3		45.5	16.3	2.1	31.6	8.8			29.6	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	46.0	4.3		45.5	16.3	2.1	31.6	8.8			29.6	0.2
LOS	D	A		D	B	A	C	A			C	A
Approach Delay		5.5			16.2			21.1			11.4	
Approach LOS		A			B			C			B	
Queue Length 50th (ft)	24	50		1	233	0	36	1			9	0
Queue Length 95th (ft)	m33	150		m3	256	m1	57	19			20	0
Internal Link Dist (ft)		2975			1704			680			416	
Turn Bay Length (ft)	200			140		225	120					
Base Capacity (vph)	111	1978		97	1838	851	406	500			392	531
Starvation Cap Reductn	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn	0	0		0	0	0	0	0			0	0
Storage Cap Reductn	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio	0.26	0.52		0.02	0.45	0.02	0.16	0.11			0.04	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 114 (95%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 44.6%		ICU Level of Service A	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Voyager Ave/Olinda & Birch Street



Appendix O VMT Analysis

Appendices

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TECHNICAL MEMORANDUM

To:	Elizabeth Kim PlaceWorks	Date:	February 22, 2022
From:	Richard E. Barretto, P.E., Principal Zawwar Saiyed, P.E., Associate Principal Yi Li, Transportation Engineer I Linscott, Law and Greenspan, Engineers	LLG Ref:	2.18.4052.1

Subject: ***Vehicle Miles Traveled (VMT) Analysis for the Brea 265 Specific Plan, Brea***

As requested, Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit this Vehicle Miles Traveled (VMT) Analysis Technical Memorandum for the proposed Brea 265 Specific Plan (herein after referred to as "Project") in the City of Brea, Orange County, California. This Technical Memorandum presents the VMT screening criteria, analysis methodology, significance thresholds and VMT analysis. It should be noted that the approach and methodology outlined in this Technical Memorandum is consistent with the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)*, which provides additional detail on the language and analysis procedures described in this Technical Memorandum.

The Brea 265 Specific Plan is a master planned residential community consisting of 260.7 acres located in the City of Brea and unincorporated Orange County; although not a part of the Specific Plan, an additional 1.4 acres of open space located on the northeast corner of Valencia Avenue and Rose Drive has been included this resulting in a total overall acreage of 262.1 acres. The proposed Project is generally located east of the State Route (SR) 57 Freeway and north of SR-90 (Imperial Highway), towards the eastern portion of the City and is surrounded by existing residential neighborhood communities, the Brea Sports Park and Carbon Canyon Regional Park. The Specific Plan area is bisected by Valencia Avenue which runs in a north-south direction, and by Lambert Road which runs in an east-west direction. The Project site is located to the south of Lambert Road/Carbon Canyon Road, north of Rose Drive, east of Valencia Avenue and west of Carbon Canyon Regional Park. Of the 217.7 acres located within unincorporated Orange County, 123.2 acres is currently designated as "Hillside Residential", and 94.5 acres is designated as "Low Density Residential" land use in the City's General Plan. The 43-acre portion of the Project that is located within the City is designated as "Hillside Residential".

The following sections of this Technical Memorandum present the Project description, City of Brea's VMT screening criteria, analysis methodology, thresholds, VMT analysis and results.

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PROJECT DESCRIPTION

The proposed Project is a master planned residential community of low-density, medium-density, and high-density residential neighborhoods, parks, recreational amenities, and open space within thirteen (13) planning areas (PA) of the proposed specific plan. The Project will include a mix of approximately 1,100 residential dwelling units on 197.5 acres, up to 15.1 acres of parks/recreations uses, including up to 13 acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.1-acre Trail Staging Area, and 47.5 acres of open space/slopes. The proposed Project allows for a fire station and police substation on a 1.0-acre site on the northwest corner of Lambert and Valencia. Inclusion of 2.0 acres of Master Plan Right-of-way results in a total project acreage of 262.1 acres. Affordable housing units are also included as part of the total dwelling units proposed for the Project. The proposed Project would be phased and constructed based on market conditions. The proposed land uses would be linked together by an extensive trail network that will connect to the Tracks at Brea and other regional systems, as well as to the adjacent neighborhoods and off-site parks, open space, and surrounding employment centers and retail venues.

Per the Project's development tabulation, two (2) residential land use categories are proposed and consists of 450 "low density" DU, and 650 "medium density" DU, with 15.1 acres of parks/recreations uses, including up to 13-acres of Sports Park uses adjacent to the existing Brea Sports Park and a 2.1-acre Trail Staging Area. From review of the Project's details, the above-referenced land uses translate to the development of 450 single family detached DU, and 650 single family attached DU (i.e. townhomes, row homes, detached cluster homes, attached motorcourt homes, etc.). The proposed Sports Park component of the Project is essentially an expansion of the existing Brea Sports Park, that together will provide the Brea community and new residents of the Project with recreational opportunities.

Figure 1 presents a vicinity map for the Project site***.*** ***Figure 2*** presents an existing aerial of the Project site. ***Figure 3*** presents the proposed land uses by area for the proposed Project, prepared by *KTGY Architecture Planning.*

PROJECT SCREENING CRITERIA

Project screening is used to determine if a project will be required to conduct a detailed VMT analysis. The following section discusses the various screening methods outlined in the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)*, and outlines whether the Project will screen-out of further analysis, either in its entirety, or partially based on individual land uses.

Project components that screen-out are assumed to have no significant impact on transportation.

Step 1: Transit Priority Area (TPA) Screening

The *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)* states that:

- Projects located within a TPA[1] may be presumed to have a less than significant impact absent substantial evidence to the contrary. This presumption may NOT be appropriate if the project:
    1. Has a Floor Area Ratio (FAR) of less than 0.75;
    2. Includes more parking for use by residents, customers, or employees of the project than required by the City;
    3. Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the City of Brea, with input from the Southern California Association of Governments [SCAG]); or
    4. Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on currently available transit service in the City of Brea, there are no identified TPA's in the vicinity of the Project.

Based on the above, the Project does not screen-out of further analysis since it is not located in a TPA.

Step 2: Low VMT Area Screening

Based on the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020),* residential and office projects located within a low VMT-generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary as presented in *Attachment C Low VMT Area Map.*

Based on the above, the Project does not screen-out of further analysis since it is not located in a low VMT area per the Low VMT Area Map since it currently is within unincorporated Orange County and not presented in the Map for the City of Brea.

[1] A TPA is defined as a half mile area around an existing major transit stop or an existing stop along a high-quality transit corridor. Per the *Pub. Resources Code, § 21064.3* - 'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods. Further, per the *Pub. Resources Code, § 21155* - For purposes of this section, a 'high-quality transit corridor' means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

Step 3: Project Type Screening

The *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)* states that:

- The following uses can be presumed to have a less than significant impact absent substantial evidence to the contrary as their uses are local serving in nature:
    - Local parks
    - Local-serving retail uses less than 50,000 square feet
    - Community institutions (public libraries, fire stations, local government)
    - Affordable, supportive, or transitional housing
    - Project generating less than 110 daily vehicle trips

It should be noted that the Sports Park component of the Project does screen-out of further analysis and thus this project component is assumed to have no significant impact on transportation since it falls under the "local park" category. It should be noted that this was excluded as a model input.

Further, it should be noted that the residential components of the Project do not screen-out since they do not fall within the categories listed above and they are anticipated to generate more than 110 daily vehicle trips as presented in ***Table 1****.*

VEHICLE MILES TRAVELED (VMT) ANALYSIS METHODOLOGY

As required by the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)*, projects that do not screen-out through the steps above shall complete a full VMT analysis and forecasting through the Orange County Traffic Analysis Model (OCTAM) to determine if the Project is anticipated to have a significant VMT impact. This analysis shall include both "Project generated VMT" for the project TAZs and "Project effect on VMT" estimates under the four scenarios listed below:

- Baseline Conditions
- Baseline Plus Project
- Cumulative No Project
- Cumulative Plus Project

Based on the above, a full VMT analysis utilizing OCTAM has been conducted to determine the VMT for the Project and for the City of Brea and will provide the following:

- Project-generated VMT per Service Population
- Link-level Boundary Citywide VMT per Service Population

VEHICLE MILES TRAVELED (VMT) IMPACT THRESHOLDS

As previously discussed, a project that does not meet the screening criteria will require preparation of a detailed transportation analysis. The project VMT will be evaluated in order to determine if the project is expected to cause a significant transportation impact. The VMT significance criteria as stated in the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)* is detailed below.

- A project would result in a significant project-generated VMT impact if either of the following conditions are satisfied:
    - The baseline[2] or cumulative[3] project-generated VMT per service population exceeds the City of Brea General Plan Buildout VMT per service population.
- The project's effect on VMT would be considered significant if it resulted in either of the following conditions to be satisfied:
    - The baseline or cumulative link-level boundary Citywide VMT per service population increases under the plus project condition compared to the no project condition.

Please note that the cumulative no project scenario reflects the adopted Regional Transportation Plan/Sustainable Community Strategy (RTP/SCS); as such, if a project is consistent with the SCAG RTP/SCS, then the cumulative (project effect on VMT) shall be considered less than significant subject to consideration of other substantial evidence.

It is our understanding that the Project is consistent with the adopted Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS), thus the cumulative impacts are considered to be less than significant. Further, it should be noted that the cumulative analysis is provided for informational purposes only.

[2] The Baseline Year for the current OCTAM 5.0 is 2016.

[3] The Cumulative Year for the current OCTAM 5.0 is 2045.

Further, it should be noted that no phasing analysis has been conducted since it is not required per the City Guidelines.

VEHICLE MILES TRAVELED (VMT) ANALYSIS

Summarized in the section below are the VMT per Service Population values utilizing OCTAM for the City of Brea and the proposed Project. According to OCTAM, the Project is located in Traffic Analysis Zones (TAZs) 43, 52 and 53 (*Table 1* details the residential components and the corresponding TAZs) and the Project development totals were converted into Socio-Economic Data (SED) and inputted into OCTAM. ***Figure 4*** presents the TAZ Map from OCTAM.

VMT Impact Threshold for Project-Generated VMT

As shown below, the City of Brea General Plan buildout VMT per Service Population was calculated to be 30.1 VMT per Service Population. When compared to this figure, the Project baseline Project-generated VMT per Service Population is ***13.11%*** (TAZ 42), ***33.62%*** (TAZ 52) and ***5.37%*** (TAZ 53) below the City of Brea General Plan Buildout VMT per Service Population threshold and the cumulative Project-generated VMT per Service Population is ***11.33%*** (TAZ 42), ***39.77%*** (TAZ 52) and ***4.49%*** (TAZ 53) below the City General Plan Buildout VMT per Service Population threshold. Based on the criteria outlined in this report and the table below, the Project is not anticipated to have a Project-generated VMT impact.

Baseline Project-Generated VMT per Service Population			
Description	**Project**	**City of Brea General Plan Buildout**	**Compared to Thresholds (City of Brea)**
TAZ 43	26.1	30.1	13.11% Lower
TAZ 52	20.0	30.1	33.62% Lower
TAZ 53	28.4	30.1	5.37% Lower
Cumulative Project-Generated VMT per Service Population			
Description	**Project**	**City of Brea General Plan Buildout**	**Compared to Thresholds (City of Brea)**
TAZ 43	26.6	30.1	11.33% Lower
TAZ 52	18.1	30.1	39.77% Lower
TAZ 53	28.7	30.1	4.49% Lower

VMT Impact Threshold for Project's Effect on VMT

As shown below, the proposed Project baseline link-level Citywide VMT per Service Population is ***6.36***% below the "no Project" condition link-level Citywide VMT per

Service Population threshold and cumulative link-level Citywide boundary VMT per Service Population is ***5.36***% below the "no Project" condition link-level Citywide VMT per Service Population threshold. Based on the criteria outlined in this report, the Project link-level VMT per Service Population will not increase under the "plus Project" condition when compared to "no Project" condition and thus, the Project's effect on VMT is not anticipated to be significant.

Link-Level Boundary Citywide VMT per Service Population			
Description	**No Project Scenario**	**Plus Project Scenario**	**Compared to Thresholds (No Project Scenario)**
Baseline	15.42	14.44	6.36% Lower
Cumulative	14.55	13.77	5.36% Lower

It should be noted that as previously mentioned and according to the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)*, if a project is consistent with the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), then the cumulative impacts shall be considered less than significant. Since, the proposed Project is consistent with the RTP/SCS, the cumulative impacts are considered to be less than significant and the cumulative analysis is provided for informational purpose only.

It is noted that the Project-Generated VMT/SP for TAZ 52 for baseline and cumulative conditions, is 33.62% and 39.77% lower than the City of Brea General Plan Buildout VMT/SP, respectively, which is considered reasonable for the reasons listed below:

- The Olinda Elementary School enrollment is included in the service population calculation and its effect results in a reduction to the VMT per service population value.
- The Olinda Elementary School helps reduce the VMT since the residents of TAZ 52 drive a shorter distance.
- There is a major employment center just south of the Project site which also promotes shorter distances to be driven for employment.
- The VMT/SP under the base conditions (without Project) for TAZ 52 is significantly lower than the City of Brea General Plan Buildout VMT/SP.
- The Project population-density increases from 4.46 to 11.54 because of the multi-family homes. Population is included in the service population calculation and its effect results in a reduction to the VMT per service population value.

- The areas surrounding TAZ 52 are yellow (VMT/SP below City average) as presented in the *Attachment C Low VMT Area Map*.

Further, it should be noted that the model was developed, validated and adopted by OCTA. The VMT/SP for the three (3) Project TAZs in the base model (without the addition of the Project) are below the average city VMT/SP. The Project VMT/SP characteristics are similar to the TAZ VMT/SP characteristics. It should be noted that the VMT is per SP and not total VMT, hence with the addition of the Project, the service population driving per day change is nominal.

ACTIVE TRANSPORTATION AND PUBLIC TRANSIT ANALYSIS

According to the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)* potential impacts to public transit, pedestrian facilities and travel, and bicycle facilities and travel can be evaluated using the following criteria:

- A significant impact occurs if the project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

It should be noted that the proposed Project is consistent with the adopted policies, plans, or programs regarding active transportation or public transit facilities. Further, the proposed Project will not decrease the performance or safety of such facilities and does not have the potential to conflict with existing or proposed facilities supporting these travel modes.

Thus, based on the above, the Project is not anticipated to result in a significant impact on the City's active transportation facilities, the public transit system, or the safety of residents and patrons of those facilities and services.

CONCLUSION

Consistent with the *City of Brea Transportation Impact Analysis (TIA) Guidelines (dated September 2020)* and based on the VMT methodology, criteria, guidelines, thresholds and results outlined in this Technical Memorandum, the Project is not anticipated to result in a significant VMT impact nor will the Project's effect on VMT be considered significant under baseline or cumulative conditions. Furthermore, the Project is not anticipated to result in a significant impact on the City's active transportation facilities, the public transit system, or the safety of residents and patrons of those facilities and services.

LINSCOTT LAW & GREENSPAN engineers

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We appreciate the opportunity to provide this Technical Memorandum. Should you have any questions regarding the memorandum, please contact us at (949) 825-6175.

cc: File

LINSCOTT LAW & GREENSPAN engineers

TABLE 1
PROJECT TRIP GENERATION RATES AND FORECAST[4]

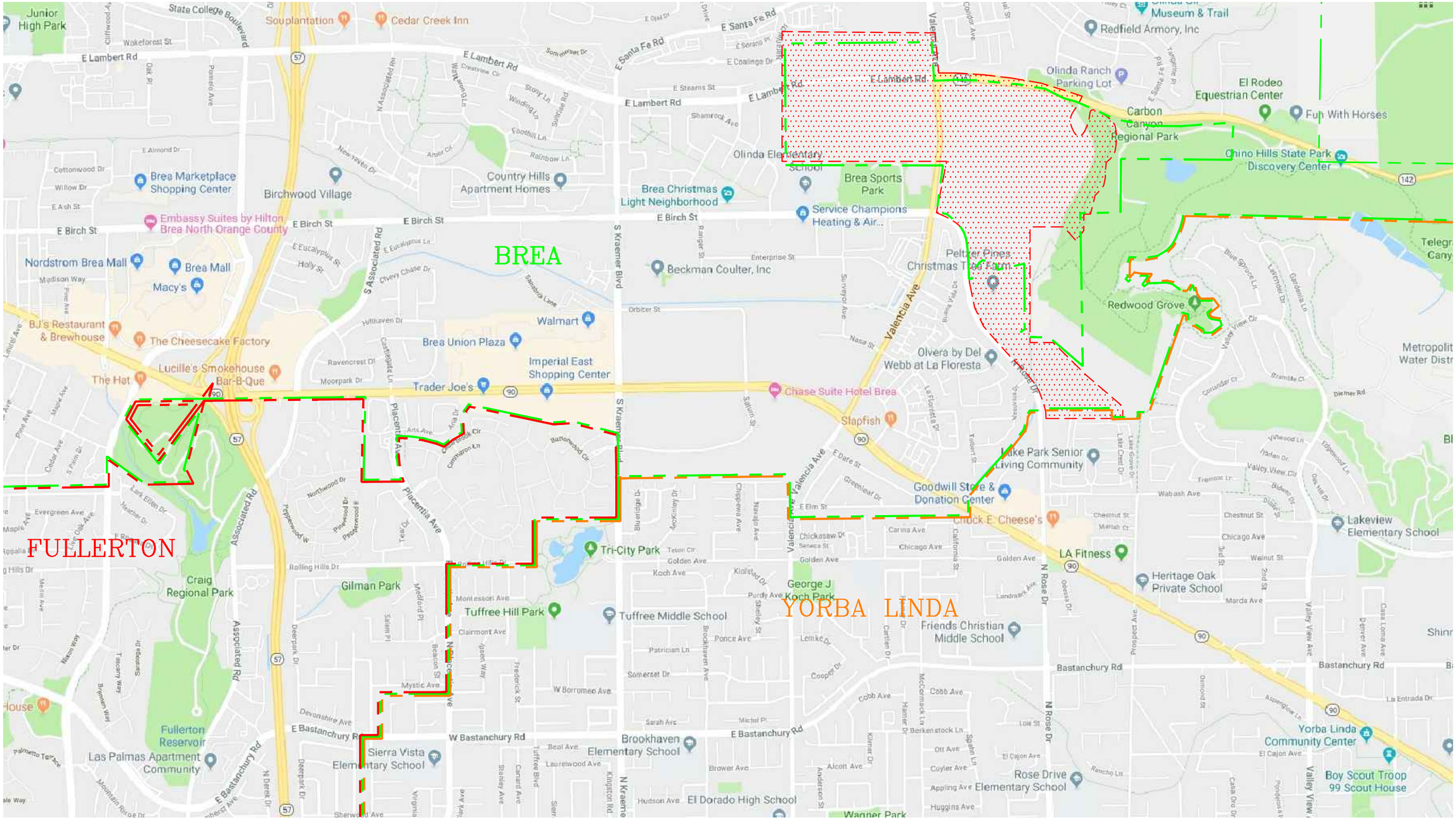
Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Rates:							
▪ 210: Single Family Detached Housing (TE/DU)	9.43	26%	74%	0.70	63%	37%	0.94
▪ 215: Single Family Attached Housing (TE/DU)	7.20	31%	69%	0.48	57%	43%	0.57
▪ 220: Multifamily Housing (Low-Rise[5]) (TE/DU)	6.74	24%	76%	0.40	63%	37%	0.51
▪ 488: Soccer Complex (TE/Field)[6]	71.33	61%	39%	0.99	66%	34%	16.43
Proposed Project Zone 1 (TAZ 43):							
▪ Single Family Homes (105 DU)	990	19	55	74	62	37	99
Proposed Project Zone 2 (TAZ 52):							
▪ Multifamily/Single Family Attached (507 DU)	3,650	75	168	243	165	124	289
▪ Sports Park (6 soccer fields)	428	4	2	6	65	34	99
Zone 2 Subtotal	*4,078*	*79*	*170*	*249*	*230*	*158*	*388*
Proposed Project Zone 3 (TAZ 53):							
▪ Single Family Homes (345 DU)	3,253	63	179	242	204	120	324
▪ Multifamily/Single Family Attached (143 DU)	1,030	21	48	69	46	36	82
Zone 3 Subtotal	*4,283*	*84*	*227*	*311*	*250*	*156*	*406*
Total Proposed Project	**9,351**	**182**	**452**	**634**	**542**	**351**	**893**

Notes:
TE/DU = Trip End per Dwelling Unit

[4] Source: *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2021).

[5] Low-Rise Multifamily Housing consists of buildings that are less than 3 levels.

[6] A soccer complex is an outdoor facility that is used for non-professional soccer games. It may consist of multiple fields. The size of each field within the land use may vary to accommodate games for different age groups. On-site amenities may include stadium seating, a fitness trail, an activities shelter, aquatic center, picnic grounds, basketball and tennis courts, and a playground.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

= PROJECT SITE

FIGURE 1

VICINITY MAP

BREA 265 SPECIFIC PLAN, BREA



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N NO SCALE

SOURCE: GOOGLE

KEY

= PROJECT SITE

FIGURE 2

EXISTING SITE AERIAL

BREA 265 SPECIFIC PLAN, BREA

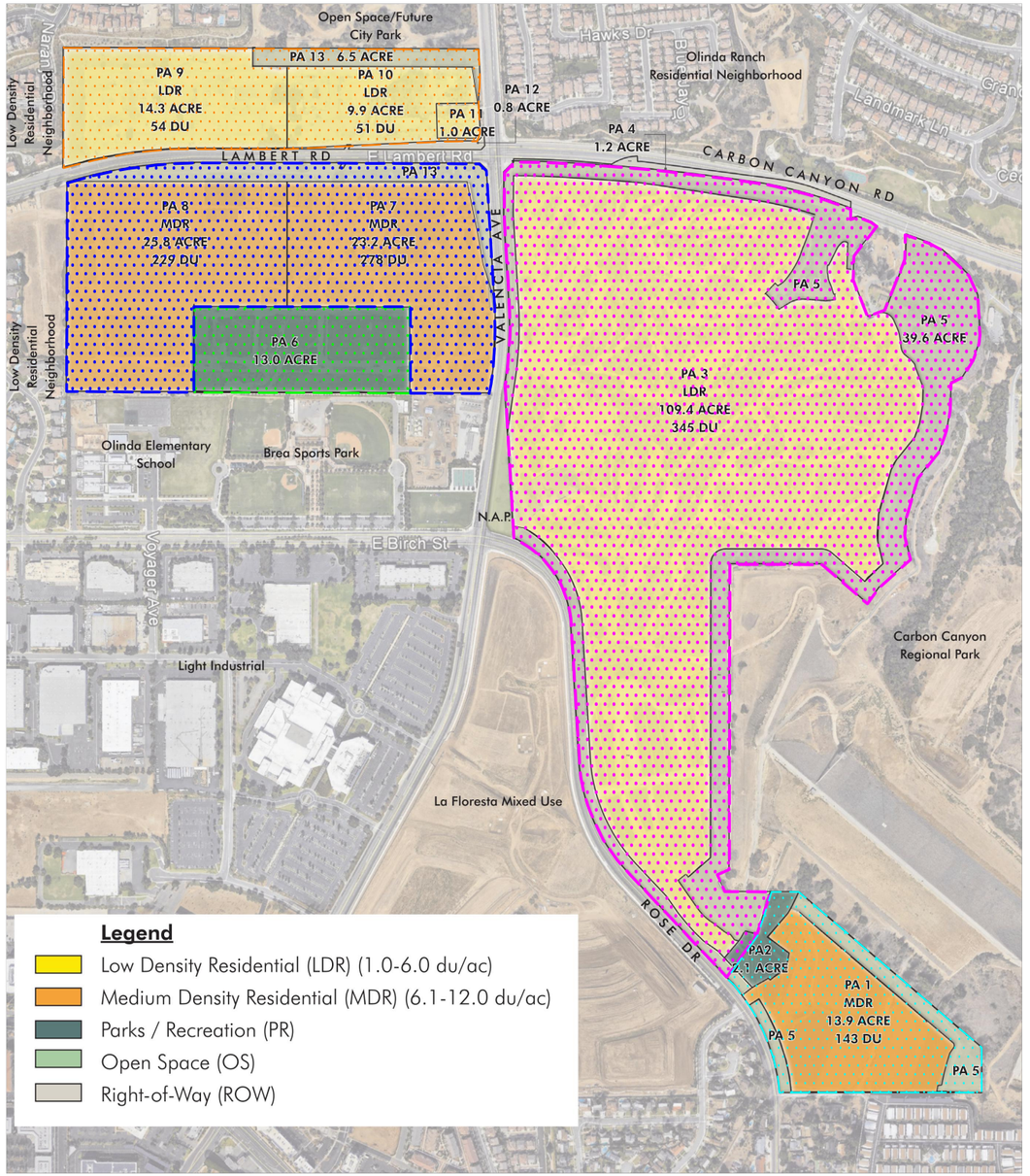
Table 3-1 Proposed Land Use Summary

Land Use	Gross Area (Acres)	Density Range (DU/AC)	Dwelling Units
Residential[1]			
Low Density Residential (LDR)	134.6	1.0 – 6.0	450
Medium Density Residential (MDR)	62.9	6.1 – 12.0	650
Residential Subtotal	197.5		1,100
Nonresidential			
Park/Recreation (PR)	15.1	n/a	n/a
Open Space (OS)[2]	47.5	n/a	n/a
Master Plan Right-of-Way	2.0	n/a	n/a
Nonresidential Subtotal	64.6	n/a	n/a
Total	262.1 acres	4.2	1,100 Units

[1] Units may be transferred between density designations and locations.
[2] Open Space category does not include private open space and recreation areas.

Table 3-2 Proposed Land Use Category Statistical Summary by Planning Area

Planning Area (PA)	Land Use Category	Gross Area (AC)	Density Range (DU/AC)[1]	Target Density (DU/AC)[2]	Dwelling Units (DU)[3]
1	MDR	13.9	6.1 – 12.0	10.3	143
2	PR	2.1	n/a	n/a	n/a
3	LDR	109.4	1.0 – 6.0	3.2	345
4	ROW	1.2	n/a	n/a	n/a
5	OS	39.6	n/a	n/a	n/a
6	PR	13.0	n/a	n/a	n/a
7	MDR	23.2	6.1 – 12.0	12.0	278
8	MDR	25.8	6.1 – 12.0	8.9	229
9	LDR	14.3	1.0 – 6.0	3.8	54
10	LDR	9.9	1.0 – 6.0	5.2	51
11[4]	LDR	1.0	1.0 – 6.0	n/a	n/a
12	ROW	0.8	n/a	n/a	n/a
13	OS	6.5	n/a	n/a	n/a
	Specific Plan Total	**260.7 acres**		**4.2**	**1,100**
Not-a-Part	OS	1.4	n/a	n/a	n/a
	Proposed Project Total	**262.1**	**n/a**	**n/a**	**1,100**



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: KTGY ARCHITECTURE+PLANNING

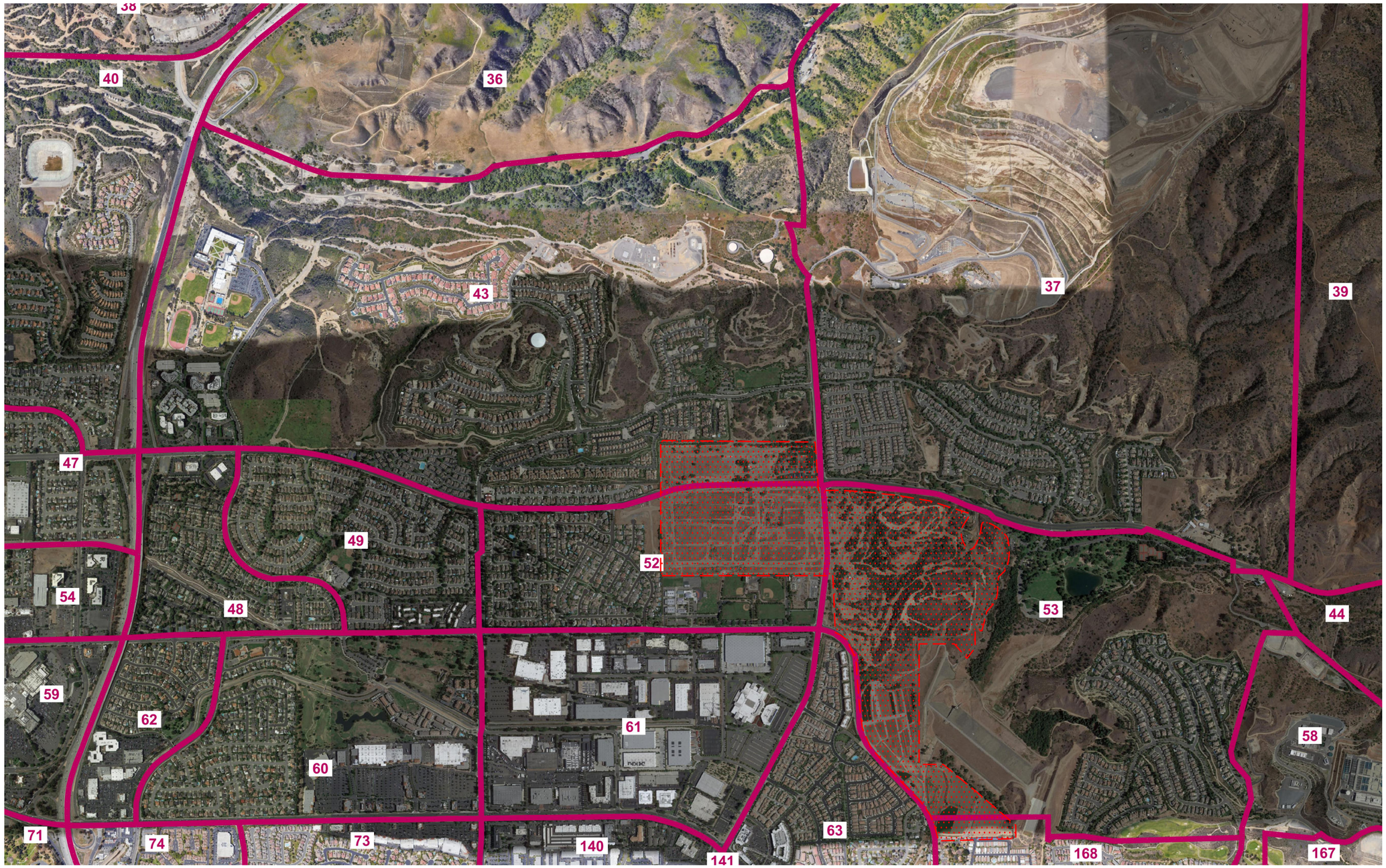
KEY
= ZONE 1
= ZONE 2A
= ZONE 2B
= ZONE 3A
= ZONE 3B

O-13

FIGURE 3

PROPOSED LAND USES BY AREA

BREA 265 SPECIFIC PLAN, BREA



SOURCE: OCTAM

KEY

= PROJECT SITE

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 4

TAZ MAP

BREA 265 SPECIFIC PLAN, BREA

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Appendix P Water Systems Analysis

Appendices

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PSOMAS

TECHNICAL MEMORANDUM

To: Elizabeth Kim

From: Kim Alexander

Date: March 3, 2022

Subject: Draft Brea 265 Water System Analysis

Proposed Project

The Brea 265 Specific Plan (Project) consists of the redevelopment of the project area by Aera Energy from active oil operations into a proposed master-planned residential community. The Project will provide for a mix of housing, parks and recreational uses, and open space that are compatible with the existing neighborhoods in the area. The Brea 265 Specific Plan provides a maximum of 1,100 dwelling units within two residential land use categories, designated as Low Density Residential (LDR) and Medium Density Residential (MDR). The Land Use Summary is shown in Table 1 based on the October 14, 2021 Draft Specific Plan.

Table 1
Land Use Summary

Land Use	AC	DU's
Residential		
Low Density Residential (LDR)*	134.6	450
Medium Density Residential (MDR)	62.9	650
Non-Residential		
Parks/Recreation (PR)	15.1	N/A
Open Space (OS)	47.0	N/A
Right-of-Way (ROW)	2.0	N/A
Total	**262.1**	**1,100**

*Includes 1-acre public safety/civic uses

City Water Demand

City water demands were developed and projected in the City's 2020 Urban Water Management Plan (UWMP) based on projections prepared by CDM Smith as part of the 2021 OC Water Demand Forecast for Municipal Water District of Orange County (MWDOC) and Orange County Water District (OCWD). The demand projections were made for the Orange County region as a whole and also provided retail agency specific demands based on collaboration with MWDOC and OCWD member agencies.

The CDM Smith forecast methodology began with a retail water agency survey that asked for FY 2017-18, FY 2018-19, and FY 2019-20 water use by major sector, including number of accounts. Given that FY 2017-18 was a slightly above-normal demand year (warmer/drier than average) and FY 2018-19 was a slightly below-normal demand year (cooler/wetter than average), water use from these two years were averaged to represent an average-year base water demand.

For the residential sectors (single-family and multifamily) the base year water demand was divided by households in order to get a total per unit water use (gallons per home per day). In order to split household water use into indoor and outdoor uses, three sources of information were used: (1) the Residential End Uses of Water (Water Research Foundation, 2016); (2) California's plumbing codes and landscape ordinances; and (3) California Department of Water Resources (DWR) Model Water Efficient Landscape Ordinance (MWELO) calculator.

Three different periods of residential end uses of water were analyzed as follows:

- Pre-2010 efficiency levels – Has an average indoor water use that is considered to be moderately efficient, also does not include the most recent requirements for MWELO.
- High-efficiency levels – Includes the most recent plumbing codes that are considered to be highly efficient, and also includes the most recent requirements for MWELO.
- Current average efficiency levels – Represents the weighted average between pre-2010 efficiency and high efficiency levels, based on average age of homes for each retail water agency.

For outdoor residential water use, the indoor per capita total was multiplied by each member agency-specific persons per household in order to get an indoor residential household water use (gallons per day per home), and then was subtracted from the base year total household water use for single-family and multifamily for each agency based on actual water use as reported by the agency surveys.

For existing residential homes, the current average indoor and outdoor water use for each member agency were used for the year 2020. It was assumed that indoor water uses would reach the high efficiency level by 2040. Based on current age of homes, replacement/remodeling rates, and water utility rebate programs it is believed this assumption is very achievable. It was also assumed that current outdoor water use would be reduced by 5% by 2050.

For new homes, the indoor high efficiency level was assumed for the years 2025 through 2050. Outdoor uses for new homes were assumed to be 25% and 30% lower than current household water use for single-family and multifamily homes, respectively. The resulting residential water demand projections utilized in the City's 2020 UWMP are shown in Table 2.

Table 2
Unit Water Use Factors from Brea 2020 UWMP

	2025	2030	2035	2040	2045
Residential Dwelling Units	**17,053**	**17,068**	**17,068**	**17,265**	**17,476**
Single-Family	9,579	9,594	9,594	9,622	9,628
Multi-Family	7,474	7,474	7,474	7,643	7,848
Residential Demand (AFY)	**4,797**	**4,724**	**4,646**	**4,603**	**4,622**
Single-Family	3,692	3,640	3,583	3,535	3,522
Multi-Family	1,105	1,084	1,063	1,068	1,100
Residential Unit Demand (gpd/du)					
Single-Family	344	339	333	328	327
Multi-Family	132	129	127	125	125
Population	*45,883*	*46,615*	*47,697*	*48,155*	*48,236*
Per-capita Residential Use	*93.3*	*90.5*	*87.0*	*85.3*	*85.5*

Source: City of Brea 2020 UWMP and Center for Demographic Research at California State University, Fullerton, 2020

Existing and projected population, single-family and multifamily households for each retail water agency were provided by the Center for Demographic Research at California State University Fullerton (CDR) under contract by MWDOC and OCWD. CDR provides historical and future demographics by census tracts for all of Orange County. Census tract data is then clipped to retail water agency service boundaries in order to produce historical and projected demographic data by agency.

The projected number of residential dwelling units and the calculated per dwelling unit demand for single-family and multi-family homes is shown in Table 2. The best representation for water use in water efficient homes is given by years 2040 and 2045. It was assumed in the demand projections that existing home indoor use would reach high efficiency levels by 2040 and new homes would start off as efficient. This results in water efficient residential use factors of 327 gpd/du for single-family homes and 125 gpd/du for multi-family homes shown for 2040 in Table 2. These factors are slightly higher than what a new home factor would be because outdoor use for existing homes was only reduced by 5% by 2050 when compared to existing outdoor use while for new homes it was reduced by 25% for single-family and 30% for multi-family homes when compared to existing outdoor use.

The City identified water demands from anticipated new development in the 2020 UWMP and the 2021 Water Master Plan (WMP), including Brea 265. The estimated water demand for Brea 265 of 545.9 AFY is documented in Table 3-4 of the UWMP and Table 4-14 of the WMP. This demand quantity was calculated in the WMP using a single water demand factor, for single-family residential use, applied to the entire project acreage. The various demand factors in the WMP were generated on a per-acre basis using billed water use data for 2019 divided by the corresponding land use acreage from GIS. The year 2019 was chosen as a representative year most closely matching the five-year average water use from 2015 through 2019. A per-acre factor was developed for residential uses, rather than a per dwelling unit factor, because the

City's GIS data did not include the number of dwelling units. The resulting demand factors for single-family and multi-family uses in the WMP combine many different densities and ages of housing products. This is an appropriate approach to estimating system-wide future water demands for the WMP as a high-level planning document. A separate and more detailed demand projection for the Proposed Project is presented below based on Specific Plan land use data, metered water use for similar housing products, and estimated irrigation water use.

Proposed Project Demand Factors

Domestic Demand

The Project area will contain all new construction with mandated water conservation measures in place. The City provided 2018 water use data for newer developments within their service area that have residential densities similar to the Proposed Project. The year 2018 was selected because it had the highest metered water use since 2015 and would provide conservative results for modeling purposes. The developments provided were Olinda Ranch, Blackstone, and La Floresta. The average calculated densities and average water demand per dwelling unit (du) for these developments are summarized in Table 3.

Table 3
2018 Average Water Use by Residential Development

Development	Land Use	AC	DU's	Average Density (du/ac)	Average Use (gpd/du)
Olinda Ranch	Very Low Density	41	63	1.5	762
PA 6 Blackstone	SFD	33	93	2.8	407
PA 5 Blackstone	SFD	25	100	4.0	352
PA 8 La Floresta	Zero Lot Line SFD	16	77	6.0	218
PA 3 Blackstone	SFD Cluster	49	261	6.5	145
PA 3 La Floresta	SFD Cluster	12	89	8.5	144
PA 7 La Floresta	Townhomes			15.0	122

The residential land use data for the Project was split into the area west of Valencia Avenue and the area east of Valencia Avenue to account for the lower density product to the east. The Project's residential land use types and densities were compared with the water use data in Table 3 to estimate Project water demand factors on a per dwelling unit basis. The proposed demand factors also take into account estimated sewer flow generation factors that were calculated using September 2019 sewer flow monitoring data collected as part of this Project and documented in the Draft Brea 265 Sewer System Analysis dated February 2, 2022. Sewer flow represents indoor water use with the remainder of the water demand attributed to outdoor (irrigation) use. The recommended residential water demand factors for the Proposed Project are shown in Table 4 along with the resulting average water demand. The residential water use factors for the Project are conservatively higher than those used in the City's 2020 UWMP for new residential development.

Table 4
Proposed Project Water Demand Factors for Residential Use

Proposed Land Use	Acres	du/ac	DU's	Factor (gpd/du)	Average Demand (gpd)
WEST LOW DENSITY RESIDENTIAL					
Low Density Residential (LDR)	25.2	4.2	105	380	39,900
Public Safety/Civic[(1)]					330
Medium Density Residential (MDR)	49.0	10.3	507	160	81,120
Subtotal	**74.2**	**8.2**	**612**	**198**	**121,350**
EAST HILLSIDE RESIDENTIAL					
Low Density Residential (LDR)	109.4	3.1	345	420	144,900
Medium Density Residential (MDR)	13.9	10.0	143	160	22,880
Subtotal	**123.3**	**4.0**	**488**	**344**	**167,780**
Total Domestic	**197.5**	**5.6**	**1,100**		**289,130**

(1) Included in LDR land use in Specific Plan (PA 11). Average flow assumes 6 personnel and 55 gpcd.

The Specific Plan breaks down residential use into Low Density Residential (LDR) and Medium Density Residential (MDR) as opposed to the Single-Family and Multi-Family Residential categories used in the 2020 UWMP. The LDR category provides for detached and attached single-family homes. The MDR products provides for detached and attached single-family homes, townhomes, condominiums, and duplexes. Both residential categories are classified based on residential density shown in Table 4. The LDR demand factor for the western Project area of 380 gpd/du is based on the average water use for Blackstone Planning Area (PA) 5 and PA 6 shown in Table 3. The factor is conservatively high given the lower density of these existing housing products. It also correlates with the sewer generation factor of 230 gpd/du, assuming that approximately 60 percent of the water demand will be indoor use (sewer flow) and 40 percent outdoor use for irrigation. The LDR factor for the eastern Project area of 420 gpd/du is based on the lower density Blackstone PA 6 development. This factor also correlates with the sewer flow factor used for this product of 250 gpd/du, assuming the same 60/40 indoor/outdoor ratio.

A factor of 160 gpd/du is assumed for MDR homes in both the eastern and western Project areas based on the Blackstone and La Floresta Cluster homes and La Floresta zero lot line detached homes. This is conservative given the higher density product within the Project areas compared to the Blackstone and La Floresta homes. The MDR product correlates with the estimated sewer flow by assuming 80 percent indoor use (sewer flow) and 20 percent outdoor use. The lower outdoor use is anticipated for the MDR homes due to limited yard/landscape areas within these products. Water demand for the common area landscaping is accounted for separately and is described below.

In addition to the residential land uses, the Specific Plan provides for a reserved site for public safety/civic uses within PA 11 which is designated in the LDR category. Water demand for this public use was calculated using and estimated 6 personnel on duty at any one time and a demand of 55 gallons per capita per day (gpcd). The estimate of personnel on duty was provided by City staff.

Landscape Irrigation Demand

The parks and recreation area within the Project includes a 13-acre sports park to the west of Valencia Avenue and a 2.1-acre park to the east of Rose Drive. State mandated water conservation measures require an outdoor water budget that is consistent with the Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) adopted by the State Water Resources Board in 2015. The MWELO requires the calculation of a maximum applied water allowance (MAWA) for outdoor water use that is no more than 55% of the reference evapotranspiration (ETo) rate for residential landscaping and 45% for commercial landscaping. A landscape irrigation factor of 2,040 gpd/acre was calculated for the Project residential areas based on the MAWA using the ETo data for Monrovia, CA, obtained from California Irrigation Management Information System (CIMIS) and an ETo adjustment factor (ETAF) of 0.55 (55% of the ETo) for residential areas. The Monrovia CIMIS station is the closest station to the Project site and the ETo for that station was 49.85 inches per year. The resulting common area irrigation water demand estimate for the Project is shown in Table 5. The irrigated acreage for the residential common areas was provided by the developer's engineer, Hunsaker & Associates, and the park area is included in the Project Specific Plan. As a cross-check, the irrigation demand for the sports park was calculated using the proposed site plan along with the ETo and estimated plant factor and irrigation efficiency. The result was an estimated 31 AFY for the parks and recreation area compared to 35 AFY derived using the MAWA calculation.

Table 5
Proposed Irrigation Demand Factors

Land Use	Acres	Factor (gpd/ac)	GPD
Irrigated Common Areas	65.00	2,040	132,602
Parks/Recreation	15.10	2,040	30,805
Total	**80.10**		**163,407**
Monrovia ETo (in/yr)	49.85		

Total Demand

New developments are required to comply with current water conservation standards and are expected to have lower than average demand when compared to current City-wide use. As such, the recommended factors utilized in this analysis are sufficiently conservative and appropriate for planning purposes. The projected water demand for the Project, utilizing the factors described above, is summarized in Table 6. The required water supply for the Project would take into

account water losses through the system. Using a 5 percent water loss, consistent with the 2020 UWMP, the total supply requirement equals 532 AFY.

Table 6
Water Demand Summary

Water Use	gpd	AFY
Residential	289,130	323.9
Irrigation	163,407	183.0
Total Water Demand	**452,537**	**507**

The population for the proposed Project is estimated using the factors utilized in the Project Environmental Impact Report (EIR) of 2.82 persons per du. The resulting population estimate is 3,102 for the Project. Using this population estimate and the calculated Project residential demand, the resulting residential per capita water use is equal to 93 gpd. In comparison, using data from the 2020 UWMP for year 2045 (water efficient homes), the residential per capita water use is equal to 86 gpd, again showing that Project water demand estimates used in this analysis are conservative, but reasonable.

Model Analysis

Water service will be provided to the proposed Project by the City of Brea from two pressure zones. For the Project area west of Valencia Avenue, at least two connections will be made to the City's 790 Zone to form a looped system. It is recommended that two connections are made to the City's 790 Zone pipeline in Valencia Avenue with a potential third connection point to the City pipeline in Lambert Road. Pressures will be reduced from the 790 Zone, through pressure reducing valves (PRVs), to a hydraulic grade line (HGL) of approximately 655 feet, providing static service pressures between approximately 60 and 80 psi. East of Valencia Avenue, the northern portion of the Project area will have at least two connections to the City's 790 Zone pipeline in Valencia Avenue with pressures reduced through PRVs, similar to the western project area, with a HGL of approximately 655 feet. The southern portion of the eastern Project area will have at least two looped connections to the City's 605 Zone pipeline along Rose Avenue. This service area does not require PRVs.

Onsite Water System

The onsite service pressures and fire flow were modeled utilizing the City's existing hydraulic model in InfoWater software by Innovyze. The conceptual backbone water system was incorporated into the model based on preliminary Project grading. The model junction map is included in Appendix A.
The system was evaluated using the following design criteria based on the City's 2021 Water System Master Plan Update (2021 WMP):

- Minimum service pressure of 40 psi during peak hour
- Maximum static service pressure of 80 psi, above which individual pressure regulators are required

- Minimum fire pressure of 20 psi during maximum day demand conditions
- Assumed fire flow of 1,500 gpm for single family residential and 2,500 gpm for multi-family residential use with actual flows to be determined by the local fire authority
- Pipeline velocity below 7 fps for non-fire flow conditions and below 15 fps for fire flow conditions

Maximum day and peak hour demands were estimated using the Project demand calculations above for average day and the peaking factors documented in the 2021 WMP as shown in Table 7. Maximum day demand is calculated using a peaking factor of 1.59 times the average demand and peak hour demand is calculated using a peaking factor of 3.00 times the average day demand.

Table 7
Water Demand Peaking

Water Demand	Factor	gpm
Average Day Demand	1.00	314
Maximum Day Demand	1.59	500
Peak Hour Demand	3.00	943

Model simulations indicate that the City's existing water system can supply sufficient service pressure and fire flow to the Project area to meet the above design criteria. Model output for peak hour and maximum day demand plus fire flow conditions is included in Appendix A for the conceptual, onsite water system. The final system must be designed appropriately based on the required fire flow as stipulated by the local fire authority but based on all new residential developments requiring fire sprinkler systems the assumptions used in the model should be conservative.

Off-site Water System

The City's water system was evaluated to determine impacts of Project demands on the existing distribution system and the potential for off-site improvement requirements. The City's water system model was updated as part of the 2021 WMP. Additionally, potential capital improvement projects were identified related to both existing and buildout conditions (including Brea 265). The City has experienced difficulty filling Valencia Reservoir during peak demand months. Because the Project area is in the vicinity of and would be supplied from the Valencia Reservoir, Project demands would aggravate the already strained conditions. This water supply analysis uses the existing model to evaluate specific offsite pump station and pipeline improvements needed to serve the increased demand from the Project while also providing sufficient supply capacity to Valencia Reservoir and the areas it serves.

Increased pumping capacity at Berry Street Booster Pump Station (BPS) was identified in the WMP as an improvement to meet existing system deficiencies. The existing high-pressure pumps (790 Zone) do not have enough capacity to supply maximum day demand with the largest pump out of service as required under primary booster pump design criteria. As such, the WMP recommended an additional high-pressure pump at Berry Street BPS. A minimum capacity of 1,191 gpm was identified to meet existing deficiencies and a minimum capacity of 1,778 gpm to

meet future demands including the Project. The WMP also identified pipeline improvements along Valencia Avenue, between Birch Street and Lambert Road and from the Valencia Reservoir inlet/outlet line to Sandpiper Way, to eliminate bottlenecks in the system that supplies Valencia Reservoir and meet pipeline velocity design criteria. These pipelines are to be upsized from 12-inch to 24-inch in diameter which will match the diameter of the exiting 24-inch pipeline between these two segments along Valencia Avenue between Lambert Road to Sandpiper Way. The locations of the proposed pipeline improvements are illustrated in Appendix B. These capital improvement projects increase both pumping and pipeline capacities available to supply Valencia Reservoir, though they were not specifically evaluated for that purpose. Additionally, the pipeline improvements would reduce friction losses to the reservoir, thus requiring less added head at the pump station and ultimately lower energy costs.

The existing WMP model was updated to run extended period simulations (EPS) to better evaluate the emptying and filling of Valencia Reservoir under existing and proposed improved conditions. City staff provided hourly reservoir levels for a peak summer period from August 29 through September 2, 2021. Valencia Reservoir levels dropped from a high of about 24 feet (60 % full) down to about 16 feet in two days and then fluctuated between 16 (40 % full) and 19 feet (48 % full) during the peak period while the other reservoirs were able to maintain water levels. Valencia Reservoir is filled directly from Berry Street BPS and is located farthest from this primary source of water supply to the City. The remaining reservoirs are either at lower elevations and filled through altitude valves or at higher elevations and filled through and intermediate booster pump stations. Both of these controls allow for the other reservoirs to be easily filled.

Hourly imported water supply rates from California Domestic Water Company (CDWC) at Berry Street BPS and the calculated hourly volume change at the City's reservoirs were used to estimate the City's demand peaking. The average hourly volume of water entering the distribution system was divided by the average demand for the entire period to develop a universal demand peaking curve for input into the EPS model. City staff provided control data for Berry Street BPS (used to fill Valencia Reservoir), Tonner BPS (used to fill Tonner Reservoir), and the altitude valves that are used to fill Westside and Eastside Reservoirs (also from Berry Street BPS). This data was also incorporated into the EPS model. Simulations for consecutive maximum day demands over a 72-hour period demonstrate the existing conditions, with Valencia Reservoir emptying and then remaining at low levels while the other reservoirs maintain water levels. This is due to the combination of pipeline friction losses to Valencia Reservoir and the lower discharge head at Berry Street BPS during high flow rates simulated along the existing pump curves.

The proposed pipeline improvements along Valencia Avenue and up to the Reservoir were incorporated into the model for proposed conditions and simulations were conducted to evaluate the proposed increased pumping capacity to the 790 Zone at Berry Street BPS. The pipeline improvements alone increase flow to Valencia Reservoir but do not provide sufficient supply to maintain water levels. Results indicate that increasing the discharge pressure at Berry Street BPS does allow water levels to be maintained. The City did not have SCADA data available for Berry Street BPS but the control data provided indicates a discharge pressure range between 170 and 197 psi at the pumps. The pumps operate along pump curves which supply higher flow rates at a

lower discharge pressure or lower flow rates at a higher discharge pressure. To fill the reservoir, increasingly higher head is needed as water levels in the reservoir increase.

The existing pumps provide a total dynamic head (TDH) of approximately 409 feet at peak flows. During maximum day demand EPS simulations, the resulting discharge pressure fluctuates between approximately 170 and 175 psi. Simulated average day demand indicates discharge pressures of approximately 180 psi at the BPS. Increasing the TDH at the BPS to approximate 425 feet at peak flow rates results in a discharge pressure of approximately 182 psi and allows Valencia Reservoir to maintain water levels over consecutive maximum days. This required discharge pressure is well within the existing discharge pressure range at the pump station and would not over pressurize the system. The proposed pump could be utilized during peak flow conditions to allow for higher flow rates at a higher discharge pressure without over pressurizing the system. Proposed Project demands were also added to the improved system with similar results. Modeled water levels at Valencia Reservoir both before and after the proposed improvements are included in Appendix B. These simulations include only water supply from CDWC through Berry Street BPS with no imported water from MWD.

The ability to fill Valencia Reservoir with the high-pressure pumps at Berry Street BPS is limited by the capacity of the I-Line from CDWC that supplies the Berry Street Reservoir on the suction side of the pump station. The existing maximum day demand of approximately 8,600 gpm, documented in the WMP, is already approaching the maximum capacity of the I-Line documented as 20 cfs (9,000 gpm) in Table 2-7 of the City's WMP. The current combined capacity of the Berry Street BPS for both the low-pressure (515 Zone) and high-pressure (790 Zone) pumps is 10,500 gpm, exceeding the capacity of the supply line. Higher pumping rates, above the capacity of the I-Line, can only be maintained for a limited period by utilizing storage at Berry Street Reservoir. With projected demand increases documented herein and in the Brea 265 Water Supply Assessment, including the Project, supplemental supply will be needed from MWD to meet demands and maintain water levels in storage tanks, including Valencia Reservoir.

Conclusion

Onsite water service and fire flow for the Project can be provided by the City's existing water distribution system within the required design criteria. The Project areas located east and west of Valencia Avenue will be served off of the City's 790 Zone through PRV's. The Project area located east of Rose Drive will be served directly off of the City's 605 Zone. The City's 605 Zone is also served off of the 790 Zone through PRVs.

The Project adds an average day demand of approximately 300 gpm and a maximum day demand of approximately 500 gpm, supplied primarily through the combination of Valencia Reservoir and the Berry Street high-pressure pumps (790 Zone). This system is already strained during peak demand conditions and the City is unable to maintain water levels in Valencia Reservoir. There is also an existing pumping deficiency in the 790 Zone. Added demands from the Project would exasperate these issues.

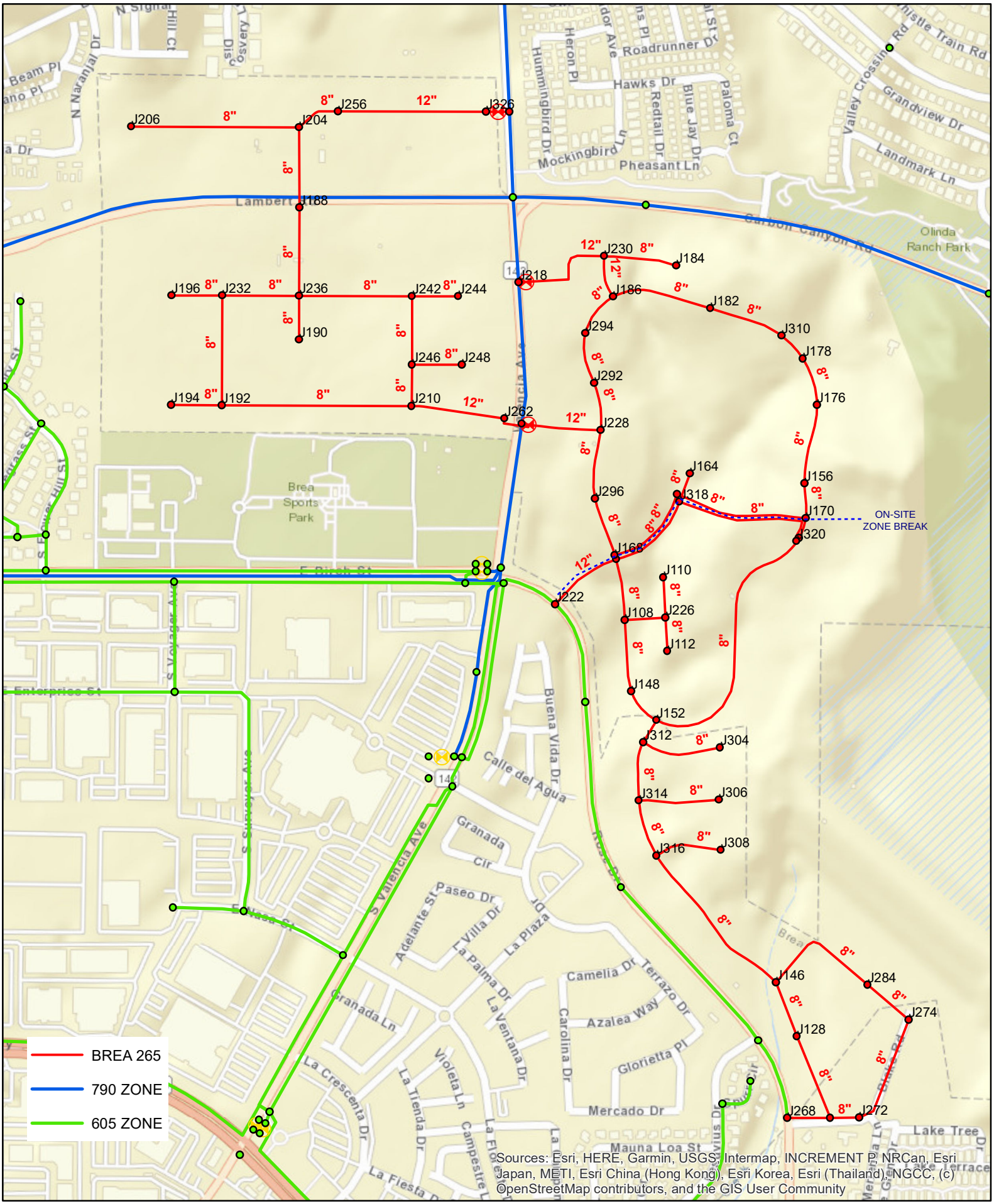
It is recommended to increase the capacity and discharge head to the 790 Zone at Berry Street BPS. There are three existing high-pressure pumps and a new fourth pump would be added to meet maximum day demands with one pump out of service. The capacity identified in the WMP

of 2,000 gpm for the new pump is recommended. Additionally, the fourth pump may be utilized to increase discharge head during peak flow rates (approximately 7,000 gpm) by operating with the other three pumps to provide a TDH from the pump station of at least 425 feet. Prior to selecting a new pump and the future operation of the Berry Street BPS, it is recommended to collect SCADA data for pump station under existing conditions, including flow rates and discharge head/pressure, to confirm the existing operation of the system and the model results. The modeled flow rates for both the low-pressure (515 Zone) and high-pressure (790 Zone) pumps are impacted by many factors including the large number of PRV's in the system and flow from the upper to the lower zone.

It is recommended that new 24-inch pipelines in Valencia Avenue be constructed to increase system capacity to fill Valencia Reservoir. This allows for a lower discharge head at Berry Street BPS and lower energy costs due to reduced friction losses. Approximately 1,270 LF of new 24-inch pipeline is recommended from the Reservoir inlet/outlet to Sandpiper Way, replacing existing 12-inch pipeline. Approximately 2,060 LF of new 24-inch pipeline is recommended from Lambert Road to Birch Street. The WMP noted that the existing 12-inch pipeline along Valencia Avenue, between Lambert Avenue and Birch Street, is in good condition and may be repurposed in the proposed reduced zone serving the Project once the new 24-inch pipeline improvement is constructed.

cc: Mike Swan, PSOMAS

APPENDIX A
Onsite Model Output



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

PSOMAS

Conceptual On-site Water System Model Junction Map

BREA 265 CONCEPTUAL ON-SITE WATER SYSTEM SIMULATIONS

PEAK HOUR DEMAND SIMULATION

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J326	34.6	530	656	54.8
J230	0.0	508	656	64.3
J184	20.1	514	656	61.7
J186	0.0	501	656	67.3
J294	20.1	495	656	69.9
J256	35.4	510	656	63.4
J292	20.1	486	656	73.8
J228	0.0	476	656	78.1
J182	21.0	513	656	62.1
J262	0.0	483	656	75.1
J296	29.0	461	656	84.6
J168	0.0	445	656	91.6
J162	0.0	458	656	85.9
J310	21.0	506	656	65.1
J154	0.0	472	656	79.8
J156	18.4	486	656	73.8
J170	12.0	477	656	77.7
J176	13.2	500	656	67.7
J178	21.0	529	656	55.1
J210	17.7	478	656	77.2
J204	36.2	506	656	65.1
J206	36.2	498	656	68.5
J246	21.1	484	656	74.6
J248	21.1	486	656	73.7
J188	23.4	505	656	65.5
J190	17.7	482	656	75.4
J192	29.7	467	656	81.9
J236	23.4	488	656	72.8
J242	41.4	489	656	72.4
J194	29.7	470	656	80.6
J232	29.7	482	656	75.4
J244	41.4	490	656	71.9
J196	29.7	477	656	77.6
J222	0.0	443	592	64.8
J106	0.0	445	592	63.9
J108	0.0	434	592	68.6
J318	0.0	456	592	59.3
J112	0.0	429	592	70.8
J164	32.8	459	592	57.8
J226	0.0	435	592	68.2
J268	0.0	402	592	82.5
J110	32.8	440	592	66.0

MDD PLUS FIRE FLOW SIMULATION

ID	Static Pressure (psi)	Static Head (ft)	Available Hydrant Flow at 20 psi (gpm)
J256	63	656	7,606
J294	70	656	6,918
J292	74	656	7,185
J162	86	656	4,482
J162	86	656	4,482
J168	92	656	5,390
J168	92	656	5,390
J296	85	656	6,059
J154	80	656	3,600
J170	78	656	3,891
J266	66	656	2,197
J188	66	656	5,352
J188	66	656	5,352
J246	75	656	6,441
J248	74	656	4,260
J190	76	656	4,295
J242	72	656	5,589
J192	82	656	5,103
J232	76	656	5,086
J244	72	656	3,919
J244	72	656	3,919
J222	69	603	3,576
J106	69	603	3,425
J108	73	603	3,228
J110	71	603	2,427
J112	76	603	2,575
J164	63	603	2,397
J318	64	603	2,657
J148	80	603	3,295
J268	87	603	3,495
J270	87	603	3,465
J272	86	603	3,329
J276	85	603	2,578
J278	85	603	2,682
J282	85	603	3,065
J320	57	603	2,234
J128	85	603	3,292
J146	84	603	3,236
J152	80	603	3,299
J274	84	603	3,221
J284	84	603	3,235
J312	81	603	3,224

BREA 265 CONCEPTUAL ON-SITE WATER SYSTEM SIMULATIONS

PEAK HOUR DEMAND SIMULATION

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J270	0.0	403	592	82.1
J272	0.0	404	592	81.6
J320	15.8	472	592	52.2
J148	0.0	419	592	75.1
J128	0.0	407	592	80.3
J152	0.0	419	592	75.1
J146	35.0	410	592	79.0
J274	35.0	409	592	79.4
J284	0.0	410	592	79.0
J312	0.0	417	592	76.0
J304	34.6	435	592	68.2
J314	0.0	412	592	78.1
J316	0.0	412	592	78.1
J306	34.6	430	592	70.3
J308	34.6	426	592	72.1

MDD PLUS FIRE FLOW SIMULATION

ID	Static Pressure (psi)	Static Head (ft)	Available Hydrant Flow at 20 psi (gpm)
J304	73	603	2,381
J306	75	603	2,362
J308	77	603	2,429
J316	83	603	3,047

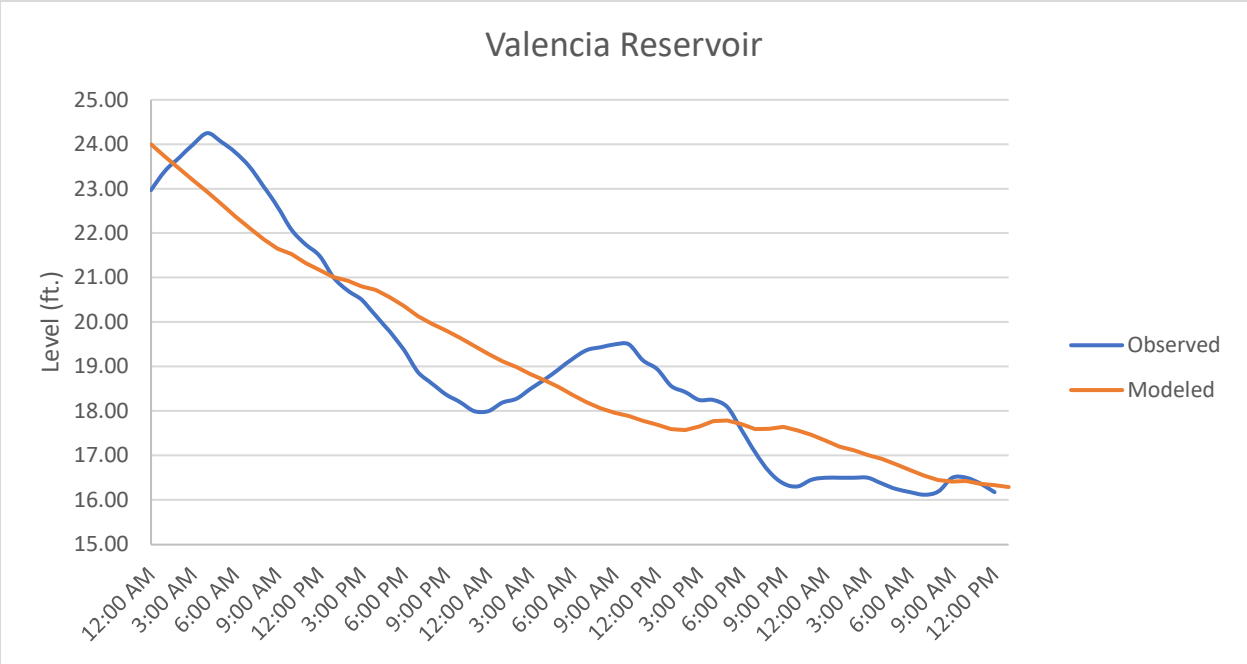
APPENDIX B

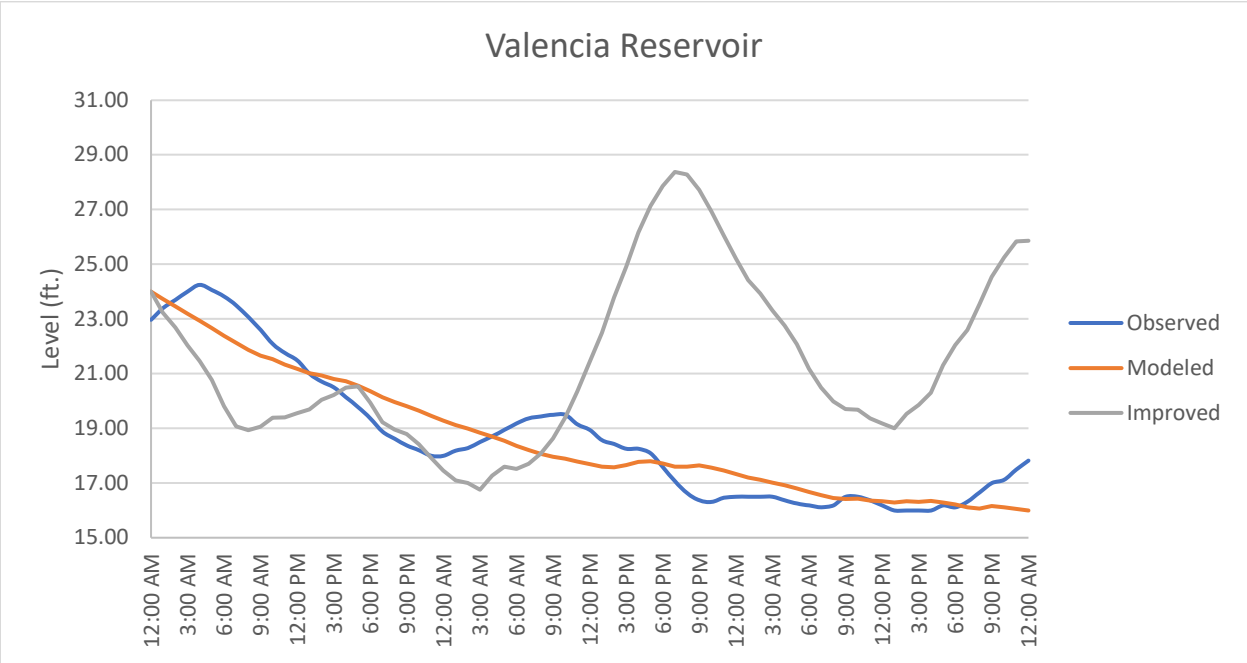
Off-site System Improvements

2021 BREA WATER MASTER PLAN
Valencia Avenue Pipeline Improvements



MAXIMUM DAY DEMAND – SIMULATED AND OBSERVED WATER LEVELS





Appendix Q Water Supply Assessment

Appendices

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BREA 265
WATER SUPPLY ASSESSMENT

March 2022

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CITY OF BREA

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ABBREVIATIONS/ACRONYMS

AF	Acre-feet
AFY	Acre-feet per year
CDR	Center for Demographic Research
CEQA	California Environmental Quality Act
CGBC	California Green Building Standards Code
City, Brea	City of Brea
CRA	Colorado River Aqueduct
CVP	Central Valley Project
DU	Dwelling Unit
DWR	California Department of Water Resources
EIR	Environmental Impact Report
FY	Fiscal Year
GMP	Groundwater Management Plan
Gpd	Gallons per day
gpm	Gallons per minute
IID	Imperial Irrigation District
IRP	Integrated Resources Planning
MAF	Million acre-feet
MCL	Maximum Contaminant Level
Metropolitan, MWD	Metropolitan Water District of Southern California
MG	Million gallons
MWDOC	Municipal Water District of Orange County
MWELO	Model Water Efficient Landscape Ordinance
OC	Orange County
QSA	Quantification Settlement Agreement
RA	Replenishment Assessment
SB	Senate Bill
SDCWA	San Diego County Water Authority
SWP	State Water Project
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment
WSAP	Water Supply Allocation Plan
WSDM	Water Surplus and Drought Management
WUE	Water Use Efficiency

EXECUTIVE SUMMARY

This Water Supply Assessment (WSA) has been prepared for the Brea 265 Specific Plan Project (the "Proposed Project") in accordance with applicable sections of the Public Resources Code and California Water Code as referenced in Senate Bill (SB) 610.

The Proposed Project encompasses approximately 265 acres located north of State Route 90 (SR 90) and east of State Route 57 (SR 57) in the City of Brea and in the City of Brea's Sphere of Influence. See Figure ES-1. The Proposed Project consists of the redevelopment of the project area by Aera Energy from active oil operations into a proposed master-planned community. The specific plan is a direct reflection of the City's foundational planning strategies which includes a resident-driven strategic plan adopted in 2017.

The purpose of this WSA is to provide information to verify that there is sufficient water supply to the City to provide for the Proposed Project now and into the future. This WSA develops the water demands that the City will need to serve because of the land use changes in the Proposed Project area, as addressed in the specific plan. The proposed land use changes and commensurate additional water demand requires the preparation of a WSA.

The Proposed Project would allow development of up to 1,100 dwelling units with parks and open space, and as such, necessitates the preparation of a WSA because the project exceeds at least one of the minimum development thresholds per SB 610 of 500 residential dwelling units.

E.1 Water Demands

City Water Demands

The City's total water demand in FY 2020 was 9,131 acre-feet (AF). The City has reduced water use in accordance the Water Conservation Act of 2009 (SBx7-7) that mandated water demand reductions of 10 percent by 2015, and a reduction of 20 percent by 2020, both of which the City has met.

Annual potable water use within the City's service area has averaged 9,956 AF in the past decade. As a result of Governor Jerry Brown's mandatory water conservation order in 2014, retail water use within the City's service area has decreased from the average of 10,679 AF (FY2010/11 through FY2014/15) to the last five-year average of 9,234 (FY2015/16 through FY2019/20). In FY 2019-20, the City's water use profile was comprised of 51.2% residential use, 28.7% commercial, institutional, and industrial (CII) use, 15.0% large landscape/irrigation, with non-revenue water (NRW) and other uses comprising about 5.0%. There is currently no recycled water use within the City's service area.

City water demands were developed and projected in the City's 2020 UWMP based on projections prepared by CDM Smith as part of the 2021 OC Water Demand Forecast for Municipal Water District of Orange County (MWDOC) and Orange County Water District (OCWD). The updated demand projections were made for the Orange County region as a whole and also provided retail agency specific demands based on collaboration with MWDOC and OCWD member agencies.

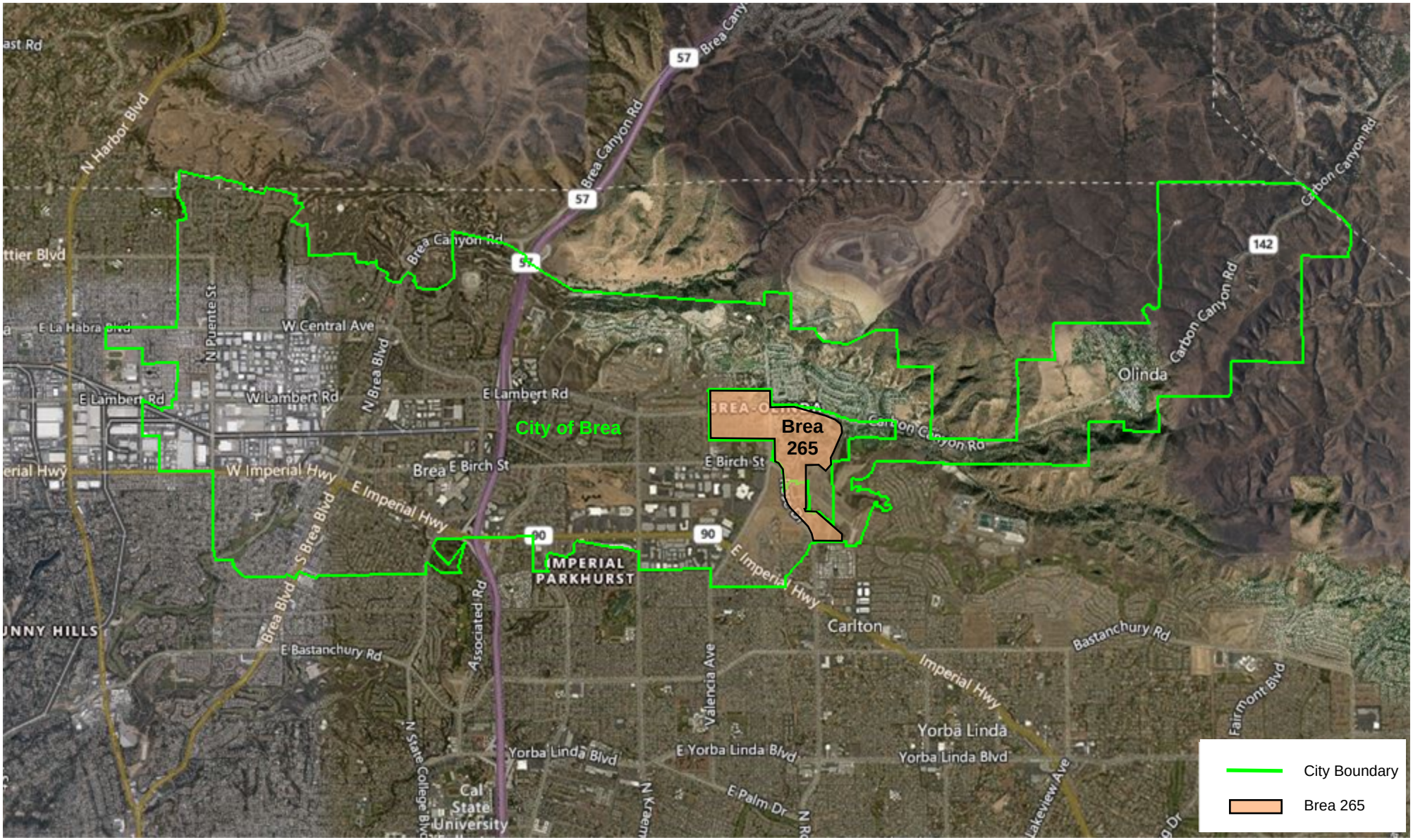

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Figure ES-1
Regional Location

Project Water Demands

Except for some agricultural use in the southern area, most of the Project site has been used for oil production continuously since the early 1900s. Of the approximately 190 wells drilled on the site, 110 remain in operation and produce approximately 500 barrels per day. Once the project entitlements are complete, Aera will discontinue all on-site oil operations and abandon and remediate wells and production facilities in accordance with Federal, State, and local regulations. No residual oil operations will remain in the repurposed residential community.
Water consumption (demand) for the existing land uses in the specific plan area are assumed to be negligible in this WSA. Regardless, the water demand for the existing land uses are accounted for in the existing demand reported in the City's 2020 UWMP. Projected water demand for the Brea 265 Project was specifically addressed as 'Under Entitlement Review' in Table 3-4 of the 2020 UWMP, Developments in the City. However, the projected demographic data presented in the 2020 UWMP does not appear to account for enough future dwelling units (DUs) to include the Proposed Project.

Average water use factors for existing newer residential developments within the City were analyzed for various land use densities that are similar to the proposed densities within the Project. These water use factors were then compared with the unit water use factors in the aforementioned 2021 OC Water Demand Forecast for MWDOC and OCWD that was used to develop demands for the 2020 UWMP. Demand factors based on City meter data for similar densities were utilized in this WSA to estimate Project water demands. These factors reflect new development standards for water conservation and are more closely related to the proposed land use densities. For example, proposed hillside residential use within the eastern portion of the Project area results in higher per dwelling unit water use factors than utilized in the OC Water Demand Forecast study. Based on the estimated Proposed Project development phasing, estimated demand phasing is shown in Table E.1. The estimated buildout water demand for the Proposed Project is projected to be 507 acre-feet per year (AFY), excluding water loss.

Table E.1
Estimated Project Phasing of Water Demand[(a)]

Demand	FY 2025	FY 2030	FY 2035	FY 2040	FY 2045
Estimated Proposed Project Water Demand (AFY)	507	507	507	507	507

(a) Not including water loss

Projected normal City water demand through FY 2045 is shown in Table E.2. All demands include an estimated 5 percent in water loss consistent with the 2020 UWMP. City water demand, as estimated in the 2020 UWMP, was projected to include increased demand due to residential development. However, as discussed above, the demographic data used to project future demand does not appear to account for enough DUs to accommodate the Project. As such, Project demand was added to the projected demand presented in the 2020 UWMP. The demand from the Proposed Project in FY 2045 is projected to be 5 percent of the total demand estimated for the City.

Table E.2
Projected Normal City Water Demand (AF)

Projected Normal Demand[a]	FY 2025	FY 2030	FY 2035	FY 2040	FY 2045
Total City Demand without Proposed Project (2020 UWMP)[b]	9,543	9,695	9,691	9,725	9,745
Additional Proposed Project Demand[c]	532	532	532	532	532
Total Demand	10,075	10,227	10,223	10,257	10,277

(a) Includes 5% water loss consistent with the 2020 UWMP
(b) Normal year demand as projected in the City's 2020 UWMP, not including the Project area demand
(c) Additional demand based on Proposed Project

E.2 Water Supply

The City's primary sources of water supply are imported groundwater from the Main San Gabriel Basin provided by California Domestic Water Company (CDWC) and imported water from the Colorado River and State Water Project (SWP) provided by Metropolitan through MWDOC. The City also extracts local groundwater from the La Habra Groundwater Basin (Basin). However, the one groundwater well owned by the City is used strictly for irrigation purposes. In FY 2019-20, the City relied on 99% imported water from CDWC and 1% local groundwater. It is projected that by 2045, the water supply portfolio will shift to 92.5% imported water from CDWC, 6.5% imported water from MWDOC, and 1% groundwater. Metropolitan's 2020 UWMP includes strategies that will be used to meet full-service demands at the retail level under all foreseeable hydrologic conditions through 2045. The projected imported water supply numbers from MWDOC represent only the supplies projected to meet demands and not the full supply capacity.

Imported Water Supply

The City obtains imported groundwater supply from CDWC, a mutual water company. CDWC provides groundwater from the Main San Gabriel Basin to each of its member agencies who own and/or lease stock in the company. There are two classes of entitlement with CDWC, which translate to different water allotments: "common stock entitlement" and "other entitlement." As of 2020, the City owns approximately 2,208 and leases another 188 common stock entitlements, which translates to an entitlement allotment of approximately 3,475 AFY. As for other entitlements, the City owns approximately 2,189 shares, which translates to approximately 1,663 AFY. The City also leases additional shares of CDWC stock from member agencies that do not use their maximum allotted amount. The City receives water from CDWC through three metered connection. Each connection is gravity fed and comes from one of two CDWC hydraulic lift systems.

Each CDWC member agency receives a prescribed entitlement to water based upon the number of shares owned and the safe yield of the Main San Gabriel Basin. The member agency entitlement criterion per share varies year by year, based on CDWC's allotted percentage and the Basin Operating Safe Yield of the Main San Gabriel Basin. The Basin Operating Safe Yield is determined annually by the Main San Gabriel Basin Watermaster, the agency created by the Main San Gabriel Judgment to manage the Main San Gabriel Basin. Agencies that use water beyond their share of

entitlement must pay a surcharge levied by CDWC (Brea, Water Master Plan Update, November 2009).

Metropolitan's 2020 UWMP finds that Metropolitan can meet, full-service demands of its member agencies from 2020 through 2045 during normal years, a single dry year, and multiple dry years. Metropolitan's 2020 UWMP was developed as part of the 2020 Integrated Water Resources Plan (IRP) planning process. The IRP represents Metropolitan's comprehensive blueprint for long-term water reliability, including key supply development and water use efficiency goals. The foundation of Metropolitan's resource strategy for achieving regional water supply reliability has been to develop and implement water resources programs and activities through its IRP preferred resource mix. This preferred resource mix includes conservation, local resources such as water recycling and groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater storage, out-of-region banking, treatment, conveyance, and infrastructure improvements.

Groundwater Supply

The La Habra Groundwater Basin covers parts of Los Angeles County and Orange County and is part of both the Coastal Plan of Los Angeles, Central Basin, and the Coastal Plain of Orange County, Orange County Basin. A portion of the Basin is located within Central Basin as well as the northern tip of the Orange County Basin. La Habra's Groundwater Management Plan only focuses on the portion of the Basin located outside of both Central Basin and Orange County Basin. The Basin lies entirely within the Coyote Creek Watershed.

The Sustainable Groundwater Management Act (SGMA) was adopted by the State of California in 2014 to help manage its groundwater sustainability and limit adverse effects of groundwater extractions. DWR designated the non-adjudicated Coastal Plain of OC Basins medium-priority, thus requiring the creation of a Groundwater Sustainability Plan (GSP). OCWD led the effort, along with its member agencies, to comply with the SGMA by creating the "Basin 8-1 Alternative" which meets State's requirements for a Groundwater Sustainability Plan (GSP). The City of La Habra has been deemed the exclusive Groundwater Sustainability Agency (GSA) under the SGMA for the La Habra-Brea Management Area. The La Habra-Brea Management Area is part of Basin 8-1 but is hydrogeologically distinct from the OCWD Management Area and is not under the jurisdiction of OCWD.

The La Habra Basin is not adjudicated. Instead, the City follows a "safe yield" which is used for the management and future planning of the Basin for sustained beneficial use. The safe yield is the volume of groundwater that can be pumped without depleting the aquifer to a point where it cannot recover through natural recharge over a reasonable period of time. The safe yield for the Basin was estimated to be approximately 4,500 AFY. This safe yield was determined through an average from two separate studies that took into account natural groundwater recharge and natural groundwater discharge. The La Habra Basin continues to be managed sustainably by maintaining and coordinating groundwater production within the estimated safe yield. The City of La Habra is also evaluating its existing monitoring program with the intent to develop a more robust groundwater elevation and water quality monitoring program (UWMP, 2020).

Historically, groundwater produced from the Basin yielded low quality water. The City owns and operates one non-potable groundwater well used for irrigation at Brea Creek Golf Course. Local groundwater accounted for 57 to 107 AFY of the City's total water supply in the past five years.

Since FY 2015-16, the volume of groundwater pumped by the City has increased and remained relatively stable for the last four years.

E.3 Reliability of Water Supplies

Every urban water supplier is required to assess, in their UWMP, the reliability of their water service to its customers under a normal year, a single dry year, and a drought period lasting five consecutive years. The water service reliability assessment compares projected supply to projected demand for these three hydrological scenarios between 2025 and 2045. Factors affecting reliability, such as climate change and regulatory impacts, are accounted for as part of the assessment.

The City depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. Metropolitan's, MWDOC's and the City's 2020 UWMP conclude that they can meet full-service demands of their member agencies through 2045 during normal years, single-dry years, and multiple-dry years. Consequently, the City is projected to meet full-service demands through 2045 for the same scenarios, due to diversified supply and conservation measures.
For this WSA, the additional demands estimated for the Proposed Project are added to the normal-year, single dry-year, and multiple dry-year demands projected for the City through FY 2045 as estimated in the City's 2020 UWMP, which are compared with projected available groundwater and imported water supplies. Demands for dry-year scenarios were increased 6.0 percent to be consistent with the City's 2020 UWMP (based on higher anticipated irrigation demand).

E.4 Conclusion

The estimated water demand for the Proposed Project is projected to be 507 AFY at Project buildout. Adding the reported water loss, consistent with the City's UWMP, increases this additional demand to a supply requirement of 532 AF, which is 5 percent of the total supply requirement estimated for the City in FY 2045.

The City is projected to have sufficient imported and groundwater supplies to meet normal, single-dry year, and multiple-dry year conditions including the Proposed Project demands because:

1. Metropolitan has projected supply surpluses for each of these conditions, and
2. The City can increase groundwater import water by leases of additional shares of CDWC stock from member agencies that do not use their maximum allotted amount

The information included in this WSA identifies a sufficient and reliable water supply for the City, now and into the future, including a sufficient water supply for the land uses proposed for the Proposed Project. These supplies are also enough to provide for overall City-wide growth at the rate projected in the City's 2020 UWMP.

1 INTRODUCTION

1.1 Proposed Project

The Brea 265 Specific Plan Project encompasses approximately 265 acres located north of State Route 90 (SR 90) and east of State Route 57 (SR 57) in the City of Brea and in the City of Brea's Sphere of Influence. The Proposed Project consists of the redevelopment of the project area by Aera Energy from active oil operations into a proposed master-planned community. The specific plan is a direct reflection of the City's foundational planning strategies which includes a resident-driven strategic plan adopted in 2017. The Proposed Project would allow development of up to 1,100 dwelling units with parks and open space, and as such, necessitates the preparation of a WSA because the project exceeds a number of minimum development thresholds per SB 610, one of which is 500 dwelling units.

The Brea 265 Specific Plan serves as a planning tool to implement the intent of the Brea General Plan for the area covered by the Specific Plan. The Specific Plan is consistent with the applicable goals and objectives identified in the General Plan and includes regulations and standards necessary for the systematic implementation of the General Plan.

Approval of the Proposed Project includes the adoption of a new specific plan, the Brea 265 Specific Plan. Approximately 43 acres of the Specific Plan area are located within the City of Brea's corporate boundaries and designated as "Hillside Residential" on the Brea General Plan's Land Use Policy Map. The remaining 217.7 acres of the Specific Plan area are within unincorporated Orange County and in the southern portion of Brea's Sphere of Influence. The General Plan's Land Use Policy Map designates 123.2 acres of this 217.7-acre portion as "Hillside Residential" and 94.5 acres as "Low Density Residential." In concurrent with Specific Plan approvals, the 217.7-acre portion of the Brea 265 site currently within City's Sphere of Influence will be annexed into the City and the amended land use designations on this portion of Brea 265 will become in effect upon completion of the annexation process. Implementation of the Specific Plan requires a zone change from the existing designation to "Brea 265 Specific Plan."

The City of Brea is the Lead Agency for purposes of California Environmental Quality Act (CEQA) compliance and has prepared an EIR to consider the following discretionary actions for which applications have been submitted to the City. These actions and approvals are required to implement the Brea 265 Specific Plan.

- **Environmental Impact Report (EIR):** The Brea 265 Specific Plan is a discretionary project and is subject to CEQA requirements. The EIR for Brea 265 has been prepared in accordance with CEQA and the CEQA Guidelines. As part of the Specific Plan approval process, the EIR must be considered and certified by the City Council prior to approvals of any project related entitlements.
- **Specific Plan/Pre-Zoning:** The Brea 265 Specific Plan will regulate future development in the Specific Plan area. The Specific Plan will implement the City's General Plan and will be adopted by ordinance by the City Council. Approval of the Specific Plan is required for changing the zoning designations of the project site from "Hillside Residential" and "Single Family Residential" to "Brea 265 Specific Plan" and for pre-zoning of the 217.7-acre portion of the Specific Plan area currently within the County and in Brea's Sphere of Influence.

- **Development Agreement:** A Development Agreement will be negotiated between the City of Brea and the Project Applicant (Aera Energy) in conjunction with the Brea 265 Specific Plan/Pre-Zoning requests. The Development Agreement will establish vesting of development rights and entitlements, identify project improvements, timing of improvements, as well as the responsibilities and rights of both the City and the Project Applicant.
- **Annexation:** After the above discretionary actions have received approvals from the City Council, the property will be annexed into the City of Brea consistent with the 2005 pre-annexation agreement. The request will be processed through the Orange County Local Agency Formation Commission (OC LAFCO) to annex the 217.7-acre portion of the Brea 265 site currently within the City's Sphere of Influence into the City. The annexation area is shown in Figure 1-1.

1.2 WSA Purpose

The purpose of this WSA is to provide information to verify that there is sufficient water supply to the City to provide for the Proposed Project now and into the future. This WSA develops the additional water demand that will need to be served by the City as a result of the land use changes in the Proposed Project area, which are consistent with the land uses being addressed the EIR. The proposed land use changes and commensurate additional water demand requires the preparation of a new WSA in conjunction with the subject EIR.



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Figure 1-1
Annexation Area

2 LEGISLATION

According to the Guidebook for Implementation of Senate Bill (SB) 610 and SB 221 Water Code Section 10912, a "Project" requiring a WSA is defined by any of the following criteria:

1. A proposed residential development of more than 500 dwelling units (DU)
2. A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet (sf) of floor space
3. A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space
4. A proposed hotel or motel, or both, having more than 500 rooms
5. A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor space
6. A mixed-use project that includes one or more of the projects specified in this subdivision
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project

The Proposed Project would allow development of up to 1,100 DUs and as such, necessitates the preparation of a WSA following the requirements of SB 610.

2-1 SB 610 – Costa – Water Supply Planning

SB 610 was chaptered into law on October 9, 2001. It mandates that a city or county approving certain projects subject to CEQA (i) identify any public water system that may supply water for the project, and (ii) request those public water systems to prepare a specified water supply assessment. The assessment is to include the following:

1. A discussion of whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing.
2. The identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts.
3. A description of the quantities of water received in prior years by the public water system under the existing water supply entitlements, water rights, or water service contracts.
4. A demonstration of water supply entitlements, water rights, or water service contracts by the following means:
    a. Written contracts or other proof of entitlement to an identified water supply.
    b. Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

c. Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

d. Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

5. The identification of other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system.

6. If groundwater is included for the supply for a proposed project, the following additional information is required:

   a. Review of any information contained in the Urban Water Management Plan (UWMP) relevant to the identified water supply for the proposed project.

   b. Description of any groundwater basin(s) from which the proposed project will be supplied. Adjudicated basins must have a copy of the court order or decree adopted and a description of the amount of groundwater the public water system has the legal right to pump. For non-adjudicated basins, information on whether the DWR has identified the basin as over-drafted or has projected that the basin will become over-drafted if present management conditions continue, in the most current bulletin of DWR that characterizes the condition of the basin, and a detailed description of the efforts being undertaken in the basin to eliminate the long-term overdraft condition.

   c. Description and analysis of the amount and location of groundwater pumped by the public water system for the past five years from any groundwater basin which the proposed project will be supplied. Analysis should be based on information that is reasonably available, including, but not limited to, historic use records.

   d. Description and analysis of the amount and location of groundwater projected to be pumped by the public water system from any groundwater basin by which the proposed project will be supplied. Analysis should be based on information that is reasonably available, including, but not limited to, historic use records.

   e. Analysis of the sufficiency of the groundwater from the basin(s) from which the proposed project will be supplied.

The Water Supply Assessment shall be included in any environmental document prepared for the project. The assessment may include an evaluation of any information included in that environmental document. A determination shall be made whether the projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. Additionally, SB 610 requires new information to be included as part of an UWMP if groundwater is identified as a source of water available to the supplier. Information must include a description of all water supply projects and programs that may be undertaken to meet total projected water use. SB 610 prohibits eligibility for funds from specified bond acts until the plan is submitted to the State.

2-2 SB 1262 – Sustainable Groundwater Management Act

State Senate Bill 1262 adopted in September 2016 amends Section 66473.7 of the Government Code to require WSAs to address certain elements regarding groundwater sustainability if the project relies in whole or in part on groundwater as a source of supply.

For this WSA, the portions of SB 1262 that are applicable are as follows:

For a basin that has not been adjudicated that is a basin designated as high- or medium-priority pursuant to Section 10722.4, information regarding the following should be provided:

- Whether the department (DWR) has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924.
- If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan.

The City extracts local groundwater from the La Habra Groundwater Basin (Basin). However, the one groundwater well owned by the City is used strictly for irrigation purposes and will not be utilized to supply the Project.

3 BREA 265 SPECIFIC PLAN

3.1 Proposed Project Location

The proposed Brea 265 Specific Plan is located in the City of Brea, and in the City of Brea's Sphere of Influence. The City of Brea is located on the north-eastern border of Orange County. The project site is located north of State Route 90 (SR 90) and east of State Route 57 (SR 57), as shown in Figure ES-1, Regional Map. Locally, the project is located towards the eastern portion of the City surrounded by existing residential neighborhoods, the Brea Sports Park and Carbon Canyon Regional Park, as shown by Figure 3-1, Local Context. The Specific Plan area is bisected by Valencia Avenue which runs in a north-south direction, and by Lambert Road which runs in an east-west direction. The project site is located to the south of Lambert Road/Carbon Canyon Road, north of Rose Drive, east of Valencia Avenue and west of Carbon Canyon Regional Park.

3.2 Proposed Project Characteristics

"Project," as defined by the CEQA Guidelines, means "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is any of the following: (1)…enactment and amendment of zoning ordinances, and the adoption and amendment of local General Plans or elements thereof pursuant to Government Code Sections 65100–65700" (14 Cal. Code of Reg. 15378[a]).

3.2.1 Existing Conditions

Aera Energy plans to redevelop approximately 265 acres of active oil operations within the Proposed Project area. Except for agricultural use in the southern area, the majority of the site has been used for oil production continuously since the early 1900s. Of the approximately 190 wells drilled on the site 110 remain in operation and produce approximately 500 barrels per day. Once the Project entitlements are complete, Aera will discontinue all on-site oil operations and abandon and remediate wells and production facilities in accordance with Federal, State, and local regulations. No residual oil operations will remain in the repurposed residential community.

No specific plan has been adopted for the Proposed Project. Currently, development activities in the Project Area are governed by the City's adopted General Plan and Zoning Code. The existing General Plan and zoning designations for the Proposed Project area are shown on Figure 3-2.



PSOMAS

Figure 3-1
Local Vicinity



PSOMAS

Figure 3-2
Existing General Plan Land Use and Zoning

3.2.2 Proposed Project Description

The Proposed Project consists of the adoption and implementation of a specific plan for the Project Area as described below.

Brea 265 Specific Plan

The Brea 265 Draft Specific Plan, dated October 14, 2021, proposes a master planned residential community within the City of Brea as shown in Land Use Summary Table 3.1 below. The Specific Plan proposes:

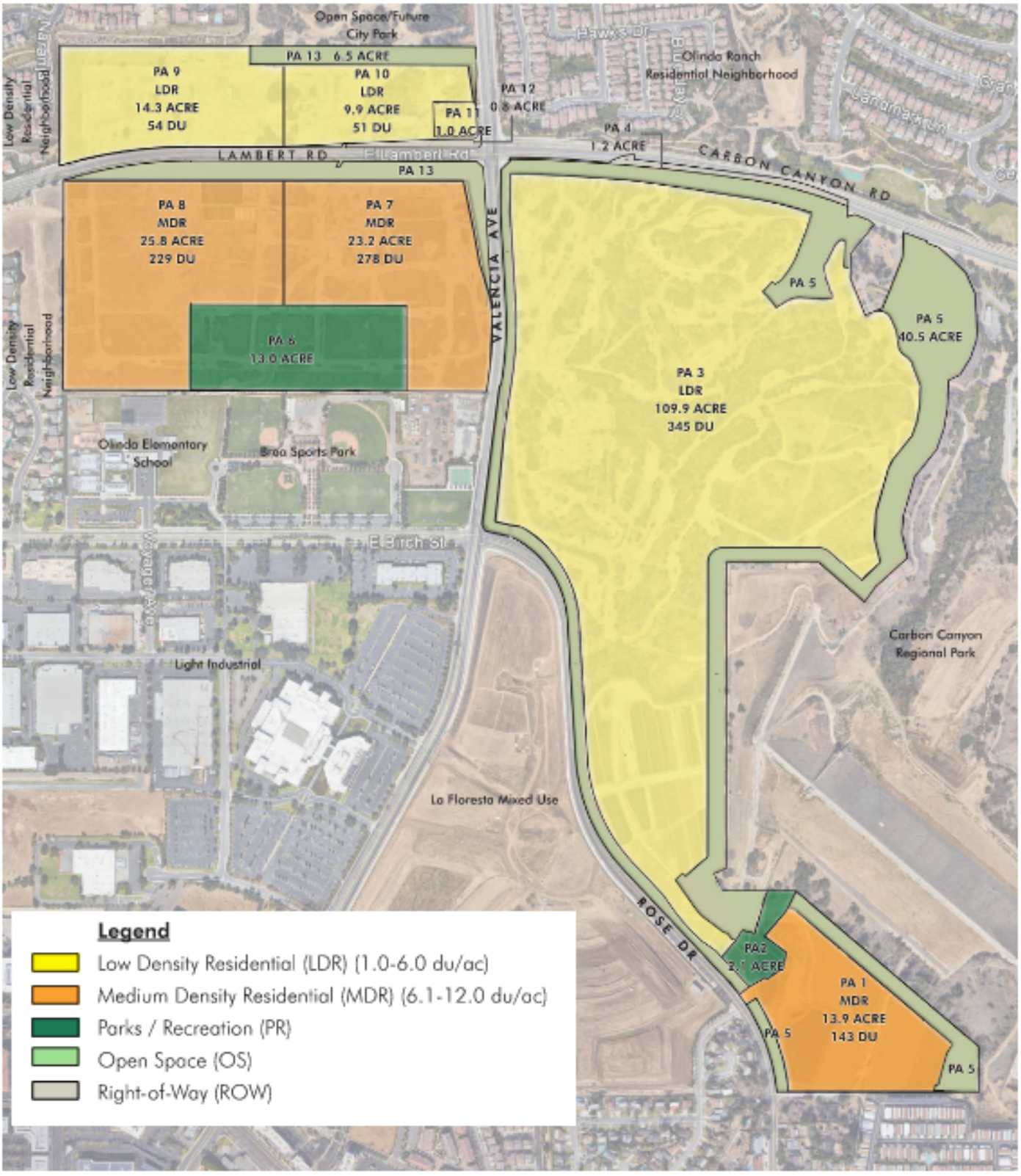
- A mix of approximately 1,100 residential units (on approximated 189 acres)
- 15.1 acres of parks/recreations uses
- 47.0 acres of open space
- Overall average density 4.2 du/acre

These land uses would be linked together through a trail system that connects the park/recreation areas to the adjacent neighborhoods and off-site parks, open space, employment centers and retail venues. The land use is intended to provide for a mix of housing and recreational/open space uses that are compatible with the existing neighborhoods in the area. The plan provides a maximum of 1,100 dwelling units within two residential land use categories, designated as Low Density Residential (LDR) and Medium Density Residential (MDR), along with open space, trails, and street system, as shown on Figure 3-3, Conceptual Land Use Plan.

Table 3.1
Proposed Brea 265 Specific Plan Development Areas

Land Use	AC	DU's
Residential		
Low Density Residential (LDR)*	134.6	450
Medium Density Residential (MDR)	62.9	650
Non-Residential		
Parks/Recreation (PR)	15.1	N/A
Open Space (OS)	47.0	N/A
Right-of-Way (ROW)	2.0	N/A
Total	**262.1**	**1,100**

*Includes 1-acre public safety/civic uses



For illustrative purposes only; final design may vary.

PSOMAS

Figure 3-3
Specific Plan Land Use

3.2.3 Proposed Project Phasing

The Proposed Project will be implemented in phases with construction beginning after 2020 and projected buildout estimated to occur by the year 2025. The estimated Project phasing is shown in Table 3.2. The initial implementation phase will include Proposed Project adoption and the necessary amendments to City documents.

Table 3.2
Estimated Brea 265 Specific Plan Phasing

Land Use	FY 2020	FY 2025	FY 2030	FY 2035	FY 2040	FY 2045
Residential Phasing by DU						
Low Density Residential (LDR)	0	450	450	450	450	450
Medium Density Residential (MDR)	0	650	650	650	650	650
Total Residential DU's	**0**	**1,100**	**1,100**	**1,100**	**1,100**	**1,100**
Non-Residential Phasing by Acres						
Parks/Recreation	0	15.1	15.1	15.1	15.1	15.1
Total Non-Residential Acres	**0**	**15.1**	**15.1**	**15.1**	**15.1**	**15.1**

3.3 Project Water Demand

Water consumption (demand) for the existing land uses in the specific plan area are assumed to be negligible in this WSA. Regardless, the water demand for the existing land uses are accounted for in the existing demand reported in the City's 2020 UWMP, along with the projected future demand through fiscal year (FY) 2045.

3.3.1 City Water Demand Factors

City water demands were developed and projected in the City's 2020 UWMP are based on projections prepared by CDM Smith as part of the 2021 OC Water Demand Forecast for Municipal Water District of Orange County (MWDOC) and Orange County Water District (OCWD). The updated demand projections were made for the Orange County region as a whole and also provided retail agency specific demands based on collaboration with MWDOC and OCWD member agencies.

The forecast methodology began with a retail water agency survey that asked for FY 2017-18, FY 2018-19, and FY 2019-20 water use by major sector, including number of accounts. Given that FY 2017-18 was a slightly above-normal demand year (warmer/drier than average) and FY 2018-19 was a slightly below-normal demand year (cooler/wetter than average), water use from these two years were averaged to represent an average-year base water demand.

For the residential sectors (single-family and multi-family) the base year water demand was divided by households in order to get a total per unit water use (gallons per home per day). In order to split household water use into indoor and outdoor uses, three sources of information were used: (1) the Residential End Uses of Water (Water Research Foundation, 2016); (2) California's plumbing codes and landscape ordinances; and (3) CA DWR's Model Water Efficient Landscape Ordinance (MWELO) calculator.

Three different periods of residential end uses of water were analyzed as follows:

- Pre-2010 efficiency levels – Has an average indoor water use that is considered to be moderately efficient, also does not include the most recent requirements for MWELO.
- High-efficiency levels – Includes the most recent plumbing codes that are considered to be highly efficient, and also includes the most recent requirements for MWELO.
- Current average efficiency levels – Represents the weighted average between pre-2010 efficiency and high efficiency levels, based on average age of homes for each retail water agency.

For outdoor residential water use, the indoor per capita total was multiplied by each member agency-specific persons per household in order to get an indoor residential household water use (gallons per day per home), and then was subtracted from the base year total household water use for single-family and multifamily for each agency based on actual water use as reported by the agency surveys.

For existing residential homes, the current average indoor and outdoor water use for each member agency were used for the year 2020. It was assumed that indoor water uses would reach the high efficiency level by 2040. Based on current age of homes, replacement/remodeling rates, and water utility rebate programs it is believed this assumption is very achievable. It was also assumed that current outdoor water use would be reduced by 5% by 2050.

For new homes, the indoor high efficiency level was assumed for the years 2025 through 2050. Outdoor uses for new homes were assumed to be 25% and 30% lower than current household water use for single-family and multifamily homes, respectively. The resulting residential water demand projections utilized in the City's 2020 UWMP are shown in Table 3.3

Table 3.3
City of Brea 2020 UWMP Residential Demand Data

	2020	2025	2030	2035	2040	2045
Residential Dwelling Units	**17,031**	**17,053**	**17,068**	**17,068**	**17,265**	**17,476**
Single-Family	9,557	9,579	9,594	9,594	9,622	9,628
Multi-Family	7,474	7,474	7,474	7,474	7,643	7,848
Residential Demand (AFY)	**4,675**	**4,797**	**4,724**	**4,646**	**4,603**	**4,622**
Single-Family	3,627	3,692	3,640	3,583	3,535	3,522
Multi-Family	1,048	1,105	1,084	1,063	1,068	1,100
Residential Unit Demand (gpd/du)						
Single-Family	339	344	339	333	328	327
Multi-Family	125	132	129	127	125	125
Population	*45,629*	*45,883*	*46,615*	*47,697*	*48,155*	*48,236*
Per-capita Residential Demand	*91.5*	*93.3*	*90.5*	*87.0*	*85.3*	*85.5*

Source: City of Brea 2020 UWMP and Center for Demographic Research at California State University, Fullerton, 2020

Existing and projected population, single-family and multi-family households for each retail water agency were provided by the Center for Demographic Research at California State University Fullerton (CDR) under contract by MWDOC and OCWD. CDR provides historical and future demographics by census tracts for all of Orange County. Census tract data is then clipped to retail water agency service boundaries in order to produce historical and projected demographic data by agency.

The projected number of residential dwelling units and the calculated per dwelling unit demand for single-family and multi-family homes is shown in Table 3.3. The best representation for water use in water efficient homes is given by years 2040 and 2045. It was assumed in the demand projections that existing home indoor use would reach high efficiency levels by 2040 and new homes would start off as efficient. This results in water efficient residential use factors of 327 gpd/du for single-family homes and 125 gpd/du for multi-family homes shown for 2040 in Table 3-3. These factors are slightly higher than what a new home factor would be because outdoor use for existing homes was only reduced by 5% by 2050 when compared to existing outdoor use while for new homes it was reduced by 25% for single-family and 30% for multi-family homes when compared to existing outdoor use.

These demand factors are maintained in this analysis for the projection of City water demand. The City identified water demands from anticipated new development in the 2020 UWMP, including Brea 265. An estimated water demand for Brea 265 of 545.9 AFY is documented in Table 3-4 of the UWMP. However, the demographic data presented in Table 3.3 above, taken from the UWMP, does not appear to account for sufficient residential growth to accommodate the Project. As such, Project demands will be added to the overall City demands presented in the 2020 UWMP.

The Project demand of 545.9 AFY presented in the UWMP was taken from the City of Brea 2021 Water Master Plan (WMP). The WMP used a single water demand factor, for single-family residential use, and applied it to the entire project acreage. This is an appropriate approach to

estimating system-wide future water demands for the WMP as a high-level planning document. The various demand factors in the WMP were generated on a per-acre basis using billed water use data for 2019 divided by the corresponding land use acreage from GIS. The year 2019 was chosen as a representative year most closely matching the five-year average water use from 2015 through 2019. The WMP developed a per-acre factor for residential uses, rather than a per dwelling unit factor, because the City's GIS data did not include the number of dwelling units. The resulting demand factors for single-family and multi-family uses in the WMP combine many different densities and ages of housing products. As such, a separate and more detailed demand projection for the Proposed Project is presented below based on Specific Plan land use data, metered water use for similar housing products, and estimated irrigation water use.

The Project area will contain all new construction with mandated water conservation measures in place. The City provided 2018 water use data for newer developments within their service area that have residential densities similar to the Proposed Project. The year 2018 was selected because it had the highest metered water use since 2015 and would provide conservative results for water supply planning. The developments provided were Olinda Ranch, Blackstone, and La Floresta. The average calculated densities and average water demand per dwelling unit (du) for these developments are summarized in Table 3.4.

Table 3.4

2018 Average Water Use by Residential Development

Development	Land Use	AC	DU's	Average Density (du/ac)	Average Use (gpd/du)
Olinda Ranch	Very Low Density	41	63	1.5	762
PA 6 Blackstone	SFD	33	93	2.8	407
PA 5 Blackstone	SFD	25	100	4.0	352
PA 8 La Floresta	Zero Lot Line SFD	16	77	6.0	218
PA 3 Blackstone	SFD Cluster	49	261	6.5	145
PA 3 La Floresta	SFD Cluster	12	89	8.5	144
PA 7 La Floresta	Townhomes			15.0	122

The residential land use data for the Project was split into the area west of Valencia Avenue and the area east of Valencia Avenue to account for the lower density product to the east. The Project's residential land use types and densities were compared with the water use data in Table 3.4 to estimate Project water demand factors on a per dwelling unit basis. The proposed demand factors also take into account estimated sewer flow generation factors that were calculated using September 2019 sewer flow monitoring data collected as part of this Project. Sewer flow represents indoor water use with the remainder of the water demand attributed to outdoor (irrigation) use. The recommended residential water demand factors for the Proposed Project are shown in Table 3.5 along with the resulting average water demand. The Project water demand factors are conservatively higher than those used for projected residential growth in the City's 2020 UWMP, shown in Table 3.3.

Table 3.5
Proposed Project Water Demand Factors for Residential Use

Proposed Land Use	Acres	du/ac	DU's	Factor (gpd/du)	Average Demand (gpd)
WEST LOW DENSITY RESIDENTIAL					
Low Density Residential (LDR)	25.2	4.2	105	380	39,900
Public Safety/Civic[(1)]					330
Medium Density Residential (MDR)	49.0	10.3	507	160	81,120
Subtotal	**74.2**	**8.2**	**612**		**121,350**
EAST HILLSIDE RESIDENTIAL					
Low Density Residential (LDR)	109.4	3.1	345	420	144,900
Medium Density Residential (MDR)	13.9	10.0	143	160	22,880
Subtotal	**123.3**	**4.0**	**488**		**167,780**
Total Domestic	**197.5**	**5.6**	**1,100**		**289,130**

(1) Included in LDR land use in Specific Plan (PA 11). Average flow assumes 6 personnel and 55 gpcd.

The Specific Plan breaks down residential use into Low Density Residential (LDR) and Medium Density Residential (MDR) as opposed to the Single-Family and Multi-Family Residential categories used in the 2020 UWMP. The LDR category provides for detached and attached single-family homes. The MDR products provides for detached and attached single-family homes, townhomes, condominiums, and duplexes. Both residential categories are classified based on residential density shown in Table 3.5. The LDR demand factor for the western Project area of 380 gpd/du is based on the average water use for Blackstone Planning Area (PA) 5 and PA 6 shown in Table 3.4. The factor is conservatively high given the lower density of these existing housing products. It also correlates with the sewer generation factor of 230 gpd/du, assuming that approximately 60 percent of the water demand will be indoor use (sewer flow) and 40 percent outdoor use for irrigation. The LDR factor for the eastern Project area of 420 gpd/du is based on the lower density Blackstone PA 6 development. This factor also correlates with the sewer flow factor used for this product of 250 gpd/du, assuming the same 60/40 indoor/outdoor ratio.

A factor of 160 gpd/du is assumed for MDR homes in both the eastern and western Project areas based on the Blackstone and La Floresta Cluster homes and La Floresta zero lot line detached homes. This is conservative given the higher density product within the Project areas compared to the Blackstone and La Floresta homes. The MDR product correlates with the estimated sewer flow by assuming 80 percent indoor use (sewer flow) and 20 percent outdoor use. The lower outdoor use is anticipated for the MDR homes due to limited yard/landscape areas within these products. Water demand for the common area landscaping is accounted for separately and is described below.

In addition to the residential land uses, the Specific Plan provides for a reserved site for public safety/civic uses within PA 11 which is designated in the LDR category. Water demand for this public use was calculated using and estimated 6 personnel on duty at any one time and a demand of 55 gallons per capita per day (gpcd). The estimate of personnel on duty was provided by City staff.

Landscape Irrigation Demand

The parks and recreation area within the Project includes a 13-acre sports park to the west of Valencia Avenue and a 2.1-acre park to the east of Rose Drive. State mandated water conservation measures require an outdoor water budget that is consistent with the Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) adopted by the State Water Resources Board in 2015. The MWELO requires the calculation of a maximum applied water allowance (MAWA) for outdoor water use that is no more than 55% of the reference evapotranspiration (ETo) rate for residential landscaping and 45% for commercial landscaping. A landscape irrigation factor of 2,040 gpd/acre was calculated for the Project residential areas based on the MAWA using the ETo data for Monrovia, CA, of obtained from California Irrigation Management Information System (CIMIS) and an ETo adjustment factor (ETAF) of 0.55 (55% of the ETo) for residential areas. The Monrovia CIMIS station is the closest station to the Project site and the ETo for that station was 49.85 inches per year. The resulting common area irrigation water demand estimate for the Project is shown in Table 3.6. The irrigated acreage for the residential common areas was provided by the developer's engineer, Hunsaker & Associates, and the park area is included in the Project Specific Plan. As a cross-check, the irrigation demand for the sports park was calculated using the proposed site plan along with the ETo and estimated plant factor and irrigation efficiency. The result was an estimated 31 AFY for the parks and recreation area compared to 35 AFY derived using the MAWA calculation.

Table 3.6
Proposed Irrigation Demand Factors

Land Use	Acres	Factor (gpd/ac)	GPD
Irrigated Common Areas	65.00	2,040	132,602
Parks/Recreation	15.10	2,040	30,805
Total	**80.10**		**163,407**
Monrovia Eto (in/yr)	49.85		

New developments are required to comply with current water conservation standards and are expected to have lower than average demand when compared to current City-wide use. As such, the recommended factors utilized in this analysis are sufficiently conservative and appropriate for planning purposes. The projected water use for the Project, utilizing the factors described above, is summarized in Table 3.7.

Table 3.7
Water Demand Summary

Water Use	gpd	AFY
Residential	289,130	323.9
Irrigation	163,407	183.0
Total Water Demand	**452,537**	**507**

The resulting total water demand is somewhat lower than the value reported for Brea 265 in Table 3-4 of the UWMP. However, the residential water use factors for the Project are conservatively higher than those used in the City's 2020 UWMP for new residential development.

The population for the Proposed Project is estimated using the factors utilized in the Project Environmental Impact Report (EIR) of 2.82 persons per du from the City's General Plan 2021-2029 Housing Element. The resulting population estimate is 3,102 for the Project. Using this population estimate and the calculated Project residential demand, the resulting residential per capita water use is equal to 93 gpd. In comparison, using data from the 2020 UWMP for year 2045 (water efficient homes), the residential per capita water use is equal to 86 gpd, again showing that Project water demand estimates in this WSA are conservative.

Based on the estimated Project development phasing as shown in Table 3.2, estimated water demand phasing is shown in Table 3.8 (excluding water loss). Buildout is estimated to occur by 2025, so Project water demands are estimated to remain constant from 2025 through 2045.

Table 3.8
Estimated Project Phasing of Water Demand

	2025	2030	2035	2040	2045
Brea 265 Water Demand (AFY)	507	507	507	507	507

4 CITY WATER SYSTEM

4.1 City Water System Characteristics

The City is located in northern Orange County between the City of La Habra on the west, City of Fullerton on the southwest, the City of Yorba Linda on the southeast and the County of Los Angeles on the north and encompasses an area of approximately 12.1 square miles. The City Water Division serves all the City's area except the Vesuvius tract at the eastern end which is served by Yorba Linda Water District. The City's water service area population was 45,629 in 2020 according to the CDR. The City receives its water from three main sources, local well water from the La Habra Basin and the Main San Gabriel Basin, which is provided by the California Domestic Water Company (CDWC) and imported water from the Municipal Water District of Orange County (MWDOC). MWDOC is Orange County's wholesale supplier and is a member agency of the Metropolitan Water District of Southern California (Metropolitan).

The City's distribution system consists of 228 miles of pipeline and seven storage reservoirs with a combined storage capacity of 69.5 million gallons (MG). The storage system is supported with five booster pump stations. The booster pumps have a total capacity of 14,800 gallons per minute (gpm) serving 18 pressure zones. In 2020, the City served 13,821 municipal connections that supplied 9,131 AF of water. The City also manages an irrigation well located at the Brea Creek Golf Course that pumps up to 450 gpm to serve the golf course.

4.2 City Water Demands

Annual potable water use within the City's service area has averaged 9,956 AF in the past decade. As a result of Governor Jerry Brown's mandatory water conservation order in 2014, retail water use within the City's service area has decreased from the average of 10,679 AF (FY2010/11 through FY2014/15) to the last five-year average of 9,234 (FY2015/16 through FY2019/20). In FY 2019-20, the City used 9,131 AF of water; this was comprised of 9,039 AF (99%) potable imported water from CDWC, and 92 AF (1%) non potable water pumped from La Habra Groundwater Basin for irrigation purposes only. In FY 2019-20, the City's water use profile was comprised of 51.2% residential use, 28.7% commercial, institutional, and industrial (CII) use, 15.0% large landscape/irrigation, with non-revenue water (NRW) and other uses comprising about 5.0%. There is currently no recycled water use within the City's service area.

The California Green Building Standards Code (CGBC) has a direct impact on new residential and non-residential building and water conservation in the State. The 2016 California Green Building Standards Code, which became effective on January 1, 2017, aims to cut indoor water consumption by 20 to 35 percent from standards in place prior to the adoption of the first CGBC that became effective August 1, 2009, primarily through more efficient indoor water fixtures. The 2016 California Green Building Standards Code also includes outdoor water conservation by reducing the area devoted to high-irrigation use lawns and plants, emphasizing natural drought-tolerant plantings and the installation of irrigation controls that respond to local weather conditions. This is consistent with the MWELO, which was adopted by the State on July 15, 2015.

Future City water demands were projected in the City's 2020 UWMP based on such factors as current and future demographics and future water use efficiency measures. As discussed in Section 3.3.1, the water demand projections included in the City's 2020 UWMP were an outcome of the 2021 OC Water Demand Forecast for Municipal Water District MWDOC and OCWD prepared

by CDM Smith. Water demand for existing land use at the Project site is included in the City's 2020 UWMP water use data, though this existing demand is assumed negligible in this WSA. The additional demand resulting from the Proposed Project was identified in the UWMP as future residential use (2020 UWMP, Table 3-4) with a projected demand of 545.9 AFY.

When looking at projected water demand by use sector, it appears that the residential demand and corresponding residential units may not account for enough residential growth given the Project size and anticipated future densification projects within the City. Therefore, to be conservative, the demand for the Project will be added to the demand projections in the 2020 UWMP, even though the Project was specifically identified in the UWMP.

Projected City water demand through FY 2045, including the water demand from the Proposed Project, is shown in Table 4.1. A separate line item is shown for the Project which is then added to the projected City demand from the 2020 UWMP. All demands in Table 4.1 include 5 percent water loss consistent with the 2020 UWMP.

Table 4.1
Projected Normal City Water Demand (AF)

Projected Normal Demand[a]	FY 2025	FY 2030	FY 2035	FY 2040	FY 2045
Total City Demand without Project (2020 UWMP)[b]	9,543	9,695	9,691	9,725	9,745
Additional Proposed Project Demand[c]	532	532	532	532	532
Total Demand	**10,075**	**10,227**	**10,223**	**10,257**	**10,277**

(a) All demands include estimated 5% water loss consistent with the 2020 UWMP
(b) Normal year demand as projected in the City's 2020 UWMP assumed not to include Project demand
(c) Projected for FY2025, 2030, 2035, 2040, & 2045 (507 AFY from Table 3.8 plus 5% water loss)

4.3 City Water Supply

The City's primary sources of water supply are imported groundwater from the Main San Gabriel Basin through CDWC and imported water from Metropolitan through MWDOC. The City also extracts local groundwater from the La Habra Groundwater Basin (Basin). However, the one groundwater well owned by the City is used strictly for irrigation purposes. City water supply by source for the five fiscal years 2016-2020 consisting of groundwater supplied through CDWC, imported water supplied through MWDOC, and non-potable local groundwater is shown in Table 4.2.

Table 4.2
Historical City Potable Water Supply (AF)

Source	2016	2017	2018	2019	2020
CDWC Imported	7,267	7,645	7,950	8,315	9,039
MWDOC Imported	1,553	1,160	1,889	877	0
Local Groundwater	57	96	107	95	92
Total	**8,878**	**8,900**	**9,946**	**9,287**	**9,131**

The City's projected water supply from the 2020 UWMP is shown in Table 4.3 in Section 4.3.5. The imported water supply numbers shown in Table 4.3 represent only the supplies projected to meet demands and not the full supply capacity.

Non-revenue water (water loss) is defined by the International Water Association (IWA) and American Waterworks Association (AWWA) as the difference between distribution systems input (supply) volume and billed authorized consumption (demand). Water loss is an extraneous demand on the water system. In the City's 2020 UWMP, non-revenue potable water was calculated at approximately 5 percent of the water supplied into the City's distribution system in FY 2020. Water loss is included in the supply totals for each water supply shown in Table 4.2 and Table 4.3.

4.3.1 Imported Groundwater Supply

The information in this section is intended to furnish the information required by Water Code section 10910(f).

The City obtains imported groundwater supply from CDWC, a mutual water company. CDWC provides groundwater from the Main San Gabriel Basin to each of its member agencies who own and/or lease stock in the company. There are two classes of entitlement with CDWC, which translate to different water allotments: "common stock entitlement" and "other entitlement." As of 2020, the City owns approximately 2,208 and leases another 188 common stock entitlements, which translates to an entitlement allotment of approximately 3,475 AFY. As for other entitlements, the City owns approximately 2,189 shares, which translates to approximately 1,663 AFY. The City also leases additional shares of CDWC stock from member agencies that do not use their maximum allotted amount. The City receives water from CDWC through three metered connections. Each connection is gravity fed and comes from one of two CDWC hydraulic lift systems.

Each CDWC member agency receives a prescribed entitlement to water based upon the number of shares owned and the safe yield of the Main San Gabriel Basin. The member agency entitlement criterion per share varies year by year, based on CDWC's allotted percentage and the Basin Operating Safe Yield (OSY) from the Basin. The OSY is determined annually by the Main San Gabriel Basin Watermaster, the agency created by the Main San Gabriel Judgment to manage the Main San Gabriel Basin. Agencies that use water beyond their share of entitlement must pay a surcharge levied by CDWC. As such, there is not a permanent limit or cap on the amount of water CDWC can produce from the Basin. CDWC owns approximately 12,363 AF of prescriptive pumping rights in the Main San Gabriel Basin with the quantity available adjusted annually based on the determination of the Basin's OSY. Based on the FY 2020-21 OSY for the Basin set at 150,000 AF, CDWC's prescriptive pumping rights is adjusted to total approximately 9,383 AF. Currently, this is the amount of groundwater CDWC can produce from the Basin before incurring replacement water assessments. The Main San Gabriel Basin and the Basin Judgement are further described in Section 6.2.1 of the City's 2020 UWMP.

4.3.2 Imported Surface Water

The information in this section is intended to provide the information required by Water Code section 10910(d).

MWDOC provides imported water supplies to the City as a member agency of Metropolitan. Metropolitan is a wholesale water agency serving 19 million people in six Southern California counties. Metropolitan was formed in 1928 and is composed of 26 member agencies including both cities and water districts. Metropolitan provides water from the Colorado River and the State Water Project (San-Joaquin River Delta), and also obtains additional supplies from numerous storage, water transfers, exchanges, water banking, and fallowing projects.
Metropolitan has a legal entitlement to receive water from the Colorado River under a permanent service contract with the Secretary of the Interior. The Colorado River Aqueduct (CRA) transports water from Lake Havasu, at the border of the states of California and Arizona, approximately 242 miles to its terminus at Lake Mathews in Riverside County. The actual amount of water per year that may be conveyed through the CRA to Metropolitan's member agencies is subject to the availability of Colorado River water for delivery. The CRA is owned and operated by Metropolitan and has a capacity of 1.2 MAF a year. Water from the Colorado River or its tributaries is available to users in California, Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, as well as to Mexico. Metropolitan has a basic entitlement of 550,000 AFY of Colorado River water, plus surplus water up to an additional 662,000 AFY under specific conditions.

Metropolitan also receives water from the San-Joaquin River Delta (Delta) in northern California via the 444-mile-long California Aqueduct (State Water Project or SWP), which is managed by the Department of Water Resources (DWR). The DWR has entered into contracts with water districts and regional agencies (SWP Contractors) specifying the amount of SWP water to be delivered to each SWP Contractor. Each SWP Contractor was provided with a contract amount (Table A Amount) and capacity rights to the SWP aqueduct and storage system in return for payments intended to cover operation and maintenance, bondholder obligations, and repayment of moneys loaned from the California Water Fund. DWR water supply contracts contemplate that the SWP would deliver 4.17 MAFY to 29 SWP Contractors. Of this amount, 4.13 MAFY is the maximum Table A water available for delivery from the Delta pumps as stated in the State Water Contract.

In accordance with its contract with the DWR, Metropolitan has a Table A allocation of 1,911,500 AF per year under contract from the SWP. The availability of water supplies from the SWP can be highly variable. A wet water year may be followed by a dry or critically dry year and fisheries issues can restrict the operations of the export pumps even when water supplies are available. As such, annual deliveries are set as a percentage of the maximum allocation-based water supply for that year.

Metropolitan's 2020 UWMP finds that Metropolitan can meet demands of its member agencies, including the City through MWDOC, from 2020 through 2045 during normal years, a single dry year, and multiple dry years. The foundation of Metropolitan's resource strategy for achieving regional water supply reliability has been to develop and implement water resources programs and activities that provide a mix of resources. This preferred resource mix includes conservation, local resources such as water recycling and groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater

storage, out-of-region water banking, treatment, conveyance, and infrastructure improvements. Reliability of Metropolitan's supply is further discussed in Section 5.0, Reliability of Water Supplies.

Metropolitan member agencies receive imported water at various delivery points along the Metropolitan transmission system and pay for it at tiered and/or uniform rates established by the Board depending on the class of service. The City purchases treated potable water from Metropolitan through MWDOC. The three City supply connections with Metropolitan are OC-6, OC-29, and OC-62, with capacities of 10 cubic feet per second (cfs), 15 cfs, and 10 cfs, respectively (Brea, Water Master Plan, May 2021). The infrastructure programs are in place and no further regulatory permits are required to permit Metropolitan to convey imported water to these facilities for use by the City. Because the City also is supplied with groundwater through CDWC, reliance on imported surface water from Metropolitan is greatly reduced. Metropolitan water can be utilized to smooth out seasonal peaks and enhance overall water supply reliability to the City.

A description of the amount of Metropolitan water delivered to the City in the past and anticipated to be delivered to the City in the future under a variety of scenarios is set forth in Section 5 of this WSA.

4.3.3 Local Groundwater Supply

The La Habra Basin

The unadjudicated La Habra Basin covers parts of Los Angeles County and Orange County and is part of both the Central Basin and the Orange County Basin, which are both designated by DWR as medium-priority basins. The La Habra Basin lies entirely within the Coyote Creek Watershed. A portion of the Basin is located within Central Basin as well as the northern tip of the Orange County Basin. La Habra's Groundwater Management Plan only focuses on the portion of the Basin located outside of both Central Basin and Orange County Basin.

From a structural geology standpoint, the La Habra Basin area is dominated by the northwest trending La Habra Syncline (a U–shaped down–fold) which is bounded on the north by the Puente Hills and on the south by the Coyote Hills. The fold is a naturally occurring trough, or valley, where significant quantities of groundwater have accumulated over the past 150,000 years. The La Habra Groundwater Basin consists of three water-bearing zones: 1) the Alluvium, 2) the La Habra Formation (including the Coyote Hills Formation), and 3) the San Pedro Formation.

The Alluvium is comprised of young and old alluvium. The deposits are found along the surface stream courses and is composed of unconsolidated silt, clay, sand, and gravel. Alluvium thickness ranges from a few feet to over 100 feet. Generally, the La Habra Formation lies below the Alluvium, consisting of the La Habra and Coyote Hills Formations. However, in the Coyote Hill and Puente Hills, the Alluvium is uplifted and exposed. The La Habra Formation consists of non-marine mudstone, siltstone, sandstone, and conglomerate. It ranges in thickness from 300 to nearly 1,200 feet. Water levels of wells in the La Habra Formation have been measured between 100 and 200 feet below ground surface across the La Habra Basin area.

Underneath the La Habra Formation lies the San Pedro Formation. As the deepest water bearing unit, the San Pedro Formation is comprised of sand, gravel, sandstone, conglomerate, and shale. The San Pedro Formation ranges between 200 and 400 feet in thickness and produces the best quality groundwater of all the water bearing zones. Pressure levels of confined groundwater in wells of the San Pedro aquifer zone range from about 100 to 200 feet below ground surface.

Sustainable Groundwater Management Act

In 2014, the State of California adopted the Sustainable Groundwater Management Act (SGMA) to help manage its groundwater sustainably, and limit adverse effects such as significant groundwater-level declines, land subsidence, and water quality degradation. SGMA requires all high- and medium-priority basins, as designated by DWR, be sustainably managed. DWR designated the non-adjudicated Coastal Plain of OC Basin as a medium-priority basin, primarily due to heavy reliance on the groundwater as a source of water supply. Compliance with SGMA can be achieved in one of two ways (City of La Habra et al., 2017):

1) A GSA is formed, and a GSP is adopted, or
2) Special Act Districts created by statute, such as OCWD, and other agencies may prepare and submit an Alternative to a GSP

Led by OCWD, the agencies within Basin 8-1, collaborated to submit an Alternative to a GSP in 2017, titled the "Basin 8-1 Alternative" to meet SGMA compliance. This document supersedes the La Habra Basin Groundwater Management Plan from 2014 and will be updated every five years. The current (2017) version of the SGMA-compliant document can be found on the following link: basin-8-1-alternative-final-report-1.pdf (ocwd.com).

Basin Safe Yield

The Basin is not adjudicated. Instead, the City follows a "safe yield" which is used for the management and future planning of the Basin for sustained beneficial use. The safe yield is the volume of groundwater that can be pumped without depleting the aquifer to a point where it cannot recover through natural recharge over a reasonable period of time.

The safe yield for the Basin was estimated to be approximately 4,500 AFY. This safe yield was determined through an average from two separate studies that accounted for natural groundwater recharge and natural groundwater discharge. The La Habra Basin continues to be managed sustainably by maintaining and coordinating groundwater production within the estimated safe yield. The City of La Habra is also evaluating its existing monitoring program with the intent to develop a more robust groundwater elevation and water quality monitoring program (La Habra, 2020).

Groundwater elevations within the Basin have risen approximately 100 feet from the 1940s through 2014 with an overall rising trend of 50 to 60 feet between 1970 and 2007. This increase in groundwater elevations demonstrates the Basin is not currently in an overdraft condition. However, the City will continue monitoring groundwater elevation trends of the Basin and will review its groundwater operations should groundwater elevations show any signs of decline (La Habra, Groundwater Study, August 2014).

Historic Groundwater Extraction

Historically, groundwater produced from the Basin yielded low quality water. The City owns and operates one non-potable groundwater well used for irrigation at Brea Creek Golf Course. Local groundwater accounted for 57 to 107 AFY of the City's total water supply in the past five years. Since FY 2015-16, the volume of groundwater pumped by the City has increased and remained relatively stable for the last four years (Table 4.2).

4.3.4 Recycled Water Supply

The City does not own or operate any wastewater or recycled water facilities and does not use recycled water as a supply source.

4.3.5 Projected City Water Supply

Projected normal–year supply by source for the City from the 2020 UWMP through the year 2045 is shown in Table 4.3.

Table 4.3
2020 UWMP Projected City Normal Year Water Supply (AF)

Supply Sources/Demands	FY 2025	FY 2030	FY 2035	FY 2040	FY 2045
Supply	Normal Year				
CDWC	9,000	9,000	9,000	9,000	9,000
MWDOC	428	580	576	610	630
Local (Groundwater)[(a)]	115	115	115	115	115
Total Supply	**9,543**	**9,695**	**9,691**	**9,725**	**9,745**

(a) One City well used for irrigation
(b) Source: City of Brea 2020 UWMP

5 RELIABILITY OF WATER SUPPLIES

Every urban water supplier is required to assess the reliability of their water service to its customers under normal, dry, and multiple dry water years. The City depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. There are various factors that may impact reliability of supplies such as legal, environmental, water quality and climatic. This section provides a description of Metropolitan's, CDWC's, and the City of Brea's efforts in securing adequate water supply, as well as the reliability of regional and City normal, single dry year, and multiple dry year water supplies. Metropolitan's, MWDOC's and the City's 2020 UWMPs conclude that they are able to meet, full-service demands of their member agencies through 2045 during normal years, a single-dry year, and multiple-dry years. Consequently, the City is projected to meet full-service demands through 2045 for the same scenarios.

5.1 Metropolitan Water District Supply Reliability

Metropolitan was formed in the late 1920's. Collectively, charter members recognized the limited water supplies available within the region and realized that continued prosperity and economic development of Southern California depended upon the acquisition and careful management of an adequate supplemental water supply. This foresight made the continued development of Southern California possible.

Metropolitan acquires water from Northern California via the State Water Project (SWP) and from the Colorado River to supply water to most of Southern California. As a wholesaler, Metropolitan has no retail customers, and distributes treated and untreated water directly to its 26 member agencies.

Metropolitan's 2020 IRP update describes the core water resources that will be used to meet full-service demands at the retail level under all foreseeable hydrologic conditions from 2025 through 2045. The foundation of Metropolitan's resource strategy for achieving regional water supply reliability has been to develop and implement water resources programs and activities through its IRP preferred resource mix. This preferred resource mix includes conservation, local resources such as water recycling and groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater storage, out-of-region banking, treatment, conveyance, and infrastructure improvements.

Metropolitan's 2020 UWMP was developed as part of the 2020 IRP planning process. Metropolitan's 2020 UWMP finds that Metropolitan can meet, full-service demands of its member agencies from 2020 through 2045 during normal years, single dry year, and multiple dry years. The IRP represents Metropolitan's comprehensive blueprint for long-term water reliability, including key supply development and water use efficiency goals.

The reliability and operational issues related to Metropolitan's various sources of supply are discussed by major source in the subsequent sections.

5.1.1 State Water Project

The SWP consists of a network of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR and is an integral part of the effort to ensure that business and industry, urban and suburban residents, and farmers throughout much of California have sufficient water. The SWP is the largest state-built, multipurpose, user-financed water project in the United States. Nearly two-thirds of residents in California receive at least part of their water from the SWP with approximately 70 percent of SWP's contracted water supply going to urban users and 30 percent to agricultural users. The primary purpose of the SWP is to divert and store water during wet periods in northern and central California and distribute it to areas of need in northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and Southern California.

The availability of water supplies from the SWP can be highly variable. A wet water year may be followed by a dry or critically dry year and fisheries issues can restrict the operations of the export pumps even when water supplies are available.

The Sacramento-San Joaquin River Delta (Delta) is key to the SWP's ability to deliver water to its agricultural and urban contractors. All but five of the 29 SWP contractors receive water deliveries below the Delta (pumped via the Harvey O. Banks or Barker Slough pumping plants). However, the Delta faces many challenges concerning its long-term sustainability such as climate change posing a threat of increased variability in floods and droughts. Sea level rise complicates efforts in managing salinity levels and preserving water quality in the Delta to ensure a suitable water supply for urban and agricultural use. Furthermore, other challenges include continued subsidence of Delta islands, many of which are below sea level, and the related threat of a catastrophic levee failure as the water pressure increases, or because of a major seismic event.

Ongoing regulatory restrictions, such as those imposed by federal biological opinions (Biops) on the effects of SWP and the federal Central Valley Project (CVP) operations on certain marine life, also contribute to the challenge of determining the SWP's water delivery reliability. In dry, below-normal conditions, Metropolitan has increased the supplies delivered through the California Aqueduct by developing flexible CVP/SWP storage and transfer programs. The goal of the storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Harvey O. Banks pumping plant capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions. In addition, the California State Water Resources Control Board (SWRCB) has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level.

"Table A" water is the maximum entitlement of SWP water for each water contracting agency. Currently, the combined maximum Table A amount is 4.17 MAFY. Of this amount, 4.13 MAFY is the maximum Table A water available for delivery from the Delta pumps as stated in the State Water Contract. However, deliveries commonly are less than 50 percent of Table A amounts.

SWP contractors may receive Article 21 water on a short-term basis in addition to Table A water if requested. Article 21 of SWP contracts allows contractors to receive additional water deliveries only under specific conditions, generally during wet months of the year (December through March). Because an SWP contractor must have an immediate use for Article 21 supply or a place to store it outside of the SWP, there are few contractors like Metropolitan that can access such supplies.

Carryover water is SWP water allocated to an SWP contractor and approved for delivery to the contractor each year but not used by the end of the year. The unused water is stored in the SWP's share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

Turnback pool water is Table A water that has been allocated to SWP contractors that has exceeded their demands. This water can then be purchased by another contractor depending on its availability.

SWP Delta exports are the water supplies that are transferred directly to SWP contractors or to San Luis Reservoir storage south of the Delta via the Harvey O. Banks pumping plant. Estimated average annual Delta exports and SWP Table A water deliveries have generally decreased since 2005, when Delta export regulations affecting SWP pumping operations began to become more restrictive due to the Biops.

Metropolitan's 2020 UWMP provides details on the factors that affect the ability to estimate existing and future water delivery reliability. In summary, they include water availability at the source, water rights with priority of the SWP, climate change, regulatory restrictions on SWP Delta exports, ongoing environmental and policy planning efforts, and Delta levee failure. Metropolitan estimated SWP supplies using the 2019 SWP Delivery Capability Report distributed by DWR in August 2020. The Delivery Capability Report presents the current estimate of the amount of deliveries for current (2020) conditions and conditions 20 years in the future.

5.1.2 Colorado River Aqueduct

The Colorado River was Metropolitan's original source of water after Metropolitan's establishment in 1928. The CRA, which is owned and operated by Metropolitan, transports water from the Colorado River to its terminus at Lake Mathews in Riverside County. The actual amount of water per year that may be conveyed through the CRA to Metropolitan's member agencies is subject to the availability of Colorado River water for delivery.

The CRA includes supplies from the implementation of the Quantification Settlement Agreement (QSA) and related agreements to transfer water from agricultural agencies to urban uses. The 2003 QSA enabled California to implement major Colorado River water conservation and transfer programs, stabilizing water supplies for 75 years and reducing the state's demand on the river to its 4.4 million acre-feet (MAF) entitlement. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 MAF on an as-needed basis. Water from the Colorado River or its tributaries is available to users in California, Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, as well as to Mexico. California is apportioned the use of 4.4 MAF of water from the Colorado River each year plus one-half of any surplus that may be available for use collectively in Arizona, California, and Nevada. In addition, California has

historically been allowed to use Colorado River water apportioned to but not used by Arizona or Nevada. Metropolitan has a basic entitlement of 550,000 AFY of Colorado River water, plus surplus water up to an additional 662,000 AFY when the following conditions exists (Metropolitan, 2020 UWMP):

- Water unused by the California holders of priorities 1 through 3
- Water saved by the Palo Verde land management, crop rotation, and water supply program
- When the U.S. Secretary of the Interior makes available either one or both:
  - Surplus water is available
  - Colorado River water is apportioned to but unused by Arizona and/or Nevada

Approximately 40 million people rely on the Colorado River and its tributaries for water with 5.5 million acres of land using Colorado River water for irrigation. Climate change will affect future supply and demand as increasing temperatures may increase evapotranspiration from vegetation along with an increase in water loss due to evaporation in reservoirs, therefore reducing the available amount of supply from the Colorado River and exacerbating imbalances between increasing demands from rapid growth and decreasing supplies.

The Colorado River Basin experienced a severe 5-year drought from 2000 to 2004 with below average precipitation and runoff. Average precipitation has been near normal since that time while runoff has been less than average in two out of every three years. This change in the precipitation to runoff relationship is indicative of a drying trend that is characterized as a long-term drought. For example, in 2020 the Upper Colorado River Basin snowpack reached a level of 107 percent of the median. However, runoff was observed from April through July was just 52 percent of the average due to hot and dry conditions. This drying trend over the past 21-years has resulted in Lake Mead and Lake Powell storage at 40 and 42 percent of capacity (Metropolitan, 2020 UWMP).

The coordinated operation of Lake Powell and Lake Mead was provided for in the 2007 Interim Guidelines and the Intentionally Created Surplus (ICS) program that allows Metropolitan to store water in Lake Mead. These stored supplies will help ensure that Metropolitan can deliver up the CRA capacity of 1.25 MAF. Additionally, the Lower Basin Drought Contingency Plan (DCP) was signed in 2019 to incentivize storage in Lake Mead. This program helps maintain water levels and increases Metropolitan's flexibility to both store water and take delivery of stored water.

With the long-term challenges of water demand exceeding available supply from the Colorado River, and additional uncertainties due to climate change, Metropolitan has developed a number of supply and conservation programs to increase the amount of supply available from the Colorado River. These are discussed in Chapter 3 of the Metropolitan 2020 UWMP which also quantifies the volume of water available through these programs to meet expected CRA deliveries equal to its annual capacity of 1.25 MAF. The amount of supplies available to Metropolitan for the 2020 UWMP planning period is based on U.S. Bureau of Reclamation modeling.

5.1.3 Storage

Storage is a major component of Metropolitan's dry year resource management strategy. Metropolitan's likelihood of having adequate supply capability to meet projected demands, without implementing its Water Supply Allocation Plan (WSAP), is dependent on its storage resources. Under some conditions, Metropolitan may choose to implement the WSAP to preserve storage reserves for a future year rather than using the full supply capability. The WSAP provides a detailed methodology to fairly distribute a limited amount of water supply.

Lake Oroville is the SWP's largest storage facility, with a capacity of about 3.5 MAF. The water is released from Oroville Dam into the Feather River as needed, which converges with the Sacramento River while some of the water at Bethany Reservoir is diverted from the California Aqueduct into the South Bay Aqueduct. The primary pumping plant, the Harvey O. Banks pumping plant, pumps Delta water into the California Aqueduct, which is the longest water conveyance system in California.

5.1.4 Supply Management Strategies

On the regional level, Metropolitan has taken a number of actions to secure a reliable water source for its member agencies. Metropolitan developed its WSAP for dealing with potential shortages that take into consideration the impact on retail customers and the economy, changes and losses in local supplies, the investment in and development of local resources, and conservation achievements. Metropolitan's Water Surplus and Drought Management (WSDM) Plan, developed in 1999, provides policy guidance for managing regional water supplies during both surplus and shortage conditions with the overall goal to minimize the probability of severe shortages. Additional actions taken by Metropolitan over the past several years have increased spending on conservation, local projects, and water supply/reliability enhancements.

5.2 California Domestic Water Company Supply Reliability

CDWC has water rights, production, treatment, and conveyance facilities in the Main San Gabriel Basin that serve overlying customers within the Suburban Water Company as well as serving the City and the City of La Habra. Based on the ten-year average from FY 2010-11 through 2019-20, the annual deliveries of groundwater from CDWC to the City and the City of La Habra are approximately 13,261 AFY, but this volume varies from year to year.

The Main San Gabriel Basin lies in eastern Los Angeles County and occupies most of San Gabriel Valley. The hydrologic basin or watershed coincides with a portion of the upper San Gabriel River watershed, and the aquifer or groundwater basin underlies most of the San Gabriel Valley. It is bounded on the north by the San Gabriel Mountains, on the northwest by Raymond Basin, on the southeast by Puente Basin, and on the south by Central Basin. The Main San Gabriel Basin encompasses approximately 107,000 acres and has a storage of 8.9 MAF when the groundwater elevation at the Baldwin Park Key Well is 316 feet. Generally speaking, one foot of groundwater elevation is equivalent to approximately 8,000 AF of storage.

The hydrogeological San Gabriel Basin is divided between three sub-basins, Main Basin, Puente Basin, and portions of Six Basins area. A portion of Six Basins area is tributary to the Main Basin. Each of the sub-basins are adjudicated and managed separately.

Major sources of recharge to the Main San Gabriel Basin are infiltration of rainfall on the valley floor and runoff from the nearby mountains. The Main San Gabriel Basin is the first of a series of basins to receive the water from mountain runoff. The Main San Gabriel Basin interacts hydrogeologically and institutionally with adjoining basins, including Puente Basin, Central Basin, and West Coast Basin (Main San Gabriel Basin Watermaster, 2020).

Main San Gabriel Basin Judgment

Rapid urbanization in the San Gabriel Valley in the 1940s resulted in an increased demand for groundwater drawn from the Upper Area users in Main San Gabriel Basin. Consequently, the Main San Gabriel Basin was in a state of overdraft and the available water supply for the Lower Area and downstream users decreased. In 1968, at the request of producers, the Upper San Gabriel Municipal Water District filed a complaint that would adjudicate water rights in the Main San Gabriel Basin and would bring all Basin producers under control of one governing body. The final result was the entry of the Main San Gabriel Basin Judgment in 1973.

The Judgment defined the water rights of 190 original parties to the legal action. It created a new governing body, the Main San Gabriel Basin Watermaster, and described a program for management of water in the Main San Gabriel Basin. Under the terms of the Main San Gabriel Basin Judgment all rights to the diversion of surface water and production of groundwater within the Main Basin and its Relevant Watershed were adjudicated. The Main Basin Judgment does not restrict the quantity of water agencies may extract from the Main Basin. Rather, it provides a means for replacing with Supplemental Water all annual extractions in excess of an agency's annual right to extract water. The Main Basin Watermaster annually establishes an Operating Safe Yield for the Main Basin that is then used to allocate to each agency its portion of the Operating Safe Yield that can be produced free of a Replacement Water Assessment. If a producer extracts water in excess of his right under the annual Operating Safe Yield, it must pay an assessment for Replacement Water that is sufficient to purchase one AF of Supplemental Water to be spread in the Main San Gabriel Basin for each AF of excess production. All water production is metered and is reported quarterly to the Main Basin Watermaster. The Operating Safe yield for FY 2022-23 through 2025-26 has been set to 130,000 AF per year[1].

In addition to Replacement Water Assessments, the Main Basin Watermaster levies an Administration Assessment to fund the administration of the Main Basin management program under the Main Basin Judgment and a Make-up Obligation Assessment in order to fulfill the requirements for any make-up Obligation under the Long Beach Judgment and to supply fifty percent of the administration costs of the River Watermaster service. The Main Basin Watermaster levies an In-lieu Assessment and may levy special Administration Assessments.

Water rights under the Main Basin Judgment are transferable by lease or purchase so long as such transfers meet the requirements of the Judgment. There is also provision for Cyclic Storage Agreements that allow Parties and non-parties to store imported supplemental water in the Main Basin under such agreements with the Main Basin Watermaster pursuant to uniform rules and conditions and Court approval (Main San Gabriel Basin Watermaster, Annual Report, 2015).

The Main Basin Watermaster has entered into a Cyclic Storage Agreement with three municipal water districts, Metropolitan, Three Valleys Municipal Water District (TVMWD), and Upper San

[1] Main San Gabriel Basin Watermaster, May 2021.

Gabriel Valley Municipal Water District (USGVMWD). The first agreement with Metropolitan and USGVMWD permits Metropolitan to deliver and store imported water in the Main Basin in an amount not to exceed 100,000 AF for future Replacement Water use. The second Cyclic Storage Agreement is with TVMWD and permits Metropolitan to deliver and store 40,000 AF for future Replacement Water use. The third is with SGVMWD.

Water Quality

A number of contaminants in limited parts of the Main San Gabriel Basin require careful monitoring and treatment before the water can be supplied to customers. The primary contaminants of concerns in the Main San Gabriel Basin include volatile organic compounds (VOCs) and nitrates, perchlorate, NDMA, trichloropropane (1,2,3-TCP), and hexavalent chromium (CR VI). VOCs and nitrates are the most prevalent contaminants found in the Main San Gabriel Basin. As a result, the location and treatment methods are generally well understood. During FY 2019-20, 30 treatment plants treated approximately 75,000 AF of VOC-contaminated water from the Main San Gabriel Basin. Although VOC contamination is substantial, it is centered in just a few areas, leaving a large portion of the Main San Gabriel Basin unaffected.

The California State Division of Drinking Water (DDW) lowered the notification level of perchlorate from 18 to 4 parts per billion (ppb) in January 2002. Subsequently, a total of 22 wells from the Main San Gabriel Basin were removed from service due to unacceptable levels of perchlorate. In October 2007, the DDW established a maximum contaminant level (MCL) of 6 ppb. Efforts to treat perchlorate by the Watermaster resulted in ion-exchange technology treatment facilities at five sites in the Baldwin Park Operable Unit (BPOU) and at two facilities in other parts of the Main San Gabriel Basin during FY 2019-20. In April 2020, DDW issued a Notice of Proposed Rulemaking to consider lowering the perchlorate Detection Limit for Purposes of Reporting (DLR) to 2 ppb, and in anticipation of this possible revision, the Watermaster coordinated with Producers to conduct “low-level” detection sampling at a level of 0.1 ppb.

During 1998, eight local wells within the Main San Gabriel Basin had levels of NDMA above the notification level of 2 ppt at the time. Five of the wells with measurable levels of NDMA had already been taken out of service for other reasons, and the other three were taken offline as a direct result of NDMA levels above notification level. The Watermaster played a key role in the construction of NDMA treatment facilities within the Main San Gabriel Basin. Five facilities were operational during FY 2019-20.

1,2,3-TCP is a degreasing agent that has been detected in the BPOU during the winter of 2006. Its presence delayed the use of one treatment facility for potable purposes. The DDW determined 1,2,3-TCP is best treated through liquid phase GAC. Facilities to treat 1,2,3-TCP were operational during FY 2019-20.

The DDW required specific water systems to conduct water quality tests for Per- and polyfluoroalkyl substances (PFAS) and Perfluorooctane Sulfanate (PFOS) during 2019 and established the notification level at 5.1 ppt and 6.5 ppt for PFOS and PFOS, respectively. The Watermaster is conducting PFAS sampling and monitoring as required by the SWRCB and working with the DDW to characterize the extent of PFAS in the Main San Gabriel Basin (Main San Gabriel Basin Watermaster, 2020).

5.3 City Water Supply Reliability Measures

Demand Management Measures

The provisions and water conservation measures to be implemented in response to specific water shortage levels are described in the City of Brea Water Shortage Contingency Plan (WSCP) located in Appendix H of the City's 2020 UWMP. Aligned with the WSCP, the City adopted Ordinance No. 1221, the Water Shortage Contingency Response Ordinance, on June 1, 2021. This Ordinance updates Ordinance No. 1123, the Water Conservation and Water Supply Shortage Program (WCWSS Program), adopted on June 2, 2009. The new Ordinance was adopted to be consistent with 2018 amendments to the Urban Water Management Planning Act that include new WSCP requirements, MWDOC's 2020 UWMP, and MWDOC's 2020 WSCP. The purpose of Ordinance No. 1123 is to establish water management requirements necessary to "assure adequate supplies of water to meet the needs of the public and further the public health, safety, and welfare, recognizing that water is a scarce natural resource that requires careful management not only in times of drought, but at all times."

The ordinance establishes permanent water conservation standards intended to alter behavior related to water use efficiency for non-shortage conditions related to:

- Limits on watering hours and no irrigation within 48 hours of rainfall event
- Limits on water duration
- No excessive water flow or runoff -
- No washing down hard or paved surfaces -
- Obligation to fix leaks, breaks, or malfunctions
- Water fountains and decorative water features only as part of recirculating system -
- Limits on washing vehicles -
- Drinking water served upon request only
- Commercial lodging establishments must provide option to note launder linen daily
- No installation of single pass cooling systems
- No installation of non-re-circulating water systems in commercial car wash and laundry systems
- Restaurant required to use water conserving dish wash spray valves

The ordinance also establishes six levels of water supply shortage response actions to be implemented during times of declared water shortage or declared water shortage emergency, with increasing restrictions on water use in response to worsening drought or emergency conditions and decreasing supplies.

The City is fully metered for all customer sectors, including separate meters for single-family and multi-family residential, CII, dedicated landscape, and City-owned meters. The City's program for meter replacement and calibration consists of replacing meters every 10 years and calibrating meters every two years for diameters 1.5-inch and above or as needed.

The City has a four-tier inclining block rate structure for single-family residential customers and a uniform rate for non-residential customers. Non-residential category includes multifamily, commercial, industrial, institutional, and greenbelt. A 20 percent lifeline discount for the first tier of the inclining rate structure is in place to assist low-income residents. Qualified residents may also receive a discount of 10 percent on the second tier and five percent of the third tier of the inclining rate structure. The City's water rate structure includes a monthly service charge based on meter size and monthly usage charges based on the amount of water used. This rate structure became effective on July 1, 2017. The City's conservation pricing structure is always in place and is not dependent upon a water shortage for implementation.

5.4 Normal, Dry Year and Multiple-Dry Year Supply Reliability

5.4.1 Metropolitan Supplies and Demands

In their 2020 UWMP, Metropolitan estimated supply capability and projected demands for an average (normal) year based on an average of hydrologies for the years 1922-2017; for a single dry-year based on a repeat of the hydrology in the year 1977; and for multiple dry years based on a repeat hydrology of a five consecutive year drought from 1988 through 1992. The single and multiple-dry-year hydrologies represent the timing of the least amount of available water resources from the SWP, a major source of Metropolitan's supply.

Metropolitan developed demand forecasts by first estimating total retail demands for its service area and then factoring out water savings attributed to conservation. Projections of local supplies then were derived based on information gathered from Metropolitan's annual local production surveys and communication with member agency staff. The resulting difference between total demands net of conservation and local supplies is the expected regional demands on Metropolitan supplies. These estimates are summarized by category in Table 5.4 for average, single-dry and multiple-dry-year water supply scenarios. More detailed information on Metropolitan's forecasts and these tables can be found in their 2020 UWMP. In all scenarios shown in Table 5.4 there is a projected surplus, even without Metropolitan's Supplies under Development and Potential Supplies.

5.4.2 City Supplies and Demands

The supply and demand reliability assessment is taken from the City's 2020 UWMP. The basis of normal-year, single-dry, and multiple-dry year hydrology are consistent with the hydrologic condition for the MWDOC service area, which the City is a part of, as provided in the MWDOC 2020 UWMP. City normal-year supplies and demands were discussed in Section 4.0. Normal-year hydrology is represented by the average of FY 2017-18 and FY 2018-19. The City demands presented in the 2020 UWMP are assumed to not include the increased demands attributed to the Proposed Project. As such, these demands were added to the projected City demands. The supplies are consistent with the normal-year supplies estimated in the City's 2020 UWMP with imported supplies from MWDOC increased in Table 5.5 to accommodate the increased demands from the Proposed Project. It is noted in the UWMP that the supply data in the reliability analysis was presented to match the projected City demand and does not account for additional supplies available. The City can purchase more Metropolitan water through MWDOC who demonstrates

surplus as discussed above. Based on Metropolitan's and MWDOC's UWMP, imported water is available to close any local water supply gap.

Table 5.6 shows City supplies and demands projected to occur for a single dry-year based on a repeat of the hydrology in the year 2014, consistent the MWDOC 2020 UWMP. Demands were increased 6.0 percent relative to demands forecast for normal-year conditions consistent with the City's 2020 UWMP. Again, supply is increased to accommodate the additional demands from the Proposed Project. Table 5.7 shows City supplies and demands projected to occur for multiple dry years based on a repeat of the hydrology in the years 2012-2016, consistent with MWDOC 2020 UWMP. Each year of the 5-year drought period was estimated using the same assumptions as the City's 2020 UWMP with demand increasing by 6.0 percent by year 5, relative to the normal year demand. .

The City is projected to have sufficient imported and groundwater supplies to meet normal, single-dry year, and multiple-dry year conditions with the addition of the Proposed Project demands as Metropolitan has projected supply surpluses for each of these conditions (even without supplies under development and potential supplies). Also, additional groundwater supplies are available for purchase through CDWC. It should be noted that imported water supplies are increased in single and multiple dry years consistent with Metropolitan's 2020 UWMP due to the fact that in dry years Metropolitan draws water from surface and groundwater storage programs.

Table 5.4
Metropolitan Regional Water Demands
Single Dry, Multiple Dry and Average Years (AF)

Metropolitan Supply Capability and Projected Demands (AFY)					
Single Dry Year MWD Supply Capability and Projected Demands (1977 Hydrology)					
Fiscal Year	**2025**	**2030**	**2035**	**2040**	**2045**
Capability of Current Supplies	2,772,000	2,761,000	2,760,000	2,760,000	2,757,000
Projected Demands	1,544,000	1,500,000	1,473,000	1,496,000	1,525,000
Projected Surplus	1,228,000	1,261,000	1,287,000	1,264,000	1,232,000
Projected Surplus %[(a)]	80%	84%	87%	84%	81%
Supplies under Development	0	0	0	0	0
Potential Surplus	1,228,000	1,261,000	1,287,000	1,264,000	1,232,000
Potential Surplus %[(a)]	80%	84%	87%	84%	81%
Multiple Dry Year MWD Supply Capability and Projected Demands (1988-1992 Hydrology)					
Fiscal Year	**2025**	**2030**	**2035**	**2040**	**2045**
Capability of Current Supplies	2,178,800	2,219,000	2,241,000	2,263,000	2,239,000
Projected Demands	1,592,000	1,570,000	1,537,000	1,539,000	1,564,000
Projected Surplus	586,800	649,000	704,000	724,000	675,000
Projected Surplus %[(a)]	37%	41%	46%	47%	43%
Supplies under Development	0	0	0	0	0
Potential Surplus	586,800	649,000	704,000	724,000	675,000
Potential Surplus %[(a)]	37%	41%	46%	47%	43%
Average Year MWD Supply Capability and Projected Demands (1922-2017 Hydrology)					
Fiscal Year	**2025**	**2030**	**2035**	**2040**	**2045**
Capability of Current Supplies	3,899,000	3,893,000	3,890,000	3,888,000	3,885,000
Projected Demands	1,427,000	1,388,000	1,362,000	1,378,000	1,403,000
Projected Surplus	2,472,000	2,505,000	2,528,000	2,510,000	2,482,000
Projected Surplus %[(a)]	173%	180%	186%	182%	177%
Supplies under Development	13,000	13,000	13,000	13,000	13,000
Potential Surplus	2,485,000	2,518,000	2,541,000	2,523,000	2,495,000
Potential Surplus %[(a)]	174%	181%	187%	183%	178%

(a) As a percentage of projected demand

(b) Total demands are adjusted to include IID-SDCWA transfer and exchange and canal lining. These supplies are calculated as local supplies but shown for CRA capacity limit calculations

Source: 2020 Metropolitan Urban Water Management Plan

Table 5.5
City Projected Normal-Year Water Supply and Demand (AF)

Supply Sources/Demands	2025	2030	2035	2040	2045
Supply	Normal Year				
CDWD	9,000	9,000	9,000	9,000	9,000
MWDOC[a]	960	1,112	1,108	1,142	1,162
Local (Groundwater)[b]	115	115	115	115	115
Total Supply	10,075	10,227	10,223	10,257	10,277
Demand[c]	Normal Year				
Total City Demand without Project[d]	9,543	9,695	9,691	9,725	9,745
Additional Proposed Project Demand[e]	532	532	532	532	532
Total Demand[f]	10,075	10,227	10,223	10,257	10,277

(a) The amount of MWDOC imported water supply to meet demand
(b) Local groundwater for irrigation uses and not utilized by the Project
(c) All normal-year demand includes 5% non-revenue water (water loss) consistent with City's 2020 UWMP
(d) Normal year demand based on the City's 2020 UWMP, assumed to not include Project demand
(e) Project demand based on Brea 265 Specific Plan. See Table 4.1
(f) Normal year demand based on the City's 2020 UWMP plus Proposed Project demand

Table 5.6
City Projected Single Dry-Year Water Supply and Demand (AF)

Supply Sources/Demands	2025	2030	2035	2040	2045
Supply	Single-Dry Year				
CDWD	9,000	9,000	9,000	9,000	9,000
MWDOC[a]	1,564	1,726	1,721	1,758	1,779
Local Groundwater[b]	115	115	115	115	115
Total Supply	10,679	10,841	10,836	10,873	10,894
Demand[c]	Single-Dry Year				
Total City Demand without Project[d]	10,115	10,277	10,272	10,309	10,330
Additional Proposed Project Demand[e]	564	564	564	564	564
Total Demand[f]	10,679	10,841	10,836	10,873	10,894

(a) The amount of MWDOC imported water supply to meet demand
(b) Local groundwater for irrigation uses and not utilized by the Project
(c) Includes 5% non-revenue water (water loss) consistent with City's 2020 UWMP and is 6% greater than normal year demand consistent with City's 2020 UWMP
(d) Single-dry year demand based on the City's 2020 UWMP, assumed to not include Project demand
(e) Project demand based on Brea 265 Specific Plan land use and increased by 6% for single-dry year
(f) Single-dry year demand based on the City's 2020 UWMP plus Proposed Project demand

Table 5.7
Projected Multiple Dry-Year Water Supply and Demand (AF)

Supply Sources/Demands		2025	2030	2035	2040	2045
First Year	CDWD	9,000	9,000	9,000	9,000	9,000
	MWDOC[a]	1,195	1,576	1,705	1,708	1,742
	Local Groundwater[b]	115	115	115	115	115
	Total Supply	10,310	10,691	10,820	10,823	10,857
	Total City Demand without Project	9,766	10,147	10,276	10,279	10,313
	Proposed Project Demand	544	544	544	544	544
	Total Demand[c]	10,310	10,691	10,820	10,823	10,857
Second Year	CDWD	9,000	9,000	9,000	9,000	9,000
	MWDOC[a]	1,288	1,614	1,709	1,721	1,751
	Local Groundwater[b]	115	115	115	115	115
	Total Supply	10,403	10,729	10,824	10,836	10,866
	Total City Demand without Project	9,854	10,180	10,275	10,287	10,317
	Proposed Project Demand	549	549	549	549	549
	Total Demand[c]	10,403	10,729	10,824	10,836	10,866
Third Year	CDWD	9,000	9,000	9,000	9,000	9,000
	MWDOC[a]	1,380	1,651	1,713	1,733	1,761
	Local Groundwater[b]	115	115	115	115	115
	Total Supply	10,495	10,766	10,828	10,848	10,876
	Total City Demand without Project	9,941	10,212	10,274	10,294	10,322
	Proposed Project Demand	554	554	554	554	554
	Total Demand[c]	10,495	10,766	10,828	10,848	10,876
Fourth Year	CDWD	9,000	9,000	9,000	9,000	9,000
	MWDOC[a]	1,472	1,688	1,717	1,746	1,770
	Local Groundwater[b]	115	115	115	115	115
	Total Supply	10,587	10,803	10,832	10,861	10,885
	Total City Demand without Project	10,028	10,244	10,273	10,302	10,326
	Proposed Project Demand	559	559	559	559	559
	Total Demand[c]	10,587	10,803	10,832	10,861	10,885
Fifth Year	CDWD	9,000	9,000	9,000	9,000	9,000
	MWDOC[a]	1,564	1,726	1,721	1,758	1,779
	Local Groundwater[b]	115	115	115	115	115
	Total Supply	10,679	10,841	10,836	10,873	10,894
	Total City Demand without Project	10,115	10,277	10,272	10,309	10,330
	Proposed Project Demand	564	564	564	564	564
	Total Demand[c]	10,679	10,841	10,836	10,873	10,894

(a) The amount of MWDOC imported water supply to meet demand
(b) Local groundwater for irrigation uses and not utilized by the Project
(c) Each multiple dry-year demand includes 5% water loss and increases to 6% greater than normal year demand by year 5, consistent with City's 2020 UWMP

6 CONCLUSION

The estimated buildout water demand for the Proposed Project is projected to be 507 AF greater (not including water loss) than the FY 2020 water demand for existing project area which was assumed to be negligible for the purpose of this WSA. Adding projected water loss consistent with the City's UWMP increases this additional demand to a supply requirement of 532 AF (including water loss), which is 5 percent of the total supply requirement estimated for the City in FY 2045.

The City is projected to have sufficient imported and groundwater supplies to meet normal, single-dry year, and multiple-dry year conditions with the addition of the Proposed Project demands because:

1. Metropolitan has projected supply surpluses for each of these conditions, and
2. The City can increase groundwater purchases through CDWC based on historical use.

The information included in this WSA identifies a sufficient and reliable water supply for the City, now and into the future, including a sufficient water supply for the land uses proposed for the Brea 265 Specific Plan. These supplies are also sufficient to provide for overall City-wide growth at the rate projected in the City's 2020 UWMP that includes the Proposed Project.

7 REFERENCES

The following documents were used, in conjunction with discussions with the City of Brea, in preparing this water supply assessment:

CDM Smith, *2021 OC Water Demand Forecast for MWDOC and OCWD,* March 30, 2021.

City of Brea, *2020 Urban Water Management Plan*, June 2021. Available: https://www.ci.brea.ca.us/428/Water-Division

CivilTec Engineering Inc., *City of Brea 2021 Water Master Plan*, May 2021

DWR, *The State Water Project Final Delivery Capability Report 2019,* August 2020.

DWR, *The State Water Project Final Delivery Capability Report 2017,* March 2018.

Main San Gabriel Basin Watermaster, *2019-2020 Annual Report.*

Metropolitan Water District of Southern California (MWD), 2020 *Urban Water Management Plan, June* 2021.

MWDOC, 2020 *Urban Water Management Plan, June* 2021.

Appendix R Sewer System Analysis

Appendices

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PSOMAS

TECHNICAL MEMORANDUM

To: Elizabeth Kim

From: Kim Alexander

Date: March 3, 2022

Subject: Brea 265 Sewer System Analysis

Tributary Sewer System

The western portion of the Brea 265 Project (Project), located west of Valencia Avenue, is tributary to the City of Brea sewer system pipelines shown on Figure 1. The nearest sewer to the Project is an 8-inch pipeline that extends through the Brea Sports Park up to the southern edge of the Project boundary. This pipeline currently serves the Brea Sports Park and Thompson Energy operations. The 8-inch pipeline discharges south to the 8-inch pipeline along Birch Street and continues east approximately 1,050 feet to Flower Hill Street where the system routes through the residential neighborhood located north of Birch Street. The 8-inch pipeline transitions into a 10-inch pipeline within the neighborhood at Primrose Avenue and Foxglove Street. At this location, a substantial amount of additional sewer flow enters from the Blackstone development located north of Lambert Road. The 10-inch pipeline turns south on Starflower Street which transitions into Ranger Avenue (at the intersection of Birch Street) and continues south in Ranger to a 15-inch pipeline along north side of the Loftus Diversion Channel. The 15-inch pipeline along the channel also serves the industrial area located north of the channel and flows west to Kraemer Boulevard. Just upstream of Kraemer, the 15-inch pipeline transitions to a short reach of 12-inch pipeline with a steep slope then the sewer flows south in a 15-inch pipeline in Kraemer to Orange County Sanitation District's (OCSD) trunk sewer at Imperial Highway.

As-built drawings were provided by the City for the tributary sewer system for input into InfoSewer modeling software. The pipeline lengths and slopes were entered in the model based on these drawings where available. There are reaches of the system where plans could not be located and for these reaches the pipe length and slope were entered based on the City's model data presented in the City's 2021 Sewer Master Plan (SMP). These reaches for which as-built drawings were not available are highlighted on Figure 1.

The OCSD Carbon Canyon Interceptor runs through the eastern portion of the Project, located east of Valencia Avenue. The former OCSD Carbon Canyon Lift Station and its associated force main were eliminated with the construction of this gravity main system through the Project property. In exchange for allowing a right-of-way through the property, OCSD agreed to allow the Project to discharge to the Carbon Canyon Interceptor and included stub-outs for future sewer connections at their manholes within the Project.

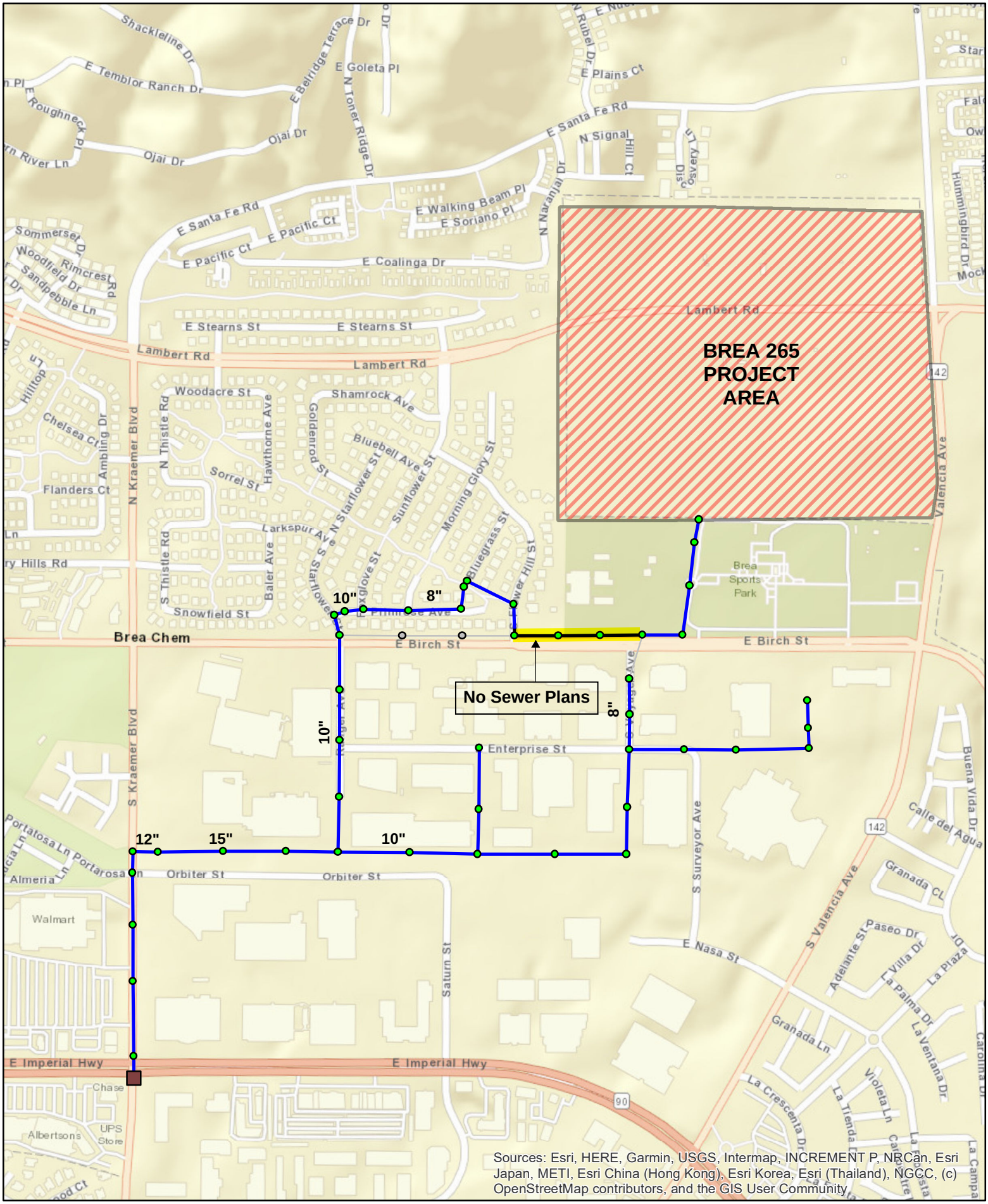

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Figure 1
Tributary Sewer Pipeline

Flow Monitoring

As part of this study, flow monitoring was conducted by ADS from September 12 to October 1, 2019, in the southern tributary sewer system toward Birch Street where the western Project area flow will discharge. Flow monitoring locations were selected to calibrate the sewer model and determine appropriate flow factors for the land uses in the tributary area. Figure 2 shows flow monitoring (FM) locations and the various tributary sub-basins color coded by flow monitoring station and labeled by the street name of the station. The most upstream FM station is along Birch Street, downstream the Brea Sports Park. This location was selected to determine the flow from the oil operations within the park area as well as from the park itself (pink area on Figure 2).

The next monitoring location downstream was along Ranger Avenue. This location was selected to measure the primarily residential flow from the neighborhood just north of Birch, and the Blackstone residential development located north of Lambert Road that is tributary to the study area sewer system (brown area on Figure 2). The non-residential flow also contributing to the cumulative flows measured at the Ranger FM station include an elementary school and a small amount of industrial use adjacent to Ranger Avenue, in addition to the flows measured at the Birch FM station. The third and final downstream station was located along Kraemer Boulevard which collects the Ranger flows and the additional tributary basin area that contains a combination of residential and industrial flows (blue area on Figure 2). A summary of the average and peak flows from the FM data are shown on Table 1. The ADS flow monitoring report is included in Appendix A. The data shows only limited fluctuation in the flows at the Birch Street location, typical residential peaking at the Ranger Avenue location with peak flows occurring in the morning and evening, and similar morning and evening peaking at the Kraemer Boulevard location, apparently dominated by residential flow. The incremental flow (non-cumulative) from each sub-basin tributary to each FM station is estimated by subtracting the flow at the upstream station (sub-basin) from the flow at the downstream station. The sub-basins tributary to each FM station are shown on Figure 2, and will be referred to as the Birch basin, Ranger basin, and Kraemer basin.

TABLE 1 - FLOW MONITORING DATA SUMMARY (MGD)

FM Station Flow	Avg	Peak	Peak to Avg
Birch Street	0.106	0.135	1.27
Ranger Avenue	0.241	0.390	1.62
Kraemer Boulevard	0.370	0.649	1.75
Tributary Sub-Basin Flow (1)	**Avg**	**Peak**	**Peak to Avg**
Birch Street	0.106	0.135	1.27
Ranger Avenue	0.135	0.255	1.89
Kraemer Boulevard	0.129	0.259	2.01

(1) Equal to FM station flow less the upstream station flow.

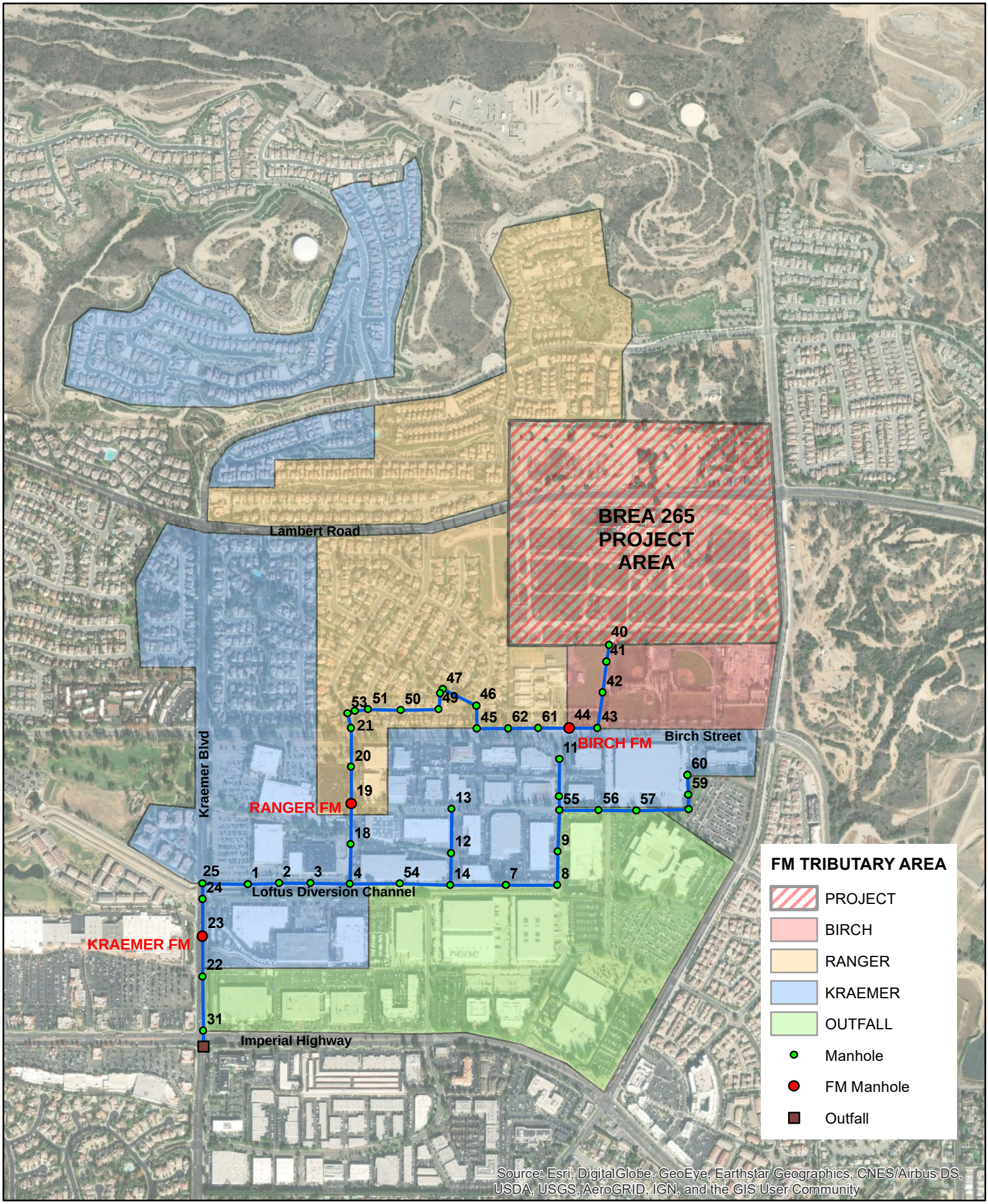

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Figure 2
FM Tributary Basins

Model Flow Factor Estimates

Flow factors were estimated based on the monitoring data for each of the tributary basins shown on Figure 2 and the corresponding land use within each of the areas. The tributary area to each FM station was estimated based on sewer plans and sewer GIS information provided by the City. An iterative, trial and error method was used within Excel to select flow factors to match average flow monitoring data as close as possible. Flow factors were varied up and down within typical ranges used for residential and industrial land use categories. A year's worth of metered water use data for 2018 was provided by the City for planning areas within the Blackstone development as well as other newer residential developments in the City (summarized in Appendix B). A percentage of the water demand will be for outdoor use with the indoor use discharging to the sewers. The dwelling units (du's) were counted within the FM tributary areas and factors (per du) applied based on both density and metered water use data.

The average and peak flows for the Birch FM station were utilized in the model for loading the sewer generated within the park area. Estimates were then made to calibrate the residential flow to the FM station along Ranger which include portions of Blackstone and the neighborhood along Birch. Residential densities include low density with approximately 3 dwelling units per acre (du/ac) and cluster homes with approximately 5 du/ac. Following this same process, residential flow factors were applied to the basin tributary to Kraemer. The residential land uses in the Kraemer area include the same cluster homes as the Ranger basin with approximately 5 du/ac and single-family homes on slightly smaller lots than the Ranger basin with a density of approximately 4 du/ac. The single-family residential use in the Kraemer basin area was reduced slightly based on the higher density. The remaining flow to the Kraemer station was attributed to the industrial uses.

The estimated flow factors developed from the monitoring data and by land use are shown in Table 2. These factors were used to calibrate the model of the tributary sewer system to the monitored flow data. A low density residential (LDR) flow factor of 250 gpd/du was used for the largest lots within the Ranger basin. The slightly higher density LDR lots within the Kraemer basin were given a factor of 200 gpd/du. Based on the metered water use data for similar density lots provided by the City, these sewer factors represent an indoor use equal to approximately 60% of the total water use, which is within the expected range for low density lots. An estimated factor of 130 gpd/du is used for cluster homes within both the Ranger and Kraemer basins. These homes are within Blackstone PA3 and have an average water use of 145 gpd/du, resulting in 90% of the water use contributing to sewer flow. A factor of 110 gpd/du was assumed for all apartments and is equal to 90% of high-density water use data provided by the City of 122 gpd/du. An indoor use percentage of 90% is typical for higher density lots with limited outdoor irrigation. The industrial flow within the study area was estimated using a flow factor of 700 gallons per day per acre. Using these factors, the resulting average flow rates are shown in Table 2. The resulting flows are conservatively greater than the observed flows recorded for the Ranger and Kraemer stations, also shown in Table 2, but still within 10 percent.

TABLE 2 - MODEL FLOW FACTOR DATA

MH#[1]	Land Use	Units[2]	Density (du/ac)	Factor (gpd/du)	Average Flow		Peak Flow		Development/Street Location
					gpd	gpm	gpd	gpm	
Birch FM Basin Area									
40	***Birch Street FM Actual***				***106,000***	***74***	***135,000***	***94***	***Sports Park and Thompson Energy***
Range FM Basin Area									
61	Elementary School	640		10	6,400	4	12,160	8	
46	LDR	77	2.9	250	19,250	13	36,575	25	Flower Hill
49	LDR	33	2.9	250	8,250	6	15,675	11	Bluegrass
53	LDR	78	2.9	250	19,500	14	37,050	26	Starflower
51	LDR	54	3.2	250	13,500	9	25,650	18	Blackstone/Stearns
51	LDR	59	2.9	250	14,750	10	28,025	19	PA1 Blackstone/Rubel
51	MDR/Cluster	196	5.3	130	25,480	18	48,412	34	PA3 Blackstone/Coalinga/Walking Beam
51	Appartments	94	18.8	110	10,340	7	19,646	14	PA2 Blackstone
20	Industrial	30.4		700	21,287	15	40,445	28	Ranger
19	**Ranger FM Calculated**				**308,827**	**170**	**398,638**	**277**	
19	***Ranger FM Actual***				***241,000***	***167***	***390,000***	***271***	***Ranger Flow Meter***
Kraemer FM Basin Area									
25	MDR/Cluster	65	5.3	130	8450	6	16,055	11	PA3 Blackstone/Pacific Court
25	MDR	188	4.0	200	37600	26	71,440	50	PA4 and PA5 Blackstone
25	MDR	140	3.6	200	28000	19	53,200	37	Kraemer East @ Edgemont
25	MDR	54	3.9	200	10800	8	20,520	14	Kraemer West @ Edgemont
25	Appartments	115	17.4	110	12650	9	24,035	17	Kraemer West @ Channel
2	Industrial	15.3		700	10703	7	20,336	14	Kraemer East @ Channel
1	Industrial	17.6		700	12334	9	23,435	16	Orbiter St
55	Industrial	22.7		700	15897	11	30,204	21	Voyager
13	Industrial	14.3		700	10038	7	19,072	13	Enterprise
4	Industrial	23.3		700	16278.5	11	30,929	21	Ranger
23	**Kraemer FM Calculated**				**542,761**	**283**	**707,864**	**492**	
23	***Kraemer FM Actual***				***370,000***	***257***	***649,000***	***451***	***Kraemer Flow Meter***

1) MH# is for loading the model and corresponds to Figure 2

2) Units are dwelling units for residential use, acreage for industrial use, and students for Elementary School.

Project Flows

The City's 2021 SMP requires potential developers to perform a sewer generation analysis incorporating details of the specific development area and conduct a hydraulic analysis to verify available downstream system capacity. The 94.5-acre western Project area that is tributary to the study sewer system has planned residential land uses as shown in Table 3 below. The housing products include low density residential (LDR) and medium density residential (MDR) homes. The number of dwelling units and densities by residential land use type were obtained from the Brea 265 Specific Plan dated October 14, 2021 and are also included in Table 3. The LDR land use area identified in the Specific Plan includes a 1.0-acre reserved site for public safety/civic uses. City staff estimated that 6 personnel would be on duty at any one time. Project flows were estimated based on water use data provided by the City for other new developments (summarized in Appendix B) and the calibrated flow factors for the study area tributary basins as described above. The resulting flow factor estimates are 230 gpd/du for LDR and 130 gpd/du for MDR. These factors are similar to those used for the Kraemer basin residential land use mix which has higher density residential uses than the Ranger basin making these factors more appropriate. Using these factors, the resulting average sewer flow for the western Project area equals 90,390 gpd. The estimated population for this same area equals 1,726 people based on 2.82 persons per dwelling unit from the City of Brea General Plan 2021-2029 Housing Element (consistent with the Brea 265 EIR). The resulting per capita sewer generation rate is equal to 52 gallons per day. This estimate is within State regulations which call for indoor water use of 55 gallons per capita per day (gpcd) through 2025 decreasing to 50 gpcd by 2030.

The Brea 265 Project was identified in the 2021 SMP and evaluated as a near-term project to determine any resulting capacity constraints. The SMP projected an average sewer flow rate of 145,000 gpd for the western portion of the Project and 114,600 gpd for the eastern portion of the Project. SMP loading factors for residential land uses equal 270 gpd/du for single-family residential (1.0 to 6.0 du/ac), 248 gpd/du for multi-family residential (6.1 to 12.0 du/ac), and 210 gpd/du for high density residential (12.1 to 24.9 du/ac). These factors were utilized in this analysis and applied based on residential land use density. It should be noted, however, that the SMP factors for multi-family density products exceed metered water use for similar new developments, with water use ranging from 144 to 218 gpd/du (Appendix B). The SMP factor for parks was also utilized and is equal to 10.5 gpd/acre. The estimated lower factors, based on flow monitoring and metered water use for similar products, were presented as a realistic projection of the future flows while the factors presented in Table 3 from the 2021 SMP are used as a conservative planning estimate, consistent with the SMP analysis. Table 3 shows the average and peak dry weather sewer generation for the Project area using the 2021 SMP factors. The resulting average dry weather flow (ADWF) for the western study area is 154,553 gpd, or 89.6 gpcd using the population estimate of 1,726. Peak dry weather flows (PDWF) are also calculated using the SMP peaking criteria ($Q_{pk} = 1.777 \times Q_{avg}^{0.92}$, Q in cfs).

TABLE 3 – BREA 265 WESTERN AREA ESTIMATED SEWER LOADING

Proposed Land Use	Acres	du/ac	DU's	Factor (gpd/unit)	Average Flow gpd	Average Flow gpm	Peak Dry Flow gpd	Peak Dry Flow gpm
WESTERN PROJECT AREA								
Low Density Residential	25.2	4.2	105	270	28,350	19.7	56,487	39.2
Public Safety/Civic(1)					330	0.2	658	0.5
Medium Density Residential	49	10.3	507	248	125,736	87.3	250,528	174.0
Parks/Recreation	13.0			10.5	137	0.1	272	0.2
Open Space and ROW	7.3							
Total	**94.5**		**612**		**154,553**	**107.3**	**307,945**	**213.9**

(1) Included in LDR land use in Specific Plan (PA 11). Average flow assumes 6 personnel and 55 gpcd.

Similarly, sewer flow for the eastern Project area is projected using Specific Plan land use and SMP loading factors as shown in Table 4. It is assumed that these flows will discharge to OCSD's Carbon Canyon Interceptor which runs through the eastern portion of the Project. The location of the connection point or points, along with the on-site sewer collection system, are to be determined during preliminary design.

TABLE 4 - BREA 265 EASTERN AREA ESTIMATED SEWER LOADING - SMP FACTORS

Proposed Land Use	Acres	du/ac	DU's	Factor (gpd/unit)	Average Flow gpd	Average Flow gpm	Peak Dry Flow gpd	Peak Dry Flow gpm
EASTERN PROJECT AREA								
Low Density Residential	109.9	3.1	345	270	93,150	64.7	188,349	130.8
Medium Density Residential	13.9	10.0	143	248	35,464	24.6	71,708	49.8
Parks/Recreation	2.1			10.5	22	0.0	45	0.0
Open Space and ROW	41.7							
Total	**167.6**		**488**		**128,636**	**89.3**	**260,098**	**180.6**

Model Analysis

The sewer model for the western Project tributary sewer was updated with the existing sewer loads based on the flow factors shown in Table 2 for existing land use to calibrate to the flow monitoring data. Project flow was estimated using the SMP flow factors presented in Table 3. The SMP criteria uses PDWF and peak wet weather flow (PWWF) to evaluate pipe capacity. PWWF is calculated by multiplying the PDWF by 1.25. The capacity criteria requires a PDWF d/D at or below 0.64 and a PWWF d/D at or below 0.75. Simulations were run utilizing the updated flow factors for existing loads and adding the estimated Project sewer loads to the model at MH 40. Sewer model output for simulated PDWF and PWWF with and without the Project is included in Appendix C along with the corresponding model sewer map showing manhole numbers. This model output assumes all sewer flow for the Project area located west of Valencia Avenue discharges south to MH 40.

Model output indicates capacity constraints due to Project sewer flows along Birch Street and through the neighborhood north of Birch Street. As shown in the model output (Appendix C), all but four sewer reaches from MH 44 downstream to MH 21 (Ranger and Birch) exceed the City's d/D capacity criteria. The deficient reaches are illustrated on Figure 3 in red. Two potential capital improvements appear feasible to solve the capacity limitations along Birch Street:

1. Construct a new sewer in Birch Street diverting all flow tributary to MH 44 westerly in Birch Street to MH 21 at Birch and Ranger.

2. Construct a new diversion MH just downstream of MH 44 that would send the total flow southerly in Voyager Avenue to MH 11.

The two alternative capital improvements are illustrated on Figures 4 and 5. Figure 4 illustrates the first alternative that involves construction of approximately 1,900 feet of new 10-inch pipeline along Birch Street from MH 44 to Ranger. There are no plans available for the identified deficient reaches along Birch Street so it is recommended that the manholes be surveyed to confirm manhole inverts, pipeline slopes, and modeling results. Alternative 1 model output is summarized in Table 5 with the upsized diameters highlighted. The second alternative improvement, shown on Figure 5, diverts the sewer in Birch Street to the sewer in Voyager Avenue at MH 44 by constructing approximately 300 feet of 8-inch pipeline from MH 44 to MH 11 in Voyager Avenue. All flow originating upstream of MH 44, including the Project, would be diverted to Voyager Avenue with the existing pipeline that continues down Birch Street plugged at MH 44. Alternative 2 results are shown in Table 6. Of these two alternatives, Alternative 2 is recommended due to the shorter length of pipeline improvements and eliminating the construction of a new pipeline along Birch Street.

The following items related to Project sewer improvements should be considered during the preliminary design phase:

- The on-site sewer in the western portion of the Project will have to cross Lambert Road, a major 4-lane roadway. The conceptual crossing location is included in the Brea 265 Specific Plan.

- The eastern portion of the Project will discharge to the OCSD Carbon Canyon Interceptor at a location or locations to be determined during the preliminary design phase. The conceptual sewer system alignment for the eastern Project area is included in the Brea 265 Specific Plan.

- It was assumed in this analysis that all downstream OCSD pipelines have sufficient capacity for the additional Project flows.

- Bridge Energy currently sewers its operation north of Lambert Road across Lambert Road and then across Valencia where it combines with its other operations and sewers directly to an OCSD trunk sewer. Once that portion of the Brea 265 development is under construction, Bridge Energy will no longer be able to sewer in this manner and will have



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Figure 3
Project Deficient Pipelines



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Figure 4
Alternative 1 Improvement

Table 5 - Alternative 1										
From ID	To ID	From Inv	To Inv	Diameter (in)	Length (ft)	Slope	PDWF (gpm)	d/D	PWWF (gpm)	d/D
40	41	449.77	447.33	8	145.6	0.017	307.9	0.46	361.3	0.51
41	42	447.16	445.07	8	266.8	0.008	307.9	0.58	361.3	0.65
42	43	444.9	441.18	8	307.8	0.012	307.9	0.51	361.3	0.56
43	44	441.02	437.69	8	246.8	0.013	307.9	0.49	361.3	0.54
44	61	437.69	436.5	10	240.0	0.005	307.9	0.47	361.3	0.51
61	62	436.33	434.86	10	295.0	0.005	315.9	0.47	371.3	0.52
62	45	432.3	431.49	10	253.0	0.003	315.9	0.54	371.3	0.60
45	68	431.49	426.65	10	360.0	0.013	315.9	0.36	371.3	0.39
68	70	426.65	421.81	10	360.0	0.013	315.9	0.36	371.3	0.39
70	21	421.81	416.97	10	360.0	0.013	315.9	0.36	371.3	0.39
21	20	416.97	414.62	10	335.3	0.007	462.9	0.54	555.1	0.60
20	19	414.54	405.73	10	314.4	0.028	490.9	0.37	590.1	0.41
19	18	405.65	391.2	10	348.2	0.042	490.9	0.34	590.1	0.37
18	4	391.12	381.46	10	321.9	0.030	490.9	0.37	590.1	0.41
4	3	380.99	379.59	15	284.6	0.005	545.9	0.35	658.8	0.39
3	2	379.57	377.59	15	400.0	0.005	545.9	0.35	658.8	0.39
2	1	377.57	375.59	15	400.0	0.005	559.9	0.36	676.3	0.40
1	25	375.46	365.92	12	162.0	0.060	575.9	0.26	696.3	0.29
25	24	365.92	365.13	15	131.3	0.006	704.9	0.38	857.6	0.43
24	23	365.13	363.53	15	320.5	0.005	704.9	0.40	857.6	0.45
23	22	363.53	361.1	15	347.2	0.007	704.9	0.37	857.6	0.41
22	31	361.1	357.86	15	462.9	0.007	704.9	0.37	857.6	0.41
31	32	357.86	357.45	21	135.1	0.003	738.9	0.30	900.1	0.33

NOTE: Improved diameters are shaded.



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Figure 5
Alternative 2 Improvement

Table 6 - Alternative 2										
From ID	To ID	From Inv	To Inv	Diameter (in)	Length (ft)	Slope	PDWF (gpm)	d/D	PWWF (gpm)	d/D
40	41	449.77	447.33	8	145.6	0.017	307.9	0.46	361.3	0.51
41	42	447.16	445.07	8	266.8	0.008	307.9	0.58	361.3	0.65
42	43	444.9	441.18	8	307.8	0.012	307.9	0.51	361.3	0.56
43	44	441.02	437.69	8	246.8	0.013	307.9	0.49	361.3	0.54
44	11	437.69	428.08	8	282.2	0.034	307.9	0.38	361.3	0.42
11	10	428.08	416.64	8	220.0	0.052	307.9	0.34	361.3	0.37
10	55	416.64	404.93	8	225.1	0.052	307.9	0.34	361.3	0.37
55	9	404.74	398.24	8	406.0	0.016	328.9	0.49	387.6	0.54
9	8	398.15	394.94	8	311.8	0.010	328.9	0.56	387.6	0.62
8	7	394.94	390.15	10	462.7	0.010	328.9	0.39	387.6	0.43
7	14	390.03	387.08	10	462.3	0.006	328.9	0.45	387.6	0.50
14	54	386.98	384.33	10	417.7	0.006	341.9	0.46	403.8	0.51
54	4	384.23	381.47	10	435.4	0.006	164.5	0.31	403.8	0.51
4	3	380.99	379.59	15	284.6	0.005	545.9	0.35	658.8	0.39
3	2	379.57	377.59	15	400.0	0.005	545.9	0.35	658.8	0.39
2	1	377.57	375.59	15	400.0	0.005	559.9	0.36	676.3	0.40
1	25	375.46	365.92	12	158.0	0.060	575.9	0.26	696.3	0.29
25	24	365.92	365.13	15	131.3	0.006	704.9	0.38	857.6	0.43
24	23	365.13	363.53	15	320.5	0.005	704.9	0.40	857.6	0.45
23	22	363.53	361.1	15	347.2	0.007	704.9	0.37	857.6	0.41
22	31	361.1	357.86	15	462.9	0.007	704.9	0.37	857.6	0.41
31	32	357.86	357.45	21	135.1	0.003	738.9	0.30	900.1	0.33

NOTE: Proposed pipeline shaded.

to find an alternative sewage disposal solution. Note that flows from Bridge Energy were not included in the tributary pipeline system evaluated in this analysis.

- Project flows in this analysis are based on very conservative SMP loading factors that exceed State standards for indoor per capita water use. It is anticipated that actual Project flows will be less and conform with State regulations.

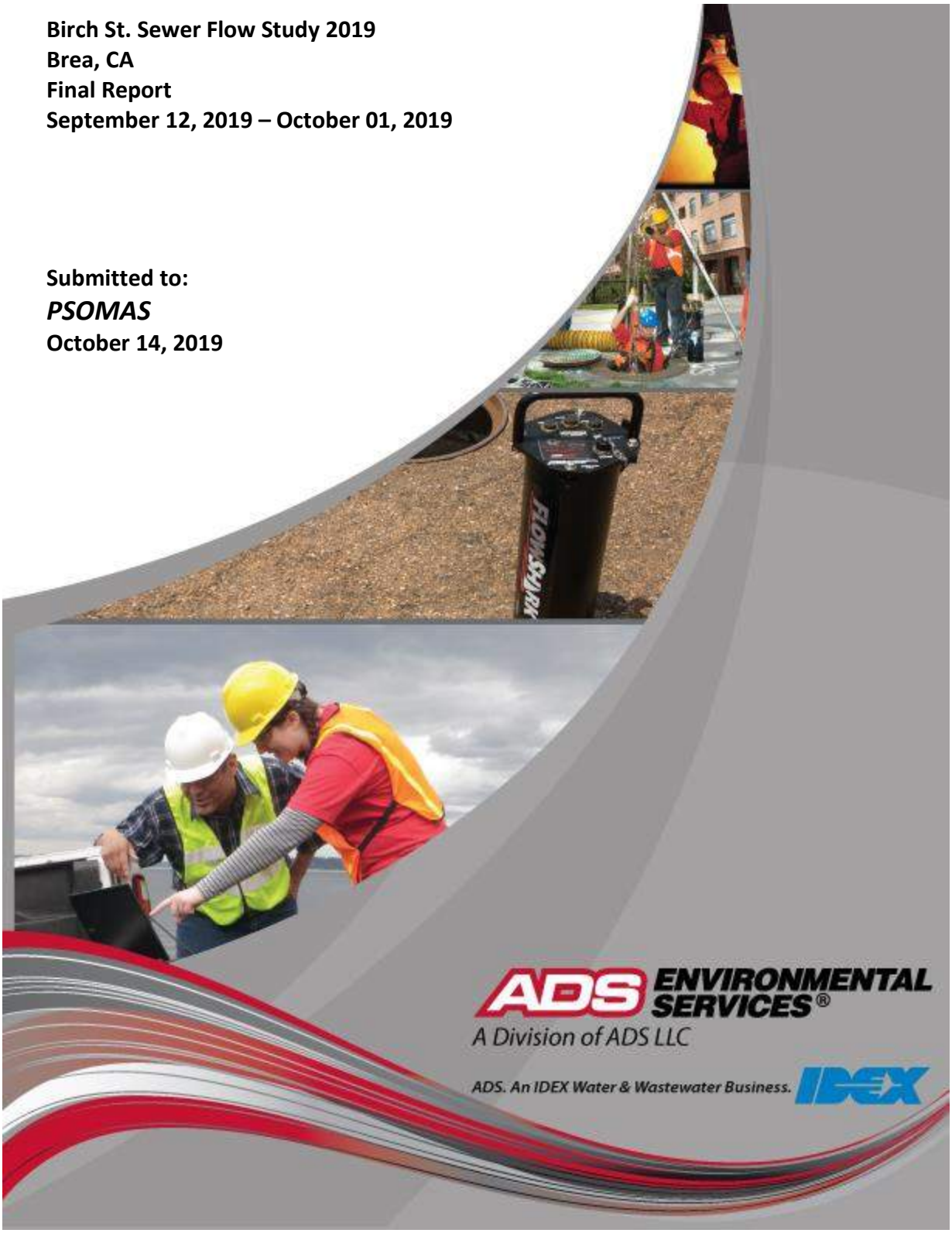
cc: Mike Swan, PSOMAS

APPENDIX A

Flow Monitoring Report

Birch St. Sewer Flow Study 2019
Brea, CA
Final Report
September 12, 2019 – October 01, 2019

Submitted to:
PSOMAS
October 14, 2019



Birch St. Sewer Flow Study 2019
Brea, CA

Prepared for:

Mike D. Swan, P.E. ENV SP
***PSOMAS* | Balancing the Natural and Built Environment**
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October 14, 2019

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Senior Project Manager
Water & Wastewater Infrastructure
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

SUBJECT: Birch St. Sewer Flow Study 2019 - Brea, CA

Dear Mike,

ADS is pleased to submit the report for the Birch St. Sewer Flow Study conducted on behalf of *PSOMAS*. The metering was contracted for fourteen (14) days at three(3) locations. Additional data days have been provided for each location. The study period is September 12, 2019 - October 01, 2019 .

The report contains 5-minute averaged depth, velocity, and quantity hydrographs as well as daily long tables for the metering period in pdf format. An Excel file containing depth, quantity, and velocity entities for the monitoring location in 5-minute format was previously provided.

In addition, we would be happy to further explain any details about the report that may seem unclear. Should you have any questions or comments, you may contact the Project Manager, Paul Mitchell at (714) 379-9778 ext 223.

It has been our pleasure to serve you in the performance of this project. Thank you for choosing ADS products and services to meet your flow monitoring needs.

Sincerely,
ADS ENVIRONMENTAL SERVICES

Latisha Bennett
Data Analyst III

Scope and Methodology

Introduction

PSOMAS entered into an agreement with ADS Environmental Services to conduct flow monitoring at three (3) metering points in the Brea, CA Collection System. The study was contracted for a fourteen (14) day period. Several additional data days have been provided for all locations. The primary objective of the monitoring was to determine current flows for development planning purposes.

Project Scope

The scope of this study involved using flow monitors to quantify wastewater flows at the designated locations. Specifically, the study included the following key components.

- Investigate the proposed flow-monitoring sites for adequate hydraulic conditions.
- Flow monitor installations.
- Flow monitor confirmations and data collections.
- Flow data analysis.

Equipment installation was completed on September 11, 2019. The study period began on September 12, 2019 and was completed on October 01, 2019 .

Flow Monitoring Equipment





The ***ADS FlowShark Triton*** monitor was selected for this project. This flow monitor is an area velocity flow monitor that uses both the Continuity and Manning's equations to measure flow.

The ADS FlowShark Triton monitor consists of data acquisition sensors and a battery-powered microcomputer. The microcomputer includes a processor unit, data storage, and an on-board clock to control and synchronize the sensor recordings. The monitor was programmed to acquire and store depth of flow and velocity readings at 5-minute intervals.

The FS Triton monitor features cross-checking using multiple technologies in each sensor for continuous running of comparisons and tolerances. The FS Triton monitor can support two (2) sets of sensors. The sensor option used for this project was:
The Peak Combo Sensor installed at the bottom of the pipe includes three types of data acquisition technologies.

The ***up looking ultrasonic depth*** uses sound waves from two independent transceivers to measure the distance from the sensor upward toward the flow surface; applying the speed of sound in the water and the temperature measured by sensor to calculate depth.

The ***pressure depth*** is calculated by using a piezo-resistive crystal to determine the difference between hydrostatic and atmospheric pressure. The pressure sensor is temperature compensated and vented to the atmosphere through a desiccant filled breather tube.

To obtain ***peak velocity*****,** the sensor sends an ultrasonic signal at an angle upward through the widest cross-section of the oncoming flow. The signal is reflected by suspended particles, air bubbles, or organic matter with a frequency shift proportional to the velocity of the reflecting objects. The reflected signal is received by the sensor and processed using digital spectrum analysis to determine the peak flow velocity.

Installation

Installation of flow monitoring equipment typically proceeds in four steps. First, the site is investigated for safety and to determine physical and hydraulic suitability for the flow monitoring equipment. Second, the equipment is physically installed at the selected location. Third, the monitor is tested to assure proper operation of the velocity and depth of flow sensors and verify that the monitor clock is operational and synchronized to the master computer clock. Fourth, the depth and velocity sensors are confirmed and line confirmations are performed.

In pipes up to 42 inches in diameter, the sensors were mounted on expandable stainless steel rings, inserted at least a foot upstream into influent pipes and tightened against the inside walls of the pipes. Influent pipe installations reduce the influences of turbulence and backwater often caused by changes in channel geometry in manholes.





Data Collection, Confirmation, and Quality Assurance

Data collects were done remotely via wireless connect on a weekly basis via ADS Representatives. During the monitoring period, field crews visit each monitoring location to verify proper monitor operation and document field conditions. The following quality assurance steps are taken to assure the integrity of the collected data:

Measure power supplies: monitors were powered by dry cell battery packs. Voltages were recorded and battery packs replaced, as necessary. Separate batteries provided back-up power to memory allowing primary batteries to be replaced without loss of data.

Clock synchronization: Field crews synchronized monitor clocks to master clocks.

Confirm depth and velocity readings: Field crews descended into meter manholes to manually measure depths and velocities and compare them meter readings to confirm that they agreed. They also measured silt levels, if any, in the inverts of the pipes. Silt areas were subtracted from flow areas to compute true areas of flow.

Confirm average velocities through cross-sectional velocity profiles: Since ADS velocity sensors measure peak velocity, field crews collected cross-sectional velocity profiles in order to develop a relationship between peak and average velocity in lines that meet the hydraulic criteria.

Upload and Review Data: Data collected from the monitors were uploaded and reviewed by a Data Analyst for completeness, outliers and deviations in the flow patterns, which indicate system anomalies or equipment failure.

Flow Quantification Methods

There are two main equations used to measure open channel flow: the ***Continuity Equation*** and the ***Manning Equation.*** The Continuity Equation, which is considered the most accurate, can be used if both depth of flow and velocity are available. In cases where velocity measurements are not available or not practical to obtain, the Manning Equation can be used to estimate velocity from the depth data based on certain physical characteristics of the pipe (i.e. the slope and roughness of the pipe being measured). However, the Manning equation assumes uniform, steady flow hydraulic conditions with non-varying roughness, which are typically invalid assumptions in most sanitary sewers. The Continuity Equation was used exclusively for this study.

Continuity Equation
The Continuity Equation states that the flow quantity (Q) is equal to the wetted area (A) multiplied by the average velocity (V) of the flow.

$$Q = A * V$$

This equation is applicable in a variety of conditions including backwater, surcharge, and reverse flow.

Data Analysis and Presentation

Data Analysis

A flow monitor is typically programmed to collect data at 5-minute intervals throughout the monitoring period. The monitor stores raw data consisting of (1) the ultrasonic depth, (2) the peak velocity and (3) the pressure depth. The data is imported into ADS's proprietary software and is examined by a data analyst to verify its integrity. The data analyst also reviews the daily field reports and site visit records to identify conditions that would affect the collected data.

Velocity profiles and the line confirmation data developed by the field personnel are reviewed by the data analyst to identify inconsistencies and verify data integrity. Velocity profiles are reviewed and an average to peak velocity ratio is calculated for the site. This ratio is used in converting the peak velocity measured by the sensor to the average velocity

used in the Continuity equation. The data analyst selects which depth sensor entity will be used to calculate the final depth information. Silt levels present at each site visit are reviewed and representative silt levels established.

Occasionally the velocity sensor's performance may be compromised resulting in invalid readings sporadically during the monitoring period. This is generally caused by excessive debris (silt) blocking the sensor's crystals, shallow flows (~< 2") that may drop below the top of the sensor or very clear flows lacking the particles needed to measure rate. In order to use the Continuity equation to quantify the flow during these periods, a Data Analyst and/or Engineer will use the site's historical pipe curve (depth vs. velocity) data along with valid field confirmations to reconstitute and replace the false velocity recordings with expected velocity readings for a given historical depth along the curve.

Selections for the above parameters can be constant or can change during the monitoring period. While the data analysis process is described in a linear manner, it often requires an iterative approach to accurately complete.

Data Presentation

This type of flow monitoring project generates a large volume of data. To facilitate review of the data, results have been provided in graphical and tabular formats. The flow data is presented graphically in the form of scattergraphs and hydrographs. Hydrographs are based on 5-minute averaging. Tables are provided in daily average format. These tables show the flow rate for each day, along with the daily minimum and maximums, the times they were observed, the total daily flow, and total flow for the month (or monitoring period). The following explanation of terms may aid in interpretation of the tables and hydrographs.

DEPTH - Final calculated depth measurement (in inches)

QUANTITY - Final calculated flow rate (in MGD)

VELOCITY - Final calculated flow velocity (in feet per second)

REPORT TOTAL - Total volume of flow recorded for the indicated time period (in MG)

Site Commentary

Site Information

Birch01	
Pipe Dimensions	7.88
Silt Level	0.00"

Overview

Site Birch01 functioned under normal conditions during the period Thursday, September 12, 2019 to Tuesday, October 1, 2019 . No surcharge conditions were experienced at this location. This site does not exhibit a typical diurnal pattern indicating non residential contributors to this line. The ADS crew reported the presence of an oil and tar like substance in the flow. Review of the scattergraph shows that both free flow and backwater flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Line confirmations were made more difficult that normal due to the oil and tar like substance in the flow.

This location was installed upstream of site Range02. (See Range02 Site Commentary for More Details).

Observations

Average flow depth, velocity, and quantity data observed during Thursday, September 12, 2019 to Tuesday, October 1, 2019 , along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	2.07	2.31	0.106
Minimum	1.45	1.58	0.045
Maximum	2.30	2.83	0.135
Time of Minimum	9/25/2019 12:35 AM	9/25/2019 12:15 AM	9/25/2019 12:35 AM
Time of Maximum	9/13/2019 9:00 AM	9/29/2019 3:50 PM	9/29/2019 3:50 PM

Data Quality

Data uptime observed during the Thursday, September 12, 2019 to the Tuesday, October 1, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

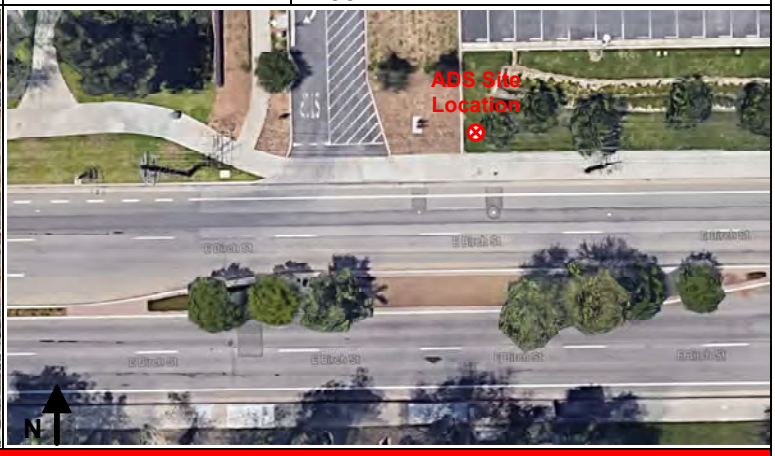
Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

ADS Site Report

Quality Form

Project Name: Brea Psomas TFM 2019	**City:** Brea	**Agency:** Brea	**FM Initials:** SK
Site Name: Birch01	**Install Date:** 9/11/19	**Monitor Type**	Peak Doppler
Address/Location: E Birch St & Voyager Ave		**Monitor Model**	Triton+
		Data Acquisition	Manual Collect/Wireless
		Manhole ID	Unknown
Access: Drive	**Type of System:** Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	7.88 "
		Pipe Width:	7.88 "





Investigation Information:

Date/Time of Investigation:	9/5/19 @ 0450
Site Hydraulics:	Good straight through flow.
Upstream Input: (L/S, P/S)	DNI
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	2.00 " +/-
Range (Air DOF):	+/-
Peak Velocity:	1.49 fps
Silt:	0 Inches

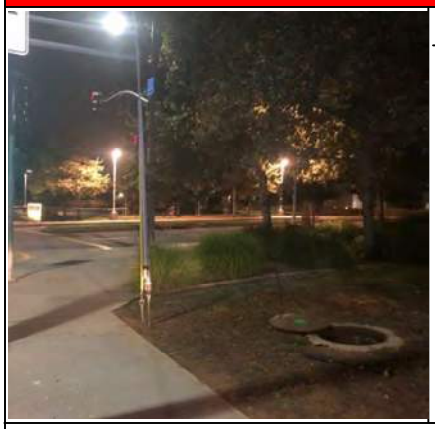
Manhole Information:

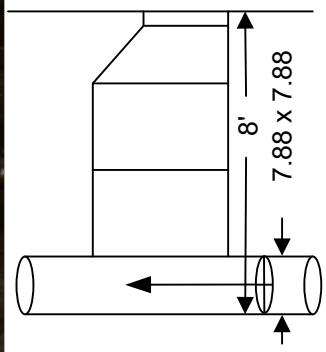
Manhole Depth:	8'
Manhole Material / Condition	Precast/ Fair
Pipe Material / Condition:	VCP/ Fair
Land Use:	Residential [X] Commercial [ ] Industrial [ ] Trunk [ ]
Oxygen: 20.9	**H2S:** 0 **LEL:** 0 **CO:** 0

Safety Notes:

Very hot and oil based flow.

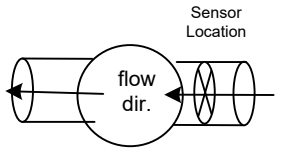
Other Information:





Cross Section





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Plan

Installation Information	
Installation Type:	Standard
Sensors Devices:	Ultrasonic / Pressure/Velocity
Surcharge Height:	0
Rain Gauge Zone:	

Backup	Yes	No	?	Distance
Trunk	[ ]	[X]	[ ]	
Lift / Pump Station	[ ]	[X]	[ ]	
WWTP	[ ]	[X]	[ ]	
Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

SCATTERGRAPH REPORT

Birch01

Flow Monitor

Birch01

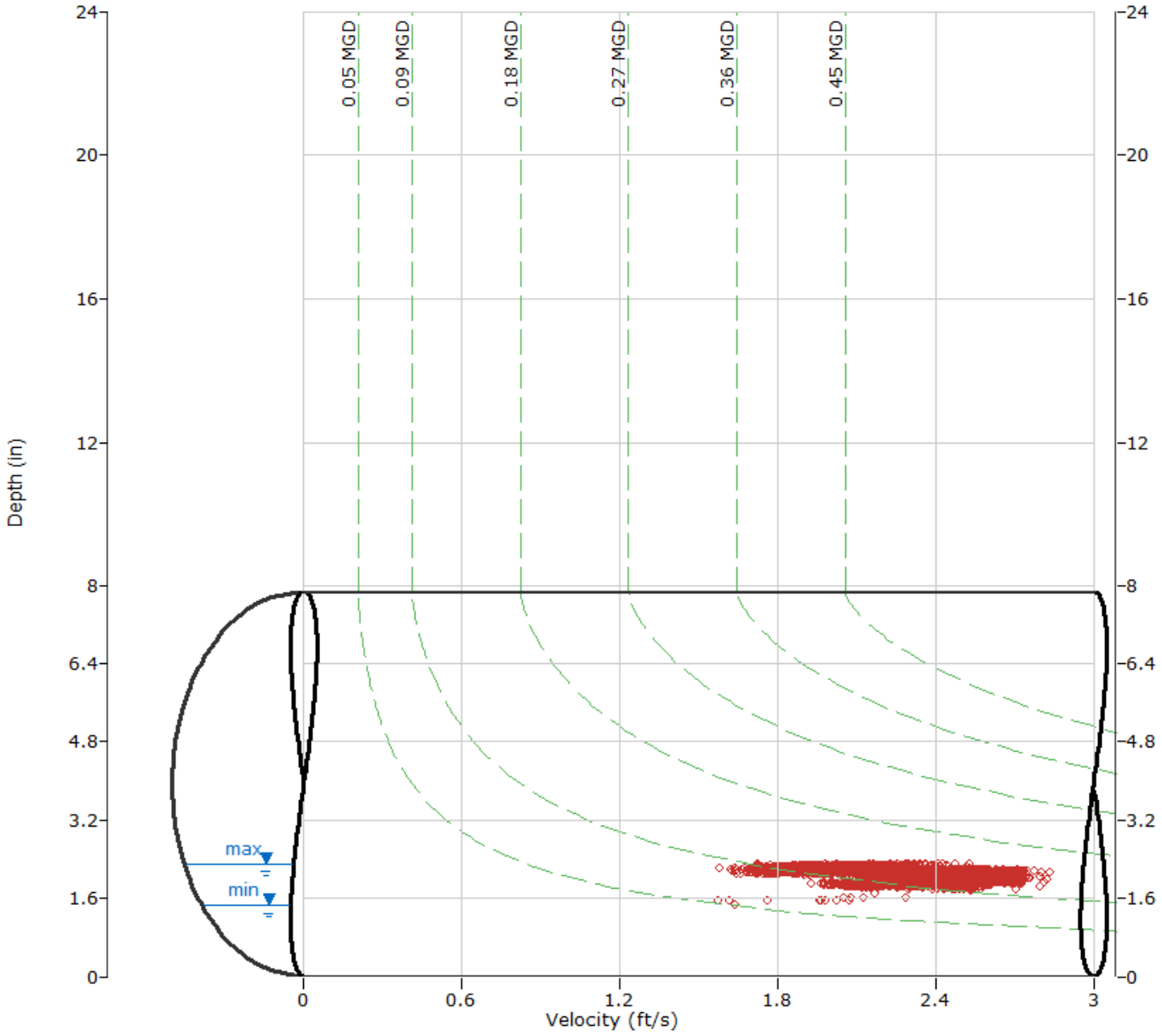
Pipe Height
7.88 in

Report Period

9/12/2019
To
10/1/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



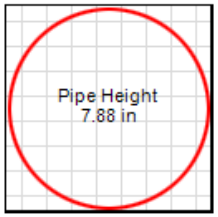
ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

Birch01

Flow Monitor

Birch01

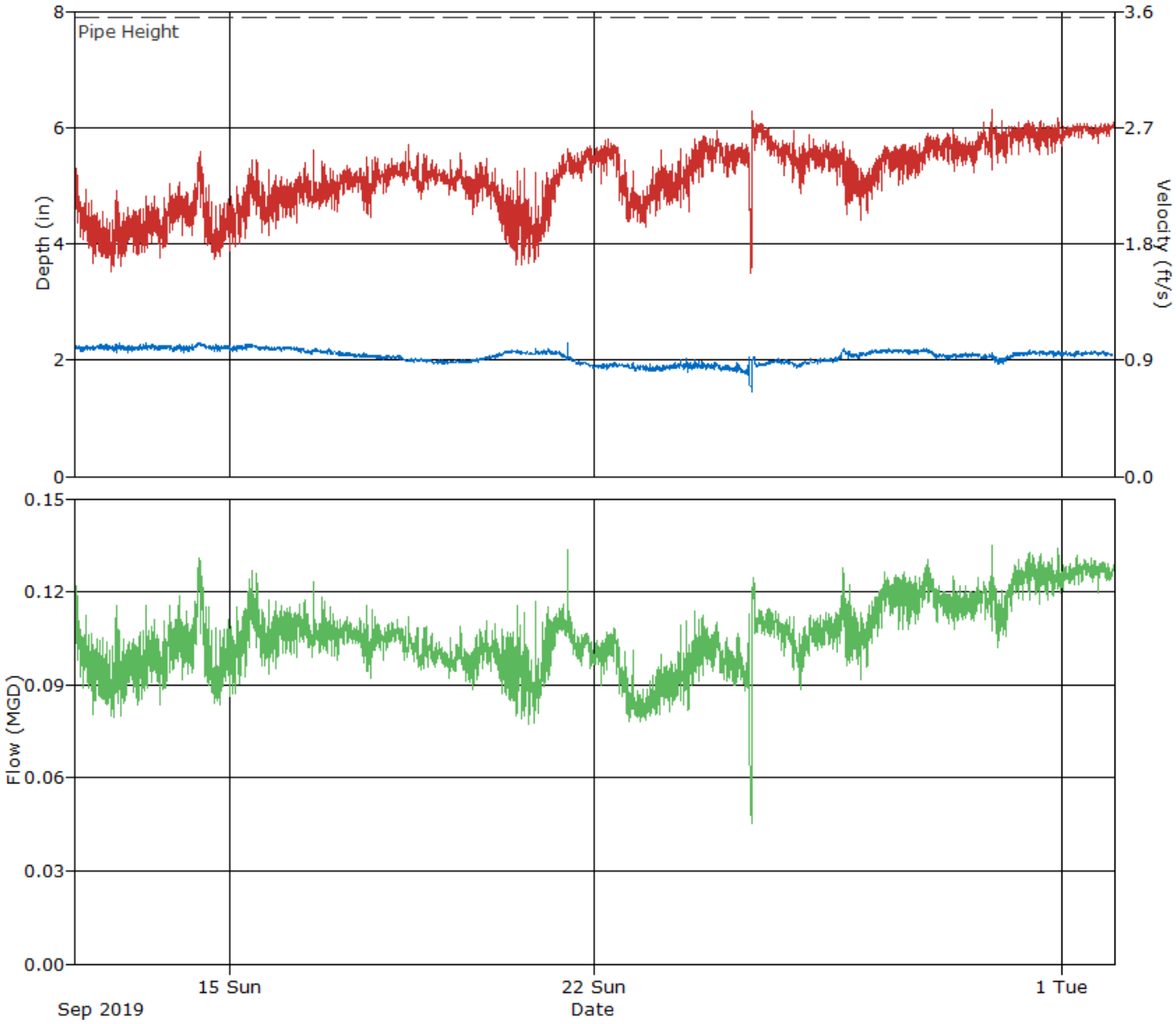


Report Period

9/12/2019
To
10/1/2019

Legend

- Depth
- Velocity
- Quantity
- Pipe Height



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 09/12/2019 00:00 - 10/01/2019 23:59

Birch01, Pipe Height: 7.88 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total MG)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
09/12/2019	19:30	2.14	21:05	2.29	2.21	17:05	1.58	00:55	2.39	1.92	18:35	0.079	00:25	0.122	0.097	0.097	
09/13/2019	01:05	2.14	09:00	2.30	2.21	15:35	1.69	20:00	2.27	1.96	15:35	0.083	09:00	0.115	0.099	0.099	
09/14/2019	02:35	2.13	10:30	2.30	2.22	16:30	1.68	10:20	2.52	2.03	19:35	0.083	09:45	0.131	0.103	0.103	
09/15/2019	03:00	2.15	08:35	2.27	2.21	02:15	1.78	12:05	2.45	2.10	02:15	0.087	10:25	0.127	0.106	0.106	
09/16/2019	12:55	2.10	02:45	2.23	2.17	06:50	1.96	14:40	2.52	2.20	06:50	0.099	14:40	0.123	0.108	0.108	
09/17/2019	22:55	2.02	00:15	2.16	2.08	16:55	2.00	19:10	2.47	2.28	16:55	0.092	14:40	0.115	0.105	0.105	
09/18/2019	21:55	1.94	06:05	2.08	2.01	16:25	2.15	10:20	2.56	2.34	16:25	0.095	10:20	0.112	0.103	0.103	
09/19/2019	04:20	1.94	23:50	2.07	1.99	16:00	2.02	10:25	2.50	2.28	16:00	0.088	22:15	0.111	0.099	0.099	
09/20/2019	00:05	2.02	20:50	2.19	2.12	11:40	1.64	02:25	2.39	2.00	17:40	0.077	20:50	0.117	0.094	0.094	
09/21/2019	23:50	1.86	11:50	2.29	2.03	00:40	1.85	22:05	2.55	2.34	00:40	0.089	11:50	0.134	0.105	0.105	
09/22/2019	19:05	1.82	18:00	1.97	1.89	23:45	1.93	06:45	2.61	2.30	21:00	0.078	09:05	0.108	0.093	0.093	
09/23/2019	19:05	1.80	18:35	2.02	1.88	04:20	2.01	22:05	2.62	2.28	01:40	0.080	22:10	0.114	0.091	0.091	
09/24/2019	23:55	1.54	23:15	2.06	1.86	23:55	1.98	08:25	2.68	2.49	23:55	0.060	23:15	0.113	0.098	0.098	
09/25/2019	00:35	1.45	01:40	2.07	1.94	00:15	1.58	01:00	2.83	2.53	00:35	0.045	01:40	0.125	0.106	0.106	
09/26/2019	00:00	1.92	19:15	2.20	2.02	20:35	2.02	03:00	2.64	2.44	00:00	0.094	18:55	0.128	0.108	0.108	
09/27/2019	02:05	2.03	15:55	2.19	2.14	02:50	1.98	22:45	2.57	2.37	02:50	0.092	22:45	0.126	0.114	0.114	
09/28/2019	20:05	2.00	08:15	2.19	2.11	01:00	2.30	21:30	2.68	2.52	01:00	0.108	09:45	0.130	0.119	0.119	
09/29/2019	18:40	1.92	15:50	2.12	2.05	07:30	2.35	15:50	2.83	2.57	18:20	0.102	15:50	0.135	0.117	0.117	
09/30/2019	00:40	2.05	09:15	2.17	2.11	17:10	2.49	22:10	2.78	2.65	00:40	0.114	22:10	0.134	0.125	0.125	
10/01/2019	05:20	2.06	15:30	2.15	2.11	16:45	2.58	23:45	2.75	2.68	16:45	0.119	06:45	0.132	0.127	0.127	

Report Summary For The Period 09/12/2019 00:00 - 10/01/2019 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)
Total			2.116
Avg	2.07	2.31	0.106

Site Commentary

Site Information

Range02	
Pipe Dimensions	10.13
Silt Level	0.00"

Overview

Site Range02 functioned under normal conditions during the period Thursday, September 12, 2019 to Tuesday, October 1, 2019 . No surcharge conditions were experienced at this location. The ADS crew reported the presence of an oil and tar like substance in this stretch of pipe. Review of the scattergraph shows that free flow conditions were maintained throughout the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Line confirmations were made more difficult that normal due to the oil and tar like substance in the flow.

This location was installed downstream of site Birch01. A check of balancing showed no problems.

Observations

Average flow depth, velocity, and quantity data observed during Thursday, September 12, 2019 to Tuesday, October 1, 2019 , along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	1.89	5.18	0.241
Minimum	1.54	3.87	0.138
Maximum	2.34	6.27	0.390
Time of Minimum	9/13/2019 4:25 AM	9/14/2019 5:20 AM	9/19/2019 2:10 AM
Time of Maximum	9/26/2019 9:25 AM	9/17/2019 8:35 AM	9/26/2019 9:25 AM

Data Quality

Data uptime observed during the Thursday, September 12, 2019 to the Tuesday, October 1, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

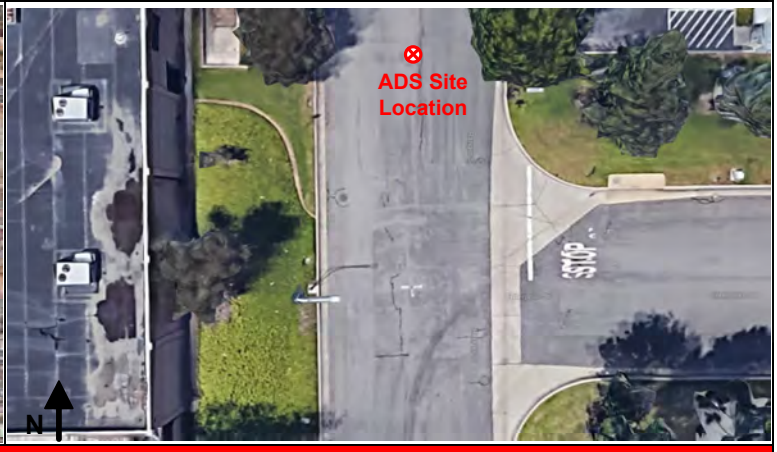
ADS Site Report

Quality Form

Project Name:	Brea Psomas TFM 2019	**City:**	Brea	**Agency:**	Brea
Site Name:	Range02	**Install Date:**	9/11/19	**FM Initials:**	SK
Address/Location:	199 Ranger St				
Access:	Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]

Monitor Type	Peak Doppler
Monitor Model	Triton+
Data Acquisition	Manual Collect/Wireless
Manhole ID	Unknown
Pipe Height:	10.13 "
Pipe Width:	10.00 "





Investigation Information:

Date/Time of Investigation:	9/5/19 @ 0600
Site Hydraulics:	Good straight through flow.
Upstream Input: (L/S, P/S)	DNI
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	2.25 " +/-
Range (Air DOF):	+/-
Peak Velocity:	6.05 fps
Silt:	0 Inches

Manhole Information:

Manhole Depth:	8'
Manhole Material / Condition	Precast/ Fair
Pipe Material / Condition:	VCP/ Fair

Land Use:	Residential [ ]	Commercial [ ]	Industrial [X]	Trunk [ ]

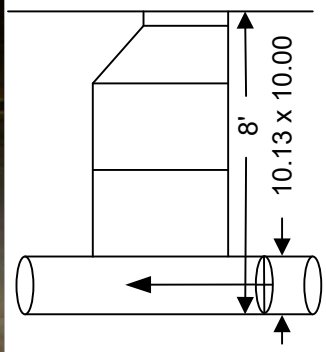
Oxygen: 20.9	**H2S:** 0	**LEL:** 0	**CO:** 0

Safety Notes:

Very hot and oil based flow.

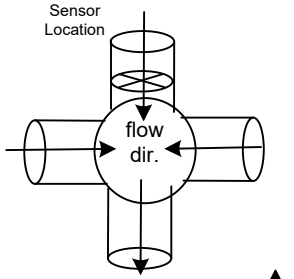
Other Information:





Cross Section





Plan

Installation Information	
Installation Type:	Standard
Sensors Devices:	Ultrasonic / Pressure/Velocity
Surcharge Height:	0
Rain Gauge Zone:	

Backup	Yes	No	?	Distance
Trunk	[ ]	[X]	[ ]	
Lift / Pump Station	[ ]	[X]	[ ]	
WWTP	[ ]	[X]	[ ]	
Other	[ ]	[X]	[ ]	

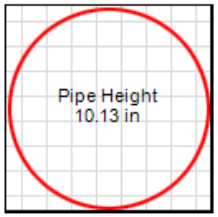
Additional Site Information / Comments:

SCATTERGRAPH REPORT

Range02

Flow Monitor

Range02

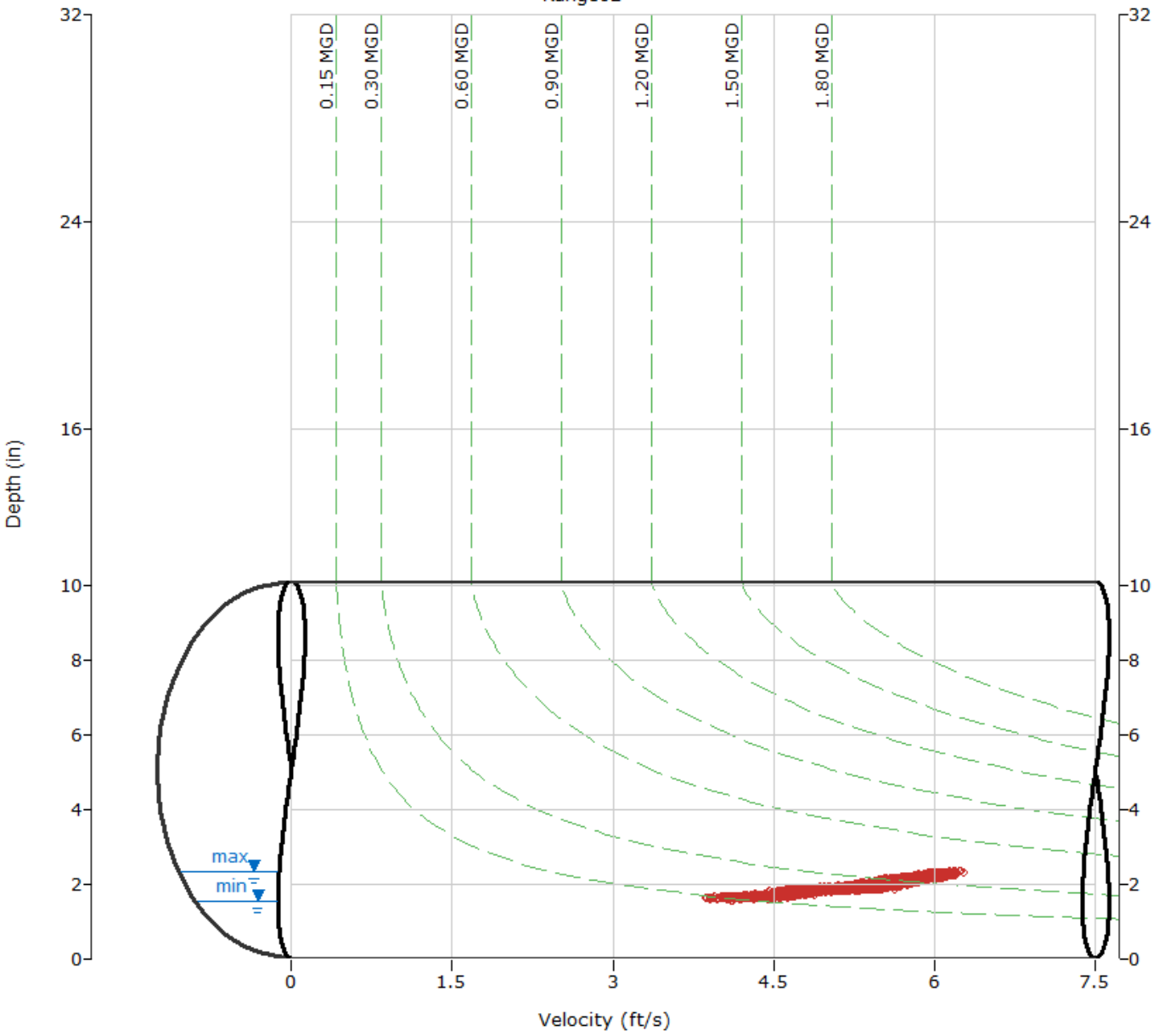


Report Period

9/12/2019
To
10/1/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



HYDROGRAPH REPORT

Range02

Flow Monitor

Range02

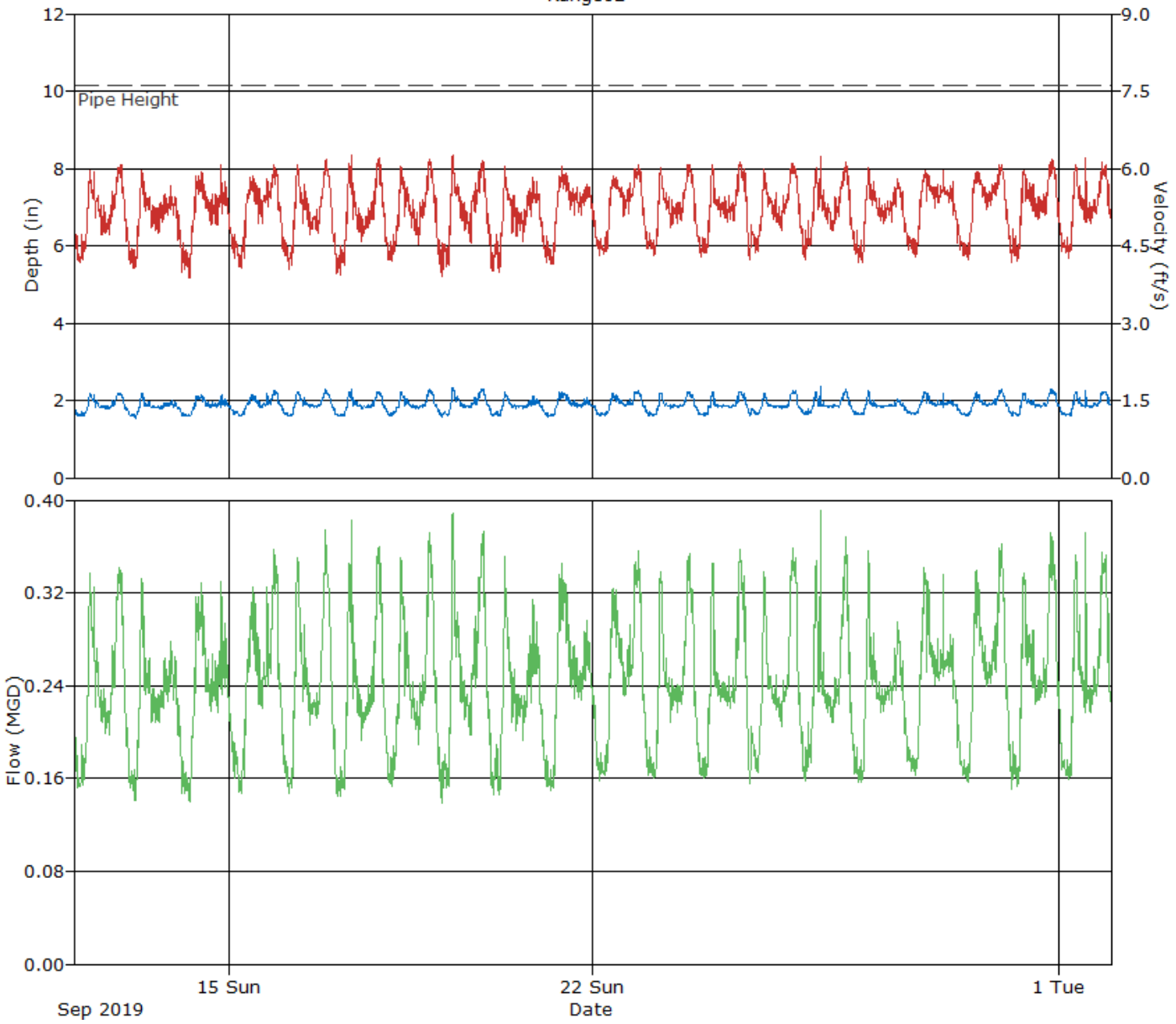
Pipe Height
10.13 in

Report Period

9/12/2019
To
10/1/2019

Legend

- Depth
- Velocity
- Quantity
- Pipe Height



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 09/12/2019 00:00 - 10/01/2019 23:59

Range02, Pipe Height: 10.13 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
09/12/2019	01:55	1.59	21:05	2.19	1.88	02:45	4.18	21:55	6.08	5.13	01:55	0.152	21:10	0.342	0.237	0.237	
09/13/2019	04:25	1.54	07:25	2.18	1.84	03:35	4.06	07:20	5.97	5.05	04:25	0.141	07:25	0.332	0.225	0.225	
09/14/2019	05:40	1.59	10:45	2.15	1.86	05:20	3.87	19:50	6.08	5.10	05:40	0.139	19:50	0.330	0.233	0.233	
09/15/2019	04:35	1.59	20:45	2.25	1.90	05:30	4.06	20:45	6.06	5.20	05:30	0.147	20:45	0.357	0.244	0.244	
09/16/2019	03:15	1.60	20:25	2.30	1.91	03:25	4.03	20:55	6.18	5.14	03:25	0.147	20:25	0.374	0.243	0.243	
09/17/2019	04:25	1.60	08:35	2.30	1.88	03:20	3.93	08:35	6.27	5.08	02:10	0.145	08:35	0.383	0.237	0.237	
09/18/2019	02:00	1.61	20:35	2.28	1.90	03:30	4.19	20:55	6.18	5.17	03:30	0.153	20:20	0.372	0.243	0.243	
09/19/2019	02:10	1.58	07:10	2.33	1.91	02:10	3.91	07:15	6.24	5.17	02:10	0.138	07:15	0.388	0.247	0.247	
09/20/2019	02:30	1.61	07:30	2.22	1.86	04:50	3.99	07:25	6.05	5.05	04:50	0.146	07:30	0.351	0.229	0.229	
09/21/2019	03:40	1.58	08:50	2.20	1.88	04:35	4.15	10:00	6.04	5.20	04:35	0.149	10:00	0.345	0.241	0.241	
09/22/2019	05:50	1.61	21:15	2.24	1.91	03:25	4.30	21:15	6.08	5.28	03:25	0.158	21:15	0.357	0.250	0.250	
09/23/2019	02:10	1.60	20:50	2.23	1.88	04:40	4.30	19:55	6.07	5.22	04:40	0.161	20:50	0.354	0.242	0.242	
09/24/2019	03:25	1.61	20:30	2.23	1.88	02:05	4.30	20:35	6.13	5.22	03:20	0.161	20:30	0.358	0.241	0.241	
09/25/2019	01:05	1.61	20:35	2.25	1.88	00:30	4.22	20:40	6.09	5.23	01:05	0.156	20:35	0.359	0.242	0.242	
09/26/2019	02:20	1.63	09:25	2.34	1.89	02:20	4.24	09:25	6.24	5.21	02:20	0.158	09:25	0.390	0.243	0.243	
09/27/2019	04:10	1.62	07:45	2.26	1.85	03:10	4.17	07:20	6.01	5.15	04:15	0.157	07:45	0.357	0.232	0.232	
09/28/2019	03:40	1.64	09:35	2.22	1.88	05:25	4.27	18:35	5.96	5.27	05:25	0.162	09:35	0.341	0.243	0.243	
09/29/2019	05:10	1.62	21:10	2.27	1.91	05:40	4.23	21:30	6.08	5.30	05:40	0.156	21:30	0.362	0.251	0.251	
09/30/2019	02:05	1.59	20:10	2.30	1.91	02:00	4.18	20:35	6.18	5.27	02:05	0.151	20:10	0.372	0.250	0.250	
10/01/2019	05:10	1.61	12:15	2.27	1.90	04:15	4.26	12:15	6.21	5.24	04:15	0.159	12:15	0.371	0.246	0.246	

Report Summary For The Period 09/12/2019 00:00 - 10/01/2019 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)
Total			4.820
Avg	1.89	5.18	0.241

Site Commentary

Site Information

Kraem03	
Pipe Dimensions	15.13
Silt Level	0.00"

Overview

Site Kraem03 functioned under normal conditions during the period Thursday, September 12, 2019 to Tuesday, October 1, 2019 . No surcharge conditions were experienced at this location. The ADS crew reported the presence of an oil and tar like substance in this stretch of pipe. Review of the scattergraph shows that free flow conditions were maintained throughout the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Line confirmations were made more difficult that normal due to the oil and tar like substance in the flow.

This location was installed downstream of site Range02. A check of balancing showed no problems.

Observations

Average flow depth, velocity, and quantity data observed during Thursday, September 12, 2019 to Tuesday, October 1, 2019 , along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	2.64	3.80	0.370
Minimum	2.01	2.92	0.191
Maximum	3.70	4.31	0.649
Time of Minimum	9/21/2019 4:20 AM	9/15/2019 5:50 AM	9/15/2019 5:50 AM
Time of Maximum	9/26/2019 9:55 AM	10/1/2019 10:55 AM	9/26/2019 9:55 AM

Data Quality

Data uptime observed during the Thursday, September 12, 2019 to the Tuesday, October 1, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

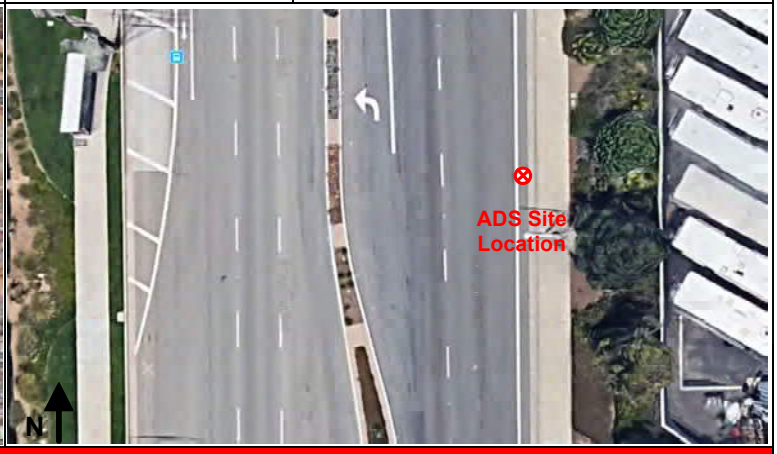
Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

ADS Site Report

Quality Form

Project Name:	Brea Psomas TFM 2019	**City:**	Brea	**Agency:** Brea	**FM Initials:** SK
Site Name:	Kraem03	**Install Date:**	9/11/19	**Monitor Type**	Peak Doppler
Address/Location:	418 Kraemer Blvd			**Monitor Model**	Triton+
				Data Acquisition	Manual Collect/Wireless
				Manhole ID	Unknown
Access: Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]	**Pipe Height:** 15.13 "
					Pipe Width: 15.25 "





Investigation Information:

Date/Time of Investigation:	9/5/19 @ 0400
Site Hydraulics:	Good straight through flow.
Upstream Input: (L/S, P/S)	DNI
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	1.75 " +/-
Range (Air DOF):	+/-
Peak Velocity:	3.24 fps
Silt:	0 Inches

Manhole Information:

Manhole Depth:	12'
Manhole Material / Condition	Precast/ Fair
Pipe Material / Condition:	VCP/ Fair

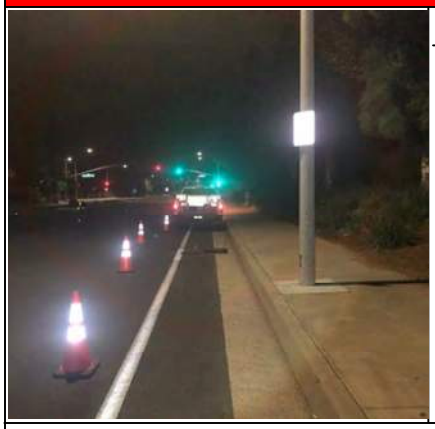
Land Use:	Residential [ ]	Commercial [x]	Industrial [ ]	Trunk [ ]

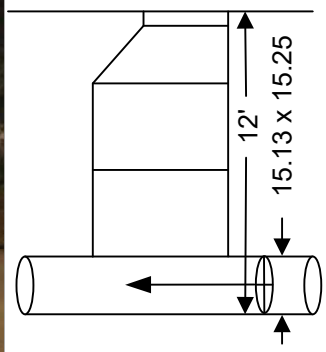
Oxygen: 20.9	**H2S:** 0	**LEL:** 0	**CO:** 0

Safety Notes:

Very hot and oil based flow.

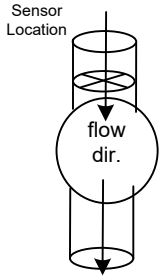
Other Information:





Cross Section





Plan

N

Installation Information	
Installation Type:	Standard
Sensors Devices:	Ultrasonic / Pressure/Velocity
Surcharge Height:	0
Rain Gauge Zone:	

Backup	Yes	No	?	Distance
Trunk	[ ]	[x]	[ ]	
Lift / Pump Station	[ ]	[x]	[ ]	
WWTP	[ ]	[x]	[ ]	
Other	[ ]	[x]	[ ]	

Additional Site Information / Comments:

SCATTERGRAPH REPORT

Kraem03

Flow Monitor

Kraem03

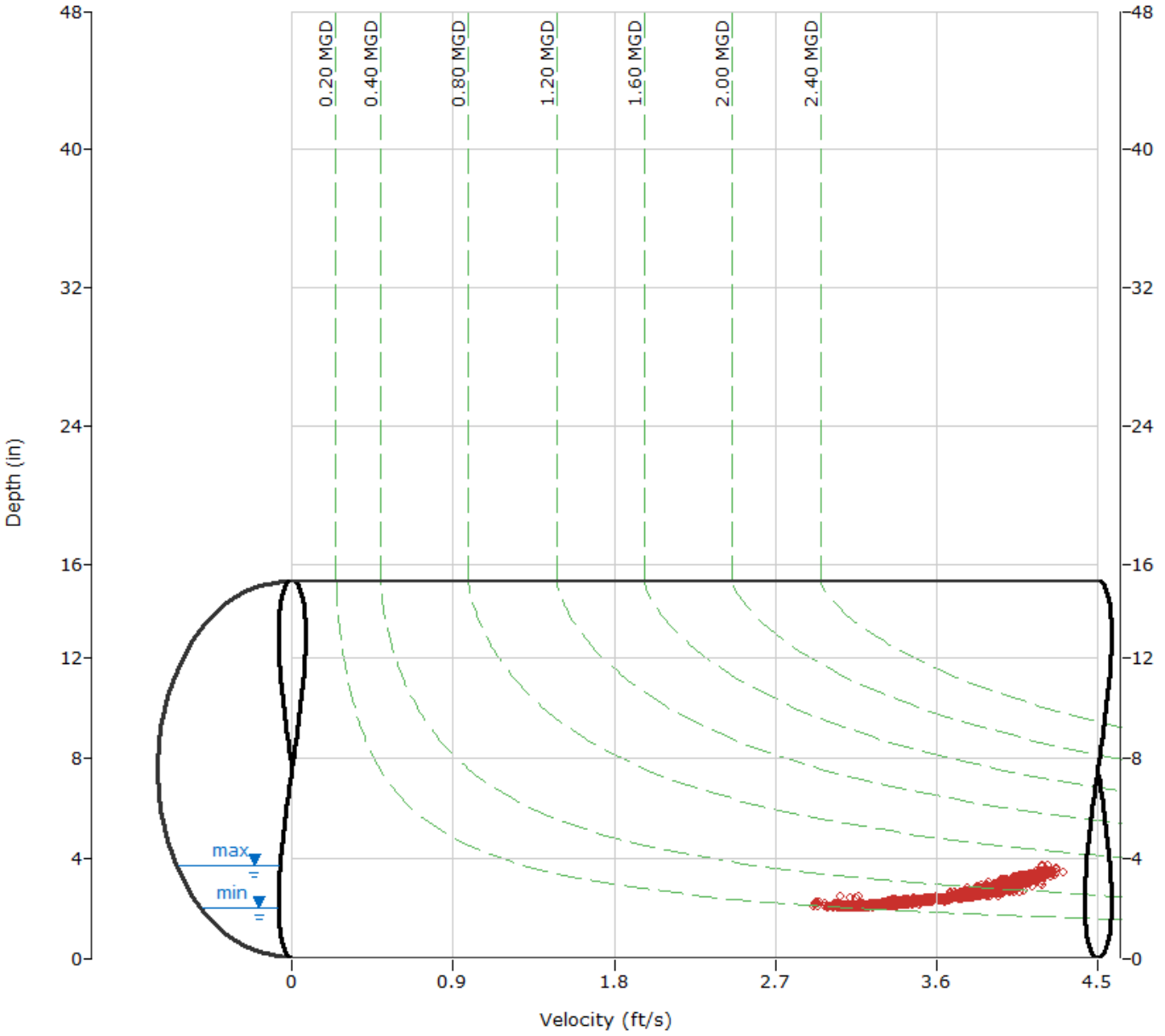
Pipe Height
15.13 in

Report Period

9/12/2019
To
10/1/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

Kraem03

Flow Monitor

Kraem03

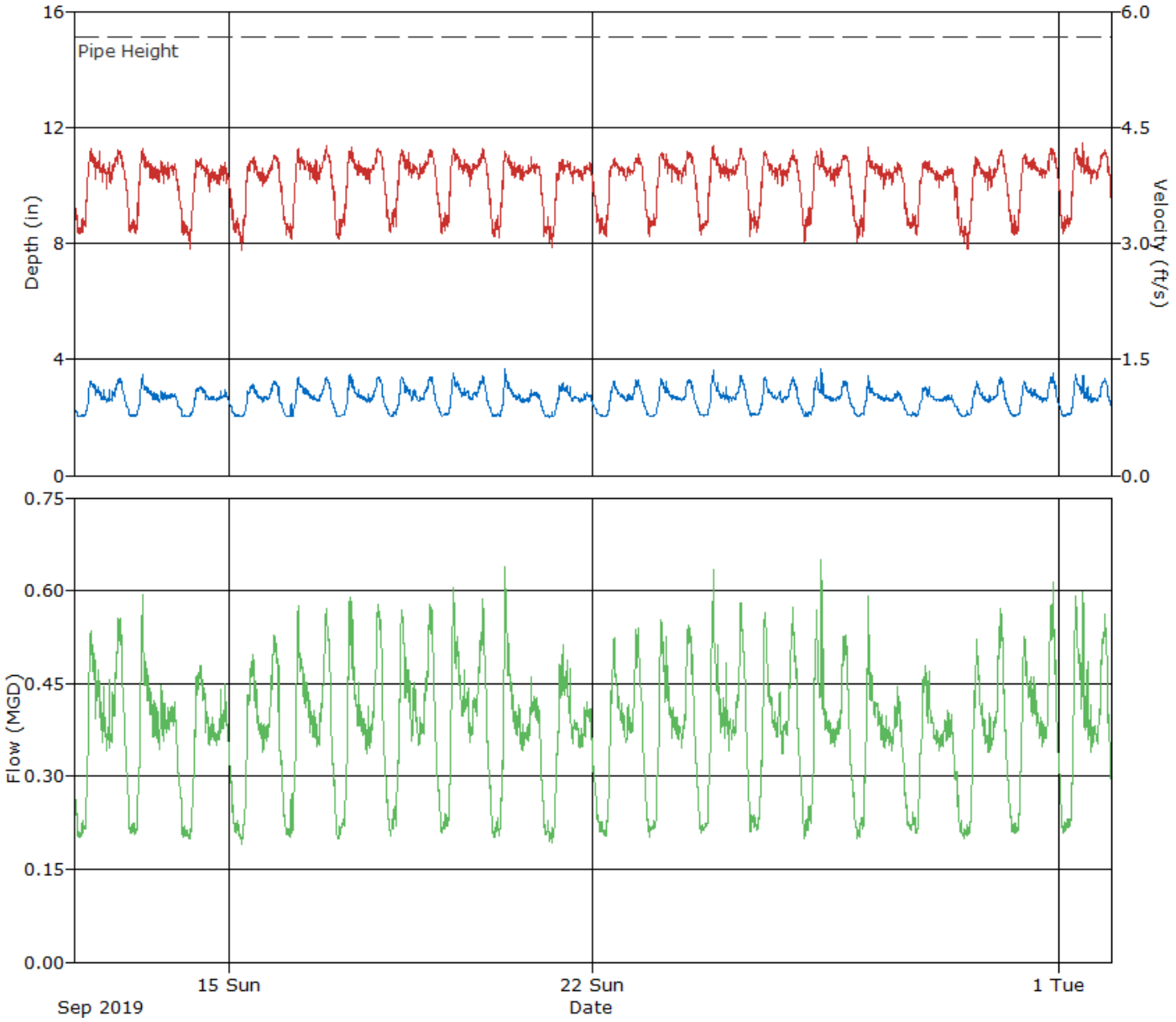
Pipe Height
15.13 in

Report Period

9/12/2019
To
10/1/2019

Legend

- Depth
- Velocity
- Quantity
- Pipe Height



Daily Tabular Report For The Period 09/12/2019 00:00 - 10/01/2019 23:59

Kraem03, Pipe Height: 15.13 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
09/12/2019	02:50	2.02	21:20	3.33	2.68	03:10	3.13	08:00	4.23	3.82	02:30	0.202	21:20	0.555	0.380	0.380	
09/13/2019	02:30	2.04	07:35	3.47	2.63	04:40	3.13	07:40	4.22	3.80	03:50	0.207	07:35	0.593	0.366	0.366	
09/14/2019	05:00	2.02	10:25	3.05	2.56	05:45	2.92	10:55	4.10	3.73	05:15	0.199	10:25	0.478	0.347	0.347	
09/15/2019	04:50	2.03	20:30	3.25	2.61	05:50	2.92	20:55	4.14	3.73	05:50	0.191	20:40	0.527	0.358	0.358	
09/16/2019	03:15	2.02	07:45	3.39	2.69	04:45	3.06	20:45	4.26	3.82	04:00	0.202	07:45	0.576	0.383	0.383	
09/17/2019	02:30	2.03	07:35	3.47	2.68	03:00	3.05	08:45	4.25	3.83	02:25	0.200	07:35	0.589	0.382	0.382	
09/18/2019	02:45	2.03	20:45	3.40	2.72	02:45	3.15	07:50	4.22	3.85	02:45	0.204	20:45	0.577	0.390	0.390	
09/19/2019	02:15	2.05	07:40	3.52	2.73	02:25	3.12	07:35	4.23	3.85	02:10	0.207	07:40	0.604	0.394	0.394	
09/20/2019	02:40	2.04	07:35	3.67	2.62	05:00	3.07	07:40	4.19	3.80	02:35	0.202	07:35	0.638	0.365	0.365	
09/21/2019	04:20	2.01	10:10	3.19	2.56	05:05	2.94	10:10	4.09	3.74	05:05	0.192	10:10	0.512	0.348	0.348	
09/22/2019	05:55	2.04	20:05	3.30	2.63	06:30	3.09	21:30	4.15	3.78	05:40	0.204	21:25	0.540	0.364	0.364	
09/23/2019	02:25	2.03	07:45	3.33	2.67	02:15	3.08	20:00	4.18	3.83	02:15	0.202	07:45	0.553	0.379	0.379	
09/24/2019	03:50	2.06	07:55	3.61	2.69	02:15	3.10	08:00	4.27	3.83	02:15	0.208	07:55	0.634	0.382	0.382	
09/25/2019	01:10	2.06	20:45	3.40	2.67	00:45	3.09	20:35	4.20	3.82	01:15	0.211	20:45	0.573	0.378	0.378	
09/26/2019	02:15	2.04	09:55	3.70	2.67	02:10	3.02	09:55	4.22	3.82	02:15	0.200	09:55	0.649	0.376	0.376	
09/27/2019	03:25	2.02	07:35	3.45	2.59	02:30	3.01	07:35	4.24	3.78	02:30	0.200	07:35	0.591	0.355	0.355	
09/28/2019	05:40	2.06	09:45	3.07	2.52	06:20	3.10	10:00	4.07	3.73	06:20	0.207	09:45	0.478	0.337	0.337	
09/29/2019	03:40	2.04	20:40	3.40	2.60	05:20	2.92	21:15	4.21	3.73	03:55	0.199	20:40	0.572	0.355	0.355	
09/30/2019	02:35	2.05	21:10	3.55	2.68	03:00	3.10	20:20	4.23	3.83	03:40	0.207	21:10	0.613	0.382	0.382	
10/01/2019	03:05	2.06	07:30	3.48	2.68	02:00	3.13	10:55	4.31	3.83	02:05	0.208	10:55	0.598	0.382	0.382	

Report Summary For The Period 09/12/2019 00:00 - 10/01/2019 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)
Total			7.400
Avg	2.64	3.80	0.370

APPENDIX B

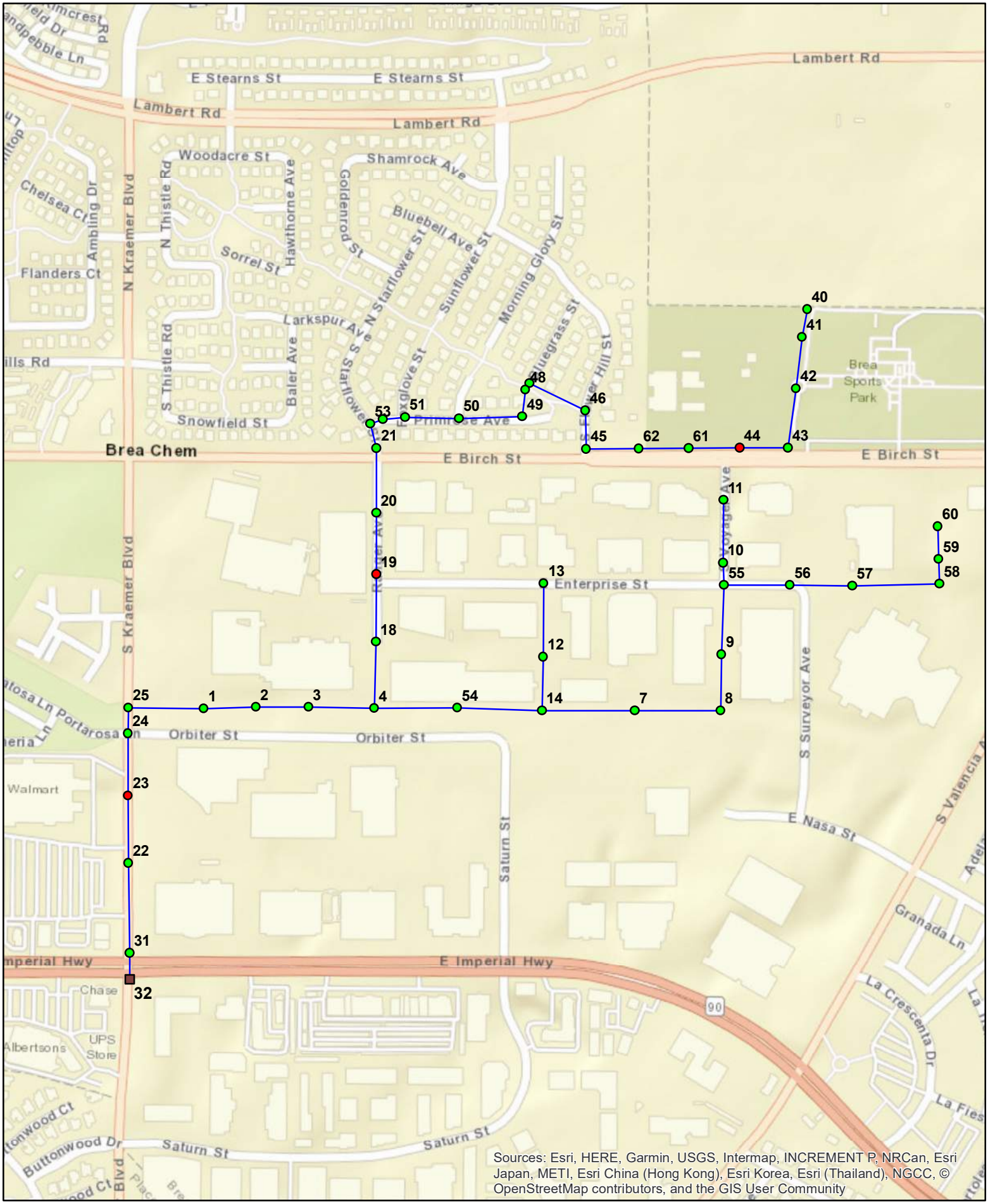
2018 Average Metered Water Use

2018 AVERAGE WATER USE BY RESIDENTIAL DEVELOPMENT

Development	Land Use	DU's	Average Density (du/ac)	Average Use (gpd/du)
Olinda Ranch	VLDR	63	1.5	762
PA 6 Blackstone	LDR	93	2.8	407
PA 5 Blackstone	LDR	100	4.0	352
PA 8 La Floresta	Z Lot Line SFD	77	6.0	218
PA 3 Blackstone	SFD Cluster	261	6.5	145
PA 3 La Floresta	SFD Cluster	89	8.5	144
PA 7 La Floresta	Townhomes		15.0	122

APPENDIX C

Sewer Model Output



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

PSOMAS

Model Manhole Numbering

Flow Model Output - Existing and Existing plus Project														
From	To	From	To	Diameter	Length		Existing				Existing plus Project			
ID	ID	Inv	Inv	(in)	(ft)	Slope	PDWF	d/D	PWWF	d/D	PDWF	d/D	PWWF	d/D
40	41	449.8	447.3	8	145.6	0.017	94.0	0.25	94.0	0.25	307.9	0.46	361.3	0.51
41	42	447.2	445.1	8	266.8	0.008	94.0	0.30	94.0	0.30	307.9	0.58	361.3	0.65
42	43	444.9	441.2	8	307.8	0.012	94.0	0.27	94.0	0.27	307.9	0.51	361.3	0.56
43	44	441.0	437.7	8	246.8	0.013	94.0	0.26	94.0	0.26	307.9	0.49	361.3	0.54
44	61	437.7	436.5	8	240.0	0.005	94.0	0.34	94.0	0.34	307.9	0.68	361.3	0.77
61	62	436.3	434.9	8	295.0	0.005	102.0	0.35	104.0	0.36	315.9	0.69	371.3	0.79
62	45	432.3	431.5	8	253.0	0.003	102.0	0.40	104.0	0.40	315.9	1.00	371.3	1.00
45	46	431.5	430.9	8	197.1	0.003	102.0	0.41	104.0	0.41	315.9	1.00	371.3	1.00
46	47	430.6	429.6	8	320.0	0.003	127.0	0.45	135.3	0.46	340.9	1.00	402.6	1.00
47	48	429.5	429.1	8	39.0	0.011	127.0	0.32	135.3	0.33	340.9	0.56	402.6	0.62
48	49	428.9	428.2	8	139.8	0.005	127.0	0.39	135.3	0.41	340.9	0.73	402.6	1.00
49	50	428.0	426.0	8	325.3	0.006	138.0	0.39	149.0	0.40	351.9	0.68	416.3	0.79
50	51	425.9	418.7	8	277.8	0.026	138.0	0.27	149.0	0.28	351.9	0.44	416.3	0.49
51	52	418.4	418.0	10	115.2	0.004	223.0	0.42	255.3	0.45	436.9	0.62	522.6	0.71
52	53	417.9	417.6	10	68.6	0.005	223.0	0.39	255.3	0.42	436.9	0.58	522.6	0.66
53	21	417.5	417.0	10	129.3	0.004	249.0	0.45	287.8	0.49	462.9	0.65	555.1	0.75
21	20	417.0	414.6	10	335.3	0.007	249.0	0.38	287.8	0.41	462.9	0.54	555.1	0.60
20	19	414.5	405.7	10	314.4	0.028	277.0	0.28	322.8	0.30	490.9	0.37	590.1	0.41
19	18	405.7	391.2	10	348.2	0.042	277.0	0.25	322.8	0.27	490.9	0.34	590.1	0.37
18	4	391.1	381.5	10	321.9	0.030	277.0	0.27	322.8	0.30	490.9	0.37	590.1	0.41
4	3	381.0	379.6	15	284.6	0.005	332.0	0.27	391.5	0.30	545.9	0.35	658.8	0.39
3	2	379.6	377.6	15	400.0	0.005	332.0	0.27	391.5	0.30	545.9	0.35	658.8	0.39
2	1	377.6	375.6	15	400.0	0.005	346.0	0.28	409.0	0.31	559.9	0.36	676.3	0.40
1	25	375.5	365.9	12	162.0	0.060	362.0	0.21	429.0	0.23	575.9	0.26	696.3	0.29
25	24	365.9	365.1	15	131.3	0.006	491.0	0.32	590.3	0.36	704.9	0.39	857.6	0.44
24	23	365.1	363.5	15	320.5	0.005	491.0	0.33	590.3	0.37	704.9	0.40	857.6	0.45
23	22	363.5	361.1	15	347.2	0.007	491.0	0.31	590.3	0.34	704.9	0.38	857.6	0.42
22	31	361.1	357.9	15	462.9	0.007	491.0	0.31	590.3	0.34	704.9	0.37	857.6	0.41
31	32	357.9	357.5	21	135.1	0.003	525.0	0.25	632.8	0.28	738.9	0.30	900.1	0.33

NOTE: Deficient reaches are shaded.